



Tube & Pipe Tools

Leading manufacturer  
of high quality tools and machines  
for the tube and pipe industry

**PRODUCTS CATALOG** 2026



Condenser expanders



Boiler expanders



Rolling controls



Basic tools



Tube Plugs



FinFan applications



Beveling tubes



Beveling pipes



Flange facers



Tube cutters



Tube pulling



Accessories

# Tube&Pipe Professional Tools





# Tube & Pipe Tools

## Catalog 2026





# Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2015

This is to certify that:

KRAIS  
Przedsiębiorstwo Produkcyjno Remontowe  
Jerzy Krajs  
Czachowo 15  
Zawonia  
55-106  
Poland

Holds Certificate No:

**FM 720649**

and operates a Quality Management System which complies with the requirements of ISO 9001:2015 for the following scope:

Production of tools and equipment for pipe processing and installation.  
Activities are related to IAF Sector 17b.

For and on behalf of BSI:

*David Fardel*

David Fardel, Country Manager, Assurance - Continental Europe

Original Registration Date: 2019-11-18

Latest Revision Date: 2022-09-23

Effective Date: 2022-11-18

Expiry Date: 2025-11-17

Page: 1 of 1



...making excellence a habit.™

This certificate was issued electronically and remains the property of BSI and is bound by the conditions of contract.  
An electronic certificate can be authenticated [online](#).  
Printed copies can be validated at [www.bsigroup.com/ClientDirectory](http://www.bsigroup.com/ClientDirectory)

Information and contacts: BSI Group Italia srl, via Fara 35, Milano, Italy, phone: +39 02 6679091  
A Member of the BSI Group of Companies.



# Table of contents

|                                      |   |
|--------------------------------------|---|
| Table of contents.....               | 3 |
| Correct expansion guide .....        | 6 |
| LUBE-A-TUBE for better rolling ..... | 8 |

## CONDENSER TUBE EXPANDERS

|                                     |    |
|-------------------------------------|----|
| Typical thrust collars.....         | 10 |
| Rolls for condenser expanders ..... | 11 |
| 900 Series .....                    | 12 |
| 1300 Series.....                    | 13 |
| 800 Series .....                    | 14 |
| 800-5 Five Roll Series .....        | 17 |
| 1200 Series.....                    | 19 |
| 1200-5 Five Roll Series .....       | 22 |
| 8012 Series.....                    | 24 |
| F600 Flare Type Series .....        | 26 |
| TACK Conical Series .....           | 27 |
| Special expanders.....              | 28 |

## BOILER TUBE EXPANDERS

|                                            |    |
|--------------------------------------------|----|
| Correct tool selection .....               | 32 |
| Short Mandrel's Expansion Range.....       | 33 |
| KS Series.....                             | 34 |
| PZ Series.....                             | 37 |
| FTKS-L Flare Type Series .....             | 39 |
| P2 Series.....                             | 41 |
| Universal Combination Roller Beading ..... | 43 |
| Colins Expander.....                       | 44 |

## ROLLING CONTROLS

|                                             |    |
|---------------------------------------------|----|
| Rolling motors.....                         | 46 |
| K20 Series.....                             | 46 |
| Push&Pull K50 Series .....                  | 46 |
| AK50 Automatic Rolling Motor.....           | 46 |
| K60 Series.....                             | 47 |
| AK60NS Automatic Rolling Motor.....         | 47 |
| Right Angle rolling motors.....             | 48 |
| K70 Right Angle Series.....                 | 48 |
| K77 Right Angle Series.....                 | 48 |
| FlexHolder System.....                      | 49 |
| TES Mini 2.....                             | 50 |
| TES-2000 Digital Tube Expanding System..... | 52 |
| TES-3000 .....                              | 54 |
| SwiftRoll Series.....                       | 57 |

## INSTALLATION TOOLS

|                                     |    |
|-------------------------------------|----|
| Tube Hole Gauge.....                | 60 |
| Vacuum Leak Tester KVLD-3000 .....  | 61 |
| Basic installation tools.....       | 62 |
| TEF – Tube End Facer .....          | 62 |
| Tool for Serrating Tube Sheet ..... | 62 |
| MWR-JGS Mini Grooving Tool .....    | 63 |
| Grooving tools for MWR-JGS.....     | 64 |
| MiniDrill .....                     | 65 |
| MicroDrill .....                    | 66 |
| Tube plugs .....                    | 67 |
| One piece tube plugs.....           | 67 |
| Evolution Tru-Torq plugs.....       | 67 |

## TUBE PLUGGING

|                                              |    |
|----------------------------------------------|----|
| KRAIS SMART PLUGGING SYSTEM.....             | 70 |
| Tube Plugs T_APPL HEP Series.....            | 72 |
| Tube Plugs T_APPL FFP Series .....           | 73 |
| Essential 4-step tube plugging protocol..... | 74 |

## FINFAN APPLICATIONS

|                            |    |
|----------------------------|----|
| MiniDrill GFF.....         | 76 |
| MiniMill 300GFF .....      | 78 |
| MiniMill 300FF .....       | 80 |
| MiniMill 101FF-JPREP ..... | 82 |
| FinMill .....              | 84 |

## TUBE BEVELING MACHINES

|                                           |     |
|-------------------------------------------|-----|
| Ranges for ID/OD mount bevelers.....      | 86  |
| ID beveling machines proper lock.....     | 87  |
| QuickFacer .....                          | 88  |
| MiniMill 101 .....                        | 90  |
| MiniMill 201 .....                        | 92  |
| MiniMill 301LP.....                       | 94  |
| PrepMill .....                            | 96  |
| HyperMill 56.....                         | 98  |
| PipeMill-8 .....                          | 100 |
| SmartMill-8 .....                         | 102 |
| PanelMill 65.....                         | 104 |
| PanelDrill.....                           | 106 |
| PanelMill PF .....                        | 108 |
| Cutters and inserts .....                 | 110 |
| Holders for regular cutter heads.....     | 111 |
| MiniMill Special Heads.....               | 115 |
| PrepMill and HyperMill Special Heads..... | 118 |
| Holders for PanelMill heads .....         | 120 |

# Table of contents

## PIPE BEVELING MACHINES

|                                         |     |
|-----------------------------------------|-----|
| MiniLathe .....                         | 122 |
| PipeLathe .....                         | 124 |
| PipeLathe 24 .....                      | 126 |
| PipeLathe 40 .....                      | 128 |
| SlimFit Split Frame Clamshells .....    | 129 |
| SFSF clamshells motors .....            | 131 |
| Clamshell K70 Drives .....              | 132 |
| Reaction ring for SFSF clamshells ..... | 133 |
| SFSF clamshells add-ons.....            | 134 |
| SFSF clamshells bits and holders.....   | 135 |

## FLANGE MANAGEMENT

|                                           |     |
|-------------------------------------------|-----|
| Manual FlangeMill .....                   | 138 |
| MFM-OMM Module.....                       | 139 |
| Outside mounting module for MFM.....      | 139 |
| Manual FlangeMill Long .....              | 140 |
| MFF-125, Mini Flange Facer .....          | 141 |
| NBFF – Narrow Body Flange Facer.....      | 143 |
| OMFM-305 .....                            | 145 |
| IMFM-24/30 .....                          | 147 |
| IMFM-24 Internal Mounted FlangeMill ..... | 149 |
| IMFM-40 Internal Mounted FlangeMill ..... | 150 |
| IMFM-40 and IMFM-60 features.....         | 151 |
| IMFM-60 Internal Mounted FlangeMill ..... | 152 |
| SFFM Flange Facer .....                   | 153 |
| SFFM Module .....                         | 154 |
| MicroDrill-SOFD.....                      | 155 |

## TUBE CUTTERS

|                                         |     |
|-----------------------------------------|-----|
| MiniCut Tools .....                     | 158 |
| MiniCut 100                             |     |
| for heat exchangers.....                | 158 |
| MiniCut 300                             |     |
| for condenser and chillers.....         | 158 |
| MiniCut 101/AF                          |     |
| with automatic feed.....                | 159 |
| Tube Cutters for MiniCut Machines ..... | 159 |
| KDM Pneumatic drill .....               | 160 |
| PTTC Universal .....                    | 160 |
| PTTT - Tube trimmer.....                | 160 |
| Solid body PTTC .....                   | 161 |

|                                                    |     |
|----------------------------------------------------|-----|
| ORTC - One Revolution Tube Cutter.....             | 162 |
| 1WTTC-1000 Wheel Type Tube Cutter.....             | 163 |
| 2WTTC-1500 Two Wheels Type Tube Cutter.....        | 167 |
| 3WTTC-2000 Three Wheels Type Tube Cutter .....     | 169 |
| 3WTTC-3000 Three Wheels Tube Cutter .....          | 171 |
| MWTTC – Manual Tube Cutter.....                    | 173 |
| Tube wall reducing tool.....                       | 174 |
| MiniDrill-500-WTRT .....                           | 175 |
| High-Performance Tube Wall Reduction Machine ..... | 175 |
| Pneumatic Chipping hammer .....                    | 177 |
| CT Collapsing tool.....                            | 177 |
| TD Tube drift .....                                | 177 |
| HyperDrill BSR .....                               | 178 |

## PULLING EQUIPMENT

|                                                |     |
|------------------------------------------------|-----|
| HETT – Tube Taping Machine .....               | 182 |
| Manual Tube Pullers .....                      | 183 |
| Manual Tube Puller.....                        | 183 |
| MSP-100 Manual Spear Puller.....               | 183 |
| MCP-100 Manual Collet Puller.....              | 184 |
| Tube Puller CP-1200.....                       | 185 |
| Tube Puller CP-1200-CC.....                    | 186 |
| Tube Puller CP-1200-FF .....                   | 187 |
| Tube Puller HPR20-CP1000.....                  | 188 |
| HPR-CP2000 Tube Puller .....                   | 190 |
| Super-Jenny Semi-Automatic Tube Puller .....   | 192 |
| ACTP - Automatic, continous tube pulling ..... | 193 |
| HPR Tube Pullers.....                          | 195 |
| HPR-20 Tube Puller .....                       | 195 |
| HPR-30 Tube Puller.....                        | 195 |
| HPR Accesories.....                            | 196 |
| HPR-30 Setup for stubs 1 1/4” and up .....     | 196 |
| Tube SpinAIR .....                             | 197 |
| Pumps .....                                    | 198 |

## ACCESSORIES

|                    |     |
|--------------------|-----|
| Accesories .....   | 200 |
| Testing pumps..... | 202 |

## USEFUL CHARTS

|                         |     |
|-------------------------|-----|
| Pipe Chart [inch] ..... | 206 |
| Pipe Chart [mm].....    | 207 |

# Table of contents

## IMPORTANT!

Due to constant improvement of products presented in this catalog, the data and part numbers may change without further notice!

Most tools are available in custom-made versions. If your work requires a special solution - contact us, we will prepare a special tool.

The tube capacities given for expansion tools in this catalog, apply only for most popular cases with a standard percentage of the wall reduction. The reached capacity can be different for thicker tube sheet, harder and exotic metal tube and a higher percentage of wall reduction.

The recommended operating ranges of all cutting tools are suitable for standard pipe sizes and materials. The processing of pipes made of non-standard materials or of non-standard dimensions should be carried out after testing and with great care.

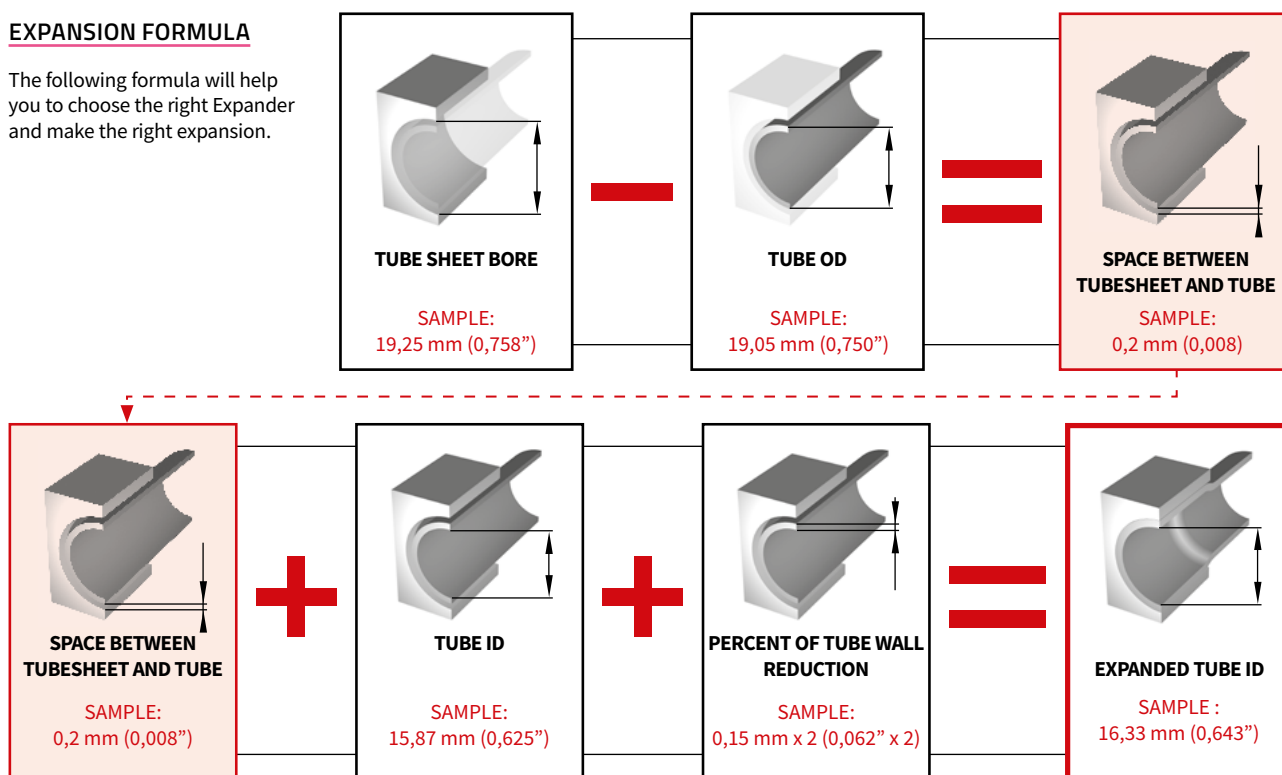
## KRAIS TUBE & PIPE TOOLS

Poland, 55-106 Zawonia, Czachowo 15, tel. +48 71 312 05 96, fax +48 71 387 03 32, mail: [export@krais.com](mailto:export@krais.com), [www.krais.com](http://www.krais.com)

# Correct expansion guide

## EXPANSION FORMULA

The following formula will help you to choose the right Expander and make the right expansion.



Percentage wall reduction is the most frequently used procedure to obtain the optimal mechanical joint between a Tube and Tube Sheet.

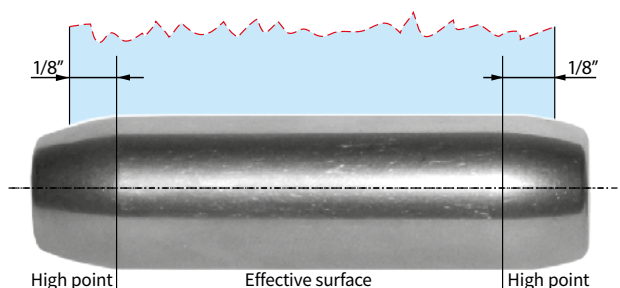
In order to calculate this reduction we must take into account the variances between the Tube OD, Tube Wall Thickness and Tube Sheet Hole Diameter. We must also consider the differing types of materials being used for both Tubes and Tube Sheets, however as a general rule, percentage wall reduction ranges between 4% - 10%.

The table illustrates the applicable percentage tube wall reductions according to the differing materials commonly used for both Tubes and Tube Sheets:

| TUBE SHEET MATERIAL | TUBE MATERIAL   | TUBE WALL REDUCTION |
|---------------------|-----------------|---------------------|
| Stainless Steel     | Stainless Steel | 4-5%                |
| Steel               | Stainless Steel | 4-5%                |
| Steel               | Steel           | 7%                  |
| Steel               | Copper          | 5%                  |
| Copper              | Copper          | 10%                 |

For boilers tube wall thickness reduction varies between 8-16%.

## ANATOMY OF ROLL



## TUBE ROLLING SETUP GUIDE

The following suggestions are offered to aid in the setting up process for rolling tubes into a heat exchanger or boiler. A good start assures good end results:

1. Pick 3 to 5 tubes in the unit to be rolled and complete the formula on the page A-1. It is important that the Measurements used in the set-up are actual, never use averaged dimensions.
2. After the worksheet is finished, start setting up the torque control motor by test rolling the first of the 5 tubes. The first test roll must be done with the airetrol or electric rolling motor set for low torque to avoid over rolling.
3. Measure the tube ID after rolling. If more expansion is needed, increase the torque setting on the control and roll the second tube. Check the finished ID this step may have to be repeated on tube # 3. By this time, the torque setting should be correct.
4. Roll tubes 4 and 5 to double check the set-up. These tubes should measure as calculated within the allowable tolerance.
 

|                 |                       |
|-----------------|-----------------------|
| Condenser tubes | 10-17 BWG +/- 0.001"  |
| Condenser tubes | 18-24 BWG +/- 0.0005" |
| Boiler tubes    | 4-10 BWG +/- 0.002"   |
| Boiler tubes    | 12-16 BWG +/- 0.001"  |
5. The rolling control is now set and ready to roll the rest of the tubes in the unit. The use of the torque control system will ensure the uniform tightness of all tubes.

### NOTE!

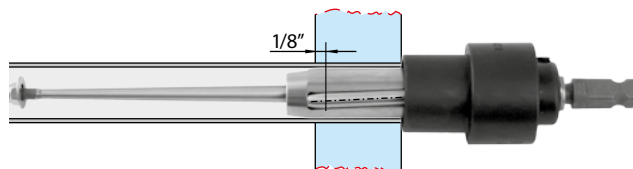
Re-roll all test tubes that were under size. To ensure the best tool life and the highest quality tube to tube sheet contact, periodic cleaning of the expander is necessary. Proper lubrication of the rolls, mandrel and thrust bearing is a must!

## BOILER TUBE INSTALLATION CODE

The ends of all tubes, suspension tubes, and nipples of water tube boilers and superheaters shall project through the tube sheets or headers not less than 1/4" nor more than 3/4" before flaring. Where tubes enter at an angle, the maximum limit of 3/4" shall apply only at point of least projection. The tubes shall be expanded and flared to an outside diameter of at least 1/8" greater than the diameter of the tube hole or they may be flared, rolled and welded except as provided in pwt 11.2; or rolled and seal welded without flaring provided the throat of the seal weld is not more than 3/8" and tubes are re-expanded after welding.

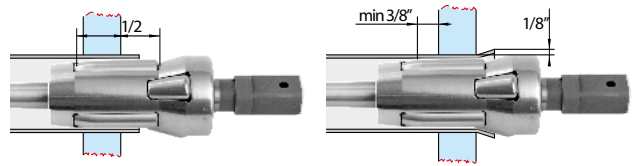
1. Tubes to protrude inside drum 1/4" minimum to 3/4" maximum.
2. Outside diameter of flare to be 1/8" larger than tube sheet hole.
3. Tube to be rolled past back of tube sheet 1/4" to 3/8".

## SETTING CONDENSER EXPANDER



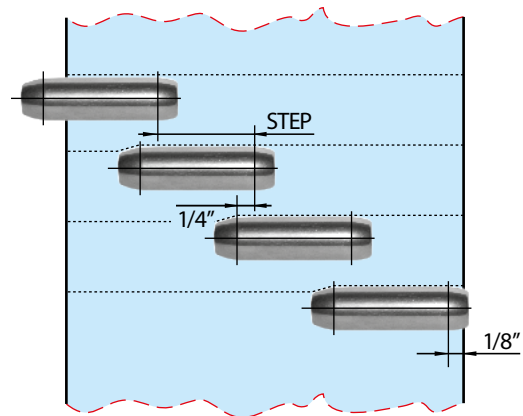
Locate high point of roll approx 1/8" inside back of tube sheet and thrust collar must be touching tube sheet.

## SETTING BOILER EXPANDER



Short straight roll set approx half way into tube sheet. Tube rolled 3/8" back of tube sheet. Flared tube diameter 1/8" larger than tube sheet hole.

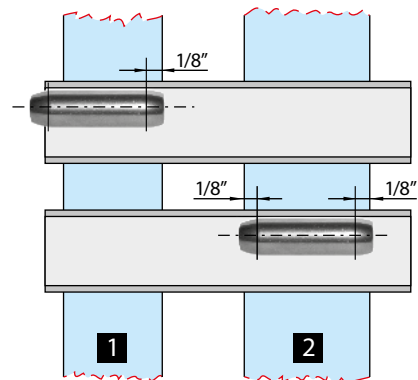
## STEP ROLLING (THICK TUBE SHEET)



To determine length of steps, divide the estimated number of steps into the length of area to be rolled. This length must be at least 1/4" shorter than the effective length of the "2R" roll.

**NOTE!** 1-1/2" long rolls have maximum effective length of 1"; 2-1/4" long rolls have maximum effective length of 1-3/4"

## DOUBLE TUBE SHEET APPLICATION



Primary tube sheet would be rolled with a 800 type expander with roll located per example.

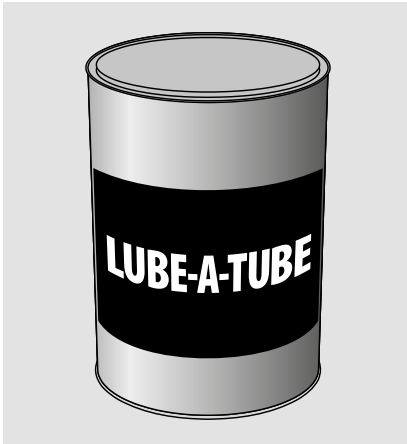
**Note!** Effective length of roll to be specified based on secondary tube sheet thickness.

Secondary tube sheet would be rolled with a 1200 type expander with „2R" type rolls as per example.

**Note!** When rolling a secondary tube sheet always use „2R" type rolls. Position expander so that the roll straddles the tube sheet with the high points approx 1/8" inside front and sack of the tube sheet.

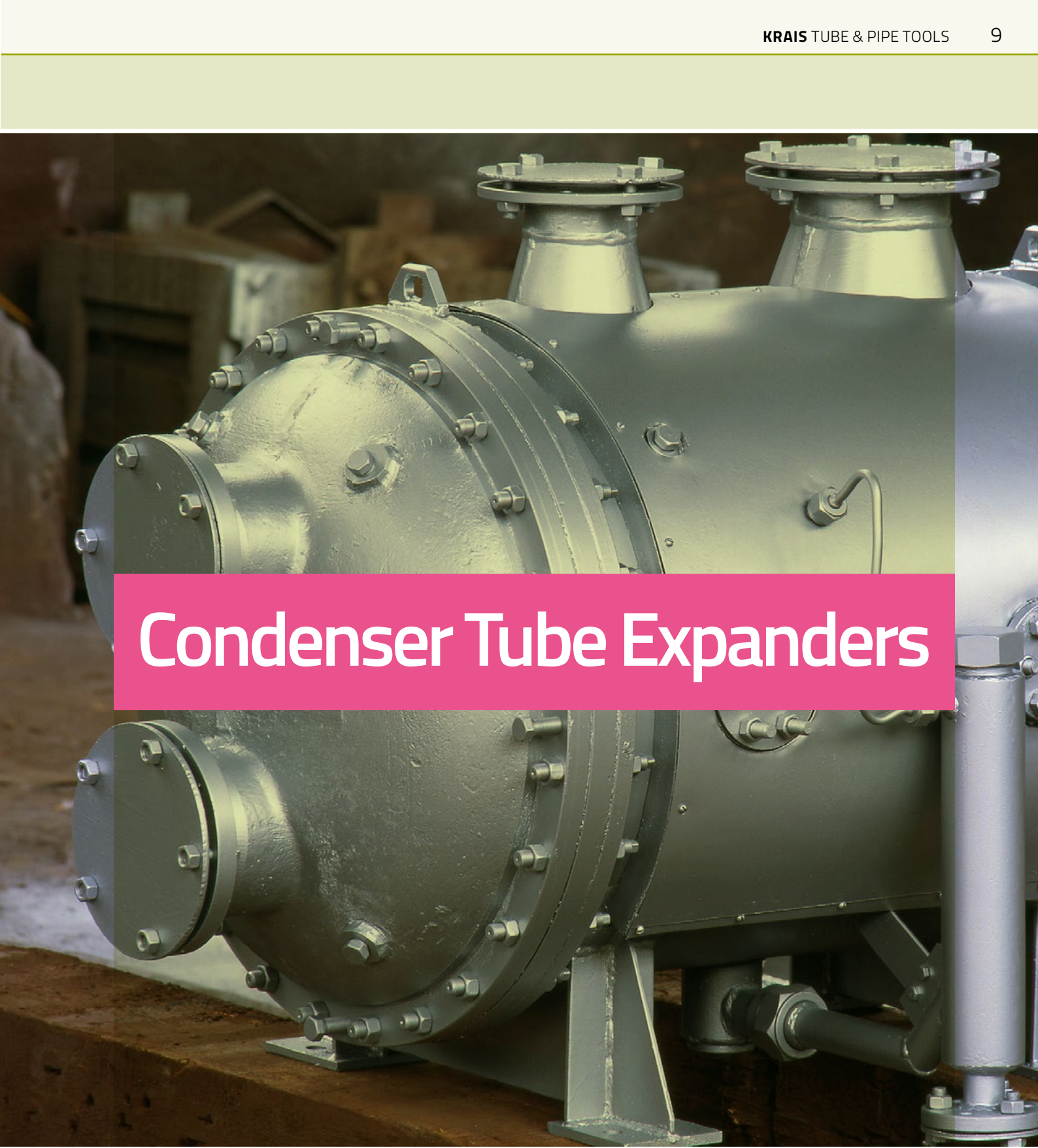


# LUBE-A-TUBE for better rolling



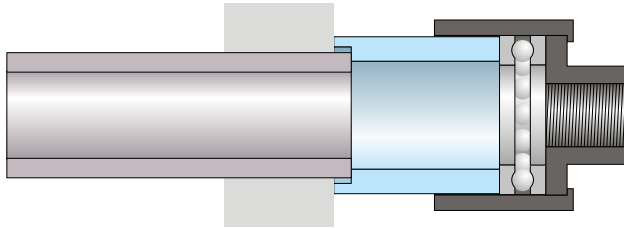
Special water soluble grease for rolling tube ends into tube sheets. Easy application: just apply directly to the inside of the tube ends; and easy removal: all Lube-A-Tube excess will be completely removed during any hydro test or boil-out operations.

- ▶ Lube-A-Tube is easy to apply. Stays in the tube during whole rolling operation - it will not leak.
- ▶ Lube-A-Tube does not carbonize under the heat and pressure found during the tube rolling operation.
- ▶ Lube-A-Tube keeps the expanding tool cool what gives a long tool life.
- ▶ Lube-A-Tube is effective for rolling condenser tubes, boiler tubes and heavy wall cracking still tubes in many environments.
- ▶ Lube-A-Tube can be used as an "indicator" to show the operator what tubes are ready and what needs still to be expanded.



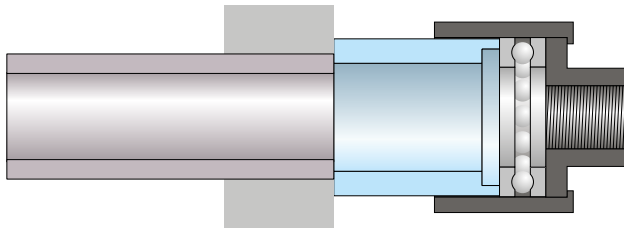
# Condenser Tube Expanders

# Typical thrust collars



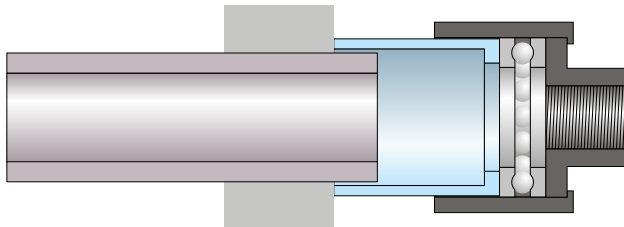
## STC

Fixed recessed thrust collar 1/8". One flip type thrust collar for 1200&800 series tube expanders.



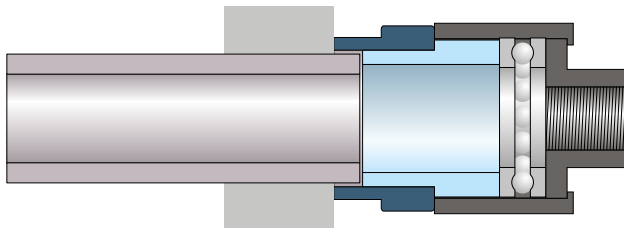
## FRTC

Full recessed thrust collar.



## ARTC

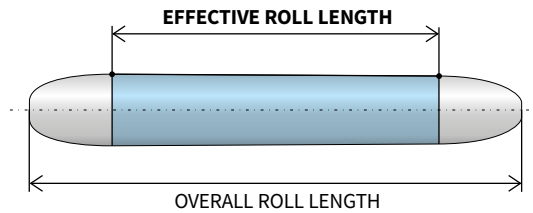
Adjustable recess thrust collar 0,025 – 0,5".



## TWTC

Thin wall thrust collar.

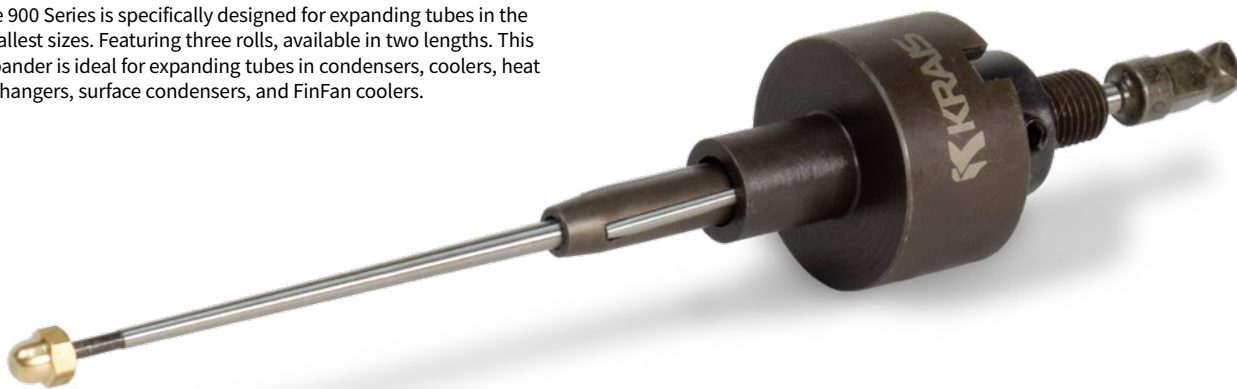
# Rolls for condenser expanders



|            |        | 38,1                                           |  | 57,1                                         |              |               |
|------------|--------|------------------------------------------------|--|----------------------------------------------|--------------|---------------|
| R-7        | STD    | 6,4<br>1/4"<br>31,7<br>1 1/4"                  |  | 6,4<br>1/4"<br>50,7<br>2"                    | R-7-A        | STANDARD      |
| R-7-2R     | 2R     | 6,4<br>1/4"<br>25,4<br>1"<br>6,4<br>1/4"       |  | 6,4<br>1/4"<br>44,3<br>1 3/4"<br>6,4<br>1/4" | R-7-A-2R     | SPECIAL ORDER |
| R-7-9R     | 9R     | 9,5<br>3/8"<br>19<br>3/4"<br>9,5<br>3/8"       |  | 9,5<br>3/8"<br>38,1<br>1 1/2"<br>9,5<br>3/8" | R-7-A-9R     |               |
| R-7-3R     | 3R     | 3,17<br>1/8"<br>31,7<br>1 1/4"<br>3,17<br>1/8" |  | 3,17<br>1/8"<br>50,7<br>2"<br>3,17<br>1/8"   | R-7-A-3R     |               |
| R-7-BLxx   | BLxx   | 6,4<br>1/4"<br>xx<br>xx                        |  | 6,4<br>1/4"<br>xx<br>xx                      | R-7-A-BLxx   |               |
| R-7-2RBLxx | 2RBLxx | 6,4<br>1/4"<br>xx<br>1/4"<br>6,4<br>1/4"       |  | 6,4<br>1/4"<br>xx<br>xx                      | R-7-A-2RBLxx |               |
| R-7-3RBLxx | 3RBLxx | 3,17<br>1/8"<br>xx<br>1/8"<br>3,17<br>1/8"     |  | 3,17<br>1/8"<br>xx<br>1/8"<br>3,17<br>1/8"   | R-7-A-3RBLxx |               |

# 900 Series

The 900 Series is specifically designed for expanding tubes in the smallest sizes. Featuring three rolls, available in two lengths. This expander is ideal for expanding tubes in condensers, coolers, heat exchangers, surface condensers, and FinFan coolers.



## WORKING RANGE

| TUBE ID         | TUBE OD        | TUBE SHEET     |
|-----------------|----------------|----------------|
| 3,86 - 8,41 mm  | 6,35 - 9,50 MM | 6,3 - 31,7 MM  |
| 0,152" - 0,331" | 1/4" - 3/8"    | 1/4" to 1-1/4" |

## OPTIONAL SPARES AND ACCESSORIES



Available rolls  
→ PAGE 11



Thrust collars  
→ PAGE 10



Rolling motors  
→ PAGE 45

| TUBE OD |       | TUBE GAUGE |       |      | TUBE ID |       | EXPANSION RANGE |       |       |        | TUBE SHEET THICKNESS |        |               |      | MANDREL | MANDREL SQUARE |     | PNEUMATIC MOTOR * | ELECTRIC MOTOR * |
|---------|-------|------------|-------|------|---------|-------|-----------------|-------|-------|--------|----------------------|--------|---------------|------|---------|----------------|-----|-------------------|------------------|
|         |       |            |       |      |         |       |                 |       |       |        | 1/4 TO 3/4"          |        | 3/4 TO 1-1/4" |      |         |                |     |                   |                  |
|         |       |            |       |      |         |       | [INCH]          | [MM]  | [BWG] | [INCH] | [MM]                 | [INCH] | [MM]          | MIN  |         | MAX            | MIN |                   |                  |
| 1/4     | 6,35  | 18         | 0,049 | 1,24 | 0,152   | 3,86  | 0,151           | 0,173 | 3,84  | 4,39   | 921                  | 921    | -             | -    | M-39    | 1/4"           | 6,3 | K20-2500          | TES3000<br>S6000 |
|         |       | 19         | 0,042 | 1,07 | 0,166   | 4,22  | 0,165           | 0,185 | 4,19  | 4,70   | 922                  | 923    | -             | -    | M-39    | 1/4"           | 6,3 |                   |                  |
|         |       | 20         | 0,035 | 0,89 | 0,180   | 4,57  | 0,175           | 0,200 | 4,45  | 5,08   | 923                  | 923    | -             | -    | M-40    | 1/4"           | 6,3 |                   |                  |
|         |       | 21         | 0,072 | 1,83 | 0,186   | 4,72  | 0,180           | 0,207 | 4,57  | 5,26   | 924                  | 924    | -             | -    | M-40    | 1/4"           | 6,3 |                   |                  |
|         |       | 22         | 0,028 | 0,71 | 0,194   | 4,93  | 0,190           | 0,216 | 4,83  | 5,49   | 925                  | 925    | -             | -    | M-41    | 1/4"           | 6,3 |                   |                  |
|         |       | 23         | 0,025 | 0,64 | 0,200   | 5,08  | 0,195           | 0,222 | 4,95  | 5,64   | 926                  | 923    | -             | -    | M-41    | 1/4"           | 6,3 |                   |                  |
|         |       | 24         | 0,022 | 0,56 | 0,206   | 5,23  | 0,201           | 0,230 | 5,11  | 5,84   | 927                  | 924    | -             | -    | M-41    | 1/4"           | 6,3 |                   |                  |
|         |       | 28         | 0,014 | 0,35 | 0,222   | 5,6   | 0,222           | 0,238 | 5,6   | 6,0    | 928                  | 903    | -             | -    | 928     | 1/4"           | 6,3 |                   |                  |
|         |       | 29         | 0,013 | 0,33 | 0,224   | 5,7   | 0,222           | 0,238 | 5,6   | 6,0    | 928                  | 903    | -             | -    | 928     | 1/4"           | 6,3 |                   |                  |
|         |       | 30         | 0,012 | 0,30 | 0,226   | 5,7   | 0,222           | 0,238 | 5,6   | 6,0    | 928                  | 903    | -             | -    | 928     | 1/4"           | 6,3 |                   |                  |
| 3/8     | 9,5   | 14         | 0,83  | 2,10 | 0,209   | 5,3   | 0,201           | 0,232 | 5,1   | 5,8    | 927                  | 924    | -             | -    | M-41    | 1/4"           | 6,3 | K20-1800          | TES3000<br>S3000 |
|         |       | 15         | 0,072 | 1,83 | 0,231   | 5,87  | 0,230           | 0,265 | 5,84  | 6,73   | 915                  | 903    | -             | -    | M-42    | 1/4"           | 6,3 |                   |                  |
|         |       | 16         | 0,065 | 1,65 | 0,245   | 6,22  | 0,240           | 0,275 | 6,10  | 6,99   | 916                  | 916    | 916L          | 916L | M-36    | 1/4"           | 6,3 |                   |                  |
|         |       | 17         | 0,058 | 1,47 | 0,259   | 6,58  | 0,255           | 0,289 | 6,48  | 7,34   | 918                  | 903    | 920           | 904  | M-38    | 1/4"           | 6,3 |                   |                  |
|         |       | 18         | 0,049 | 1,24 | 0,277   | 7,04  | 0,272           | 0,307 | 6,91  | 7,80   | 901                  | 903    | 902           | 904  | M-30    | 1/4"           | 6,3 |                   |                  |
|         |       | 19         | 0,042 | 1,07 | 0,291   | 7,39  | 0,286           | 0,320 | 7,26  | 8,13   | 903                  | 903    | 904           | 904  | M-31    | 1/4"           | 6,3 |                   |                  |
|         |       | 20         | 0,035 | 0,89 | 0,305   | 7,75  | 0,300           | 0,334 | 7,62  | 8,48   | 905                  | 907    | 906           | 908  | M-32    | 1/4"           | 6,3 |                   |                  |
|         |       | 21         | 0,032 | 0,81 | 0,311   | 7,90  | 0,306           | 0,340 | 7,77  | 8,64   | 907                  | 907    | 908           | 908  | M-33    | 1/4"           | 6,3 |                   |                  |
|         |       | 22         | 0,028 | 0,71 | 0,319   | 8,10  | 0,314           | 0,349 | 7,98  | 8,86   | 909                  | 909    | 910           | 910  | M-34    | 1/4"           | 6,3 |                   |                  |
|         |       | 23         | 0,025 | 0,64 | 0,325   | 8,26  | 0,320           | 0,357 | 8,13  | 9,07   | 911                  | 911    | 912           | 912  | M-34    | 1/4"           | 6,3 |                   |                  |
| 24      | 0,022 | 0,56       | 0,331 | 8,41 | 0,319   | 0,357 | 8,10            | 9,07  | 911   | 911    | 912                  | 912    | M-34          | 1/4" | 6,3     |                |     |                   |                  |

\* Motor recommendation applies only to most popular cases with a standard percentage of the wall reduction. The recommendation can be different for thicker tube sheet, harder and exotic metal tube and a higher percentage of wall reduction.

# 1300 Series

The 1300 Series stands out for its extended reach, designed for expanding tubes in small sizes. It offers three expansion rolls and is available in two lengths, providing a long and adjustable working range. This tool is perfect for tube expansion in condensers, coolers, heat exchangers, surface condensers, and FinFan coolers.



## WORKING RANGE

| TUBE ID         | TUBE OD | TUBE SHEET     |
|-----------------|---------|----------------|
| 5,87 - 8,41 mm  | 9,5 MM  | 19,0 - 88,9 MM |
| 0,231" - 0,331" | 3/8"    | 3/4" to 3-1/2" |

## OPTIONAL SPARES AND ACCESSORIES



Available rolls  
→ PAGE 11



Thrust collars  
→ PAGE 10



Rolling motors  
→ PAGE 45

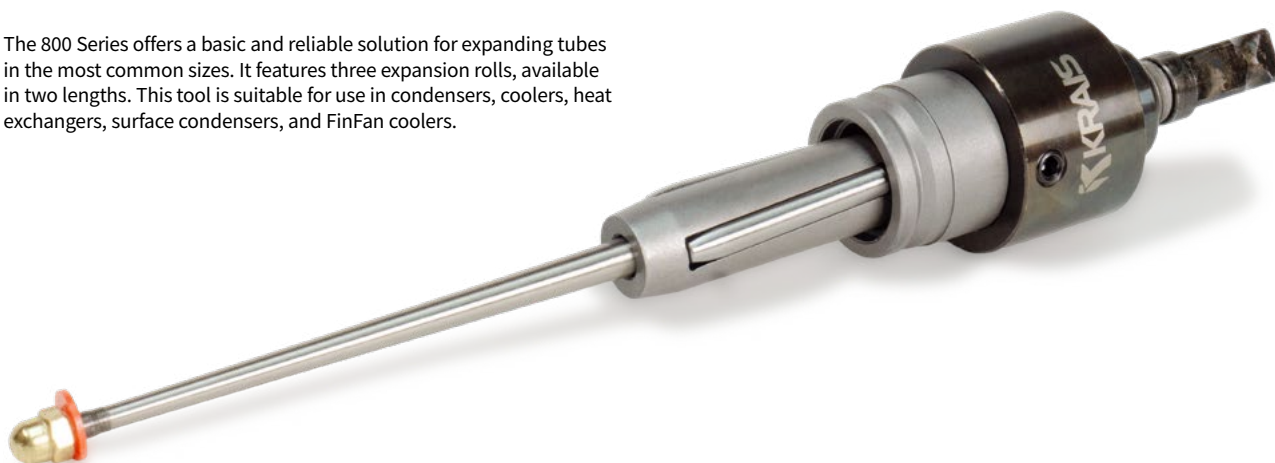
| TUBE OD |     | TUBE GAUGE |       |      | TUBE ID |      | EXPANSION RANGE |       |       |        | TUBE SHEET THICKNESS |             |                  |              | MANDREL     | MANDREL SQUARE |     | PNEUMATIC MOTOR | ELECTRIC MOTOR   |
|---------|-----|------------|-------|------|---------|------|-----------------|-------|-------|--------|----------------------|-------------|------------------|--------------|-------------|----------------|-----|-----------------|------------------|
|         |     |            |       |      |         |      |                 |       |       |        | 3/4" TO 3"           |             | 1-1/4" TO 3-1/2" |              |             |                |     |                 |                  |
|         |     |            |       |      |         |      | [INCH]          | [MM]  | [BWG] | [INCH] | [MM]                 | [INCH]      | [MM]             | MIN          |             | MAX            | MIN |                 |                  |
| 3/8     | 9,5 | 15         | 0,072 | 1,83 | 0,231   | 5,87 | 0,230           | 0,265 | 5,84  | 6,73   | <b>1315</b>          | <b>1315</b> | <b>1316</b>      | <b>1316</b>  | <b>M-86</b> | 1/4"           | 6,3 | K20-1800        | TES3000<br>S3000 |
|         |     | 16         | 0,065 | 1,65 | 0,245   | 6,22 | 0,240           | 0,275 | 6,10  | 6,99   | <b>1319</b>          | <b>1315</b> | <b>1319-L</b>    | <b>916-L</b> | <b>M-86</b> | 1/4"           | 6,3 |                 |                  |
|         |     | 17         | 0,058 | 1,47 | 0,259   | 6,58 | 0,255           | 0,289 | 6,48  | 7,34   | <b>1317</b>          | <b>903</b>  | <b>1318</b>      | <b>904</b>   | <b>M-88</b> | 1/4"           | 6,3 |                 |                  |
|         |     | 18         | 0,049 | 1,24 | 0,277   | 7,04 | 0,272           | 0,307 | 6,91  | 7,80   | <b>1301</b>          | <b>903</b>  | <b>1302</b>      | <b>904</b>   | <b>M-80</b> | 1/4"           | 6,3 |                 |                  |
|         |     | 19         | 0,042 | 1,07 | 0,291   | 7,39 | 0,286           | 0,320 | 7,26  | 8,13   | <b>1303</b>          | <b>903</b>  | <b>1304</b>      | <b>904</b>   | <b>M-81</b> | 1/4"           | 6,3 |                 |                  |
|         |     | 20         | 0,035 | 0,89 | 0,305   | 7,75 | 0,300           | 0,334 | 7,62  | 8,48   | <b>1305</b>          | <b>907</b>  | <b>1306</b>      | <b>908</b>   | <b>M-82</b> | 1/4"           | 6,3 |                 |                  |
|         |     | 21         | 0,032 | 0,81 | 0,311   | 7,90 | 0,306           | 0,340 | 7,77  | 8,64   | <b>1307</b>          | <b>907</b>  | <b>1308</b>      | <b>908</b>   | <b>M-83</b> | 1/4"           | 6,3 |                 |                  |
|         |     | 22         | 0,028 | 0,71 | 0,319   | 8,10 | 0,314           | 0,349 | 7,98  | 8,86   | <b>1309</b>          | <b>909</b>  | <b>1310</b>      | <b>910</b>   | <b>M-84</b> | 1/4"           | 6,3 |                 |                  |
|         |     | 23         | 0,025 | 0,64 | 0,325   | 8,26 | 0,320           | 0,357 | 8,13  | 9,07   | <b>1311</b>          | <b>911</b>  | <b>1312</b>      | <b>912</b>   | <b>M-84</b> | 1/4"           | 6,3 |                 |                  |
|         |     | 24         | 0,022 | 0,56 | 0,331   | 8,41 | 0,319           | 0,357 | 8,10  | 9,07   | <b>1311</b>          | <b>911</b>  | <b>1312</b>      | <b>912</b>   | <b>M-84</b> | 1/4"           | 6,3 |                 |                  |

\* Motor recommendation applies only to most popular cases with a standard percentage of the wall reduction. The recommendation can be different for thicker tube sheet, harder and exotic metal tube and a higher percentage of wall reduction.



# 800 Series

The 800 Series offers a basic and reliable solution for expanding tubes in the most common sizes. It features three expansion rolls, available in two lengths. This tool is suitable for use in condensers, coolers, heat exchangers, surface condensers, and FinFan coolers.



## WORKING RANGE

| TUBE ID         | TUBE OD        | TUBE SHEET     |
|-----------------|----------------|----------------|
| 8,48 - 26,9 mm  | 12,7 - 38,1 MM | 12,7 - 57,1 MM |
| 0,334" - 1,027" | 1/2" to 1-1/2" | 1/2" to 2-1/4" |

## ADDITIONAL INFORMATION



How-to basics  
→ PAGE 11



Rolls range  
→ PAGE 10



Rolling motors  
→ PAGE 45

| TUBE OD |       | TUBE GAUGE |       |       | TUBE ID |       | EXPANSION RANGE |       |        |       | TUBE SHEET THICKNESS |        |                 |        | MANDREL | MANDREL SQUARE |     | PNEUMATIC MOTOR * | ELECTRIC MOTOR *               |
|---------|-------|------------|-------|-------|---------|-------|-----------------|-------|--------|-------|----------------------|--------|-----------------|--------|---------|----------------|-----|-------------------|--------------------------------|
|         |       |            |       |       |         |       |                 |       |        |       | 1/2 TO 1-1/2"        |        | 1-1/4 TO 2-1/4" |        |         |                |     |                   |                                |
|         |       |            |       |       |         |       | [INCH]          | [MM]  | [INCH] | [MM]  | [INCH]               | [MM]   | MIN             | MAX    |         | MIN            | MAX |                   |                                |
| 3/8     | 9,5   | 22-24      | 0,027 | 0,71  | 0,314   | 8,00  | 0,307           | 0,358 | 7,80   | 9,10  | 795                  | 795    | -               | -      | 797     | 3/8            | 9,5 | K20-500           | TES300 S1500 or TESMini2 HTO   |
| 1/2     | 12,7  | 14         | 0,083 | 2,11  | 0,334   | 8,48  | 0,324           | 0,374 | 8,23   | 9,50  | 797                  | 797    | -               | -      | 797     | 3/8            | 9,5 |                   |                                |
|         |       | 15         | 0,072 | 1,83  | 0,356   | 9,04  | 0,348           | 0,398 | 8,84   | 10,11 | 799                  | R-1    | -               | -      | 799     | 3/8            | 9,5 |                   |                                |
|         |       | 16         | 0,065 | 1,65  | 0,370   | 9,40  | 0,36            | 0,410 | 9,14   | 10,41 | 801                  | R-1    | -               | -      | M-1     | 3/8            | 9,5 |                   |                                |
|         |       | 17         | 0,058 | 1,47  | 0,384   | 9,75  | 0,374           | 0,424 | 9,50   | 10,77 | 803                  | R-2    | -               | -      | M-1     | 3/8            | 9,5 |                   |                                |
|         |       | 18         | 0,049 | 1,24  | 0,402   | 10,21 | 0,392           | 0,447 | 9,96   | 11,35 | 805                  | R-3    | -               | -      | M-2     | 3/8            | 9,5 |                   |                                |
| 5/8     | 15,8  | 20         | 0,035 | 0,89  | 0,430   | 10,92 | 0,406           | 0,461 | 10,31  | 11,71 | 805[S]               | R-3    | -               | -      | M-3     | 3/8            | 9,5 | K50-600           | TES3000 G1450 or TesMini2 ES2  |
|         |       | 12         | 0,109 | 2,77  | 0,407   | 10,34 | 0,392           | 0,447 | 9,96   | 11,35 | 805                  | R-3    | -               | -      | M-2     | 3/8            | 9,5 |                   |                                |
|         |       | 13         | 0,095 | 2,41  | 0,435   | 11,05 | 0,425           | 0,480 | 10,80  | 12,19 | 807                  | R-4    | -               | -      | M-3     | 3/8            | 9,5 |                   |                                |
|         |       | 14         | 0,083 | 2,11  | 0,459   | 11,66 | 0,449           | 0,509 | 11,40  | 12,93 | 809                  | R-4    | 810             | R-4-A  | M-4     | 3/8            | 9,5 |                   |                                |
|         |       | 15         | 0,072 | 1,83  | 0,481   | 12,22 | 0,471           | 0,536 | 11,96  | 13,61 | 811                  | R-5    | 812             | R-5A   | M-5     | 3/8            | 9,5 | K50-1250          | TES3000 G1000 or TESMini2 DUO  |
|         |       | 16         | 0,065 | 1,65  | 0,495   | 12,57 | 0,485           | 0,550 | 12,32  | 13,97 | 813                  | R-6    | 814             | R-6A   | M-5     | 3/8            | 9,5 |                   |                                |
|         |       | 17         | 0,058 | 1,47  | 0,509   | 12,93 | 0,499           | 0,564 | 12,67  | 14,33 | 815                  | R-6    | 816             | R-6A   | M-6     | 3/8            | 9,5 |                   |                                |
|         |       | 18         | 0,049 | 1,24  | 0,527   | 13,39 | 0,517           | 0,572 | 13,13  | 14,53 | 817                  | R-7    | 818             | R-7-A  | M-7 M-5 | 3/8            | 9,5 |                   |                                |
|         |       | 19         | 0,042 | 1,07  | 0,541   | 13,74 | 0,522           | 0,582 | 13,26  | 14,78 | 819                  | R-7    | 820             | R-7-A  | M-6     | 3/8            | 9,5 |                   |                                |
|         |       | 20         | 0,035 | 0,89  | 0,555   | 14,10 | 0,536           | 0,596 | 13,61  | 15,14 | 819[S]               | R-7    | 820[S]          | R-7-A  | M-8     | 3/8            | 9,5 |                   |                                |
| 3/4     | 19    | 21         | 0,032 | 0,81  | 0,561   | 14,25 | 0,536           | 0,596 | 13,61  | 15,14 | 819[S]               | R-7    | 820[S]          | R-7-A  | M-8     | 3/8            | 9,5 | K60-900           | TES3000 + G1000 TESMini 2 +ES2 |
|         |       | 22         | 0,028 | 0,71  | 0,569   | 14,45 | 0,536           | 0,596 | 13,61  | 15,14 | 819[S]               | R-7    | 820[S]          | R-7-A  | M-8     | 3/8            | 9,5 |                   |                                |
|         |       | 10         | 0,134 | 3,40  | 0,482   | 12,24 | 0,471           | 0,536 | 11,96  | 13,61 | 811                  | R-5    | 812             | R-5-A  | M-5     | 3/8            | 9,5 | K50-400           | TES3000 G1450 or TESMini2 ES2  |
|         |       | 11         | 0,120 | 3,05  | 0,510   | 12,95 | 0,499           | 0,564 | 12,67  | 14,33 | 815                  | R-6    | 816             | R-6-A  | M-6     | 3/8            | 9,5 |                   |                                |
|         |       | 12         | 0,109 | 2,77  | 0,532   | 13,51 | 0,522           | 0,582 | 13,26  | 14,78 | 819                  | R-7    | 820             | R-7-A  | M-6     | 3/8            | 9,5 | K50-600           |                                |
|         |       | 13         | 0,095 | 2,41  | 0,560   | 14,22 | 0,550           | 0,615 | 13,97  | 15,62 | 821                  | R-8    | 822             | R-8-A  | M-8     | 3/8            | 9,5 |                   |                                |
|         |       | 14         | 0,083 | 2,11  | 0,584   | 14,83 | 0,574           | 0,639 | 14,58  | 16,23 | 823                  | R-9    | 824             | R-9-A  | M-8     | 3/8            | 9,5 |                   |                                |
|         |       | 15         | 0,072 | 1,83  | 0,606   | 15,39 | 0,596           | 0,661 | 15,14  | 16,79 | 825                  | R-10   | 826             | R-10-A | M-8     | 3/8            | 9,5 |                   |                                |
| 16      | 0,065 | 1,65       | 0,620 | 15,75 | 0,605   | 0,685 | 15,37           | 17,40 | 827    | R-10  | 828                  | R-10-A | M-9             | 3/8    | 9,5     |                |     |                   |                                |

## 800 Series

| TUBE OD |       | TUBE GAUGE |       | TUBE ID |       | EXPANSION RANGE |       |       |        | TUBE SHEET THICKNESS |        |                 |      | MANDREL | MANDREL SQUARE |     | PNEUMATIC MOTOR * | ELECTRIC MOTOR * |                               |
|---------|-------|------------|-------|---------|-------|-----------------|-------|-------|--------|----------------------|--------|-----------------|------|---------|----------------|-----|-------------------|------------------|-------------------------------|
|         |       |            |       |         |       |                 |       |       |        | 1/2 TO 1-1/2"        |        | 1-1/4 TO 2-1/4" |      |         |                |     |                   |                  |                               |
|         |       |            |       |         |       | [INCH]          | [MM]  | [BWG] | [INCH] | [MM]                 | [INCH] | [MM]            | MIN  |         | MAX            | MIN |                   |                  | MAX                           |
| 3/4     | 19    | 17         | 0,058 | 1,47    | 0,634 | 16,10           | 0,619 | 0,699 | 15,72  | 17,75                | 829    | R-11            | 830  | R-11-A  | M-9            | 3/8 | 9,5               | K50-1250         | TES3000 G1000 or TESMini2 DUO |
|         |       | 18         | 0,049 | 1,24    | 0,652 | 16,56           | 0,619 | 0,699 | 15,72  | 17,75                | 829    | R-11            | 830  | R-11-A  | M-9            | 3/8 | 9,5               |                  |                               |
|         |       | 19         | 0,042 | 1,07    | 0,666 | 16,92           | 0,642 | 0,722 | 16,31  | 18,34                | 831    | R-12            | 832  | R-12-A  | M-9            | 3/8 | 9,5               |                  |                               |
|         |       | 20         | 0,035 | 0,89    | 0,680 | 17,27           | 0,642 | 0,722 | 16,31  | 18,34                | 831    | R-12            | 832  | R-12-A  | M-9            | 3/8 | 9,5               |                  |                               |
|         |       | 21         | 0,032 | 0,81    | 0,686 | 17,42           | 0,642 | 0,722 | 16,31  | 18,34                | 831    | R-12            | 832  | R-12-A  | M-9            | 3/8 | 9,5               |                  |                               |
|         |       | 22         | 0,028 | 0,71    | 0,694 | 17,63           | 0,642 | 0,722 | 16,31  | 18,34                | 831    | R-12            | 832  | R-12-A  | M-9            | 3/8 | 9,5               |                  |                               |
| 7/8     | 22,2  | 10         | 0,134 | 3,40    | 0,607 | 15,42           | 0,596 | 0,661 | 15,14  | 16,79                | 825    | R-10            | 826  | R-10-A  | M-8            | 3/8 | 9,5               | K50-400          | TES3000 G1000 or TESMini2 ES2 |
|         |       | 11         | 0,120 | 3,05    | 0,635 | 16,13           | 0,619 | 0,699 | 15,72  | 17,75                | 829    | R-11            | 830  | R-11-A  | M-9            | 3/8 | 9,5               |                  |                               |
|         |       | 12         | 0,109 | 2,77    | 0,657 | 16,69           | 0,642 | 0,722 | 16,31  | 18,34                | 831    | R-12            | 832  | R-12-A  | M-9            | 3/8 | 9,5               |                  |                               |
|         |       | 13         | 0,095 | 2,41    | 0,685 | 17,40           | 0,670 | 0,750 | 17,02  | 19,05                | 833    | R-13            | 834  | R-13-A  | M-10           | 3/8 | 9,5               |                  |                               |
|         |       | 14         | 0,083 | 2,11    | 0,709 | 18,01           | 0,685 | 0,774 | 17,40  | 19,66                | 835    | R-14            | 836  | R-14-A  | M-11           | 3/8 | 9,5               | K50-600          |                               |
|         |       | 15         | 0,072 | 1,83    | 0,731 | 18,57           | 0,712 | 0,801 | 18,08  | 20,35                | 837    | R-15            | 838  | R-15-A  | M-11           | 3/8 | 9,5               |                  |                               |
|         |       | 16         | 0,065 | 1,65    | 0,745 | 18,92           | 0,726 | 0,815 | 18,44  | 20,70                | 839    | R-15            | 840  | R-15-A  | M-12           | 3/8 | 9,5               |                  |                               |
|         |       | 17         | 0,058 | 1,47    | 0,759 | 19,28           | 0,740 | 0,829 | 18,80  | 21,06                | 843    | R-16            | 844  | R-16-A  | M-12           | 3/8 | 9,5               |                  |                               |
| 18      | 0,049 | 1,24       | 0,777 | 19,74   | 0,740 | 0,829           | 18,80 | 21,06 | 843    | R-16                 | 844    | R-16-A          | M-12 | 3/8     | 9,5            |     |                   |                  |                               |
| 1       | 25,4  | 8          | 0,165 | 4,19    | 0,670 | 17,02           | 0,655 | 0,735 | 16,64  | 18,67                | 841    | R-13            | 842  | R-13-A  | M-9            | 3/8 | 9,5               | K60-400          | TES3000 G1000 or TESMini2 ES2 |
|         |       | 9          | 0,148 | 3,76    | 0,704 | 17,88           | 0,685 | 0,774 | 17,40  | 19,66                | 835    | R-14            | 836  | R-14-A  | M-11           | 3/8 | 9,5               |                  |                               |
|         |       | 10         | 0,134 | 3,40    | 0,732 | 18,59           | 0,712 | 0,801 | 18,08  | 20,35                | 837    | R-15            | 838  | R-15-A  | M-11           | 3/8 | 9,5               |                  |                               |
|         |       | 11         | 0,120 | 3,05    | 0,760 | 19,30           | 0,740 | 0,829 | 18,80  | 21,06                | 843    | R-16            | 844  | R-16-A  | M-12           | 3/8 | 9,5               |                  |                               |
|         |       | 12         | 0,109 | 2,77    | 0,782 | 19,86           | 0,763 | 0,852 | 19,38  | 21,64                | 845    | R-17            | 846  | R-17-A  | M-12           | 3/8 | 9,5               | K50-400          |                               |
|         |       | 13         | 0,095 | 2,41    | 0,810 | 20,57           | 0,791 | 0,880 | 20,09  | 22,35                | 847    | R-18            | 848  | R-18-A  | M-12           | 3/8 | 9,5               |                  |                               |
|         |       | 14         | 0,083 | 2,11    | 0,834 | 21,18           | 0,810 | 0,909 | 20,57  | 23,09                | 849    | R-18            | 850  | R-18-A  | M-13           | 3/8 | 9,5               |                  |                               |
|         |       | 15         | 0,072 | 1,83    | 0,856 | 21,74           | 0,837 | 0,936 | 21,26  | 23,77                | 851    | R-19            | 852  | R-19-A  | M-13           | 3/8 | 9,5               |                  |                               |
|         |       | 16         | 0,065 | 1,65    | 0,870 | 22,10           | 0,837 | 0,936 | 21,26  | 23,77                | 851    | R-19            | 852  | R-19-A  | M-13           | 3/8 | 9,5               | K50-600          |                               |
|         |       | 17         | 0,058 | 1,47    | 0,884 | 22,45           | 0,865 | 0,964 | 21,97  | 24,49                | 855    | R-21            | 856  | R-21-A  | M-13           | 3/8 | 9,5               |                  |                               |
|         |       | 18         | 0,049 | 1,24    | 0,902 | 22,91           | 0,865 | 0,964 | 21,97  | 24,49                | 855    | R-21            | 856  | R-21-A  | M-13           | 3/8 | 9,5               |                  |                               |
|         |       | 19         | 0,042 | 1,07    | 0,916 | 23,27           | 0,865 | 0,964 | 21,97  | 24,49                | 855    | R-21            | 856  | R-21-A  | M-13           | 3/8 | 9,5               |                  |                               |
| 1-1/8   | 28,5  | 20         | 0,035 | 0,89    | 0,930 | 23,62           | 0,865 | 0,964 | 21,97  | 24,49                | 855    | R-21            | 856  | R-21-A  | M-13           | 3/8 | 9,5               | K60-400          | TES3000 G1000 or TESMini2 DU1 |
|         |       | 8          | 0,165 | 4,19    | 0,795 | 20,19           | 0,776 | 0,875 | 19,71  | 22,23                | 853    | R-20            | 854  | R-20-A  | M-13           | 3/8 | 9,5               |                  |                               |
|         |       | 9          | 0,148 | 3,76    | 0,829 | 21,06           | 0,810 | 0,909 | 20,57  | 23,09                | 849    | R-18            | 850  | R-18-A  | M-13           | 3/8 | 9,5               |                  |                               |
|         |       | 10         | 0,134 | 3,40    | 0,857 | 21,77           | 0,837 | 0,936 | 21,26  | 23,77                | 851    | R-19            | 852  | R-19-A  | M-13           | 3/8 | 9,5               |                  |                               |
|         |       | 11         | 0,120 | 3,05    | 0,885 | 22,48           | 0,865 | 0,964 | 21,97  | 24,49                | 855    | R-21            | 856  | R-21-A  | M-13           | 3/8 | 9,5               |                  |                               |
|         |       | 12         | 0,109 | 2,77    | 0,907 | 23,04           | 0,883 | 0,982 | 22,43  | 24,94                | 857    | R-21            | 858  | R-21-A  | M-14           | 1/2 | 12,7              |                  |                               |
|         |       | 13         | 0,095 | 2,41    | 0,935 | 23,75           | 0,916 | 1,015 | 23,27  | 25,78                | 859    | R-22            | 860  | R-22-A  | M-14           | 1/2 | 12,7              |                  |                               |
|         |       | 14         | 0,083 | 2,11    | 0,959 | 24,36           | 0,935 | 1,044 | 23,75  | 26,52                | 861    | R-23            | 862  | R-23-A  | M-15           | 1/2 | 12,7              |                  |                               |
|         |       | 15         | 0,072 | 1,83    | 0,981 | 24,92           | 0,962 | 1,071 | 24,43  | 27,20                | 863    | R-24            | 864  | R-24-A  | M-15           | 1/2 | 12,7              |                  |                               |
|         |       | 16         | 0,065 | 1,65    | 0,995 | 25,27           | 0,962 | 1,071 | 24,43  | 27,20                | 863    | R-24            | 864  | R-24-A  | M-15           | 1/2 | 12,7              |                  |                               |
| 1-1/4   | 31,7  | 17         | 0,058 | 1,47    | 1,009 | 25,63           | 0,990 | 1,099 | 25,15  | 27,91                | 867    | R-26            | 868  | R-26-A  | M-16           | 1/2 | 12,7              | K60-400          | TES3000 G1000 or TESMini2 DU1 |
|         |       | 18         | 0,049 | 1,24    | 1,027 | 26,09           | 0,990 | 1,099 | 25,15  | 27,91                | 867    | R-26            | 868  | R-26-A  | M-16           | 1/2 | 12,7              |                  |                               |
|         |       | 8          | 0,165 | 4,19    | 0,92  | 23,37           | 0,901 | 1,010 | 22,89  | 25,65                | 865    | R-25            | 866  | R-25-A  | M-15           | 1/2 | 12,7              |                  |                               |
|         |       | 9          | 0,148 | 3,76    | 0,954 | 24,23           | 0,935 | 1,044 | 23,75  | 26,52                | 861    | R-23            | 862  | R-23-A  | M-15           | 1/2 | 12,7              |                  |                               |
|         |       | 10         | 0,134 | 3,40    | 0,982 | 24,94           | 0,962 | 1,071 | 24,43  | 27,20                | 863    | R-24            | 864  | R-24-A  | M-15           | 1/2 | 12,7              |                  |                               |
|         |       | 11         | 0,120 | 3,05    | 1,010 | 25,65           | 0,990 | 1,099 | 25,15  | 27,91                | 867    | R-26            | 868  | R-26-A  | M-16           | 1/2 | 12,7              |                  |                               |
|         |       | 12         | 0,109 | 2,77    | 1,032 | 26,21           | 1,013 | 1,122 | 25,73  | 28,50                | 869    | R-27            | 870  | R-27-A  | M-16           | 1/2 | 12,7              |                  |                               |
|         |       | 13         | 0,095 | 2,41    | 1,060 | 26,92           | 1,041 | 1,150 | 26,44  | 29,21                | 871    | R-28            | 872  | R-28-A  | M-17           | 1/2 | 12,7              |                  |                               |
|         |       | 14         | 0,083 | 2,11    | 1,084 | 27,53           | 1,060 | 1,169 | 26,92  | 29,69                | 873    | R-29            | 874  | R-29-A  | M-17           | 1/2 | 12,7              |                  |                               |
|         |       | 15         | 0,072 | 1,83    | 1,106 | 28,09           | 1,087 | 1,196 | 27,61  | 30,38                | 875    | R-30            | 876  | R-30-A  | M-17           | 1/2 | 12,7              |                  |                               |
| 16      | 0,065 | 1,65       | 1,12  | 28,45   | 1,087 | 1,196           | 27,61 | 30,38 | 875    | R-30                 | 876    | R-30-A          | M-17 | 1/2     | 12,7           |     |                   |                  |                               |
| 17      | 0,058 | 1,47       | 1,134 | 28,80   | 1,115 | 1,224           | 28,32 | 31,09 | 879    | R-30                 | 880    | R-30-A          | M-18 | 1/2     | 12,7           |     |                   |                  |                               |
| 18      | 0,049 | 1,24       | 1,152 | 29,26   | 1,115 | 1,224           | 28,32 | 31,09 | 879    | R-30                 | 880    | R-30-A          | M-18 | 1/2     | 12,7           |     |                   |                  |                               |

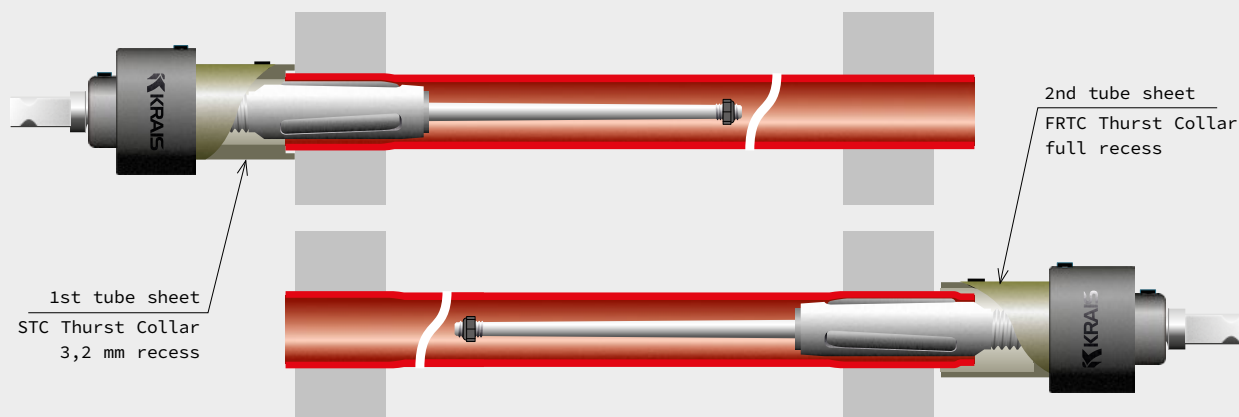
## 800 Series

| TUBE OD |       | TUBE GAUGE |       |       | TUBE ID |       | EXPANSION RANGE |       |            |             | TUBE SHEET THICKNESS |               |                 |               | MANDREL     | MANDREL SQUARE |      | PNEUMATIC MOTOR * | ELECTRIC MOTOR *             |
|---------|-------|------------|-------|-------|---------|-------|-----------------|-------|------------|-------------|----------------------|---------------|-----------------|---------------|-------------|----------------|------|-------------------|------------------------------|
|         |       |            |       |       |         |       |                 |       |            |             | 1/2 TO 1-1/2"        |               | 1-1/4 TO 2-1/4" |               |             |                |      |                   |                              |
|         |       |            |       |       |         |       | [INCH]          | [MM]  | [INCH]     | [MM]        | [INCH]               | [MM]          | MIN             | MAX           |             | MIN            | MAX  |                   |                              |
| 1-3/8   | 34,9  | 8          | 0,165 | 4,19  | 1,045   | 26,54 | 1,026           | 1,135 | 26,06      | 28,83       | <b>877</b>           | <b>R-31</b>   | <b>878</b>      | <b>R-31-A</b> | <b>M-17</b> | 1/2            | 12,7 | K60-250           | TES3000 G400 or TESMini2 DU1 |
|         |       | 9          | 0,148 | 3,76  | 1,079   | 27,41 | 1,060           | 1,169 | 26,92      | 29,69       | <b>873</b>           | <b>R-29</b>   | <b>874</b>      | <b>R-29-A</b> | <b>M-17</b> | 1/2            | 12,7 |                   |                              |
|         |       | 10         | 0,134 | 3,40  | 1,107   | 28,12 | 1,087           | 1,196 | 27,61      | 30,38       | <b>875</b>           | <b>R-30</b>   | <b>876</b>      | <b>R-30-A</b> | <b>M-17</b> | 1/2            | 12,7 |                   |                              |
|         |       | 11         | 0,120 | 3,05  | 1,135   | 28,83 | 1,115           | 1,224 | 28,32      | 31,09       | <b>879</b>           | <b>R-30</b>   | <b>880</b>      | <b>R-30-A</b> | <b>M-18</b> | 1/2            | 12,7 |                   |                              |
|         |       | 12         | 0,109 | 2,77  | 1,157   | 29,39 | 1,133           | 1,242 | 28,78      | 31,55       | <b>881</b>           | <b>R-32</b>   | <b>882</b>      | <b>R-32-A</b> | <b>M-18</b> | 1/2            | 12,7 | K60-400           |                              |
|         |       | 13         | 0,095 | 2,41  | 1,185   | 30,10 | 1,160           | 1,275 | 29,46      | 32,39       | <b>883</b>           | <b>R-33</b>   | <b>884</b>      | <b>R-33-A</b> | <b>M-19</b> | 1/2            | 12,7 |                   |                              |
|         |       | 14         | 0,083 | 2,11  | 1,209   | 30,71 | 1,179           | 1,294 | 29,95      | 32,87       | <b>885</b>           | <b>R-34</b>   | <b>886</b>      | <b>R-34-A</b> | <b>M-20</b> | 1/2            | 12,7 |                   |                              |
|         |       | 15         | 0,072 | 1,83  | 1,231   | 31,27 | 1,206           | 1,321 | 30,63      | 33,55       | <b>887</b>           | <b>R-35</b>   | <b>888</b>      | <b>R-35-A</b> | <b>M-20</b> | 1/2            | 12,7 |                   |                              |
| 1-1/2   | 38,1  | 16         | 0,065 | 1,65  | 1,245   | 31,62 | 1,206           | 1,321 | 30,63      | 33,55       | <b>887</b>           | <b>R-35</b>   | <b>888</b>      | <b>R-35-A</b> | <b>M-20</b> | 1/2            | 12,7 | K60-250           | TES3000 G400 or TESMini2 DU1 |
|         |       | 8          | 0,165 | 4,19  | 1,170   | 29,72 | 1,145           | 1,260 | 29,08      | 32,00       | <b>889</b>           | <b>R-34</b>   | <b>890</b>      | <b>R-34-A</b> | <b>M-19</b> | 1/2            | 12,7 |                   |                              |
|         |       | 9          | 0,148 | 3,76  | 1,204   | 30,58 | 1,179           | 1,294 | 29,95      | 32,87       | <b>885</b>           | <b>R-34</b>   | <b>886</b>      | <b>R-34-A</b> | <b>M-20</b> | 1/2            | 12,7 |                   |                              |
|         |       | 10         | 0,134 | 3,40  | 1,232   | 31,29 | 1,206           | 1,321 | 30,63      | 33,55       | <b>887</b>           | <b>R-35</b>   | <b>888</b>      | <b>R-35-A</b> | <b>M-20</b> | 1/2            | 12,7 |                   |                              |
|         |       | 11         | 0,120 | 3,05  | 1,260   | 32,00 | 1,235           | 1,350 | 31,37      | 34,29       | <b>891</b>           | <b>R-36</b>   | <b>892</b>      | <b>R-36-A</b> | <b>M-20</b> | 1/2            | 12,7 | K60-400           |                              |
|         |       | 12         | 0,109 | 2,77  | 1,282   | 32,56 | 1,257           | 1,372 | 31,93      | 34,85       | <b>893</b>           | <b>R-37</b>   | <b>894</b>      | <b>R-37-A</b> | <b>M-20</b> | 1/2            | 12,7 |                   |                              |
|         |       | 13         | 0,095 | 2,41  | 1,310   | 33,27 | 1,285           | 1,400 | 32,64      | 35,56       | <b>895</b>           | <b>R-37</b>   | <b>896</b>      | <b>R-37-A</b> | <b>M-21</b> | 1/2            | 12,7 |                   |                              |
|         |       | 14         | 0,083 | 2,11  | 1,334   | 33,88 | 1,285           | 1,400 | 32,64      | 35,56       | <b>895</b>           | <b>R-37</b>   | <b>896</b>      | <b>R-37-A</b> | <b>M-21</b> | 1/2            | 12,7 |                   |                              |
|         |       | 15         | 0,072 | 1,83  | 1,356   | 34,44 | 1,331           | 1,446 | 33,81      | 36,73       | <b>897</b>           | <b>R-38</b>   | <b>898</b>      | <b>R-38-A</b> | <b>M-21</b> | 1/2            | 12,7 | K60-400           |                              |
|         |       | 16         | 0,065 | 1,65  | 1,370   | 34,80 | 1,331           | 1,446 | 33,81      | 36,73       | <b>897</b>           | <b>R-38</b>   | <b>898</b>      | <b>R-38-A</b> | <b>M-21</b> | 1/2            | 12,7 |                   |                              |
|         |       | 17         | 0,058 | 1,47  | 1,384   | 35,15 | 1,331           | 1,472 | 33,81      | 37,39       | <b>899</b>           | <b>R-38</b>   | <b>900</b>      | <b>R-38-A</b> | <b>M-22</b> | 1/2            | 12,7 |                   |                              |
|         |       | 18         | 0,049 | 1,24  | 1,402   | 35,61 | 1,331           | 1,472 | 33,81      | 37,39       | <b>899</b>           | <b>R-38</b>   | <b>900</b>      | <b>R-38-A</b> | <b>M-22</b> | 1/2            | 12,7 |                   |                              |
| 19      | 0,042 | 1,07       | 1,416 | 35,97 | 1,331   | 1,472 | 33,81           | 37,39 | <b>899</b> | <b>R-38</b> | <b>900</b>           | <b>R-38-A</b> | <b>M-22</b>     | 1/2           | 12,7        | K60-400        |      |                   |                              |
| 20      | 0,035 | 0,89       | 1,430 | 36,32 | 1,331   | 1,472 | 33,81           | 37,39 | <b>899</b> | <b>R-38</b> | <b>900</b>           | <b>R-38-A</b> | <b>M-22</b>     | 1/2           | 12,7        |                |      |                   |                              |

\* Motor recommendation applies only to most popular cases with a standard percentage of the wall reduction. The recommendation can be different for thicker tube sheet, harder and exotic metal tube and a higher percentage of wall reduction.

### RECOMMENDATION

Recommended selection of thrust collars when rolling pipes from both sides to prevent the formation of stresses.



# 800-5 Five Roll Series

The 800-5 Series is designed with five rolling elements, making it ideal for thin-walled tubes. Rolls are available in two lengths. It is highly recommended for expanding tubes in condensers, coolers, heat exchangers, surface condensers, and FinFan coolers.



## WORKING RANGE

| TUBE ID          | TUBE OD        | TUBE SHEET     |
|------------------|----------------|----------------|
| 12,98 - 36,68 MM | 15,8 - 38,1 MM | 12,7 - 57,1 MM |
| 0,509" - 1,440"  | 5/8" to 1-1/2" | 1/2" to 2-1/4" |

## ADDITIONAL INFORMATION



How-to basics  
→ PAGE 11



Rolls range  
→ PAGE 10



Rolling motors  
→ PAGE 45

| TUBE OD |      | TUBE GAUGE |       | TUBE ID |       | EXPANSION RANGE |       |       |        | TUBE SHEET THICKNESS |          |                  |          | MANDREL  | MANDREL SQUARE |     | PNEUMATIC MOTOR * | ELECTRIC MOTOR * |                                |
|---------|------|------------|-------|---------|-------|-----------------|-------|-------|--------|----------------------|----------|------------------|----------|----------|----------------|-----|-------------------|------------------|--------------------------------|
|         |      |            |       |         |       |                 |       |       |        | 1/2" TO 1-1/2"       |          | 1-1/4" TO 2-1/4" |          |          |                |     |                   |                  |                                |
|         |      |            |       |         |       | [INCH]          | [MM]  | [BWG] | [INCH] | [MM]                 | [INCH]   | [MM]             | MIN      |          | MAX            | MIN |                   |                  | MAX                            |
| 5/8     | 15,8 | 17         | 0,058 | 1,47    | 0,509 | 12,93           | 0,499 | 0,564 | 12,67  | 14,33                | 815-5    | R-4-5            | 816-5    | R-4-A-5  | M-816-5        | 3/8 | 9,5               | K50-1250         | TES3000 G1000 or TESMini2 DUO  |
|         |      | 18         | 0,049 | 1,24    | 0,527 | 13,39           | 0,517 | 0,572 | 13,13  | 14,53                | 817-5    | R-4-5            | 818-5    | R-4-A-5  | M-9            | 3/8 | 9,5               |                  |                                |
|         |      | 19         | 0,042 | 1,07    | 0,541 | 13,74           | 0,522 | 0,582 | 13,26  | 14,78                | 819-5    | R-4-5            | 820-5    | R-4-A-5  | M-820-5        | 3/8 | 9,5               |                  |                                |
|         |      | 20         | 0,035 | 0,89    | 0,555 | 14,10           | 0,536 | 0,596 | 13,61  | 15,14                | 819-5[S] | R-4-5            | 820-5[S] | R-4-A-5  | 820-5[S]       | 3/8 | 9,5               |                  |                                |
|         |      | 21         | 0,032 | 0,81    | 0,561 | 14,25           | 0,536 | 0,596 | 13,61  | 15,14                | 819-5[S] | R-4-5            | 820-5[S] | R-4-A-5  | 820-5[S]       | 3/8 | 9,5               |                  |                                |
|         |      | 22         | 0,028 | 0,71    | 0,569 | 14,45           | 0,536 | 0,596 | 13,61  | 15,14                | 819-5[S] | R-4-5            | 820-5[S] | R-4-A-5  | 820-5[S]       | 3/8 | 9,5               |                  |                                |
| 3/4     | 19,0 | 13         | 0,095 | 2,41    | 0,560 | 14,22           | 0,550 | 0,615 | 13,97  | 15,62                | 821-5    | R-5-5            | 822-5    | R-5-A-5  | M-822-5        | 3/8 | 9,5               | K50-600          | TES3000 + G1450 TesMini2 + ES2 |
|         |      | 14         | 0,083 | 2,11    | 0,584 | 14,83           | 0,574 | 0,639 | 14,58  | 16,23                | 823-5    | R-6-5            | 824-5    | R-6-A-5  | M-824-5        | 3/8 | 9,5               |                  |                                |
|         |      | 15         | 0,072 | 1,83    | 0,606 | 15,39           | 0,590 | 0,661 | 14,99  | 16,79                | 825-5    | R-7-5            | 826-5    | R-7-A-5  | M-826-5        | 3/8 | 9,5               |                  |                                |
|         |      | 16         | 0,065 | 1,65    | 0,620 | 15,75           | 0,605 | 0,685 | 15,37  | 17,40                | 827-5    | R-7-5            | 828-5    | R-7-A-5  | M-13           | 3/8 | 9,5               | K50-1250         | TES3000 G1000 or TESMini2 DUO  |
|         |      | 17         | 0,058 | 1,47    | 0,634 | 16,10           | 0,619 | 0,699 | 15,72  | 17,75                | 829-5    | R-7-5            | 830-5    | R-7-A-5  | M-830-5        | 3/8 | 9,5               |                  |                                |
|         |      | 18         | 0,049 | 1,24    | 0,652 | 16,56           | 0,619 | 0,699 | 15,72  | 17,75                | 829-5    | R-7-5            | 830-5    | R-7-A-5  | M-830-5        | 3/8 | 9,5               |                  |                                |
|         |      | 19         | 0,042 | 1,07    | 0,666 | 16,92           | 0,642 | 0,722 | 16,31  | 18,34                | 831-5    | R-9-5            | 832-5    | R-9-A-5  | M-13           | 3/8 | 9,5               |                  |                                |
|         |      | 20         | 0,035 | 0,89    | 0,680 | 17,27           | 0,642 | 0,722 | 16,31  | 18,34                | 831-5    | R-9-5            | 832-5    | R-9-A-5  | M-13           | 3/8 | 9,5               |                  |                                |
|         |      | 21         | 0,032 | 0,81    | 0,686 | 17,42           | 0,642 | 0,722 | 16,31  | 18,34                | 831-5    | R-9-5            | 832-5    | R-9-A-5  | M-13           | 3/8 | 9,5               |                  |                                |
|         |      | 22         | 0,028 | 0,71    | 0,694 | 17,63           | 0,642 | 0,722 | 16,31  | 18,34                | 831-5    | R-9-5            | 832-5    | R-9-A-5  | M-13           | 3/8 | 9,5               |                  |                                |
| 7/8     | 22,2 | 13         | 0,095 | 2,41    | 0,685 | 17,40           | 0,670 | 0,750 | 17,02  | 19,05                | 833-5    | R-9-5            | 834-5    | R-9-A-5  | M-14-3/8       | 3/8 | 9,5               | K50-600          | TES3000 G1450 or TESMini2 ES2  |
|         |      | 14         | 0,083 | 2,11    | 0,709 | 18,01           | 0,685 | 0,774 | 17,40  | 19,66                | 835-5    | R-10-5           | 836-5    | R-10-A-5 | M-15           | 3/8 | 9,5               |                  |                                |
|         |      | 16         | 0,065 | 1,65    | 0,745 | 18,92           | 0,726 | 0,815 | 18,44  | 20,70                | 839-5    | R-11-5           | 840-5    | R-11-A-5 | M-840-5        | 3/8 | 9,5               |                  |                                |
|         |      | 17         | 0,058 | 1,47    | 0,759 | 19,28           | 0,740 | 0,829 | 18,80  | 21,06                | 843-5    | R-11-5           | 844-5    | R-11-A-5 | M-17-3/8       | 3/8 | 9,5               | K50-1250         | TES3000 G1000 or TESMini2 DUO  |
|         |      | 18         | 0,049 | 1,24    | 0,777 | 19,74           | 0,740 | 0,829 | 18,80  | 21,06                | 843-5    | R-11-5           | 844-5    | R-11-A-5 | M-17-3/8       | 3/8 | 9,5               |                  |                                |
|         |      | 19         | 0,042 | 1,07    | 0,791 | 20,09           | 0,763 | 0,852 | 19,38  | 21,64                | 845-5    | R-11-5           | 846-5    | R-11-A-5 | M-18-3/8       | 3/8 | 9,5               |                  |                                |
|         |      | 20         | 0,035 | 0,89    | 0,805 | 20,45           | 0,763 | 0,852 | 19,38  | 21,64                | 845-5    | R-11-5           | 846-5    | R-11-A-5 | M-18-3/8       | 3/8 | 9,5               |                  |                                |
|         |      | 21         | 0,032 | 0,81    | 0,811 | 20,60           | 0,763 | 0,852 | 19,38  | 21,64                | 845-5    | R-11-5           | 846-5    | R-11-A-5 | M-18-3/8       | 3/8 | 9,5               |                  |                                |
|         |      | 22         | 0,028 | 0,71    | 0,819 | 20,80           | 0,763 | 0,852 | 19,38  | 21,64                | 845-5    | R-11-5           | 846-5    | R-11-A-5 | M-18-3/8       | 3/8 | 9,5               |                  |                                |

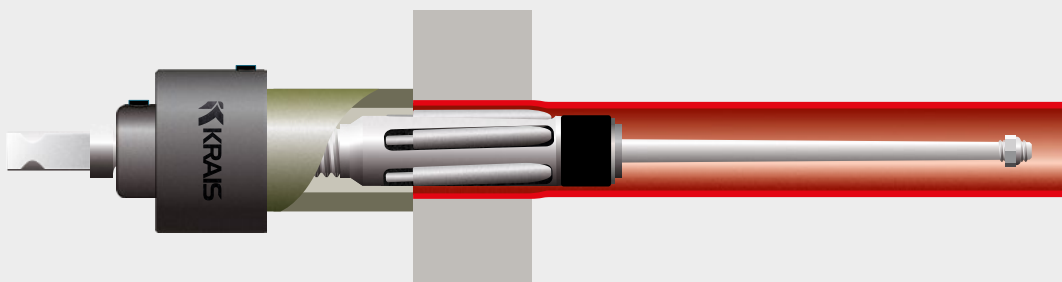
## 800-5 Five Roll Series

| TUBE OD |       | TUBE GAUGE |        |       | TUBE ID |       | EXPANSION RANGE |       |       |        | TUBE SHEET THICKNESS |          |                  |          | MANDREL  | MANDREL SQUARE |        | PNEUMATIC MOTOR * | ELECTRIC MOTOR *               |
|---------|-------|------------|--------|-------|---------|-------|-----------------|-------|-------|--------|----------------------|----------|------------------|----------|----------|----------------|--------|-------------------|--------------------------------|
|         |       |            |        |       |         |       |                 |       |       |        | 1/2" TO 1-1/2"       |          | 1-1/4" TO 2-1/4" |          |          |                |        |                   |                                |
|         |       |            |        |       |         |       | [INCH]          |       | [MM]  |        | 12,7 TO 38,1 MM      |          | 31,7 TO 57,1MM   |          |          |                | [INCH] |                   |                                |
| [INCH]  | [MM]  | [BWG]      | [INCH] | [MM]  | [INCH]  | [MM]  | MIN             | MAX   | MIN   | MAX    | TOOL NO.             | ROLL NO. | TOOL NO.         | ROLL NO. |          | [INCH]         | [MM]   |                   |                                |
| 1       | 25,4  | 12         | 0,109  | 2,77  | 0,782   | 19,86 | 0,763           | 0,852 | 19,38 | 21,64  | 845-5                | R-11-5   | 846-5            | R-11-A-5 | M-18-3/8 | 3/8            | 9,5    | K50-600           | TES3000 G1450 or TESMini2 ES2  |
|         |       | 13         | 0,095  | 2,41  | 0,810   | 20,57 | 0,791           | 0,880 | 20,09 | 22,35  | 847-5                | R-13-5   | 848-5            | R-13-A-5 | M-18-3/8 | 3/8            | 9,5    |                   |                                |
|         |       | 14         | 0,083  | 2,11  | 0,834   | 21,18 | 0,810           | 0,909 | 20,57 | 23,09  | 849-5                | R-12-5   | 850-5            | R-12-A-5 | M-850-5  | 3/8            | 9,5    |                   |                                |
|         |       | 15         | 0,072  | 1,83  | 0,856   | 21,74 | 0,837           | 0,936 | 21,26 | 23,77  | 851-5                | R-14-5   | 852-5            | R-14-A-5 | M-852-5  | 3/8            | 9,5    |                   |                                |
|         |       | 16         | 0,065  | 1,65  | 0,87    | 22,10 | 0,837           | 0,936 | 21,26 | 23,77  | 851-5                | R-13-5   | 852-5            | R-13-A-5 | M-852-5  | 3/8            | 9,5    |                   |                                |
|         |       | 17         | 0,058  | 1,47  | 0,884   | 22,45 | 0,865           | 0,964 | 21,97 | 24,49  | 855-5                | R-13-5   | 856-5            | R-13-A-5 | M-856-5  | 3/8            | 9,5    | K50-1250          | TES3000 G1000 or TESMini2 DU0  |
|         |       | 18         | 0,049  | 1,24  | 0,902   | 22,91 | 0,865           | 0,964 | 21,97 | 24,49  | 855-5                | R-13-5   | 856-5            | R-13-A-5 | M-856-5  | 3/8            | 9,5    |                   |                                |
|         |       | 19         | 0,042  | 1,07  | 0,916   | 23,27 | 0,865           | 0,964 | 21,97 | 24,49  | 855-5                | R-13-5   | 856-5            | R-13-A-5 | M-856-5  | 3/8            | 9,5    |                   |                                |
|         |       | 20         | 0,035  | 0,89  | 0,93    | 23,62 | 0,865           | 0,964 | 21,97 | 24,49  | 855-5                | R-13-5   | 856-5            | R-13-A-5 | M-856-5  | 3/8            | 9,5    |                   |                                |
|         |       | 21         | 0,032  | 0,81  | 0,936   | 23,77 | 0,883           | 0,982 | 22,43 | 24,94  | 857-5                | R-15-5   | 858-5            | R-15-A-5 | M-21-3/8 | 3/8            | 9,5    |                   |                                |
| 22      | 0,028 | 0,71       | 0,944  | 23,98 | 0,883   | 0,982 | 22,43           | 24,94 | 857-5 | R-15-5 | 858-5                | R-15-A-5 | M-21-3/8         | 3/8      | 9,5      |                |        |                   |                                |
| 1-1/8   | 28,5  | 12         | 0,109  | 2,77  | 0,907   | 23,04 | 0,883           | 0,982 | 22,43 | 24,94  | 857-5                | R-15-5   | 858-5            | R-15-A-5 | M-21-3/8 | 3/8            | 9,5    | K60-400           | TES3000 + G1000 TESMini2 + DU1 |
|         |       | 13         | 0,095  | 2,41  | 0,935   | 23,75 | 0,916           | 1,015 | 23,27 | 25,78  | 859-5                | R-16-5   | 860-5            | R-16-A-5 | M-860-5  | 1/2            | 12,7   |                   |                                |
|         |       | 14         | 0,083  | 2,11  | 0,959   | 24,36 | 0,935           | 1,044 | 23,75 | 26,52  | 861-5                | R-17-5   | 862-5            | R-17-A-5 | M-862-5  | 1/2            | 12,7   |                   |                                |
| 1-1/4   | 31,7  | 15         | 0,072  | 1,83  | 1,106   | 28,09 | 1,087           | 1,196 | 27,61 | 30,38  | 875-5                | R-21-5   | 876-5            | R-21-A-5 | M-876-5  | 1/2            | 12,7   | K60-400           | TES3000 G1000 or TESMini2 DU1  |
|         |       | 16         | 0,065  | 1,65  | 1,120   | 28,45 | 1,087           | 1,196 | 27,61 | 30,38  | 875-5                | R-21-5   | 876-5            | R-21-A-5 | M-876-5  | 1/2            | 12,7   |                   |                                |
|         |       | 17         | 0,058  | 1,47  | 1,134   | 28,80 | 1,115           | 1,231 | 28,32 | 31,27  | 879-5                | R-21-5   | 880-5            | R-21-A-5 | M-880-5  | 1/2            | 12,7   |                   |                                |
|         |       | 18         | 0,049  | 1,24  | 1,152   | 29,26 | 1,115           | 1,231 | 28,32 | 31,27  | 879-5                | R-21-5   | 880-5            | R-21-A-5 | M-880-5  | 1/2            | 12,7   |                   |                                |
|         |       | 19         | 0,042  | 1,07  | 1,166   | 29,62 | 1,115           | 1,231 | 28,32 | 31,27  | 879-5                | R-21-5   | 880-5            | R-21-A-5 | M-880-5  | 1/2            | 12,7   |                   |                                |
|         |       | 20         | 0,035  | 0,89  | 1,180   | 29,97 | 1,115           | 1,231 | 28,32 | 31,27  | 879-5                | R-21-5   | 880-5            | R-21-A-5 | M-880-5  | 1/2            | 12,7   |                   |                                |
|         |       | 21         | 0,032  | 0,81  | 1,186   | 30,12 | 1,115           | 1,231 | 28,32 | 31,27  | 879-5                | R-21-5   | 880-5            | R-21-A-5 | M-880-5  | 1/2            | 12,7   |                   |                                |
| 22      | 0,028 | 0,71       | 1,194  | 30,33 | 1,115   | 1,231 | 28,32           | 31,27 | 879-5 | R-21-5 | 880-5                | R-21-A-5 | M-880-5          | 1/2      | 12,7     |                |        |                   |                                |
| 1-3/8   | 34,9  | 12         | 0,109  | 2,77  | 1,157   | 29,39 | 1,133           | 1,242 | 28,78 | 31,55  | 881-5                | R-21-5   | 882-5            | R-21-A-5 | M-882-5  | 1/2            | 12,7   | K60-250           |                                |
|         |       | 14         | 0,083  | 2,11  | 1,209   | 30,71 | 1,179           | 1,294 | 29,95 | 32,87  | 885-5                | R-23-5   | 886-5            | R-23-A-5 | M-882-5  | 1/2            | 12,7   |                   |                                |
| 1-1/2   | 38,1  | 17         | 0,058  | 1,47  | 1,384   | 35,15 | 1,331           | 1,472 | 33,81 | 37,39  | 899-5                | R-29-5   | 900-5            | R-29-A-5 | M-900-5  | 1/2            | 12,7   | K60-900           | TES3000 G1000 or TESMini2 ES2  |
|         |       | 18         | 0,049  | 1,24  | 1,402   | 35,61 | 1,331           | 1,472 | 33,81 | 37,39  | 899-5                | R-29-5   | 900-5            | R-29-A-5 | M-900-5  | 1/2            | 12,7   |                   |                                |
|         |       | 19         | 0,042  | 1,07  | 1,416   | 35,97 | 1,331           | 1,472 | 33,81 | 37,39  | 899-5                | R-29-5   | 900-5            | R-29-A-5 | M-900-5  | 1/2            | 12,7   |                   |                                |
|         |       | 20         | 0,035  | 0,89  | 1,430   | 36,32 | 1,331           | 1,472 | 33,81 | 37,39  | 899-5                | R-29-5   | 900-5            | R-29-A-5 | M-900-5  | 1/2            | 12,7   |                   |                                |
|         |       | 21         | 0,032  | 0,81  | 1,436   | 36,47 | 1,331           | 1,472 | 33,81 | 37,39  | 899-5                | R-29-5   | 900-5            | R-29-A-5 | M-900-5  | 1/2            | 12,7   |                   |                                |
|         |       | 22         | 0,028  | 0,71  | 1,444   | 36,68 | 1,331           | 1,472 | 33,81 | 37,39  | 899-5                | R-29-5   | 900-5            | R-29-A-5 | M-900-5  | 1/2            | 12,7   |                   |                                |

\* Motor recommendation applies only to most popular cases with a standard percentage of the wall reduction. The recommendation can be different for thicker tube sheet, harder and exotic metal tube and a higher percentage of wall reduction.

### RECOMMENDATION

For the thin wall tube, it is recommended to use 5 roll expanders with bottle rolls (BL) type rolls and BL type thrust collar to prevent the tube to be retracted inside the thrust collar making the tube projection uneven or even effectively jammed the tube inside collar.





# 1200 Series

The 1200 Series offers an extended reach for expanding tubes in the most common sizes. It comes with three expansion rolls, which are available in two lengths. Tool provides a long and adjustable working range. This tool is also available in extended versions and is ideal for use in condensers, coolers, heat exchangers, surface condensers, and FinFan coolers.



## WORKING RANGE

| TUBE ID         | TUBE OD        | TUBE SHEET      |
|-----------------|----------------|-----------------|
| 8,48 - 36,32 MM | 12,7 - 38,1 MM | See table below |
| 0,334 - 1,430"  | 1/2" to 1-1/2" |                 |

## ADDITIONAL INFORMATION



How-to basics  
→ PAGE 11



Rolls range  
→ PAGE 10



Rolling motors  
→ PAGE 45

## TUBE SHEET THICKNESS

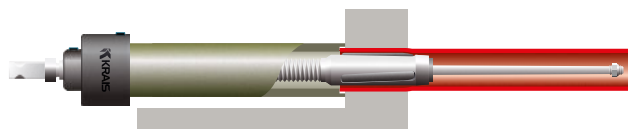
| ROLLS          | REACH | TUBE SHEET THICKNESS |                 |
|----------------|-------|----------------------|-----------------|
|                |       | [INCH]               | [MM]            |
| 1 1/2"<br>38,1 | STD   | 1 1/2 - 6"           | 38,1 - 152,4 mm |
|                | A     | 1 1/2 - 8"           | 38,1 - 203,2 mm |
|                | B     | 1 1/2 - 10"          | 38,1 - 254,0 mm |
|                | C     | 1 1/2 - 12"          | 38,1 - 304,8 mm |
| 2 1/4"<br>57,1 | STD   | 2 1/4 - 6 3/4"       | 57,1 - 171,4 mm |
|                | A     | 2 1/4 - 8 3/4"       | 57,1 - 222,2 mm |
|                | B     | 2 1/4 - 10 3/4"      | 57,1 - 273,0 mm |
|                | C     | 2 1/4 - 12 3/4"      | 57,1 - 323,8 mm |

### NOTE!

Please note that expanders are equipped with "UNIVERSAL NOSE PIECE" which shorten the expansion reach by 3/4". In order to receive full expansion reach, expander has to be equipped with "SHORT NOSE PIECE".

### OPTIONAL

Special extended thrust collars to reach the face of the tube sheet



| TUBE OD |       | TUBE GAUGE |       |       | TUBE ID |       | EXPANSION RANGE |       |         |        | TUBE SHEET THICKNESS |        |                  |       | MANDREL | MANDREL SQUARE |     | PNEUMATIC MOTOR * | ELECTRIC MOTOR *              |
|---------|-------|------------|-------|-------|---------|-------|-----------------|-------|---------|--------|----------------------|--------|------------------|-------|---------|----------------|-----|-------------------|-------------------------------|
|         |       |            |       |       |         |       |                 |       |         |        | 1/2" TO 6"           |        | 2-1/4" TO 6-3/4" |       |         |                |     |                   |                               |
|         |       |            |       |       |         |       | [INCH]          | [MM]  | [BWG]   | [INCH] | [MM]                 | [INCH] | [MM]             | MIN   |         | MAX            | MIN |                   |                               |
| 3/8     | 9,5   | 22-24      | 0,027 | 0,71  | 0,314   | 8,00  | 0,307           | 0,358 | 7,80    | 9,10   | 1195                 | 795    | -                | -     |         | M-1195         | 3/8 |                   |                               |
| 1/2     | 12,7  | 14         | 0,083 | 2,11  | 0,334   | 8,48  | 0,324           | 0,374 | 8,23    | 9,50   | 1197                 | 797    | -                | -     | 1197    | 3/8            | 9,5 |                   |                               |
|         |       | 15         | 0,072 | 1,83  | 0,356   | 9,04  | 0,348           | 0,398 | 8,84    | 10,11  | 1199                 | R-1    | -                | -     | 1199    | 3/8            | 9,5 |                   |                               |
|         |       | 16         | 0,065 | 1,65  | 0,370   | 9,40  | 0,36            | 0,41  | 9,14    | 10,41  | 1201                 | R-1    | -                | -     | M-51    | 3/8            | 9,5 |                   |                               |
|         |       | 17         | 0,058 | 1,47  | 0,384   | 9,75  | 0,374           | 0,424 | 9,50    | 10,77  | 1203                 | R-2    | -                | -     | M-51    | 3/8            | 9,5 |                   |                               |
|         |       | 18         | 0,049 | 1,24  | 0,402   | 10,21 | 0,392           | 0,447 | 9,96    | 11,35  | 1205                 | R-3    | -                | -     | M-52    | 3/8            | 9,5 | K20-1800          |                               |
| 20      | 0,035 | 0,89       | 0,430 | 10,92 | 0,406   | 0,461 | 10,31           | 11,71 | 1205[S] | R-3    | -                    | -      | M-53             | 3/8   | 9,5     |                |     |                   |                               |
| 5/8     | 15,8  | 12         | 0,109 | 2,77  | 0,407   | 10,34 | 0,392           | 0,447 | 9,96    | 11,35  | 1205                 | R-3    | -                | -     | M-52    | 3/8            | 9,5 | K50-600           | TES3000 G1450 or TesMini2 ES2 |
|         |       | 13         | 0,095 | 2,41  | 0,435   | 11,05 | 0,425           | 0,480 | 10,80   | 12,19  | 1207                 | R-4    | -                | -     | M-53    | 3/8            | 9,5 |                   |                               |
|         |       | 14         | 0,083 | 2,11  | 0,459   | 11,66 | 0,449           | 0,509 | 11,40   | 12,93  | 1209                 | R-4    | 1210             | R-4-A | M-54    | 3/8            | 9,5 |                   |                               |
|         |       | 15         | 0,072 | 1,83  | 0,481   | 12,22 | 0,471           | 0,536 | 11,96   | 13,61  | 1211                 | R-5    | 1212             | R-5A  | M-55    | 3/8            | 9,5 |                   |                               |



## 1200 Series

| TUBE OD |      | TUBE GAUGE |       |      | TUBE ID |       | EXPANSION RANGE |       |       |        | TUBE SHEET THICKNESS |        |                  |        | MANDREL   | MANDREL SQUARE |      | PNEUMATIC MOTOR * | ELECTRIC MOTOR *               |
|---------|------|------------|-------|------|---------|-------|-----------------|-------|-------|--------|----------------------|--------|------------------|--------|-----------|----------------|------|-------------------|--------------------------------|
|         |      |            |       |      |         |       |                 |       |       |        | 1/2" TO 6"           |        | 2-1/4" TO 6-3/4" |        |           |                |      |                   |                                |
|         |      |            |       |      |         |       | [INCH]          | [MM]  | [BWG] | [INCH] | [MM]                 | [INCH] | [MM]             | MIN    |           |                |      |                   |                                |
| 5/8     | 15,8 | 16         | 0,065 | 1,65 | 0,495   | 12,57 | 0,485           | 0,550 | 12,32 | 13,97  | 1213                 | R-6    | 1214             | R-6A   | M-55      | 3/8            | 9,5  | K50-1250          | TES3000 G1000 or TESMini2 DUO  |
|         |      | 17         | 0,058 | 1,47 | 0,509   | 12,93 | 0,499           | 0,564 | 12,67 | 14,33  | 1215                 | R-6    | 1216             | R-6A   | M-56      | 3/8            | 9,5  |                   |                                |
|         |      | 18         | 0,049 | 1,24 | 0,527   | 13,39 | 0,517           | 0,572 | 13,13 | 14,53  | 1217                 | R-7    | 1218             | R-7-A  | M-58 M-55 | 3/8            | 9,5  |                   |                                |
|         |      | 19         | 0,042 | 1,07 | 0,541   | 13,74 | 0,522           | 0,582 | 13,26 | 14,78  | 1219                 | R-7    | 1220             | R-7-A  | M-56      | 3/8            | 9,5  |                   |                                |
|         |      | 20         | 0,035 | 0,89 | 0,555   | 14,10 | 0,536           | 0,596 | 13,61 | 15,14  | 1219[S]              | R-7    | 1220[S]          | R-7-A  | M-58      | 3/8            | 9,5  |                   |                                |
|         |      | 21         | 0,032 | 0,81 | 0,561   | 14,25 | 0,536           | 0,596 | 13,61 | 15,14  | 1219[S]              | R-7    | 1220[S]          | R-7-A  | M-58      | 3/8            | 9,5  |                   |                                |
|         |      | 22         | 0,028 | 0,71 | 0,569   | 14,45 | 0,536           | 0,596 | 13,61 | 15,14  | 1219[S]              | R-7    | 1220[S]          | R-7-A  | M-58      | 3/8            | 9,5  |                   |                                |
| 3/4     | 19   | 10         | 0,134 | 3,40 | 0,482   | 12,24 | 0,471           | 0,536 | 11,96 | 13,61  | 1211                 | R-5    | 1212             | R-5-A  | M-55      | 3/8            | 9,5  | K60-900           | TES3000 + G1000 TESMini2 + ES2 |
|         |      | 11         | 0,120 | 3,05 | 0,510   | 12,95 | 0,499           | 0,564 | 12,67 | 14,33  | 1215                 | R-6    | 1216             | R-6-A  | M-56      | 3/8            | 9,5  |                   |                                |
|         |      | 12         | 0,109 | 2,77 | 0,532   | 13,51 | 0,522           | 0,582 | 13,26 | 14,78  | 1219                 | R-7    | 1220             | R-7-A  | M-56      | 3/8            | 9,5  |                   |                                |
|         |      | 13         | 0,095 | 2,41 | 0,560   | 14,22 | 0,55            | 0,615 | 13,97 | 15,62  | 1221                 | R-8    | 1222             | R-8-A  | M-58      | 3/8            | 9,5  | K50-400           | TES3000 G1450 or TESMini2 ES2  |
|         |      | 14         | 0,083 | 2,11 | 0,584   | 14,83 | 0,574           | 0,639 | 14,58 | 16,23  | 1223                 | R-9    | 1224             | R-9-A  | M-58      | 3/8            | 9,5  |                   |                                |
|         |      | 15         | 0,072 | 1,83 | 0,606   | 15,39 | 0,596           | 0,661 | 15,14 | 16,79  | 1225                 | R-10   | 1226             | R-10-A | M-58      | 3/8            | 9,5  | K50-600           |                                |
|         |      | 16         | 0,065 | 1,65 | 0,620   | 15,75 | 0,605           | 0,685 | 15,37 | 17,40  | 1227                 | R-10   | 1228             | R-10-A | M-59      | 3/8            | 9,5  |                   |                                |
|         |      | 17         | 0,058 | 1,47 | 0,634   | 16,10 | 0,619           | 0,699 | 15,72 | 17,75  | 1229                 | R-11   | 1230             | R-11-A | M-59      | 3/8            | 9,5  | K60-900           | TES3000 G1000 or TESMini2 DUO  |
|         |      | 18         | 0,049 | 1,24 | 0,652   | 16,56 | 0,619           | 0,699 | 15,72 | 17,75  | 1229                 | R-11   | 1230             | R-11-A | M-59      | 3/8            | 9,5  |                   |                                |
|         |      | 19         | 0,042 | 1,07 | 0,666   | 16,92 | 0,642           | 0,722 | 16,31 | 18,34  | 1231                 | R-12   | 1232             | R-12-A | M-59      | 3/8            | 9,5  |                   |                                |
|         |      | 20         | 0,035 | 0,89 | 0,680   | 17,27 | 0,642           | 0,722 | 16,31 | 18,34  | 1231                 | R-12   | 1232             | R-12-A | M-59      | 3/8            | 9,5  |                   |                                |
|         |      | 21         | 0,032 | 0,81 | 0,686   | 17,42 | 0,642           | 0,722 | 16,31 | 18,34  | 1231                 | R-12   | 1232             | R-12-A | M-59      | 3/8            | 9,5  |                   |                                |
|         |      | 22         | 0,028 | 0,71 | 0,694   | 17,63 | 0,642           | 0,722 | 16,31 | 18,34  | 1231                 | R-12   | 1232             | R-12-A | M-59      | 3/8            | 9,5  |                   |                                |
| 7/8     | 22,2 | 10         | 0,134 | 3,40 | 0,607   | 15,42 | 0,596           | 0,661 | 15,14 | 16,79  | 1225                 | R-10   | 1226             | R-10-A | M-58      | 3/8            | 9,5  | K50-400           | TES3000 G1000 or TESMini2 ES2  |
|         |      | 11         | 0,120 | 3,05 | 0,635   | 16,13 | 0,619           | 0,699 | 15,72 | 17,75  | 1229                 | R-11   | 1230             | R-11-A | M-59      | 3/8            | 9,5  |                   |                                |
|         |      | 12         | 0,109 | 2,77 | 0,657   | 16,69 | 0,642           | 0,722 | 16,31 | 18,34  | 1231                 | R-12   | 1232             | R-12-A | M-59      | 3/8            | 9,5  |                   |                                |
|         |      | 13         | 0,095 | 2,41 | 0,685   | 17,40 | 0,67            | 0,750 | 17,02 | 19,05  | 1233                 | R-13   | 1234             | R-13-A | M-60      | 3/8            | 9,5  | K50-600           |                                |
|         |      | 14         | 0,083 | 2,11 | 0,709   | 18,01 | 0,685           | 0,774 | 17,40 | 19,66  | 1235                 | R-14   | 1236             | R-14-A | M-61      | 3/8            | 9,5  |                   |                                |
|         |      | 15         | 0,072 | 1,83 | 0,731   | 18,57 | 0,712           | 0,801 | 18,08 | 20,35  | 1237                 | R-15   | 1238             | R-15-A | M-61      | 3/8            | 9,5  |                   |                                |
|         |      | 16         | 0,065 | 1,65 | 0,745   | 18,92 | 0,726           | 0,815 | 18,44 | 20,70  | 1239                 | R-15   | 1240             | R-15-A | M-62      | 3/8            | 9,5  | K50-1250          | TES3000 + G1450 TESMini2 ES2   |
|         |      | 17         | 0,058 | 1,47 | 0,759   | 19,28 | 0,740           | 0,829 | 18,80 | 21,06  | 1243                 | R-16   | 1244             | R-16-A | M-62      | 3/8            | 9,5  |                   |                                |
| 1       | 25,4 | 18         | 0,049 | 1,24 | 0,777   | 19,74 | 0,740           | 0,829 | 18,80 | 21,06  | 1243                 | R-16   | 1244             | R-16-A | M-62      | 3/8            | 9,5  | K60-400           | TES3000 G1000 or TESMini2 ES2  |
|         |      | 8          | 0,165 | 4,19 | 0,670   | 17,02 | 0,655           | 0,735 | 16,64 | 18,67  | 1241                 | R-13   | 1242             | R-13-A | M-59      | 3/8            | 9,5  |                   |                                |
|         |      | 9          | 0,148 | 3,76 | 0,704   | 17,88 | 0,685           | 0,774 | 17,40 | 19,66  | 1235                 | R-14   | 1236             | R-14-A | M-61      | 3/8            | 9,5  |                   |                                |
|         |      | 10         | 0,134 | 3,40 | 0,732   | 18,59 | 0,712           | 0,801 | 18,08 | 20,35  | 1237                 | R-15   | 1238             | R-15-A | M-61      | 3/8            | 9,5  |                   |                                |
|         |      | 11         | 0,120 | 3,05 | 0,760   | 19,30 | 0,740           | 0,829 | 18,80 | 21,06  | 1243                 | R-16   | 1244             | R-16-A | M-62      | 3/8            | 9,5  |                   |                                |
|         |      | 12         | 0,109 | 2,77 | 0,782   | 19,86 | 0,763           | 0,852 | 19,38 | 21,64  | 1245                 | R-17   | 1246             | R-17-A | M-62      | 3/8            | 9,5  |                   |                                |
|         |      | 13         | 0,095 | 2,41 | 0,810   | 20,57 | 0,791           | 0,880 | 20,09 | 22,35  | 1247                 | R-18   | 1248             | R-18-A | M-62      | 3/8            | 9,5  |                   |                                |
|         |      | 14         | 0,083 | 2,11 | 0,834   | 21,18 | 0,810           | 0,909 | 20,57 | 23,09  | 1249                 | R-18   | 1250             | R-18-A | M-63      | 3/8            | 9,5  |                   |                                |
|         |      | 15         | 0,072 | 1,83 | 0,856   | 21,74 | 0,837           | 0,936 | 21,26 | 23,77  | 1251                 | R-19   | 1252             | R-19-A | M-63      | 3/8            | 9,5  |                   |                                |
|         |      | 16         | 0,065 | 1,65 | 0,870   | 22,10 | 0,837           | 0,936 | 21,26 | 23,77  | 1251                 | R-19   | 1252             | R-19-A | M-63      | 3/8            | 9,5  |                   |                                |
|         |      | 17         | 0,058 | 1,47 | 0,884   | 22,45 | 0,865           | 0,964 | 21,97 | 24,49  | 1255                 | R-21   | 1256             | R-21-A | M-63      | 3/8            | 9,5  |                   |                                |
|         |      | 18         | 0,049 | 1,24 | 0,902   | 22,91 | 0,865           | 0,964 | 21,97 | 24,49  | 1255                 | R-21   | 1256             | R-21-A | M-63      | 3/8            | 9,5  |                   |                                |
| 1-1/8   | 28,5 | 19         | 0,042 | 1,07 | 0,916   | 23,27 | 0,865           | 0,964 | 21,97 | 24,49  | 1255                 | R-21   | 1256             | R-21-A | M-63      | 3/8            | 9,5  | K60-400           | TES3000 G1000 or TESMini2 DU1  |
|         |      | 20         | 0,035 | 0,89 | 0,930   | 23,62 | 0,865           | 0,964 | 21,97 | 24,49  | 1255                 | R-21   | 1256             | R-21-A | M-63      | 3/8            | 9,5  |                   |                                |
|         |      | 8          | 0,165 | 4,19 | 0,795   | 20,19 | 0,776           | 0,875 | 19,71 | 22,23  | 1253                 | R-20   | 1254             | R-20-A | M-63      | 3/8            | 9,5  |                   |                                |
|         |      | 9          | 0,148 | 3,76 | 0,829   | 21,06 | 0,810           | 0,909 | 20,57 | 23,09  | 1249                 | R-18   | 1250             | R-18-A | M-63      | 3/8            | 9,5  |                   |                                |
|         |      | 10         | 0,134 | 3,40 | 0,857   | 21,77 | 0,837           | 0,936 | 21,26 | 23,77  | 1251                 | R-19   | 1252             | R-19-A | M-63      | 3/8            | 9,5  |                   |                                |
|         |      | 11         | 0,120 | 3,05 | 0,885   | 22,48 | 0,865           | 0,964 | 21,97 | 24,49  | 1255                 | R-21   | 1256             | R-21-A | M-63      | 3/8            | 9,5  |                   |                                |
|         |      | 12         | 0,109 | 2,77 | 0,907   | 23,04 | 0,883           | 0,982 | 22,43 | 24,94  | 1257                 | R-21   | 1258             | R-21-A | M-64      | 1/2            | 12,7 |                   |                                |
|         |      | 13         | 0,095 | 2,41 | 0,935   | 23,75 | 0,916           | 1,015 | 23,27 | 25,78  | 1259                 | R-22   | 1260             | R-22-A | M-64      | 1/2            | 12,7 |                   |                                |
|         |      | 14         | 0,083 | 2,11 | 0,959   | 24,36 | 0,935           | 1,044 | 23,75 | 26,52  | 1261                 | R-23   | 1262             | R-23-A | M-65      | 1/2            | 12,7 |                   |                                |
|         |      | 15         | 0,072 | 1,83 | 0,981   | 24,92 | 0,962           | 1,071 | 24,43 | 27,20  | 1263                 | R-24   | 1264             | R-24-A | M-65      | 1/2            | 12,7 |                   |                                |
|         |      | 16         | 0,065 | 1,65 | 0,995   | 25,27 | 0,962           | 1,071 | 24,43 | 27,20  | 1263                 | R-24   | 1264             | R-24-A | M-65      | 1/2            | 12,7 |                   |                                |
|         |      | 17         | 0,058 | 1,47 | 1,009   | 25,63 | 0,990           | 1,099 | 25,15 | 27,91  | 1267                 | R-26   | 1268             | R-26-A | M-66      | 1/2            | 12,7 |                   |                                |
|         |      | 18         | 0,049 | 1,24 | 1,027   | 26,09 | 0,990           | 1,099 | 25,15 | 27,91  | 1267                 | R-26   | 1268             | R-26-A | M-66      | 1/2            | 12,7 |                   |                                |

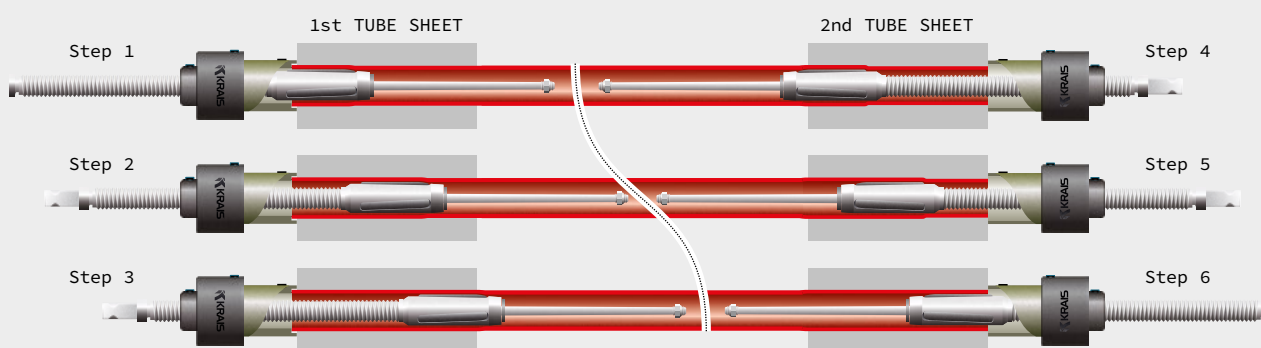
## 1200 Series

| TUBE OD |       | TUBE GAUGE |       |       | TUBE ID |       | EXPANSION RANGE |       |       |        | TUBE SHEET THICKNESS |        |                  |        | MANDREL | MANDREL SQUARE |      | PNEUMATIC MOTOR * | ELECTRIC MOTOR *              |     |
|---------|-------|------------|-------|-------|---------|-------|-----------------|-------|-------|--------|----------------------|--------|------------------|--------|---------|----------------|------|-------------------|-------------------------------|-----|
|         |       |            |       |       |         |       |                 |       |       |        | 1/2" TO 6"           |        | 2-1/4" TO 6-3/4" |        |         |                |      |                   |                               |     |
|         |       |            |       |       |         |       | [INCH]          | [MM]  | [BWG] | [INCH] | [MM]                 | [INCH] | [MM]             | MIN    |         | MAX            | MIN  |                   |                               | MAX |
| 1-1/4   | 31,7  | 8          | 0,165 | 4,19  | 0,92    | 23,37 | 0,901           | 1,010 | 22,89 | 25,65  | 1265                 | R-25   | 1266             | R-25-A | M-65    | 1/2            | 12,7 | K60-400           | TES3000 G1000 or TESMini2 DU1 |     |
|         |       | 9          | 0,148 | 3,76  | 0,954   | 24,23 | 0,935           | 1,044 | 23,75 | 26,52  | 1261                 | R-23   | 1262             | R-23-A | M-65    | 1/2            | 12,7 |                   |                               |     |
|         |       | 10         | 0,134 | 3,40  | 0,982   | 24,94 | 0,962           | 1,071 | 24,43 | 27,20  | 1263                 | R-24   | 1264             | R-24-A | M-65    | 1/2            | 12,7 |                   |                               |     |
|         |       | 11         | 0,120 | 3,05  | 1,010   | 25,65 | 0,990           | 1,099 | 25,15 | 27,91  | 1267                 | R-26   | 1268             | R-26-A | M-66    | 1/2            | 12,7 |                   |                               |     |
|         |       | 12         | 0,109 | 2,77  | 1,032   | 26,21 | 1,013           | 1,122 | 25,73 | 28,50  | 1269                 | R-27   | 1270             | R-27-A | M-66    | 1/2            | 12,7 |                   |                               |     |
|         |       | 13         | 0,095 | 2,41  | 1,060   | 26,92 | 1,041           | 1,150 | 26,44 | 29,21  | 1271                 | R-28   | 1272             | R-28-A | M-67    | 1/2            | 12,7 |                   |                               |     |
|         |       | 14         | 0,083 | 2,11  | 1,084   | 27,53 | 1,060           | 1,169 | 26,92 | 29,69  | 1273                 | R-29   | 1274             | R-29-A | M-67    | 1/2            | 12,7 |                   |                               |     |
|         |       | 15         | 0,072 | 1,83  | 1,106   | 28,09 | 1,087           | 1,196 | 27,61 | 30,38  | 1275                 | R-30   | 1276             | R-30-A | M-67    | 1/2            | 12,7 |                   |                               |     |
|         |       | 16         | 0,065 | 1,65  | 1,12    | 28,45 | 1,087           | 1,196 | 27,61 | 30,38  | 1275                 | R-30   | 1276             | R-30-A | M-67    | 1/2            | 12,7 |                   |                               |     |
|         |       | 17         | 0,058 | 1,47  | 1,134   | 28,80 | 1,115           | 1,224 | 28,32 | 31,09  | 1279                 | R-30   | 1280             | R-30-A | M-68    | 1/2            | 12,7 |                   |                               |     |
| 1-3/8   | 34,9  | 8          | 0,165 | 4,19  | 1,045   | 26,54 | 1,026           | 1,135 | 26,06 | 28,83  | 1277                 | R-31   | 1278             | R-31-A | M-67    | 1/2            | 12,7 | K60-250           | TES3000 G400 or TESMini2 DU1  |     |
|         |       | 9          | 0,148 | 3,76  | 1,079   | 27,41 | 1,060           | 1,169 | 26,92 | 29,69  | 1273                 | R-29   | 1274             | R-29-A | M-67    | 1/2            | 12,7 |                   |                               |     |
|         |       | 10         | 0,134 | 3,40  | 1,107   | 28,12 | 1,087           | 1,196 | 27,61 | 30,38  | 1275                 | R-30   | 1276             | R-30-A | M-67    | 1/2            | 12,7 |                   |                               |     |
|         |       | 11         | 0,120 | 3,05  | 1,135   | 28,83 | 1,115           | 1,224 | 28,32 | 31,09  | 1279                 | R-30   | 1280             | R-30-A | M-68    | 1/2            | 12,7 |                   |                               |     |
|         |       | 12         | 0,109 | 2,77  | 1,157   | 29,39 | 1,133           | 1,242 | 28,78 | 31,55  | 1281                 | R-32   | 1282             | R-32-A | M-68    | 1/2            | 12,7 | K60-400           |                               |     |
|         |       | 13         | 0,095 | 2,41  | 1,185   | 30,10 | 1,160           | 1,275 | 29,46 | 32,39  | 1283                 | R-33   | 1284             | R-33-A | M-69    | 1/2            | 12,7 |                   |                               |     |
|         |       | 14         | 0,083 | 2,11  | 1,209   | 30,71 | 1,179           | 1,294 | 29,95 | 32,87  | 1285                 | R-34   | 1286             | R-34-A | M-70    | 1/2            | 12,7 |                   |                               |     |
|         |       | 15         | 0,072 | 1,83  | 1,231   | 31,27 | 1,206           | 1,321 | 30,63 | 33,55  | 1287                 | R-35   | 1288             | R-35-A | M-70    | 1/2            | 12,7 |                   |                               |     |
|         |       | 16         | 0,065 | 1,65  | 1,245   | 31,62 | 1,206           | 1,321 | 30,63 | 33,55  | 1287                 | R-35   | 1288             | R-35-A | M-70    | 1/2            | 12,7 |                   |                               |     |
| 1-1/2   | 38,1  | 8          | 0,165 | 4,19  | 1,170   | 29,72 | 1,145           | 1,260 | 29,08 | 32,00  | 1289                 | R-34   | 1290             | R-34-A | M-69    | 1/2            | 12,7 | K60-250           | TES3000 G400 or TESMini2 DU1  |     |
|         |       | 9          | 0,148 | 3,76  | 1,204   | 30,58 | 1,145           | 1,294 | 29,08 | 32,87  | 1285                 | R-34   | 1286             | R-34-A | M-70    | 1/2            | 12,7 |                   |                               |     |
|         |       | 10         | 0,134 | 3,40  | 1,232   | 31,29 | 1,206           | 1,321 | 30,63 | 33,55  | 1287                 | R-35   | 1288             | R-35-A | M-70    | 1/2            | 12,7 |                   |                               |     |
|         |       | 11         | 0,120 | 3,05  | 1,260   | 32,00 | 1,235           | 1,350 | 31,37 | 34,29  | 1291                 | R-36   | 1292             | R-36-A | M-70    | 1/2            | 12,7 |                   |                               |     |
|         |       | 12         | 0,109 | 2,77  | 1,282   | 32,56 | 1,257           | 1,372 | 31,93 | 34,85  | 1293                 | R-37   | 1294             | R-37-A | M-70    | 1/2            | 12,7 | K60-400           |                               |     |
|         |       | 13         | 0,095 | 2,41  | 1,310   | 33,27 | 1,285           | 1,400 | 32,64 | 35,56  | 1295                 | R-37   | 1296             | R-37-A | M-71    | 1/2            | 12,7 |                   |                               |     |
|         |       | 14         | 0,083 | 2,11  | 1,334   | 33,88 | 1,285           | 1,400 | 32,64 | 35,56  | 1295                 | R-37   | 1296             | R-37-A | M-71    | 1/2            | 12,7 |                   |                               |     |
|         |       | 15         | 0,072 | 1,83  | 1,356   | 34,44 | 1,331           | 1,446 | 33,81 | 36,73  | 1297                 | R-38   | 1298             | R-38-A | M-71    | 1/2            | 12,7 |                   |                               |     |
|         |       | 16         | 0,065 | 1,65  | 1,370   | 34,80 | 1,331           | 1,446 | 33,81 | 36,73  | 1297                 | R-38   | 1298             | R-38-A | M-71    | 1/2            | 12,7 |                   |                               |     |
|         |       | 17         | 0,058 | 1,47  | 1,384   | 35,15 | 1,331           | 1,472 | 33,81 | 37,39  | 1299                 | R-38   | 1300             | R-38-A | M-72    | 1/2            | 12,7 |                   |                               |     |
|         |       | 18         | 0,049 | 1,24  | 1,402   | 35,61 | 1,331           | 1,472 | 33,81 | 37,39  | 1299                 | R-38   | 1300             | R-38-A | M-72    | 1/2            | 12,7 |                   |                               |     |
| 19      | 0,042 | 1,07       | 1,416 | 35,97 | 1,331   | 1,472 | 33,81           | 37,39 | 1299  | R-38   | 1300                 | R-38-A | M-72             | 1/2    | 12,7    |                |      |                   |                               |     |
| 20      | 0,035 | 0,89       | 1,430 | 36,32 | 1,331   | 1,472 | 33,81           | 37,39 | 1299  | R-38   | 1300                 | R-38-A | M-72             | 1/2    | 12,7    |                |      |                   |                               |     |

\* Motor recommendation applies only to most popular cases with a standard percentage of the wall reduction. The recommendation can be different for thicker tube sheet, harder and exotic metal tube and a higher percentage of wall reduction.

### RECOMMENDATION

Recommended order of step by step expanding in a thick tube sheets in order to avoid tension between both tube sheets after rolling.



# 1200-5 Five Roll Series

The 1200-5 Series is an extended reach tool with five expansion rolls, particularly suited for thin-walled tubes. Available in two lengths, it offers a long and adjustable working range. Extended versions of this tool are available, and it is recommended for expanding tubes in condensers, coolers, heat exchangers, surface condensers, and FinFan coolers.



## WORKING RANGE

| TUBE ID          | TUBE OD        | TUBE SHEET      |
|------------------|----------------|-----------------|
| 14,83 - 36,32 MM | 19,0 - 38,1 MM | See table below |
| 0,584 - 1,430"   | 1/2" to 1-1/2" |                 |

## ADDITIONAL INFORMATION



How-to basics  
→ PAGE 11



Rolls range  
→ PAGE 10



Rolling motors  
→ PAGE 45

## TUBE SHEET THICKNESS

| ROLLS          | REACH | TUBE SHEET THICKNESS |                 |
|----------------|-------|----------------------|-----------------|
|                |       | [INCH]               | [MM]            |
| 1-1/2"<br>38,1 | STD   | 1 1/2 - 6"           | 38,1 - 152,4 mm |
|                | A     | 1 1/2 - 8"           | 38,1 - 203,2 mm |
|                | B     | 1 1/2 - 10"          | 38,1 - 254,0 mm |
|                | C     | 1 1/2 - 12"          | 38,1 - 304,8 mm |
| 2-1/4"<br>57,1 | STD   | 2 1/4 - 6 3/4"       | 57,1 - 171,4 mm |
|                | A     | 2 1/4 - 8 3/4"       | 57,1 - 222,2 mm |
|                | B     | 2 1/4 - 10 3/4"      | 57,1 - 273,0 mm |
|                | C     | 2 1/4 - 12 3/4"      | 57,1 - 323,8 mm |

**NOTE!** Please note that expanders are equipped with "UNIVERSAL NOSE PIECE" which shorten the expansion reach by 3/4". In order to receive full expansion reach, expander has to be equipped with "SHORT NOSE PIECE".

| TUBE OD |      | TUBE GAUGE |        | TUBE ID |        | EXPANSION RANGE |       |       |       | TUBE SHEET THICKNESS |           |                  |           | MANDREL  | MANDREL SQUARE |        | PNEUMATIC MOTOR * | ELECTRIC MOTOR * |                               |
|---------|------|------------|--------|---------|--------|-----------------|-------|-------|-------|----------------------|-----------|------------------|-----------|----------|----------------|--------|-------------------|------------------|-------------------------------|
|         |      |            |        |         |        |                 |       |       |       | 1/2" TO 6"           |           | 2-1/4" TO 6-3/4" |           |          |                |        |                   |                  |                               |
| [INCH]  | [MM] | [BWG]      | [INCH] | [MM]    | [INCH] | [MM]            | MIN   | MAX   | MIN   | MAX                  | TOOL NO.  | ROLL NO.         | TOOL NO.  | ROLL NO. |                | [INCH] | [MM]              |                  |                               |
| 5/8     | 15,8 | 17         | 0,058  | 1,47    | 0,509  | 12,93           | 0,499 | 0,564 | 12,67 | 14,33                | 1215-5    | R-4-5            | 1216-5    | R-4-A-5  | M-1216-5       | 3/8    | 9,5               | K50-1250         | TES3000 G1000 or TESMini2 DUO |
|         |      | 18         | 0,049  | 1,24    | 0,527  | 13,39           | 0,517 | 0,572 | 13,13 | 14,53                | 1217-5    | R-4-5            | 1218-5    | R-4-A-5  | M-59           | 3/8    | 9,5               |                  |                               |
|         |      | 19         | 0,042  | 1,07    | 0,541  | 13,74           | 0,522 | 0,582 | 13,26 | 14,78                | 1219-5    | R-4-5            | 1220-5    | R-4-A-5  | M-1220-5       | 3/8    | 9,5               |                  |                               |
|         |      | 20         | 0,035  | 0,89    | 0,555  | 14,10           | 0,536 | 0,596 | 13,61 | 15,14                | 1219-5[S] | R-4-5            | 1220-5[S] | R-4-A-5  | M-1220-5[S]    | 3/8    | 9,5               |                  |                               |
|         |      | 21         | 0,032  | 0,81    | 0,561  | 14,25           | 0,536 | 0,596 | 13,61 | 15,14                | 1219-5[S] | R-4-5            | 1220-5[S] | R-4-A-5  | M-1220-5[S]    | 3/8    | 9,5               |                  |                               |
|         |      | 22         | 0,028  | 0,71    | 0,569  | 14,45           | 0,536 | 0,596 | 13,61 | 15,14                | 1219-5[S] | R-4-5            | 1220-5[S] | R-4-A-5  | M-1220-5[S]    | 3/8    | 9,5               |                  |                               |
| 3/4     | 19,0 | 13         | 0,095  | 2,41    | 0,560  | 14,22           | 0,550 | 0,615 | 13,97 | 15,62                | 1221-5    | R-5-5            | 1222-5    | R-5-A-5  | M-1222-5       | 3/8    | 9,5               | K50-600          | TES3000 G1450 TesMini2 ES2    |
|         |      | 14         | 0,083  | 2,11    | 0,584  | 14,83           | 0,574 | 0,639 | 14,58 | 16,23                | 1223-5    | R-6-5            | 1224-5    | R-6-A-5  | M-1224-5       | 3/8    | 9,5               |                  |                               |
|         |      | 15         | 0,072  | 1,83    | 0,606  | 15,39           | 0,590 | 0,661 | 14,99 | 16,79                | 1225-5    | R-7-5            | 1226-5    | R-7-A-5  | M-1226-5       | 3/8    | 9,5               |                  |                               |
| 3/4     | 19,0 | 16         | 0,065  | 1,65    | 0,620  | 15,75           | 0,605 | 0,685 | 15,37 | 17,40                | 1227-5    | R-7-5            | 1228-5    | R-7-A-5  | M-63           | 3/8    | 9,5               | K50-1250         | TES3000 G1000 or TESMini2 DUO |
|         |      | 17         | 0,058  | 1,47    | 0,634  | 16,10           | 0,619 | 0,699 | 15,72 | 17,75                | 1229-5    | R-7-5            | 1230-5    | R-7-A-5  | M-1230-5       | 3/8    | 9,5               |                  |                               |
|         |      | 18         | 0,049  | 1,24    | 0,652  | 16,56           | 0,619 | 0,699 | 15,72 | 17,75                | 1229-5    | R-7-5            | 1230-5    | R-7-A-5  | M-1230-5       | 3/8    | 9,5               |                  |                               |
|         |      | 19         | 0,042  | 1,07    | 0,666  | 16,92           | 0,642 | 0,722 | 16,31 | 18,34                | 1231-5    | R-9-5            | 1232-5    | R-9-A-5  | M-63           | 3/8    | 9,5               |                  |                               |
|         |      | 20         | 0,035  | 0,89    | 0,680  | 17,27           | 0,642 | 0,722 | 16,31 | 18,34                | 1231-5    | R-9-5            | 1232-5    | R-9-A-5  | M-63           | 3/8    | 9,5               |                  |                               |
|         |      | 21         | 0,032  | 0,81    | 0,686  | 17,42           | 0,642 | 0,722 | 16,31 | 18,34                | 1231-5    | R-9-5            | 1232-5    | R-9-A-5  | M-63           | 3/8    | 9,5               |                  |                               |
| 7/8     | 22,2 | 22         | 0,028  | 0,71    | 0,694  | 17,63           | 0,642 | 0,722 | 16,31 | 18,34                | 1231-5    | R-9-5            | 1232-5    | R-9-A-5  | M-63           | 3/8    | 9,5               | K50-600          | TES3000 G1450 or TESMini2 ES2 |
|         |      | 13         | 0,095  | 2,41    | 0,685  | 17,40           | 0,670 | 0,750 | 17,02 | 19,05                | 1233-5    | R-9-5            | 1234-5    | R-9-A-5  | M-64-3/8       | 3/8    | 9,5               |                  |                               |
|         |      | 14         | 0,083  | 2,11    | 0,709  | 18,01           | 0,685 | 0,774 | 17,40 | 19,66                | 1235-5    | R-10-5           | 1236-5    | R-10-A-5 | M-65           | 3/8    | 9,5               |                  |                               |
|         |      | 16         | 0,065  | 1,65    | 0,745  | 18,92           | 0,726 | 0,815 | 18,44 | 20,70                | 1239-5    | R-11-5           | 1240-5    | R-11-A-5 | M-1240-5       | 3/8    | 9,5               |                  |                               |
|         |      | 17         | 0,058  | 1,47    | 0,759  | 19,28           | 0,740 | 0,829 | 18,80 | 21,06                | 1243-5    | R-11-5           | 1244-5    | R-11-A-5 | M-67-3/8       | 3/8    | 9,5               |                  |                               |
|         |      | 18         | 0,049  | 1,24    | 0,777  | 19,74           | 0,740 | 0,829 | 18,80 | 21,06                | 1243-5    | R-11-5           | 1244-5    | R-11-A-5 | M-67-3/8       | 3/8    | 9,5               |                  |                               |
|         |      | 19         | 0,042  | 1,07    | 0,791  | 20,09           | 0,763 | 0,852 | 19,38 | 21,64                | 1245-5    | R-11-5           | 1246-5    | R-11-A-5 | M-68-3/8       | 3/8    | 9,5               |                  |                               |
|         |      | 20         | 0,035  | 0,89    | 0,805  | 20,45           | 0,763 | 0,852 | 19,38 | 21,64                | 1245-5    | R-11-5           | 1246-5    | R-11-A-5 | M-68-3/8       | 3/8    | 9,5               |                  |                               |
| 7/8     | 22,2 | 21         | 0,032  | 0,81    | 0,811  | 20,60           | 0,763 | 0,852 | 19,38 | 21,64                | 1245-5    | R-11-5           | 1246-5    | R-11-A-5 | M-68-3/8       | 3/8    | 9,5               | K50-1250         | TES3000 G1000 or TESMini2 DUO |
|         |      | 22         | 0,028  | 0,71    | 0,819  | 20,80           | 0,763 | 0,852 | 19,38 | 21,64                | 1245-5    | R-11-5           | 1246-5    | R-11-A-5 | M-68-3/8       | 3/8    | 9,5               |                  |                               |

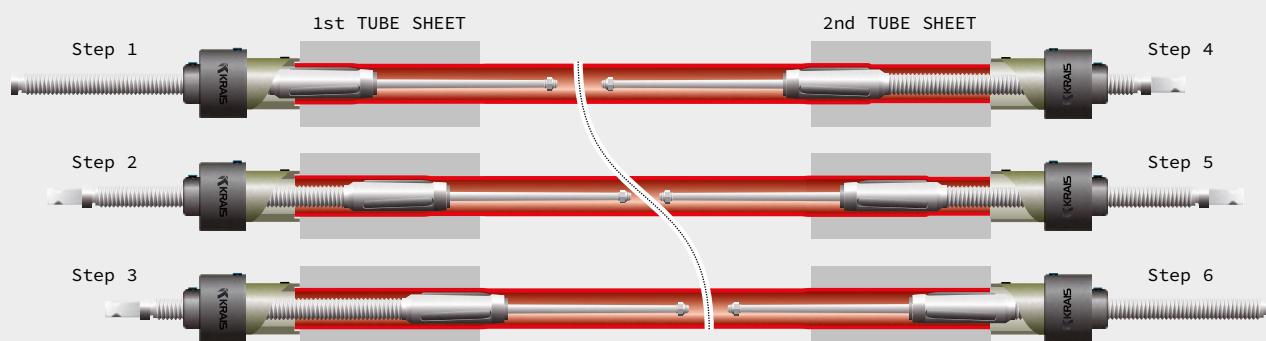
# 1200-5 Five Roll Series

| TUBE OD |      | TUBE GAUGE |       | TUBE ID |       | EXPANSION RANGE |       |       |        | TUBE SHEET THICKNESS |        |                  |        | MANDREL  |          | MANDREL SQUARE |      | PNEUMATIC MOTOR* | ELECTRIC MOTOR*                           |
|---------|------|------------|-------|---------|-------|-----------------|-------|-------|--------|----------------------|--------|------------------|--------|----------|----------|----------------|------|------------------|-------------------------------------------|
|         |      |            |       |         |       |                 |       |       |        | 1/2" TO 6"           |        | 2-1/4" TO 6-3/4" |        |          |          |                |      |                  |                                           |
|         |      |            |       |         |       | [INCH]          | [MM]  | [BWG] | [INCH] | [MM]                 | [INCH] | [MM]             | MIN    |          |          |                |      |                  |                                           |
| 1       | 25,4 | 12         | 0,109 | 2,77    | 0,782 | 19,86           | 0,763 | 0,852 | 19,38  | 21,64                | 1245-5 | R-11-5           | 1246-5 | R-11-A-5 | M-68-3/8 | 3/8            | 9,5  | K50-600          | TES3000<br>G1450<br>or<br>TESMini2<br>ES2 |
|         |      | 13         | 0,095 | 2,41    | 0,810 | 20,57           | 0,791 | 0,880 | 20,09  | 22,35                | 1247-5 | R-13-5           | 1248-5 | R-13-A-5 | M-68-3/8 | 3/8            | 9,5  |                  |                                           |
|         |      | 14         | 0,083 | 2,11    | 0,834 | 21,18           | 0,810 | 0,909 | 20,57  | 23,09                | 1249-5 | R-12-5           | 1250-5 | R-12-A-5 | M-1250-5 | 3/8            | 9,5  |                  |                                           |
|         |      | 15         | 0,072 | 1,83    | 0,856 | 21,74           | 0,837 | 0,936 | 21,26  | 23,77                | 1251-5 | R-14-5           | 1252-5 | R-14-A-5 | M-1252-5 | 3/8            | 9,5  |                  |                                           |
|         |      | 16         | 0,065 | 1,65    | 0,87  | 22,10           | 0,837 | 0,936 | 21,26  | 23,77                | 1251-5 | R-14-5           | 1252-5 | R-14-A-5 | M-1252-5 | 3/8            | 9,5  |                  |                                           |
|         |      | 17         | 0,058 | 1,47    | 0,884 | 22,45           | 0,865 | 0,964 | 21,97  | 24,49                | 1255-5 | R-13-5           | 1256-5 | R-13-A-5 | M-1256-5 | 3/8            | 9,5  |                  |                                           |
|         |      | 18         | 0,049 | 1,24    | 0,902 | 22,91           | 0,865 | 0,964 | 21,97  | 24,49                | 1255-5 | R-13-5           | 1256-5 | R-13-A-5 | M-1256-5 | 3/8            | 9,5  | K50-1250         | TES3000<br>G1000<br>or<br>TESMini2<br>DU0 |
|         |      | 19         | 0,042 | 1,07    | 0,916 | 23,27           | 0,865 | 0,964 | 21,97  | 24,49                | 1255-5 | R-13-5           | 1256-5 | R-13-A-5 | M-1256-5 | 3/8            | 9,5  |                  |                                           |
|         |      | 20         | 0,035 | 0,89    | 0,93  | 23,62           | 0,865 | 0,964 | 21,97  | 24,49                | 1255-5 | R-13-5           | 1256-5 | R-13-A-5 | M-1256-5 | 3/8            | 9,5  |                  |                                           |
|         |      | 21         | 0,032 | 0,81    | 0,936 | 23,77           | 0,883 | 0,982 | 22,43  | 24,94                | 1257-5 | R-15-5           | 1258-5 | R-15-A-5 | M-71-3/8 | 3/8            | 9,5  |                  |                                           |
|         |      | 22         | 0,028 | 0,71    | 0,944 | 23,98           | 0,883 | 0,982 | 22,43  | 24,94                | 1257-5 | R-15-5           | 1258-5 | R-15-A-5 | M-71-3/8 | 3/8            | 9,5  |                  |                                           |
| 1-1/8   | 28,5 | 12         | 0,109 | 2,77    | 0,907 | 23,04           | 0,883 | 0,982 | 22,43  | 24,94                | 1257-5 | R-15-5           | 1258-5 | R-15-A-5 | M-71-3/8 | 3/8            | 9,5  | K60-400          | TES3000<br>G1000 or<br>TESMini2<br>DU1    |
|         |      | 13         | 0,095 | 2,41    | 0,935 | 23,75           | 0,916 | 1,015 | 23,27  | 25,78                | 1259-5 | R-16-5           | 1260-5 | R-16-A-5 | M-1260-5 | 1/2            | 12,7 |                  |                                           |
| 1-1/4   | 31,7 | 14         | 0,083 | 2,11    | 0,959 | 24,36           | 0,935 | 1,044 | 23,75  | 26,52                | 1261-5 | R-17-5           | 1262-5 | R-17-A-5 | M-1262-5 | 1/2            | 12,7 | K60-400          | TES3000<br>G1000<br>or<br>TESMini2<br>DU1 |
|         |      | 15         | 0,072 | 1,83    | 1,106 | 28,09           | 1,087 | 1,196 | 27,61  | 30,38                | 1275-5 | R-21-5           | 1276-5 | R-21-A-5 | M-1276-5 | 1/2            | 12,7 |                  |                                           |
|         |      | 16         | 0,065 | 1,65    | 1,120 | 28,45           | 1,087 | 1,196 | 27,61  | 30,38                | 1275-5 | R-21-5           | 1276-5 | R-21-A-5 | M-1276-5 | 1/2            | 12,7 |                  |                                           |
|         |      | 17         | 0,058 | 1,47    | 1,134 | 28,80           | 1,115 | 1,231 | 28,32  | 31,27                | 1279-5 | R-21-5           | 1280-5 | R-21-A-5 | M-1280-5 | 1/2            | 12,7 |                  |                                           |
|         |      | 18         | 0,049 | 1,24    | 1,152 | 29,26           | 1,115 | 1,231 | 28,32  | 31,27                | 1279-5 | R-21-5           | 1280-5 | R-21-A-5 | M-1280-5 | 1/2            | 12,7 |                  |                                           |
|         |      | 19         | 0,042 | 1,07    | 1,166 | 29,62           | 1,115 | 1,231 | 28,32  | 31,27                | 1279-5 | R-21-5           | 1280-5 | R-21-A-5 | M-1280-5 | 1/2            | 12,7 |                  |                                           |
|         |      | 20         | 0,035 | 0,89    | 1,180 | 29,97           | 1,115 | 1,231 | 28,32  | 31,27                | 1279-5 | R-21-5           | 1280-5 | R-21-A-5 | M-1280-5 | 1/2            | 12,7 |                  |                                           |
|         |      | 21         | 0,032 | 0,81    | 1,186 | 30,12           | 1,115 | 1,231 | 28,32  | 31,27                | 1279-5 | R-21-5           | 1280-5 | R-21-A-5 | M-1280-5 | 1/2            | 12,7 |                  |                                           |
| 1-3/8   | 34,9 | 12         | 0,109 | 2,77    | 1,157 | 29,39           | 1,133 | 1,242 | 28,78  | 31,55                | 1281-5 | R-21-5           | 1282-5 | R-21-A-5 | M-1282-5 | 1/2            | 12,7 | K60-250          |                                           |
|         |      | 14         | 0,083 | 2,11    | 1,209 | 30,71           | 1,179 | 1,294 | 29,95  | 32,87                | 1285-5 | R-23-5           | 1286-5 | R-23-A-5 | M-1282-5 | 1/2            | 12,7 |                  |                                           |
| 1-1/2   | 38,1 | 17         | 0,058 | 1,47    | 1,384 | 35,15           | 1,331 | 1,472 | 33,81  | 37,39                | 1299-5 | R-29-5           | 1300-5 | R-29-A-5 | M-1300-5 | 1/2            | 12,7 | K60-900          | TES3000<br>G1000<br>or<br>TESMini2<br>ES2 |
|         |      | 18         | 0,049 | 1,24    | 1,402 | 35,61           | 1,331 | 1,472 | 33,81  | 37,39                | 1299-5 | R-29-5           | 1300-5 | R-29-A-5 | M-1300-5 | 1/2            | 12,7 |                  |                                           |
|         |      | 19         | 0,042 | 1,07    | 1,416 | 35,97           | 1,331 | 1,472 | 33,81  | 37,39                | 1299-5 | R-29-5           | 1300-5 | R-29-A-5 | M-1300-5 | 1/2            | 12,7 |                  |                                           |
|         |      | 20         | 0,035 | 0,89    | 1,430 | 36,32           | 1,331 | 1,472 | 33,81  | 37,39                | 1299-5 | R-29-5           | 1300-5 | R-29-A-5 | M-1300-5 | 1/2            | 12,7 |                  |                                           |
|         |      | 21         | 0,032 | 0,81    | 1,436 | 36,47           | 1,331 | 1,472 | 33,81  | 37,39                | 1299-5 | R-29-5           | 1300-5 | R-29-A-5 | M-1300-5 | 1/2            | 12,7 |                  |                                           |
|         |      | 22         | 0,028 | 0,71    | 1,444 | 36,68           | 1,331 | 1,472 | 33,81  | 37,39                | 1299-5 | R-29-5           | 1300-5 | R-29-A-5 | M-1300-5 | 1/2            | 12,7 |                  |                                           |

\* Motor recommendation applies only to most popular cases with a standard percentage of the wall reduction. The recommendation can be different for thicker tube sheet, harder and exotic metal tube and a higher percentage of wall reduction.

## RECOMMENDATION

Recommended order of step by step expanding in a thick tube sheets in order to avoid tension between both tube sheets after rolling.





# 8012 Series

The 8012 Series is designed for expanding tubes in larger sizes and is recommended for use with thick tube sheets and step-by-step rolling. It features three expansion rolls and a wide working range. This tool is suitable for use in condensers, coolers, heat exchangers, surface condensers, and FinFan coolers.



## WORKING RANGE

| TUBE ID         | TUBE OD        | TUBE SHEET       |
|-----------------|----------------|------------------|
| 8,48 - 36,32 mm | 44,4 - 76,2 mm | 12,7 - 101,6 mm  |
| 0,334 - 1,430"  | 1-3/4" to 3"   | 1-1/2" to 2-1/4" |

## ADDITIONAL INFORMATION



How-to  
basics  
→ PAGE 11



Rolls  
range  
→ PAGE 10



Rolling  
motors  
→ PAGE 45

| TUBE OD |      | TUBE GAUGE |        |      | TUBE ID |       | EXPANSION RANGE |       |       |       | TOOL NO.         | ROLL NO. | MANDREL | MANDREL | PNEUMATIC MOTOR * | ELECTRIC MOTOR *   |
|---------|------|------------|--------|------|---------|-------|-----------------|-------|-------|-------|------------------|----------|---------|---------|-------------------|--------------------|
|         |      |            |        |      |         |       | [INCH]          |       | [MM]  |       |                  |          |         |         |                   |                    |
| [INCH]  | [MM] | [BWG]      | [INCH] | [MM] | [INCH]  | [MM]  | MIN             | MAX   | MIN   | MAX   |                  |          |         |         |                   |                    |
| 1-3/4   | 44,4 | 8          | 0,165  | 4,19 | 1,42    | 36,07 | 1,368           | 1,55  | 34,75 | 39,37 | 8012-1-3/4-8     | R-33-A   | M-90    | 3/4     | K60-400           | TESMini2 DU1       |
|         |      | 10         | 0,134  | 3,40 | 1,482   | 37,64 | 1,420           | 1,607 | 36,07 | 40,82 | 8012-1-3/4-10    | R-37-A   | M-90    | 3/4     |                   |                    |
|         |      | 11         | 0,120  | 3,05 | 1,510   | 38,35 | 1,454           | 1,635 | 36,93 | 41,53 | 8012-1-3/4-11    | R-42     | M-90    | 3/4     |                   |                    |
|         |      | 12         | 0,109  | 2,77 | 1,532   | 38,91 | 1,482           | 1,657 | 37,64 | 42,09 | 8012-1-3/4-12    | R-44     | M-90    | 3/4     |                   |                    |
|         |      | 13         | 0,095  | 2,41 | 1,560   | 39,62 | 1,510           | 1,685 | 38,35 | 42,80 | 8012-1-3/4-13    | R-46     | M-90    | 3/4     |                   |                    |
|         |      | 14         | 0,083  | 2,11 | 1,584   | 40,23 | 1,532           | 1,709 | 38,91 | 43,41 | 8012-1-3/4-14    | R-48     | M-90    | 3/4     | K60-900           |                    |
| 2       | 50,8 | 8          | 0,165  | 4,19 | 1,670   | 42,42 | 1,595           | 1,795 | 40,51 | 45,59 | 8012-2-8         | R-48     | M-91    | 3/4     | K60-250           | TESMini2 K90-E-190 |
|         |      | 10         | 0,134  | 3,40 | 1,732   | 43,99 | 1,640           | 1,857 | 41,66 | 47,17 | 8012-2-10        | R-50     | M-91    | 3/4     |                   |                    |
|         |      | 11         | 0,120  | 3,05 | 1,760   | 44,70 | 1,670           | 1,885 | 42,42 | 47,88 | 8012-2-11        | R-52     | M-91    | 3/4     |                   |                    |
|         |      | 12         | 0,109  | 2,77 | 1,782   | 45,26 | 1,704           | 1,907 | 43,28 | 48,44 | 8012-2-12        | R-54     | M-91    | 3/4     |                   |                    |
|         |      | 13         | 0,095  | 2,41 | 1,810   | 45,97 | 1,732           | 1,956 | 43,99 | 49,68 | 8012-2-13-18     | R-56     | M-91    | 3/4     |                   |                    |
|         |      | 14         | 0,083  | 2,11 | 1,834   | 46,58 | 1,732           | 1,956 | 43,99 | 49,68 | 8012-2-13-18     | R-56     | M-91    | 3/4     |                   |                    |
|         |      | 15         | 0,072  | 1,83 | 1,856   | 47,14 | 1,732           | 1,956 | 43,99 | 49,68 | 8012-2-13-18     | R-56     | M-91    | 3/4     |                   |                    |
|         |      | 16         | 0,065  | 1,65 | 1,870   | 47,50 | 1,732           | 1,956 | 43,99 | 49,68 | 8012-2-13-18     | R-56     | M-91    | 3/4     |                   |                    |
|         |      | 17         | 0,058  | 1,47 | 1,884   | 47,85 | 1,732           | 1,956 | 43,99 | 49,68 | 8012-2-13-18     | R-56     | M-91    | 3/4     |                   |                    |
|         |      | 18         | 0,049  | 1,24 | 1,902   | 48,31 | 1,732           | 1,956 | 43,99 | 49,68 | 8012-2-13-18     | R-56     | M-91    | 3/4     |                   |                    |
| 2-1/4   | 57,1 | 10         | 0,134  | 3,40 | 1,982   | 50,34 | 1,890           | 2,107 | 48,01 | 53,52 | 8012-2-1/4-10    | R-56     | M-92    | 3/4     | K60-250           | TESMini2 K90-E-190 |
|         |      | 11         | 0,120  | 3,05 | 2,010   | 51,05 | 1,920           | 2,135 | 48,77 | 54,23 | 8012-2-1/4-11    | R-58     | M-92    | 3/4     |                   |                    |
|         |      | 12         | 0,109  | 2,77 | 2,032   | 51,61 | 1,954           | 2,157 | 49,63 | 54,79 | 8012-2-1/4-12    | R-60     | M-92    | 3/4     |                   |                    |
|         |      | 13         | 0,095  | 2,41 | 2,060   | 52,32 | 1,982           | 2,185 | 50,34 | 55,50 | 8012-2-1/4-13-16 | R-62     | M-92    | 3/4     |                   |                    |
|         |      | 14         | 0,083  | 2,11 | 2,084   | 52,93 | 1,982           | 2,185 | 50,34 | 55,50 | 8012-2-1/4-13-16 | R-62     | M-92    | 3/4     |                   |                    |
|         |      | 15         | 0,072  | 1,83 | 2,106   | 53,49 | 1,982           | 2,185 | 50,34 | 55,50 | 8012-2-1/4-13-16 | R-62     | M-92    | 3/4     |                   |                    |
|         |      | 16         | 0,065  | 1,65 | 2,120   | 53,85 | 1,982           | 2,185 | 50,34 | 55,50 | 8012-2-1/4-13-16 | R-62     | M-92    | 3/4     |                   |                    |

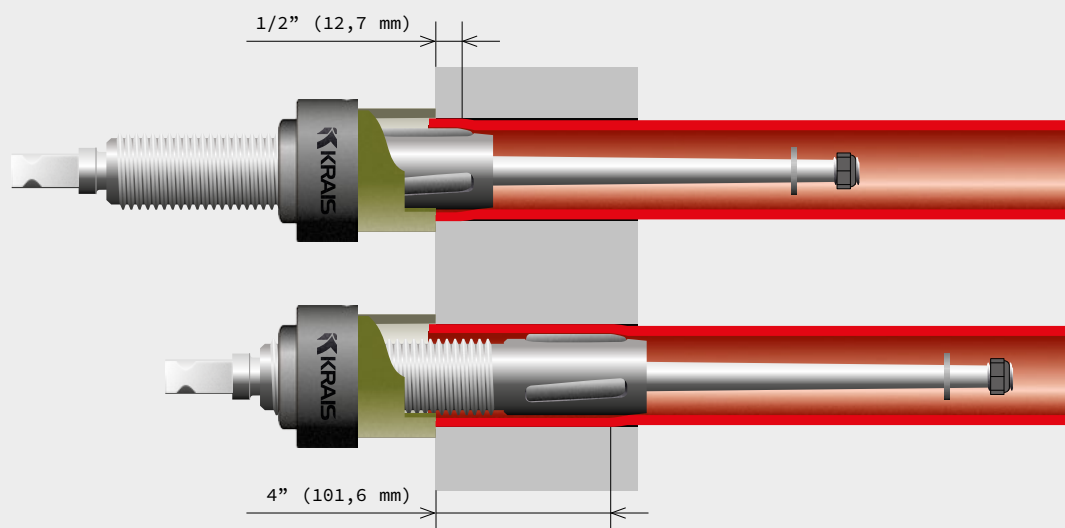
## 8012 Series

| TUBE OD |      | TUBE GAUGE |        |      | TUBE ID |       | EXPANSION RANGE |       |       |       | TOOL NO.         | ROLL NO. | MANDREL | MANDREL | PNEUMATIC MOTOR * | ELECTRIC MOTOR *      |
|---------|------|------------|--------|------|---------|-------|-----------------|-------|-------|-------|------------------|----------|---------|---------|-------------------|-----------------------|
|         |      |            |        |      |         |       | [INCH]          |       | [MM]  |       |                  |          |         |         |                   |                       |
| [INCH]  | [MM] | [BWG]      | [INCH] | [MM] | [INCH]  | [MM]  | MIN             | MAX   | MIN   | MAX   |                  |          |         | [INCH]  |                   |                       |
| 2-1/2   | 63,5 | 10         | 0,134  | 3,40 | 2,232   | 56,69 | 2,140           | 2,407 | 54,36 | 61,14 | 8012-2-1/2-10-12 | R-64     | M-93    | 3/4     | K60-250           | TESMini2<br>K90-E-190 |
|         |      | 11         | 0,120  | 3,05 | 2,260   | 57,40 | 2,140           | 2,407 | 54,36 | 61,14 | 8012-2-1/2-10-12 | R-64     | M-93    | 3/4     |                   |                       |
|         |      | 12         | 0,109  | 2,77 | 2,282   | 57,96 | 2,140           | 2,407 | 54,36 | 61,14 | 8012-2-1/2-10-12 | R-64     | M-93    | 3/4     |                   |                       |
|         |      | 13         | 0,095  | 2,41 | 2,310   | 58,67 | 2,232           | 2,450 | 56,69 | 62,23 | 8012-2-1/2-13-18 | R-64     | M-94    | 3/4     |                   |                       |
|         |      | 14         | 0,083  | 2,11 | 2,334   | 59,28 | 2,232           | 2,450 | 56,69 | 62,23 | 8012-2-1/2-13-18 | R-64     | M-94    | 3/4     |                   |                       |
|         |      | 15         | 0,072  | 1,83 | 2,356   | 59,84 | 2,232           | 2,450 | 56,69 | 62,23 | 8012-2-1/2-13-18 | R-64     | M-94    | 3/4     |                   |                       |
|         |      | 16         | 0,065  | 1,65 | 2,370   | 60,20 | 2,232           | 2,450 | 56,69 | 62,23 | 8012-2-1/2-13-18 | R-64     | M-94    | 3/4     |                   |                       |
|         |      | 17         | 0,058  | 1,47 | 2,384   | 60,55 | 2,232           | 2,450 | 56,69 | 62,23 | 8012-2-1/2-13-18 | R-64     | M-94    | 3/4     |                   |                       |
|         |      | 18         | 0,049  | 1,24 | 2,402   | 61,01 | 2,232           | 2,450 | 56,69 | 62,23 | 8012-2-1/2-13-18 | R-64     | M-94    | 3/4     |                   |                       |
| 2-3/4   | 69,8 | 10         | 0,134  | 3,40 | 2,482   | 63,04 | 2,390           | 2,702 | 60,71 | 68,63 | 8012-2-3/4-10-16 | R-66     | M-96    | 1       | K72-RT-90         | TESMini2<br>K90-E-90  |
|         |      | 11         | 0,120  | 3,05 | 2,510   | 63,75 | 2,390           | 2,702 | 60,71 | 68,63 | 8012-2-3/4-10-16 | R-66     | M-96    | 1       |                   |                       |
|         |      | 12         | 0,109  | 2,77 | 2,532   | 64,31 | 2,390           | 2,702 | 60,71 | 68,63 | 8012-2-3/4-10-16 | R-66     | M-96    | 1       |                   |                       |
|         |      | 13         | 0,095  | 2,41 | 2,560   | 65,02 | 2,390           | 2,702 | 60,71 | 68,63 | 8012-2-3/4-10-16 | R-66     | M-96    | 1       |                   |                       |
|         |      | 14         | 0,083  | 2,11 | 2,584   | 65,63 | 2,390           | 2,702 | 60,71 | 68,63 | 8012-2-3/4-10-16 | R-66     | M-96    | 1       |                   |                       |
|         |      | 15         | 0,072  | 1,83 | 2,606   | 66,19 | 2,390           | 2,702 | 60,71 | 68,63 | 8012-2-3/4-10-16 | R-66     | M-96    | 1       |                   |                       |
|         |      | 16         | 0,065  | 1,65 | 2,620   | 66,55 | 2,390           | 2,702 | 60,71 | 68,63 | 8012-2-3/4-10-16 | R-66     | M-96    | 1       |                   |                       |
| 3       | 76,2 | 8          | 0,165  | 4,19 | 2,670   | 67,82 | 2,560           | 2,829 | 65,02 | 71,86 | 8012-3-8-9       | R-67     | M-97    | 1       | K72-RT-90         | TESMini2<br>K90-E-90  |
|         |      | 9          | 0,148  | 3,76 | 2,704   | 68,68 | 2,560           | 2,829 | 65,02 | 71,86 | 8012-3-8-9       | R-67     | M-97    | 1       |                   |                       |
|         |      | 10         | 0,134  | 3,40 | 2,732   | 69,39 | 2,640           | 2,952 | 67,06 | 74,98 | 8012-3-10-18     | R-67     | M-96    | 1       |                   |                       |
|         |      | 11         | 0,120  | 3,05 | 2,760   | 70,10 | 2,640           | 2,952 | 67,06 | 74,98 | 8012-3-10-18     | R-67     | M-96    | 1       |                   |                       |
|         |      | 12         | 0,109  | 2,77 | 2,782   | 70,66 | 2,640           | 2,952 | 67,06 | 74,98 | 8012-3-10-18     | R-67     | M-96    | 1       |                   |                       |
|         |      | 13         | 0,095  | 2,41 | 2,810   | 71,37 | 2,640           | 2,952 | 67,06 | 74,98 | 8012-3-10-18     | R-67     | M-96    | 1       |                   |                       |
|         |      | 14         | 0,083  | 2,11 | 2,834   | 71,98 | 2,640           | 2,952 | 67,06 | 74,98 | 8012-3-10-18     | R-67     | M-96    | 1       |                   |                       |
|         |      | 15         | 0,072  | 1,83 | 2,856   | 72,54 | 2,640           | 2,952 | 67,06 | 74,98 | 8012-3-10-18     | R-67     | M-96    | 1       |                   |                       |
|         |      | 16         | 0,065  | 1,65 | 2,870   | 72,90 | 2,640           | 2,952 | 67,06 | 74,98 | 8012-3-10-18     | R-67     | M-96    | 1       |                   |                       |
|         |      | 17         | 0,058  | 1,47 | 2,884   | 73,25 | 2,640           | 2,952 | 67,06 | 74,98 | 8012-3-10-18     | R-67     | M-96    | 1       |                   |                       |
|         |      | 18         | 0,049  | 1,24 | 2,902   | 73,72 | 2,640           | 2,952 | 67,06 | 74,98 | 8012-3-10-18     | R-67     | M-96    | 1       |                   |                       |

\* Motor recommendation applies only to most popular cases with a standard percentage of the wall reduction. The recommendation can be different for thicker tube sheet, harder and exotic metal tube and a higher percentage of wall reduction.

### **i** RECOMMENDATION

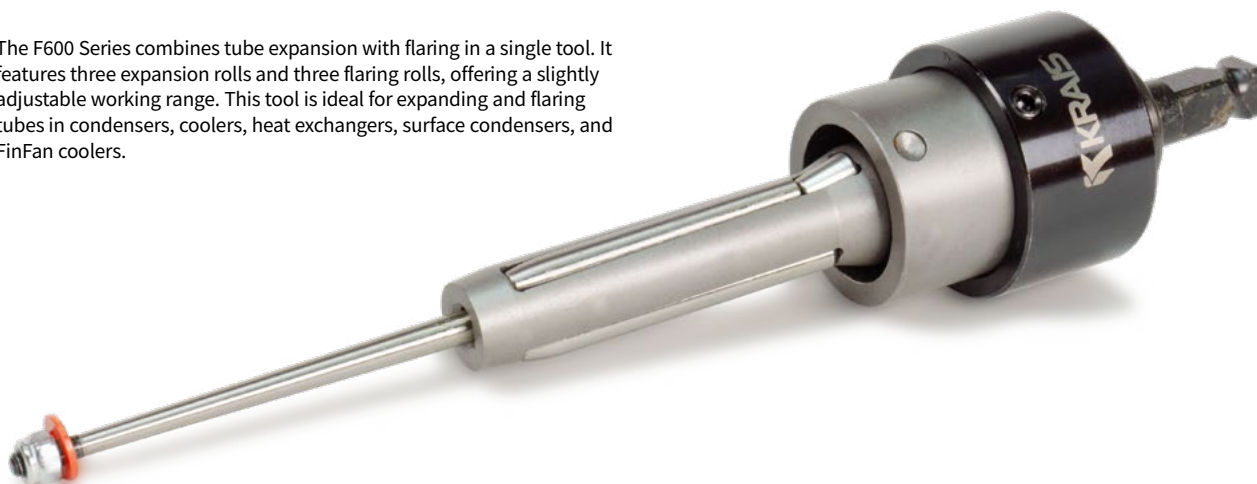
When rolling a pipe in a thick tube sheet, we recommend initial rolling to a minimum of 1/2 inch, followed by rolling deeper into the pipe in subsequent steps.





# F600 Flare Type Series

The F600 Series combines tube expansion with flaring in a single tool. It features three expansion rolls and three flaring rolls, offering a slightly adjustable working range. This tool is ideal for expanding and flaring tubes in condensers, coolers, heat exchangers, surface condensers, and FinFan coolers.



## WORKING RANGE

| TUBE ID          | TUBE OD        | TUBE SHEET       |
|------------------|----------------|------------------|
| 13,51 – 22,45 mm | 15,8 – 25,4 MM | 38,1 – 57,1 MM   |
| 0,532 – 0,884"   | 5/8" to 1"     | 1-1/2" to 2-1/4" |

## ADDITIONAL INFORMATION



How-to basics  
→ PAGE 11



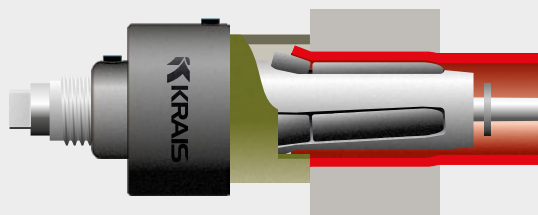
Rolls range  
→ PAGE 10



Rolling motors  
→ PAGE 45

## RECOMMENDATION

When using the F-600 series expander make sure that the flare length is correctly set up and the thrust collar rest against the tube sheet.



| TUBE ID |       | ROLL LENGTH<br>1-1/2" (38,1 MM) |          | ROLL LENGTH<br>2-1/4" (57,1 MM) |          | EXPANSION RANGE |       |       |       | FLARE ROLL | MANDREL | RECCOMENDED DRIVE* |           |
|---------|-------|---------------------------------|----------|---------------------------------|----------|-----------------|-------|-------|-------|------------|---------|--------------------|-----------|
|         |       |                                 |          |                                 |          | [INCH]          |       | [MM]  |       |            |         |                    |           |
| [INCH]  | [MM]  | TOOL NO.                        | ROLL NO. | TOOL NO.                        | ROLL NO. | MIN             | MAX   | MIN   | MAX   |            |         | ELECTRIC           | PNEUMATIC |
| 0,532   | 13,51 | 619                             | K-7      | 620                             | K-7A     | 0,511           | 0,570 | 12,98 | 14,48 | F-8        | M-6     | TESMini 2, ES2     | K50-600   |
| 0,560   | 14,22 | 621                             | K-8      | 622                             | K-8A     | 0,539           | 0,606 | 13,69 | 15,39 | F-8        | M-8     | TESMini 2, ES2     | K50-600   |
| 0,584   | 14,83 | 623                             | K-9      | 624                             | K-9A     | 0,562           | 0,629 | 14,27 | 15,98 | F-9        | M-8     | TESMini 2, ES2     | K50-600   |
| 0,606   | 15,39 | 625                             | K-10     | 626                             | K-10A    | 0,586           | 0,649 | 14,88 | 16,48 | F-10       | M-8     | TESMini 2, ES2     | K50-600   |
| 0,620   | 15,75 | 627                             | K-10     | 628                             | K-10A    | 0,594           | 0,677 | 15,09 | 17,20 | F-10       | M-9     | TESMini 2, ES2     | K50-600   |
| 0,634   | 16,10 | 629                             | K-11     | 630                             | K-11 A   | 0,610           | 0,688 | 15,49 | 17,48 | F-11       | M-9     | TESMini 2, ES2     | K50-400   |
| 0,657   | 16,69 | 631                             | K-12     | 632                             | K-12A    | 0,633           | 0,712 | 16,08 | 18,08 | F-12       | M-9     | TESMini 2, ES2     | K50-400   |
| 0,670   | 17,02 | 641                             | K-13     | 642                             | K-13A    | 0,645           | 0,724 | 16,38 | 18,39 | F-13       | M-9     | TESMini 2, ES2     | K50-400   |
| 0,685   | 17,40 | 633                             | K-13     | 634                             | K-13A    | 0,661           | 0,740 | 16,79 | 18,80 | F-13       | M-10    | TESMini 2, ES2     | K50-400   |
| 0,709   | 18,01 | 635                             | K-14     | 636                             | K-14A    | 0,677           | 0,763 | 17,20 | 19,38 | F-14       | M-11    | TESMini 2, ES2     | K60-900   |
| 0,731   | 18,57 | 637                             | K-15     | 638                             | K-15A    | 0,700           | 0,791 | 17,78 | 20,09 | F-15       | M-11    | TESMini 2, ES2     | K60-900   |
| 0,745   | 18,92 | 639                             | K-15     | 640                             | K-15A    | 0,716           | 0,807 | 18,19 | 20,50 | F-15       | M-12    | TESMini 2, ES2     | K60-900   |
| 0,760   | 19,30 | 643                             | K-16     | 644                             | K-16A    | 0,732           | 0,818 | 18,59 | 20,78 | F-16       | M-12    | TESMini 2, DU1     | K60-900   |
| 0,782   | 19,86 | 645                             | K-17     | 646                             | K-17A    | 0,751           | 0,842 | 19,08 | 21,39 | F-17       | M-12    | TESMini 2, DU1     | K60-900   |
| 0,795   | 20,19 | 653                             | K-20     | 654                             | K-20A    | 0,767           | 0,866 | 19,48 | 22,00 | F-20       | M-13    | TESMini 2, DU1     | K60-900   |
| 0,810   | 20,57 | 647                             | K-18     | 648                             | K-18A    | 0,779           | 0,870 | 19,79 | 22,10 | F-18       | M-12    | TESMini 2, DU1     | K60-900   |
| 0,834   | 21,18 | 649                             | K-18     | 650                             | K-18A    | 0,799           | 0,897 | 20,29 | 22,78 | F-18       | M-13    | TESMini 2, DU1     | K60-900   |
| 0,856   | 21,74 | 651                             | K-19     | 652                             | K-19A    | 0,826           | 0,921 | 20,98 | 23,39 | F-19       | M-13    | TESMini 2, DU1     | K60-900   |
| 0,884   | 22,45 | 655                             | K-21     | 656                             | K-21A    | 0,854           | 0,948 | 21,69 | 24,08 | F-21       | M-13    | TESMini 2, DU1     | K60-900   |

\* Motor recommendation applies only to most popular cases with a standard percentage of the wall reduction. The recommendation can be different for thicker tube sheet, harder and exotic metal tube and a higher percentage of wall reduction.

# TACK Conical Series

The TACK Series is a specialized tool for conical tube expansion over short sections. It comes with three rolls and is designed specifically for expanding tubes prior to welding in condensers, coolers, heat exchangers, surface condensers, and FinFan coolers.



## WORKING RANGE

| TUBE ID        | TUBE OD       |
|----------------|---------------|
| 8,0 - 50,0 mm  | 9,5 - 50,8 mm |
| 0,315 - 1,969" | 3/8" to 1"    |

## ADDITIONAL INFORMATION



How-to basics  
→ PAGE 11



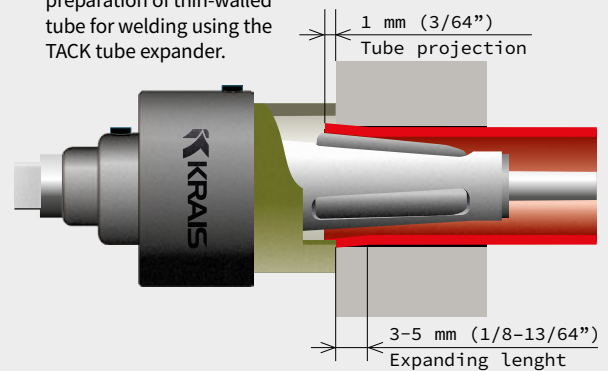
Rolls range  
→ PAGE 10



Rolling motors  
→ PAGE 45

## RECOMMENDATION

Proper rolling and preparation of thin-walled tube for welding using the TACK tube expander.



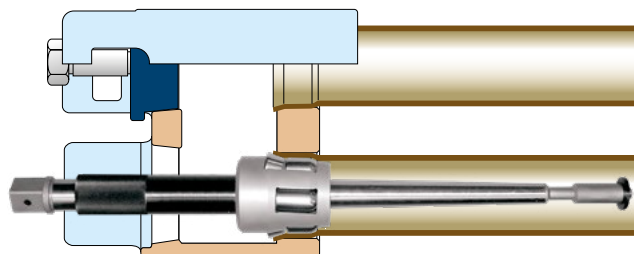
| EXPANSION RANGE |       |       |       | TOOL              | ROLLS | MANDREL | MANDREL SQUARE |        | RECOMMENDED MOTOR * |                     |
|-----------------|-------|-------|-------|-------------------|-------|---------|----------------|--------|---------------------|---------------------|
| MIN             | MAX   | MIN   | MAX   |                   |       |         | [MM]           | [INCH] | AIR                 | ELECTRIC            |
| 7,80            | 9,90  | 0,307 | 0,390 | TRE-797           | R-797 | M-797   | 9,5            | 3/8    | K20-1800            | TesMini 2 with HT-0 |
| 8,60            | 11,00 | 0,339 | 0,433 | TRE-801           | R-1   | M-1     | 9,5            | 3/8    | K20-1800            | TesMini 2 with HT-0 |
| 9,40            | 12,00 | 0,370 | 0,472 | TRE-805           | R-3   | M-2     | 9,5            | 3/8    | K20-1800            | TesMini 2 with HT-0 |
| 11,30           | 14,30 | 0,445 | 0,563 | TRE-811           | R-5   | M-5     | 9,5            | 3/8    | K20-1800            | TesMini 2 with HT-0 |
| 11,90           | 15,10 | 0,469 | 0,594 | TRE-815           | R-6   | M-6     | 9,5            | 3/8    | K20-1800            | TesMini 2 with HT-0 |
| 12,30           | 15,60 | 0,484 | 0,614 | TRE-819           | R-7   | M-6     | 9,5            | 3/8    | K20-1800            | TesMini 2 with HT-0 |
| 13,70           | 17,00 | 0,539 | 0,669 | TRE-823           | R-9   | M-8     | 9,5            | 3/8    | K20-1800            | TesMini 2 with HT-0 |
| 15,50           | 19,10 | 0,610 | 0,752 | TRE-831           | R-12  | M-9     | 9,5            | 3/8    | K20-550             | TesMini 2 with DU-0 |
| 16,20           | 19,80 | 0,638 | 0,780 | TRE-833           | R-13  | M-10    | 9,5            | 3/8    | K20-550             | TesMini 2 with DU-0 |
| 17,90           | 21,85 | 0,705 | 0,860 | TRE-843           | R-16  | M-12    | 9,5            | 3/8    | K20-550             | TesMini 2 with DU-0 |
| 19,70           | 23,90 | 0,776 | 0,941 | TRE-849           | R-18  | M-13    | 9,5            | 3/8    | K20-550             | TesMini 2 with DU-0 |
| 21,10           | 25,30 | 0,831 | 0,996 | TRE-855           | R-21  | M-13    | 9,5            | 3/8    | K50-1250            | TesMini 2 with DU-0 |
| 23,50           | 28,00 | 0,925 | 1,102 | TRE-863           | R-24  | M-15    | 12,7           | 1/2    | K50-1250            | TesMini 2 with DU-0 |
| 25,60           | 30,00 | 1,008 | 1,181 | TRE-871           | R-28  | M-17    | 12,7           | 1/2    | K50-1250            | TesMini 2 with DU-0 |
| 27,90           | 32,35 | 1,098 | 1,274 | TRE-881           | R-32  | M-18    | 12,7           | 1/2    | K50-1250            | TesMini 2 with DU-0 |
| 29,10           | 33,70 | 1,146 | 1,327 | TRE-885           | R-34  | M-20    | 12,7           | 1/2    | K50-600             | TesMini 2 with DU-0 |
| 31,80           | 36,40 | 1,252 | 1,433 | TRE-895           | R-37  | M-21    | 12,7           | 1/2    | K50-600             | TesMini 2 with DU-0 |
| 32,90           | 38,20 | 1,295 | 1,504 | TRE-899           | R-38  | M-22    | 12,7           | 1/2    | K50-600             | TesMini 2 with DU-1 |
| 36,40           | 43,20 | 1,433 | 1,701 | TRE-9012-13/4-12  | R-44  | M-90    | 19,1           | 3/4    | K60-900             | TesMini 2 with DU-1 |
| 39,20           | 46,80 | 1,543 | 1,843 | TRE-8012-175-14   | R-48  | M-91    | 19,1           | 3/4    | K60-900             | TesMini 2 with DU-1 |
| 41,20           | 49,10 | 1,622 | 1,933 | TRE-8012-2-11     | R-52  | M-91    | 19,1           | 3/4    | K60-900             | TesMini 2 with DU-1 |
| 42,60           | 50,90 | 1,677 | 2,004 | TRE-8012-2-13-18  | R-56  | M-91    | 19,1           | 3/4    | K60-900             | TesMini 2 with DU-1 |
| 46,70           | 54,80 | 1,839 | 2,157 | TRE-8012-2-1/4-10 | R-56  | M-92    | 19,1           | 3/4    | K60-900             | TesMini 2 with DU-1 |

\* Motor recommendation applies only to most popular cases with a standard percentage of the wall reduction. The recommendation can be different for thicker tube sheet, harder and exotic metal tube and a higher percentage of wall reduction.

# Special expanders

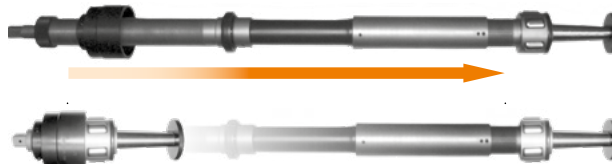
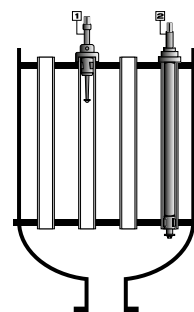
## REFINERY TUBE EXPANDER

Tube expander for straight rolling or rolling and flaring very thick-walled tubes in cracking furnace tube seats for tubes outside diameter from 50 to 250 mm (2"-10") and gauges from 6 to 15 mm (0,19" to 0,59"). Flaring 10 to 15 degree. Roll length 38,1 to 101 mm (1-1/2" - 4"). Made on request to drawing of the tube seat.



## SUGAR REFINERY EXPANDER

These are fixed rolling length special purpose tools which may be power or hand-driven. They are self-feeding parallel-rolling type. When ordering please give precise details of vessel in which the expander is to be used, quoting size and length of tube, distance over tube plates, tube plate thickness and any tube projection details. Ideally a drawing should be provided.



## NOTCHING & EXPANDING



NE notching&expanding type tube expander for thin tube sheet and thin wall tubes. Expand and notch the tube in one operation. The notches lock the tube in front and back side of the tube sheet and prevent to unseal during the transportation or expanding the near by and already expanded tubes. The expansion range is adjustable within 0,005 mm. Do not need the torque controlled drive.



## STEP-BY-STEP



STEP-BY-STEP expander are an excellent tool for fast tube rolling in thick tube sheets, from 6" to 24". The Expanders have grooves spaced at 1" (25,4 mm) increments along the cage of the tool, which allows the spring loaded thrust collar, to quickly and efficiently travel along the complete length of the tool. Significant time savings are achieved with this fast step rolling throughout the full width of the tube sheet.

## PSE PIPE



PSE expanders are designed to true up the ends of pipe and also to enlarge pipe inside diameters to a specific size in order to create the correct clearance between the pipe OD and ID prior to brazing or silver soldering. The Threaded mandrel allows fast and accurate sizing of the pipe end. Available up to 8" OD.

## TWTC



5-Roll expander with TWTC thin wall thrust collar.

## LUBRICATION-COOLING BOX



Condenser tube expander with cooling-lubricating box. Made upon order only.

# Special expanders

## LINSEN EXPANDERS



LINSEN expanders can be driven by electric or pneumatic drills. Designed to produce tube end connections without fittings.

Enlarges tube end without distortions or buckling and leaving.

0,015" (0,38 mm) clearance that another tube with the same outside diameter can be inserted and soldered. It is excellent for U-tubes, short bends, for copper, brass aluminium and thin steel tubes. Available from 3/8" (9,5 mm) to 2" (50,8 mm). For more details contact factory.



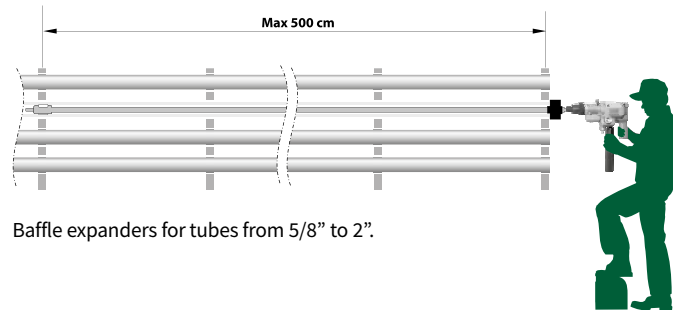
## SR EXPANDERS



SR series xpanders are designed for expanding tubes with minimum travel of mandrel.

Expander mandrel is short and it allows to use SR expanders near tube bends or ID fixed tubes.

## BAFFLE TUBE EXPANDERS



Baffle expanders for tubes from 5/8" to 2".

## 5-ROLL EXPANDER WITH NYLON BUSH

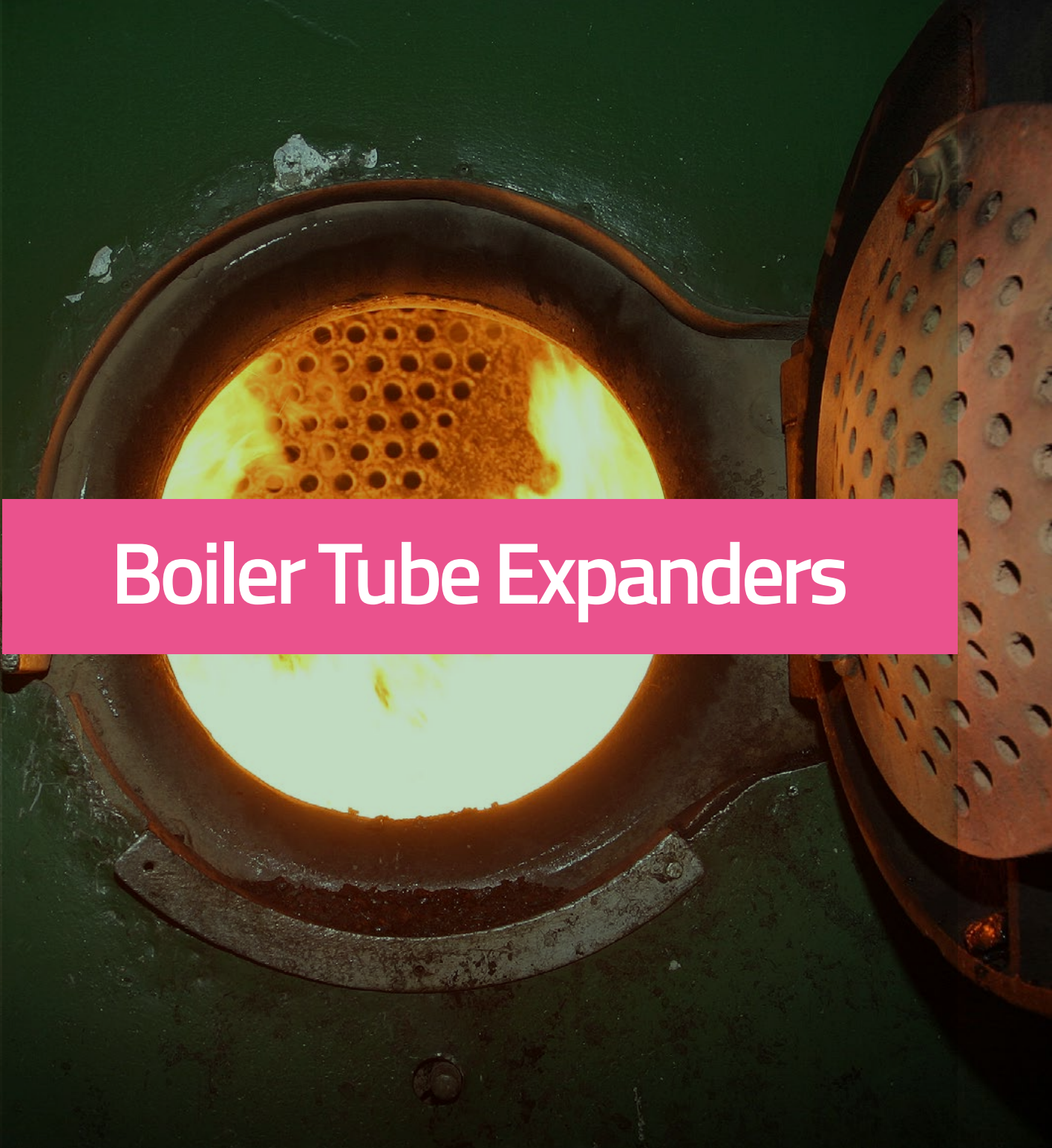


5-Roll expander with nylon bush in front of the cage to protect to the tubes from the scratches. Used for tytanium tubes.

# AVAILABLE SOON

## Heat Exchanger & Condenser Cleaning Systems

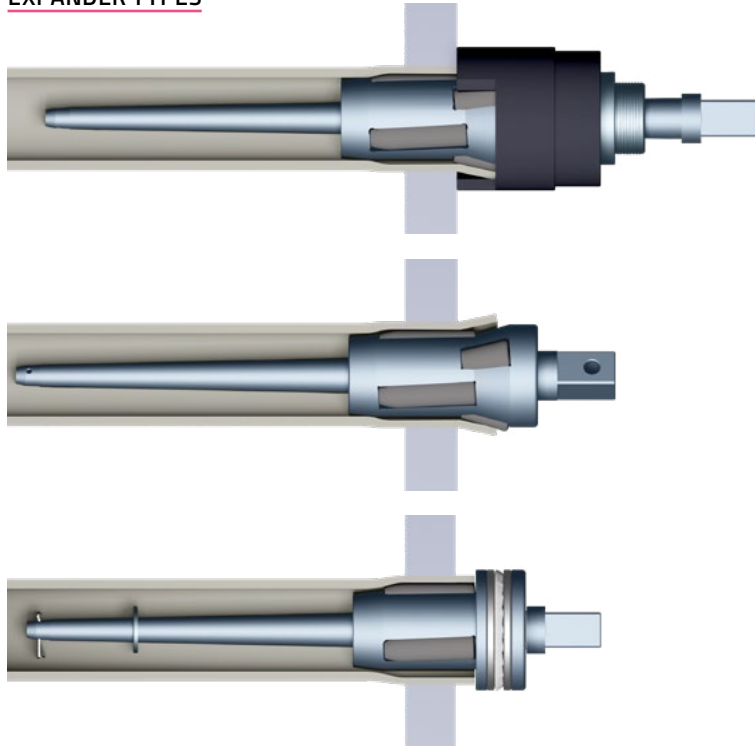




# Boiler Tube Expanders

# Correct tool selection

## EXPANDER TYPES



### FTKS SERIES

► This expander will simultaneously expand and flare the tubes in 1 single operation. An adjustable collar with a ball bearing prevents the cage and flare rolls to penetrate too much inside the tube. Allows consistent expansion and flare even for non-experienced operators. This tool is an excellent expander for re-rolling leaky tubes.

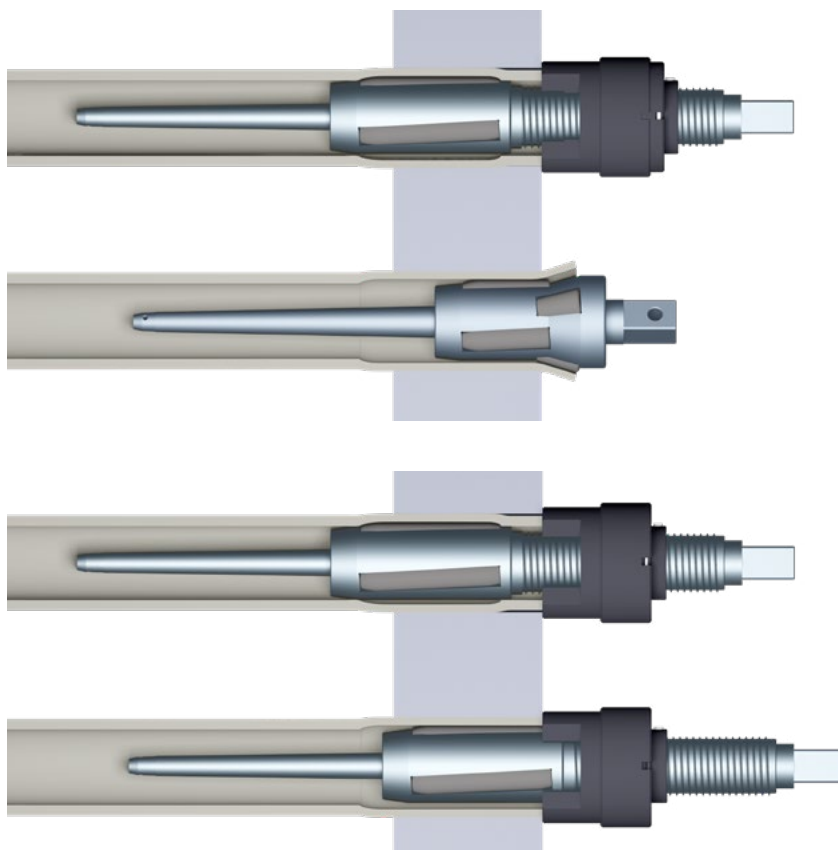
### KS SERIES

► Self-feeding boiler tube expander, simultaneously expands and flare the tube. An excellent expander for re-rolling leaky tubes and new constructions.

### PZ SERIES

► Self-feeding, fixed depth, three roll boiler tube expander with plane collar and ball bearing. An excellent expander for re-rolling leaky tubes and new boilers.

## PROPER EXPANDING PROCESS FOR HEAVY TUBE SHEETS AND BOILER DRUMS



### EXPANSION WITH FLARE

1. Insert the tube expander inside the tube; rolls should stick out 8-12 mm behind the drum. Expand the tube until the set torque on the expanding machine is reached (according to the tube's calculated expanded inside diameter).
2. If the expansion with flare is desired, use the KS flare tube expander in the next step. Insert expander into the tube for the depth that will overlap with the first expansion, start next step expanding and flaring. Please note that operation with KS expander may need more than one pass. It depends on the required wall reduction and gap size between the tube and the hole in the drum. The more significant gap requires more passes - it is needed to avoid the cage penetration too much into the tube, which may cause damage to the tube or tool.

### EXPANSION WITHOUT FLARE

1. Insert the tube expander inside the tube; rolls should stick out 8-12 mm behind the drum. Expand the tube until the set torque on the expanding machine is reached (according to the tube's calculated expanded inside diameter).
2. If the flare is not desired, then readjust the P2 expander to the required expanding length and finish the expansion as shown in the picture.

# Short Mandrel's Expansion Range

| MANDREL<br>SET | EXPANSION RANGE ON THE EACH MANDREL |        |        |       |        |        |        |       |        |        |        |       | PROTRUDING FROM<br>THE FRONT OF CAGE |       | SQUARE |
|----------------|-------------------------------------|--------|--------|-------|--------|--------|--------|-------|--------|--------|--------|-------|--------------------------------------|-------|--------|
|                | A                                   |        |        |       | B      |        |        |       | C      |        |        |       |                                      |       |        |
|                | [MM]                                |        | [INCH] |       | [MM]   |        | [INCH] |       | [MM]   |        | [INCH] |       |                                      |       |        |
|                | MIN                                 | MAX    | MIN    | MAX   | MIN    | MAX    | MIN    | MAX   | MIN    | MAX    | MIN    | MAX   | MM                                   | INCH  |        |
| TKK-19         | 19,00                               | 20,00  | 0,748  | 0,787 | 20,00  | 21,00  | 0,787  | 0,827 | 21,00  | 22,00  | 0,827  | 0,866 | 40,00                                | 1,575 | ½"     |
| TKK-20         | 20,00                               | 21,00  | 0,787  | 0,826 | 21,00  | 22,00  | 0,827  | 0,866 | 22,00  | 23,00  | 0,866  | 0,906 | 40,00                                | 1,575 | ½"     |
| TKK-22         | 22,00                               | 23,00  | 0,866  | 0,905 | 23,00  | 24,00  | 0,906  | 0,945 | 24,00  | 25,00  | 0,945  | 0,984 | 40,00                                | 1,575 | ½"     |
| TKK-23         | 23,00                               | 24,00  | 0,906  | 0,944 | 24,00  | 25,00  | 0,945  | 0,984 | 25,00  | 26,00  | 0,984  | 1,024 | 40,00                                | 1,575 | ½"     |
| TKK-24         | 24,00                               | 25,00  | 0,945  | 0,984 | 25,00  | 26,00  | 0,984  | 1,024 | 26,00  | 27,00  | 1,024  | 1,063 | 40,00                                | 1,575 | ½"     |
| TKK-25         | 25,00                               | 26,00  | 0,984  | 1,023 | 26,00  | 27,00  | 1,024  | 1,063 | 27,00  | 28,00  | 1,063  | 1,102 | 40,00                                | 1,575 | ½"     |
| TKK-27         | 27,00                               | 28,00  | 1,063  | 1,102 | 28,00  | 29,00  | 1,102  | 1,142 | 29,00  | 30,00  | 1,142  | 1,181 | 40,00                                | 1,575 | ½"     |
| TKK-28         | 28,00                               | 29,30  | 1,102  | 1,153 | 29,30  | 30,60  | 1,154  | 1,205 | 30,60  | 32,00  | 1,205  | 1,260 | 50,00                                | 1,969 | ½"     |
| TKK-29         | 29,00                               | 30,30  | 1,142  | 1,192 | 30,30  | 31,60  | 1,193  | 1,244 | 31,60  | 33,00  | 1,244  | 1,299 | 50,00                                | 1,969 | ½"     |
| TKK-30         | 30,00                               | 31,30  | 1,181  | 1,232 | 31,30  | 32,60  | 1,232  | 1,283 | 32,60  | 34,00  | 1,283  | 1,339 | 50,00                                | 1,969 | ½"     |
| TKK-32         | 32,00                               | 33,30  | 1,260  | 1,311 | 33,30  | 34,60  | 1,311  | 1,362 | 34,60  | 36,00  | 1,362  | 1,417 | 50,00                                | 1,969 | ½"     |
| TKK-37*1       | 35,00                               | 37,00  | 1,378  | 1,456 | 37,00  | 39,00  | 1,457  | 1,535 | 39,00  | 41,00  | 1,535  | 1,614 | 65,00                                | 2,559 | ¾"     |
| TKK-37         | 37,00                               | 39,00  | 1,457  | 1,535 | 39,00  | 41,00  | 1,535  | 1,614 | 41,00  | 43,00  | 1,614  | 1,693 | 65,00                                | 2,559 | ¾"     |
| TKK-42*2       | 40,00                               | 42,00  | 1,575  | 1,653 | 42,00  | 44,00  | 1,654  | 1,732 | 44,00  | 46,00  | 1,732  | 1,811 | 65,00                                | 2,559 | ¾"     |
| TKK-42         | 42,00                               | 44,00  | 1,654  | 1,732 | 44,00  | 46,00  | 1,732  | 1,811 | 46,00  | 48,00  | 1,811  | 1,890 | 65,00                                | 2,559 | ¾"     |
| TKK-44         | 44,00                               | 46,00  | 1,732  | 1,811 | 46,00  | 48,00  | 1,811  | 1,890 | 48,00  | 50,00  | 1,890  | 1,969 | 65,00                                | 2,559 | ¾"     |
| TKK-47         | 47,00                               | 49,40  | 1,850  | 1,944 | 49,40  | 51,70  | 1,945  | 2,035 | 51,70  | 54,00  | 2,035  | 2,126 | 75,00                                | 2,953 | ¾"     |
| TKK-49         | 49,00                               | 51,40  | 1,929  | 2,023 | 51,40  | 53,70  | 2,024  | 2,114 | 53,70  | 56,00  | 2,114  | 2,205 | 75,00                                | 2,953 | ¾"     |
| TKK-49*3       | 52,00                               | 54,60  | 2,047  | 2,149 | 54,40  | 56,90  | 2,142  | 2,240 | 57,70  | 59,20  | 2,272  | 2,331 | 75,00                                | 2,953 | ¾"     |
| TKK-54         | 54,00                               | 56,60  | 2,126  | 2,228 | 56,60  | 59,30  | 2,228  | 2,335 | 59,30  | 62,00  | 2,335  | 2,441 | 82,00                                | 3,228 | ¾"     |
| TKK-57         | 57,00                               | 60,00  | 2,244  | 2,362 | 60,00  | 63,00  | 2,362  | 2,480 | 63,00  | 66,00  | 2,480  | 2,598 | 90,00                                | 3,543 | ¾"     |
| TKK-65*4       | 60,00                               | 63,00  | 2,362  | 2,480 | 63,00  | 66,00  | 2,480  | 2,598 | 66,00  | 69,00  | 2,598  | 2,717 | 90,00                                | 3,543 | ¾"     |
| TKK-65         | 65,00                               | 68,00  | 2,559  | 2,677 | 68,00  | 71,00  | 2,677  | 2,795 | 71,00  | 74,00  | 2,795  | 2,913 | 90,00                                | 3,543 | ¾"     |
| TKK-72*5       | 68,00                               | 71,40  | 2,677  | 2,811 | 71,40  | 74,70  | 2,811  | 2,941 | 74,70  | 78,00  | 2,941  | 3,071 | 100,00                               | 3,937 | 1"     |
| TKK-72         | 72,00                               | 75,30  | 2,835  | 2,964 | 75,40  | 78,60  | 2,969  | 3,094 | 78,70  | 82,00  | 3,098  | 3,228 | 100,00                               | 3,937 | 1"     |
| TKK-77         | 77,00                               | 80,40  | 3,031  | 3,165 | 80,40  | 83,70  | 3,165  | 3,295 | 83,70  | 87,00  | 3,295  | 3,425 | 100,00                               | 3,937 | 1"     |
| TKK-82         | 82,00                               | 85,40  | 3,228  | 3,362 | 85,40  | 88,70  | 3,362  | 3,492 | 88,70  | 92,00  | 3,492  | 3,622 | 100,00                               | 3,937 | 1"     |
| TKK-86         | 86,00                               | 89,40  | 3,386  | 3,519 | 89,40  | 92,70  | 3,520  | 3,650 | 92,70  | 96,00  | 3,650  | 3,780 | 100,00                               | 3,937 | 1"     |
| TKK-90         | 90,00                               | 94,00  | 3,543  | 3,700 | 94,00  | 98,00  | 3,701  | 3,858 | 98,00  | 102,00 | 3,858  | 4,016 | 115,00                               | 4,528 | 1"     |
| TKK-96         | 96,00                               | 100,00 | 3,780  | 3,937 | 100,00 | 104,00 | 3,937  | 4,094 | 104,00 | 108,00 | 4,094  | 4,252 | 115,00                               | 4,528 | 1"     |

\*1 re. expander KS-35

\*2 re. expander KS-40

\*3 re. expander KS-52

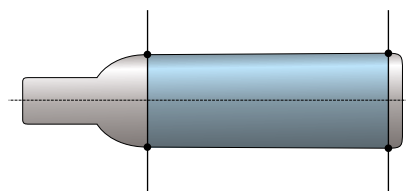
\*4 re. expander KS-60

\*5 re. expander KS-68

## ROLLS RANGE (SHEET THICKNESS) FOR KS, PZ & FTKS

| ROLL LENGTH |        | TUBE SHEET THICKNESS |         | AVAILABILITY       |
|-------------|--------|----------------------|---------|--------------------|
| [MM]        | [INCH] | [INCH]               | [MM]    |                    |
| 40          | 1,574  | ½" - ¾"              | 12 - 19 | On request         |
| 42          | 1,653  | ½" - ¾"              | 12 - 19 | <b>Standard</b>    |
| 50          | 1,968  | 5/8" - 7/8"          | 16 - 22 | <b>Standard</b>    |
| 60          | 2,362  | 7/8" - 1¼"           | 22 - 32 | On request         |
| 80          | 3,149  | 1⅜" - 1¾"            | 35 - 45 | On request         |
| 100         | 3,937  | 1⅞" - 2¼"            | 48 - 58 | On special request |

## BOTTLE ROLLS FOR KS, PZ

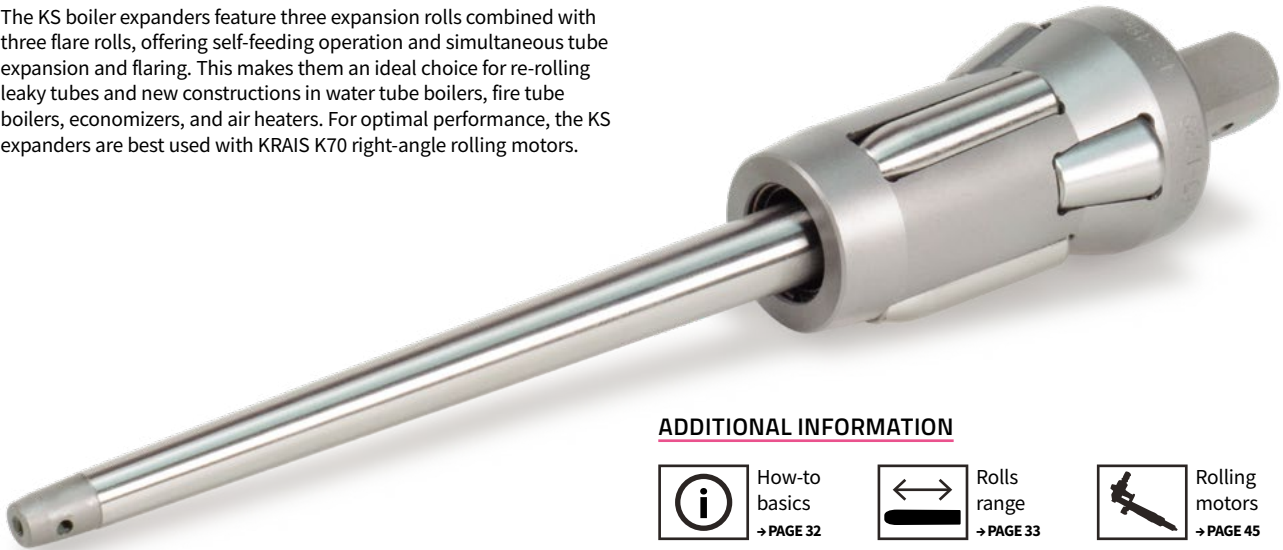


For KS and PZ expanders there are available special bottle type rolls which reduce the effective roll length. Max. for 10 mm from the front of the roll.



# KS Series

The KS boiler expanders feature three expansion rolls combined with three flare rolls, offering self-feeding operation and simultaneous tube expansion and flaring. This makes them an ideal choice for re-rolling leaky tubes and new constructions in water tube boilers, fire tube boilers, economizers, and air heaters. For optimal performance, the KS expanders are best used with KRAIS K70 right-angle rolling motors.



## ADDITIONAL INFORMATION



How-to basics  
→ PAGE 32



Rolls range  
→ PAGE 33



Rolling motors  
→ PAGE 45

| Tube OD |       | Tube Gauge | Tool No. | Expansion Range |      |        |      | Rolls        |        |       | Mandrel |        |        | Short Mandrell Set (3 pcs.) |        |        | Square |
|---------|-------|------------|----------|-----------------|------|--------|------|--------------|--------|-------|---------|--------|--------|-----------------------------|--------|--------|--------|
|         |       |            |          | [mm]            |      | [inch] |      | No.          | Lenght |       | No.     | Length |        | No.                         | Length |        |        |
| [inch]  | [mm]  | [BWG]      |          | min             | max  | min    | max  |              |        | [mm]  |         | [inch] |        |                             | [mm]   | [inch] |        |
| 1"      | 25,40 | 9-11       | KS-1942  | 19,0            | 22,0 | 0,75   | 0,87 | RR12RK5/42   | 42     | 1,654 | TK19    | 196    | 7,677  | -                           | -      | -      | 1/2    |
| 1"      | 25,40 | 13-14      | KS-2042  | 20,0            | 23,0 | 0,79   | 0,91 | RR12RK5/42   | 42     | 1,654 | TK20    | 196    | 7,677  | -                           | -      | -      | 1/2    |
| 1-1/4"  | 31,75 | 7          | KS-2242  | 22,0            | 25,0 | 0,87   | 0,98 | RR12RK5/42   | 42     | 1,654 | TK22    | 196    | 7,677  | -                           | -      | -      | 1/2    |
| 1-1/4"  | 31,75 | 9          | KS-2342  | 23,0            | 26,0 | 0,91   | 1,02 | RR13RK6/42   | 42     | 1,654 | TK23    | 196    | 7,677  | -                           | -      | -      | 1/2    |
| 1-1/4"  | 31,75 | 10         | KS-2442  | 24,0            | 27,0 | 0,94   | 1,06 | RR13RK6/42   | 42     | 1,654 | TK24    | 196    | 7,677  | -                           | -      | -      | 1/2    |
| 1-1/4"  | 31,75 | 11-13      | KS-2542  | 25,0            | 28,0 | 0,98   | 1,10 | RR13RK6/42   | 42     | 1,654 | TK25    | 196    | 7,677  | -                           | -      | -      | 1/2    |
| 1-1/4"  | 31,75 | 12-14      | KS-2642  | 26,0            | 29,0 | 1,02   | 1,14 | RR13RK6/42   | 42     | 1,654 | TK26    | 196    | 7,677  | -                           | -      | -      | 1/2    |
| 1-1/4"  | 31,75 | 14-15      | KS-2742  | 27,0            | 30,0 | 1,06   | 1,18 | RR15RK7/42   | 42     | 1,654 | TK27    | 196    | 7,874  | -                           | -      | -      | 1/2    |
| 1-1/4"  | 31,75 | 16         | KS-2842  | 28,0            | 32,0 | 1,10   | 1,26 | RR16RK8/42   | 42     | 1,654 | TK28    | 260    | 10,236 | TKK28                       | 175    | 6,890  | 3/4    |
|         |       |            | KS-2850  | 28,0            | 32,0 | 1,10   | 1,26 | RR16RK8/50   | 50     | 1,969 | TK28    | 260    | 10,236 | TKK28                       | 175    | 6,890  | 3/4    |
|         |       |            | KS-2860  | 28,0            | 32,0 | 1,10   | 1,26 | RR16RK8/60   | 60     | 2,362 | TK28    | 260    | 10,236 | TKK28                       | 175    | 6,890  | 3/4    |
|         |       |            | KS-2880  | 28,0            | 32,0 | 1,10   | 1,26 | RR16RK8/80   | 80     | 3,150 | TK28    | 260    | 10,236 | TKK28                       | 175    | 6,890  | 3/4    |
| 1-1/2"  | 38,10 | 7-10       | KS-2942  | 29,0            | 33,0 | 1,14   | 1,30 | RR16RK8/42   | 42     | 1,654 | TK29    | 260    | 10,236 | TKK29                       | 175    | 6,890  | 3/4    |
|         |       |            | KS-2950  | 29,0            | 33,0 | 1,14   | 1,30 | RR16RK8/50   | 50     | 1,969 | TK29    | 260    | 10,236 | TKK29                       | 175    | 6,890  | 3/4    |
|         |       |            | KS-2960  | 29,0            | 33,0 | 1,14   | 1,30 | RR16RK8/60   | 60     | 2,362 | TK29    | 260    | 10,236 | TKK29                       | 175    | 6,890  | 3/4    |
|         |       |            | KS-2980  | 29,0            | 33,0 | 1,14   | 1,30 | RR16RK8/80   | 80     | 3,150 | TK29    | 260    | 10,236 | TKK29                       | 175    | 6,890  | 3/4    |
| 1-1/2"  | 38,10 | 10-12      | KS-3042  | 30,0            | 34,0 | 1,18   | 1,34 | RR16RK8/42   | 42     | 1,654 | TK30    | 260    | 10,236 | TKK30                       | 175    | 6,890  | 3/4    |
|         |       |            | KS-3050  | 30,0            | 34,0 | 1,18   | 1,34 | RR16RK8/50   | 50     | 1,969 | TK30    | 260    | 10,236 | TKK30                       | 175    | 6,890  | 3/4    |
|         |       |            | KS-3060  | 30,0            | 34,0 | 1,18   | 1,34 | RR16RK8/60   | 60     | 2,362 | TK30    | 260    | 10,236 | TKK30                       | 175    | 6,890  | 3/4    |
|         |       |            | KS-3080  | 30,0            | 34,0 | 1,18   | 1,34 | RR16RK8/80   | 80     | 3,150 | TK30    | 260    | 10,236 | TKK30                       | 175    | 6,890  | 3/4    |
| 1-1/2"  | 38,10 | 12-14      | KS-3242  | 32,0            | 36,0 | 1,26   | 1,42 | RR17RK9/42   | 42     | 1,654 | TK32    | 260    | 10,236 | TKK32                       | 175    | 6,890  | 3/4    |
|         |       |            | KS-3250  | 32,0            | 36,0 | 1,26   | 1,42 | RR17RK9/50   | 50     | 1,969 | TK32    | 260    | 10,236 | TKK32                       | 175    | 6,890  | 3/4    |
|         |       |            | KS-3260  | 32,0            | 36,0 | 1,26   | 1,42 | RR17RK9/60   | 60     | 2,362 | TK32    | 260    | 10,236 | TKK32                       | 175    | 6,890  | 3/4    |
|         |       |            | KS-3280  | 32,0            | 36,0 | 1,26   | 1,42 | RR17RK9/80   | 80     | 3,150 | TK32    | 260    | 10,236 | TKK32                       | 175    | 6,890  | 3/4    |
| 1-1/2"  | 38,10 | 13-20      | KS-3342  | 33,0            | 38,0 | 1,30   | 1,50 | RP33RR33/42  | 42     | 1,654 | TK33    | 290    | 11,417 | TKK33                       | 181    | 7,126  | 3/4    |
|         |       |            | KS-3350  | 33,0            | 38,0 | 1,30   | 1,50 | RP33RR33/50  | 50     | 1,969 | TK33    | 290    | 11,417 | TKK33                       | 181    | 7,126  | 3/4    |
|         |       |            | KS-3360  | 33,0            | 38,0 | 1,30   | 1,50 | RP33RR33/60  | 60     | 2,362 | TK33    | 290    | 11,417 | TKK33                       | 181    | 7,126  | 3/4    |
|         |       |            | KS-3380  | 33,0            | 38,0 | 1,30   | 1,50 | RP33RR33/80  | 80     | 3,150 | TK33    | 290    | 11,417 | TKK33                       | 181    | 7,126  | 3/4    |
| 1-3/4"  | 44,45 | 8-9        | KS-3542  | 35,0            | 41,0 | 1,38   | 1,61 | RR21RK35 /42 | 42     | 1,654 | TK37    | 310    | 12,205 | TKK37                       | 188    | 7,402  | 3/4    |
|         |       |            | KS-3550  | 35,0            | 41,0 | 1,38   | 1,61 | RR21RK35 /50 | 50     | 1,969 | TK37    | 310    | 12,205 | TKK37                       | 188    | 7,402  | 3/4    |
|         |       |            | KS-3560  | 35,0            | 41,0 | 1,38   | 1,61 | RR21RK35 /60 | 60     | 2,362 | TK37    | 310    | 12,205 | TKK37                       | 188    | 7,402  | 3/4    |
|         |       |            | KS-3580  | 35,0            | 41,0 | 1,38   | 1,61 | RR21RK35 /80 | 80     | 3,150 | TK37    | 310    | 12,205 | TKK37                       | 188    | 7,402  | 3/4    |
| 1-3/4"  | 44,45 | 10-12      | KS-3742  | 37,0            | 43,0 | 1,46   | 1,69 | RR22RK10/42  | 42     | 1,654 | TK37    | 310    | 12,205 | TKK37                       | 188    | 7,402  | 3/4    |
|         |       |            | KS-3750  | 37,0            | 43,0 | 1,46   | 1,69 | RR22RK10/50  | 50     | 1,969 | TK37    | 310    | 12,205 | TKK37                       | 188    | 7,402  | 3/4    |
|         |       |            | KS-3760  | 37,0            | 43,0 | 1,46   | 1,69 | RR22RK10/60  | 60     | 2,362 | TK37    | 310    | 12,205 | TKK37                       | 188    | 7,402  | 3/4    |
|         |       |            | KS-3780  | 37,0            | 43,0 | 1,46   | 1,69 | RR22RK10/80  | 80     | 3,150 | TK37    | 310    | 12,205 | TKK37                       | 188    | 7,402  | 3/4    |

## KS Series

| Tube OD |       | Tube Gauge | Tool No. | Expansion Range |      |        |      | Rolls       |        |       | Mandrel |        |        | Short Mandrell Set (3 pcs.) |        |        | Square |
|---------|-------|------------|----------|-----------------|------|--------|------|-------------|--------|-------|---------|--------|--------|-----------------------------|--------|--------|--------|
|         |       |            |          | [mm]            |      | [inch] |      | No.         | Lenght |       | No.     | Length |        | No.                         | Length |        |        |
| [inch]  | [mm]  | [BWG]      |          | min             | max  | min    | max  |             |        | [mm]  |         | [inch] |        |                             | [mm]   | [inch] |        |
| 1-3/4"  | 44,45 | 12-18      | KS-3942  | 39,0            | 45,0 | 1,54   | 1,77 | RR40RK40/42 | 42     | 1,654 | TK37    | 310    | 12,205 | TKK37                       | 188    | 7,402  | 3/4    |
|         |       |            | KS-3950  | 39,0            | 45,0 | 1,54   | 1,77 | RR40RK40/50 | 50     | 1,969 | TK37    | 310    | 12,205 | TKK37                       | 188    | 7,402  | 3/4    |
|         |       |            | KS-3960  | 39,0            | 45,0 | 1,54   | 1,77 | RR40RK40/60 | 60     | 2,362 | TK37    | 310    | 12,205 | TKK37                       | 188    | 7,402  | 3/4    |
|         |       |            | KS-3980  | 39,0            | 45,0 | 1,54   | 1,77 | RR40RK40/80 | 80     | 3,150 | TK37    | 310    | 12,205 | TKK37                       | 188    | 7,402  | 3/4    |
| 2"      | 50,80 | 7-9        | KS-4040  | 40,0            | 46,0 | 1,57   | 1,81 | RR40RK40/40 | 40     | 1,575 | TK42    | 310    | 12,205 | TKK42                       | 205    | 8,071  | 3/4    |
|         |       |            | KS-4050  | 40,0            | 46,0 | 1,57   | 1,81 | RR40RK40/50 | 50     | 1,969 | TK42    | 310    | 12,205 | TKK42                       | 205    | 8,071  | 3/4    |
|         |       |            | KS-4060  | 40,0            | 46,0 | 1,57   | 1,81 | RR40RK40/60 | 60     | 2,362 | TK42    | 310    | 12,205 | TKK42                       | 205    | 8,071  | 3/4    |
|         |       |            | KS-4080  | 40,0            | 46,0 | 1,57   | 1,81 | RR40RK40/80 | 80     | 3,150 | TK42    | 310    | 12,205 | TKK42                       | 205    | 8,071  | 3/4    |
| 2"      | 50,80 | 10-13      | KS-4240  | 42,0            | 48,0 | 1,65   | 1,89 | RR23RK11/40 | 40     | 1,575 | TK42    | 310    | 12,205 | TKK42                       | 205    | 8,071  | 3/4    |
|         |       |            | KS-4250  | 42,0            | 48,0 | 1,65   | 1,89 | RR23RK11/50 | 50     | 1,969 | TK42    | 310    | 12,205 | TKK42                       | 205    | 8,071  | 3/4    |
|         |       |            | KS-4260  | 42,0            | 48,0 | 1,65   | 1,89 | RR23RK11/60 | 60     | 2,362 | TK42    | 310    | 12,205 | TKK42                       | 205    | 8,071  | 3/4    |
|         |       |            | KS-4280  | 42,0            | 48,0 | 1,65   | 1,89 | RR23RK11/80 | 80     | 3,150 | TK42    | 310    | 12,205 | TKK42                       | 205    | 8,071  | 3/4    |
| 2"      | 50,80 | 12-14      | KS-4440  | 44,0            | 50,0 | 1,73   | 1,97 | RR23RK11/40 | 40     | 1,575 | TK44    | 310    | 12,205 | TKK44                       | 205    | 8,071  | 3/4    |
|         |       |            | KS-4450  | 44,0            | 50,0 | 1,73   | 1,97 | RR23RK11/50 | 50     | 1,969 | TK44    | 310    | 12,205 | TKK44                       | 205    | 8,071  | 3/4    |
|         |       |            | KS-4460  | 44,0            | 50,0 | 1,73   | 1,97 | RR23RK11/60 | 60     | 2,362 | TK44    | 310    | 12,205 | TKK44                       | 205    | 8,071  | 3/4    |
|         |       |            | KS-4480  | 44,0            | 50,0 | 1,73   | 1,97 | RR23RK11/80 | 80     | 3,150 | TK44    | 310    | 12,205 | TKK44                       | 205    | 8,071  | 3/4    |
| 2"      | 50,80 | 15-16      | KS-4740  | 47,0            | 54,0 | 1,85   | 2,13 | RR24RK12/40 | 40     | 1,575 | TK47    | 340    | 13,307 | TKK47                       | 218    | 8,583  | 3/4    |
|         |       |            | KS-4750  | 47,0            | 54,0 | 1,85   | 2,13 | RR24RK12/50 | 50     | 1,969 | TK47    | 340    | 13,307 | TKK47                       | 218    | 8,583  | 3/4    |
|         |       |            | KS-4760  | 47,0            | 54,0 | 1,85   | 2,13 | RR24RK12/60 | 60     | 2,362 | TK47    | 340    | 13,307 | TKK47                       | 218    | 8,583  | 3/4    |
|         |       |            | KS-4780  | 47,0            | 54,0 | 1,85   | 2,13 | RR24RK12/80 | 80     | 3,150 | TK47    | 340    | 13,307 | TKK47                       | 218    | 8,583  | 3/4    |
| 2-1/4"  | 57,15 | 10-13      | KS-4940  | 49,0            | 56,0 | 1,93   | 2,20 | RR24RK12/40 | 40     | 1,575 | TK49    | 340    | 13,307 | TKK49                       | 218    | 8,583  | 3/4    |
|         |       |            | KS-4950  | 49,0            | 56,0 | 1,93   | 2,20 | RR24RK12/50 | 50     | 1,969 | TK49    | 340    | 13,307 | TKK49                       | 218    | 8,583  | 3/4    |
|         |       |            | KS-4960  | 49,0            | 56,0 | 1,93   | 2,20 | RR24RK12/60 | 60     | 2,362 | TK49    | 340    | 13,307 | TKK49                       | 218    | 8,583  | 3/4    |
|         |       |            | KS-4980  | 49,0            | 56,0 | 1,93   | 2,20 | RR24RK12/80 | 80     | 3,150 | TK49    | 340    | 13,307 | TKK49                       | 218    | 8,583  | 3/4    |
| 2-1/4"  | 57,15 | 14-16      | KS-5240  | 52,0            | 59,0 | 2,05   | 2,32 | RR25RK13/40 | 40     | 1,575 | TK49    | 340    | 13,307 | TKK49                       | 218    | 8,583  | 3/4    |
|         |       |            | KS-5250  | 52,0            | 59,0 | 2,05   | 2,32 | RR25RK13/50 | 50     | 1,969 | TK49    | 340    | 13,307 | TKK49                       | 218    | 8,583  | 3/4    |
|         |       |            | KS-5260  | 52,0            | 59,0 | 2,05   | 2,32 | RR25RK13/60 | 60     | 2,362 | TK49    | 340    | 13,307 | TKK49                       | 218    | 8,583  | 3/4    |
|         |       |            | KS-5280  | 52,0            | 59,0 | 2,05   | 2,32 | RR25RK13/80 | 80     | 3,150 | TK49    | 340    | 13,307 | TKK49                       | 218    | 8,583  | 3/4    |
| 2-1/2"  | 63,50 | 8-13       | KS-5440  | 54,0            | 62,0 | 2,13   | 2,44 | RR26RK14/40 | 40     | 1,575 | TK54    | 375    | 14,764 | TKK54                       | 230    | 9,055  | 3/4    |
|         |       |            | KS-5450  | 54,0            | 62,0 | 2,13   | 2,44 | RR26RK14/50 | 50     | 1,969 | TK54    | 375    | 14,764 | TKK54                       | 230    | 9,055  | 3/4    |
|         |       |            | KS-5460  | 54,0            | 62,0 | 2,13   | 2,44 | RR26RK14/60 | 60     | 2,362 | TK54    | 375    | 14,764 | TKK54                       | 230    | 9,055  | 3/4    |
|         |       |            | KS-5480  | 54,0            | 62,0 | 2,13   | 2,44 | RR26RK14/80 | 80     | 3,150 | TK54    | 375    | 14,764 | TKK54                       | 230    | 9,055  | 3/4    |
| 2-1/2"  | 63,50 | 12-16      | KS-5740  | 57,0            | 66,0 | 2,24   | 2,60 | RR27RK15/40 | 40     | 1,575 | TK57    | 395    | 15,551 | TKK57                       | 235    | 9,252  | 3/4    |
|         |       |            | KS-5750  | 57,0            | 66,0 | 2,24   | 2,60 | RR27RK15/50 | 50     | 1,969 | TK57    | 395    | 15,551 | TKK57                       | 235    | 9,252  | 3/4    |
|         |       |            | KS-5760  | 57,0            | 66,0 | 2,24   | 2,60 | RR27RK15/60 | 60     | 2,362 | TK57    | 395    | 15,551 | TKK57                       | 235    | 9,252  | 3/4    |
|         |       |            | KS-5780  | 57,0            | 66,0 | 2,24   | 2,60 | RR27RK15/80 | 80     | 3,150 | TK57    | 395    | 15,551 | TKK57                       | 235    | 9,252  | 3/4    |
| 2-3/4"  | 69,85 | 7-11       | KS-6040  | 60,0            | 69,0 | 2,36   | 2,72 | RR28RK16/40 | 40     | 1,575 | TK57    | 395    | 15,551 | TKK57                       | 235    | 9,252  | 3/4    |
|         |       |            | KS-6050  | 60,0            | 69,0 | 2,36   | 2,72 | RR28RK16/50 | 50     | 1,969 | TK57    | 395    | 15,551 | TKK57                       | 235    | 9,252  | 3/4    |
|         |       |            | KS-6060  | 60,0            | 69,0 | 2,36   | 2,72 | RR28RK16/60 | 60     | 2,362 | TK57    | 395    | 15,551 | TKK57                       | 235    | 9,252  | 3/4    |
|         |       |            | KS-6080  | 60,0            | 69,0 | 2,36   | 2,72 | RR28RK16/80 | 80     | 3,150 | TK57    | 395    | 15,551 | TKK57                       | 235    | 9,252  | 3/4    |
| 3"      | 76,20 | 7-8        | KS-6540  | 65,0            | 74,0 | 2,56   | 2,91 | RR29RK17/40 | 40     | 1,575 | TK65    | 395    | 15,551 | TKK65                       | 235    | 9,252  | 3/4    |
|         |       |            | KS-6550  | 65,0            | 74,0 | 2,56   | 2,91 | RR29RK17/50 | 50     | 1,969 | TK65    | 395    | 15,551 | TKK65                       | 235    | 9,252  | 3/4    |
|         |       |            | KS-6560  | 65,0            | 74,0 | 2,56   | 2,91 | RR29RK17/60 | 60     | 2,362 | TK65    | 395    | 15,551 | TKK65                       | 235    | 9,252  | 3/4    |
|         |       |            | KS-6580  | 65,0            | 74,0 | 2,56   | 2,91 | RR29RK17/80 | 80     | 3,150 | TK65    | 395    | 15,551 | TKK65                       | 235    | 9,252  | 3/4    |
| 3"      | 76,20 | 10-14      | KS-6840  | 68,0            | 77,0 | 2,68   | 3,03 | RR30RK18/40 | 40     | 1,575 | TK72    | 403    | 15,866 | TKK72                       | 255    | 10,039 | 1      |
|         |       |            | KS-6850  | 68,0            | 77,0 | 2,68   | 3,03 | RR30RK18/50 | 50     | 1,969 | TK72    | 403    | 15,866 | TKK72                       | 255    | 10,039 | 1      |
|         |       |            | KS-6860  | 68,0            | 77,0 | 2,68   | 3,03 | RR30RK18/60 | 60     | 2,362 | TK72    | 403    | 15,866 | TKK72                       | 255    | 10,039 | 1      |
|         |       |            | KS-6880  | 68,0            | 77,0 | 2,68   | 3,03 | RR30RK18/80 | 80     | 3,150 | TK72    | 403    | 15,866 | TKK72                       | 255    | 10,039 | 1      |
| 3-1/4"  | 82,55 | 7-11       | KS-7240  | 72,0            | 81,0 | 2,83   | 3,19 | RR31RK19/40 | 40     | 1,575 | TK72    | 403    | 15,866 | TKK72                       | 255    | 10,039 | 1      |
|         |       |            | KS-7250  | 72,0            | 81,0 | 2,83   | 3,19 | RR31RK19/50 | 50     | 1,969 | TK72    | 403    | 15,866 | TKK72                       | 255    | 10,039 | 1      |
|         |       |            | KS-7260  | 72,0            | 81,0 | 2,83   | 3,19 | RR31RK19/60 | 60     | 2,362 | TK72    | 403    | 15,866 | TKK72                       | 255    | 10,039 | 1      |
|         |       |            | KS-7280  | 72,0            | 81,0 | 2,83   | 3,19 | RR31RK19/80 | 80     | 3,150 | TK72    | 403    | 15,866 | TKK72                       | 255    | 10,039 | 1      |
| 3-1/4"  | 82,55 | 15-16      | KS-7740  | 77,0            | 87,0 | 3,03   | 3,43 | RR32RK20/40 | 40     | 1,575 | TK77    | 422    | 16,614 | TKK77                       | 255    | 10,039 | 1      |
|         |       |            | KS-7750  | 77,0            | 87,0 | 3,03   | 3,43 | RR32RK20/50 | 50     | 1,969 | TK77    | 422    | 16,614 | TKK77                       | 255    | 10,039 | 1      |
|         |       |            | KS-7760  | 77,0            | 87,0 | 3,03   | 3,43 | RR32RK20/60 | 60     | 2,362 | TK77    | 422    | 16,614 | TKK77                       | 255    | 10,039 | 1      |
|         |       |            | KS-7780  | 77,0            | 87,0 | 3,03   | 3,43 | RR32RK20/80 | 80     | 3,150 | TK77    | 422    | 16,614 | TKK77                       | 255    | 10,039 | 1      |

| Tube OD |        | Tube Gauge | Tool No. | Expansion Range |       |        |      | Rolls       |        |        | Mandrel |        |        | Short Mandrell Set (3 pcs.) |        |        | Square |
|---------|--------|------------|----------|-----------------|-------|--------|------|-------------|--------|--------|---------|--------|--------|-----------------------------|--------|--------|--------|
|         |        |            |          | [mm]            |       | [inch] |      | No.         | Lenght |        | No.     | Length |        | No.                         | Length |        |        |
| [inch]  | [mm]   | [BWG]      |          | min             | max   | min    | max  |             | [mm]   | [inch] |         | [mm]   | [inch] |                             | [mm]   | [inch] | [mm]   |
| 3-1/2"  | 88,90  | 10-13      | KS-8240  | 82,0            | 92,0  | 3,23   | 3,62 | RR33RK21/40 | 40     | 1,575  | TK82    | 422    | 16,614 | TKK82                       | 255    | 10,039 | 1      |
|         |        |            | KS-8250  | 82,0            | 92,0  | 3,23   | 3,62 | RR33RK21/50 | 50     | 1,969  | TK82    | 422    | 16,614 | TKK82                       | 255    | 10,039 | 1      |
|         |        |            | KS-8260  | 82,0            | 92,0  | 3,23   | 3,62 | RR33RK21/60 | 60     | 2,362  | TK82    | 422    | 16,614 | TKK82                       | 255    | 10,039 | 1      |
|         |        |            | KS-8280  | 82,0            | 92,0  | 3,23   | 3,62 | RR33RK21/80 | 80     | 3,150  | TK82    | 422    | 16,614 | TKK82                       | 255    | 10,039 | 1      |
| 3-3/4"  | 95,25  | 8-12       | KS-8640  | 86,0            | 96,0  | 3,39   | 3,78 | RR34RK22/40 | 40     | 1,575  | TK86    | 422    | 16,614 | TKK86                       | 255    | 10,039 | 1      |
|         |        |            | KS-8650  | 86,0            | 96,0  | 3,39   | 3,78 | RR34RK22/50 | 50     | 1,969  | TK86    | 422    | 16,614 | TKK86                       | 255    | 10,039 | 1      |
|         |        |            | KS-8660  | 86,0            | 96,0  | 3,39   | 3,78 | RR34RK22/60 | 60     | 2,362  | TK86    | 422    | 16,614 | TKK86                       | 255    | 10,039 | 1      |
|         |        |            | KS-8680  | 86,0            | 96,0  | 3,39   | 3,78 | RR34RK22/80 | 80     | 3,150  | TK86    | 422    | 16,614 | TKK86                       | 255    | 10,039 | 1      |
| 4"      | 101,60 | 9-12       | KS-9040  | 90,0            | 100,0 | 3,54   | 3,94 | RR34RK22/40 | 40     | 1,575  | TK90    | 422    | 16,614 | TKK90                       | 275    | 10,827 | 1      |
|         |        |            | KS-9050  | 90,0            | 100,0 | 3,54   | 3,94 | RR34RK22/50 | 50     | 1,969  | TK90    | 422    | 16,614 | TKK90                       | 275    | 10,827 | 1      |
|         |        |            | KS-9060  | 90,0            | 100,0 | 3,54   | 3,94 | RR34RK22/60 | 60     | 2,362  | TK90    | 422    | 16,614 | TKK90                       | 275    | 10,827 | 1      |
|         |        |            | KS-9080  | 90,0            | 100,0 | 3,54   | 3,94 | RR34RK22/80 | 80     | 3,150  | TK90    | 422    | 16,614 | TKK90                       | 275    | 10,827 | 1      |
| 4"      | 101,60 | 16         | KS-9640  | 96,0            | 106,0 | 3,78   | 4,17 | RR35RK23/40 | 40     | 1,575  | TK96    | 422    | 16,614 | TKK96                       | 275    | 10,827 | 1      |
|         |        |            | KS-9650  | 96,0            | 106,0 | 3,78   | 4,17 | RR35RK23/50 | 50     | 1,969  | TK96    | 422    | 16,614 | TKK96                       | 275    | 10,827 | 1      |
|         |        |            | KS-9660  | 96,0            | 106,0 | 3,78   | 4,17 | RR35RK23/60 | 60     | 2,362  | TK96    | 422    | 16,614 | TKK96                       | 275    | 10,827 | 1      |
|         |        |            | KS-9680  | 96,0            | 106,0 | 3,78   | 4,17 | RR35RK23/80 | 80     | 3,150  | TK96    | 422    | 16,614 | TKK96                       | 275    | 10,827 | 1      |

\* 100 mm roll length made to order only if technically possible



# PZ Series

The PZ expanders come equipped with three expansion rolls and a self-feeding mechanism, making them perfect for both re-rolling leaky tubes and constructing new water tube boilers, fire tube boilers, economizers, and air heaters. Upon request, these expanders are available with five rolls for more demanding applications. KRAIS K70 right-angle rolling motors are recommended for use with these expanders.



## ADDITIONAL INFORMATION



How-to  
basics  
→ PAGE 32



Rolls  
range  
→ PAGE 33



Rolling  
motors  
→ PAGE 45

| Tube OD |       | Tube Gauge | Tool No. | Expansion Range |      |        |      | Stdandard Rolls |        |        | Mandrel |        |        | Short Mandrell Set (3 pcs.) |        |        | Square |
|---------|-------|------------|----------|-----------------|------|--------|------|-----------------|--------|--------|---------|--------|--------|-----------------------------|--------|--------|--------|
|         |       |            |          | [mm]            |      | [inch] |      | No.             | Lenght |        | No.     | Length |        | No.                         | Length |        |        |
| [inch]  | [mm]  | [BWG]      |          | min             | max  | min    | max  |                 | [mm]   | [inch] |         | [mm]   | [inch] |                             | [mm]   | [inch] |        |
| 1"      | 25,40 | 11-12      | PZ-1942  | 19,0            | 22,0 | 0,75   | 0,87 | RR12/42         | 42     | 1,654  | TK19    | 196    | 7,677  | -                           | -      | -      | 1/2    |
|         |       |            | PZ-1950  | 19,0            | 22,0 | 0,75   | 0,87 | RR12/50         | 50     | 1,969  | TK19    | 196    | 7,677  | -                           | -      | -      | 1/2    |
| 1"      | 25,40 | 13-16      | PZ-2042  | 20,0            | 23,0 | 0,79   | 0,91 | RR12/42         | 42     | 1,654  | TK20    | 196    | 8,189  | -                           | -      | -      | 1/2    |
|         |       |            | PZ-2050  | 20,0            | 23,0 | 0,79   | 0,91 | RR12/50         | 50     | 1,969  | TK20    | 196    | 8,189  | -                           | -      | -      | 1/2    |
| 1-1/8"  | 28,58 | 12-14      | PZ-2242  | 22,0            | 25,0 | 0,87   | 0,98 | RR12/42         | 42     | 1,654  | TK22    | 196    | 8,661  | -                           | -      | -      | 1/2    |
|         |       |            | PZ-2250  | 22,0            | 25,0 | 0,87   | 0,98 | RR12/50         | 50     | 1,969  | TK22    | 196    | 8,661  | -                           | -      | -      | 1/2    |
| 1-1/8"  | 28,58 | 14-16      | PZ-2342  | 23,0            | 26,0 | 0,91   | 1,02 | RR13/42         | 42     | 1,654  | TK23    | 196    | 8,661  | -                           | -      | -      | 1/2    |
|         |       |            | PZ-2350  | 23,0            | 26,0 | 0,91   | 1,02 | RR13/50         | 50     | 1,969  | TK23    | 196    | 8,661  | -                           | -      | -      | 1/2    |
| 1-1/8"  | 28,58 | 15-17      | PZ-2442  | 24,0            | 27,0 | 0,94   | 1,06 | RR13/42         | 42     | 1,654  | TK24    | 196    | 8,661  | -                           | -      | -      | 1/2    |
|         |       |            | PZ-2450  | 24,0            | 27,0 | 0,94   | 1,06 | RR13/50         | 50     | 1,969  | TK24    | 196    | 8,661  | -                           | -      | -      | 1/2    |
| 1-1/8"  | 28,58 | 16         | PZ-2542  | 25,0            | 28,0 | 0,98   | 1,10 | RR13/42         | 42     | 1,654  | TK25    | 196    | 8,661  | -                           | -      | -      | 1/2    |
|         |       |            | PZ-2550  | 25,0            | 28,0 | 0,98   | 1,10 | RR13/50         | 50     | 1,969  | TK25    | 196    | 8,661  | -                           | -      | -      | 1/2    |
| 1-1/4"  | 31,75 | 12-14      | PZ-2642  | 26,0            | 29,0 | 1,02   | 1,14 | RR13/42         | 42     | 1,654  | TK26    | 196    | 8,661  | -                           | -      | -      | 1/2    |
|         |       |            | PZ-2650  | 26,0            | 29,0 | 1,02   | 1,14 | RR13/50         | 50     | 1,969  | TK26    | 196    | 8,661  | -                           | -      | -      | 1/2    |
| 1-1/4"  | 31,75 | 12-17      | PZ-2742  | 27,0            | 30,0 | 1,06   | 1,18 | RR15/42         | 42     | 1,654  | TK27    | 196    | 8,661  | -                           | -      | -      | 1/2    |
|         |       |            | PZ-2750  | 27,0            | 30,0 | 1,06   | 1,18 | RR15/50         | 50     | 1,969  | TK27    | 196    | 8,661  | -                           | -      | -      | 1/2    |
| 1-1/4"  | 31,75 | 16         | PZ-2842  | 28,0            | 32,0 | 1,10   | 1,26 | RR16/42         | 42     | 1,654  | TK28    | 260    | 11,220 | -                           | -      | -      | 3/4    |
|         |       |            | PZ-2850  | 28,0            | 32,0 | 1,10   | 1,26 | RR16/50         | 50     | 1,969  | TK28    | 260    | 11,220 | -                           | -      | -      | 3/4    |
| 1-1/2"  | 38,10 | 7-11       | PZ-2942  | 29,0            | 33,0 | 1,14   | 1,30 | RR16/42         | 42     | 1,654  | TK29    | 260    | 11,220 | -                           | -      | -      | 3/4    |
|         |       |            | PZ-2950  | 29,0            | 33,0 | 1,14   | 1,30 | RR16/50         | 50     | 1,969  | TK29    | 260    | 11,220 | -                           | -      | -      | 3/4    |
| 1-1/2"  | 38,10 | 10-12      | PZ-3042  | 30,0            | 34,0 | 1,18   | 1,34 | RR16/42         | 42     | 1,654  | TK30    | 260    | 11,220 | -                           | -      | -      | 3/4    |
|         |       |            | PZ-3050  | 30,0            | 34,0 | 1,18   | 1,34 | RR16/50         | 50     | 1,969  | TK30    | 260    | 11,220 | -                           | -      | -      | 3/4    |
| 1-1/2"  | 38,10 | 13-16      | PZ-3242  | 32,0            | 36,0 | 1,26   | 1,42 | RR17/42         | 42     | 1,654  | TK32    | 260    | 10,236 | -                           | -      | -      | 3/4    |
|         |       |            | PZ-3250  | 32,0            | 36,0 | 1,26   | 1,42 | RR17/50         | 50     | 1,969  | TK32    | 260    | 10,236 | -                           | -      | -      | 3/4    |
| 1-1/2"  | 38,10 | 13-20      | PZ-3342  | 33,0            | 38,0 | 1,30   | 1,50 | RP33/42         | 42     | 1,654  | TK33    | 290    | 11,417 | TKK33                       | 181,00 | 7,126  | 3/4    |
|         |       |            | PZ-3350  | 33,0            | 38,0 | 1,30   | 1,50 | RP33/50         | 50     | 1,969  | TK33    | 290    | 11,417 | TKK33                       | 181,00 | 7,126  | 3/4    |
| 1-3/4"  | 44,45 | 8-9        | PZ-3542  | 35,0            | 41,0 | 1,38   | 1,61 | RR21/42         | 42     | 1,654  | TK37    | 310    | 12,205 | TKK37                       | 188,00 | 7,402  | 3/4    |
|         |       |            | PZ-3550  | 35,0            | 41,0 | 1,38   | 1,61 | RR21/50         | 50     | 1,969  | TK37    | 310    | 12,205 | TKK37                       | 188,00 | 7,402  | 3/4    |
| 1-3/4"  | 44,45 | 10-16      | PZ-3742  | 37,0            | 43,0 | 1,46   | 1,69 | RR22/42         | 42     | 1,654  | TK37    | 310    | 12,205 | TKK37                       | 188,00 | 7,402  | 3/4    |
|         |       |            | PZ-3750  | 37,0            | 43,0 | 1,46   | 1,69 | RR22/50         | 50     | 1,969  | TK37    | 310    | 12,205 | TKK37                       | 188,00 | 7,402  | 3/4    |
| 1-3/4"  | 44,45 | 12-18      | PZ-3942  | 39,0            | 45,0 | 1,54   | 1,77 | RR40/42         | 42     | 1,654  | TK37    | 310    | 12,205 | TKK37                       | 188,00 | 7,402  | 3/4    |
|         |       |            | PZ-3950  | 39,0            | 45,0 | 1,54   | 1,77 | RR40/50         | 50     | 1,969  | TK37    | 310    | 12,205 | TKK37                       | 188,00 | 7,402  | 3/4    |
| 2"      | 50,80 | 7-10       | PZ-4050  | 40,0            | 46,0 | 1,57   | 1,81 | RR40/50         | 50     | 1,969  | TK42    | 310    | 12,205 | TKK42                       | 205,00 | 8,071  | 3/4    |
|         |       |            | PZ-4080  | 40,0            | 46,0 | 1,57   | 1,81 | RR40/80         | 80     | 3,150  | TK42    | 310    | 12,205 | TKK42                       | 205,00 | 8,071  | 3/4    |

# PZ Series

| Tube OD |        | Tube Gauge | Tool No. | Expansion Range |       |        |      | Stdandard Rolls |        |       | Mandrel |        |        | Short Mandrell Set (3 pcs.) |        |        | Square |
|---------|--------|------------|----------|-----------------|-------|--------|------|-----------------|--------|-------|---------|--------|--------|-----------------------------|--------|--------|--------|
|         |        |            |          | [mm]            |       | [inch] |      | No.             | Lenght |       | No.     | Length |        | No.                         | Length |        |        |
| [inch]  | [mm]   | [BWG]      |          | min             | max   | min    | max  |                 |        | [mm]  |         | [inch] |        |                             | [mm]   | [inch] |        |
| 2"      | 50,80  | 11-12      | PZ-4250  | 42,0            | 48,0  | 1,65   | 1,89 | RR23/50         | 50     | 1,969 | TK42    | 310    | 12,205 | TKK42                       | 205,00 | 8,071  | 3/4    |
|         |        |            | PZ-4280  | 42,0            | 48,0  | 1,65   | 1,89 | RR23/80         | 80     | 3,150 | TK42    | 310    | 12,205 | TKK42                       | 205,00 | 8,071  | 3/4    |
| 2"      | 50,80  | 13-15      | PZ-4450  | 44,0            | 50,0  | 1,73   | 1,97 | RR23/50         | 50     | 1,969 | TK44    | 310    | 12,205 | TKK44                       | 205,00 | 8,071  | 3/4    |
|         |        |            | PZ-4480  | 44,0            | 50,0  | 1,73   | 1,97 | RR23/80         | 80     | 3,150 | TK44    | 310    | 12,205 | TKK44                       | 205,00 | 8,071  | 3/4    |
| 2"      | 50,80  | 15-16      | PZ-4750  | 47,0            | 54,0  | 1,85   | 2,13 | RR24/50         | 50     | 1,969 | TK47    | 340    | 13,307 | TKK47                       | 218,00 | 8,583  | 3/4    |
|         |        |            | PZ-4780  | 47,0            | 54,0  | 1,85   | 2,13 | RR24/80         | 80     | 3,150 | TK47    | 340    | 13,307 | TKK47                       | 218,00 | 8,583  | 3/4    |
| 2-1/4"  | 57,15  | 10-12      | PZ-4950  | 49,0            | 56,0  | 1,93   | 2,20 | RR24/50         | 50     | 1,969 | TK49    | 340    | 13,307 | TKK49                       | 218,00 | 8,583  | 3/4    |
|         |        |            | PZ-4980  | 49,0            | 56,0  | 1,93   | 2,20 | RR24/80         | 80     | 3,150 | TK49    | 340    | 13,307 | TKK49                       | 218,00 | 8,583  | 3/4    |
| 2-1/4"  | 57,15  | 14-16      | PZ-5250  | 52,0            | 59,0  | 2,05   | 2,32 | RR25/50         | 50     | 1,969 | TK49    | 340    | 13,307 | TKK49                       | 218,00 | 8,583  | 3/4    |
|         |        |            | PZ-5280  | 52,0            | 59,0  | 2,05   | 2,32 | RR25/80         | 80     | 3,150 | TK49    | 340    | 13,307 | TKK49                       | 218,00 | 8,583  | 3/4    |
| 2-1/2"  | 63,50  | 11-12      | PZ-5450  | 54,0            | 62,0  | 2,13   | 2,44 | RR26/50         | 50     | 1,969 | TK54    | 375    | 14,764 | TKK54                       | 230,00 | 9,055  | 3/4    |
|         |        |            | PZ-5480  | 54,0            | 62,0  | 2,13   | 2,44 | RR26/80         | 80     | 3,150 | TK54    | 375    | 14,764 | TKK54                       | 230,00 | 9,055  | 3/4    |
| 2-1/2"  | 63,50  | 13-16      | PZ-5750  | 57,0            | 66,0  | 2,24   | 2,60 | RR27/50         | 50     | 1,969 | TK57    | 395    | 15,551 | TKK57                       | 235,00 | 9,252  | 3/4    |
|         |        |            | PZ-5780  | 57,0            | 66,0  | 2,24   | 2,60 | RR27/80         | 80     | 3,150 | TK57    | 395    | 15,551 | TKK57                       | 235,00 | 9,252  | 3/4    |
| 2-3/4"  | 69,85  | 7-11       | PZ-6050  | 60,0            | 69,0  | 2,36   | 2,72 | RR28/50         | 50     | 1,969 | TK57    | 395    | 15,551 | TKK57                       | 235,00 | 9,252  | 3/4    |
|         |        |            | PZ-6080  | 60,0            | 69,0  | 2,36   | 2,72 | RR28/80         | 80     | 3,150 | TK57    | 395    | 15,551 | TKK57                       | 235,00 | 9,252  | 3/4    |
| 3"      | 76,20  | 7-11       | PZ-6550  | 65,0            | 74,0  | 2,56   | 2,91 | RR29/50         | 50     | 1,969 | TK65    | 395    | 15,551 | TKK65                       | 235,00 | 9,252  | 3/4    |
|         |        |            | PZ-6580  | 65,0            | 74,0  | 2,56   | 2,91 | RR29/80         | 80     | 3,150 | TK65    | 395    | 15,551 | TKK65                       | 235,00 | 9,252  | 3/4    |
| 3"      | 76,20  | 12-13      | PZ-6850  | 68,0            | 77,0  | 2,68   | 3,03 | RR30/50         | 50     | 1,969 | TK72    | 403    | 15,866 | TKK72                       | 255,00 | 10,039 | 1      |
|         |        |            | PZ-6880  | 68,0            | 77,0  | 2,68   | 3,03 | RR30/80         | 80     | 3,150 | TK72    | 403    | 15,866 | TKK72                       | 255,00 | 10,039 | 1      |
| 3-1/4"  | 82,55  | 7-12       | PZ-7250  | 72,0            | 81,0  | 2,83   | 3,19 | RR31/50         | 50     | 1,969 | TK72    | 403    | 15,866 | TKK72                       | 255,00 | 10,039 | 1      |
|         |        |            | PZ-7280  | 72,0            | 81,0  | 2,83   | 3,19 | RR31/80         | 80     | 3,150 | TK72    | 403    | 15,866 | TKK72                       | 255,00 | 10,039 | 1      |
| 3-1/4"  | 82,55  | 13-16      | PZ-7750  | 77,0            | 87,0  | 3,03   | 3,43 | RR32/50         | 50     | 1,969 | TK77    | 422    | 16,614 | TKK77                       | 255,00 | 10,039 | 1      |
|         |        |            | PZ-7780  | 77,0            | 87,0  | 3,03   | 3,43 | RR32/80         | 80     | 3,150 | TK77    | 422    | 16,614 | TKK77                       | 255,00 | 10,039 | 1      |
| 3-1/2"  | 88,90  | 10-16      | PZ-8250  | 82,0            | 92,0  | 3,23   | 3,62 | RR33/50         | 50     | 1,969 | TK82    | 422    | 16,614 | TKK82                       | 255,00 | 10,039 | 1      |
|         |        |            | PZ-8280  | 82,0            | 92,0  | 3,23   | 3,62 | RR33/80         | 80     | 3,150 | TK82    | 422    | 16,614 | TKK82                       | 255,00 | 10,039 | 1      |
| 3-3/4"  | 95,25  | 7-12       | PZ-8650  | 86,0            | 96,0  | 3,39   | 3,78 | RR34/50         | 50     | 1,969 | TK86    | 422    | 16,614 | TKK86                       | 255,00 | 10,039 | 1      |
|         |        |            | PZ-8680  | 86,0            | 96,0  | 3,39   | 3,78 | RR34/80         | 80     | 3,150 | TK86    | 422    | 16,614 | TKK86                       | 255,00 | 10,039 | 1      |
| 4"      | 101,60 | 8-12       | PZ-9050  | 90,0            | 100,0 | 3,54   | 3,94 | RR34/50         | 50     | 1,969 | TK90    | 422    | 16,614 | TKK90                       | 275,00 | 10,827 | 1      |
|         |        |            | PZ-9080  | 90,0            | 100,0 | 3,54   | 3,94 | RR34/80         | 80     | 3,150 | TK90    | 422    | 16,614 | TKK90                       | 275,00 | 10,827 | 1      |
| 4"      | 101,60 | 13-16      | PZ-9650  | 96,0            | 106,0 | 3,78   | 4,17 | RR35/50         | 50     | 1,969 | TK96    | 422    | 16,614 | TKK96                       | 275,00 | 10,827 | 1      |
|         |        |            | PZ-9680  | 96,0            | 106,0 | 3,78   | 4,17 | RR35/80         | 80     | 3,150 | TK96    | 422    | 16,614 | TKK96                       | 275,00 | 10,827 | 1      |

\* 100 mm roll length made to order, only if technically possible!

## SHORTER EXPANSION LENGTH



If you require expanding shorter expansion length than a standard expander, we can supply the reduction collar SC (you can specify desired length in order e.g. PZ-4280/60).

# FTKS-L Flare Type Series

The FTKS-L expander stands out for its self-feeding mechanism that combines three expansion rolls and three flare rolls, allowing for simultaneous tube expansion and flaring. An adjustable thrust collar ensures friction-free operation, longer tool life, and consistent flare length. This expander is highly effective for re-rolling leaky tubes and new installations in water tube boilers, fire tube boilers, economizers, and air heaters. KRAIS K70 right-angle rolling motors are recommended for use with this tool.



## ADDITIONAL INFORMATION



How-to  
basics  
→ PAGE 32



Rolls  
range  
→ PAGE 33



Rolling  
motors  
→ PAGE 45

| Tube OD |       | Tube Gauge | Tool No.    | Expansion Range |      |        |      | Standard Rolls |        |       | Mandrel |        | Short Mandrell Set (3 pcs.) |       |        | Square |     |
|---------|-------|------------|-------------|-----------------|------|--------|------|----------------|--------|-------|---------|--------|-----------------------------|-------|--------|--------|-----|
|         |       |            |             | [mm]            |      | [inch] |      | No.            | Lenght |       | No.     | Length |                             | No.   | Length |        |     |
| [inch]  | [mm]  | [BWG]      |             | min             | max  | min    | max  |                |        | [mm]  |         | [inch] |                             |       | [mm]   | [inch] |     |
| 1-1/4"  | 31,75 | 16         | FTKS-2842-L | 28,0            | 31,5 | 1,10   | 1,24 | RR16RK8        | 42     | 1,654 | T-300   | 375    | 14,764                      | PTK28 | 175    | 6,890  | 3/4 |
|         |       |            | FTKS-2880-L | 28,0            | 31,5 | 1,10   | 1,24 | RR16RK8/80     | 80     | 3,150 | T-300   | 375    | 14,764                      | PTK28 | 175    | 6,890  | 3/4 |
| 1-1/2"  | 38,10 | 7-10       | FTKS-2942-L | 29,0            | 32,5 | 1,14   | 1,28 | RR16RK8        | 42     | 1,654 | T-300   | 375    | 14,764                      | PTK29 | 175    | 6,890  | 3/4 |
|         |       |            | FTKS-2980-L | 29,0            | 32,5 | 1,14   | 1,28 | RR16RK8/80     | 80     | 3,150 | T-300   | 375    | 14,764                      | PTK29 | 175    | 6,890  | 3/4 |
| 1-1/2"  | 38,10 | 10-12      | FTKS-3042-L | 30,0            | 33,5 | 1,18   | 1,32 | RR16RK8        | 42     | 1,654 | T-300   | 375    | 14,764                      | PTK30 | 175    | 6,890  | 3/4 |
|         |       |            | FTKS-3080-L | 30,0            | 33,5 | 1,18   | 1,32 | RR16RK8/80     | 80     | 3,150 | T-300   | 375    | 14,764                      | PTK30 | 175    | 6,890  | 3/4 |
| 1-1/2"  | 38,10 | 12-14      | FTKS-3242-L | 32,0            | 35,5 | 1,26   | 1,40 | RR17RK9        | 42     | 1,654 | T-320   | 385    | 15,157                      | PTK32 | 175    | 6,890  | 3/4 |
|         |       |            | FTKS-3280-L | 32,0            | 35,5 | 1,26   | 1,40 | RR17RK9/80     | 80     | 3,150 | T-320   | 385    | 15,157                      | PTK32 | 175    | 6,890  | 3/4 |
| 1-1/2"  | 38,10 | 13-20      | FTKS-3342-L | 33,0            | 36,5 | 1,30   | 1,44 | RP33RR33       | 42     | 1,654 | T-320   | 385    | 15,157                      | PTK33 | 181    | 7,126  | 3/4 |
|         |       |            | FTKS-3380-L | 33,0            | 36,5 | 1,30   | 1,44 | RP33RR33/80    | 80     | 3,150 | T-320   | 385    | 15,157                      | PTK33 | 181    | 7,126  | 3/4 |
| 1-3/4"  | 44,45 | 8-9        | FTKS-3542-L | 35,0            | 40,5 | 1,38   | 1,59 | RR21RK35       | 42     | 1,654 | T-370   | 410    | 16,142                      | PTK37 | 188    | 7,402  | 3/4 |
|         |       |            | FTKS-3580-L | 35,0            | 40,5 | 1,38   | 1,59 | RR21RK35/80    | 80     | 3,150 | T-370   | 410    | 16,142                      | PTK37 | 188    | 7,402  | 3/4 |
| 1-3/4"  | 44,45 | 10-12      | FTKS-3742-L | 37,0            | 42,5 | 1,46   | 1,67 | RR22RK10       | 42     | 1,654 | T-370   | 410    | 16,142                      | PTK37 | 188    | 7,402  | 3/4 |
|         |       |            | FTKS-3780-L | 37,0            | 42,5 | 1,46   | 1,67 | RR22RK10/80    | 80     | 3,150 | T-370   | 410    | 16,142                      | PTK37 | 188    | 7,402  | 3/4 |
| 1-3/4"  | 44,45 | 12-18      | FTKS-3950-L | 39,0            | 44,5 | 1,54   | 1,75 | RR40RK40       | 50     | 1,654 | T-370   | 410    | 16,142                      | PTK37 | 188    | 7,402  | 3/4 |
|         |       |            | FTKS-3980-L | 39,0            | 44,5 | 1,54   | 1,75 | RR40RK40/80    | 80     | 3,150 | T-370   | 410    | 16,142                      | PTK37 | 188    | 7,402  | 3/4 |
| 2"      | 50,80 | 7-9        | FTKS-4050-L | 40,0            | 45,5 | 1,57   | 1,79 | RR40RK40       | 50     | 1,969 | T-420   | 410    | 16,142                      | PTK42 | 205    | 8,071  | 3/4 |
|         |       |            | FTKS-4080-L | 40,0            | 45,5 | 1,57   | 1,79 | RR40RK40/80    | 80     | 3,150 | T-420   | 410    | 16,142                      | PTK42 | 205    | 8,071  | 3/4 |
| 2"      | 50,80 | 10-13      | FTKS-4250-L | 42,0            | 47,5 | 1,65   | 1,87 | RR23RK11       | 50     | 1,969 | T-420   | 410    | 16,142                      | PTK42 | 205    | 8,071  | 3/4 |
|         |       |            | FTKS-4280-L | 42,0            | 47,5 | 1,65   | 1,87 | RR23RK11/80    | 80     | 3,150 | T-420   | 410    | 16,142                      | PTK42 | 205    | 8,071  | 3/4 |
| 2"      | 50,80 | 12-14      | FTKS-4450-L | 44,0            | 49,5 | 1,73   | 1,95 | RR23RK11       | 50     | 1,969 | T-440   | 410    | 16,142                      | PTK44 | 205    | 8,071  | 3/4 |
|         |       |            | FTKS-4480-L | 44,0            | 49,5 | 1,73   | 1,95 | RR23RK11/80    | 80     | 3,150 | T-440   | 410    | 16,142                      | PTK44 | 205    | 8,071  | 3/4 |
| 2"      | 50,80 | 16         | FTKS-4750-L | 47,0            | 53,5 | 1,85   | 2,11 | RR24RK12       | 50     | 1,969 | T-470   | 435    | 17,126                      | PTK47 | 218    | 8,583  | 3/4 |
|         |       |            | FTKS-4780-L | 47,0            | 53,5 | 1,85   | 2,11 | RR24RK12/80    | 80     | 3,150 | T-470   | 435    | 17,126                      | PTK47 | 218    | 8,583  | 3/4 |
| 2-1/4"  | 57,15 | 10-13      | FTKS-4950-L | 49,0            | 55,5 | 1,93   | 2,19 | RR24RK12       | 50     | 1,969 | T-490   | 435    | 17,126                      | PTK49 | 218    | 8,583  | 3/4 |
|         |       |            | FTKS-4980-L | 49,0            | 55,5 | 1,93   | 2,19 | RR24RK12/80    | 80     | 3,150 | T-490   | 435    | 17,126                      | PTK49 | 218    | 8,583  | 3/4 |
| 2-1/4"  | 57,15 | 14-16      | FTKS-5250-L | 52,0            | 58,5 | 2,05   | 2,30 | RR25RK13       | 50     | 1,969 | T-490   | 435    | 17,126                      | PTK49 | 218    | 8,583  | 3/4 |
|         |       |            | FTKS-5280-L | 52,0            | 58,5 | 2,05   | 2,30 | RR25RK13/80    | 80     | 3,150 | T-490   | 435    | 17,126                      | PTK49 | 218    | 8,583  | 3/4 |
| 2-1/2"  | 63,50 | 8-13       | FTKS-5450-L | 54,0            | 61,5 | 2,13   | 2,42 | RR26RK14       | 50     | 1,969 | T-540   | 470    | 18,504                      | PTK54 | 230    | 9,055  | 3/4 |
|         |       |            | FTKS-5480-L | 54,0            | 61,5 | 2,13   | 2,42 | RR26RK14/80    | 80     | 3,150 | T-540   | 470    | 18,504                      | PTK54 | 230    | 9,055  | 3/4 |

| Tube OD |        | Tube Gauge | Tool No.    | Expansion Range |       |        |      | Stdandard Rolls |        |       | Mandrel |        |        | Short Mandrell Set (3 pcs.) |        |        | Square |
|---------|--------|------------|-------------|-----------------|-------|--------|------|-----------------|--------|-------|---------|--------|--------|-----------------------------|--------|--------|--------|
|         |        |            |             | [mm]            |       | [inch] |      | No.             | Lenght |       | No.     | Length |        | No.                         | Length |        |        |
| [inch]  | [mm]   | [BWG]      |             | min             | max   | min    | max  |                 |        | [mm]  |         | [inch] |        |                             | [mm]   | [inch] |        |
| 2-1/2"  | 63,50  | 12-16      | FTKS-5750-L | 57,0            | 65,5  | 2,24   | 2,58 | RR27RK15        | 50     | 1,969 | T-570   | 500    | 19,685 | PTK57                       | 235    | 9,252  | 3/4    |
|         |        |            | FTKS-5780-L | 57,0            | 65,5  | 2,24   | 2,58 | RR27RK15/80     | 80     | 3,150 | T-570   | 500    | 19,685 | PTK57                       | 235    | 9,252  | 3/4    |
| 2-3/4"  | 69,85  | 7-11       | FTKS-6050-L | 60,0            | 68,5  | 2,36   | 2,70 | RR28RK16        | 50     | 1,969 | T-570   | 500    | 19,685 | PTK57                       | 235    | 9,252  | 3/4    |
|         |        |            | FTKS-6080-L | 60,0            | 68,5  | 2,36   | 2,70 | RR28RK16/80     | 80     | 3,150 | T-570   | 500    | 19,685 | PTK57                       | 235    | 9,252  | 3/4    |
| 3"      | 76,20  | 7-8        | FTKS-6550-L | 65,0            | 73,5  | 2,56   | 2,89 | RR29RK17        | 50     | 1,969 | T-650   | 500    | 19,685 | PTK65                       | 235    | 9,252  | 3/4    |
|         |        |            | FTKS-6580-L | 65,0            | 73,5  | 2,56   | 2,89 | RR29RK17/80     | 80     | 3,150 | T-650   | 500    | 19,685 | PTK65                       | 235    | 9,252  | 3/4    |
| 3"      | 76,20  | 10-14      | FTKS-6850-L | 68,0            | 76,5  | 2,68   | 3,01 | RR30RK18        | 50     | 1,969 | T-720   | 530    | 20,866 | PTK72                       | 255    | 10,039 | 1      |
|         |        |            | FTKS-6880-L | 68,0            | 76,5  | 2,68   | 3,01 | RR30RK18/80     | 80     | 3,150 | T-720   | 530    | 20,866 | PTK72                       | 255    | 10,039 | 1      |
| 3-1/4"  | 82,55  | 7-11       | FTKS-7250-L | 72,0            | 80,5  | 2,83   | 3,17 | RR31RK19        | 50     | 1,969 | T-720   | 530    | 20,866 | PTK72                       | 255    | 10,039 | 1      |
|         |        |            | FTKS-7280-L | 72,0            | 80,5  | 2,83   | 3,17 | RR31RK19/80     | 80     | 3,150 | T-720   | 530    | 20,866 | PTK72                       | 255    | 10,039 | 1      |
| 3-1/4"  | 82,55  | 15-16      | FTKS-7750-L | 77,0            | 86,5  | 3,03   | 3,41 | RR32RK20        | 50     | 1,969 | T-770   | 530    | 20,866 | PTK77                       | 255    | 10,039 | 1      |
|         |        |            | FTKS-7780-L | 77,0            | 86,5  | 3,03   | 3,41 | RR32RK20/80     | 80     | 3,150 | T-770   | 530    | 20,866 | PTK77                       | 255    | 10,039 | 1      |
| 3-1/2"  | 88,90  | 10-13      | FTKS-8250-L | 82,0            | 91,5  | 3,23   | 3,60 | RR33RK21        | 50     | 1,969 | T-820   | 530    | 20,866 | PTK82                       | 255    | 10,039 | 1      |
|         |        |            | FTKS-8280-L | 82,0            | 91,5  | 3,23   | 3,60 | RR33RK21/80     | 80     | 3,150 | T-820   | 530    | 20,866 | PTK82                       | 255    | 10,039 | 1      |
| 3-3/4"  | 95,25  | 8-12       | FTKS-8650-L | 86,0            | 95,5  | 3,39   | 3,76 | RR34RK22        | 50     | 1,969 | T-860   | 530    | 20,866 | PTK86                       | 255    | 10,039 | 1      |
|         |        |            | FTKS-8680-L | 86,0            | 95,5  | 3,39   | 3,76 | RR34RK22/80     | 80     | 3,150 | T-860   | 530    | 20,866 | PTK86                       | 255    | 10,039 | 1      |
| 4"      | 101,60 | 9-12       | FTKS-9050-L | 90,0            | 99,5  | 3,54   | 3,92 | RR34RK22        | 50     | 1,969 | T-900   | 530    | 20,866 | PTK90                       | 275    | 10,827 | 1      |
|         |        |            | FTKS-9080-L | 90,0            | 99,5  | 3,54   | 3,92 | RR34RK22/80     | 80     | 3,150 | T-900   | 530    | 20,866 | PTK90                       | 275    | 10,827 | 1      |
| 4"      | 101,60 | 16         | FTKS-9650-L | 96,0            | 105,5 | 3,78   | 4,15 | RR35RK23        | 50     | 1,969 | T-960   | 530    | 20,866 | PTK96                       | 275    | 10,827 | 1      |
|         |        |            | FTKS-9680-L | 96,0            | 105,5 | 3,78   | 4,15 | RR35RK23/80     | 80     | 3,150 | T-960   | 530    | 20,866 | PTK96                       | 275    | 10,827 | 1      |

# P2 Series

The P2 expander is designed for deep-reach tube expansions with its three rolls and adjustable reach. It offers parallel rolling with long, effective double-radius rolls, which are self-retained in the cage. This expander is excellent for touch-up expansion, hard rolling, re-rolling leaky tubes, and new constructions in water tube boilers, fire tube boilers, economizers, and air heaters. Expanders with five rolls, longer rolls, or extended reach in 2-inch increments are available upon request.

KRAIS K70 right-angle rolling motors are recommended for use with these expanders.



## ADDITIONAL INFORMATION



How-to basics  
→ PAGE 32



Rolls range  
→ PAGE 33



Rolling motors  
→ PAGE 45

## MAX REACH FOR P2 EXPANDERS

| COLLAR   | 60 MM ROLLS |        | 80 MM ROLLS |        |
|----------|-------------|--------|-------------|--------|
|          | [MM]        | [INCH] | [MM]        | [INCH] |
| Standard | 112         | 4,40"  | 132         | 5,20"  |
| Short    | 132         | 5,20"  | 152         | 6"     |

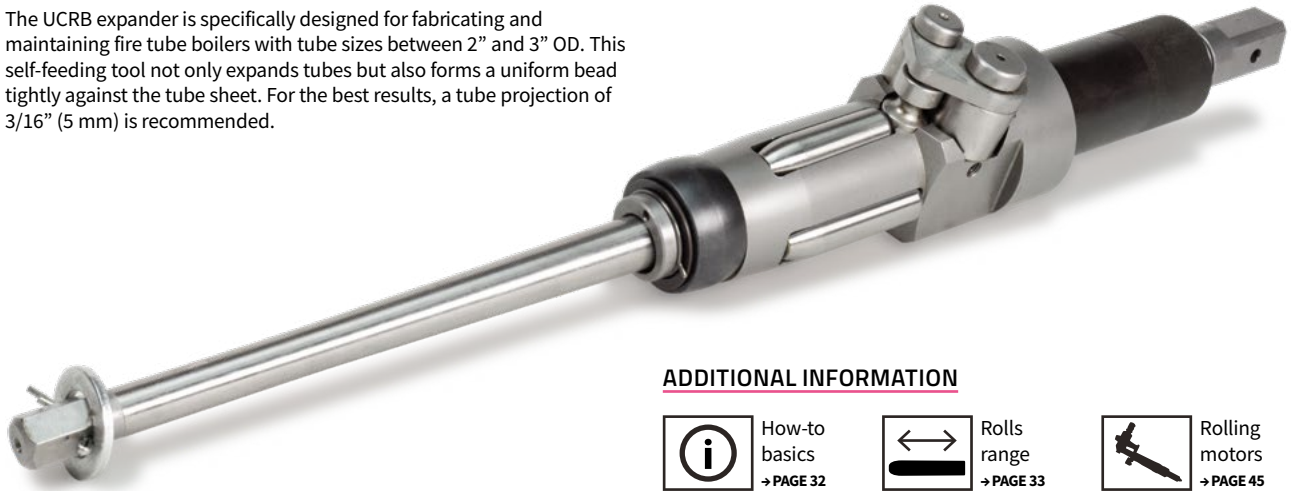
| Tube OD |       | Tube Gauge | Tool No.  | Expansion range |      |        |      | Rolls     |        |       | Mandrel |        |        | Short Mandrell Set (3 pcs.) |        |        | Square |
|---------|-------|------------|-----------|-----------------|------|--------|------|-----------|--------|-------|---------|--------|--------|-----------------------------|--------|--------|--------|
|         |       |            |           | [mm]            |      | [inch] |      | No.       | Lenght |       | No.     | Length |        | No.                         | Length |        |        |
| [inch]  | [mm]  | [bwg]      |           | min             | max  | min    | max  |           |        | [mm]  |         | [inch] |        |                             | [mm]   | [inch] |        |
| 1-1/4"  | 31,70 | 16         | P2-280    | 28,0            | 33,0 | 1,10   | 1,30 | 998       | 60     | 2,362 | T-290   | 385,00 | 15,157 | PTK28                       | 175    | 6,890  | 1/2"   |
|         |       |            | P2-280/80 | 28,0            | 33,0 | 1,10   | 1,30 | 998/80    | 80     | 3,150 | T-290   | 385,00 | 15,157 | PTK28                       | 175    | 6,890  | 1/2"   |
| 1-1/2"  | 38,10 | 7-11       | P2-290    | 29,0            | 34,0 | 1,14   | 1,34 | 1048      | 60     | 2,362 | T-290   | 385,00 | 15,157 | PTK29                       | 175    | 6,890  | 1/2"   |
|         |       |            | P2-290/80 | 29,0            | 34,0 | 1,14   | 1,34 | 1048/80   | 80     | 3,150 | T-290   | 385,00 | 15,157 | PTK29                       | 175    | 6,890  | 1/2"   |
| 1-1/2"  | 38,10 | 10-12      | P2-300    | 30,0            | 35,0 | 1,18   | 1,38 | 1089      | 60     | 2,362 | T-290   | 385,00 | 15,157 | PTK30                       | 175    | 6,890  | 1/2"   |
|         |       |            | P2-300/80 | 30,0            | 35,0 | 1,18   | 1,38 | 1089/80   | 80     | 3,150 | T-290   | 385,00 | 15,157 | PTK30                       | 175    | 6,890  | 1/2"   |
| 1-1/2"  | 38,10 | 13-16      | P2-320    | 32,0            | 37,0 | 1,26   | 1,46 | 1143      | 60     | 2,362 | T-320   | 385,00 | 15,157 | PTK32                       | 175    | 6,890  | 1/2"   |
|         |       |            | P2-320/80 | 32,0            | 37,0 | 1,26   | 1,46 | 1143/80   | 80     | 3,150 | T-320   | 385,00 | 15,157 | PTK32                       | 175    | 6,890  | 1/2"   |
| 1-1/2"  | 38,10 | 13-20      | P2-330    | 33,0            | 38,0 | 1,30   | 1,50 | RR1143    | 60     | 2,362 | T-320   | 385,00 | 15,157 | PTK33                       | 181    | 7,126  | 3/4"   |
|         |       |            | P2-330/80 | 33,0            | 38,0 | 1,30   | 1,50 | RR1143/80 | 80     | 3,150 | T-320   | 385,00 | 15,157 | PTK33                       | 181    | 7,126  | 3/4"   |
| 1-3/4"  | 44,40 | 8-9        | P2-350    | 35,0            | 41,0 | 1,38   | 1,61 | RR21A     | 60     | 2,362 | T-370   | 410,00 | 16,142 | PTK37                       | 188    | 7,402  | 3/4"   |
|         |       |            | P2-350/80 | 35,0            | 41,0 | 1,38   | 1,61 | RR21A/80  | 80     | 3,150 | T-370   | 410,00 | 16,142 | PTK37                       | 188    | 7,402  | 3/4"   |
| 1-3/4"  | 44,40 | 10-16      | P2-370    | 37,0            | 43,0 | 1,46   | 1,69 | RR22A     | 60     | 2,362 | T-370   | 410,00 | 16,142 | PTK37                       | 188    | 7,402  | 3/4"   |
|         |       |            | P2-370/80 | 37,0            | 43,0 | 1,46   | 1,69 | RR22A/80  | 80     | 3,150 | T-370   | 410,00 | 16,142 | PTK37                       | 188    | 7,402  | 3/4"   |
| 1-3/4"  | 44,45 | 12-18      | P2-390    | 39,0            | 45,0 | 1,54   | 1,77 | RR22A     | 60     | 2,362 | T-370   | 410,00 | 16,142 | PTK37                       | 188    | 7,402  | 3/4"   |
|         |       |            | P2-390/80 | 39,0            | 45,0 | 1,54   | 1,77 | RR22A/80  | 80     | 3,150 | T-370   | 410,00 | 16,142 | PTK37                       | 188    | 7,402  | 3/4"   |
| 2"      | 50,80 | 7-10       | P2-400    | 40,0            | 46,0 | 1,57   | 1,81 | RR40A     | 60     | 2,362 | T-420   | 410,00 | 16,142 | PTK42                       | 205    | 8,071  | 3/4"   |
|         |       |            | P2-400/80 | 40,0            | 46,0 | 1,57   | 1,81 | RR40A/80  | 80     | 3,150 | T-420   | 410,00 | 16,142 | PTK42                       | 205    | 8,071  | 3/4"   |
| 2"      | 50,80 | 11-12      | P2-420    | 42,0            | 48,0 | 1,65   | 1,89 | RR23A     | 60     | 2,362 | T-420   | 410,00 | 16,142 | PTK42                       | 205    | 8,071  | 3/4"   |
|         |       |            | P2-420/80 | 42,0            | 48,0 | 1,65   | 1,89 | RR23A/80  | 80     | 3,150 | T-420   | 410,00 | 16,142 | PTK42                       | 205    | 8,071  | 3/4"   |
| 2"      | 50,80 | 13-15      | P2-440    | 44,0            | 50,0 | 1,73   | 1,97 | RR23A     | 60     | 2,362 | T-440   | 410,00 | 16,142 | PTK44                       | 205    | 8,071  | 3/4"   |
|         |       |            | P2-440/80 | 44,0            | 50,0 | 1,73   | 1,97 | RR23A/80  | 80     | 3,150 | T-440   | 410,00 | 16,142 | PTK44                       | 205    | 8,071  | 3/4"   |
| 2"      | 50,80 | 16         | P2-470    | 47,0            | 54,0 | 1,85   | 2,13 | RR24A     | 60     | 2,362 | T-470   | 435,00 | 17,126 | PTK47                       | 218    | 8,583  | 3/4"   |
|         |       |            | P2-470/80 | 47,0            | 54,0 | 1,85   | 2,13 | RR24A/80  | 80     | 3,150 | T-470   | 435,00 | 17,126 | PTK47                       | 218    | 8,583  | 3/4"   |
| 2-1/4"  | 57,10 | 10-12      | P2-490    | 49,0            | 56,0 | 1,93   | 2,20 | RR24A     | 60     | 2,362 | T-490   | 435,00 | 17,126 | PTK49                       | 218    | 8,583  | 3/4"   |
|         |       |            | P2-490/80 | 49,0            | 56,0 | 1,93   | 2,20 | RR24A/80  | 80     | 3,150 | T-490   | 435,00 | 17,126 | PTK49                       | 218    | 8,583  | 3/4"   |
| 2-1/4"  | 57,10 | 14-16      | P2-520    | 52,0            | 59,0 | 2,05   | 2,32 | RR25A     | 60     | 2,362 | T-490   | 435,00 | 17,126 | PTK49                       | 218    | 8,583  | 3/4"   |
|         |       |            | P2-520/80 | 52,0            | 59,0 | 2,05   | 2,32 | RR25A/80  | 80     | 3,150 | T-490   | 435,00 | 17,126 | PTK49                       | 218    | 8,583  | 3/4"   |
| 2-1/2"  | 63,50 | 11-12      | P2-540    | 54,0            | 62,0 | 2,13   | 2,44 | RR26A     | 60     | 2,362 | T-540   | 470,00 | 18,504 | PTK54                       | 230    | 9,055  | 3/4"   |
|         |       |            | P2-540/80 | 54,0            | 62,0 | 2,13   | 2,44 | RR26A/80  | 80     | 3,150 | T-540   | 470,00 | 18,504 | PTK54                       | 230    | 9,055  | 3/4"   |
| 2-1/2"  | 63,50 | 13-16      | P2-570    | 57,0            | 66,0 | 2,24   | 2,60 | RR27A     | 60     | 2,362 | T-570   | 500,00 | 19,685 | PTK57                       | 235    | 9,252  | 3/4"   |
|         |       |            | P2-570/80 | 57,0            | 66,0 | 2,24   | 2,60 | RR27A/80  | 80     | 3,150 | T-570   | 500,00 | 19,685 | PTK57                       | 235    | 9,252  | 3/4"   |



| Tube OD |        | Tube Gauge | Tool No.  | Expansion range |       |        |      | Rolls    |        |        | Mandrel |        |        | Short Mandrell Set (3 pcs.) |        |        | Square |
|---------|--------|------------|-----------|-----------------|-------|--------|------|----------|--------|--------|---------|--------|--------|-----------------------------|--------|--------|--------|
|         |        |            |           | [mm]            |       | [inch] |      | No.      | Lenght |        | No.     | Length |        | No.                         | Length |        |        |
| [inch]  | [mm]   | [bwg]      |           | min             | max   | min    | max  |          | [mm]   | [inch] |         | [mm]   | [inch] |                             | [mm]   | [inch] | [mm]   |
| 2-3/4"  | 69,80  | 7-11       | P2-600    | 60,0            | 69,0  | 2,36   | 2,72 | RR28A    | 60     | 2,362  | T-570   | 500,00 | 19,685 | PTK57                       | 235    | 9,252  | 3/4"   |
|         |        |            | P2-600/80 | 60,0            | 69,0  | 2,36   | 2,72 | RR28A/80 | 80     | 3,150  | T-570   | 500,00 | 19,685 | PTK57                       | 235    | 9,252  | 3/4"   |
| 3"      | 76,20  | 7-11       | P2-650    | 65,0            | 74,0  | 2,56   | 2,91 | RR29A    | 60     | 2,362  | T-650   | 500,00 | 19,685 | PTK65                       | 235    | 9,252  | 3/4"   |
|         |        |            | P2-650/80 | 65,0            | 74,0  | 2,56   | 2,91 | RR29A/80 | 80     | 3,150  | T-650   | 500,00 | 19,685 | PTK65                       | 235    | 9,252  | 3/4"   |
| 3"      | 76,20  | 13-15      | P2-680    | 68,0            | 77,5  | 2,68   | 3,05 | RR30A    | 60     | 2,362  | T-720   | 530,00 | 20,866 | PTK72                       | 255    | 10,039 | 1"     |
|         |        |            | P2-680/80 | 68,0            | 77,5  | 2,68   | 3,05 | RR30A/80 | 80     | 3,150  | T-720   | 530,00 | 20,866 | PTK72                       | 255    | 10,039 | 1"     |
| 3-1/4"  | 82,55  | 7-12       | P2-720    | 72,0            | 81,5  | 2,83   | 3,21 | RR31A    | 60     | 2,362  | T-720   | 530,00 | 20,866 | PTK72                       | 255    | 10,039 | 1"     |
|         |        |            | P2-720/80 | 72,0            | 81,5  | 2,83   | 3,21 | RR31A/80 | 80     | 3,150  | T-720   | 530,00 | 20,866 | PTK72                       | 255    | 10,039 | 1"     |
| 3-1/4"  | 82,55  | 13-16      | P2-770    | 77,0            | 87,0  | 3,03   | 3,43 | RR32A    | 60     | 2,362  | T-770   | 530,00 | 20,866 | PTK77                       | 255    | 10,039 | 1"     |
|         |        |            | P2-770/80 | 77,0            | 87,0  | 3,03   | 3,43 | RR32A/80 | 80     | 3,150  | T-770   | 530,00 | 20,866 | PTK77                       | 255    | 10,039 | 1"     |
| 3-1/2"  | 88,90  | 10-16      | P2-820    | 82,0            | 92,0  | 3,23   | 3,62 | RR33A    | 60     | 2,362  | T-820   | 530,00 | 20,866 | PTK82                       | 255    | 10,039 | 1"     |
|         |        |            | P2-820/80 | 82,0            | 92,0  | 3,23   | 3,62 | RR33A/80 | 80     | 3,150  | T-820   | 530,00 | 20,866 | PTK82                       | 255    | 10,039 | 1"     |
| 3-3/4"  | 95,25  | 7-12       | P2-860    | 86,0            | 96,0  | 3,39   | 3,78 | RR34A    | 60     | 2,362  | T-860   | 530,00 | 20,866 | PTK86                       | 255    | 10,039 | 1"     |
|         |        |            | P2-860/80 | 86,0            | 96,0  | 3,39   | 3,78 | RR34A/80 | 80     | 3,150  | T-860   | 530,00 | 20,866 | PTK86                       | 255    | 10,039 | 1"     |
| 4"      | 101,60 | 8-12       | P2-900    | 90,0            | 100,0 | 3,54   | 3,94 | RR34A    | 60     | 2,362  | T-900   | 530,00 | 20,866 | PTK90                       | 275    | 10,827 | 1"     |
|         |        |            | P2-900/80 | 90,0            | 100,0 | 3,54   | 3,94 | RR34A/80 | 80     | 3,150  | T-900   | 530,00 | 20,866 | PTK90                       | 275    | 10,827 | 1"     |
| 4"      | 101,60 | 13-16      | P2-960    | 96,0            | 106,0 | 3,78   | 4,17 | RR35A    | 60     | 2,362  | T-960   | 530,00 | 20,866 | PTK96                       | 275    | 10,827 | 1"     |
|         |        |            | P2-960/80 | 96,0            | 106,0 | 3,78   | 4,17 | RR35A/80 | 80     | 3,150  | T-960   | 530,00 | 20,866 | PTK96                       | 275    | 10,827 | 1"     |

# Universal Combination Roller Beading

The UCRB expander is specifically designed for fabricating and maintaining fire tube boilers with tube sizes between 2" and 3" OD. This self-feeding tool not only expands tubes but also forms a uniform bead tightly against the tube sheet. For the best results, a tube projection of 3/16" (5 mm) is recommended.



## ADDITIONAL INFORMATION



How-to  
basics  
→ PAGE 32



Rolls  
range  
→ PAGE 33



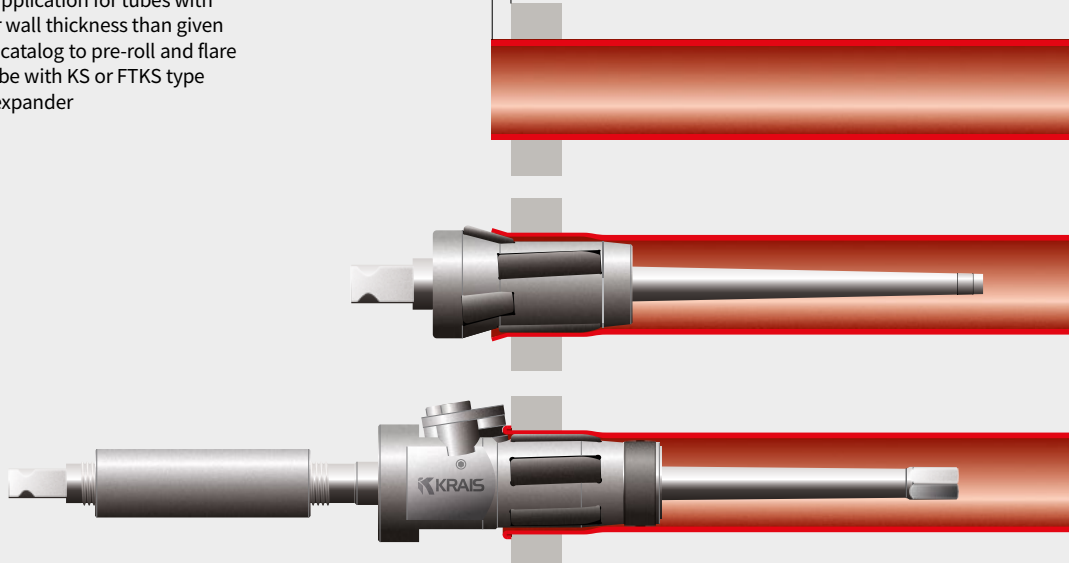
Rolling  
motors  
→ PAGE 45

| TUBE OD |      | TUBE GAUGE | TOOL NO. | EXPANSION RANGE |       |      |      | ROLLS   | BEADING ROLLS | FRONT PILOT | MANDREL | SQUARE |      |
|---------|------|------------|----------|-----------------|-------|------|------|---------|---------------|-------------|---------|--------|------|
|         |      |            |          | [INCH]          |       | [MM] |      |         |               |             |         | [INCH] | [MM] |
| [INCH]  | [MM] | [BWG]      |          | MIN             | MAX   | MIN  | MAX  |         |               |             |         |        |      |
| 2"      | 50,8 | 10         | 41633-00 | 1,700           | 1,907 | 43,2 | 48,4 | R-42811 | BR-41631-10   | P-41701-10  | M-42157 | 3/4"   | 19   |
|         |      | 11         | 41633-00 | 1,700           | 1,907 | 43,2 | 48,4 | R-42811 | BR-41631-11   | P-41701-11  | M-42157 | 3/4"   | 19   |
|         |      | 12         | 41633-00 | 1,700           | 1,907 | 43,2 | 48,4 | R-42811 | BR-41631-12   | P-41701-12  | M-42157 | 3/4"   | 19   |
|         |      | 13         | 41633-00 | 1,700           | 1,907 | 43,2 | 48,4 | R-42811 | BR-41631-13   | P-41701-13  | M-42157 | 3/4"   | 19   |
| 2-1/2"  | 63,5 | 10         | 41634-00 | 2,200           | 2,460 | 55,9 | 62,6 | R-41673 | BR-41651-10   | P-41702-10  | M-42158 | 3/4"   | 19   |
|         |      | 11         | 41634-00 | 2,200           | 2,460 | 55,9 | 62,6 | R-41673 | BR-41651-11   | P-41702-11  | M-42158 | 3/4"   | 19   |
|         |      | 12         | 41634-00 | 2,200           | 2,460 | 55,9 | 62,6 | R-41673 | BR-41651-12   | P-41702-12  | M-42158 | 3/4"   | 19   |
|         |      | 13         | 41634-00 | 2,200           | 2,460 | 55,9 | 62,6 | R-41673 | BR-41651-13   | P-41702-13  | M-42158 | 3/4"   | 19   |
| 3"      | 76,2 | 10         | 41359-00 | 2,700           | 2,890 | 68,6 | 75,7 | R-41676 | BR-41666-10   | P-41703-10  | M-42159 | 1"     | 25,4 |
|         |      | 11         | 41359-00 | 2,700           | 2,890 | 68,6 | 75,7 | R-41676 | BR-41666-11   | P-41703-11  | M-42159 | 1"     | 25,4 |
|         |      | 12         | 41359-00 | 2,700           | 2,890 | 68,6 | 75,7 | R-41676 | BR-41666-12   | P-41703-12  | M-42159 | 1"     | 25,4 |

## RECOMMENDATION

It is recommended that for heavy duty application for tubes with bigger wall thickness than given in the catalog to pre-roll and flare the tube with KS or FTKS type tube expander

1/2" (12,7 mm)  
TUBE PROJECTION



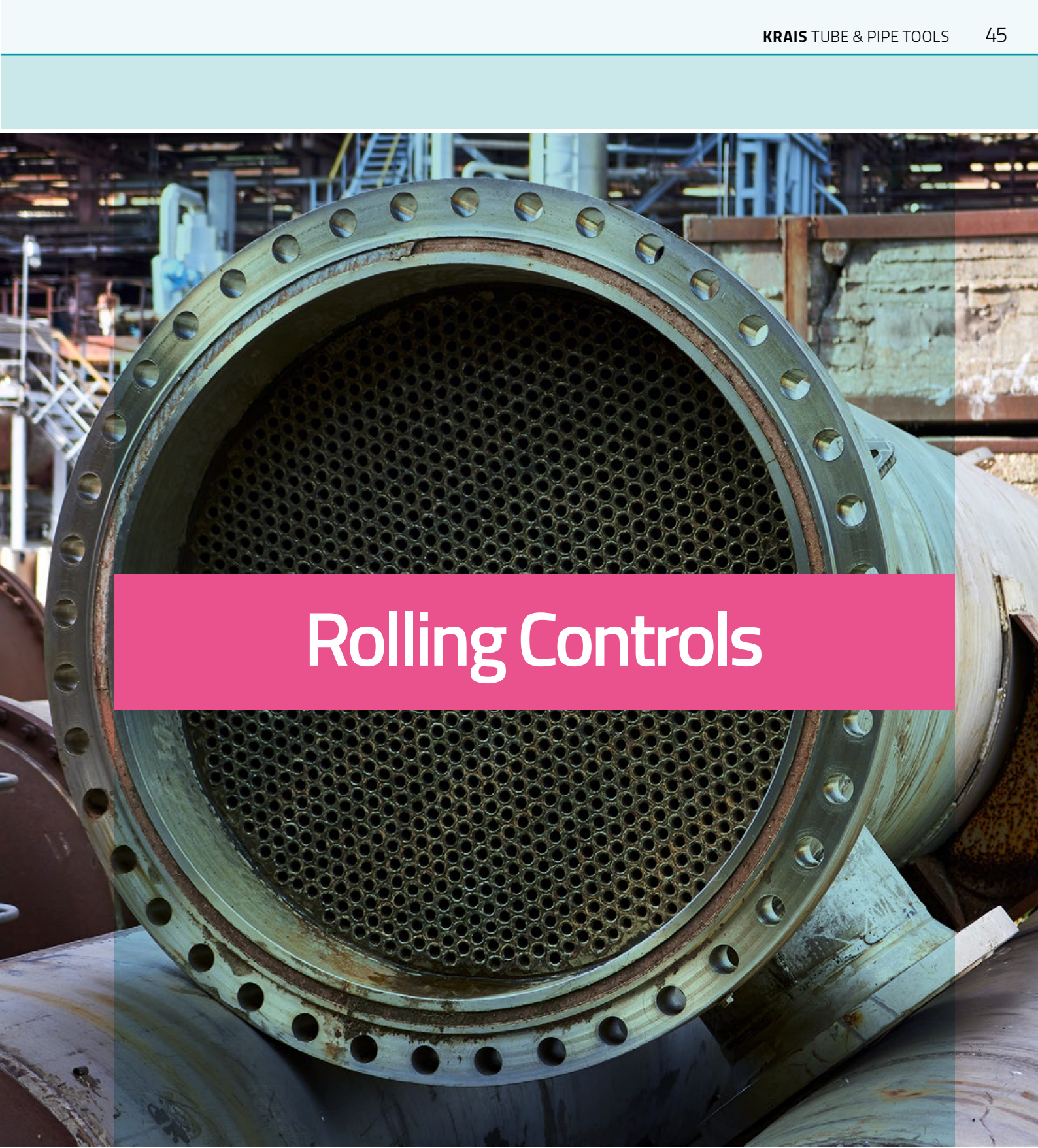
# Colins Expander

The CBTE series offers non-parallel, self-feeding boiler tube expanders, suitable for tube sizes ranging from ½" to 4". These expanders are ideal for both new installations and repair work on thin tube sheets or leaky joints. They are recommended for tube sheets with a thickness between 1/8" and 5/8" (3 mm to 16 mm).



| TUBE OD |        | GAUGE | TUBE ID |       |        |        | TOOL NO. | EXPANSION RANGE |       |        |        | ROLLS NO. | MANDREL NO. | MANDREL SQUARE |       |
|---------|--------|-------|---------|-------|--------|--------|----------|-----------------|-------|--------|--------|-----------|-------------|----------------|-------|
|         |        |       | [INCH]  |       | [MM]   |        |          | [INCH]          |       | [MM]   |        |           |             | [INCH]         | [MM]  |
| [INCH]  | [MM]   | [BWG] | MIN     | MAX   | MIN    | MAX    |          | MIN             | MAX   | MIN    | MAX    |           |             |                |       |
| 1/2"    | 12,70  | 16-17 | 0,370   | 0,384 | 9,40   | 9,76   | CBTE-10  | 0,352           | 0,435 | 8,94   | 11,05  | RS-13     | MS-22       | 3/8"           | 9,52  |
|         |        | 18-19 | 0,402   | 0,416 | 10,22  | 10,56  | CBTE-11  | 0,382           | 0,465 | 9,70   | 11,81  | RS-13     | MS-23       | 3/8"           | 9,52  |
| 5/8"    | 15,88  | 14    | 0,459   | 0,459 | 11,65  | 11,65  | CBTE-13  | 0,438           | 0,521 | 11,12  | 13,23  | RS-14     | MS-24       | 3/8"           | 9,52  |
|         |        | 15-17 | 0,481   | 0,509 | 12,21  | 12,93  | CBTE-15  | 0,462           | 0,566 | 11,73  | 14,37  | RS-15     | MS-25       | 3/8"           | 9,52  |
|         |        | 18-19 | 0,527   | 0,541 | 13,39  | 13,73  | CBTE-17  | 0,490           | 0,620 | 12,44  | 15,74  | RS-15     | MS-26       | 3/8"           | 9,52  |
|         |        | 10    | 0,482   | 0,482 | 12,25  | 12,25  | CBTE-15  | 0,462           | 0,566 | 11,73  | 14,37  | RS-15     | MS-25       | 3/8"           | 9,52  |
| 3/4"    | 19,05  | 11-12 | 0,510   | 0,532 | 12,95  | 13,51  | CBTE-17  | 0,490           | 0,620 | 12,44  | 15,74  | RS-15     | MS-26       | 3/8"           | 9,52  |
|         |        | 13-15 | 0,560   | 0,606 | 14,23  | 15,39  | CBTE-19  | 0,538           | 0,688 | 13,66  | 17,47  | RS-16     | MS-26       | 3/8"           | 9,52  |
|         |        | 16-17 | 0,620   | 0,634 | 15,75  | 16,11  | CBTE-21  | 0,596           | 0,752 | 15,13  | 19,10  | RS-17     | MS-27       | 3/8"           | 9,52  |
|         |        | 18-19 | 0,652   | 0,916 | 16,57  | 23,26  | CBTE-22  | 0,620           | 0,776 | 15,75  | 19,71  | RS-18     | MS-27       | 3/8"           | 9,52  |
| 7/8"    | 22,22  | 11    | 0,635   | 0,635 | 16,12  | 16,12  | CBTE-21  | 0,596           | 0,752 | 15,13  | 19,10  | RS-17     | MS-27       | 3/8"           | 9,52  |
|         |        | 12    | 0,657   | 0,657 | 16,68  | 16,68  | CBTE-22  | 0,620           | 0,776 | 15,75  | 19,71  | RS-18     | MS-27       | 3/8"           | 9,52  |
|         |        | 13-14 | 0,685   | 0,709 | 17,40  | 18,00  | CBTE-23  | 0,650           | 0,806 | 16,51  | 20,47  | RS-19     | MS-27       | 3/8"           | 9,52  |
|         |        | 15-17 | 0,731   | 0,759 | 18,56  | 19,28  | CBTE-24  | 0,710           | 0,866 | 18,03  | 21,99  | RS-19     | MS-28       | 1/2"           | 12,70 |
| 1"      | 25,40  | 9     | 0,704   | 0,704 | 17,88  | 17,88  | CBTE-23  | 0,650           | 0,806 | 16,51  | 20,47  | RS-19     | MS-27       | 3/8"           | 9,52  |
|         |        | 10-11 | 0,732   | 0,760 | 18,60  | 19,30  | CBTE-24  | 0,710           | 0,866 | 18,03  | 21,99  | RS-19     | MS-28       | 1/2"           | 12,70 |
|         |        | 12-13 | 0,782   | 0,810 | 19,86  | 20,58  | CBTE-25  | 0,760           | 0,916 | 19,30  | 23,26  | RS-20     | MS-28       | 1/2"           | 12,70 |
|         |        | 14-16 | 0,834   | 0,870 | 21,18  | 22,10  | CBTE-26  | 0,812           | 0,968 | 20,62  | 24,58  | RS-21     | MS-28       | 1/2"           | 12,70 |
|         |        | 17-18 | 0,884   | 0,902 | 22,46  | 22,92  | CBTE-27  | 0,861           | 1,018 | 21,88  | 25,85  | RS-22     | MS-28       | 1/2"           | 12,70 |
| 1-1/8"  | 28,58  | 12    | 0,908   | 0,908 | 23,06  | 23,06  | CBTE-27  | 0,862           | 1,018 | 21,89  | 25,85  | RS-22     | MS-28       | 1/2"           | 12,70 |
|         |        | 13-17 | 0,937   | 1,008 | 23,80  | 25,60  | CBTE-29  | 0,890           | 1,173 | 22,60  | 29,80  | RS-24     | MS-29       | 1/2"           | 12,70 |
| 1-1/4"  | 31,75  | 9-12  | 0,949   | 1,028 | 24,10  | 26,10  | CBTE-29  | 0,890           | 1,173 | 22,60  | 29,80  | RS-24     | MS-29       | 1/2"           | 12,70 |
|         |        | 13-16 | 1,058   | 1,118 | 26,88  | 28,40  | CBTE-30  | 1,016           | 1,291 | 25,80  | 32,80  | RS-25     | MS-29       | 1/2"           | 12,70 |
| 1-3/8"  | 34,93  | 13    | 1,185   | 1,185 | 30,10  | 30,10  | CBTE-31  | 1,150           | 1,398 | 29,20  | 35,50  | RS-26     | MS-29       | 1/2"           | 12,70 |
| 1-1/2"  | 38,10  | 11-12 | 1,260   | 1,280 | 32,00  | 32,50  | CBTE-31  | 1,150           | 1,398 | 29,20  | 35,50  | RS-26     | MS-29       | 1/2"           | 12,70 |
|         | 38,10  | 13-16 | 1,310   | 1,370 | 33,28  | 34,80  | CBTE-32  | 1,274           | 1,524 | 32,35  | 38,70  | RS-26     | MS-30       | 3/4"           | 19,05 |
| 1-5/8"  | 41,28  | 11-13 | 1,385   | 1,435 | 35,17  | 36,45  | CBTE-33  | 1,336           | 1,586 | 33,93  | 40,28  | RS-27     | MS-30       | 3/4"           | 19,05 |
| 1-3/4"  | 44,45  | 11-13 | 1,510   | 1,560 | 38,35  | 39,63  | CBTE-36  | 1,462           | 1,712 | 37,13  | 43,48  | RS-28     | MS-30       | 3/4"           | 19,05 |
| 1-7/8"  | 47,63  | 11-13 | 1,635   | 1,685 | 41,52  | 42,80  | CBTE-40  | 1,600           | 1,850 | 40,64  | 46,99  | RS-29     | MS-31       | 3/4"           | 19,05 |
| 2"      | 50,80  | 11-13 | 1,760   | 1,810 | 44,70  | 45,98  | CBTE-44  | 1,724           | 1,974 | 43,78  | 50,14  | RS-30     | MS-31       | 3/4"           | 19,05 |
| 2-1/8"  | 53,98  | 11-13 | 1,885   | 1,935 | 47,87  | 49,15  | CBTE-52  | 1,850           | 2,100 | 46,99  | 53,34  | RS-31     | MS-31       | 3/4"           | 19,05 |
| 2-1/4"  | 57,15  | 11-13 | 2,008   | 2,058 | 51,00  | 52,28  | CBTE-56  | 1,980           | 2,230 | 50,28  | 56,64  | RS-31     | MS-32       | 1"             | 25,40 |
| 2-1/2"  | 63,50  | 11-13 | 2,260   | 2,310 | 57,40  | 58,68  | CBTE-65  | 2,230           | 2,480 | 56,64  | 63,00  | RS-32     | MS-32       | 1"             | 25,40 |
| 2-3/4"  | 69,85  | 11-13 | 2,510   | 2,560 | 63,75  | 65,03  | CBTE-66  | 2,480           | 2,730 | 63,00  | 69,35  | RS-33     | MS-32       | 1"             | 25,40 |
| 3"      | 76,20  | 10-13 | 2,732   | 2,810 | 69,40  | 71,38  | CBTE-68  | 2,690           | 3,023 | 68,33  | 76,78  | RS-33     | MS-33       | 1"             | 25,40 |
| 3-1/4"  | 82,55  | 10-13 | 2,984   | 3,062 | 75,80  | 77,78  | CBTE-70  | 2,940           | 3,273 | 74,67  | 83,13  | RS-34     | MS-33       | 1"             | 25,40 |
| 3-1/2"  | 88,90  | 10-13 | 3,232   | 3,310 | 82,10  | 84,08  | CBTE-80  | 3,190           | 3,523 | 81,02  | 89,48  | RS-35     | MS-33       | 1"             | 25,40 |
| 3-3/4"  | 95,25  | 9-13  | 3,454   | 3,560 | 87,73  | 90,43  | CBTE-84  | 3,412           | 3,745 | 86,66  | 95,12  | RS-34     | MS-35       | 1"             | 25,40 |
| 4"      | 101,60 | 9-13  | 3,704   | 3,810 | 94,08  | 96,78  | CBTE-90  | 3,661           | 3,995 | 93,00  | 101,47 | RS-35     | MS-35       | 1"             | 25,40 |
| 4-1/2   | 114,30 | 9-13  | 4,204   | 4,310 | 106,78 | 109,48 | CBTE-100 | 4,161           | 4,449 | 105,70 | 113,00 | RS-36     | MS-35       | 1"             | 25,40 |



A large industrial pipe with a perforated end flange is shown in a factory setting. The pipe is made of metal and has a flange with many small holes. The background shows industrial equipment and structures.

# Rolling Controls

# Rolling motors

## K20 Series

K20 pneumatic rolling motor is designed for the fast and accurate torque controlled rolling of tubes from 1/4" – 1/2" OD (6.3 - 12.7 mm OD). This uniquely designed tool with automatic reverse, expands tubes to a preset torque, at which point it automatically trips over to its reverse rotation, backing itself out of the tube ready for the next expansion. The process is fast and effortless making it the ideal tool for production rolling applications. In line version is available on request.



|          | TUBE OD |      | FREE SPEED | MIN TORQUE |       | MAX TORQUE |      | WEIGHT |      | LENGTH |      | AIR USE |         | SQUARE | CHUCKS |      |
|----------|---------|------|------------|------------|-------|------------|------|--------|------|--------|------|---------|---------|--------|--------|------|
|          | [INCH]  | [MM] | [RPM]      | [IN.LBS]   | [NM]  | [IN.LBS]   | [NM] | [LBS]  | [KG] | [INCH] | [MM] | [CFM]   | [L/MIN] |        | INC.   | OPT. |
| K20-550  | 1/2"    | 12,7 | 550        | 0,166      | 0,226 | 6,25       | 8,47 | 2,64   | 1,2  | 8,62   | 219  | 17      | 480     | 3/8"   | 1/4"   | 3/8" |
| K20-1800 | 3/8"    | 9,5  | 1800       | 0,166      | 0,226 | 2,25       | 3,05 | 2,42   | 1,1  | 8,07   | 205  | 17      | 480     | 3/8"   | 1/4"   | 3/8" |
| K20-2500 | 1/4"    | 6,3  | 2500       | 0,166      | 0,226 | 0,66       | 0,9  | 2,29   | 1,1  | 8,07   | 205  | 17      | 480     | 3/8"   | 1/4"   | 3/8" |

## Push&Pull K50 Series

K50 series pneumatic motors has been specifically engineered to ensure uniform tube to tube sheet expansions, thereby preventing the under and over rolling of tubes. This pneumatic tool features an aluminum body, weighing in at only 10.5 lbs (4.76 kg) with an ergonomically correct push/pull throttle. Automatically stops tube expansion at defined settings.



|          | TUBE OD |      | FREE SPEED | MIN TORQUE |      | MAX TORQUE |       | WEIGHT |      | LENGTH  |      | AIR USE |         | SQUARE | CHUCKS |      |
|----------|---------|------|------------|------------|------|------------|-------|--------|------|---------|------|---------|---------|--------|--------|------|
|          | [INCH]  | [MM] | [RPM]      | [IN.LBS]   | [NM] | [IN.LBS]   | [NM]  | [LBS]  | [KG] | [INCH]  | [MM] | [CFM]   | [L/MIN] |        | STD.   | OPT. |
| K50-1250 | 3/4"    | 19   | 1250       | 14,00      | 1,58 | 108        | 12,20 | 10,5   | 4,76 | 12 1/4" | 311  | 60      | 1700    | 3/8"   | 3/8"   | 1/2" |
| K50-600  | 1"      | 25,4 | 485        | 22,00      | 2,49 | 193        | 21,81 | 10,5   | 4,76 | 12 1/4" | 311  | 60      | 1700    | 3/8"   | 3/8"   | 1/2" |
| K50-400  | 1 1/4"  | 31,7 | 400        | 44,15      | 5,00 | 318        | 36,00 | 10,5   | 4,76 | 12 1/4" | 311  | 60      | 1700    | 3/8"   | 3/8"   | 1/2" |

## AK50 Automatic Rolling Motor

AK50 tube rolling motor with automatic reverse. The machine automatically:

- ▶ start up when the expander is located in the tube;
- ▶ reverse the revolution to the left once determine the set up torque;
- ▶ stop when expander is withdrawn from the tube
- ▶ thanks to delay timer, machine automatically runs in forward direction after defined period from end of previous expansion ("NS" option)
- ▶ automatic tube expander lubrication ("L" option)

All the other features are the same as for standard K50 rolling motors.



|               | TUBE OD |      | FREE SPEED | MIN TORQUE |      | MAX TORQUE |       | WEIGHT |      | LENGTH  |      | AIR USE |         | SQUARE | CHUCKS |      |
|---------------|---------|------|------------|------------|------|------------|-------|--------|------|---------|------|---------|---------|--------|--------|------|
|               | [INCH]  | [MM] | [RPM]      | [IN.LBS]   | [NM] | [IN.LBS]   | [NM]  | [LBS]  | [KG] | [INCH]  | [MM] | [CFM]   | [L/MIN] |        | STD.   | OPT. |
| AUTO K50-1250 | 3/4"    | 19   | 1250       | 14,00      | 1,58 | 108        | 12,20 | 10,5   | 4,76 | 12 1/4" | 311  | 60      | 1700    | 3/8"   | 3/8"   | 1/2" |
| AUTO K50-600  | 1"      | 25,4 | 485        | 22,00      | 2,49 | 193        | 21,81 | 10,5   | 4,76 | 12 1/4" | 311  | 60      | 1700    | 3/8"   | 3/8"   | 1/2" |
| AUTO K50-400  | 1 1/4"  | 31,7 | 400        | 44,15      | 5,00 | 318        | 36,00 | 10,5   | 4,76 | 12 1/4" | 311  | 60      | 1700    | 3/8"   | 3/8"   | 1/2" |



# Rolling motors

## K60 Series

K60 rolling motors control expansion by the accurate measurement of torque. They automatically stop expanding according to a predetermined setting. Torque control prevents over- and under-expansion of tubes, assures uniformly tightened tube joints, and provides maximum holding strength for individual tubes. All K60 motors include torque sensing cams designed and manufactured specifically for tube expanding applications.

- ▶ Strong, lightweight aluminum housings for easier handling and less operator fatigue
- ▶ Rugged drive combines precision control and measured torque output
- ▶ Simple dial-a-torque adjustment collar for easy set up
- ▶ Cushioned shut-off reduces torque reaction
- ▶ Quick change chucks to improve productivity



|                | TUBE OD |      | FREE SPEED | MIN TORQUE |      | MAX TORQUE |       | WEIGHT |       | LENGTH |      | AIR USE |         | SQUARE | CHUCKS   |          |
|----------------|---------|------|------------|------------|------|------------|-------|--------|-------|--------|------|---------|---------|--------|----------|----------|
|                | [INCH]  | [MM] | [RPM]      | [FT.LBS]   | [NM] | [FT.LBS]   | [NM]  | [LBS]  | [KG]  | [INCH] | [MM] | [CFM]   | [L/MIN] |        | STD.     | OPT.     |
| <b>K60-900</b> | 1-1/2"  | 38,1 | 756        | 4,7        | 6,4  | 30,7       | 41,6  | 27     | 12,25 | 18     | 457  | 1980    | 70      | 1/2"   | 3/8, 1/2 | 3/4, 1   |
| <b>K60-400</b> | 2"      | 50,8 | 400        | 10,0       | 12,8 | 61,0       | 82,5  | 27     | 12,25 | 18     | 457  | 1980    | 70      | 3/4"   | 3/4, 1   | 3/8, 1/2 |
| <b>K60-250</b> | 2-1/2"  | 63,5 | 220        | 25,0       | 33,9 | 100,0      | 135,5 | 27     | 12,25 | 18     | 457  | 1980    | 70      | 3/4"   | 3/4, 1   | 3/8, 1/2 |

## AK60NS Automatic Rolling Motor

AK60NS is a tube rolling motor with the fully automatic reverse system. The machine automatically:

- ▶ startup rotating in the forward direction;
- ▶ reverse the revolution to the left once determine the setup torque;
- ▶ thanks to adjustable delay timer, the machine automatically runs in forwarding direction after a defined period from the end of a previous expansion;
- ▶ automatic tube expander lubrication "L" is available optionally.

All the other features are the same as for standard K60 rolling motors.

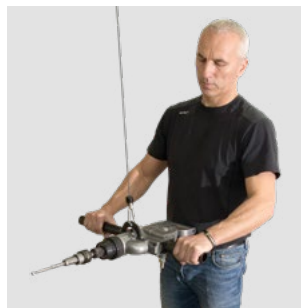


|                    | TUBE OD |      | FREE SPEED | MIN TORQUE |      | MAX TORQUE |      | WEIGHT |       | LENGTH |      | AIR USE |         | SQUARE | CHUCKS   |        |
|--------------------|---------|------|------------|------------|------|------------|------|--------|-------|--------|------|---------|---------|--------|----------|--------|
|                    | [INCH]  | [MM] | [RPM]      | [FT.LBS]   | [NM] | [FT.LBS]   | [NM] | [LBS]  | [KG]  | [INCH] | [MM] | [CFM]   | [L/MIN] |        | STD.     | OPT.   |
| <b>AK60NS-1200</b> | 1"      | 25,4 | 1200       | 3,8        | 5,0  | 19,0       | 25,0 | 27     | 12,25 | 18     | 457  | 1980    | 70      | 1/2"   | 3/8, 1/2 | 3/4, 1 |
| <b>AK60NS-900</b>  | 1-1/2"  | 38,1 | 756        | 4,7        | 6,4  | 30,7       | 41,6 | 27     | 12,25 | 18     | 457  | 1980    | 70      | 1/2"   | 3/8, 1/2 | 3/4, 1 |

### AUTO K60 ON SITE



Auto K60 fastened on the Flexpander.



K60 fastened on the rope balancer.

# Righ Angle rolling motors

## K70 Right Angle Series

K70 Torque Controlled Rolling Motors have been designed for the Boiler Tube Industry. Tools have a unique head design which features a fully enclosed bearing design for long and trouble free life.

With industry input, our tools have been specifically engineered to precisely and consistently expand tubes in Steam / Mud Drums, Fire Tube and related Boilers and Equipment.

All models are equipped with a roll throttle as standard, a lever throttle is optional.

### K70 OPTIONAL ACCESSORIES



Right angle gear drive



Parallel gear drive



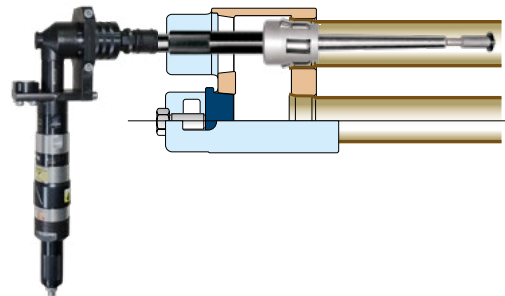
Single universal joint

|            | TUBE OD |        | FREE SPEED | MIN TORQUE |          | MAX TORQUE |          | WEIGHT |       | LENGTH |        | HEIGHT WITHOUT SQUARE DRIVE |        | SIDE TO CENTER |        | SQUARE | CHUCK    |        |
|------------|---------|--------|------------|------------|----------|------------|----------|--------|-------|--------|--------|-----------------------------|--------|----------------|--------|--------|----------|--------|
|            | [MM]    | [INCH] | [RPM]      | [NM]       | [FT.LBS] | [NM]       | [FT.LBS] | [KG]   | [LBS] | [MM]   | [INCH] | [MM]                        | [INCH] | [MM]           | [INCH] |        | INC.     | OPT.   |
| K72-RT-90  | 101,6   | 4"     | 90         | 200        | 150      | 410        | 305      | 6,7    | 14,75 | 550    | 21,7   | 70                          | 2,75   | 37             | 1,5    | 3/4"   | 1", 3/4" | -      |
| K72-LT-90  | 101,6   | 4"     | 90         | 200        | 150      | 410        | 305      | 6,7    | 14,75 | 550    | 21,7   | 70                          | 2,75   | 37             | 1,5    | 3/4"   | 1", 3/4" | -      |
| K73-RT-190 | 63,5    | 2,5"   | 190        | 95         | 70       | 200        | 140      | 5,8    | 13,00 | 530    | 20,1   | 65                          | 2,60   | 28             | 1,1    | 3/4"   | 3/4"     | 1/2"   |
| K73-LT-190 | 63,5    | 2,5"   | 190        | 95         | 70       | 200        | 140      | 5,8    | 13,00 | 530    | 20,1   | 65                          | 2,60   | 28             | 1,1    | 3/4"   | 3/4"     | 1/2"   |
| K73-RT-280 | 57,1    | 2,25"  | 280        | 60         | 44       | 140        | 104      | 5,8    | 13,00 | 530    | 20,1   | 65                          | 2,60   | 28             | 1,1    | 3/4"   | 3/4"     | 1/2"   |
| K73-LT-280 | 57,1    | 2,25"  | 280        | 60         | 44       | 140        | 104      | 5,8    | 13,00 | 530    | 20,1   | 65                          | 2,60   | 28             | 1,1    | 3/4"   | 3/4"     | 1/2"   |
| K73-RT-375 | 50,8    | 2"     | 375        | 40         | 30       | 110        | 82       | 5,8    | 13,00 | 530    | 20,1   | 65                          | 2,60   | 28             | 1,1    | 3/4"   | 3/4"     | 1/2"   |
| K73-LT-375 | 50,8    | 2"     | 375        | 40         | 30       | 110        | 82       | 5,8    | 13,00 | 530    | 20,1   | 65                          | 2,60   | 28             | 1,1    | 3/4"   | 3/4"     | 1/2"   |
| K75-RT-30  | 152,0   | 6"     | 30         | 120        | 90       | 1230       | 922      | 7,5    | 16,50 | 620    | 24,0   | 70                          | 2,75   | 37             | 1,5    | 1"     | 1"       | 1-1/4" |
| K75-LT-30  | 152,0   | 6"     | 30         | 120        | 90       | 1230       | 922      | 7,5    | 16,50 | 620    | 24,0   | 70                          | 2,75   | 37             | 1,5    | 1"     | 1"       | 1-1/4" |
| K75-RT-60  | 127,0   | 5"     | 60         | 60         | 45       | 640        | 480      | 6,5    | 14,3  | 620    | 24,0   | 70                          | 2,75   | 37             | 1,5    | 1"     | 1"       | 1-1/4" |
| K75-LT-60  | 127,0   | 5"     | 60         | 60         | 45       | 640        | 480      | 6,5    | 14,3  | 620    | 24,0   | 70                          | 2,75   | 37             | 1,5    | 1"     | 1"       | 1-1/4" |

LT - lever throttle; RT - roll throttle

## K77 Right Angle Series

Torque controlled pneumatic rolling motor suitable for expanding tube up to 8" and refinery fittings.



|           | TUBE OD |        | FREE SPEED | MIN TORQUE |          | MAX TORQUE |          | WEIGHT |       | LENGTH |        | HEIGHT WITHOUT SQUARE DRIVE |        | SIDE TO CENTER |        | SQUARE | CHUCK      |        |
|-----------|---------|--------|------------|------------|----------|------------|----------|--------|-------|--------|--------|-----------------------------|--------|----------------|--------|--------|------------|--------|
|           | [MM]    | [INCH] | [RPM]      | [NM]       | [FT.LBS] | [NM]       | [FT.LBS] | [KG]   | [LBS] | [MM]   | [INCH] | [MM]                        | [INCH] | [MM]           | [INCH] |        | INC.       | OPT.   |
| K77-RT-25 | 203,2   | 8"     | 25         | 710        | 532      | 1455       | 1075     | 10     | 14,75 | 552    | 21,73  | 190                         | 4,826  | 39             | 1,535  | 1"     | 1", 1-1/4" | 1-1/2" |
| K77-LT-25 | 203,2   | 8"     | 25         | 710        | 532      | 1455       | 1075     | 10     | 14,75 | 552    | 21,73  | 190                         | 4,826  | 39             | 1,535  | 1"     | 1", 1-1/4" | 1-1/2" |
| K77-RT-8  | 203,2   | 8"     | 8          | 315        | 232      | 4300       | 3172     | 15     | 14,75 | 552    | 21,73  | 190                         | 4,826  | 39             | 1,535  | 1"     | 1", 1-1/4" | 1-1/2" |
| K77-LT-8  | 203,2   | 8"     | 8          | 315        | 232      | 4300       | 3172     | 15     | 14,75 | 552    | 21,73  | 190                         | 4,826  | 39             | 1,535  | 1"     | 1", 1-1/4" | 1-1/2" |

LT - lever throttle; RT - roll throttle

# FlexHolder System

The FlexHolder articulated arm supports the weight and absorbs the torque of the rolling motors and beveling machines using a pneumatic counterbalance, which allows the operator to effortlessly move the rolling motor into position.

- ▶ Positive tool holding system virtually eliminates the chance for operator error.
  - ▶ Increases expander life up to three times compared to conventional tube rolling.
  - ▶ Extends tool life by using the lubricated air from rolling motor's exhaust for cooling the rolls & mandrels, significantly reducing tooling cost.
- Standard model features 1,5 m vertical and 1,5 m horizontal reach (models with increased vertical and horizontal capacity are available upon request). Column can be easily removed from the base for the transportation purposes.

## SPECIFICATION

|                       |        |           |
|-----------------------|--------|-----------|
| Vertical movement     | 150 cm | 59"       |
| Horizontal movement   | 150 cm | 59"       |
| Minimum Lift Capacity | 5 kg   | 10 Lbs    |
| Lift Capacity         | 30 kg  | 37 Lbs    |
| Allowable Torque      | 170 Nm | 125 FtLbs |



**FLEXHolder** can be supplied as a column, without trolley, which can be fixed to the floor, your own trolley or any other preferred way.



# TES Mini 2

TES Mini 2 is a semi automatic torque controller for the precise expansion of ferrous, non-ferrous and alloy tubing. It is ideal for condenser/chillers, heat exchangers and boilers. It's one of most popular tools because of its accuracy, speed and ease of use.

The second generation TES Mini has been designed with direct input from our customers and utilizes the latest electronic components. As a direct result of these new technologies, gains in precision and energy efficiency have been realized from an already accurate system ( $\pm 1\%$ ). The redesigned control panel is simpler to navigate and incorporates a built in card reader for detailed work reports.

## MAIN TES MINI 2 FEATURES

- ▶ microprocessor controlled tube expansion;
- ▶ consistent torque control over 1 or 10,000 expansions;
- ▶ controls torque during long series of tube expanding;
- ▶ programmable torque shut-off value and high/low torque limits;
- ▶ reverse button for retracting expanders from the tubes;
- ▶ programmable timers for; cycle start, reverse pause, end of cycle, and a suppression timer for low torque value settings;
- ▶ CE Certified design.

Usage of our TES Mini 2 Controller, which is durable and easy to maintain, ensures that all tubes are expanded to the same torque. With the proper, easy to use set up, you can avoid over rolling which damages joint integrity and the distortion of tube sheet ligaments.

## TES MINI 2 FUNCTIONS

- ▶ speed adjustment or limit (depends on motor type)
- ▶ torque adjustment
- ▶ suppression time adjustments
- ▶ pause time adjustments
- ▶ softstart delay
- ▶ report generation (up to 9999 cycles)
- ▶ works with 110 V and 230 V

## DIMENSIONS



# TES Mini 2

## TES MINI 2 MOTORS

TES Mini in conjunction with one of our tube rolling motors will improve productivity and safety, while delivering unmatched performance and durability.

| DRIVE                                                                               |           | TUBE OD |       | FREE SPEED               | MAX RPM<br>UNDER<br>LOAD | MOTOR<br>POWER | TORQUE       |                |            |              | WEIGHT |       |
|-------------------------------------------------------------------------------------|-----------|---------|-------|--------------------------|--------------------------|----------------|--------------|----------------|------------|--------------|--------|-------|
|                                                                                     |           | MIN     | MAX   |                          |                          |                | [NM]         |                | [FT-LBS]   |              | [KG]   | [LBS] |
|                                                                                     |           |         |       |                          |                          |                | MIN          | MAX            | MIN        | MAX          |        |       |
|    | HT-0      | 1/4     | 1/2   | 2300                     | 1700                     | 460 W          | 0,70         | 10,00          | 0,5        | 7,4          | 1,2    | 2,6   |
|    | MS-2      | 5/8     | 1 1/8 | 650<br>1200              | 430<br>760               | 1150 W         | 8,30<br>5,50 | 40,00<br>25,00 | 6,1<br>4,1 | 29,5<br>18,4 | 3,2    | 7,1   |
|    | DU-0      | 5/8     | 1     | 628<br>2100              | 450<br>1550              | 650 W          | 7,30<br>2,70 | 30,00<br>10,40 | 5,4<br>2,0 | 22,1<br>7,7  | 2,0    | 4,4   |
|  | DU-1      | 3/4     | 2     | 150<br>250<br>445<br>720 | 120<br>219<br>380<br>650 | 2000 W         | 12,00        | 250,00         | 8,9        | 184,4        | 8,6    | 19,0  |
|  | K90-E-90  | 2       | 5     | 90                       | 81                       | 1150 W         | 70,00        | 510,00         | 51,6       | 376,2        | 10,0   | 22,0  |
|                                                                                     | K90-E-190 | 1 1/2   | 3     | 142                      | 129                      | 1150 W         | 50,00        | 260,00         | 36,9       | 191,8        | 10,0   | 22,0  |
|                                                                                     | K90-E-280 | 1 1/4   | 2 1/2 | 274                      | 250                      | 1150 W         | 40,00        | 190,00         | 29,5       | 140,1        | 10,0   | 22,0  |

\* Tube Capacity depends on material and technical condition of tube



# TES-2000 Digital Tube Expanding System

Transform your tube expansion process with the TES 2000 Digital Tube Expanding System – a solution designed for precision, efficiency, and ease of use.

## PRECISION AND CONTROL

The TES 2000 Controller is the heart of this system, offering durable performance and effortless maintenance. Its advanced digital capabilities ensure that every tube is expanded to the exact same torque, eliminating the risks of over-rolling and distortion of tube sheet ligaments. Experience unparalleled accuracy with variable speed and torque repeatability of +/- 1%.

## HIGH-TECH INNOVATION

Equipped with a state-of-the-art servo drive, the TES 2000 guarantees high-quality, repeatable results. This purely digital and modular system adapts seamlessly to a wide range of tube diameters and materials, making it the ideal choice for demanding applications. Whether you're working with standard or exotic materials, the TES 2000 delivers consistent, reliable performance every time.

## DESIGNED FOR EASE AND EFFICIENCY

Simplicity meets sophistication with the TES 2000. The system is designed for easy setup, allowing you to get started quickly and efficiently. Its user-friendly interface and programmable features, including adjustable speed and torque settings, programmable timers, and report generation, provide complete control over your expansion process.

## TECHNICAL SPECIFICATIONS

- Tube compatibility: ½" – 1 1/4"
- Power supply: 230V, 50/60Hz
- Supported languages: english
- System is fully CE compliant and fully adheres to RoHS standards

## CUTTING-EDGE FUNCTIONS

The TES 2000 is packed with features to enhance your workflow:

- ▶ Speed and torque adjustments for precise control.
- ▶ Programmable timers for cycle start, reverse pause, and end of cycle.
- ▶ Low torque suppression timer to prevent damage.
- ▶ Internal storage for log files, supporting up to 9999 cycles.



## TES-2000 MOTOR

|          | RPM |      | TORQUE NM |        | TORQUE FT-LBS |              | WEIGHT |           |
|----------|-----|------|-----------|--------|---------------|--------------|--------|-----------|
|          | MIN | MAX  | MIN       | MAX    | MIN           | MAX          | KG     | LBS       |
| GEAR 1:1 | 400 | 5000 | 1,25 Nm   | 8,4 Nm | 0,92 Ft-Lbs   | 6,20 Ft-Lbs  | 5 kg   | 11,02 lbs |
| GEAR 1:6 | 70  | 800  | 8,00 Nm   | 46 Nm  | 5,90 Ft-Lbs   | 33,93 Ft-Lbs |        |           |



## USER-FRIENDLY INTERFACE

The Text Panel (TP) series HMI provides a straightforward, monochrome text and graphical interface with physical membrane buttons. While simple in appearance, this interface offers robust control functions and easy operation, making it accessible to users of all skill levels.

# TES-2000 Digital Tube Expanding System

## EFFICIENCY AT ITS BEST

Designed for professionals who demand the best, the TES 2000 delivers uniform tube expansion with greater efficiency and accuracy. Its high-tech servo drive ensures that every expansion is performed to perfection, saving you time and effort.



TES units are equipped with top quality connectors.



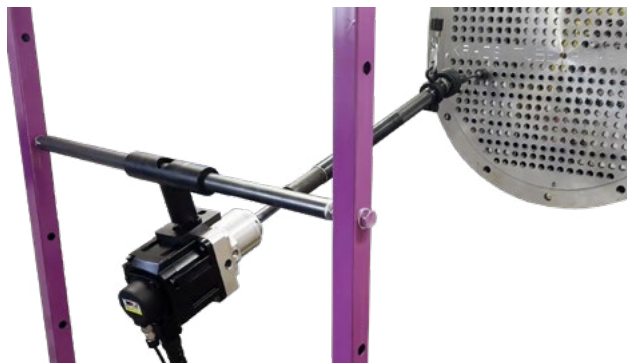
Easy-to-access button allows for convenient work control.



## TELESCOPIC SHAFT



As an option, KRAIS offer an articulated telescopic shaft - convenient way to improve efficiency and option to machine most inaccessible tubes. The telescopic shaft is useful especially to roll tubes close and deep to the shell. The shaft is easy to handle, accurate and stable at all speeds.

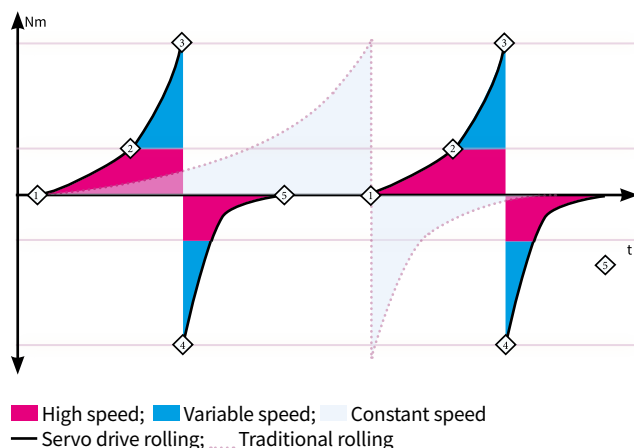


Built to work with the regular TES2000 motor and TES3000, G-1000, G-400, and G-1450 motors.

## BASIC FEATURES

Overall telescopic range:..... 940 - 1480 mm (37,0" - 58,3")  
 Extensibility:..... 520 mm (20,5")  
 Handle part length:..... 225 mm (8,9")  
 Weight:..... 8 kg (17,6 Lbs)  
 Max. torque: ..... 120 Nm (88,5 FtLbs)

## SERVO DRIVE WORKING SCHEME



## FLEXHOLDER

To work with TES3000 controllers we recommend arm FlexHolder. This connection allows you to create a mobile workstation with an above average performance!



# TES-3000

This Digital Tube Expanding System features a range of powerful and efficient servo motors. Variable Speed and Torque repeatability +/- 1% are a few of the advantages of this system. Created for the demanding customer, this system ensures uniform tube expansion over a wide range of tube diameters and materials, greater efficiency and accuracy combined with ease of use make this system, simple, affordable and extremely fast.

## BASIC PARAMETERS

- ▶ Power supply:
- ▶ TES 3000: 400V 50/60Hz
- ▶ For tubes: ½" – 1 ½"
- ▶ Control unit weight: 14 kg
- ▶ Footswitch weight: 5 kg
- ▶ Dimensions: 800 x 200 x 900 mm

## MAIN TES FEATURES

- ▶ Purely digital and modular system.
- ▶ High tech servo drive and motor assure accuracy, high quality and repeatability of the results and efficient work.
- ▶ Extremely easy and user friendly interface on 7" touch screen.
- ▶ Supported languages: English, Korean, German, Spanish, Portuguese, Chinese, Polish.
- ▶ USB Flash Drive available to dump expanding log files (48 MB of internal storage space for the log files)
- ▶ Easy software upgrade with USB flash memory
- ▶ CE compliant. In full accordance with RoHS compliance.
- ▶ Motor equipped with EnDat encoder.

## APLS (OPTIONAL)

The automatic, pneumatic lubrication system is controlled by TES-3000 control box. It automatically shoots a drop of oil on the rolls before the expander is inserted into the expanded tube.

## TES-3000 SPECIFICATION

|                       |                                                                                                          |
|-----------------------|----------------------------------------------------------------------------------------------------------|
| Colors                | 65536                                                                                                    |
| Resolution (W x H)    | 800 x 480                                                                                                |
| Back Light            | LED                                                                                                      |
| Processor             | Cortex A8 600MHz                                                                                         |
| Touch Panel Type      | 4 wires resistive type                                                                                   |
| Storage               | 128 MB Flash                                                                                             |
| RAM                   | 128 MB                                                                                                   |
| USB Host              | USB 2.0 – software updates, dump the log files                                                           |
| CE                    | Complies with EN 55022:2006, Class A, EN 61000-3-2:2006, EN 61000-3-3:1995 + A1:2001 + A2:2005 standards |
| UL                    | E248297                                                                                                  |
| Protection Structure  | IP65 front panel                                                                                         |
| Storage Temperature   | -20°~60°C (-4°~140°F)                                                                                    |
| Operating Temperature | 0°~50°C (32°~122°F)                                                                                      |
| Operation Humidity    | 10-90% RH (non-condense)                                                                                 |



Special designed body shape for convenient of operator

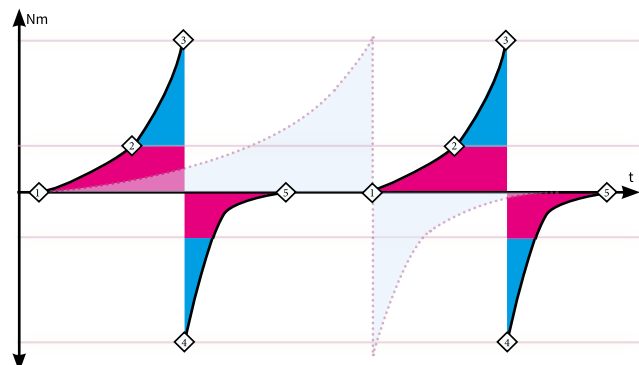


USB host for easy software upgrade to latest version.



TES units are equipped with top quality connectors.

## SERVO DRIVE WORKING SCHEME



■ High speed; ■ Variable speed; ■ Constant speed  
— Servo drive rolling; ..... Traditional rolling

# TES-3000

## MOTORS FOR TES-3000

We offer a full range of motors, you can choose a proper one that fits your needs. Each motor is equipped with one of 5 of the gear boxes. Each with protection level IP56.

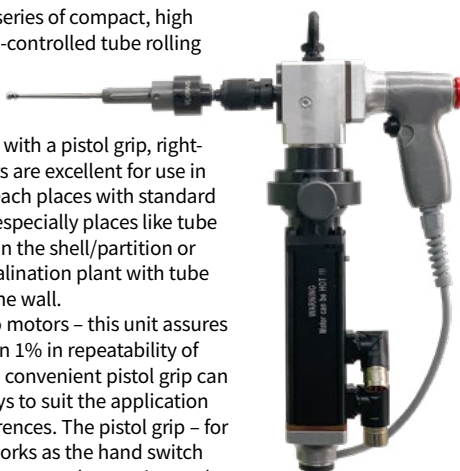
| DRIVE                                                                               |       | PHASE VOLTAGE | WEIGHT | MAX RPM | TORQUE (WITH TES-3000) |      |       |       |
|-------------------------------------------------------------------------------------|-------|---------------|--------|---------|------------------------|------|-------|-------|
|                                                                                     |       |               |        |         | NM                     |      | FT.LB |       |
|                                                                                     |       |               |        |         | MIN                    | MAX  | MIN   | MAX   |
|    | S3000 | 3/400V        | 5,0 kg | 3000    | 0,2                    | 2,5  | 0,10  | 1,80  |
|                                                                                     | S6000 | 3/400V        | 5,0 kg | 6000    | 0,2                    | 2,5  | 0,10  | 1,80  |
|                                                                                     | S5    | 3/400V        | 5,0 kg | 1662    | 2,3                    | 8,6  | 1,60  | 6,30  |
|                                                                                     | S4    | 3/400V        | 5,0 kg | 1500    | 2,7                    | 9,5  | 1,90  | 7,00  |
|                                                                                     | S3    | 3/400V        | 5,0 kg | 1091    | 3,0                    | 13,0 | 2,20  | 9,50  |
|                                                                                     | S2    | 3/400V        | 5,0 kg | 800     | 2,8                    | 18,0 | 2,00  | 13,20 |
|                                                                                     | S1    | 3/400V        | 5,0 kg | 600     | 3,0                    | 24,0 | 2,20  | 17,70 |
|    | S1-RA | 3/400V        | 6,5 kg | 320     | 2,2                    | 45,0 | 1,62  | 33,0  |
|                                                                                     | S2-RA | 3/400V        | 6,5 kg | 425     | 1,7                    | 33,0 | 1,25  | 24,0  |
|                                                                                     | S3-RA | 3/400V        | 6,5 kg | 580     | 1,1                    | 24,0 | 0,81  | 17,0  |
|                                                                                     | S4-RA | 3/400V        | 6,2 kg | 797     | 0,9                    | 17,0 | 0,66  | 12,0  |
|                                                                                     | S5-RA | 3/400V        | 6,2 kg | 884     | 0,7                    | 16,0 | 0,51  | 11,0  |
|  | G3000 | 3/400V        | 9,5 kg | 3000    | 0,5                    | 18   | 3,68  | 13,27 |
|                                                                                     | G2000 | 3/400V        | 9,5 kg | 2000    | 0,8                    | 23   | 5,9   | 16,96 |
|                                                                                     | G1455 | 3/400V        | 9,0 kg | 1453    | 2,3                    | 70   | 1,6   | 51,6  |
|                                                                                     | G1000 | 3/400V        | 9,0 kg | 1000    | 3,4                    | 102  | 2,5   | 75,2  |
|                                                                                     | G400  | 3/400V        | 9,5 kg | 400     | 7,5                    | 240  | 5,5   | 177   |

## MOTOR WHICH "FITS EVERYWHERE"

KRAIS Sx-RA is the series of compact, high customizable servo-controlled tube rolling motors.

The compact body, with a pistol grip, right-angle rolling motors are excellent for use in tight and hard to reach places with standard rolling motors. An especially places like tube sheet placed deep in the shell/partition or a condenser in desalination plant with tube sheet opposite to the wall.

Like all KRAIS servo motors – this unit assures differences less than 1% in repeatability of torque control. The convenient pistol grip can be position in 3 ways to suit the application and operator preferences. The pistol grip – for a better control – works as the hand switch with two triggers: for manual operation and emergency button. The machine is equipped with suspension for balancer.



## MANY CUSTOM CONFIGURATIONS

Pistol grip at left side



Pistol grip at back



Pistol grip at right side



Pistol grip at left side with handle on bottom



Pistol grip at back with handle on bottom



Pistol grip at back side with handle on left



... plus many more, which can fit in all tough locations!



# TES-3000

## TELESCOPIC SHAFT



As an option, KRAIS offer an articulated telescopic shaft - convenient way to improve efficiency and option to machine most inaccessible tubes. The telescopic shaft is useful especially to roll tubes close and deep to the shell. The shaft is easy to handle, accurate and stable at all speeds.



Built to work within digital rolling system TES3000 with G-1000, G-400 and G-1450 motors.  
If you need to work in the explosive environment, the telescopic shaft module is ready to work with pneumatic rolling motor AK60-900-NS.

### BASIC FEATURES

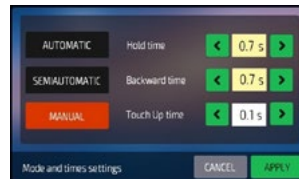
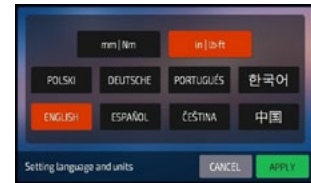
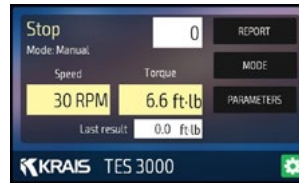
Overall telescopic range:..... 940 - 1480 mm (37,0" - 58,3")  
Extensibility: ..... 520 mm (20,5")  
Handle part length:..... 225 mm (8,9")  
Weight:..... 8 kg (17,6 Lbs)  
Max. torque: ..... 120 Nm (88,5 FtLbs)

## FLEXHOLDER

To work with TES3000 controllers we recommend arm FlexHolder. This connection allows you to create a mobile workstation with an above average performance!



## TES-3000 SOFTWARE



- Friendly interface and large touch screen allows to configure different motor types with their predefined min/max values and to set up required expanding parameters.
- Torque Wizard helps to calculate torque settings based on: %wl reduct, Feed Angle, Mandrel taper, Tube Diameter, Tube Yield (Ultimate tensile strength), Wall Thickness (Gauge, Expansion Length)
- 3 operating modes available: MANUAL: Single expansion, SEMIAUTO: Single expansion with autorevers, AUTO: Expansion with autorevers in endless loop until operator stops
- Configurable expanding timers: reverse rolling time, time between expanding cycles (to move expander from one to another tube), time to expand with maximum rpm in the initial expanding phase
- Other features: Expanding counter, Color status lamps, Metric and imperial units available, Translated to many languages.

## G1000-COOLING

Additional cooling module 24Volt can be purchased to all motor without back D-handle



## TES3000-APLS

Automatic Pneumatic Lubricating System. The system, dedicated and integrated for the 2022 version of TES-3000, dispenses oil drops precisely into the rolls and mandrel. It eliminates the problem of the correct amount of lubrication and reduces tool wear.





# SwiftRoll Series

The Swiftroll robot is a cutting-edge solution designed for simultaneous tube expanding and facing. With three sizes available - XS, XM, and XL - Swiftroll offers versatile capabilities, while the Xm variant focuses specifically on tube expansion.

Based on 6 axis FANUC robot, a special version of TES3000 for CNC – digital controller for speed and expansion managing and KRAIS dual function, dual-gear, 3 KW servo drive. All works under Fanuc R30iB system. SwiftRoll has an overload system in the event of a collision to prevent damages. SwiftRoll is delivered with built-in HMI software and PC laptop with custom CAM software for easy tube sheet programming. SwiftRoll is installed on the convenient steel platform.

As optional we can furnish the robot with: automatic referencing function, vision system and force sensors allow robots to detect force and torque. SwiftRoll can be built with a bigger robot that provides double capacity: bigger reach radius and lifting.



| WORKING RANGE |              |         | STANDARD MOTOR PARAMETERS |                |                |       |
|---------------|--------------|---------|---------------------------|----------------|----------------|-------|
| AXIS NUMBER   | REACH RADIUS | LIFTING | ROLLING SPEED             | ROLLING TORQUE | FACING SPEED   | POWER |
| 6             | 1200 mm      | 20 Kg   | Up to 1000 Rpm            | 102 Nm         | Up to 1000 Rpm | 3 kW  |
|               | 47,00"       | 44 Lbs  |                           | 75 Ft.Lbs      |                |       |

## TES3000 - SEPARATE UNIT



The TES3000 for CNC can also be used as the independent rolling system. Can be used with FlexHolder, telescopic shaft or handheld. And, thanks to the wide range of motor drives, TES3000 for CNC can be used to process expansion of tubes in varies sizes and materials.

## R3000 - NEW DRIVE



Newest range of motors for tube rolling and facing in one. Torque range from 0,5 Nm to 50 Nm and speed from 200 to 3000 Rpm (depends on application).

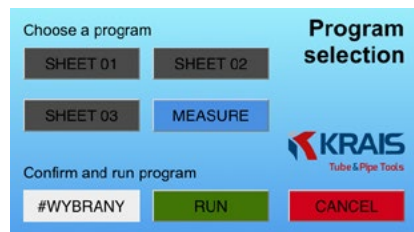
## SWIFTROLL XS



SwiftRoll XS the smallest version of the SwiftRoll. Designed for small cooler manufacturers. With this version, the tube facing is not available. Available motors up to 6000 rpm.

# SwiftRoll X1

## CUSTOM HMI SOFTWARE



The robot is delivered with the pre-installed KRAIS HMI system dedicated exclusively to support of referencing, tube expanding, tube facing and welding tubes to tube sheet.

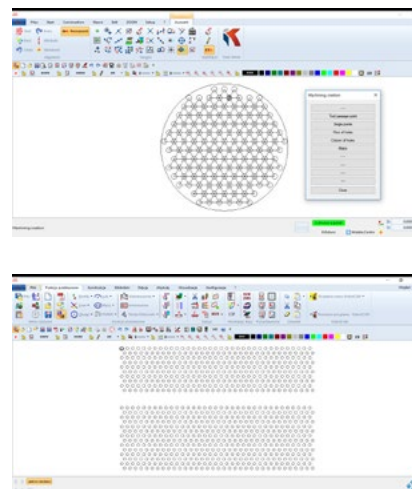
The system has been written to facilitate the operation of the robot and to hide functions that may be unnecessary in the working process or are too advanced at the very beginning of learning.

## INCLUDED CAM SOFTWARE

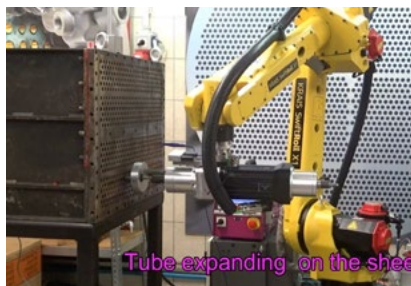
Unique feature delivered as standard is full featured, customized CAM software. In a very short period of time allows creating programs for tube expanding, facing or welding to tube sheet.

Software functions allow measuring all tube sheet parameters based on sheet drawing. The precise definition of tube holes locations is determined in few clicks. Calibration, made by robot's header, joins information from drawing with the real sitting of the tube sheet. The whole process takes minutes.

One of the essential functions of software is a possibility to automatically programming the order of expanding tubes. It is very important to avoid tube sheet deformation while expanding from the top to the bottom or another way around.



## SWIFTROLL IN ACTION



Simultaneous machining of two (!) tube sheets. Both of them were prepared earlier and now they need tube facing and expanding. After an hour setup, all work is done totally automatically.





# Installation Tools

# Tube Hole Gauge

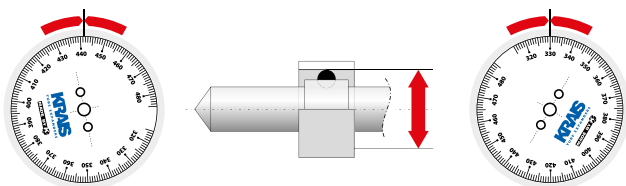
Tube Hole Gauges utilize a precision three-point contact, self-centring system, for measuring both Tube and Tube sheet ID. Our Reversible Dial Plate, allows the user to measure in both inch/decimal and metric units. Our standard adjustable depth is 4" or 8" (101 or 203 mm) dependent on model. We offer additional 8" (203 mm) reach extensions to increase the capacity of these tools for Fin Fan and similar units. All gages are furnished with both setting ring and carrying case.



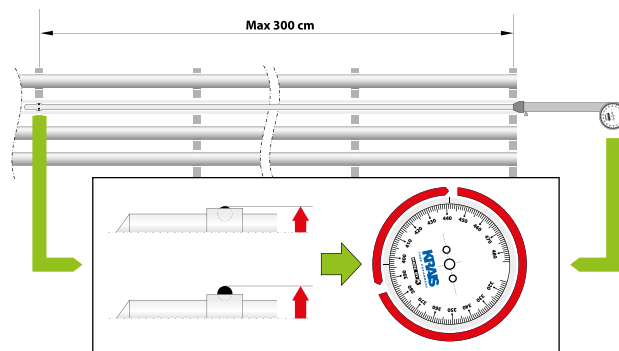
| SIZE*  |       | ID RANGE |       |        |       | TOOL<br>NUMBER | REACH  |       | SETTING<br>RING | MANDREL<br>EXTENSION | BODY<br>EXTENSION |
|--------|-------|----------|-------|--------|-------|----------------|--------|-------|-----------------|----------------------|-------------------|
|        |       | MIN      |       | MAX    |       |                |        |       |                 |                      |                   |
| [INCH] | [MM]  | [INCH]   | [MM]  | [INCH] | [MM]  |                | [INCH] | [MM]  |                 |                      |                   |
| 3/8    | 9,53  | 0,290    | 0,350 | 7,37   | 8,89  | K200-95        | 4      | 101,6 | SR-3/8          | K200-95-ME           | K200-95-BE        |
| 1/2    | 12,70 | 0,350    | 0,450 | 8,89   | 11,43 | K200-127       | 4      | 101,6 | SR-1/2          | K200-127-ME          | K200-127-BE       |
| 5/8    | 15,88 | 0,440    | 0,560 | 11,18  | 14,22 | K200-158       | 4      | 101,6 | SR-5/8          | K200-158-ME          | K200-158-BE       |
| 3/4    | 19,05 | 0,550    | 0,715 | 13,97  | 18,16 | K200-190       | 8      | 203,2 | SR-3/4          | K200-190-ME          | K200-190-BE       |
| 7/8    | 22,23 | 0,675    | 0,840 | 17,15  | 21,34 | K200-222       | 8      | 203,2 | SR-7/8          | K2000-222-ME         | K200-222-BE       |
| 1      | 25,40 | 0,800    | 0,965 | 20,32  | 24,51 | K200-254       | 8      | 203,2 | SR-1            | K200-254-ME          | K200-254-BE       |
| 1 1/4  | 31,75 | 0,950    | 1,170 | 24,13  | 29,72 | K200-317       | 8      | 203,2 | SR-1-1/4        | K200-317-ME          | K200-317-BE       |
| 1 3/8  | 34,93 | 1,085    | 1,295 | 27,56  | 32,89 | K200-350       | 8      | 203,2 | SR-1-3/8        | K200-350-ME          | K200-350-BE       |
| 1 1/2  | 38,10 | 1,240    | 1,450 | 31,50  | 36,83 | K200-381       | 8      | 203,2 | SR-1-1/2        | K200-381-ME          | K200-381-BE       |
| 1 3/4  | 44,45 | 1,476    | 1,685 | 37,49  | 42,80 | K200-444       | 8      | 203,2 | SR-1-3/4        | K200-444-ME          | K200-444-BE       |
| 2      | 50,80 | 1,700    | 1,910 | 43,18  | 48,51 | K200-508       | 8      | 203,2 | SR-2            | K200-508-ME          | K200-508-BE       |
| 2 1/4  | 57,15 | 1,948    | 2,16  | 49,479 | 54,86 | K200-571       | 8      | 203,2 | SR-1-1/4        | K200-571-ME          | K200-571-BE       |
| 2 1/2  | 63,50 | 2,200    | 2,41  | 55,880 | 61,21 | K200-635       | 8      | 203,2 | SR-2-1/2        | K200-635-ME          | K200-635-BE       |
| 3      | 76,20 | 2,660    | 2,87  | 67,564 | 72,90 | K200-762       | 8      | 203,2 | SR-3            | K200-762-ME          | K200-762-BE       |

\* other sizes on request

## FREE GAUGE ADJUSTMENT



## LONG VERSION (UP TO 3M)





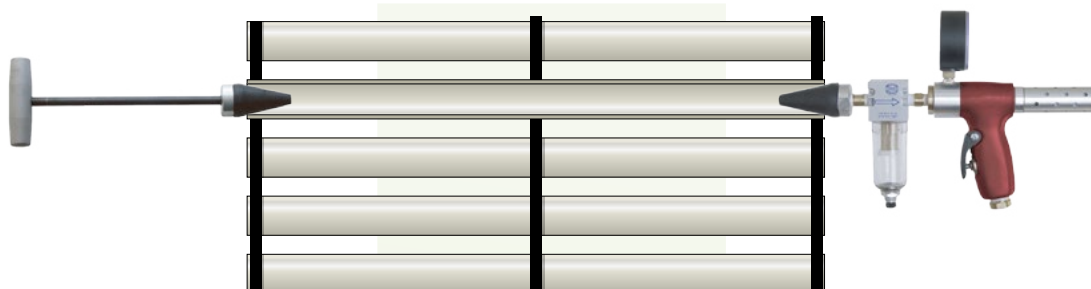
# Vacuum Leak Tester KVLD-3000

The vacuum leak tester KVLD-3000 is a simple, precise method of testing tubes in boilers, condensers, and heat exchangers. It is the fastest, most accurate means of locating leaky tubes for plugging or replacement.

- ▶ Only one tool necessary for testing multiple tube sizes.
- ▶ Built-in easy to read vacuum gauge.
- ▶ Muffled exhaust for quiet operation.
- ▶ Lightweight, easy to use.

## SPECIFICATIONS

- ▶ Cover wide range of tubes with one unit (tube sizes: 1/4" (6,3) to 3" (76,2 mm)).
- ▶ Requires 90 PSI (6,2 bar) compressed air.
- ▶ Air consumption: 26 C.F.M. (720 l/min).
- ▶ Carrying case measures: 16" x 12" x 4" (410 x 300 x 85 mm).
- ▶ Tool weight: 4,4 lbs (1,2 kg).
- ▶ Approximate shipping weight: 6,6 lbs (3,0 kg).

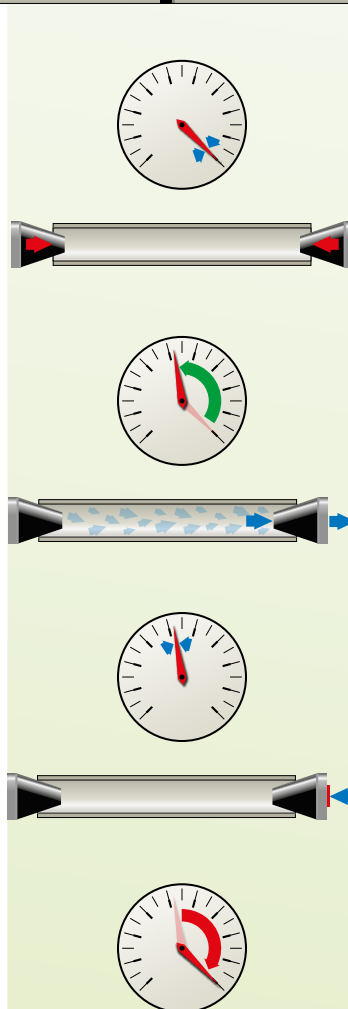


## NOZZLES AVAILABLE

| PART NUMBER | TUBE OD                           |
|-------------|-----------------------------------|
| K-1002      | 1/4" (6,3 mm) - 3/4" (19 mm)      |
| K-1003      | 5/8" (15,9 mm) - 1 1/4" (31,7 mm) |
| K-1004      | 1 1/8" (28,6 mm) - 2" (50,8 mm)   |
| K-1005      | 1 7/8" (47,6 mm) - 3" (76,2 mm)   |

## OPERATING INSTRUCTIONS

1. Seal far end of tube to be tested with "t" handle type tube plug or optional snap type tube plug.
2. Place nozzle of tester into near end of tube.
3. Squeeze trigger of test unit until gauge reaches desired reading.
4. Release trigger and observe gauge.
5. A steady reading on gauge indicates no leaks.
6. Move to next tube and repeat.





# Basic installation tools

## TEF – Tube End Facer



Typical application for TEF is the tube trimming of heat exchanger, condenser and chiller tubes to a uniform 1/8" (3 mm) tube projection after tube rolling. This will fit into all electric and pneumatic power tools equipped with a 1/2" Jacobs chuck. The tool is fitted with a three slot collar for precision adjustment and features a very simple mechanism for tool bit replacement. TEF is equipped with a hex shank as standard.

Work best with KDM - Krais Drilling Machine.



| TUBE OD |      | TOOL NO.        | PILOT RANGE | SPARE BITS                  |                    |
|---------|------|-----------------|-------------|-----------------------------|--------------------|
| [INCH]  | [MM] |                 |             | NON FERROUS OR CARBON STEEL | STAINLESS          |
| 3/8"    | 9,50 | <b>TEF-375</b>  | 16 – 20     | <b>TEF-376</b>              | <b>TEF-376-SS</b>  |
| 1/2"    | 12,7 | <b>TEF-500</b>  | 16 – 20     | <b>TEF-506</b>              | <b>TEF-506-SS</b>  |
| 5/8"    | 15,8 | <b>TEF-625</b>  | 14 – 20     | <b>TEF-626</b>              | <b>TEF-626-SS</b>  |
| 3/4"    | 19,0 | <b>TEF-750</b>  | 12 – 20     | <b>TEF-756</b>              | <b>TEF-756-SS</b>  |
| 7/8"    | 22,2 | <b>TEF-875</b>  | 14 – 18     | <b>TEF-876</b>              | <b>TEF-876-SS</b>  |
| 1"      | 25,4 | <b>TEF-1000</b> | 10 – 18     | <b>TEF-1006</b>             | <b>TEF-1006-SS</b> |
| 1-1/4"  | 31,7 | <b>TEF-1250</b> | 10 – 18     | <b>TEF-1256</b>             | <b>TEF-1256-SS</b> |
| 1-1/2"  | 38,1 | <b>TEF-1500</b> | 10 – 18     | <b>TEF-1506</b>             | <b>TEF-1506-SS</b> |
| 2"      | 50,8 | <b>TEF-2000</b> | 10 – 18     | <b>TEF-2006</b>             | <b>TEF-2006-SS</b> |
| 2-1/2"  | 63,5 | <b>TEF-2500</b> | 10 – 18     | <b>TEF-2506</b>             | <b>TEF-2506-SS</b> |

## Tool for Serrating Tube Sheet



Portable, self-centering tool for grooving tube sheet. Unique single-piece mandrel with built-in rollers in the part that operates directly in the hole allows obtaining a perfect surface, free from burrs and flashes. The latter was formed with the previous designs during the friction of the mandrel against the walls of the hole - now, it is eliminated through the use of rollers - the mandrel rolls over the walls of the hole. Owing to the lack of friction the life of the tool has grown very significantly. As an option, the tool can be delivered with a special channel conducted inside the mandrel. Channel serving the purpose of feeding the cooling medium directly through the tool cutter, this having an enormous impact on the life of the cutter and helping in rinsing out chips during the work.

Grooving tools can be used both on portable and stationary multiradial drills. They also find their application on CNC machine tools.

JGS grooving tools are manufactured within a broad range of sizing: from 3/8" (9.52 mm) up to 4" (101.6 mm), in both imperial and metric versions. As a standard, the tools have an adjustment system for channel cutting reach, 22.2 mm to 54.0 mm (as counted from the bottom face to the internal edge of the channel being cut).

Work best with KDM - Krais Drilling Machine.



### CUTTER BITS



Example of cutter bits, available as optional.

### NOTE!

For tube sheet holes bigger up to 0,25 mm than tube OD the tailor-made mandrel should be considered. Hole bigger more than 0,25 mm may create a damage of the tool mandrel or drilling machine!

### IMPERIAL VERSION TOOLS

| Tool No.        | Tube OD | Tool Bits (spacing) |                  |                  |
|-----------------|---------|---------------------|------------------|------------------|
|                 | [inch]  | 1/8 x 1/4 x 1/8"    | 1/8 x 3/8 x 1/8" | 1/8 x 1/8 x 1/8" |
| <b>JGS-375</b>  | 3/8"    | ST-3703-S           | ST-3703          | ST-3703-SPEC     |
| <b>JGS-500</b>  | 1/2"    | ST-5003-S           | ST-5003          | ST-5003-SPEC     |
| <b>JGS-625</b>  | 5/8"    | ST-6203-S           | ST-6203          | ST-6203-SPEC     |
| <b>JGS-750</b>  | 3/4"    | ST-7503-S           | ST-7503          | ST-7503-SPEC     |
| <b>JGS-875</b>  | 7/8"    | ST-7503-S           | ST-7503          | ST-7503-SPEC     |
| <b>JGS-1000</b> | 1"      | ST-7503-S           | ST-7503          | ST-7503-SPEC     |
| <b>JGS-1250</b> | 1-1/4"  | ST-7503-S           | ST-7503          | ST-7503-SPEC     |
| <b>JGS-1500</b> | 1-1/2"  | ST-7503-S           | ST-7503          | ST-7503-SPEC     |
| <b>JGS-2000</b> | 2"      | ST-7503-S           | ST-7503          | ST-7503-SPEC     |
| <b>JGS-2500</b> | 2-1/2"  | ST-7503-S           | ST-7503          | ST-7503-SPEC     |

### METRIC VERSION TOOLS

| Tool No.           | Tube OD | Tool Bits (spacing) |              |              |
|--------------------|---------|---------------------|--------------|--------------|
|                    | [mm]    | 3 x 6 x 3 mm        | 3 x 9 x 2 mm | 3 x 3 x 3 mm |
| <b>JGS-375-10</b>  | 10,00   | GS-106              | GS-109       | GS-103       |
| <b>JGS-500-12</b>  | 12,00   | GS-206              | GS-209       | GS-203       |
| <b>JGS-625-16</b>  | 16,00   | GS-306              | GS-309       | GS-303       |
| <b>JGS-750-20</b>  | 20,00   | GS-406              | GS-409       | GS-403       |
| <b>JGS-875-22</b>  | 22,00   | GS-406              | GS-409       | GS-403       |
| <b>JGS-1000-25</b> | 25,00   | GS-406              | GS-409       | GS-403       |
| <b>JGS-1250-32</b> | 32,00   | GS-406              | GS-409       | GS-403       |
| <b>JGS-1500-38</b> | 38,00   | GS-406              | GS-409       | GS-403       |
| <b>JGS-2000-51</b> | 51,00   | GS-406              | GS-409       | GS-403       |

Other sizes and bits on request.

### TOOL BIT SPACING



# MWR-JGS Mini Grooving Tool

First in the world, quick, powerful, yet handheld machine for serrating tube sheet in heat exchangers, boiler drums, FinFan coolers and other tubular vessels that need grooves in the tube sheet. Tool uses one cutting bit for cut any material tubes.

This unique system safely and quickly produces grooves in under 20 second for 1" tube.

Can be used as a tool for maintenance companies as well as the production tool with our dual pneumatic locking system and pneumatic cooling and lubricating module.

| CUTTING RANGE  |            | FREE SPEED |       | POWER       |        | TORQUE      |      |
|----------------|------------|------------|-------|-------------|--------|-------------|------|
| Up to 101,6 mm |            | 100 Rpm    |       | 1,3 Hp      |        | 140 Nm      |      |
| Up to 4"       |            |            |       |             |        | 105 Ft.Lbs  |      |
| AIR USE        |            | BODY WIDTH |       | BODY HEIGHT |        | BODY WEIGHT |      |
| 55 cfm         | 1,3 m3/min | 2,32"      | 59 mm | 13,1"       | 335 mm | 17,5 Lbs    | 8 kg |



## MWR-JGS ON REGULAR TUBE SHEET



On standard heat exchangers machine locks onto two shafts on the adjacent holes. The locking plate is manufactured according to the tube hole pitch to ensure precise tool alignment.

## MWR-JGS REACTION PLATES



Standard locking plate has 2 reaction shafts, located from each site of the spindle. We can also supply locking plate that has locking shaft located on one side of the spindle and can be rotated through 180 degrees to accommodate partition plates, channel heads etc.

## MWR-JGS E

MWR-JGS E is the electric version of the Mini Grooving Tool. The standard machine covers the same tube sizes. The electric motor, made by Makita, has a 3 stage planetary gear box manufactured by KRAIS. It has variable speed control and produces enormous torque. It is interchangeable with our pneumatic drive and can be purchased at any time.

|             |                     |
|-------------|---------------------|
| Free Speed  | 115 RPM             |
| Power       | 750 W               |
| Torque      | 368 Nm (280 Ft.Lbs) |
| Feed Stroke | 25 mm (1")          |



Full range of the grooving tools from 1/2" to 4"



The rollers over the circumference of the mandrel allow to achieve a perfect surface of the hole.

# Grooving tools for MWR-JGS



| TUBE SIZE | TOOL NUMBER           | TOOL BIT<br>1/8X1/4X1/8" | TOOL BIT 3X6X3<br>MM | TOOL BIT<br>SPRING | MANDREL       | TURNING<br>ROLS |
|-----------|-----------------------|--------------------------|----------------------|--------------------|---------------|-----------------|
| 1/2"      | <b>JGS-MWR-127</b>    | ST-5003-S                | GS-206               | ST-5011            | GS-MWR-127    | -               |
| 5/8"      | <b>JGS-MWR-158</b>    | ST-6203-S                | GS-306               | ST-6211            | GS-MWR-158    | -               |
| 16 mm     | <b>JGS-MWR-160</b>    | ST-6203-S                | GS-306               | ST-6211            | GS-MWR-160    | -               |
| 3/4"      | <b>JGS-MWR-190-R</b>  | ST-7503-S                | GS-406               | ST-7511            | GS-MWR-190-R  | STR-3-55        |
| 20 mm     | <b>JGS-MWR-200-R</b>  | ST-7503-S                | GS-406               | ST-7511            | GS-MWR-200-R  | STR-4-55        |
| 22 mm     | <b>JGS-MWR-220-R</b>  | ST-7503-S                | GS-406               | ST-7511            | GS-MWR-220-R  | STR-4-55        |
| 7/8"      | <b>JGS-MWR-222-R</b>  | ST-7503-S                | GS-406               | ST-7511            | GS-MWR-222-R  | STR-5-55        |
| 25 mm     | <b>JGS-MWR-250-R</b>  | ST-7503-S                | GS-406               | ST-7511            | GS-MWR-250-R  | STR-5-55        |
| 1"        | <b>JGS-MWR-254-R</b>  | ST-7503-S                | GS-406               | ST-7511            | GS-MWR-254-R  | STR-5-55        |
| 1-1/8"    | <b>JGS-MWR-285-R</b>  | ST-7503-S                | GS-406               | ST-7511            | GS-MWR-285-R  | STR-5-55        |
| 1-1/4"    | <b>JGS-MWR-317-R</b>  | ST-7503-S                | GS-406               | ST-7511            | GS-MWR-317-R  | STR-5-55        |
| 1-1/2"    | <b>JGS-MWR-381-R</b>  | ST-7503-S                | GS-406               | ST-7511            | GS-MWR-381-R  | STR-5-55        |
| 1-3/4"    | <b>JGS-MWR-444-R</b>  | ST-7503-S                | GS-406               | ST-7511            | GS-MWR-444-R  | STR-5-55        |
| 2"        | <b>JGS-MWR-508-R</b>  | ST-7503-S                | GS-406               | ST-7511            | GS-MWR-508-R  | STR-5-55        |
| 51"       | <b>JGS-MWR-510-R</b>  | ST-7503-S                | GS-406               | ST-7511            | GS-MWR-510-R  | STR-5-55        |
| 2-1/4"    | <b>JGS-MWR-751-R</b>  | ST-7503-S                | GS-406               | ST-7511            | GS-MWR-751-R  | STR-5-55        |
| 2-1/2"    | <b>JGS-MWR-635-R</b>  | ST-7503-S                | GS-406               | ST-7511            | GS-MWR-635-R  | STR-5-55        |
| 2-3/4" *  | <b>JGS-MWR-698-R</b>  | ST-7503-S                | GS-406               | ST-7511            | GS-MWR-698-R  | STR-5-55        |
| 3" *      | <b>JGS-MWR-762-R</b>  | ST-7503-S                | GS-406               | ST-7511            | GS-MWR-762-R  | STR-5-55        |
| 4" *      | <b>JGS-MWR-1002-R</b> | ST-7503-S                | GS-406               | ST-7511            | GS-MWR-1002-R | STR-5-55        |

\* tool needs speed reducer

# MiniDrill

MiniDrill is a unique machining platform designed to safely perform multiple machining operations on heat exchangers, boilers and similar thermal exchange equipment. Designed with operator safety in mind, this system can drill, ream, bore and even re-machine serrations in steam drums quickly and safely. With a 80 mm (3.150") travel, this tool is ideally suited for the majority of plant equipment. The system is fully torque reacted with 2 clamping arms that are independent of one another and can accommodate most pitch configurations. Once locked into the tubes, the MiniDrill is extremely stable.



## AVAILABLE TOOLS WORKING WITH MINIDRILL



### WALL REDUCING

Tube wall reducing head with carbide inserts.



### DRILLING

Drill for machining holes in tube plugs before removing them with our special plug removal tool.



### REAMMING

Safely ream tube sheets.



### BORING HEAD

Boring head to machine heavy wall boiler tubes, safely and efficiently prior to collapsing through the drum.



## OTHER AVAILABLE ACCESSORIES

### MINIDRILL WITH FAST CLAMPING

MiniDrill with the fast pneumatic clamping system is ideal for manufacturing plants that make large amounts of work on tubes and pipes. It offers rapid tube to tube cycle time, increased productivity with little operator fatigue.



## EXAMPLE TOOL APPLICATION



Reducing tube wall on a 6" thick tube sheet prior to punching.



# MicroDrill

## Specialized machine for precise plug removal

The MicroDrill is a compact tool for drilling, reaming, boring, and removing taper plugs—welded or non-welded—from heat exchangers. Its low-profile design allows mounting just 24 mm from the shell or partition plate, ensuring high accessibility in tight spaces. Built for operator safety and reliable performance.

### KEY FEATURES

#### 60 MM (2.4") TOOL TRAVEL

Covers most heat exchanger tube sheets; suitable for various equipment types.

#### STABLE AND ACCURATE

Firm clamping ensures precise, repeatable machining.

#### TORQUE-REACTIVE PLATFORM

Absorbs machining forces, improving safety and control.

#### INDEPENDENT CLAMPING SHAFTS

Two standard shafts (optional third) accommodate different tube pitch layouts.

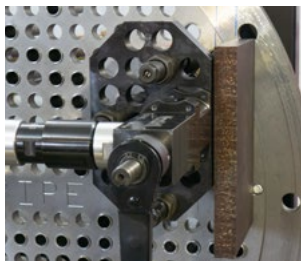
#### OPERATOR SAFETY

Designed for quick, safe plug removal with minimal risk.



| WORKING RANGE  |             | LOCKING RANGE            |       | POWER       |        | TORQUE                                              |        |
|----------------|-------------|--------------------------|-------|-------------|--------|-----------------------------------------------------|--------|
| 12,5– 38,0 mm  |             | According to the drawing |       | 0,98 Hp     |        | 18 Nm / 300 RPM<br>(55 Nm / 100 RPM*)               |        |
| 0,492 – 1,496" |             |                          |       |             |        | 13,28 Ft-lbs / 300 RPM<br>(40,57 Ft-lbs / 100 RPM*) |        |
| AIR USE        |             | BODY WIDTH               |       | BODY HEIGHT |        | BODY LENGTH                                         |        |
| 17 cfm         | 0,48 m³/min | 1,73"                    | 44 mm | 10,82"      | 275 mm | 12,2"                                               | 310 mm |

\*with 3x Speed Reducer



#### RIGID LOCKING

On standard heat exchangers, MicroDrill machine secures itself in the tube sheet using a locking plate and two (optionally three) clamping shafts. The locking plate is specifically manufactured to match the tube hole pitch, ensuring perfect alignment for accurate and stable machining.



#### UNIVERSAL REACTION PLATE

The MicroDrill includes a locking plate and three shafts. The universal plate design allows the use of two shafts on one side for access to the last row of holes. The plate can also rotate 180 degrees to fit partition plates, channel heads, and other components.

### AVAILABLE TOOLS



#### STWRPH

Weld removal head for tube plugs



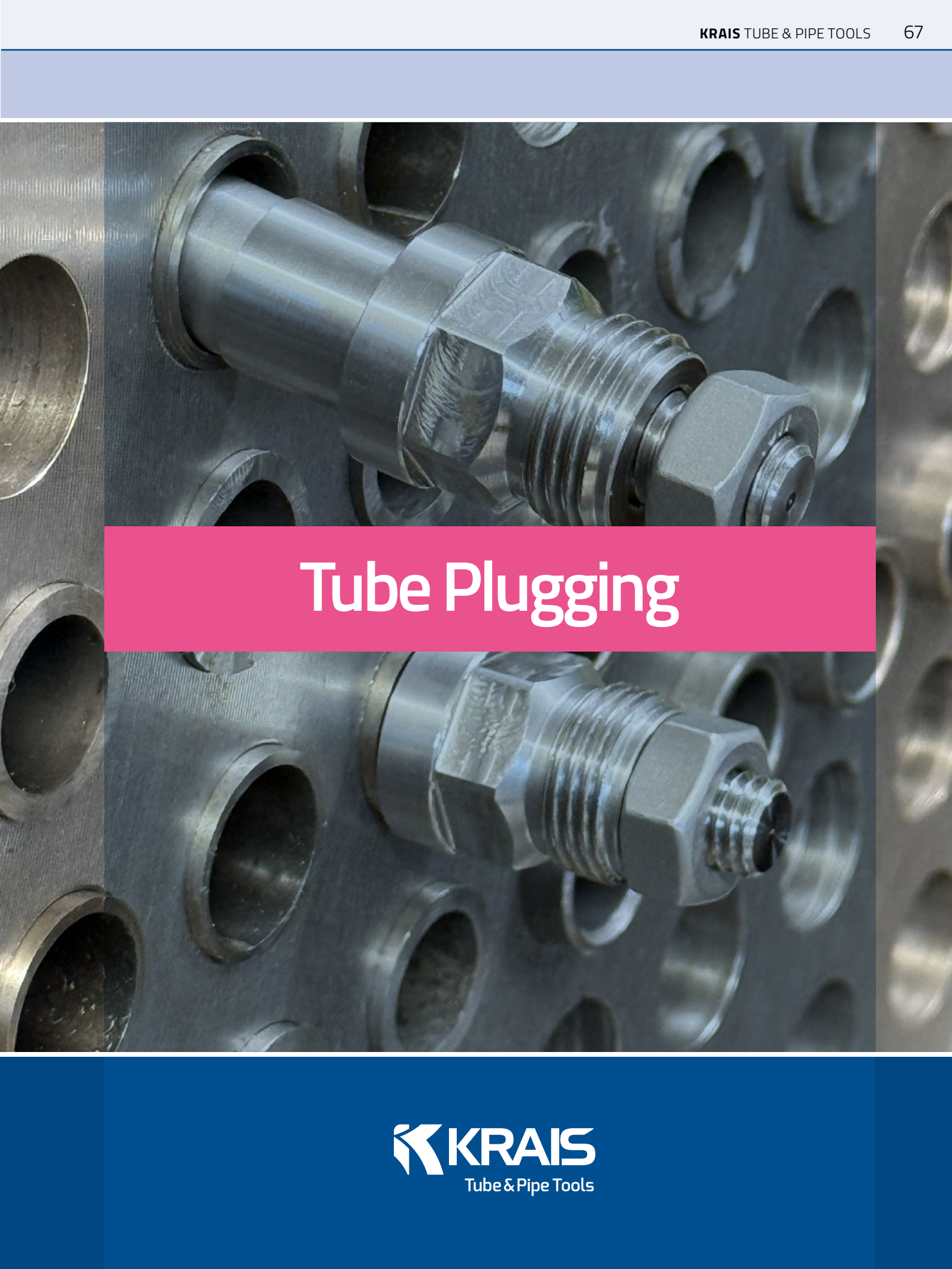
#### WELDON 25

Drill bit holder for ER-25 collets



#### MPP-381

Manual tube plug puller up to 1-1/2" plugs



# Tube Plugging

# KRAIS SMART PLUGGING SYSTEM

## ➔ THE CHALLENGE

Traditional plugging of damaged tubes in heat exchangers and condensers requires maintaining expensive, extensive inventory. For every tube outer diameter (OD), you must stock separate plugs for every possible wall thickness (BWG). This ties up capital, consumes warehouse space, and delays reaction time during critical failures.

## ➔ THE NEW STANDARD

KRAIS changes the rules. We have developed a system based on precision reaming of the tube interior to a fixed, pre-defined dimension. Consequently, for a given tube diameter, you only need **one single plug size**, regardless of the tube's wall thickness (BWG).

## ➔ KEY BENEFITS

**Inventory Reduction:** instead of dozens of size variations, you stock only one plug type per tube diameter.

**Instant Readiness:** eliminate lead times for non-standard plug sizes during emergencies.

**Cost Efficiency:** reduced frozen capital and minimized risk of obsolete stock.

**Reliability:** precision surface preparation ensures a seal integrity that outperforms standard methods.

### MINIMILL301 SPS

A compact, pneumatic machine designed for the precision reaming of tube ends. The system removes corrosion, deposits, and pitting, calibrating the Internal Diameter (ID) to perfectly match the universal KRAIS T\_APPLE SPS plugs.

- **Durability:** Cutting heads manufactured from M2 high-speed steel or steel with 6% cobalt.
- **Reusability:** Tools can be resharpened multiple times, significantly lowering operational costs.
- **Performance Options:** Optional Oerlikon oxide coatings available for machining hard and exotic materials.



### T\_APPLE SPS PLUGS

Designed specifically for the KRAIS Smart Plugging System (SPS), this universal plug eliminates the need for gauge-specific sizing. By mating with the precision-reamed bore created by the MiniMill-301 SPS, a single plug size securely seals any wall thickness for a given tube outer diameter (OD)

- **Universal Compatibility:** Replaces gauge-specific plugs with one single item per Tube OD, drastically reducing inventory.
- **Torque-Controlled Installation:** Ensures consistent radial expansion without tube deformation.
- **Simplified Tooling:** Installs with a standard manual torque wrench; no hydraulic equipment required.
- **Engineered Reliability:** Delivers a secure seal capable of withstanding high thermal cycling and vibration.



| WORKING RANGE     |                | FEED STROKE |        | POWER       | FREE SPEED | TORQUE      |           |
|-------------------|----------------|-------------|--------|-------------|------------|-------------|-----------|
| APPLICATION RANGE | LOCKING RANGE  |             |        |             |            |             |           |
| 12,4 – 25,4 mm    | 12,4 – 24,0 mm | 25 mm       | 0,787» | 1,3 HP      | 300 RPM    | 43 Nm       | 32 ft.lbs |
| 0,488 – 1,000"    | 0,488 – 0,945" |             |        |             |            |             |           |
| AIR USE           |                | BODY WIDTH  |        | BODY HEIGHT |            | BODY WEIGHT |           |
| 55 cfm            | 1.3 m³/min     | 2.32"       | 59 mm  | 13.1"       | 335 mm     | 15.4 Lbs    | 7 kg      |



### SPS PLUGS SELECTION TABLE

Please measure your tube ID and select a proper material (XX): CS for Carbon Steel, BR for Admiralty Brass, SS for Stainless Steel, CN for Cu Nickel

| TUBE OD |       | WALL | TUBE ID |       | PLUG NR     | TOOL NR   |
|---------|-------|------|---------|-------|-------------|-----------|
| [INCH]  | [MM]  |      | [INCH]  | [MM]  |             |           |
| 3/4"    | 19,05 | 18   | 0,652   | 16,56 | SPS-1690-XX | SPST-1700 |
| 7/8"    | 22,22 | 18   | 0,777   | 19,74 | SPS-2010-XX | SPST-2020 |
| 1"      | 25,4  | 18   | 0,902   | 22,91 | SPS-2300-XX | SPST-2330 |

### TOOL REAMING RANGE TABLE

Please check before order if your measured tube ID fits in tool reaming range.

| TOOL NR   | TUBE OD |       | BWG   | [INCH] |       | [MM]  |       | CUT LENGTH |
|-----------|---------|-------|-------|--------|-------|-------|-------|------------|
|           | [INCH]  | [MM]  |       | MIN    | MAX   | MIN   | MAX   |            |
| SPST-1700 | 3/4"    | 19,05 | 12-18 | 0,650  | 0,670 | 13,50 | 16-56 | 25 mm      |
| SPST-2020 | 7/8"    | 22,22 | 12-18 | 0,780  | 0,800 | 16,60 | 19,74 | 25 mm      |
| SPST-2330 | 1"      | 25,4  | 10-18 | 0,900  | 0,920 | 18,60 | 22,90 | 25 mm      |

### AVAILABLE LOCKING JAWS

| JAWS      | RANGE [MM] |       | RANGE [INCH] |       | SPRING  |
|-----------|------------|-------|--------------|-------|---------|
|           | MIN        | MAX   | MIN          | MAX   |         |
| 201MM#36  | 12,40      | 14,50 | 0,488        | 0,571 | DW-11   |
| 203 MM#36 | 13,90      | 16,00 | 0,547        | 0,630 | DW-12,5 |
| 205 MM#36 | 15,90      | 18,00 | 0,626        | 0,709 | DW-15,5 |
| 207 MM#36 | 16,90      | 19,00 | 0,665        | 0,748 |         |
| 209 MM#36 | 18,90      | 21,00 | 0,744        | 0,827 |         |
| 211 MM#36 | 19,90      | 22,00 | 0,783        | 0,866 |         |
| 213 MM#36 | 20,90      | 23,00 | 0,823        | 0,906 |         |
| 214 MM#36 | 21,90      | 24,00 | 0,862        | 0,944 |         |

### PROPER TORQUE



A torque wrench should be used to ensure correct plug installation.

### EASY PLUG REMOVAL



A dedicated slide hammer, connected to the threaded part of the plug, allows safe extraction of the plug for tube inspection or replacement

### SAFE PLUGGING PROCEDURE (STEP-BY-STEP)

1. MEASURE: use the **KRAIS Tube Hole Gauge** to precisely determine the tube condition and dimension prior to machining.
2. PRESSURE RELIEF (CRITICAL): before plugging, the tube must be pierced to relieve internal pressure. Use the **ORTCC (One Revolution Tube Cutter type C)**. This ensures operator safety and procedural compliance.
3. REAM: use the **MiniMill-301 SPS** to machine the tube interior to the required dimension.
4. PLUG: install the universal **KRAIS T\_APPLE SPS** plug.

### THE STARTER KIT INCLUDES:

- ▶ MiniMill-301 SPS Machine.
- ▶ One selected reaming tool (for 3/4", 7/8", or 1" tubes).

Additional tools available as options.

Universal plugs (SPS series) are sized and sold separately based on specific plant requirements.



### KRAIS TUBE HOLE GAUGE K200

Choosing the correct plug size is essential for optimal performance, reliability, and safety of KRAIS tube plugs. Use the detailed sizing chart to determine the appropriate plug dimensions, ensuring compatibility and precise fitting within your specific tubing system and operational requirements



### ORTCC - ONE REVOLUTION TUBE CUTTER VERSION C

One Revolution Tube Cutter version C is used for piercing heavy wall, carbon steel tubes for ventilation prior to plugging the leaky tubes. Delivered in two length version 6" and 12".



# Tube Plugs T\_APPL HEP Series

## High pressure plugs for general heat exchangers applications

The KRAIS T\_APPL HEP series tube plugs are a specialized, mechanical plug engineered for use in a wide range of heat exchangers. Designed for high-pressure environments, it offers secure sealing without damaging the tube wall, even under severe thermal stress or vibration.

### KEY ADVANTAGES

- Torque-controlled installation - ensures repeatable, consistent radial expansion with no tube deformation.
- Installation requires only a manual torque wrench. No high pressure pumps, no hydraulic oil leaks.
- Engineered expansion delivers a reliable mechanical seal, even under high thermal cycling and vibration.

### PROPER TORQUE

### EASY PLUG REMOVAL



A torque wrench should be used to ensure correct plug installation. Recommendation: T\_APPL TW#100



A dedicated slide hammer, connected to the threaded part of the plug, allows safe extraction of the plug for tube inspection or replacement



### TOOL SELECTION TABLE

Please measure your tube ID and select a proper material (XX): CS for Carbon Steel, BR for Admiralty Brass, SS for Stainless Steel, CN for Cu Nickel

| TUBE OD |       | WALL  | TUBE ID |       | TOOL NR     |
|---------|-------|-------|---------|-------|-------------|
| [INCH]  | [MM]  | [BWG] | [INCH]  | [MM]  |             |
| 5/8"    | 15,88 | 18    | 0,527   | 13,39 | HEP-1351-XX |
|         |       | 19    | 0,541   | 13,74 | HEP-1422-XX |
|         |       | 20    | 0,555   | 14,10 |             |
|         |       | 21    | 0,561   | 14,25 | HEP-1483-XX |
|         |       | 22    | 0,569   | 14,45 |             |
| 3/4"    | 19,05 | 12    | 0,532   | 13,51 | HEP-1351-XX |
|         |       | 13    | 0,560   | 14,22 | HEP-1422-XX |
|         |       | 14    | 0,584   | 14,83 | HEP-1483-XX |
|         |       | 15    | 0,606   | 15,39 | HEP-1539-XX |
|         |       | 16    | 0,620   | 15,75 |             |
|         |       | 17    | 0,634   | 16,10 | HEP-1610-XX |
|         |       | 18    | 0,652   | 16,56 | HEP-1656-XX |
|         |       | 19    | 0,666   | 16,92 | HEP-1691-XX |
|         |       | 20    | 0,680   | 17,27 |             |
|         |       | 21    | 0,686   | 17,42 | HEP-1762-XX |
|         |       | 22    | 0,694   | 17,63 |             |
|         |       | 7/8"  | 22,22   | 12    | 0,657       |
| 13      | 0,685 |       |         | 17,40 | HEP-1762-XX |
| 14      | 0,709 |       |         | 18,01 | HEP-1803-XX |

| TUBE OD |       | WALL  | TUBE ID |       | TOOL NR     |
|---------|-------|-------|---------|-------|-------------|
| [INCH]  | [MM]  | [BWG] | [INCH]  | [MM]  |             |
| 7/8"    | 22,22 | 15    | 0,731   | 18,57 | HEP-1853-XX |
|         |       | 16    | 0,745   | 18,92 | HEP-1892-XX |
|         |       | 17    | 0,759   | 19,28 |             |
|         |       | 18    | 0,777   | 19,74 | HEP-1973-XX |
|         |       | 19    | 0,791   | 20,09 |             |
|         |       | 20    | 0,805   | 20,45 | HEP-2044-XX |
|         |       | 21    | 0,811   | 20,60 | HEP-2080-XX |
|         |       | 22    | 0,819   | 20,80 |             |
| 1"      | 25,4  | 12    | 0,782   | 19,86 | HEP-1973-XX |
|         |       | 13    | 0,810   | 20,57 | HEP-2044-XX |
|         |       | 14    | 0,834   | 21,18 | HEP-2184-XX |
|         |       | 15    | 0,856   | 21,74 | HEP-2174-XX |
|         |       | 16    | 0,870   | 22,10 |             |
|         |       | 17    | 0,884   | 22,45 | HEP-2245-XX |
|         |       | 18    | 0,902   | 22,91 | HEP-2236-XX |
|         |       | 19    | 0,916   | 23,27 | HEP-2326-XX |
|         |       | 20    | 0,930   | 23,62 |             |
|         |       | 21    | 0,963   | 24,46 | HEP-2397-XX |
|         |       | 22    | 0,944   | 23,98 |             |

### TOOL EXPANSION RANGE TABLE

Please check before ordering if your measured ID fits within plugs range.

| TOOL NR     | [INCH] |       | [MM]  |       |
|-------------|--------|-------|-------|-------|
|             | MIN    | MAX   | MIN   | MAX   |
| HEP-1351-XX | 0,530  | 0,550 | 13,46 | 13,97 |
| HEP-1422-XX | 0,550  | 0,570 | 13,97 | 14,48 |
| HEP-1483-XX | 0,570  | 0,590 | 14,48 | 14,99 |
| HEP-1539-XX | 0,610  | 0,630 | 15,49 | 16,00 |
| HEP-1610-XX | 0,630  | 0,650 | 16,00 | 16,51 |
| HEP-1656-XX | 0,650  | 0,670 | 16,51 | 17,02 |
| HEP-1691-XX | 0,670  | 0,690 | 17,02 | 17,53 |
| HEP-1762-XX | 0,690  | 0,710 | 17,53 | 18,03 |
| HEP-1803-XX | 0,710  | 0,730 | 18,03 | 18,54 |
| HEP-1853-XX | 0,730  | 0,750 | 18,54 | 19,05 |
| HEP-1892-XX | 0,750  | 0,770 | 19,05 | 19,56 |
| HEP-1973-XX | 0,780  | 0,800 | 19,81 | 20,32 |
| HEP-2044-XX | 0,800  | 0,820 | 20,32 | 20,83 |
| HEP-2080-XX | 0,820  | 0,840 | 20,83 | 21,34 |
| HEP-2184-XX | 0,840  | 0,860 | 21,34 | 21,84 |
| HEP-2174-XX | 0,860  | 0,880 | 21,84 | 22,35 |
| HEP-2245-XX | 0,880  | 0,900 | 22,35 | 22,86 |
| HEP-2236-XX | 0,900  | 0,920 | 22,86 | 23,37 |
| HEP-2326-XX | 0,920  | 0,940 | 23,37 | 23,88 |
| HEP-2397-XX | 0,940  | 0,960 | 23,88 | 24,38 |

# Tube Plugs T\_APPL FFP Series

## High pressure plugs for applications in fin fan air-cooled heat exchangers (ACHE)

The KRAIS T\_APPL FFP series tube plugs are a specialized, mechanical plug engineered for use in air-cooled fin fan heat exchangers. Designed for high-pressure environments, it offers secure sealing without damaging the tube wall, even under severe thermal stress or vibration. Unlike general-purpose plugs, the T\_APPL is designed for difficult-to-reach tube sheet locations, especially where compact water box openings and restricted visibility are common.

### KEY ADVANTAGES

- Torque-controlled installation - ensures repeatable, consistent radial expansion with no tube deformation.
- Installation requires only a manual torque wrench. No high pressure pumps, no hydraulic oil leaks.
- The long-reach Push-in Spanner enables easy access in deep or narrow configurations in fin fan systems.
- Engineered expansion delivers a reliable mechanical seal, even under high thermal cycling and vibration.



### PROPER TORQUE



A torque wrench should be used to ensure correct plug installation - only precise torque application can achieve reliable and leak-tight tube sealing. Recommendation: T\_APPL TW#100

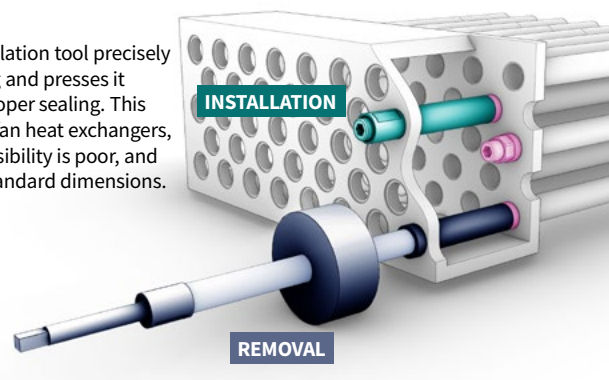
### EASY PLUG REMOVAL



A dedicated slide hammer, connected to the threaded part of the plug, allows safe extraction of the plug for tube inspection or replacement

### PUSH-IN SPANNER

A specially designed installation tool precisely positions the T\_APPL plug and presses it into the tube to ensure proper sealing. This solution is tailored for fin fan heat exchangers, where access is limited, visibility is poor, and tool reach must exceed standard dimensions.



### TOOL SELECTION TABLE

Please measure your tube ID and select a proper material (XX): CS for Carbon Steel, BR for Admiralty Brass, SS for Stainless Steel, CN for Cu Nickel

| TUBE OD |       | WALL  | TUBE ID |       | TOOL NR     |
|---------|-------|-------|---------|-------|-------------|
| [INCH]  | [MM]  | [BWG] | [INCH]  | [MM]  |             |
| 7/8"    | 22,22 | 15    | 0,731   | 18,57 | FFP-1853-xx |
|         |       | 16    | 0,745   | 18,92 | FFP-1892-xx |
|         |       | 17    | 0,759   | 19,28 |             |
|         |       | 18    | 0,777   | 19,74 | FFP-1973-xx |
|         |       | 19    | 0,791   | 20,09 | FFP-2044-xx |
|         |       | 20    | 0,805   | 20,45 |             |
|         |       | 21    | 0,811   | 20,60 | FFP-2080-xx |
|         |       | 22    | 0,819   | 20,80 |             |

| TUBE OD |       | WALL  | TUBE ID |       | TOOL NR     |
|---------|-------|-------|---------|-------|-------------|
| [INCH]  | [MM]  | [BWG] | [INCH]  | [MM]  |             |
| 1"      | 25,4  | 10    | 0,732   | 18,59 | FFP-1853-xx |
|         |       | 11    | 0,760   | 19,30 | FFP-1892-xx |
|         |       | 12    | 0,782   | 19,86 | FFP-1973-xx |
|         |       | 13    | 0,810   | 20,57 | FFP-2044-xx |
|         |       | 14    | 0,834   | 21,18 | FFP-2184-xx |
|         |       | 15    | 0,856   | 21,74 | FFP-2174-xx |
|         |       | 16    | 0,870   | 22,10 |             |
|         |       | 17    | 0,884   | 22,45 | FFP-2245-xx |
|         |       | 18    | 0,902   | 22,91 | FFP-2236-xx |
|         |       | 19    | 0,916   | 23,27 | FFP-2326-xx |
| 20      | 0,930 | 23,62 |         |       |             |

### TOOL EXPANSION RANGE TABLE

Please check before order if your measured ID fits within plugs range.

| TOOL NR     | [INCH] |       | [MM]  |       |
|-------------|--------|-------|-------|-------|
|             | MIN    | MAX   | MIN   | MAX   |
| FFP-1853-XX | 0,730  | 0,750 | 18,54 | 19,05 |
| FFP-1892-XX | 0,750  | 0,770 | 19,05 | 19,56 |
| FFP-1973-XX | 0,780  | 0,800 | 19,81 | 20,32 |
| FFP-2044-XX | 0,800  | 0,820 | 20,32 | 20,83 |
| FFP-2080-XX | 0,820  | 0,840 | 20,83 | 21,34 |
| FFP-2184-XX | 0,840  | 0,860 | 21,34 | 21,84 |
| FFP-2174-XX | 0,860  | 0,880 | 21,84 | 22,35 |
| FFP-2245-XX | 0,880  | 0,900 | 22,35 | 22,86 |
| FFP-2236-XX | 0,900  | 0,920 | 22,86 | 23,37 |
| FFP-2326-XX | 0,920  | 0,940 | 23,37 | 23,88 |
| FFP-2397-XX | 0,940  | 0,960 | 23,88 | 24,38 |

# Essential 4-step tube plugging protocol

## Precision tools for guaranteed sealing performance

### STEP 1: LEAK DETECTION

#### ► KVLD-3000 vacuum leak tester

The KVLD-3000 delivers immediate leak identification through compressed air vacuum testing—steady gauge readings confirm tube integrity, pressure drops pinpoint failure locations requiring T\_APPL intervention. Using compressed air, it creates a vacuum inside the tube—if the gauge reading holds steady, the tube is intact; a drop indicates a leak.

### STEP 2: TUBE VENTILATION

#### ► ORTC one revolution tube cutter

Unventilated tubes create projectile hazards during plug removal. ORTC's eccentric cutting principle delivers tube puncturing with quarter-turn rotation for ventilation, eliminating this risk. Full revolution cuts the tube completely. Standard adjustable length 1"-6" (25-155mm), extended reach available in 10" (254mm) increments. Hand or ratchet wrench operation only. ORTCC version C specifically engineered for heavy-wall carbon steel tube ventilation, available in 6" and 12" lengths.

### STEP 3: SURFACE PREPARATION

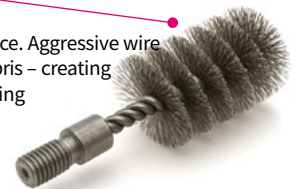
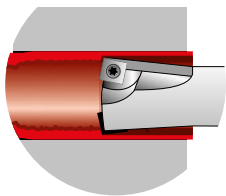
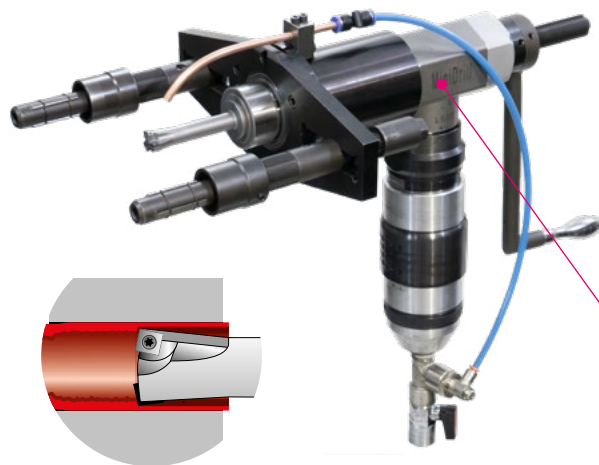
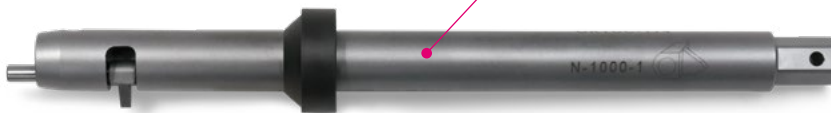
#### ► Coarse wire brush cleaning

Contaminated surfaces compromise plug performance. Aggressive wire brush cleaning removes deposits, corrosion, and debris – creating the clean substrate essential for reliable T\_APPL sealing under operational pressure.

### STEP 4: PRECISION PREPARATION

#### ► MiniDrill-500-WTRT-AC (when required)

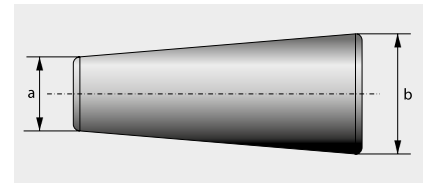
When standard cleaning proves insufficient, the MiniDrill-500-WTRT-AC delivers controlled tube wall reduction across demanding materials – carbon steel to Inconel alloys. Perfect for preparing tubes before T\_APPL plugging, effectively removing rust, scale, and deposits to ensure clean, secure sealing.



# Tube plugs

## One piece tube plugs

| TUBE OD |       | TUBE GAUGE | A      |       | B      |       | TUBE PLUG       |
|---------|-------|------------|--------|-------|--------|-------|-----------------|
| [INCH]  | [MM]  |            | [INCH] | [MM]  | [INCH] | [MM]  |                 |
| 3/8     | 9,5   | 15-22      | 0,176  | 4,47  | 0,388  | 9,86  | <b>TP-1-**</b>  |
| 1/2     | 12,7  | 11-14      | 0,176  | 4,48  | 0,388  | 9,87  | <b>TP-1-**</b>  |
|         |       | 15-22      | 0,301  | 7,65  | 0,513  | 13,00 | <b>TP-2-**</b>  |
| 5/8     | 15,8  | 11-14      | 0,301  | 7,66  | 0,513  | 13,01 | <b>TP-2-**</b>  |
|         |       | 15-22      | 0,426  | 10,82 | 0,638  | 16,20 | <b>TP-3-**</b>  |
| 3/4     | 19,05 | 11-14      | 0,426  | 10,83 | 0,638  | 16,21 | <b>TP-3-**</b>  |
|         |       | 15-22      | 0,551  | 14,00 | 0,763  | 19,38 | <b>TP-4-**</b>  |
| 7/8     | 22,22 | 11-14      | 0,551  | 14,01 | 0,763  | 19,39 | <b>TP-4-**</b>  |
|         |       | 15-22      | 0,676  | 17,17 | 0,888  | 22,56 | <b>TP-5-**</b>  |
| 1       | 25,4  | 11-14      | 0,676  | 17,18 | 0,888  | 22,57 | <b>TP-5-**</b>  |
|         |       | 15-22      | 0,801  | 20,35 | 1,013  | 25,73 | <b>TP-6-**</b>  |
| 1-1/8   | 28,6  | 11-14      | 0,801  | 20,36 | 1,013  | 25,74 | <b>TP-6-**</b>  |
|         |       | 15-22      | 0,926  | 23,52 | 1,138  | 28,9  | <b>TP-7-**</b>  |
| 1-1/4   | 31,7  | 11-14      | 0,926  | 23,53 | 1,138  | 28,10 | <b>TP-7-**</b>  |
|         |       | 15-22      | 1,015  | 25,78 | 1,263  | 32,08 | <b>TP-8-**</b>  |
| 1-3/8   | 34,9  | 11-14      | 1,015  | 25,79 | 1,263  | 32,09 | <b>TP-8-**</b>  |
|         |       | 15-22      | 1,176  | 29,87 | 1,388  | 35,87 | <b>TP-9-**</b>  |
| 1-1/2   | 38,1  | 11-14      | 1,176  | 29,88 | 1,388  | 35,88 | <b>TP-9-**</b>  |
|         |       | 15-22      | 1,301  | 32,66 | 1,513  | 38,93 | <b>TP-10-**</b> |


**\*\* SPECIFY MATERIAL:**

AL for Aluminium

S for Steel

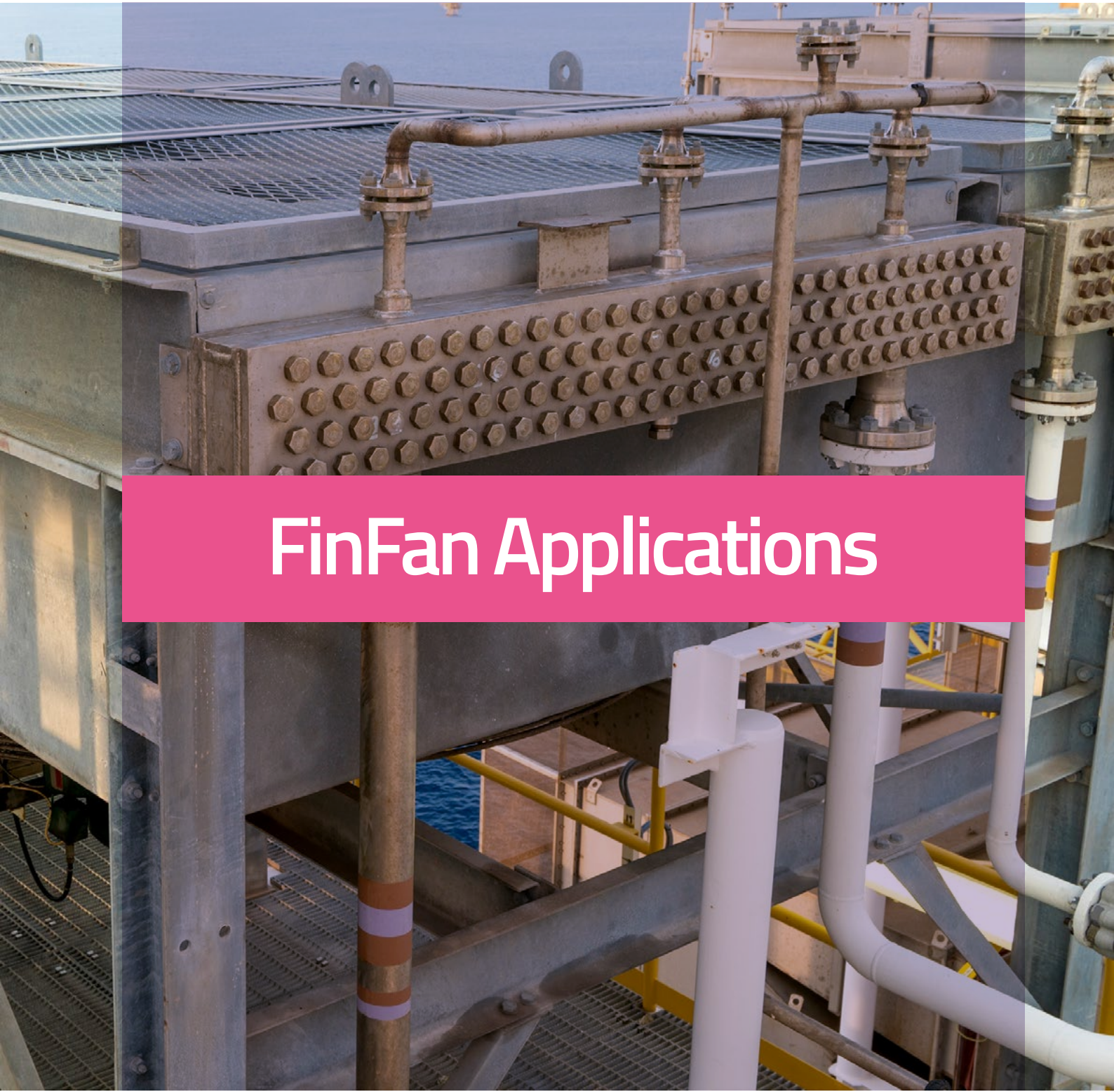
SS for Stainless Steel

B for Brass

M for Monel







# FinFan Applications

# MiniDrill GFF

MiniDrill GFF is a unique machining platform designed to safely perform the repair or increase the FinFan Cooler plug thread and other operations on heat exchangers, boilers and similar thermal exchange equipment. This system can drill, ream, bore and even re-machine serrations in steam drums. With a 80 mm (3.150") travel, tool is suited for the majority of plant equipment. The system is fully torque reacted with 2 clamping arms that are independent of one another and can accommodate most pitch configurations. Once locked into the tubes, the MiniDrill is extremely stable.



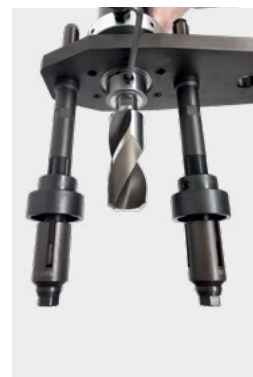
**TAILOR MADE ONLY!**

| WORKING RANGE  |            | LOCKING RANGE            |       | FREE SPEED  |        | POWER       |  | TORQUE     |  |
|----------------|------------|--------------------------|-------|-------------|--------|-------------|--|------------|--|
| 12,5– 51,0 mm  |            | According to the drawing |       | 100 Rpm     |        | 1,3 Hp      |  | 140 Nm     |  |
| 0,492 – 2,000" |            |                          |       |             |        |             |  | 105 Ft.Lbs |  |
| AIR USE        |            | BODY WIDTH               |       | BODY HEIGHT |        | BODY WEIGHT |  |            |  |
| 55 cfm         | 1,3 m3/min | 2,32"                    | 59 mm | 13,1"       | 335 mm | 17,5 Lbs    |  | 8 kg       |  |



## RIGID LOCKING

On standard FinFan gas coolers machine locks onto two shafts on the adjacent holes. The locking plate is manufactured according to the tube hole pitch to ensure precise tool alignment.



## UNIVERSAL REACTION PLATE

MiniDrill FinFan is delivered with locking plate and 2 reaction shafts. Construction of the plate allows for locking machine with both shafts on one side to allow to machine the last holes in the row. Plate can be etc.



## FINFAN THREAD REPAIR PROCESS

### PROPER MACHINE LOCKING FOR ALL STEPS

Choose the correct locking jaws to suit the existing plug holes



| PLUG SIZE |          |        | JAW SET (2 REQUIRED) |               |
|-----------|----------|--------|----------------------|---------------|
| 1-1/8"    | 28,58 mm | 12 TPI | 701MM                | #36-1-1/8-GFF |
| 1-1/4"    | 31,75 mm | 12 TPI | 703MM                | #36-1-1/4-GFF |
| 1-3/8"    | 34,93 mm | 12 TPI | 705MM                | #36-1-3/8-GFF |
| 1-1/2"    | 38,10 mm | 12 TPI | 707MM                | #36-1-1/2-GFF |
| 1-5/8"    | 41,28 mm | 12 TPI | 709MM                | #36-1-5/8-GFF |
| 1-3/4"    | 44,45 mm | 12 TPI | 711MM                | #36-1-3/4-GFF |
| 1-7/8"    | 47,63 mm | 12 TPI | 713MM                | #36-1-7/8-GFF |

**STEP 1 //** Heads for weld removal over the welded plugs (in case are welded)



| PLUGS SIZE |          |        | HEAD         | INSERT | SCREW |
|------------|----------|--------|--------------|--------|-------|
| 1-1/8"     | 28,58 mm | 12 TPI | TFWR-GFF-350 | CS-5D  | MHS-4 |
| 1-1/4"     | 31,75 mm | 12 TPI | TFWR-GFF-380 | CS-5D  | MHS-4 |
| 1-3/8"     | 34,93 mm | 12 TPI | TFWR-GFF-410 | CS-5D  | MHS-4 |
| 1-1/2"     | 38,10 mm | 12 TPI | TFWR-GFF-440 | CS-5D  | MHS-4 |
| 1-5/8"     | 41,28 mm | 12 TPI | TFWR-GFF-470 | CS-5D  | MHS-4 |
| 1-3/4"     | 44,45 mm | 12 TPI | TFWR-GFF-500 | CS-5D  | MHS-4 |
| 1-7/8"     | 47,63 mm | 12 TPI | TFWR-GFF-540 | CS-5D  | MHS-4 |

**STEP 2 //** Select the appropriate size drill head to match the desired new thread size



| DRILL HEAD SIZE |                   | DRILL HEAD |             | INSERT | SCREW |
|-----------------|-------------------|------------|-------------|--------|-------|
| 1-1/8 to 1-1/4" | 28,58 to 31,75 mm | MD-29,6-   | DRILL-L-130 | CS-0.4 | MHS-4 |
| 1-1/4 to 1-3/8" | 31,74 to 34,93 mm | MD-32,9-   | DRILL-L-130 | CS-0.4 | MHS-4 |
| 1-3/8 to 1-1/2" | 34,93 to 38,10 mm | MD-36,1-   | DRILL-L-130 | CS-0.4 | MHS-4 |
| 1-1/2 to 1-5/8" | 38,10 to 41,28 mm | MD-39,3-   | DRILL-L-130 | CS-0.4 | MHS-4 |
| 1-5/8 to 1-3/4" | 41,28 to 44,45 mm | MD-42,5-   | DRILL-L-130 | CS-0.4 | MHS-4 |
| 1-3/4 to 1-7/8" | 44,45 to 47,63 mm | MD-45,5-   | DRILL-L-130 | CS-0.4 | MHS-4 |

**STEP 3 //** Select the chamfering head to chamfer the hole before tapping (heads need a Weldon flange: MD-FLANGE-STWRMH)



| RANGE           |                   | HEAD       | INSERT | SCREW |
|-----------------|-------------------|------------|--------|-------|
| 0,787 to 1,653" | 20,00 to 42,00 mm | STWRMH-317 | WRI    | MHS-4 |
| 1,417 to 2,244" | 36,00 to 57,00 mm | STWRMH-444 | CDI    | MHS-4 |

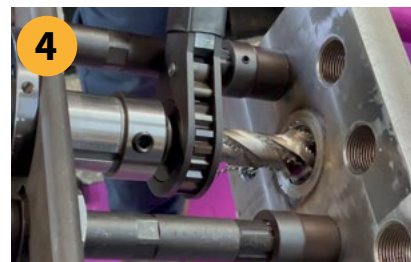
**STEP 4 //** Select tapping head to suit the required thred size



| PLUGS THREAD SIZE |          |        | TAP HEAD        | RATCHED FEED ARM |
|-------------------|----------|--------|-----------------|------------------|
| 1-1/8"            | 28,58 mm | 12 TPI | MDFFPT-1-1/8_12 | MD-RS-H28        |
| 1-1/4"            | 31,75 mm | 12 TPI | MDFFPT-1-1/4_12 | MD-RS-H28        |
| 1-3/8"            | 34,93 mm | 12 TPI | MDFFPT-1-3/8_12 | MD-RS-H28        |
| 1-1/2"            | 38,10 mm | 12 TPI | MDFFPT-1-1/2_12 | MD-RS-H28        |
| 1-5/8"            | 41,28 mm | 12 TPI | MDFFPT-1-5/8_12 | MD-RS-H28        |
| 1-3/4"            | 44,45 mm | 12 TPI | MDFFPT-1-3/4_12 | MD-RS-H28        |
| 1-7/8"            | 47,63 mm | 12 TPI | MDFFPT-1-7/8_12 | MD-RS-H28        |

### STEP 5

Produce new gasket seat using MiniMill-300GFF. Choose heads and jaws on next page.





# MiniMill 300GFF

Ideal for gasket seat machining of any size of fin fan cooler. A standard machine is equipped with a cutter head and a special locking system to fit your application. The machine locks directly into the plug thread.

## STANDARD SET UP



### GASKET FINFAN SET

Supplied with 20 mm shaft, one set of jaws to suit plug thread diameter, pilot and gasket seat milling head. Plug size details must be provided by customer with order.

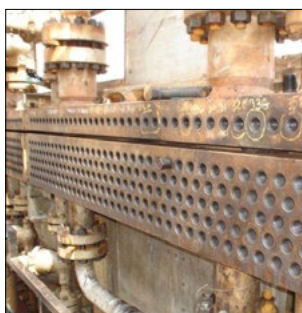


Custom machined jaws. Showing locked and up-locked position.



| STANDARD WORKING RANGE    |            |                               |       | FEED<br>STROKE | FREE<br>SPEED | POWER       | TORQUE    |
|---------------------------|------------|-------------------------------|-------|----------------|---------------|-------------|-----------|
| APPLICATION RANGE (ID-OD) |            | LOCKING RANGE (ID)            |       |                |               |             |           |
| 12 TPI                    |            | Suit to thread<br>of the plug |       | 20 mm          | 300 Rpm       | 1,3 Hp      | 43 Nm     |
| 1,125 - 2,125"            |            |                               |       | 0,787"         |               |             | 32 Ft.Lbs |
| AIR USE                   |            | BODY WIDTH                    |       | BODY HEIGHT    |               | BODY WEIGHT |           |
| 55 cfm                    | 1,3 m³/min | 2,32"                         | 59 mm | 13,1"          | 335 mm        | 13,2Lbs     | 6 kg      |

## EXAMPLE TOOL APPLICATION



FinFan cooler before a maintenance



Plug hole before re machining the gasket seat



Safely re-machine gasket surfaces in seconds.



All types of water box materials can be machined with the carbide inserts of the MiniMill 300 GFF.

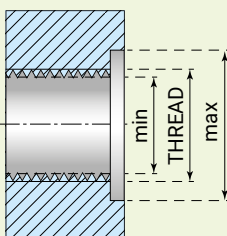
# MiniMill 300GFF

## GASKET SEAT FACING HEADS AND JAWS NUMBERS

| HEAD TYPE   | PLUG SIZE |       |     | SEAL NEST DIAMETER |            |          |          | INSERT | NO. OF INSERTS | JAWS SET NUMBER     | PLUG SIZE |        | TPI | PILOT     |
|-------------|-----------|-------|-----|--------------------|------------|----------|----------|--------|----------------|---------------------|-----------|--------|-----|-----------|
|             | [INCH]    | [MM]  | TPI | MIN [INCH]         | MAX [INCH] | MIN [MM] | MAX [MM] |        |                |                     | [INCH]    | [MM]   |     |           |
| FFGSMH-1125 | 1,125     | 28,58 | 12  | 0,940              | 1,496      | 24,00    | 38,00    | CI 5x5 | 4              | 701MM #36-1-1/8-GFF | 1,125     | 28,575 | 12  | PGFF-1125 |
| FFGSMH-1250 | 1,250     | 31,75 | 12  | 1,063              | 1,614      | 27,00    | 41,00    | CI 5x5 | 4              | 703MM #36-1-1/4-GFF | 1,250     | 31,750 | 12  | PGFF-1250 |
| FFGSMH-1350 | 1,375     | 34,93 | 12  | 1,220              | 1,772      | 31,00    | 45,00    | CI 5x5 | 4              | 705MM #36-1-3/8-GFF | 1,375     | 34,925 | 12  | PGFF-1350 |
| FFGSMH-1500 | 1,500     | 38,10 | 12  | 1,339              | 1,890      | 34,00    | 48,00    | CI 5x5 | 4              | 707MM #36-1-1/2-GFF | 1,500     | 38,100 | 12  | PGFF-1500 |
| FFGSMH-1625 | 1,625     | 41,27 | 12  | 1,457              | 2,008      | 37,00    | 51,00    | CI 5x5 | 4              | 709MM #36-1-5/8-GFF | 1,625     | 41,275 | 12  | PGFF-1625 |
| FFGSMH-1750 | 1,750     | 44,45 | 12  | 1,590              | 2,140      | 40,40    | 54,40    | CI 5x5 | 4              | 711MM #36-1-3/4-GFF | 1,750     | 44,450 | 12  | PGFF-1750 |
| FFGSMH-1875 | 1,875     | 47,62 | 12  | 1,720              | 2,270      | 43,60    | 57,60    | CI 5x5 | 4              | 713MM #36-1-7/8-GFF | 1,875     | 47,625 | 12  | PGFF-1875 |

Other sizes on request. If plug holes are damaged beyond repair, our MiniDrill 55 can be used to upsize them to the next size. Example - 1-1/8" to 1-3/8".

Seal nest diameter diagram



## OTHER OPTIONAL ACCESSORIES



### FAST CLAMPING SYSTEM

System offers rapid tube to tube cycle time, increased productivity (up to 4x) with little operator fatigue. Ideal for large amount of end preps.

# MiniMill 300FF

A standard machine for Fin Fan cooler tube trimming is equipped with custom head and locking system to suit your application (customer to provide drawing of unit). The MiniMill 300FF cutter heads have 3 carbide inserts with 4 Cutting edges each.

## STANDARD SET UP



## FINFAN ATTACHMENT

Special attachment for facing tubes in fin fan gas coolers. A locking shaft with adjustable length and a support bushing are screwed into the plug thread, making this tool the best one available on the market today. The cycle is approx. 1 min from tube to tube. For this application we recommend our 300 Rpm machine



| STANDARD WORKING RANGE    |            |                             |       | FEED<br>STROKE | FREE<br>SPEED | POWER       | TORQUE    |
|---------------------------|------------|-----------------------------|-------|----------------|---------------|-------------|-----------|
| APPLICATION RANGE (ID-OD) |            | LOCKING RANGE (ID)          |       |                |               |             |           |
| 12,5– 51,0 mm             |            | According<br>to the drawing |       | 20 mm          | 300 Rpm       | 1,3 Hp      | 43 Nm     |
| 0,492 – 2,000"            |            |                             |       | 0,787"         |               |             | 32 Ft.Lbs |
| AIR USE                   |            | BODY WIDTH                  |       | BODY HEIGHT    |               | BODY WEIGHT |           |
| 55 cfm                    | 1,3 m³/min | 2,32"                       | 59 mm | 13,1"          | 335 mm        | 13,2Lbs     | 6 kg      |

## FINFAN ATTACHMENT PART NUMBERS

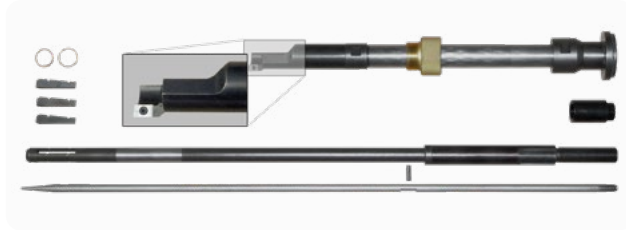
| FINFAN               | TUBE CAPACITY (OD) |       |       | INSERT | NO. INSERTS | SCREW | JAWS COVER |          |
|----------------------|--------------------|-------|-------|--------|-------------|-------|------------|----------|
|                      | [INCH]             | [MM]  | BWG   |        |             |       | MIN        | MAX      |
| 601-FinFan-1-12"     | 1,000              | 25,40 | 12-23 | CI     | 3           | 1-1/8 | 207MM#36   | 213MM#36 |
| 603-FinFan-1-1/8-12" | 1,125              | 28,58 | 12-23 | CI     | 3           | 1-1/4 | 211MM#36   | 217MM#36 |
| 605-FinFan-1-1/4-12" | 1,250              | 31,75 | 11-23 | CI     | 3           | 1-3/8 | 103MM#36   | 107MM#36 |
| 607-FinFan-1-1/2-12" | 1,500              | 38,10 | 11-23 | CI     | 3           | 1-5/8 | 107MM#36   | 111MM#36 |
| 609-FinFan-1-3/4-12" | 1,750              | 44,45 | 9-23  | CI     | 3           | 1-7/8 | 111MM#36   | 115MM#36 |
| 611-FinFan-2-12"     | 2,000              | 50,80 | 9-23  | CI     | 3           | 2-1/8 | 115MM#36   | 119MM#36 |

## AVAILABLE LENGTHS

| MODEL            | DŁUGOŚĆ |        |
|------------------|---------|--------|
|                  | [MM]    | [INCH] |
| 601-FinFan-xx-6  | 152,4   | 6"     |
| 601-FinFan-xx-8  | 203,2   | 8"     |
| 601-FinFan-xx-10 | 254,0   | 10"    |
| 601-FinFan-xx-12 | 305,0   | 12"    |
| 601-FinFan-xx-14 | 355,6   | 14"    |
| 601-FinFan-xx-16 | 406,4   | 16"    |

# MiniMill 300FF

## OPTIONAL ATTACHMENT



### FINFAN SEAL WELD REMOVAL ATTACHMENT

Simply the best solution for seal weld removal from air coolers. Adjustable length locking shaft and support bushing that fits into the plug thread, making this tool the best one available on the market today. A cycle time of approximately 1 min from tube to tube can be expected.



### FINFAN CHAMFERING ATTACHMENT

FINFAN-CMF-000-00 Chamfering Attachment for tube sheet holes in the FinFan tube sheet before welding. Available for 45-degree chamfer and R4 radius J-Prep.

## OTHER OPTIONAL ACCESSORIES



### SPEED REDUCER

Easy to use gearbox for 3x speed reduction. Increases the torque, enabling the machine to generate a thick chip whilst reducing the cutting time.



### RATCHET FEED

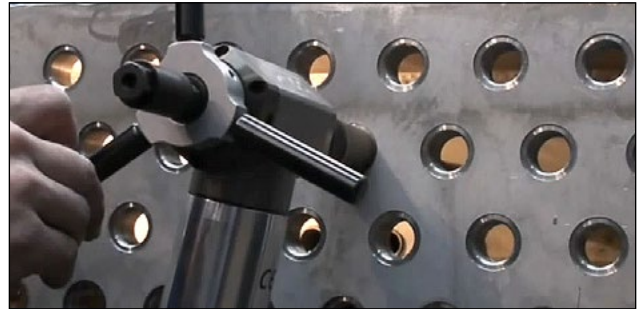
Feed system allowing to work in narrow and tight locations, eg. in water walls.



### LEVER FEED

Quick and easy feed system. Used in many basic applications.

## EXAMPLE TOOL APPLICATION



Trimming tubes safely and efficiently. Machine locks securely both to the tube and the plug thread of the water box.

## EXAMPLE TOOL APPLICATION



Water box demonstration of the simplicity of machine operation.



An operator trimming back tubes prior to seal welding.

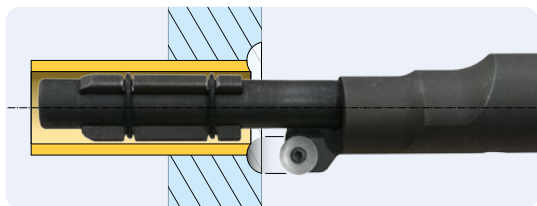




# MiniMill 101FF-JPREP

Simply the best solution for J-prep strength weld removal from air coolers. Adjustable length locking shaft and support bushing that fits into the plug thread make this tool the most efficient on the market today. A cycle time of approximately 1 min from tube to tube can be expected!

## FINFAN JPREP ATTACHMENT



The attachment, with a head of a specially designed shape, uses a large round cutting bit. The size and shape allow for the simultaneous processing of the pipe and the tube sheet. The working area covers the entire weld to be removed.



| WORKING RANGE       |            |                             |       | FEED<br>STROKE | FREE<br>SPEED | POWER       | TORQUE      |
|---------------------|------------|-----------------------------|-------|----------------|---------------|-------------|-------------|
| APPLICATION (ID-OD) |            | LOCKING (ID)                |       |                |               |             |             |
| 12,5– 51,0 mm       |            | According<br>to the drawing |       | 20 mm          | 100 Rpm       | 1,3 Hp      | 120 Nm      |
| 0,492 – 2,000"      |            |                             |       | 0,787"         |               |             | 88,5 Ft.Lbs |
| AIR USE             |            | BODY WIDTH                  |       | BODY HEIGHT    |               | BODY WEIGHT |             |
| 55 cfm              | 1,3 m³/min | 2,32"                       | 59 mm | 13,1"          | 335 mm        | 13,2Lbs     | 6 kg        |

## FINFAN JPREP ATTACHMENT PART NUMBERS

| FINFAN                 | TUBE CAPACITY (OD) |       |       | INSERT | NO. INSERTS | SCREW | JAWS COVER |          |
|------------------------|--------------------|-------|-------|--------|-------------|-------|------------|----------|
|                        | [INCH]             | [MM]  | BWG   |        |             |       | MIN        | MAX      |
| 601-FF-JPREP-1-12"     | 1,000              | 25,40 | 12-23 | O10-Co | 1           | 1-1/8 | 207MM#36   | 213MM#36 |
| 603-FF-JPREP-1-1/8-12" | 1,125              | 28,58 | 12-23 | O10-Co | 1           | 1-1/4 | 211MM#36   | 217MM#36 |
| 605-FF-JPREP-1-1/4-12" | 1,250              | 31,75 | 11-23 | O10-Co | 1           | 1-3/8 | 103MM#36   | 107MM#36 |
| 607-FF-JPREP-1-1/2-12" | 1,500              | 38,10 | 11-23 | O10-Co | 1           | 1-5/8 | 107MM#36   | 111MM#36 |
| 609-FF-JPREP-1-3/4-12" | 1,750              | 44,45 | 9-23  | O10-Co | 1           | 1-7/8 | 111MM#36   | 115MM#36 |
| 611-FF-JPREP-2-12"     | 2,000              | 50,80 | 9-23  | O10-Co | 1           | 2-1/8 | 115MM#36   | 119MM#36 |

## AVAILABLE LENGTHS

| MODEL              | DŁUGOŚĆ |        |
|--------------------|---------|--------|
|                    | [MM]    | [INCH] |
| 601-FF-JPREP-xx-6  | 152,4   | 6"     |
| 601-FF-JPREP-xx-8  | 203,2   | 8"     |
| 601-FF-JPREP-xx-10 | 254,0   | 10"    |
| 601-FF-JPREP-xx-12 | 305,0   | 12"    |
| 601-FF-JPREP-xx-14 | 355,6   | 14"    |
| 601-FF-JPREP-xx-16 | 406,4   | 16"    |

# MiniMill 101FF-JPREP

## OTHER OPTIONAL ACCESSORIES



### SPEED REDUCER

Highly recommended!

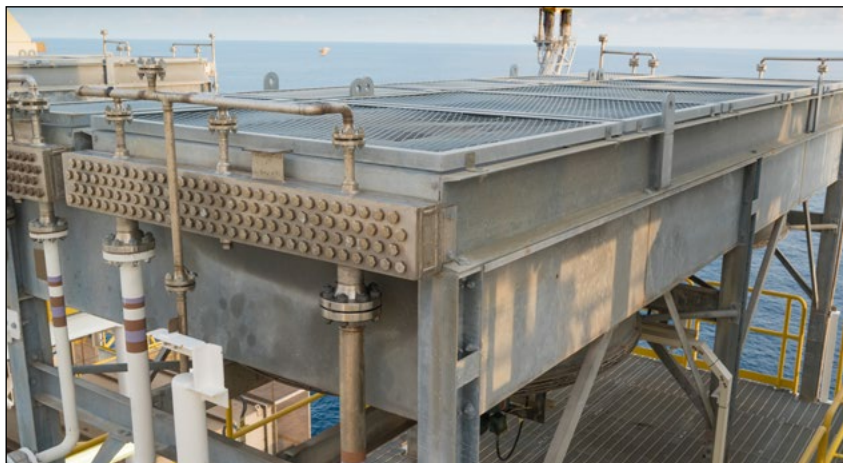
Gearbox for 3x speed reduction in cutting hard carbon steel, stainless steel, or other exotic hard metal. Increases the torque, enabling the machine to generate a thick chip while reducing the cutting time tool wear or burn during the weld removal.

### RATCHET FEED

Feed system allowing to work in narrow and tight locations, eg. in water walls.

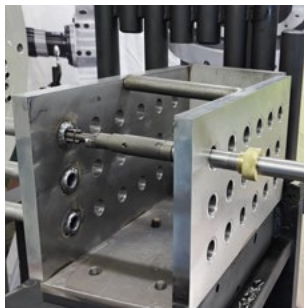


## EXAMPLE TOOL APPLICATION

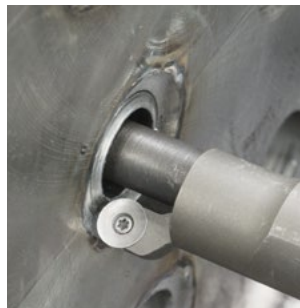
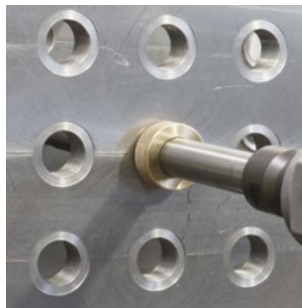


MiniMill 101FF-JPREP allows for convenient servicing FinFan gas coolers even in the toughest conditions. Machine locks securely both to the tube and the plug thread of the water box.

## EXAMPLE TOOL APPLICATION



The machine is designed for work on gas coolers: an elongated special head and a nut fixing the tool in the socket.



The bit edge covers the entire weld to be removed



Removal of the weld ends with a visible groove between the tube and the tube sheet.

# FinMill

KRAIS FinMill is a air powered tool designed for removing fin from the outside diameter of a tube. The tool is based on the same quality drive and housing as our other PrepMill series tools. Thanks to heavy duty locking system The FinMill fin tube removal tool clamps reliably in the tube and offers chatter-free work at any position.

## STANDARD SET UP



### DOUBLE SIDE HEAD

Special shaped head, allows to remove left- and right-handed fins.



### SHAFT25

Self-align, heavy duty locking system. Shafts and jaws are longer and wider to ensure maximum clamping force.

## OPTIONAL



### STAR WHEEL

The most precise feed system. Used in many basic and demanding applications.



Reversible motor allow to work and remove left and right hand fins.

| STANDARD WORKING RANGE    |            |                    |       | FEED STROKE | FREE SPEED | POWER       | TORQUE     |
|---------------------------|------------|--------------------|-------|-------------|------------|-------------|------------|
| APPLICATION RANGE (ID-OD) |            | LOCKING RANGE (ID) |       |             |            |             |            |
| 31,75 - 63,50 mm          |            | 25 - 122 mm        |       | 100 mm      | 100 Rpm    | 2,2 Hp      | 370 Nm     |
| 1-1/4" - 2-1/2"           |            | 0,984 - 4,803"     |       | 4"          |            |             | 277 Ft.Lbs |
| AIR USE                   |            | BODY WIDTH         |       | BODY HEIGHT |            | BODY WEIGHT |            |
| 75 cfm                    | 2,2 m³/min | 2,59"              | 66 mm | 14,5"       | 370 mm     | 19 Lbs      | 9 kg       |

## HEAD NUMBERS

| RANGE  |       | HEAD     |
|--------|-------|----------|
| [INCH] | [MM]  |          |
| 1-1/4  | 31,75 | FMRH-317 |
| 1-1/2  | 38,10 | FMRH-381 |
| 1-3/4  | 44,45 | FMRH-444 |
| 2      | 50,80 | FMRH-501 |
| 2-1/4  | 57,15 | FMRH-571 |
| 2-1/2  | 63,50 | FMRH-635 |

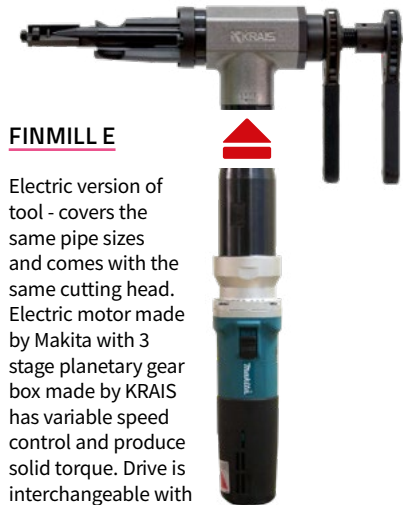
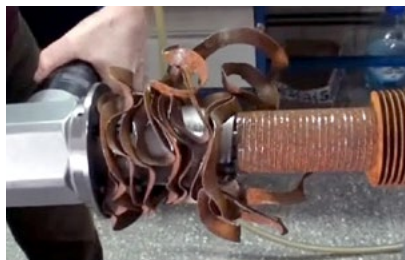
## LOCKING RANGES WITH SHAFT25

| RANGE [MM] |     | RANGE [INCH] |       | JAWS | SPRING |      |
|------------|-----|--------------|-------|------|--------|------|
| MIN        | MAX | MIN          | MAX   |      | NR     | QTY. |
| 25         | 30  | 0,984        | 1,181 | NS-1 | SP-24  | 1    |
| 30         | 35  | 1,181        | 1,378 | NS-2 | SP-24  | 1    |
| 35         | 40  | 1,378        | 1,575 | NS-3 | SP-25  | 2    |
| 40         | 45  | 1,575        | 1,772 | NS-4 | SP-25  | 2    |
| 45         | 50  | 1,772        | 1,969 | NS-5 | SP-25  | 2    |
| 50         | 55  | 1,969        | 2,165 | NS-6 | SP-25  | 2    |
| 55         | 60  | 2,165        | 2,362 | NS-7 | SP-25  | 2    |
| 60         | 65  | 2,362        | 2,559 | NS-8 | SP-25  | 2    |

## EXAMPLE TOOL APPLICATION



Removes 4.0" (101 mm) depth of fin from the tube OD in less than 2 minutes



## FINMILL E

Electric version of tool - covers the same pipe sizes and comes with the same cutting head. Electric motor made by Makita with 3 stage planetary gear box made by KRAIS has variable speed control and produce solid torque. Drive is interchangeable with pneumatic drive and can be purchased separately at any time.

Free Speed..... 115 RPM  
 Power..... 750 W  
 Torque..... 366 NM (280 Ft.Lbs)  
 Feed Stroke ..... 20 mm (0,787")  
 FinMill E works only with right hand fins.



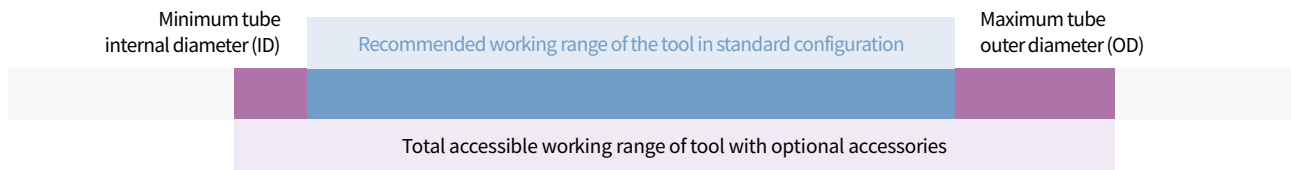


# Tube Beveling Machines

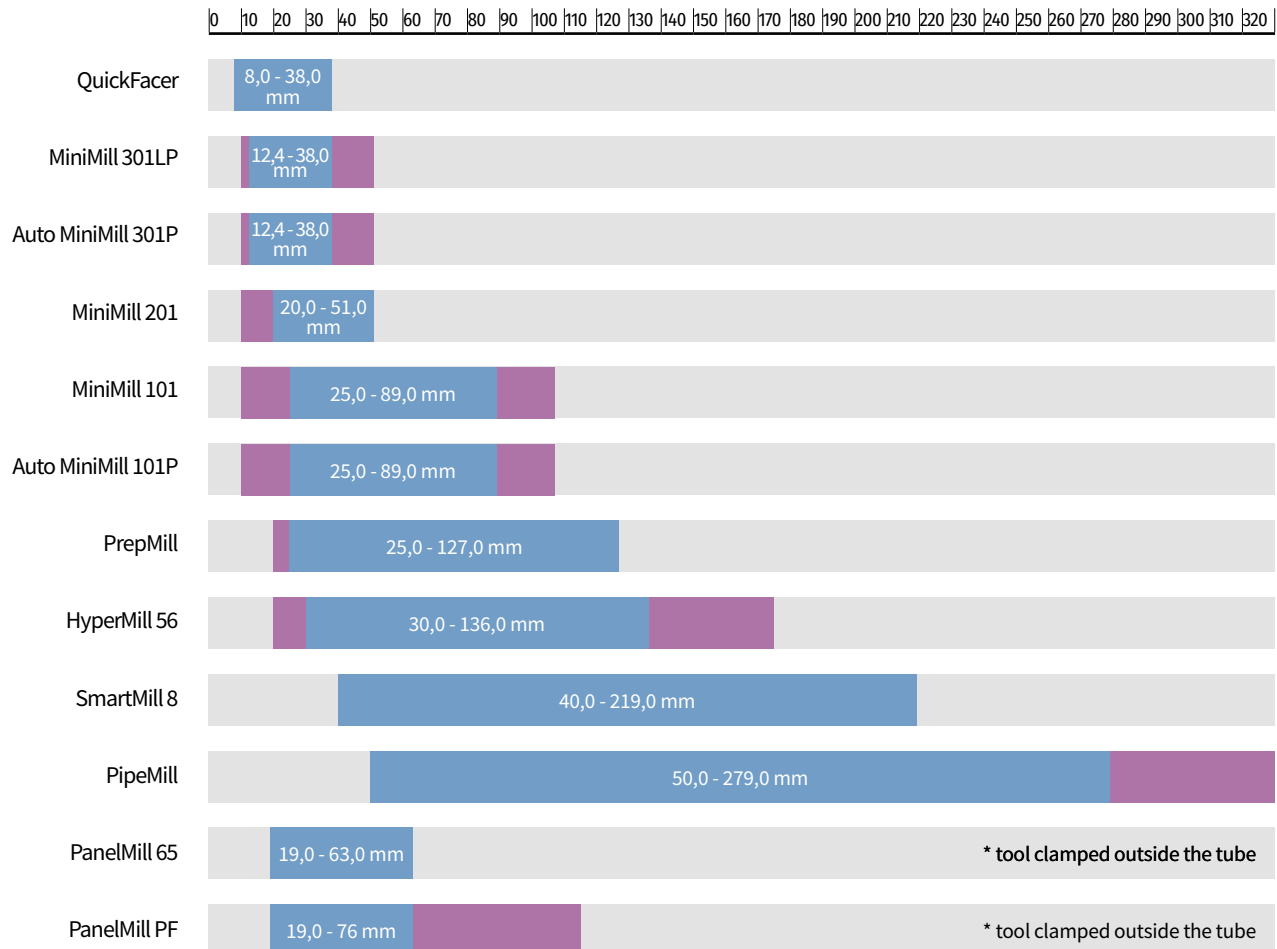


# Ranges for ID/OD mount bevelers

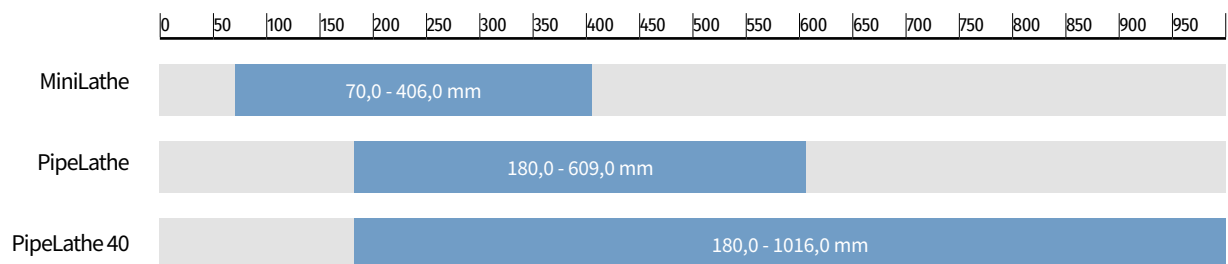
## HOW TO READ IT



## MILL SERIE WORKING RANGES (UNIVERSAL TOOLS)



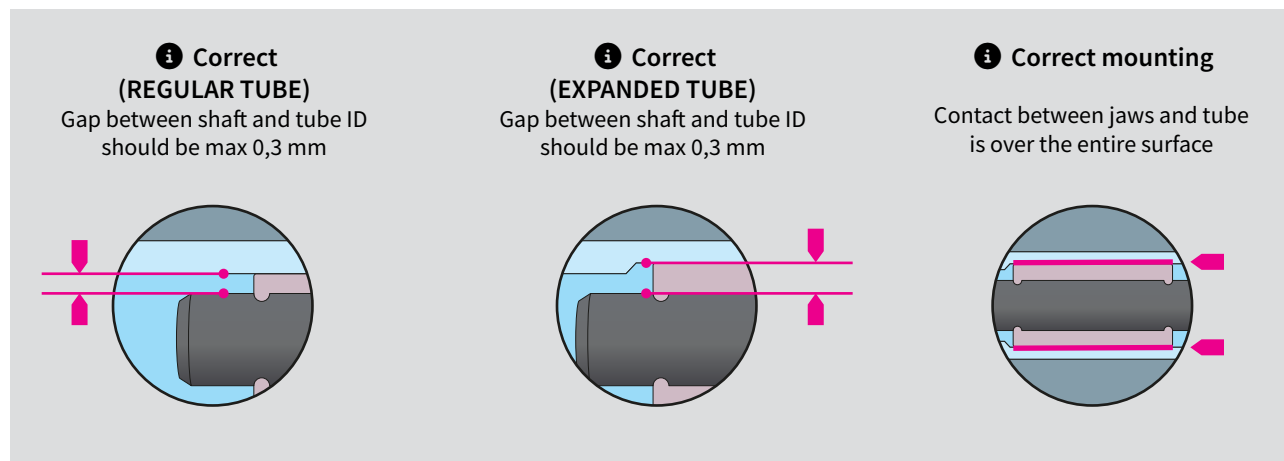
## LATHE SERIE WORKING RANGES (UNIVERSAL TOOLS)



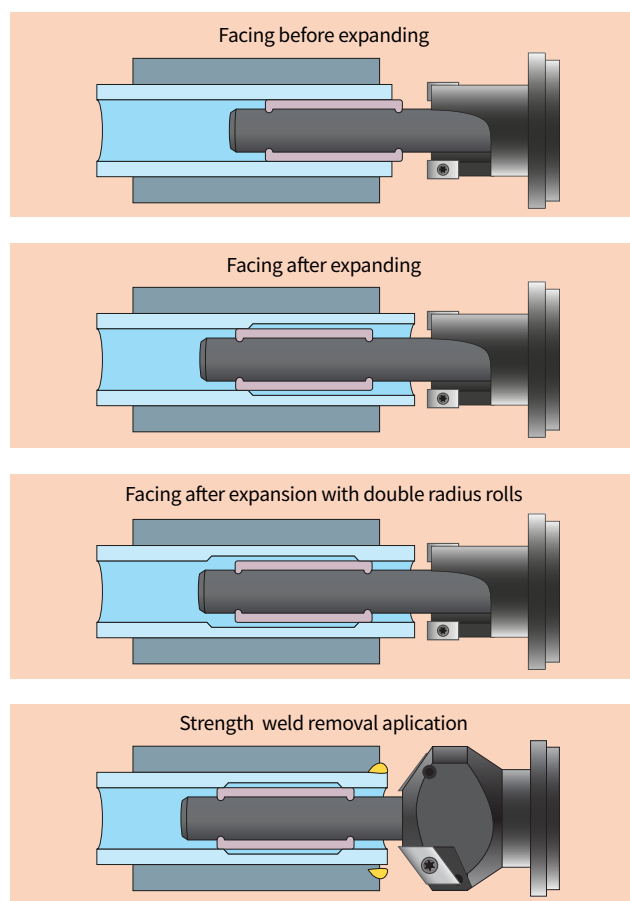
# ID beveling machines proper lock

## FOR: MINIMILL 101, MINIMILL 201, MINIMILL 301LP AND AUTO MINIMILL WITH MINISHAFT.

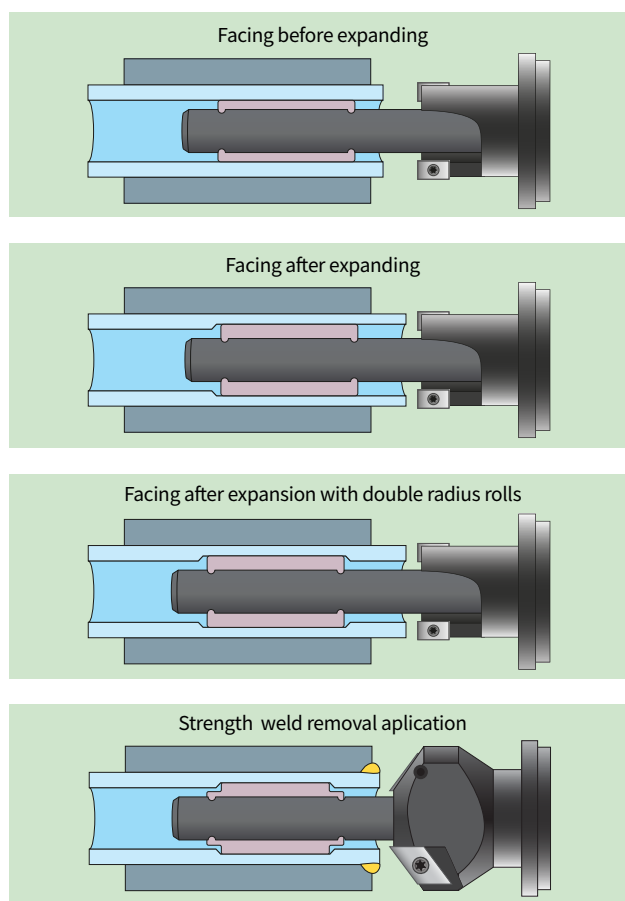
In order to obtain the best possible centring of the MiniMill into the faced, bevel or weld removal tube, we recommend to select the shaft with diameter closest possible to the inner diameter of tube.



### ✗ WRONG JAWS SETUP



### ✓ CORRECT JAWS SETUP



# QuickFacer

## MICRO FACING MACHINE

QuickFacer is a compact, high-performance tube facing tool designed for precision weld end preparation and weld removal. This portable micro lathe is suitable for a wide range of tube materials, including stainless steel and high-chromium alloys.

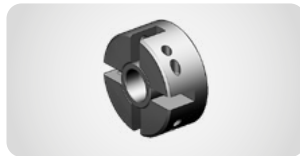
The QuickFacer machine allows for machining tubes from 8,00 up to 38,00 mm OD (0.314"–1.496"), with a locking range of 7,5 to 36,00 mm (0.295"–1.417") and a feed stroke of 15 mm (0.590"). As a standard Quickfacer is equipped with a 50 mm cutting head.

## STANDARD SET UP



### MICROSHAFT QF

A system with interchangeable guide shafts. Set covers 10,0 to 13,0 mm ID tubes, with option to extend the range.



### 50 MM (2")

The smallest cutter head, designed to fasten the wide range of cutting inserts.



**IMPORTANT!**  
Read how to properly lock on page 87

| WORKING RANGE (ID-OD) | LOCKING RANGE (ID) | FEED STROKE           | POWER             | FREE SPEED                  | TORQUE      |
|-----------------------|--------------------|-----------------------|-------------------|-----------------------------|-------------|
| 8,00 – 38,0 mm        | 7,50 – 36,00 mm    | 15,00 mm              | 0,7 kW            | 300 RPM                     | 18 Nm       |
| 0,314 – 1,496"        | 0,307 – 1,417"     | 0,590"                | 0,98 Hp           | (100 RPM with SpeedReducer) | 13,3 Ft.lbs |
| AIR USE               |                    | DIMENSIONS            |                   | BODY WEIGHT                 |             |
| 17 cfm                | 0,48 m³/min        | 1,73 x 10,82 x 12,20" | 44 x 275 x 310 mm | 7,7 Lbs                     | 3,5 kg      |

## OPTIONAL SHAFT



### MINISHAFT QF

Tool set with interchangeable guide shafts. Covers 12,4 to 24,0 mm ID tubes, with option to extend the range.

## OPTIONAL HEADS



### OBMH

Head designed for outside bevelling tubes for wide range of tube sizes.

→ TABLE PAGE 116



### STWRMH

Easy to align, sized per tube diameter, head dedicated for strength weld removal.

→ TABLE PAGE 115



### TFMH

Tube facing milling head for tubes made of any type of material.

→ TABLE PAGE 115



### TFMH127

Tube facing milling head for smallest tubes made of any type of material. Utilizes 6% cobalt special inserts.

| BIT     | MIN TUBE ID |      | MAX TUBE OD |       |
|---------|-------------|------|-------------|-------|
|         | [INCH]      | [MM] | [INCH]      | [MM]  |
| CSS 107 | 0,303       | 7,70 | 0,433       | 11,00 |
| CSS 117 | 0,327       | 8,30 | 0,551       | 14,00 |
| CSS 127 | 0,366       | 9,30 | 0,591       | 15,00 |

# QuickFacer

**QUICKFACER CLAMPING JAWS SELECTION TABLE**

| TUBE ID                     |       |        |       | JAWS       | EXPANSION PIN | SHAFT     |          |        | SPRING  |
|-----------------------------|-------|--------|-------|------------|---------------|-----------|----------|--------|---------|
| [MM]                        |       | [INCH] |       |            |               | SHAFT NR  | SHAFT OD |        |         |
| MIN                         | MAX   | MIN    | MAX   |            |               |           | [MM]     | [INCH] |         |
| 7,50                        | 8,00  | 0,295  | 0,315 | 296MM#36   | MS#158-40-QF  | 870QF#151 | 7,50     | 0,295  | DW-6,5  |
| 8,00                        | 8,50  | 0,315  | 0,335 | 297MM#36   | MS#158-40-QF  | 878QF#151 | 8,00     | 0,315  | DW-7,5  |
| 8,50                        | 9,00  | 0,335  | 0,354 | 298MM#36   | MS#158-40-QF  | 878QF#151 | 8,00     | 0,315  | DW-7,5  |
| 9,00                        | 9,50  | 0,354  | 0,374 | 298AMM#36  | MS#158-40-QF  | 878QF#151 | 8,00     | 0,315  | DW-7,5  |
| 9,00                        | 10,00 | 0,354  | 0,394 | 299MM#36   | MS#158-51-QF  | 878QF#151 | 8,00     | 0,315  | DW-7,5  |
| 9,50                        | 10,00 | 0,374  | 0,394 | 298BMM#36  | MS#158-40-QF  | 878QF#151 | 8,00     | 0,315  | DW-7,5  |
| 9,50                        | 10,50 | 0,374  | 0,413 | 300MM#36   | MS#158-51-QF  | 800QF#151 | 9,00     | 0,354  | DW-7,5  |
| 10,00                       | 11,00 | 0,394  | 0,433 | 301MM#36   | MS#158-QF     | 801QF#151 | 10,00    | 0,394  | DW-7,5  |
| 11,00                       | 12,00 | 0,433  | 0,472 | 303MM#36   | MS#158-QF     | 801QF#151 | 10,00    | 0,394  | DW-8,5  |
| 12,00                       | 13,00 | 0,472  | 0,512 | 305MM#36   | MS#158-QF     | 805QF#151 | 11,50    | 0,453  | DW-10   |
| 13,00                       | 14,00 | 0,512  | 0,551 | 307MM#36   | MS#158-QF     | 805QF#151 | 11,50    | 0,453  | DW-10   |
| 14,00                       | 15,00 | 0,551  | 0,591 | 309MM#36   | MS#158-QF     | 805QF#151 | 11,50    | 0,453  | DW-10   |
| 12,40                       | 14,50 | 0,488  | 0,571 | 201MM#36   | MM#158-QF     | 901QF#151 | 12,40    | 0,488  | DW-11   |
| 13,90                       | 16,00 | 0,547  | 0,630 | 203MM#36   | MM#158-QF     | 905QF#151 | 13,90    | 0,547  | DW-12,5 |
| 15,90                       | 18,00 | 0,626  | 0,709 | 205MM#36   | MM#158-QF     | 909QF#151 | 16,90    | 0,665  | DW-15,5 |
| 16,90                       | 19,00 | 0,665  | 0,748 | 207MM#36   | MM#158-QF     | 909QF#151 | 16,90    | 0,665  | DW-15,5 |
| 18,90                       | 21,00 | 0,744  | 0,827 | 209MM#36   | MM#158-QF     | 909QF#151 | 16,90    | 0,665  | DW-15,5 |
| 19,90                       | 22,00 | 0,783  | 0,866 | 211MM#36   | MM#158-QF     | 909QF#151 | 16,90    | 0,665  | DW-15,5 |
| 20,90                       | 23,00 | 0,823  | 0,906 | 213MM#36   | MM#158-QF     | 909QF#151 | 16,90    | 0,665  | DW-15,5 |
| 21,90                       | 24,00 | 0,862  | 0,944 | 214MM#36   | MM#158-QF     | 909QF#151 | 16,90    | 0,665  | DW-15,5 |
| UP TO 38,00 MM (1,496 INCH) |       |        |       | ON REQUEST | MM#158-QF     | 915QF#151 | 20,00    | 0,787  | DW-15,5 |

## OTHER OPTIONAL ACCESSORIES


**SPEED REDUCER**

Easy to use gearbox for 3x speed reduction. Increases the torque, enabling the machine to generate a thick chip whilst reducing the cutting time.


**LEVER FEED**

Quick and easy feed system. Used in many basic applications.


**FAST CLAMPING SYSTEM**

System offers rapid tube to tube cycle time, increased productivity (up to 4x) with little operator fatigue. Ideal for large amount of end preps.



# MiniMill 101

The MiniMill 101 is a rugged, fast, portable weld end preparation lathe designed for various tubes and pipes, including stainless steel and other high chromium materials. The machine is offered in two options:

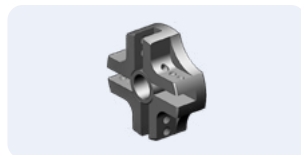
- **MiniMill 101SM**, for general use, can be used for pipe sizes of 20 - 74 mm i.d. (0.787" - 2.913") and comes with an 88 mm cutting head.
- **MiniMill 101SMSS** version is specialized for machining tubes in heat exchanger applications.

## STANDARD SET UP



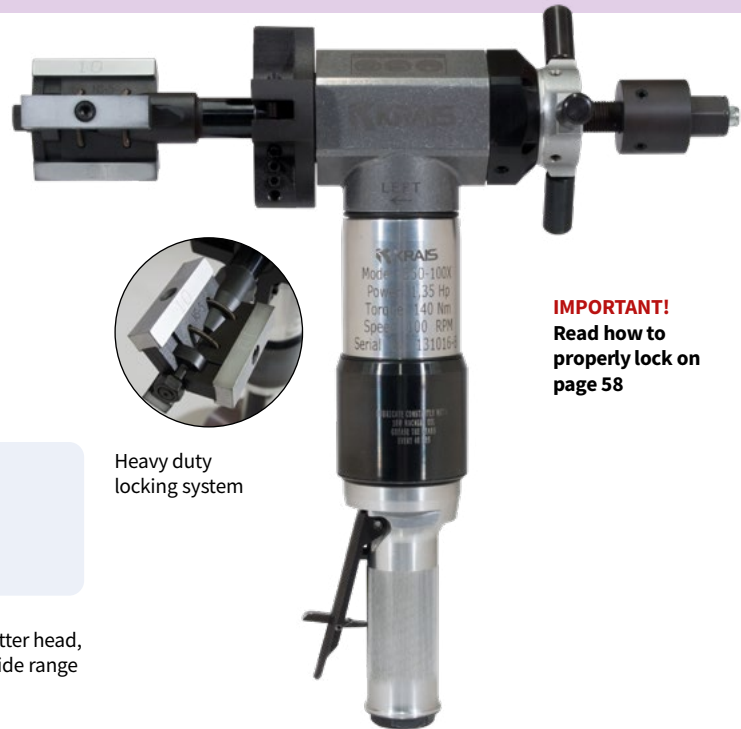
### SHAFT25

Self-align, heavy duty locking system. Shafts and jaws are longer and wider to ensure maximum clamping force.



### 88 MM (3,46")

The popular, medium cutter head, designed to fasten the wide range of cutting inserts.



**IMPORTANT!**  
Read how to properly lock on page 58

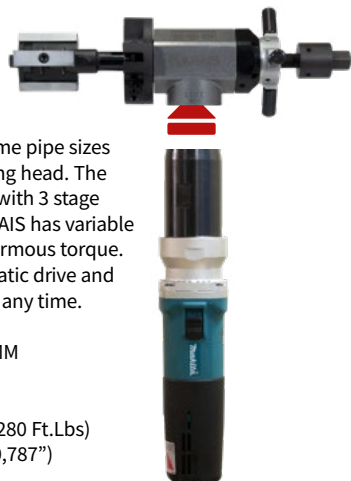
Heavy duty locking system

| MINIMILL 101SM |                         |                     |                | MINIMILL 101SMSS |                |                        |                |
|----------------|-------------------------|---------------------|----------------|------------------|----------------|------------------------|----------------|
| WORKING RANGE  |                         | TOTAL WORKING RANGE |                | WORKING RANGE    |                | TOTAL WORKING RANGE SS |                |
| APPLICATION    | LOCKING                 | APPLICATION         | LOCKING        | APPLICATION      | LOCKING        | APPLICATION            | LOCKING        |
| 25 – 89 mm     | 25 – 77 mm              | 10 – 107 mm         | 10 – 102 mm    | 12,4 – 38,0 mm   | 12,4 – 24,0 mm | 10 – 51 mm             | 10 – 48 mm     |
| 0,984 – 3,504" | 0,984 – 3,031"          | 0,394 – 4,213"      | 0,394 – 4,016" | 0,488 – 1,496"   | 0,488 – 0,945" | 0,394 – 2,008"         | 0,394 – 1,890" |
| FEED STROKE    |                         | POWER               |                | FREE SPEED       |                | TORQUE                 |                |
| 20 mm          | 0,787"                  | 1,3 hp              |                | 100 rpm          |                | 140 Nm                 | 105 Ft.lbs     |
| AIR USE        |                         | BODY WIDTH          |                | BODY HEIGHT      |                | BODY WEIGHT            |                |
| 55 cfm         | 1,3 m <sup>3</sup> /min | 2,32"               | 59 mm          | 13,1"            | 335 mm         | 11,4 Lbs               | 5,2 kg         |

## MINIMILL 101E

MiniMill 101E is electric version of MiniMill 101. A standard machine cover the same pipe sizes and comes with the same cutting head. The electric motor made by Makita with 3 stage planetary gear box made by KRAIS has variable speed control and produce enormous torque. Is interchangeable with pneumatic drive and can be purchased separately at any time.

Model..... ED-230-MM  
Free Speed..... 115 RPM  
Power..... 750 W  
Torque..... 366 NM (280 Ft.Lbs)  
Feed Stroke ..... 20 mm (0,787")

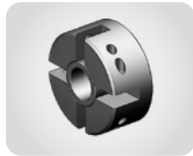


## AUTOMINIMILL 101P

Auto MiniMill 101P is a fully automatic machine, controlled by a built-in, fully pneumatic control box, with adjustable feed rate and actuated by a hand button (foot switch optional). Ideal for repetitive work cycles on condensers and heat exchangers, as well as for bevelling and facing boiler tubes.

# MiniMill 101

## OPTIONAL HEADS



### 60 MM (2,36")

The smallest cutter head, designed to fasten the wide range of cutting inserts.



### 106 MM (4,56")

The popular, large cutter head, designed to fasten the wide range of cutting inserts.



### OBMH

Head for bevelling tubes without membranes in the boiler water walls.

→ TABLE PAGE 116



### SWROTC

Seal weld removal head over tube circumference prior to re-welding the damaged joint without removing the tube.

→ TABLE PAGE 117



### STWRMH

Head dedicated for strength weld removal. Heads are easy to align and sized per tube diameter.

→ TABLE PAGE 115



### TFMH

Tube facing milling head for tubes made of any type of material. Utilizes 6% cobalt inserts.

→ TABLE PAGE 115

## OPTIONAL SHAFTS



### MICROSHAFT

A system with interchangeable guide shafts. A complete set covers 10,0 to 15,0 mm ID tubes.



### MINISHAFT

A system with interchangeable guide shafts. A complete set covers 12,4 to 48,0 mm ID tubes.

## OTHER OPTIONAL ACCESSORIES



### RATCHET FEED

Feed system allowing to work in narrow and tight locations, eg. in water walls.



### FAST CLAMPING SYSTEM

System offers rapid tube to tube cycle time, increased productivity (up to 4x) with little operator fatigue. Ideal for large amount of end preps.



### SPEED REDUCER

Easy to use gearbox for 3x speed reduction. Increases the torque, enabling the machine to generate a thick chip whilst reducing the cutting time.

## STANDARD MINIMILL 101 LOCKING RANGES

### WITH SHAFT25

| SHAFT   | JAWS | EXT.  | RANGE [MM] |     | RANGE [INCH] |       | SPRING |      |
|---------|------|-------|------------|-----|--------------|-------|--------|------|
|         |      |       | MIN        | MAX | MIN          | MAX   | NO.    | QTY. |
| SHAFT25 | NS-1 | -     | 25         | 30  | 0,984        | 1,181 | SP-24  | 1    |
|         | NS-2 | -     | 30         | 35  | 1,181        | 1,378 | SP-24  | 1    |
|         | NS-3 | -     | 35         | 40  | 1,378        | 1,575 | SP-25  | 2    |
|         | NS-4 | -     | 40         | 45  | 1,575        | 1,772 | SP-25  | 2    |
|         | NS-5 | -     | 45         | 50  | 1,772        | 1,969 | SP-25  | 2    |
|         | NS-6 | -     | 50         | 55  | 1,969        | 2,165 | SP-25  | 2    |
|         | NS-7 | -     | 55         | 60  | 2,165        | 2,362 | SP-25  | 2    |
|         | NS-8 | -     | 60         | 65  | 2,362        | 2,559 | SP-25  | 2    |
|         | NS-5 | NS-10 | 62         | 67  | 2,441        | 2,638 | SP-25  | 2    |
|         | NS-6 | NS-10 | 67         | 72  | 2,638        | 2,835 | SP-25  | 2    |
|         | NS-7 | NS-10 | 72         | 77  | 2,835        | 3,031 | SP-25  | 2    |

### OPTIONAL MINIMILL 101 LOCKING RANGES

### WITH SHAFT25

| SHAFT   | JAWS | EXT.  | RANGE [MM] |     | RANGE [INCH] |       | SPRING |      |
|---------|------|-------|------------|-----|--------------|-------|--------|------|
|         |      |       | MIN        | MAX | MIN          | MAX   | NO.    | QTY. |
| SHAFT25 | NS-8 | NS-10 | 77         | 82  | 3,031        | 3,228 | SP-25  | 2    |
|         | NS-5 | NS-20 | 82         | 87  | 3,228        | 3,425 | SP-25  | 2    |
|         | NS-6 | NS-20 | 87         | 92  | 3,425        | 3,622 | SP-25  | 2    |
|         | NS-7 | NS-20 | 92         | 97  | 3,622        | 3,819 | SP-25  | 2    |
|         | NS-8 | NS-20 | 97         | 102 | 3,819        | 4,016 | SP-25  | 2    |
|         | NS-5 | NS-30 | 102        | 107 | 4,016        | 4,213 | SP-25  | 2    |

### WITH SHAFT20

| SHAFT   | JAWS | EXT. | RANGE [MM] |     | RANGE [INCH] |       | SPRING |      |
|---------|------|------|------------|-----|--------------|-------|--------|------|
|         |      |      | MIN        | MAX | MIN          | MAX   | NO.    | QTY. |
| SHAFT20 | NS-0 | -    | 20         | 24  | 0,787        | 0,945 | SP-19  | 1    |
|         | NS-1 | -    | 24         | 28  | 0,945        | 1,102 | SP-19  | 1    |

### WITH MINISHAFT

| SHAFT     | SIZE   |       | JAWS      | RANGE [MM] |       | RANGE [INCH] |       | SPRING  |
|-----------|--------|-------|-----------|------------|-------|--------------|-------|---------|
|           | [INCH] | [MM]  |           | MIN        | MAX   | MIN          | MAX   |         |
| 901MM#151 | 0,492  | 12,40 | 201MM#36  | 12,40      | 14,50 | 0,488        | 0,571 | DW-11   |
| 905MM#151 | 0,547  | 13,90 | 203 MM#36 | 13,90      | 16,00 | 0,547        | 0,630 | DW-12,5 |
| 909MM#151 | 0,661  | 16,90 | 205 MM#36 | 15,90      | 18,00 | 0,626        | 0,709 | DW-15,5 |
|           |        |       | 207 MM#36 | 16,90      | 19,00 | 0,665        | 0,748 |         |
|           |        |       | 209 MM#36 | 18,90      | 21,00 | 0,744        | 0,827 |         |
|           |        |       | 211 MM#36 | 19,90      | 22,00 | 0,783        | 0,866 |         |
|           |        |       | 213 MM#36 | 20,90      | 23,00 | 0,823        | 0,906 |         |
|           |        |       | 214 MM#36 | 21,90      | 24,00 | 0,862        | 0,944 |         |

### WITH MICROSHAFT

| SHAFT     | SIZE   |       | JAWS     | RANGE [MM] |       | RANGE [INCH] |       | SPRING |
|-----------|--------|-------|----------|------------|-------|--------------|-------|--------|
|           | [INCH] | [MM]  |          | MIN        | MAX   | MIN          | MAX   |        |
| 800MM#151 | 0,354  | 9,00  | 301MM#36 | 10,00      | 11,00 | 0,394        | 0,433 | DW-7,5 |
| 801MM#151 | 0,394  | 10,00 | 303MM#36 | 11,00      | 12,00 | 0,433        | 0,472 | DW-8,5 |
| 805MM#151 | 0,453  | 11,50 | 305MM#36 | 12,00      | 13,00 | 0,472        | 0,512 | DW-10  |
|           |        |       | 307MM#36 | 13,00      | 14,00 | 0,512        | 0,551 |        |
|           |        |       | 309MM#36 | 14,00      | 15,00 | 0,551        | 0,591 |        |

# MiniMill 201

The MiniMill 201 is a rugged, fast, portable weld end preparation lathe for various tubes including stainless steel and other high chromium alloys. A standard machine comes complete with a 60 mm head, a locking system and includes all jaw sets to cover sizes of 20 to 44 mm (0.787" to 1.732")

STANDARD SET UP



**SHAFT20**  
Redesigned heavy duty locking system. Shafts and jaws are longer and wider to ensure maximum clamping force. The jaws are self-align.



**60 MM (2,36")**  
The smallest cutter head, designed to fasten the wide range of cutting inserts.



**IMPORTANT!**  
Read how to properly lock on page 58

| STANDARD WORKING RANGE |        |                |       | TOTAL WORKING RANGE |       |                |           |
|------------------------|--------|----------------|-------|---------------------|-------|----------------|-----------|
| APPLICATION RANGE      |        | LOCKING RANGE  |       | APPLICATION RANGE   |       | LOCKING RANGE  |           |
| 20 – 51 mm             |        | 20 – 48 mm     |       | 10 – 51 mm          |       | 10 – 48 mm     |           |
| 0,787 – 2,008"         |        | 0,787 – 1,890" |       | 0,394 – 2,008"      |       | 0,394 – 1,890" |           |
| FEED STROKE            |        | POWER          |       | FREE SPEED          |       | TORQUE         |           |
| 20 mm                  | 0,787" | 1,3 hp         |       | 200 rpm             |       | 72 Nm          | 53 Ft.lbs |
| 55 cfm                 |        | 1,3 m³/min     | 2,32" | 59 mm               | 13,1" | 335 mm         | 11,4 Lbs  |
|                        |        |                |       |                     |       |                | 5,2 kg    |

EXAMPLE TOOL APPLICATION



Standard locking system with handle feed makes quick work of trimming back tubes.



Completed strength weld removal.



Facing, bevelling tubes quickly and safely.

# MiniMill 201

## OPTIONAL HEADS



### 88 MM (3,46")

The popular, medium cutter head, designed to fasten the wide range of cutting inserts.



### OBMH

Outside beveling of both tubes and pipes. Sized per tube or pipe diameter and angle of required weld bevel.

→ TABLE PAGE 116



### SWROT

Seal weld removal head over tube circumference prior to re-welding the damaged joint without removing the tube.

TABLE PAGE 117



### STWRMH

Custom designed head dedicated for strength weld removal. Heads are sized per tube diameter.

→ TABLE PAGE 115



### MICROSHAFT

A system with interchangeable guide shafts. A complete set covers 9,0 to 15,0 mm inside diameter.



### MINISHAFT

A system with interchangeable guide shafts. A complete set covers 12,4 to 48 mm inside diameter.

## OTHER OPTIONAL ACCESSORIES



### RATCHET FEED

Feed system allowing to work in narrow and tight locations, eg. in water walls.



### LEVER FEED

Quick and easy feed system. Used in many basic applications.



### SPEED REDUCER

Easy to use gearbox for 3x speed reduction. Increases the torque, enabling the machine to generate a thick chip whilst reducing the cutting time.



### FAST CLAMPING SYSTEM

System offers rapid tube to tube cycle time, increased productivity (up to 4x) with little operator fatigue. Ideal for large amount of end preps.

## MINIMILL 201 LOCKING RANGES

### WITH SHAFT20

| SHAFT   | JAWS | EXT. | RANGE [MM] |     | RANGE [INCH] |       | SPRING |      |
|---------|------|------|------------|-----|--------------|-------|--------|------|
|         |      |      | MIN        | MAX | MIN          | MAX   | NO.    | QTY. |
| SHAFT25 | NS-0 | -    | 20         | 24  | 0,787        | 0,945 | SP-19  | 1    |
|         | NS-1 | -    | 24         | 28  | 0,945        | 1,102 | SP-19  | 1    |
|         | NS-2 | -    | 28         | 33  | 1,102        | 1,299 | SP-19  | 1    |
|         | NS-3 | -    | 33         | 38  | 1,299        | 1,496 | SP-20  | 2    |
|         | NS-4 | -    | 38         | 43  | 1,496        | 1,693 | SP-20  | 2    |
|         | NS-5 | -    | 43         | 48  | 1,693        | 1,890 | SP-20  | 2    |

### WITH MINISHAFT

| SHAFT     | SIZE   |       | JAWS      | RANGE [MM] |       | RANGE [INCH] |       | SPRING  |
|-----------|--------|-------|-----------|------------|-------|--------------|-------|---------|
|           | [INCH] | [MM]  |           | MIN        | MAX   | MIN          | MAX   |         |
| 901MM#151 | 0,492  | 12,40 | 201MM#36  | 12,40      | 14,50 | 0,488        | 0,571 | DW-11   |
| 905MM#151 | 0,547  | 13,90 | 203 MM#36 | 13,90      | 16,00 | 0,547        | 0,630 | DW-12,5 |
| 909MM#151 | 0,661  | 16,90 | 205 MM#36 | 15,90      | 18,00 | 0,626        | 0,709 | DW-15,5 |
|           |        |       | 207 MM#36 | 16,90      | 19,00 | 0,665        | 0,748 |         |
|           |        |       | 209 MM#36 | 18,90      | 21,00 | 0,744        | 0,827 |         |
|           |        |       | 211 MM#36 | 19,90      | 22,00 | 0,783        | 0,866 |         |
|           |        |       | 213 MM#36 | 20,90      | 23,00 | 0,823        | 0,906 |         |
|           |        |       | 214 MM#36 | 21,90      | 24,00 | 0,862        | 0,944 |         |

### WITH MICROSHAFT

| SHAFT     | SIZE   |       | JAWS     | RANGE [MM] |       | RANGE [INCH] |       | SPRING |
|-----------|--------|-------|----------|------------|-------|--------------|-------|--------|
|           | [INCH] | [MM]  |          | MIN        | MAX   | MIN          | MAX   |        |
| 800MM#151 | 0,354  | 9,00  | 301MM#36 | 10,00      | 11,00 | 0,394        | 0,433 | DW-7,5 |
| 801MM#151 | 0,394  | 10,00 | 303MM#36 | 11,00      | 12,00 | 0,433        | 0,472 | DW-8,5 |
| 805MM#151 | 0,453  | 11,50 | 305MM#36 | 12,00      | 13,00 | 0,472        | 0,512 | DW-10  |
|           |        |       | 307MM#36 | 13,00      | 14,00 | 0,512        | 0,551 |        |
|           |        |       | 309MM#36 | 14,00      | 15,00 | 0,551        | 0,591 |        |



# MiniMill 301LP

The fastest and strongest facing machine on the market. Engineered for safety and ease of use, featuring a pneumatic locking system with a double piston cylinder. Compact milling head with double cutting edge inserts with 6% cobalt. For all types of material including: ferrous, non-ferrous, stainless and exotic alloys steel, duplex, inconel and titanium.

## STANDARD SET UP



### MINISHAFT

A system with interchangeable guide shafts. A complete set covers 12,4 to 48,0 mm ID tubes.



### 60 MM (2,36")

The smallest cutter head, designed to fasten the wide range of cutting inserts.



### IMPORTANT!

Read how to properly lock on page 58

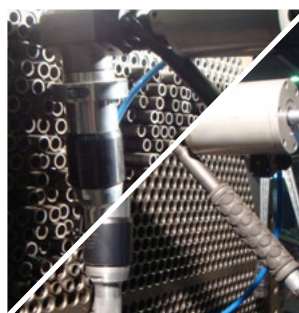
| STANDARD WORKING RANGE |        |                         |  | TOTAL WORKING RANGE |  |                |           |
|------------------------|--------|-------------------------|--|---------------------|--|----------------|-----------|
| APPLICATION RANGE      |        | LOCKING RANGE           |  | APPLICATION RANGE   |  | LOCKING RANGE  |           |
| 12,4 – 38,0 mm         |        | 12,4 – 24,0 mm          |  | 10 – 51 mm          |  | 10 – 48 mm     |           |
| 0,488 – 1,496"         |        | 0,488 – 0,945"          |  | 0,394 – 2,008"      |  | 0,394 – 1,890" |           |
| FEED STROKE            |        | POWER                   |  | FREE SPEED          |  | TORQUE         |           |
| 20 mm                  | 0,787" | 1,3 hp                  |  | 300 rpm             |  | 43 Nm          | 32 Ft.lbs |
| 55 cfm                 |        | 1,3 m <sup>3</sup> /min |  | 13,1"               |  | 335 mm         |           |
|                        |        | 2,32"                   |  | 59 mm               |  | 15,4 Lbs       |           |
|                        |        |                         |  |                     |  | 7 kg           |           |



## AUTOMINIMILL 301

Auto MiniMill 301 is a fully automatic machine, controlled by a built-in, fully pneumatic control box, with adjustable feed rate and actuated by a hand button (foot switch optional). Ideal for repetitive work cycles on condensers and heat exchangers, as well as for bevelling and facing boiler tubes.

## EXAMPLE TOOL APPLICATION



A real application: shortening a bundle. MiniMill can deal with this task quickly and efficiently.



Double sided inserts and fixed diameter heads ensure unsurpassed efficiency and quality. Mechanical stops ensure identical tube projection.

# MiniMill 301LP

## OPTIONAL HEADS



### TFMH

Tube facing milling head for tubes made of any type of material. Utilizes 6% cobalt inserts.

→ TABLE PAGE 115



### STWRMH

Head for strength weld removal. Easy to align and sized per tube diameter. Must be used with 3X Speed Reducer.

→ TABLE PAGE 115

## OPTIONAL SHAFTS



### MICROSHAFT

A system with interchangeable guide shafts. A complete set covers 9,0 to 15,0 mm inside diameter.



### SHAFT20

Self-align, heavy duty locking system. Shafts and jaws are longer and wider to ensure maximum clamping force.

## OTHER OPTIONAL ACCESSORIES



### SPEED REDUCER

Easy to use gearbox for 3x speed reduction. Increases the torque, enabling the machine to generate a thick chip whilst reducing the cutting time.



### STAR WHEEL

The most precise feed system. Used in many basic and demanding applications.

## EXAMPLE TOOL APPLICATION



The fast locking and the handle feed make this system very efficient for heat exchanger manufacturers.

## MINIMILL 301LP LOCKING RANGES

### WITH MINISHAFT

| SHAFT     | SIZE   |       | JAWS      | RANGE [MM] |       | RANGE [INCH] |       | SPRING  |
|-----------|--------|-------|-----------|------------|-------|--------------|-------|---------|
|           | [INCH] | [MM]  |           | MIN        | MAX   | MIN          | MAX   |         |
| 901MM#151 | 12,40  | 0,492 | 201MM#36  | 12,40      | 14,50 | 0,488        | 0,571 | DW-11   |
| 905MM#151 | 13,90  | 0,547 | 203 MM#36 | 13,90      | 16,00 | 0,547        | 0,630 | DW-12,5 |
| 909MM#151 | 16,90  | 0,661 | 205 MM#36 | 15,90      | 18,00 | 0,626        | 0,709 | DW-15,5 |
|           |        |       | 207 MM#36 | 16,90      | 19,00 | 0,665        | 0,748 |         |
|           |        |       | 209 MM#36 | 18,90      | 21,00 | 0,744        | 0,827 |         |
|           |        |       | 211 MM#36 | 19,90      | 22,00 | 0,783        | 0,866 |         |
|           |        |       | 213 MM#36 | 20,90      | 23,00 | 0,823        | 0,906 |         |
|           |        |       | 214 MM#36 | 21,90      | 24,00 | 0,862        | 0,944 |         |

### WITH MICROSHAFT

| SHAFT     | SIZE   |       | JAWS     | RANGE [MM] |       | RANGE [INCH] |       | SPRING |
|-----------|--------|-------|----------|------------|-------|--------------|-------|--------|
|           | [INCH] | [MM]  |          | MIN        | MAX   | MIN          | MAX   |        |
| 800MM#151 | 0,354  | 9,00  | 301MM#36 | 10,00      | 11,00 | 0,394        | 0,433 | DW-7,5 |
| 801MM#151 | 0,394  | 10,00 | 303MM#36 | 11,00      | 12,00 | 0,433        | 0,472 | DW-8,5 |
| 805MM#151 | 0,453  | 11,50 | 305MM#36 | 12,00      | 13,00 | 0,472        | 0,512 | DW-10  |
|           |        |       | 307MM#36 | 13,00      | 14,00 | 0,512        | 0,551 |        |
|           |        |       | 309MM#36 | 14,00      | 15,00 | 0,551        | 0,591 |        |

### WITH SHAFT20

| SHAFT   | JAWS | EXT. | RANGE [MM] |     | RANGE [INCH] |       | SPRING |      |
|---------|------|------|------------|-----|--------------|-------|--------|------|
|         |      |      | MIN        | MAX | MIN          | MAX   | NO.    | QTY. |
| SHAFT20 | NS-0 | -    | 20         | 24  | 0,787        | 0,945 | SP-19  | 1    |
|         | NS-1 | -    | 24         | 28  | 0,945        | 1,102 | SP-19  | 1    |
|         | NS-2 | -    | 28         | 33  | 1,102        | 1,299 | SP-19  | 1    |
|         | NS-3 | -    | 33         | 38  | 1,299        | 1,496 | SP-20  | 2    |
|         | NS-4 | -    | 38         | 43  | 1,496        | 1,693 | SP-20  | 2    |
|         | NS-5 | -    | 43         | 48  | 1,693        | 1,890 | SP-20  | 2    |

# PrepMill

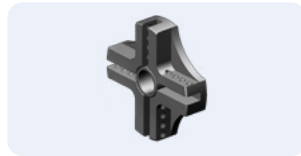
The PrepMill series pneumatic tube facing, bevelling and weld removal machine. The PrepMill is a rugged, fast, portable weld end preparation lathe for various tubes including stainless steel and other high chromium alloys. Machine is constructed on two opposite set up taper roller bearings that makes the machine extremely stable and very rigid and compact. A standard machine is equipped to cover 25 to 122 mm ID (1" to 4,8") with a 116 mm cutter head.

## STANDARD SET UP



### SHAFT25

Self-align, heavy duty locking system. Shafts and jaws are longer and wider to ensure maximum clamping force.

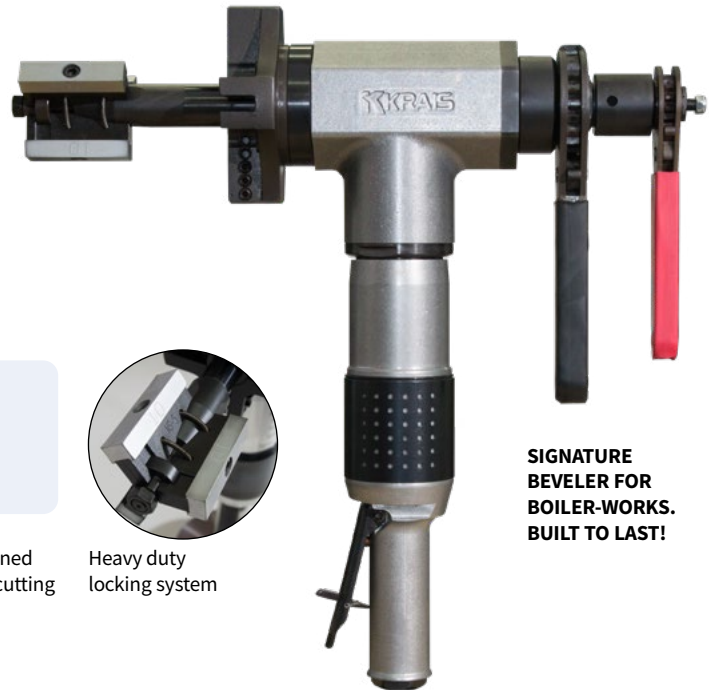


### 116 MM (4,56")

The large cutter head, designed to fasten the wide range of cutting inserts.



Heavy duty locking system



**SIGNATURE  
BEVELER FOR  
BOILER-WORKS.  
BUILT TO LAST!**

| STANDARD WORKING RANGE |    |               |       | TOTAL WORKING RANGE |  |               |            |
|------------------------|----|---------------|-------|---------------------|--|---------------|------------|
| APPLICATION RANGE      |    | LOCKING RANGE |       | APPLICATION RANGE   |  | LOCKING RANGE |            |
| 25 – 127 mm            |    | 25 – 122 mm   |       | 20 – 127 mm         |  | 20 – 122 mm   |            |
| 1 – 5"                 |    | 1,0 – 4,8"    |       | 0,787 – 5"          |  | 0,787 – 4,8"  |            |
| FEED STROKE            |    | POWER         |       | FREE SPEED          |  | TORQUE        |            |
| 25 mm                  | 1" | 1,3 hp        |       | 120 rpm             |  | 140 Nm        | 105 Ft.lbs |
| 55 cfm                 |    | 1,3 m³/min    |       | 14,5"               |  | 20,5 Lbs      | 9,5 kg     |
|                        |    | 2,59"         | 66 mm | 370 mm              |  |               |            |

## PREPMILL-E

PrepMill-E is electric version of PrepMill.

A standard machine can cover the same pipe sizes and comes with the same cutting head. The electric motor made by Makita with 3 stage planetary gear box made by KRAIS has variable speed control and produce enormous torque. Is interchangeable with pneumatic drive and can be purchased separately at any time.

Model..... ED-230-PM  
Free Speed..... 115 RPM  
Power..... 750 W  
Torque..... 368 Nm (280 Ft.Lbs)  
Feed Stroke ..... 25 mm (1")



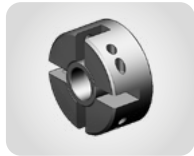
## EXAMPLE TOOL APPLICATION



PrepMill with its 66 mm (2-5/8) width body perfectly fit into limited access areas such as Water wall panels. Easy to clamp and feed with our heavy duty ratchet or star wheel feed.

# PrepMill

## OPTIONAL HEADS



### 66 MM (2,59")

The smallest cutter head, designed to fasten the wide range of cutting inserts.



### 88 MM (3,46")

The popular, medium cutter head, designed to fasten the wide range of cutting inserts.



### OBPM

Head for outside bevelling of tubes and pipes. Available in wide range of diameters and beveling angles.

→ TABLE PAGE 118



### PRRMBH

Head for membrane and overlay removal. Efficiently remove material between boiler tubes.

→ TABLE PAGE 118



### STWRPM

Head dedicated for strength weld removal. Heads are easy to align and sized per tube diameter.

→ TABLE PAGE 119



### TFPM

Tube facing milling head for tubes made of any type of material. Utilizes 6% cobalt inserts.

→ TABLE PAGE 119

## OPT. SHAFT



### SHAFT20

Self-align, heavy duty locking system. Shafts and jaws are longer and wider to ensure maximum clamping force.



### HEAD FLANGE

Adapter to use all MiniMill's special cutter heads (from size 1-1/2" and up).



### SPEED REDUCER

Easy to use gearbox for 3x speed reduction. Increases the torque, enabling the machine to generate a thick chip whilst reducing the cutting time.



### FAST CLAMPING SYSTEM

System offers rapid tube to tube cycle time, increased productivity (up to 4x) with little operator fatigue. Ideal for large amount of end preps.



### STAR WHEEL

The most precise feed system. Used in many basic and demanding applications.

## PREPMILL LOCKING RANGES

### WITH SHAFT25

| SHAFT   | JAWS | EXT.  | RANGE [MM] |     | RANGE [INCH] |       | SPRING |      |
|---------|------|-------|------------|-----|--------------|-------|--------|------|
|         |      |       | MIN        | MAX | MIN          | MAX   | NO.    | QTY. |
| SHAFT25 | NS-1 | -     | 25         | 30  | 0,984        | 1,181 | SP-24  | 1    |
|         | NS-2 | -     | 30         | 35  | 1,181        | 1,378 | SP-24  | 1    |
|         | NS-3 | -     | 35         | 40  | 1,378        | 1,575 | SP-25  | 2    |
|         | NS-4 | -     | 40         | 45  | 1,575        | 1,772 | SP-25  | 2    |
|         | NS-5 | -     | 45         | 50  | 1,772        | 1,969 | SP-25  | 2    |
|         | NS-6 | -     | 50         | 55  | 1,969        | 2,165 | SP-25  | 2    |
|         | NS-7 | -     | 55         | 60  | 2,165        | 2,362 | SP-25  | 2    |
|         | NS-8 | -     | 60         | 65  | 2,362        | 2,559 | SP-25  | 2    |
|         | NS-5 | NS-10 | 62         | 67  | 2,441        | 2,638 | SP-25  | 2    |
|         | NS-6 | NS-10 | 67         | 72  | 2,638        | 2,835 | SP-25  | 2    |
|         | NS-7 | NS-10 | 72         | 77  | 2,835        | 3,031 | SP-25  | 2    |
|         | NS-8 | NS-10 | 77         | 82  | 3,031        | 3,228 | SP-25  | 2    |
|         | NS-5 | NS-20 | 82         | 87  | 3,228        | 3,425 | SP-25  | 2    |
|         | NS-6 | NS-20 | 87         | 92  | 3,425        | 3,622 | SP-25  | 2    |
|         | NS-7 | NS-20 | 92         | 97  | 3,622        | 3,819 | SP-25  | 2    |
|         | NS-8 | NS-20 | 97         | 102 | 3,819        | 4,016 | SP-25  | 2    |
|         | NS-5 | NS-30 | 102        | 107 | 4,016        | 4,213 | SP-25  | 2    |
|         | NS-6 | NS-30 | 107        | 112 | 4,213        | 4,409 | SP-25  | 2    |
|         | NS-7 | NS-30 | 112        | 117 | 4,409        | 4,606 | SP-25  | 2    |
|         | NS-8 | NS-30 | 117        | 122 | 4,606        | 4,803 | SP-25  | 2    |

### WITH SHAFT20

| SHAFT   | JAWS | EXT. | RANGE [MM] |     | RANGE [INCH] |       | SPRING |      |
|---------|------|------|------------|-----|--------------|-------|--------|------|
|         |      |      | MIN        | MAX | MIN          | MAX   | NO.    | QTY. |
| SHAFT20 | NS-0 | -    | 20         | 24  | 0,787        | 0,945 | SP-19  | 1    |
|         | NS-1 | -    | 24         | 28  | 0,945        | 1,102 | SP-19  | 1    |

## EXAMPLE TOOL APPLICATION





# HyperMill 56

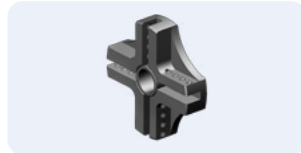
Powerful pneumatic tube facing, bevelling and weld removal machine. The HyperMill 56 is a rugged, fast, portable weld end preparation lathe for various tubes and pipes, including stainless steel and other high chromium materials. A standard machine is equipped with a solid locking system to cover most common tube sizes.

## STANDARD SET UP



### SHAFT30

Self-align, heavy duty locking system. Shafts and jaws are longer and wider to ensure maximum clamping force.



### 135 MM (5,3")

The large cutter head, very sturdy and rigid, designed to fasten the wide range of cutting inserts.



Heavy duty locking system

| STANDARD WORKING RANGE  |      |                |  | TOTAL WORKING RANGE |  |                |            |
|-------------------------|------|----------------|--|---------------------|--|----------------|------------|
| APPLICATION RANGE       |      | LOCKING RANGE  |  | APPLICATION RANGE   |  | LOCKING RANGE  |            |
| 30 – 136 mm             |      | 30 – 136 mm    |  | 20 – 175 mm         |  | 20 – 166 mm    |            |
| 1,181 – 5,354"          |      | 0,181 – 4,354" |  | 0,787 – 6,890"      |  | 0,787 – 6,535" |            |
| FEED STROKE             |      | POWER          |  | FREE SPEED          |  | TORQUE         |            |
| 40 mm                   | 1,6" | 1,3 hp         |  | 55 rpm              |  | 280 Nm         | 210 Ft.lbs |
| 55 cfm                  |      | 3,22"          |  | 15"                 |  | 19 Lbs         | 9 kg       |
| 1,3 m <sup>3</sup> /min |      | 82 mm          |  | 385 mm              |  |                |            |

## HYPERMILL 56E

HyperMill 56E is electric version of HyperMill 56. The machine can cover the same pipe sizes and comes with the same cutting head. The electric motor made by Makita with 3 stage planetary gear box made by KRAIS has variable speed control and produce enormous torque. Is interchangeable with pneumatic drive and can be purchased separately at any time.

Model..... ED-230-HM  
Free Speed..... 58 RPM  
Power..... 750 W  
Torque..... 720 Nm (530 Ft.Lbs)  
Feed Stroke ..... 40 mm (1,6")



## BATTERY OPTION

The machine is also available with a portable electric drive 18 Volt 5.2 Ah 93.6 Wh Li-Ion battery. The machine can operate up to half hour on one battery.

It is possible to have many charged batteries. Comfortable and easy to use in any place where compressed air and electricity is not available or even impossible to use as for example oil refinery.



# HyperMill 56

## OPTIONAL HEADS



**116 MM (4,56")**  
The large cutter head, designed to fasten the wide range of cutting inserts.



**175 MM (6,89")**  
Cutter head special for the largest machines, designed to fasten the wide range of cutting inserts.



**HMRBMH**  
Head for membrane and overlay removal. Efficiently remove material between boiler tubes.

## OPTIONAL SHAFTS



**SHAFT20**  
Self-align, heavy duty locking system. Shafts and jaws are longer and wider to ensure maximum clamping force.



**SHAFT25**  
Self-align, heavy duty locking system. Shafts and jaws are longer and wider to ensure maximum clamping force.

## AVAILABLE HOLDERS

**Streight weld removal holder**



IB-45-37-HM  
IB-45-30-HM  
BIT:  
2CDI

## OTHER OPTIONAL ACCESSORIES



**HEAD FLANGE**  
Adapter to use all MiniMill's special cutter heads (from size 1-1/2" and up).



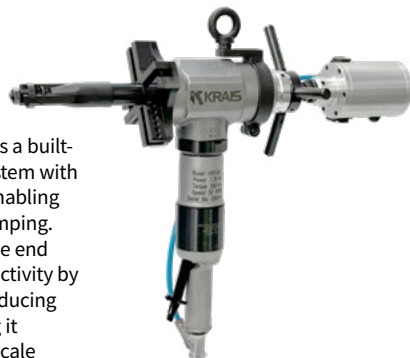
**SPEED REDUCER**  
Easy to use gearbox for 3x speed reduction. Increases the torque, enabling the machine to generate a thick chip whilst reducing the cutting time.



**RATCHET FEED**  
Feed system allowing to work in narrow and tight locations, eg. in water walls.

## HYPERMILL LP

The HyperMill LP features a built-in pneumatic locking system with a dual-piston cylinder, enabling fast and secure tube clamping. Designed for high-volume end preps, it increases productivity by up to four times while reducing operator fatigue, making it ideal for efficient, large-scale operations.



## STANDARD HYPERMILL 56 LOCKING RANGES

### WITH SHAFT30

| SHAFT   | JAWS | EXT.  | RANGE [MM] |     | RANGE [INCH] |       | SPRING |      |
|---------|------|-------|------------|-----|--------------|-------|--------|------|
|         |      |       | MIN        | MAX | MIN          | MAX   | NO.    | QTY. |
| SHAFT30 | NS-1 |       | 30         | 34  | 1,181        | 1,339 | SP-29  | 1    |
|         | NS-2 |       | 34         | 39  | 1,339        | 1,535 | SP-29  | 1    |
|         | NS-3 |       | 39         | 44  | 1,535        | 1,732 | SP-30  | 2    |
|         | NS-4 |       | 44         | 49  | 1,732        | 1,929 | SP-30  | 2    |
|         | NS-5 |       | 49         | 54  | 1,929        | 2,126 | SP-30  | 2    |
|         | NS-6 |       | 54         | 59  | 2,126        | 2,323 | SP-30  | 2    |
|         | NS-7 |       | 59         | 64  | 2,323        | 2,520 | SP-30  | 2    |
|         | NS-8 |       | 64         | 69  | 2,520        | 2,717 | SP-30  | 2    |
|         | NS-5 | NS-10 | 66         | 71  | 2,598        | 2,795 | SP-30  | 2    |
|         | NS-6 | NS-10 | 71         | 76  | 2,795        | 2,992 | SP-30  | 2    |
|         | NS-7 | NS-10 | 76         | 81  | 2,992        | 3,189 | SP-30  | 2    |
|         | NS-8 | NS-10 | 81         | 86  | 3,189        | 3,386 | SP-30  | 2    |
|         | NS-5 | NS-20 | 86         | 91  | 3,386        | 3,583 | SP-30  | 2    |
|         | NS-6 | NS-20 | 91         | 96  | 3,583        | 3,780 | SP-30  | 2    |
|         | NS-7 | NS-20 | 96         | 101 | 3,780        | 3,976 | SP-30  | 2    |
|         | NS-8 | NS-20 | 101        | 106 | 3,976        | 4,173 | SP-30  | 2    |
|         | NS-5 | NS-30 | 106        | 111 | 4,173        | 4,370 | SP-30  | 2    |
|         | NS-6 | NS-30 | 111        | 116 | 4,370        | 4,567 | SP-30  | 2    |
|         | NS-7 | NS-30 | 116        | 121 | 4,567        | 4,764 | SP-30  | 2    |
|         | NS-8 | NS-30 | 121        | 126 | 4,764        | 4,961 | SP-30  | 2    |

## OPTIONAL HYPERMILL 56 LOCKING RANGES

### WITH SHAFT30

| SHAFT   | JAWS | EXT.  | RANGE [MM] |     | RANGE [INCH] |       | SPRING |      |
|---------|------|-------|------------|-----|--------------|-------|--------|------|
|         |      |       | MIN        | MAX | MIN          | MAX   | NO.    | QTY. |
| SHAFT30 | NS-5 | NS-40 | 126        | 131 | 4,961        | 5,157 | SP-30  | 2    |
|         | NS-6 | NS-40 | 131        | 136 | 5,157        | 5,354 | SP-30  | 2    |
|         | NS-7 | NS-40 | 136        | 141 | 5,354        | 5,551 | SP-30  | 2    |
|         | NS-8 | NS-40 | 141        | 146 | 5,551        | 5,748 | SP-30  | 2    |
|         | NS-5 | NS-50 | 146        | 151 | 5,748        | 5,945 | SP-30  | 2    |
|         | NS-6 | NS-50 | 151        | 156 | 5,945        | 6,142 | SP-30  | 2    |
|         | NS-7 | NS-50 | 156        | 161 | 6,142        | 6,339 | SP-30  | 2    |
|         | NS-8 | NS-50 | 161        | 166 | 6,339        | 6,535 | SP-30  | 2    |

### WITH SHAFT25

| SHAFT   | JAWS | EXT.  | RANGE [MM] |     | RANGE [INCH] |       | SPRING |      |
|---------|------|-------|------------|-----|--------------|-------|--------|------|
|         |      |       | MIN        | MAX | MIN          | MAX   | NO.    | QTY. |
| SHAFT25 | NS-1 | -     | 25         | 30  | 0,984        | 1,181 | SP-24  | 1    |
|         | NS-2 | -     | 30         | 35  | 1,181        | 1,378 | SP-24  | 1    |
|         | NS-3 | -     | 35         | 40  | 1,378        | 1,575 | SP-25  | 2    |
|         | NS-4 | -     | 40         | 45  | 1,575        | 1,772 | SP-25  | 2    |
|         | NS-5 | -     | 45         | 50  | 1,772        | 1,969 | SP-25  | 2    |
|         | NS-6 | -     | 50         | 55  | 1,969        | 2,165 | SP-25  | 2    |
|         | NS-7 | -     | 55         | 60  | 2,165        | 2,362 | SP-25  | 2    |
|         | NS-8 | -     | 60         | 65  | 2,362        | 2,559 | SP-25  | 2    |
|         | NS-5 | NS-10 | 62         | 67  | 2,441        | 2,638 | SP-25  | 2    |
|         | NS-6 | NS-10 | 67         | 72  | 2,638        | 2,835 | SP-25  | 2    |
|         | NS-7 | NS-10 | 72         | 77  | 2,835        | 3,031 | SP-25  | 2    |
|         | NS-8 | NS-10 | 77         | 82  | 3,031        | 3,228 | SP-25  | 2    |
|         | NS-5 | NS-20 | 82         | 87  | 3,228        | 3,425 | SP-25  | 2    |
|         | NS-6 | NS-20 | 87         | 92  | 3,425        | 3,622 | SP-25  | 2    |
|         | NS-7 | NS-20 | 92         | 97  | 3,622        | 3,819 | SP-25  | 2    |
|         | NS-8 | NS-20 | 97         | 102 | 3,819        | 4,016 | SP-25  | 2    |

### WITH SHAFT20

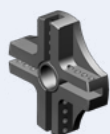
| SHAFT   | JAWS | EXT. | RANGE [MM] |     | RANGE [INCH] |       | SPRING |      |
|---------|------|------|------------|-----|--------------|-------|--------|------|
|         |      |      | MIN        | MAX | MIN          | MAX   | NO.    | QTY. |
| SHAFT20 | NS-0 | -    | 20         | 24  | 0,787        | 0,945 | SP-19  | 1    |
|         | NS-1 | -    | 24         | 28  | 0,945        | 1,102 | SP-19  | 1    |
|         | NS-2 | -    | 28         | 33  | 1,102        | 1,299 | SP-19  | 1    |
|         | NS-3 | -    | 33         | 38  | 1,299        | 1,496 | SP-20  | 2    |

# PipeMill-8

PipeMill-8 is a high-performance pneumatic tube facing, beveling, and weld removal machine engineered for demanding industrial applications. Designed for speed, durability, and precision, PipeMill-8 delivers reliable weld end preparation on a wide range of pipe materials, including stainless steel and other exotic alloys.

Its robust construction and powerful pneumatic drive ensure consistent cutting performance, while the internal locking system provides fast and secure setup on pipes with inside diameters from 50.8 to 172 mm (2.000" to 6.800"). Equipped with a 250 mm cutting head, PipeMill-8 offers excellent machining accuracy, making it an ideal solution for workshop and on-site operations where efficiency and quality are critical.

## STANDARD SET UP



### 250 MM (9,8")

Cutter head special for the largest machines. Very rigid. Designed to fasten the wide range of cutting inserts.



| STANDARD WORKING RANGE |            |                 |        | OPTIONAL WORKING RANGE |        |                 |       |
|------------------------|------------|-----------------|--------|------------------------|--------|-----------------|-------|
| APPLICATION RANGE      |            | LOCKING RANGE   |        | APPLICATION RANGE      |        | LOCKING RANGE   |       |
| 50 – 279 mm            |            | 50 – 319 mm     |        | 50 – 319 mm            |        | 50 – 319 mm     |       |
| 1,968 – 10,984"        |            | 1,968 – 12,559" |        | 1,968 – 12,559"        |        | 1,968 – 12,559" |       |
| FEED STROKE            |            | POWER           |        | FREE SPEED             |        | TORQUE          |       |
| 50 mm                  | 1,968"     | 1,3 hp          |        | Depends on gear        |        |                 |       |
| AIR USE                |            | BODY WIDTH      |        | BODY HEIGHT            |        | BODY WEIGHT     |       |
| 70 cfm                 | 2,2 m³/min | 5,7"            | 145 mm | 21,5"                  | 550 mm | 52,9 Lbs        | 24 kg |

## LOCKING RANGES WITH STANDARD JAWS

### JAWS: SM-42

| RANGE [MM] |       | RANGE [INCH] |        | EXTENSIONS  |         |          |
|------------|-------|--------------|--------|-------------|---------|----------|
| MIN        | MAX   | MIN          | MAX    | A           | B       | C        |
| 50,0       | 65,0  | 1,969        | 2,559  |             |         |          |
| 65,0       | 80,0  | 2,559        | 3,150  | ML-42-A-75  |         |          |
| 80,0       | 95,0  | 3,150        | 3,740  | ML-42-A-150 |         |          |
| 95,0       | 110,0 | 3,740        | 4,331  | ML-42-A-225 |         |          |
| 110,0      | 125,0 | 4,331        | 4,921  | ML-42-A-300 |         |          |
| 125,0      | 140,0 | 4,921        | 5,512  | ML-42-A-375 |         |          |
| 140,0      | 155,0 | 5,512        | 6,102  |             |         | SML-42-C |
| 155,0      | 170,0 | 6,102        | 6,693  | ML-42-A-75  |         | SML-42-C |
| 170,0      | 184,5 | 6,693        | 7,264  | ML-42-A-150 |         | SML-42-C |
| 184,5      | 199,0 | 7,264        | 7,835  | ML-42-A-225 |         | SML-42-C |
| 199,0      | 214,0 | 7,835        | 8,425  | ML-42-A-300 |         | SML-42-C |
| 214,0      | 229,0 | 8,425        | 9,016  | ML-42-A-375 |         | SML-42-C |
| 229,0      | 244,5 | 9,016        | 9,626  |             | ML-42-B | SML-42-C |
| 244,5      | 259,5 | 9,626        | 10,217 | ML-42-A-75  | ML-42-B | SML-42-C |
| 259,5      | 274,0 | 10,217       | 10,787 | ML-42-A-150 | ML-42-B | SML-42-C |
| 274,0      | 289,0 | 10,787       | 11,378 | ML-42-A-225 | ML-42-B | SML-42-C |
| 289,0      | 304,0 | 11,378       | 11,969 | ML-42-A-300 | ML-42-B | SML-42-C |
| 304,0      | 319,0 | 11,969       | 12,559 | ML-42-A-375 | ML-42-B | SML-42-C |

## AVAILABLE GEARBOX CONFIGURATIONS

This tool comes with one chosen gearbox as a standard. Torque/speed depends on gear configuration:

|                   |        |         |             |
|-------------------|--------|---------|-------------|
| GEARBOX <b>15</b> | 15 RPM | 2544 Nm | 1908 Ft.Lbs |
| GEARBOX <b>20</b> | 20 RPM | 1883 Nm | 1415 Ft.Lbs |
| GEARBOX <b>28</b> | 28 RPM | 1290 Nm | 969 Ft.Lbs  |
| GEARBOX <b>37</b> | 37 RPM | 971 Nm  | 730 Ft.Lbs  |

## EXAMPLE TOOL APPLICATION



# PipeMill-8

## AVAILABLE HOLDERS

| Facing                                                                            | Inside bevelling and boring                                                       | Outside bevelling                                                                 | J-Prep                                                                              | Compound bevelling                                                                  |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |  |  |  |
| F-45-90<br>BIT:<br>2CDI                                                           | IB-45-37<br>IB-45-10<br>BIT:<br>2CDI                                              | OB-45-45<br>OB-45-37<br>OB-45-30<br>OB-45-10<br>BIT:<br>2CDI                      | JP-45-45<br>JP-45-37<br>JP-45-30<br>BIT:<br>2CDJ-5                                  | CB-1037<br>(OTHERS ON REQUEST)<br>BIT:<br>CB-45                                     |

## PIPEMILL-8-H – HYDRAULIC VERSION

PipeMill-8-H is the hydraulic version of the PipeMill machine, covering the same pipe size range and using the same cutting head as other PipeMill-8 versions. The hydraulic motor provides high, constant torque for efficient and precise cutting, with performance dependent on oil pressure and flow from an external power unit. PipeMill-8-H is interchangeable with electric and pneumatic drives, allowing conversion in approximately 5 minutes. Its robust yet lightweight design makes it suitable for both field and industrial applications.

|                                           |                       |
|-------------------------------------------|-----------------------|
| Motor constant free speed .....           | 375 RPM               |
| Oil pressure required .....               | 160 bar               |
| Oil flow max .....                        | 75 l/min              |
| Motor power .....                         | 16,2 Hp               |
| Machine feed stroke .....                 | 40 mm (1,6")          |
| Cutter head max free speed .....          | 75 RPM                |
| Max constant torque on cutter blade ..... | 2200 Nm (1625 Ft.Lbs) |
| Total machine weight .....                | 41 kg                 |



## OPTIONAL HEAD

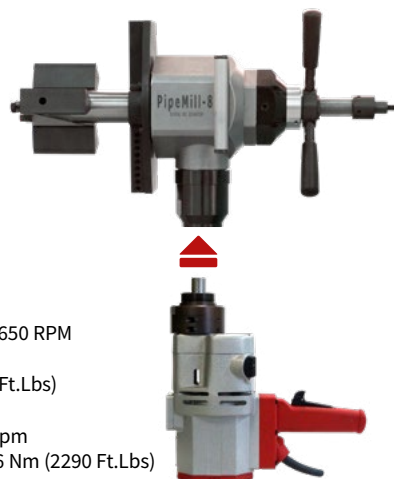


**290 MM (11,4")**  
Biggest head for Mini & HyperMill tools.  
Very rigid. Designed to fasten the wide range of cutting inserts.

## PIPEMILL-8-E – ELECTRIC VERSION

PipeMill-8-E is electric version of PipeMill-8. The machine can cover the same pipe sizes and comes with the same cutting head. The electric motor with 4 speed mechanical gear box has also variable speed control and produce enormous torque on the cutter blade. Is interchangeable with pneumatic drive and can be purchased separately at any time. Take 5 min to replace from pneumatic to electric.

|                                                   |                       |
|---------------------------------------------------|-----------------------|
| DUDE-2000-4-SPEED                                 |                       |
| Motor free speed .....                            | 120-210-380-650 RPM   |
| Motor power .....                                 | 2000 W                |
| Motor torque (on the 1st gear) .....              | 240 Nm (180 Ft.Lbs)   |
| Machine feed stroke .....                         | 40 mm (1,6")          |
| Cutter head speed .....                           | 10-17-30-50 rpm       |
| Max torque on cutter blade (on the 1st gear) .... | 3096 Nm (2290 Ft.Lbs) |





# SmartMill-8

Most powerful machine within this size range on the market today. Utilizes a powerful 2.2 kW (3 HP) pneumatic motor that is entirely engineered and manufactured by KRAIS. SmartMill-8 has a unique construction that has been specifically designed for the largest end prep systems.

- Self-centering 40 mm (1,57") one piece locking shaft.
- Only one mandrel and 6 Jaw sets needed to cover machines entire range.
- Wide clamps produce superior clamping force for chatter free end preps.
- Fully portable for on-site and Fab-shop work.

SmartMill-8 is available for sale or rent.



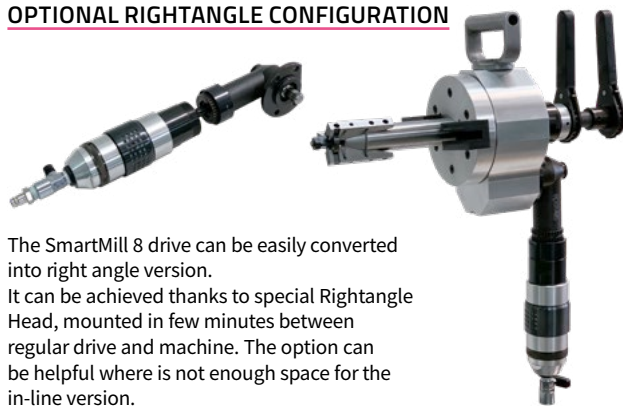
| STANDARD WORKING RANGE |            |                |         | FEED<br>STROKE    | FREE<br>SPEED      | POWER       | TORQUE     |
|------------------------|------------|----------------|---------|-------------------|--------------------|-------------|------------|
| APPLICATION RANGE      |            | LOCKING RANGE  |         |                   |                    |             |            |
| 40 - 219 mm            |            | 40 - 203,5 mm  |         | 50 mm             | 39 Rpm             | 3,0 hp      | 930 Nm     |
| 1,574 - 8,622"         |            | 1,574 - 8,012" |         | 2"                |                    |             | 697 Ft.Lbs |
| AIR USE                |            | AIR PRESSURE   |         | BODY DIMENSIONS   |                    | BODY WEIGHT |            |
| 75 cfm                 | 2,2 m³/min | 90 PSI         | 6,2 Bar | 22 x 9,25 x 7,48" | 560 x 235 x 190 mm | 46 Lbs      | 21 kg      |

## LOCKING RANGES WITH STANDARD JAWS

### JAWS: SM-7

| RANGE [MM] |       | RANGE [INCH] |       | SEGMENTS |         |                                           |
|------------|-------|--------------|-------|----------|---------|-------------------------------------------|
| MIN        | MAX   | MIN          | MAX   | SM-42-0  | SM-42-1 | ML-42-A                                   |
| 40,0       | 55,0  | 1,575        | 2,165 | SM-42-0  |         |                                           |
| 55,0       | 69,5  | 2,165        | 2,736 |          | SM-42-1 |                                           |
| 69,5       | 84,0  | 2,736        | 3,307 |          | SM-42-1 | ML-42-A-75                                |
| 84,0       | 98,5  | 3,307        | 3,878 |          | SM-42-1 | ML-42-A-150                               |
| 98,5       | 113,5 | 3,878        | 4,469 |          | SM-42-1 | ML-42-A-225                               |
| 113,5      | 128,5 | 4,469        | 5,059 |          | SM-42-1 | ML-42-A-300                               |
| 128,5      | 143,5 | 5,059        | 5,650 |          | SM-42-1 | ML-42-A-300<br>ML-42-A-75                 |
| 143,5      | 158,5 | 5,650        | 6,240 |          | SM-42-1 | ML-42-A-300<br>ML-42-A-150                |
| 158,5      | 173,5 | 6,240        | 6,831 |          | SM-42-1 | ML-42-A-300<br>ML-42-A-225                |
| 173,5      | 188,5 | 6,831        | 7,421 |          | SM-42-1 | ML-42-A-300<br>ML-42-A-225<br>ML-42-A-75  |
| 188,5      | 203,5 | 7,421        | 8,012 |          | SM-42-1 | ML-42-A-300<br>ML-42-A-225<br>ML-42-A-150 |

## OPTIONAL RIGHTANGLE CONFIGURATION



The SmartMill 8 drive can be easily converted into right angle version. It can be achieved thanks to special Rightangle Head, mounted in few minutes between regular drive and machine. The option can be helpful where is not enough space for the in-line version.

## SMARTMILL-8 PERFORMANCE



The performance of the machine may vary depending on the skill of the operator, the materials, the conditions of the tools and the air supply system in case of pneumatic unit.

# SmartMill-8

## AVAILABLE HOLDERS

| Facing                                                                            | Inside bevelling and boring                                                       | Outside bevelling                                                                 | J-Prep                                                                            | Compound bevelling                                                                  |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |  |  |  |
| F-45-90<br>BIT:<br>2CDI                                                           | IB-45-37<br>IB-45-10<br>BIT:<br>2CDI                                              | OB-45-45<br>OB-45-37<br>OB-45-30<br>OB-45-10<br>BIT:<br>2CDI                      | JP-45-45<br>JP-45-37<br>JP-45-30<br>BIT:<br>2CDJ-5                                | CB-1037<br>(OTHERS ON REQUEST)<br>BIT:<br>CB-45                                     |

## ADVANTAGES OF SMARTMILL-8



### UNIQUE SHAFT DESIGN

40 mm (1,57") shaft, assures rigidity when machining heavy wall pipe. Only 6 set of jaws needed to cover the full locking range.



### POWERFUL MOTOR UNIT

SmartMill-8 is powered by powerful and efficient drives dedicated for our Lathe series beveling machines. 39 rpm and 930 Nm (697 Ft.Lbs) torque on the cutter blade is a standard feature.



### LIGHTWEIGHT AND PORTABLE

The innovative design made it possible to produce lightweight and portable machine. Small weight of SmartMill-8 allows for fatigue-free operation in all conditions.



### HEAVY DUTY HANDLE

Machine is equipped with a solid and convenient aluminium handle.

## OPTIONALS



### RIGHT ANGLE HEAD

This right angle head allows for fastening drive in alternate positions. The useful option in tight spaces.



### 30 MM SHAFT

Optional shaft to enable the machine to be used for smaller tubes. The shaft is supplied with complete jaws set to cover up to 2" ID.

## OPTIONAL ELECTRIC MOTOR UNIT

SmartMill-8E is electric version of SmartMill-8. The machine can cover the same pipe sizes and comes with the same cutting head. The electric motor with 4 speed mechanical gear box has also variable speed control and produce enormous torque on the cutter blade. Is interchangeable with pneumatic drive and can be purchased separately at any time. Take 5 min to replace from pneumatic to electric.



### DUDE-2000-4-SPEED

Motor free speed: 120-210-380-650 RPM

Motor power: 2000 Watt

Motor torque (on the 1st gear): 240 Nm (180 Ft.Lbs)

Machine feed stroke: 50 mm (2")

Cutter head speed: 8-14-25-43 rpm

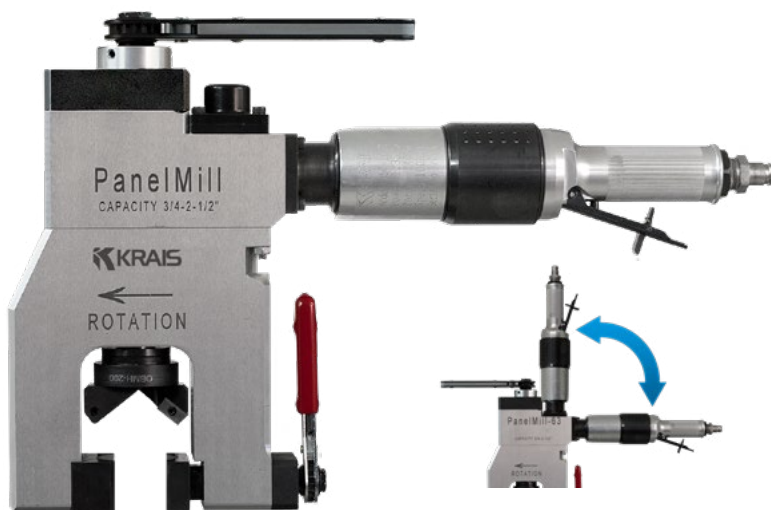
Max torque on cutter blade (on the 1st gear): 3600 Nm (2664 Ft.Lbs)

# PanelMill 65

The PanelMill attaches to the tube outside diameter by means of custom or specific clamp type jaws that provide strong clamping action that minimizes chatter and vibration.

Rugged construction allows the tool's cutting blade to end prep quickly. Several cutter heads are available for tubes with up to 2-1/2" O.D. Both the clamp and cutter heads are extremely durable and easy to change.

The ratchet feed arm enables the operator to comfortably feed the tool during bevelling or facing. The PanelMill is suitable for small bore heavy wall tubes with a high percentage of chrome, stainless steel, and other exotic alloys. Standard and custom made blades are offered in a wide variety of angles and sizes.



|          | WORKING RANGE [MM] |       | WORKING RANGE [INCH] |       | CLEARANCE |        | CLADDING REMOVAL |        | MEMBRANE UP TO |        | FEED STROKE |        | FREE SPEED | TORQUE |          |
|----------|--------------------|-------|----------------------|-------|-----------|--------|------------------|--------|----------------|--------|-------------|--------|------------|--------|----------|
|          | MIN                | MAX   | MIN                  | MAX   | [MM]      | [INCH] | [MM]             | [INCH] | [MM]           | [INCH] | [MM]        | [INCH] | [RPM]      | [NM]   | [FT.LBS] |
| 65EXT    | 19,0               | 63,5  | 0,75"                | 2,50" | 70,0      | 2,75"  | 44,4             | 1,75"  | 51,0           | 2,0"   | 25,5        | 1"     | 100*       | 140    | 105      |
| 65EXT-M* | 19,0               | 63,5  | 0,75"                | 2,50" | 84,0      | 3,3"   | 63,5             | 2,50"  | 63,5           | 2,5"   | 25,4        | 1"     | 100*       | 140    | 105      |
| 101      | 50,0               | 101,0 | 2"                   | 4"    | 122,0     | 4,8"   | 88,9             | 3,50"  | 122,0          | 4,8"   | 25,4        | 1"     | 100**      | 140    | 105      |

\*65EXT-M working range +63,5 mm membrane; \*\*65EXT and EXT-M optional free speeds are 35, 200 and 300 RPM; \*\*\*101 optional free speed: 40 RPM

|         | AIR USE |          | BODY WIDTH |        | BODY HEIGHT |        | WEIGHT |       |
|---------|---------|----------|------------|--------|-------------|--------|--------|-------|
|         | [CFM]   | [M³/MIN] | [MM]       | [INCH] | [MM]        | [INCH] | [KG]   | [LBS] |
| 65EXT   | 55      | 1,3      | 50         | 1,96"  | 300         | 11,81" | 10     | 22    |
| 65EXT-M | 55      | 1,3      | 50         | 1,96"  | 320         | 12,60" | 11     | 24    |
| 101     | 55      | 1,3      | 50         | 1,96"  | 350         | 13,78" | 18     | 40    |

## STANDARD JAWS

| JAWS NO. | TUBE OD |        |
|----------|---------|--------|
|          | [MM]    | [INCH] |
| 308 PM#2 | 25,40   | 1,000  |
| 314 PM#2 | 31,70   | 1,248  |
| 322 PM#2 | 38,10   | 1,500  |
| 334 PM#2 | 57,10   | 2,248  |

## OPTIONAL JAWS

| JAWS NO. | TUBE OD |        |
|----------|---------|--------|
|          | [MM]    | [INCH] |
| 300 PM#2 | 19,05   | 0,750  |
| 301 PM#2 | 20,00   | 0,787  |
| 304 PM#2 | 22,20   | 0,874  |
| 309 PM#2 | 25,00   | 0,984  |
| 312 PM#2 | 28,80   | 1,134  |
| 313 PM#2 | 30,00   | 1,181  |
| 318 PM#2 | 34,90   | 1,374  |
| 326 PM#2 | 44,40   | 1,748  |
| 330 PM#2 | 50,80   | 2,000  |
| 331 PM#2 | 51,00   | 2,008  |
| 338 PM#2 | 60,30   | 2,374  |
| 342 PM#2 | 63,50   | 2,500  |
| 346 PM#2 | 76,20   | 3,000  |

## PANELMILL-E

PanelMill E is electric version of PanelMill. A standard machine cover the same pipe sizes and comes with the same cutting head. The electric motor made by Makita with 3 stage planetary gear box made by KRAIS has variable speed control and produce enormous torque. Is interchangeable with pneumatic drive and can be purchased separately at any time.

Model ..... ED-230-PME  
 Free Speed.....115 RPM  
 Power.....750 W  
 Torque.....366 NM (280 Ft.Lbs)  
 Feed Stroke .....20 mm (0,787")



# PanelMill 65

## UNIVERSAL CUTTER HEADS



**50 MM (1,97'')**  
Head supplied with PanelMill 63. Designed to fasten wide range of cutting inserts.



**63 MM (2,48'')**  
Head supplied with PanelMill 100. Designed to fasten wide range of cutting inserts.



**BIT & HOLDERS**  
Universal cutter heads can hold a wide range of holders, with a bunch types of bits.

→ TABLE PAGE 44

## MACHINING IN EVERY POSITION



## OUTSIDE BEVELLING HEAD



**BIT: HSS 6% COBALT**  
**DEGREE: 37,5°**

Outside beveling head for machining tubes without membranes in a boiler water wall.

| HEAD NR   | TUBE CAPACITY |       |       | RANGE [INCH] |       | RANGE [MM] |       | INSERT | NO. OF INSERTS |
|-----------|---------------|-------|-------|--------------|-------|------------|-------|--------|----------------|
|           | [INCH]        | [MM]  | BWG   | MIN          | MAX   | MIN        | MAX   |        |                |
| OBPMH-254 | 1,000         | 25,40 | 11-23 | 0,315        | 1,339 | 8,00       | 34,00 | WRIL   | 2              |
| OBPMH-285 | 1,125         | 28,58 | 11-23 | 0,307        | 1,331 | 7,80       | 33,80 | WRIL   | 2              |
| OBPMH-317 | 1,250         | 31,75 | 8-23  | 0,433        | 1,457 | 11,00      | 37,00 | WRIL   | 2              |
| OBPMH-381 | 1,500         | 38,10 | 6-23  | 0,681        | 1,705 | 17,30      | 43,30 | WRIL   | 2              |
| OBPMH-444 | 1,750         | 44,45 | 6-23  | 0,929        | 1,953 | 23,60      | 49,60 | WRIL   | 2              |
| OBPMH-508 | 2,000         | 50,80 | 6-23  | 1,181        | 2,205 | 30,00      | 56,00 | WRIL   | 2              |
| OBPMH-571 | 2,250         | 57,15 | 6-23  | 1,433        | 2,457 | 36,40      | 62,40 | WRIL   | 2              |
| OBPMH-603 | 2,375         | 60,33 | 6-23  | 1,535        | 2,559 | 39,00      | 65,00 | WRIL   | 2              |
| OBPMH-635 | 2,500         | 63,50 | 6-23  | 1,654        | 2,677 | 42,00      | 68,00 | WRIL   | 2              |

## MEMBRANE REMOVAL HEAD



**BIT: CARBIDE**

Specially designed head for membrane removal and overlay head (cladding removal)

| HEAD NR    | TUBE CAPACITY |        | RANGE [INCH] |       | RANGE [MM] |        | INSERT | NO. OF INSERTS |
|------------|---------------|--------|--------------|-------|------------|--------|--------|----------------|
|            | [INCH]        | [MM]   | MIN          | MAX   | MIN        | MAX    |        |                |
| PMRBMH-254 | 1,000         | 25,40  | 1,000        | 1,630 | 25,40      | 41,40  | PO8    | 4              |
| PMRBMH-288 | 1,125         | 28,58  | 1,134        | 1,764 | 28,80      | 44,80  | PO8    | 5              |
| PMRBMH-317 | 1,250         | 31,75  | 1,248        | 1,878 | 31,70      | 47,70  | PO8    | 5              |
| PMRBMH-381 | 1,500         | 38,10  | 1,500        | 2,130 | 38,10      | 54,10  | PO8    | 6              |
| PMRBMH-444 | 1,750         | 44,45  | 1,748        | 2,378 | 44,40      | 60,40  | PO8    | 6              |
| PMRBMH-508 | 2,000         | 50,80  | 2,000        | 2,630 | 50,80      | 66,80  | PO8    | 7              |
| PMRBMH-571 | 2,250         | 57,15  | 2,252        | 2,882 | 57,20      | 73,20  | PO8    | 7              |
| PMRBMH-603 | 2,375         | 60,33  | 2,374        | 3,004 | 60,30      | 76,30  | PO8    | 7              |
| PMRBMH-635 | 2,500         | 63,50  | 2,500        | 3,130 | 63,50      | 79,50  | PO8    | 7              |
| PMRBMH-762 | 3,000         | 76,20  | 3,000        | 3,630 | 76,20      | 92,20  | PO8    | 8              |
| PMRBMH-889 | 3,500         | 88,90  | 3,500        | 4,130 | 88,90      | 104,90 | PO8    | 8              |
| PMRBMH-101 | 4,000         | 101,60 | 4,000        | 4,630 | 101,60     | 117,60 | PO8    | 9              |



# PanelDrill

The KRAIS PanelDrill is a modular machine for the boiler waterwalls manufactures.

This is the first outside mounting tool with unique up to 80 mm feed stroke and 50 mm thick drive spindle.

Thanks to long feed stroke, rigid construction, powerful drives options and strong clamping PanelDrill is much more comfortable than other solutions. Minimized chatter and vibration results in smooth machining and operator convenience. The PanelDrill is suitable for small bore, heavy wall tubes with a high percentage of chrome, stainless steel and other exotic alloys.

The machine is offered with a choice of one from 3 available clamping jaws: 2,5", 3" or 4" OD, other sizes are just on request.



The crank arm enables the operator to smooth and fast feeding the tool during beveling or facing.

## AVAILABLE CLAMPS



### 2,5" CLAMPS

Basic clamps allows for machining tubes with MiniDrill up to 2,5" with 2" feed range.



### 3" CLAMP

The mid 3" clamps increases MiniDrill capacity up to 76 mm (3") with 2" feed range.



### 4" CLAMP

The biggest, 4" clamps increases MiniDrill capacity up to 101 mm (4") with 2" feed range.

|                        | WORKING RANGE [MM] |       | WORKING RANGE [INCH] |       | CLEARANCE |        | CLADDING REMOVAL |        | MEMBRANE UP TO |        | FEED STROKE |        | FREE SPEED | TORQUE |          |
|------------------------|--------------------|-------|----------------------|-------|-----------|--------|------------------|--------|----------------|--------|-------------|--------|------------|--------|----------|
|                        | MIN                | MAX   | MIN                  | MAX   | [MM]      | [INCH] | [MM]             | [INCH] | [MM]           | [INCH] | [MM]        | [INCH] | [RPM]      | [NM]   | [FT.LBS] |
| PanelDrill 2,5" clamps | 19,0               | 63,5  | 0,75"                | 2,50" | 70,0      | 2,75"  | 44,4             | 1,75"  | 51,0           | 2,0"   | 50          | 2"     | 100*       | 140    | 105      |
| PanelDrill 3,0" clamps | 19,0               | 76,0  | 0,75"                | 3,00" | 84,0      | 3,3"   | 63,5             | 2,50"  | 63,5           | 2,5"   | 50          | 2"     | 100*       | 140    | 105      |
| PanelDrill 4,0" clamps | 50,0               | 101,0 | 2,00"                | 4,00" | 122,0     | 4,8"   | 88,9             | 3,50"  | 122,0          | 4,8"   | 50          | 2"     | 100**      | 140    | 105      |

\*PanelDrill with 2,5" and 3" clamps optional free speeds are 35, 200 and 300 RPM; \*\*PanelDrill with 4" clamps optional free speed: 35 RPM with Speedreducer

|                        | AIR USE |          | BODY WIDTH |        | BODY HEIGHT |        | WEIGHT |       |
|------------------------|---------|----------|------------|--------|-------------|--------|--------|-------|
|                        | [CFM]   | [M³/MIN] | [MM]       | [INCH] | [MM]        | [INCH] | [KG]   | [LBS] |
| PanelDrill 2,5" clamps | 55      | 1,3      | 50         | 1,96"  | 300         | 11,81" | 10     | 22    |
| PanelDrill 3,0" clamps | 55      | 1,3      | 50         | 1,96"  | 320         | 12,60" | 11     | 24    |
| PanelDrill 4,0" clamps | 55      | 1,3      | 50         | 1,96"  | 350         | 13,78" | 18     | 40    |

# PanelDrill

## UNIVERSAL CUTTER HEADS AND HOLDERS



### 50 MM

Standard cutter head, delivered with 2,5" clamps, covers full range from 19 to 63,5 mm tubes.



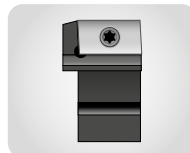
### 63 MM (2,48")

Head supplied with 3" clamps. Designed to fasten wide range of cutting inserts.



### 101 MM (3,97")

Head supplied with biggest 4" clamps. Designed to fasten wide range of cutting inserts.



### BIT & HOLDERS

Wide range of holders, with a standard and custom made blades are offered in a wide variety of angles and sizes.

→ TABLE PAGE 44

## OPTIONAL LONG FEED SYSTEM



Special version of clamps and spindle with longer feed stroke. Depending on the application, there is a possibility to build machine with stroke even up to 80 mm. Please consult with factory if you have an application that needs even longer feed.

## OTHER



### SPEED REDUCER

Easy to use gearbox for 3x speed reduction. Increases the torque, enabling the machine to generate a thick chip whilst reducing the cutting time.

## PANELDRILL PERFORMANCE



PanelDrill during 2" carbon steel membrane removal.

## PANELDRILL-E

PanelDrill E is electric version of PanelDrill. A standard machine cover the same pipe sizes and comes with the same cutting head. The electric motor made by Makita with 3 stage planetary gear box made by KRAIS has variable speed control and produce enormous torque. Is interchangeable with pneumatic drive and can be purchased separately at any time.



Model ..... ED-230-PDE  
Free Speed.....115 RPM  
Power.....750 W  
Torque.....366 NM (280 Ft.Lbs)

## CLAMPING JAWS FOR PANELDRILL

| JAWS     | TUBE OD |        |
|----------|---------|--------|
|          | [MM]    | [INCH] |
| 300 PM#2 | 19,05   | 0,750  |
| 301 PM#2 | 20,00   | 0,787  |
| 304 PM#2 | 22,20   | 0,874  |
| 308 PM#2 | 25,40   | 1,000  |
| 309 PM#2 | 25,00   | 0,984  |
| 312 PM#2 | 28,80   | 1,134  |
| 313 PM#2 | 30,00   | 1,181  |
| 314 PM#2 | 31,70   | 1,248  |
| 318 PM#2 | 34,90   | 1,374  |
| 322 PM#2 | 38,10   | 1,500  |
| 326 PM#2 | 44,40   | 1,748  |
| 330 PM#2 | 50,80   | 2,000  |
| 331 PM#2 | 51,00   | 2,008  |
| 334 PM#2 | 57,10   | 2,248  |
| 338 PM#2 | 60,30   | 2,374  |
| 342 PM#2 | 63,50   | 2,500  |
| 346 PM#2 | 76,20   | 3,000  |
| 350 PM#2 | 88,90   | 3,500  |
| 400 PM#2 | 101,60  | 4,000  |

# PanelMill PF

KRAIS PanelMill PF is the first machine where the bevelling cycle time is not dependent on an operator efficiency but on the machine mechanism. Both, the feed mechanism and the spindle rotation mechanism are driven from one source. A fixed rate of spindle advancement is achieved for each rotation of the spindle so every stroke cycle is predictable.

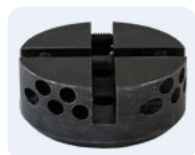
The standard machine has 35 mm feed stroke (longer ones are available as option).

PanelMill PF – positive feed bevelling machine, is highly recommended for tube end facing, bevelling, and membrane milling in water wall panels. As well as for the tube end preparation in the boiler and heat exchanger industry and FAB shops.



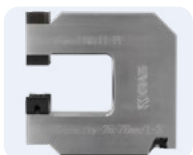
**The first one in the world! OD clamp pipe bevelling machine with Positive Feed.**

## STANDARD SET UP



### CUTTER HEAD 66 MM

Cutter head thanks to special way of fixing with spindle can cover full range from 0 to 76 mm



### 3" CLAMPS

Standard machine clamps allows for machining tubes up to 3" with 35 mm positive feed range.



### 35 MM SPINDLE

Heavy duty 35 mm (1-3/8") diameter spindle. The best stability and rigidity available on the market within this machine sizes!

| STANDARD WORKING RANGE |             |               | OPTIONAL WORKING RANGE |             |               |
|------------------------|-------------|---------------|------------------------|-------------|---------------|
| APPLICATION            | FEED STROKE | FEED PER REV. | APPLICATION            | FEED STROKE | FEED PER REV. |
| 19,05 - 76,20 mm       | 35 mm       | 0,1 mm        | 51 - 114 mm            | 35 mm       | 0,1 mm        |
| 0,75 - 3,00"           | 1,377"      | 0,003"        | 2,00 - 4,50"           | 1,377"      | 0,003"        |
| POWER                  | FREE SPEED  | TORQUE        | POWER                  | FREE SPEED  | TORQUE        |
| 2,2 hp                 | 125 Rpm     | 300 Nm        | 2,2 Hp                 | 100 Rpm     | 360 Nm        |

## STANDARD JAWS

| JAWS NO. | TUBE OD |        |
|----------|---------|--------|
|          | [MM]    | [INCH] |
| 308 PM#2 | 25,40   | 1,000  |
| 314 PM#2 | 31,70   | 1,248  |
| 322 PM#2 | 38,10   | 1,500  |
| 330 PM#2 | 50,80   | 2,000  |
| 342 PM#2 | 63,50   | 2,500  |
| 346 PM#2 | 76,20   | 3,000  |

## OPTIONAL JAWS

| JAWS NO. | TUBE OD |        |
|----------|---------|--------|
|          | [MM]    | [INCH] |
| 300 PM#2 | 19,05   | 0,750  |
| 301 PM#2 | 20,00   | 0,787  |
| 304 PM#2 | 22,20   | 0,874  |
| 309 PM#2 | 25,00   | 0,984  |
| 312 PM#2 | 28,80   | 1,134  |
| 313 PM#2 | 30,00   | 1,181  |
| 318 PM#2 | 34,90   | 1,374  |
| 326 PM#2 | 44,40   | 1,748  |
| 331 PM#2 | 51,00   | 2,008  |
| 334 PM#2 | 57,10   | 2,248  |
| 338 PM#2 | 60,30   | 2,374  |

## TWO VARIANTS



PanelMill-PF is available in two versions: right angle and in-line. You can choose the version, which suits better for your needs. Both models have exactly the same parameters.

# PanelMill PF

## UNIVERSAL CUTTER HEADS



**PMH-PF-66**  
**66 MM (2,598")**  
Head supplied with PanelMill 3". Designed to fasten wide range of cutting inserts.



**PMH-PF-99**  
**99 MM (3,897")**  
Head supplied with PanelMill 4,5". Designed to fasten wide range of cutting inserts.



**BIT & HOLDERS**  
Universal cutter heads can hold a wide range of holders, with a bunch types of bits.

## OUTSIDE BEVELLING HEAD



Angle: 37,5°; for tubes without membranes, with HSS 6% cobalt bits.



## OPTIONAL PARTS



**4,5" CLAMP**  
The bigger 4,5" clamp to increase PanelMill PF capacity up to 114 mm (4,5"). With this clamp the machine covers tube range from 51 to 114 mm (2-4,5").



**LONG FEED STROKE**  
Special version of clamps and sindle with longer feed stroke. Depending on the application, there is a possibility to build machine with stroke even up to 4". Please consult with factory if you have an application that needs even longer feed.

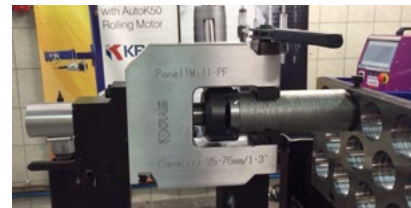


**BENCH MOUNT PLATE (BMP)**  
Thanks to bench mount plate, it is possible to attach PanelMill to the table/worktop. A table base allows you to convert PanelMill-PF to a table machine for bevelling pipes, stubs or elbows. This is only available for 4,5" clamp only.

## CLADDING REMOVAL HEAD



Head with carbide bits.



## PANELMILL PF-E

PanelMill PF can be driven by electric motor. Thus equipped machine covers the same working range but gets much more mobility. We offer two drives with different free speed. Both of them are run by Makita motor and use planetary gear Box's made by KRAIS. It has variable speed control and produce enormous torque. Electric drives are interchangeable with pneumatic one and can be purchased separately at any time.



| PanelMill Size | 3"      | 4,5"    |
|----------------|---------|---------|
| Type:          | ED600   | ED240   |
| Free speed:    | 220 Rpm | 110 Rpm |
| Power:         | 750W    | 1500 W  |
| Torque:        | 360 Nm  | 420 Nm  |
| Gearbox:       | 2-stage | 3-stage |

| HEAD NR    | TUBE CAPACITY |       | INSERT | NO. OF INSERTS |
|------------|---------------|-------|--------|----------------|
|            | [INCH]        | [MM]  |        |                |
| CRH-PF-508 | 2,000         | 50,80 | CI 9x9 | 3              |
| CRH-PF-571 | 2,250         | 57,15 | CI 9x9 | 3              |
| CRH-PF-603 | 2,375         | 60,33 | CI 9x9 | 3              |
| CRH-PF-635 | 2,500         | 63,50 | CI 9x9 | 3              |
| CRH-PF-762 | 3,000         | 76,20 | CI 9x9 | 3              |

## MEMBRANE REMOVAL AND OVERLAY HEAD



Head with carbide bits.



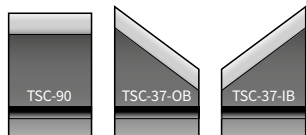
| HEAD NR       | TUBE CAPACITY |       | INSERT | NO. OF INSERTS |
|---------------|---------------|-------|--------|----------------|
|               | [INCH]        | [MM]  |        |                |
| PRRBMH-PF-508 | 2,000         | 50,80 | PO8    | 7              |
| PRRBMH-PF-571 | 2,250         | 57,15 | PO8    | 7              |
| PRRBMH-PF-603 | 2,375         | 60,33 | PO8    | 7              |
| PRRBMH-PF-635 | 2,500         | 63,50 | PO8    | 7              |
| PRRBMH-PF-762 | 3,000         | 76,20 | PO8    | 9              |



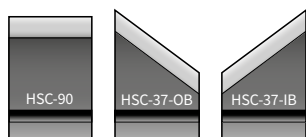
# Cutters and inserts

## REGULAR CUTTERS

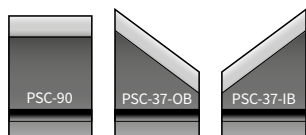
FOR USE WITHOUT HOLDERS  
BIT: HSS and HSS Cobalt



Cutters for MiniMill series



Cutters for HyperMill series



Cutters for PipeMill series

## INSERTS

Inserts options:  
HSS-Co 5% cobalt  
HSS-Co-AN 5% cobalt + ANOVA coating  
HSS-M2  
HSS-M2-TiN HSS+TiN coating



| CI | A | B |
|----|---|---|
| mm | 5 | 5 |

MAT: Carbide  
Screw: MHS-2



| CI7 | A | B |
|-----|---|---|
| mm  | 7 | 7 |

MAT: Carbide  
Screw: MHS-2,7



| CS | A   | B   |
|----|-----|-----|
| mm | 9,5 | 9,5 |

MAT: HSS 6% Cobalt  
Screw: MHS-4



| CSZ | A   | B   |
|-----|-----|-----|
| mm  | 5,8 | 9,5 |

MAT: HSS 6% Cobalt  
Screw: MHS-2,5



| CSS-CB | A   | B   |
|--------|-----|-----|
| mm     | 6,3 | 9,5 |

MAT: HSS 6% Carbide  
Screw: MHS-2,5



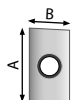
| CSS | A   | B   |
|-----|-----|-----|
| mm  | 6,3 | 9,5 |

MAT: HSS 6% Cobalt  
Screw: MHS-2,5



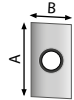
| PO8 | R |
|-----|---|
| mm  | 8 |

MAT: Carbide  
Screw: MHS-2,7



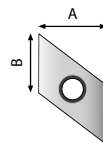
| CDI | A  | B   |
|-----|----|-----|
| mm  | 18 | 9,5 |

MAT: HSS 6% Cobalt  
Screw: MHS-4



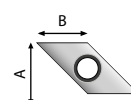
| CDI-CB | A  | B   |
|--------|----|-----|
| mm     | 18 | 9,5 |

MAT: HSS 6% Carbide  
Screw: MHS-4



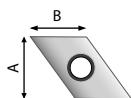
| WRIL | A    | B   |
|------|------|-----|
| mm   | 13,5 | 9,5 |

MAT: HSS 6% Cobalt  
Screw: MHS-4



| WRK | A  | B   |
|-----|----|-----|
| mm  | 10 | 9,5 |

MAT: HSS 6% Cobalt  
Screw: MHS-4



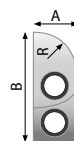
| WRI | A    | B   |
|-----|------|-----|
| mm  | 13,5 | 9,5 |

MAT: HSS 6% Cobalt  
Screw: MHS-4



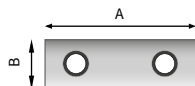
|          | A  | B   | R   |
|----------|----|-----|-----|
| CDJ-2.5* | 18 | 9,5 | 2,5 |
| CDJ-5    | 18 | 9,5 | 4,7 |
| CDJ-8*   | 18 | 9,5 | 8,0 |

MAT: HSS 6% Cobalt  
Screw: MHS-4  
\* order only



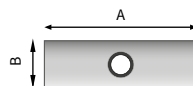
| CSWR | A   | B    | R |
|------|-----|------|---|
| mm   | 6,5 | 16,5 | 6 |

MAT: HSS 6% Cobalt  
Screw: MHS-2,5



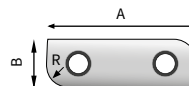
| 2CDI | A  | B    |
|------|----|------|
| mm   | 45 | 12,7 |

MAT: HSS 6% Cobalt  
Screw: MHS-5



| CDK | A  | B   |
|-----|----|-----|
| mm  | 25 | 9,5 |

MAT: HSS 6% Cobalt  
Screw: MHS-5



| 2CDJ-5 | A  | B    | R   |
|--------|----|------|-----|
| mm     | 45 | 12,7 | 4,7 |

MAT: HSS 6% Cobalt  
Screw: MHS-5



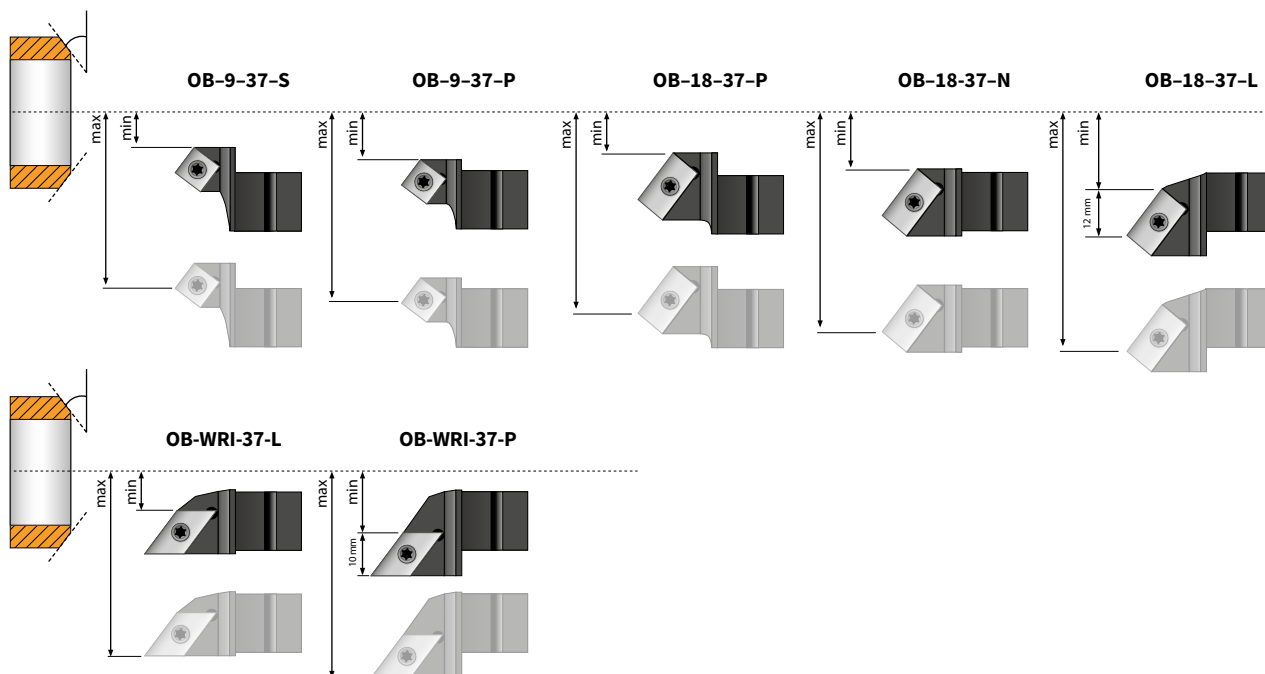
| CSS-127 | Min | Max  |
|---------|-----|------|
| mm      | 9,5 | 15,0 |

MAT: HSS 6% Cobalt

# Holders for regular cutter heads

## OUTSIDE BEVELING HOLDERS

Standard: 37,5°; other angles only on request



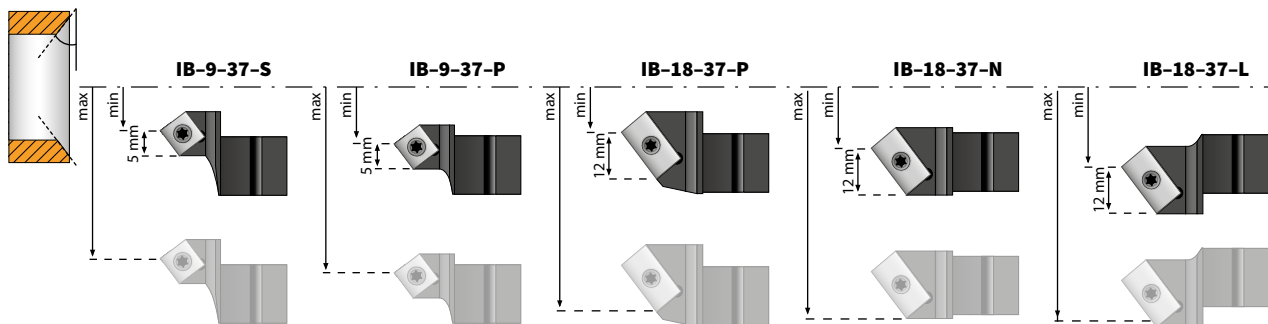
| HOLDER NO. | BIT | HEAD | RANGE [MM] |        | RANGE [INCH] |       | DEGREE*                  |
|------------|-----|------|------------|--------|--------------|-------|--------------------------|
|            |     |      | MIN        | MAX    | MIN          | MAX   |                          |
| OB-9-37-S  | CS  | 60   | 16,00      | 26,00  | 0,630        | 1,024 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 88   | 16,00      | 51,00  | 0,630        | 2,008 | 20; 30; <b>37,5</b> ; 45 |
| OB-9-37-P  | CS  | 60   | 24,00      | 34,00  | 0,945        | 1,339 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 88   | 24,00      | 58,00  | 0,945        | 2,283 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 106  | 28,00      | 72,00  | 1,102        | 2,835 | 20; 30; <b>37,5</b> ; 45 |
| OB-18-37-P | CDI | 60   | 24,00      | 47,00  | 0,945        | 1,850 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 88   | 24,00      | 71,00  | 0,945        | 2,795 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 106  | 28,00      | 85,00  | 1,102        | 3,346 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 114  | 31,00      | 88,00  | 1,220        | 3,465 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 135  | 31,00      | 109,00 | 1,220        | 4,291 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 175  | 31,00      | 149,00 | 1,220        | 5,866 | 20; 30; <b>37,5</b> ; 45 |

| HOLDER NO.  | BIT  | HEAD | RANGE [MM] |        | RANGE [INCH] |       | DEGREE*                  |
|-------------|------|------|------------|--------|--------------|-------|--------------------------|
|             |      |      | MIN        | MAX    | MIN          | MAX   |                          |
| OB-18-37-N  | CDI  | 60   | 34,00      | 56,00  | 1,339        | 2,205 | 20; 30; <b>37,5</b> ; 45 |
|             |      | 88   | 34,00      | 80,00  | 1,339        | 3,150 | 20; 30; <b>37,5</b> ; 45 |
|             |      | 106  | 38,00      | 94,00  | 1,496        | 3,701 | 20; 30; <b>37,5</b> ; 45 |
|             |      | 114  | 43,00      | 101,00 | 1,693        | 3,976 | 20; 30; <b>37,5</b> ; 45 |
|             |      | 135  | 43,00      | 122,00 | 1,693        | 4,803 | 20; 30; <b>37,5</b> ; 45 |
| OB-18-37-L  | CDI  | 175  | 43,00      | 162,00 | 1,693        | 6,378 | 20; 30; <b>37,5</b> ; 45 |
|             |      | 60   | 40,00      | 63,00  | 1,575        | 2,480 | 20; 30; <b>37,5</b> ; 45 |
|             |      | 88   | 40,00      | 87,00  | 1,575        | 3,425 | 20; 30; <b>37,5</b> ; 45 |
|             |      | 106  | 44,00      | 101,00 | 1,732        | 3,976 | 20; 30; <b>37,5</b> ; 45 |
|             |      | 114  | 47,00      | 104,00 | 1,850        | 4,094 | 20; 30; <b>37,5</b> ; 45 |
| OB-18-37-L  | CDI  | 135  | 47,00      | 125,00 | 1,850        | 4,921 | 20; 30; <b>37,5</b> ; 45 |
|             |      | 175  | 47,00      | 165,00 | 1,850        | 6,496 | 20; 30; <b>37,5</b> ; 45 |
|             |      | 175  | 47,00      | 165,00 | 1,850        | 6,496 | 20; 30; <b>37,5</b> ; 45 |
| OB-WRI-37-L | WRIL | 64   | 22,00      | 66,00  | 0,866        | 2,598 | 30; <b>37,5</b>          |
| OB-WRI-37-P | WRIL | 64   | 36,00      | 80,00  | 1,417        | 3,150 | 30; <b>37,5</b>          |
|             |      | 99   | 36,00      | 116,00 | 1,417        | 4,567 | 30; <b>37,5</b>          |

# Holders for regular cutter heads

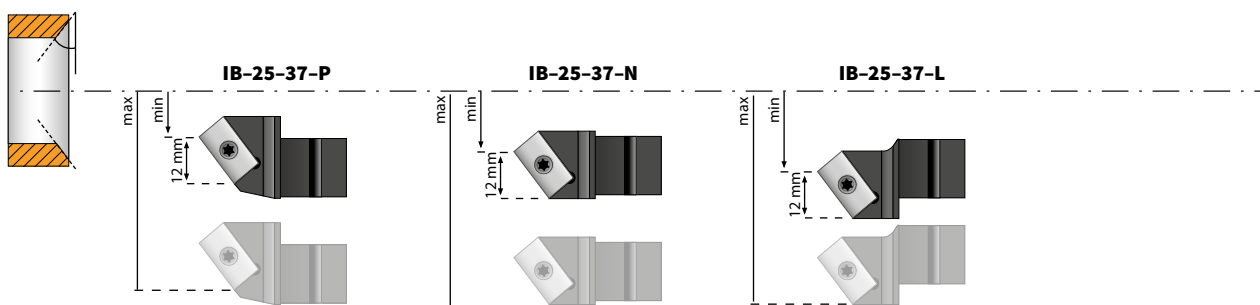
## INSIDE BEVELING HOLDERS

Standard: 37,5°; other angles only on request



| HOLDER NO. | BIT | HEAD | RANGE [MM] |        | RANGE [INCH] |       | DEGREE*                  |
|------------|-----|------|------------|--------|--------------|-------|--------------------------|
|            |     |      | MIN        | MAX    | MIN          | MAX   |                          |
| IB-9-37-S  | CS  | 60   | 29,00      | 39,00  | 1,142        | 1,535 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 88   | 29,00      | 63,00  | 1,142        | 2,480 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 106  | 33,00      | 77,00  | 1,299        | 3,031 | 20; 30; <b>37,5</b> ; 45 |
| IB-9-37-P  | CS  | 60   | 35,50      | 45,50  | 1,398        | 1,791 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 88   | 35,50      | 70,00  | 1,398        | 2,756 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 106  | 39,50      | 84,00  | 1,555        | 3,307 | 20; 30; <b>37,5</b> ; 45 |
| IB-18-37-P | CDI | 60   | 35,50      | 58,00  | 1,398        | 2,283 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 88   | 35,50      | 82,50  | 1,398        | 3,248 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 106  | 39,50      | 96,50  | 1,555        | 3,799 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 114  | 42,00      | 102,00 | 1,654        | 4,016 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 135  | 42,00      | 123,00 | 1,654        | 4,843 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 175  | 42,00      | 163,00 | 1,654        | 6,417 | 20; 30; <b>37,5</b> ; 45 |

| HOLDER NO. | BIT | HEAD | RANGE [MM] |        | RANGE [INCH] |       | DEGREE*                  |
|------------|-----|------|------------|--------|--------------|-------|--------------------------|
|            |     |      | MIN        | MAX    | MIN          | MAX   |                          |
| IB-18-37-N | CDI | 60   | 44,50      | 67,50  | 1,752        | 2,657 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 88   | 44,50      | 92,00  | 1,752        | 3,622 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 106  | 48,50      | 106,00 | 1,909        | 4,173 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 114  | 51,00      | 111,00 | 2,008        | 4,370 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 135  | 51,00      | 132,00 | 2,008        | 5,197 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 175  | 51,00      | 172,00 | 2,008        | 6,772 | 20; 30; <b>37,5</b> ; 45 |
| IB-18-37-L | CDI | 60   | 53,00      | 76,00  | 2,087        | 2,992 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 88   | 53,00      | 100,00 | 2,087        | 3,937 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 106  | 57,00      | 114,00 | 2,244        | 4,488 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 114  | 60,00      | 120,00 | 2,362        | 4,724 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 135  | 60,00      | 141,00 | 2,362        | 5,551 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 175  | 60,00      | 181,00 | 2,362        | 7,126 | 20; 30; <b>37,5</b> ; 45 |



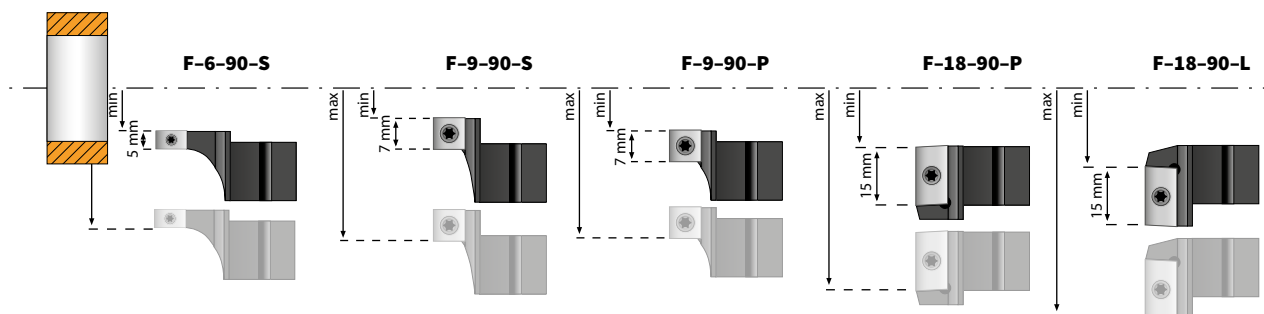
| HOLDER NO. | BIT | HEAD | RANGE [MM] |        | RANGE [INCH] |       | DEGREE*                  |
|------------|-----|------|------------|--------|--------------|-------|--------------------------|
|            |     |      | MIN        | MAX    | MIN          | MAX   |                          |
| IB-25-37-P | CDK | 60   | 35,50      | 63,00  | 1,398        | 2,480 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 88   | 35,50      | 87,50  | 1,398        | 3,444 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 106  | 39,50      | 101,50 | 1,555        | 3,996 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 114  | 42,00      | 107,00 | 1,654        | 4,212 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 135  | 42,00      | 128,00 | 1,654        | 5,039 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 175  | 42,00      | 168,00 | 1,654        | 6,614 | 20; 30; <b>37,5</b> ; 45 |
| IB-25-37-N | CDK | 60   | 44,50      | 72,50  | 1,752        | 2,854 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 88   | 44,50      | 97,00  | 1,752        | 3,818 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 106  | 48,50      | 111,00 | 1,909        | 4,370 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 114  | 51,00      | 116,00 | 2,008        | 4,566 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 135  | 51,00      | 137,00 | 2,008        | 5,393 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 175  | 51,00      | 177,00 | 2,008        | 6,969 | 20; 30; <b>37,5</b> ; 45 |

| HOLDER NO. | BIT | HEAD | RANGE [MM] |        | RANGE [INCH] |       | DEGREE*                  |
|------------|-----|------|------------|--------|--------------|-------|--------------------------|
|            |     |      | MIN        | MAX    | MIN          | MAX   |                          |
| IB-25-37-L | CDK | 60   | 53,00      | 81,00  | 2,087        | 3,188 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 88   | 53,00      | 105,00 | 2,087        | 4,133 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 106  | 57,00      | 119,00 | 2,244        | 4,685 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 114  | 60,00      | 125,00 | 2,362        | 4,921 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 135  | 60,00      | 146,00 | 2,362        | 5,748 | 20; 30; <b>37,5</b> ; 45 |
|            |     | 175  | 60,00      | 186,00 | 2,362        | 7,322 | 20; 30; <b>37,5</b> ; 45 |

# Holders for regular cutter heads

## FACING HOLDERS

Standard: 90,0°

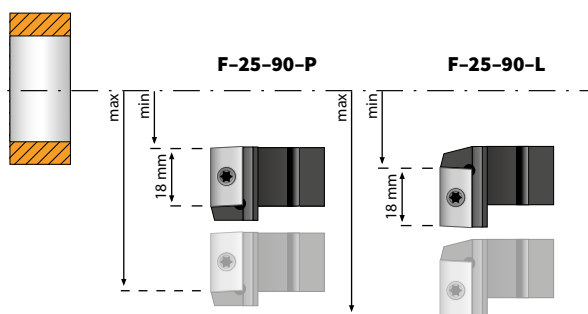


| HOLDER NO. | BIT | HEAD | RANGE [MM] |       | RANGE [INCH] |       | DEGREE* |
|------------|-----|------|------------|-------|--------------|-------|---------|
|            |     |      | MIN        | MAX   | MIN          | MAX   |         |
| F-6-90-S   | CSS | 60   | 14,50      | 24,50 | 0,571        | 0,965 | 90      |
| F-9-90-S   | CS  | 60   | 16,00      | 30,00 | 0,630        | 1,181 | 90      |
| F-9-90-P   | CS  | 60   | 24,00      | 38,00 | 0,945        | 1,496 | 90      |
|            |     | 88   | 24,00      | 62,00 | 0,945        | 2,441 | 90      |
|            |     | 106  | 28,00      | 75,00 | 1,102        | 2,953 | 90      |
|            |     | 114  | 31,00      | 80,00 | 1,220        | 3,150 | 90      |
| F-18-90-P  | CDI | 60   | 24,00      | 54,00 | 0,945        | 2,126 | 90      |
|            |     | 88   | 24,00      | 79,00 | 0,945        | 3,110 | 90      |
|            |     | 106  | 28,00      | 95,00 | 1,102        | 3,740 | 90      |

| HOLDER NO. | BIT | HEAD | RANGE [MM] |        | RANGE [INCH] |       | DEGREE* |
|------------|-----|------|------------|--------|--------------|-------|---------|
|            |     |      | MIN        | MAX    | MIN          | MAX   |         |
| F-18-90-P  | CDI | 114  | 31,00      | 98,00  | 1,220        | 3,858 | 90      |
|            |     | 135  | 31,00      | 119,00 | 1,220        | 4,685 | 90      |
|            |     | 175  | 31,00      | 159,00 | 1,220        | 6,260 | 90      |
| F-18-90-L  | CDI | 60   | 33,00      | 62,00  | 1,299        | 2,441 | 90      |
|            |     | 88   | 33,00      | 87,00  | 1,299        | 3,425 | 90      |
|            |     | 106  | 37,00      | 101,00 | 1,457        | 3,976 | 90      |
|            |     | 114  | 38,00      | 104,00 | 1,496        | 4,094 | 90      |
|            |     | 135  | 38,00      | 125,00 | 1,496        | 4,921 | 90      |
|            |     | 175  | 38,00      | 165,00 | 1,496        | 6,496 | 90      |

## FACING HOLDERS

Standard: 90,0°



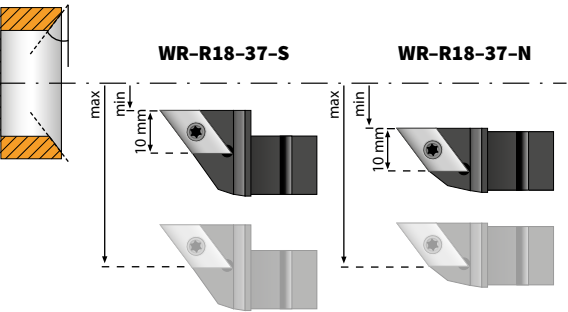
| HOLDER NO. | BIT | HEAD | RANGE [MM] |        | RANGE [INCH] |       | DEGREE* |
|------------|-----|------|------------|--------|--------------|-------|---------|
|            |     |      | MIN        | MAX    | MIN          | MAX   |         |
| F-25-90-P  | CDK | 60   | 24,00      | 61,00  | 0,945        | 2,401 | 90      |
|            |     | 88   | 24,00      | 86,00  | 0,945        | 3,385 | 90      |
|            |     | 106  | 28,00      | 102,00 | 1,102        | 4,015 | 90      |
|            |     | 114  | 31,00      | 105,00 | 1,220        | 4,133 | 90      |
|            | CDK | 135  | 31,00      | 126,00 | 1,220        | 4,960 | 90      |
|            |     | 175  | 31,00      | 166,00 | 1,220        | 6,535 | 90      |
| F-25-90-L  | CDK | 60   | 33,00      | 69,00  | 1,299        | 2,716 | 90      |
|            |     | 88   | 33,00      | 94,00  | 1,299        | 3,700 | 90      |
|            |     | 106  | 37,00      | 108,00 | 1,457        | 4,251 | 90      |
|            |     | 114  | 38,00      | 111,00 | 1,496        | 4,370 | 90      |
|            |     | 135  | 38,00      | 132,00 | 1,496        | 5,196 | 90      |
|            |     | 175  | 38,00      | 172,00 | 1,496        | 6,771 | 90      |



# Holders for regular cutter heads

## WELD REMOVAL HOLDERS

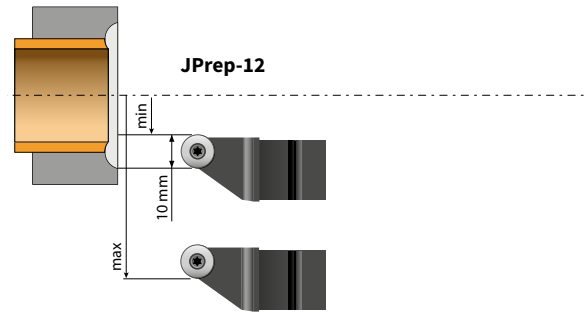
STANDARD: 37,5°; OTHER ANGLES ONLY ON REQUEST



| HOLDER NO.  | BIT | HEAD | RANGE [MM] |        | RANGE [INCH] |       | DEGREE*                  |
|-------------|-----|------|------------|--------|--------------|-------|--------------------------|
|             |     |      | MIN        | MAX    | MIN          | MAX   |                          |
| WR-R18-37-S | WRI | 60   | 15,50      | 36,00  | 0,610        | 1,417 | 20; 30; <b>37,5</b> ; 45 |
|             |     | 88   | 15,50      | 61,00  | 0,610        | 2,402 | 20; 30; <b>37,5</b> ; 45 |
|             |     | 106  | 19,50      | 75,00  | 0,768        | 2,953 | 20; 30; <b>37,5</b> ; 45 |
| WR-R18-37-N | WRI | 60   | 30,00      | 50,00  | 1,181        | 1,969 | 20; 30; <b>37,5</b> ; 45 |
|             |     | 88   | 30,00      | 75,00  | 1,181        | 2,953 | 20; 30; <b>37,5</b> ; 45 |
|             |     | 106  | 34,00      | 89,00  | 1,339        | 3,504 | 20; 30; <b>37,5</b> ; 45 |
|             |     | 114  | 37,00      | 94,00  | 1,457        | 3,701 | 20; 30; <b>37,5</b> ; 45 |
|             |     | 135  | 37,00      | 115,00 | 1,457        | 4,528 | 20; 30; <b>37,5</b> ; 45 |
|             |     | 175  | 37,00      | 155,00 | 1,457        | 6,102 | 20; 30; <b>37,5</b> ; 45 |

## JPREP STRENGTH REMOVAL

SIMULTANEOUS PROCESSING OF THE TUBE AND THE TUBE SHEET.



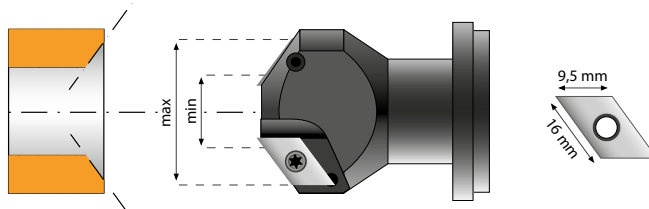
| HOLDER NO. | BIT  | HEAD | RANGE [MM] |       | RANGE [INCH] |       |
|------------|------|------|------------|-------|--------------|-------|
|            |      |      | MIN        | MAX   | MIN          | MAX   |
| JPrep-12   | PO12 | 60   | 24,00      | 38,00 | 0,945        | 1,496 |
|            |      | 88   | 24,00      | 62,00 | 0,945        | 2,441 |
|            |      | 106  | 28,00      | 75,00 | 1,102        | 2,953 |
|            |      | 114  | 31,00      | 80,00 | 1,220        | 3,150 |

# MiniMill Special Heads

## STWRMH

STRENGTH WELD REMOVAL  
BIT: HSS 6% Cobalt  
DEGREE: 37.5°

Custom designed head dedicated for strength weld removal. The heads are sized per tube diameter and are precisely engineered so that the inserts cannot damage the shaft or locking jaws. Simple, trouble-free set up makes these heads very advantageous.

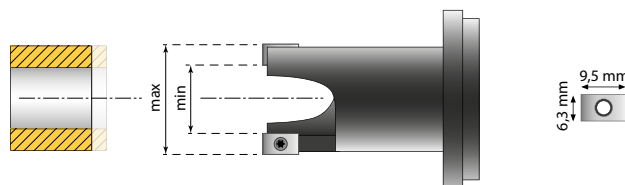


| HEAD NR    | TUBE CAPACITY |        |       | RANGE [INCH] |       | RANGE [MM] |        | INSERT | NO. OF INSERTS | SHAFT                  |
|------------|---------------|--------|-------|--------------|-------|------------|--------|--------|----------------|------------------------|
|            | [INCH]        | [MM]   | BWG   | MIN          | MAX   | MIN        | MAX    |        |                |                        |
| STWRMH-190 | 0,750         | 19,05  | 12-23 | 0,530        | 1,46  | 13,50      | 37,00  | WRI    | 2              | 901 MM#151 12,4 mm     |
| STWRMH-222 | 0,875         | 22,23  | 12-23 | 0,650        | 1,496 | 16,50      | 38,00  | WRI    | 2              | 905 MM#151 13,9 mm     |
| STWRMH-254 | 1,000         | 25,40  | 10-23 | 0,732        | 1,654 | 18,60      | 42,00  | WRI    | 2              | 909 MM#151 16,9 mm     |
| STWRMH-285 | 1,125         | 28,58  | 10-23 | 0,858        | 1,772 | 21,80      | 45,00  | WRI    | 2              | STD Shaft: 20 or 25 mm |
| STWRMH-317 | 1,250         | 31,75  | 9-23  | 0,945        | 1,850 | 24,00      | 47,00  | WRI    | 2              | STD Shaft: 20 or 25 mm |
| STWRMH-381 | 1,500         | 38,10  | 8-23  | 1,142        | 2,047 | 29,00      | 52,00  | WRI    | 2              | STD Shaft: 20 or 25 mm |
| STWRMH-444 | 1,750         | 44,45  | 8-23  | 1,417        | 2,244 | 36,00      | 57,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| STWRMH-508 | 2,000         | 50,80  | 6-23  | 1,575        | 2,480 | 40,00      | 63,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| STWRMH-571 | 2,250         | 57,15  | 6-23  | 1,811        | 2,717 | 46,00      | 69,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| STWRMH-603 | 2,375         | 60,33  | 6-23  | 1,949        | 2,854 | 49,50      | 72,50  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| STWRMH-635 | 2,500         | 63,50  | 6-23  | 2,067        | 2,972 | 52,50      | 75,50  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| STWRMH-762 | 3,000         | 76,20  | 6-23  | 2,579        | 3,484 | 65,50      | 88,50  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| STWRMH-889 | 3,500         | 88,90  | 6-23  | 3,071        | 3,976 | 78,00      | 101,00 | CDI    | 2              | STD Shaft: 20 or 25 mm |
| STWRMH-900 | 4,000         | 101,60 | 6-23  | 3,563        | 4,469 | 90,50      | 113,50 | CDI    | 2              | STD Shaft: 20 or 25 mm |

## TFMH

TUBE FACING MILLING HEAD  
BIT: HSS 6% Cobalt  
DEGREE: 90.0°

A tube facing milling head created for facing tubes made of any type of material. Utilizes 6% cobalt inserts.



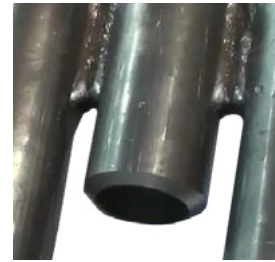
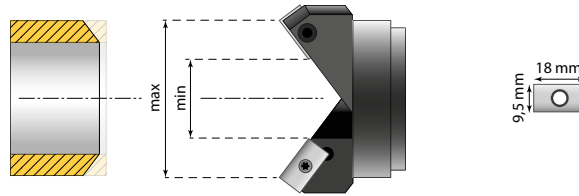
| HEAD NR  | RURA   |       |       | RANGE [INCH] |       | RANGE [MM] |       | INSERT | NO. OF INSERTS | SHAFT                    |
|----------|--------|-------|-------|--------------|-------|------------|-------|--------|----------------|--------------------------|
|          | [INCH] | [MM]  | BWG   | MIN          | MAX   | MIN        | MAX   |        |                |                          |
| TFMH-145 | 0,570  | 14,48 | 16-23 | 0,441        | 0,870 | 11,2       | 22,1  | CSZ    | 2              | 801 MM#151 Micro 10,0MM  |
| TFMH-158 | 0,625  | 15,88 | 16-23 | 0,500        | 0,933 | 12,70      | 23,70 | CSZ    | 2              | 805 MM#151 Micro 11,5 MM |
| TFMH-190 | 0,750  | 19,05 | 12-23 | 0,531        | 1,004 | 13,50      | 25,50 | CSS    | 2              | 901 MM#151 12,4 mm       |
| TFMH-222 | 0,875  | 22,23 | 12-23 | 0,654        | 1,063 | 16,60      | 27,00 | CSS    | 2              | 905 MM#151 13,9 mm       |
| TFMH-254 | 1,000  | 25,40 | 11-23 | 0,764        | 1,201 | 19,40      | 30,50 | CSS    | 2              | 909 MM#151 16,9 mm       |
| TFMH-285 | 1,125  | 28,58 | 11-23 | 0,854        | 1,307 | 21,70      | 33,20 | CSS    | 2              | 915 MM#151 20,0 mm       |
| TFMH-317 | 1,250  | 31,75 | 9-23  | 0,949        | 1,366 | 24,10      | 34,70 | CSS    | 2              | 915 MM#151 20,0 mm       |
| TFMH-381 | 1,500  | 38,10 | 9-23  | 1,197        | 1,614 | 30,40      | 41,00 | CSS    | 2              | 915 MM#151 20,0 mm       |
| TFMH-444 | 1,750  | 44,45 | 9-23  | 1,449        | 1,862 | 36,80      | 47,30 | CS     | 2              | MM#37                    |
| TFMH-508 | 2,000  | 50,80 | 9-23  | 1,701        | 2,114 | 43,20      | 53,70 | CS     | 2              | MM#37                    |

# MiniMill Special Heads

## OBMH

OUTSIDE BEVEL MILLING HEAD  
BIT: HSS 6% Cobalt  
DEGREE: 37,5°

Dedicated for the outside beveling of both tubes and pipes. Sized per tube or pipe diameter and angle of required weld bevel. The heads are precisely engineered so that the inserts cannot damage the shaft or locking jaws.

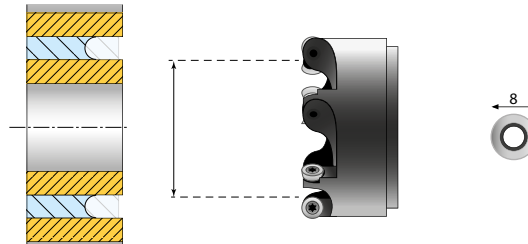


| HEAD NR  | TUBE CAPACITY |        |       | RANGE [INCH] |       | RANGE [MM] |        | INSERT | NO. OF INSERTS | SHAFT                  |
|----------|---------------|--------|-------|--------------|-------|------------|--------|--------|----------------|------------------------|
|          | [INCH]        | [MM]   | BWG   | MIN          | MAX   | MIN        | MAX    |        |                |                        |
| OBMH-190 | 0,750         | 19,05  | 14-23 | 0,5826       | 0,866 | 14,80      | 22,00  | CS     | 2              | 901 MM#151 12,4 mm     |
| OBMH-222 | 0,875         | 22,23  | 12-23 | 0,654        | 1,004 | 16,60      | 25,50  | CS     | 2              | 905 MM#151 13,9 mm     |
| OBMH-254 | 1,000         | 25,40  | 11-23 | 0,764        | 1,122 | 19,40      | 28,50  | CS     | 2              | 909 MM#151 16,9 mm     |
| OBMH-285 | 1,125         | 28,58  | 11-23 | 0,890        | 1,240 | 22,60      | 31,50  | CS     | 2              | 915 MM#151 20 mm       |
| OBMH-317 | 1,250         | 31,75  | 8-23  | 0,917        | 1,732 | 23,30      | 44,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| OBMH-381 | 1,500         | 38,10  | 6-23  | 0,984        | 1,850 | 25,00      | 47,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| OBMH-444 | 1,750         | 44,45  | 6-23  | 1,024        | 1,890 | 26,00      | 48,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| OBMH-508 | 2,000         | 50,80  | 6-23  | 1,181        | 2,047 | 30,00      | 52,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| OBMH-571 | 2,250         | 57,15  | 6-23  | 1,417        | 2,283 | 36,00      | 58,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| OBMH-603 | 2,375         | 60,33  | 6-23  | 1,535        | 2,402 | 39,00      | 61,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| OBMH-635 | 2,500         | 63,50  | 6-23  | 1,654        | 2,559 | 42,00      | 65,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| OBMH-762 | 3,000         | 76,20  | 6-23  | 2,165        | 3,031 | 55,00      | 77,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| OBMH-889 | 3,500         | 88,90  | 6-23  | 2,677        | 3,543 | 68,00      | 90,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| OBMH-900 | 4,000         | 101,60 | 6-23  | 3,150        | 4,016 | 80,00      | 102,00 | CDI    | 2              | STD Shaft: 20 or 25 mm |

## MMRBH

MEMBRANE REMOVAL HEAD  
BIT: CARBIDE

Specially designed head for membrane removal and overlay head (cladding removal)



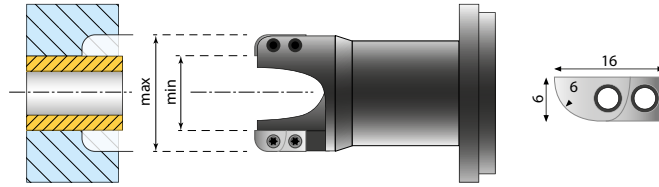
| HEAD NR   | TUBE CAPACITY |        | RANGE [INCH] |       | RANGE [MM] |        | INSERT | NO. OF INSERTS |
|-----------|---------------|--------|--------------|-------|------------|--------|--------|----------------|
|           | [INCH]        | [MM]   | MIN          | MAX   | MIN        | MAX    |        |                |
| MMRBH-254 | 1,000         | 25,40  | 1,000        | 1,630 | 25,40      | 41,40  | P08    | 4              |
| MMRBH-288 | 1,125         | 28,58  | 1,134        | 1,764 | 28,80      | 44,80  | P08    | 5              |
| MMRBH-317 | 1,250         | 31,75  | 1,248        | 1,878 | 31,70      | 47,70  | P08    | 5              |
| MMRBH-381 | 1,500         | 38,10  | 1,500        | 2,130 | 38,10      | 54,10  | P08    | 6              |
| MMRBH-444 | 1,750         | 44,45  | 1,748        | 2,378 | 44,40      | 60,40  | P08    | 6              |
| MMRBH-508 | 2,000         | 50,80  | 2,000        | 2,630 | 50,80      | 66,80  | P08    | 7              |
| MMRBH-571 | 2,250         | 57,15  | 2,252        | 2,882 | 57,20      | 73,20  | P08    | 7              |
| MMRBH-603 | 2,375         | 60,33  | 2,374        | 3,004 | 60,30      | 76,30  | P08    | 7              |
| MMRBH-635 | 2,500         | 63,50  | 2,500        | 3,130 | 63,50      | 79,50  | P08    | 7              |
| MMRBH-762 | 3,000         | 76,20  | 3,000        | 3,630 | 76,20      | 92,20  | P08    | 8              |
| MMRBH-889 | 3,500         | 88,90  | 3,500        | 4,130 | 88,90      | 104,90 | P08    | 8              |
| MMRBH-101 | 4,000         | 101,60 | 4,000        | 4,630 | 101,60     | 117,60 | P08    | 9              |

# MiniMill Special Heads

## SWROTC

TUBE FACING MILLING HEAD  
BIT: HSS 6% Cobalt

A seal weld removal head over tube circumference prior to re-welding the damaged joint without removing the tube.



| HEAD NR    | TUBE CAPACITY |       | RANGE [INCH] |       | RANGE [MM] |       | INSERT | NO. OF INSERTS | SHAFT              |
|------------|---------------|-------|--------------|-------|------------|-------|--------|----------------|--------------------|
|            | [INCH]        | [MM]  | MIN          | MAX   | MIN        | MAX   |        |                |                    |
| SWROTC-190 | 0,750         | 19,05 | 0,750        | 1,222 | 19,05      | 31,05 | CSWR   | 2              | 901 MM#151 12,4 mm |
| SWROTC-222 | 0,875         | 22,23 | 0,874        | 1,346 | 22,20      | 34,20 | CSWR   | 2              | 905 MM#151 13,9 mm |
| SWROTC-254 | 1,000         | 25,40 | 1,000        | 1,472 | 25,40      | 37,40 | CSWR   | 2              | 909 MM#151 16,9 mm |
| SWROTC-285 | 1,125         | 28,58 | 1,124        | 1,596 | 28,55      | 40,55 | CSWR   | 2              | 915 MM#151 20,0 mm |
| SWROTC-318 | 1,250         | 31,7  | 1,250        | 1,722 | 31,75      | 43,75 | CSWR   | 2              | 915 MM#151 20,0 mm |
| SWROTC-381 | 1,500         | 38,1  | 1,500        | 1,969 | 38,10      | 50,01 | CSWR   | 2              | 915 MM#151 20,0 mm |



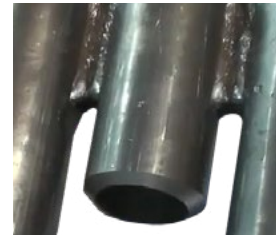
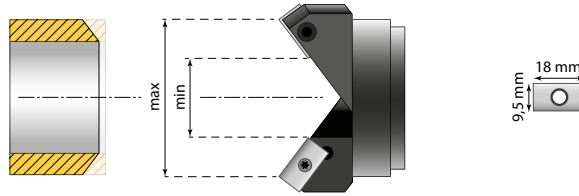
# PrepMill and HyperMill Special Heads

**FOR HYPERMILL ADDITIONAL FLANGE OBPM-F IS REQUIRED!**

## OBPM

OUTSIDE BEVEL MILLING HEAD  
BIT: HSS 6% Cobalt  
DEGREE: 37,5°

Custom, precisely designed head. Dedicated for the outside beveling of both tubes and pipes. Sized per tube or pipe diameter and angle of required weld bevel. The heads are precisely engineered so that the inserts cannot damage the shaft or locking jaws.

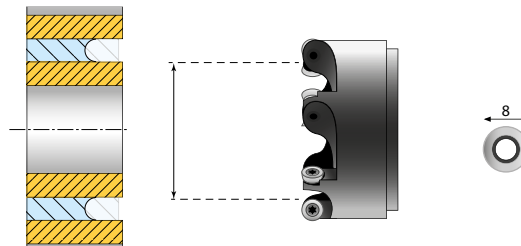


| HEAD NR  | TUBE CAPACITY |        |       | RANGE [INCH] |       | RANGE [MM] |        | INSERT | NO. OF INSERTS | SHAFT                  |
|----------|---------------|--------|-------|--------------|-------|------------|--------|--------|----------------|------------------------|
|          | [INCH]        | [MM]   | BWG   | MIN          | MAX   | MIN        | MAX    |        |                |                        |
| OBPM-190 | 0,750         | 19,05  | 14-23 | 0,5826       | 0,866 | 14,80      | 22,00  | CS     | 2              | 915 MM#151 20 mm       |
| OBPM-222 | 0,875         | 22,23  | 12-23 | 0,654        | 1,004 | 16,60      | 25,50  | CS     | 2              | STD Shaft: 20 or 25 mm |
| OBPM-254 | 1,000         | 25,40  | 11-23 | 0,764        | 1,122 | 19,40      | 28,50  | CS     | 2              | STD Shaft: 20 or 25 mm |
| OBPM-285 | 1,125         | 28,58  | 11-23 | 0,890        | 1,240 | 22,60      | 31,50  | CS     | 2              | STD Shaft: 20 or 25 mm |
| OBPM-317 | 1,250         | 31,75  | 8-23  | 0,917        | 1,732 | 23,30      | 44,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| OBPM-381 | 1,500         | 38,10  | 6-23  | 0,984        | 1,850 | 25,00      | 47,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| OBPM-444 | 1,750         | 44,45  | 6-23  | 1,024        | 1,890 | 26,00      | 48,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| OBPM-508 | 2,000         | 50,80  | 6-23  | 1,181        | 2,047 | 30,00      | 52,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| OBPM-571 | 2,250         | 57,15  | 6-23  | 1,417        | 2,283 | 36,00      | 58,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| OBPM-603 | 2,375         | 60,33  | 6-23  | 1,535        | 2,402 | 39,00      | 61,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| OBPM-635 | 2,500         | 63,50  | 6-23  | 1,654        | 2,559 | 42,00      | 65,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| OBPM-762 | 3,000         | 76,20  | 6-23  | 2,165        | 3,031 | 55,00      | 77,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| OBPM-889 | 3,500         | 88,90  | 6-23  | 2,677        | 3,543 | 68,00      | 90,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| OBPM-900 | 4,000         | 101,60 | 6-23  | 3,150        | 4,016 | 80,00      | 102,00 | CDI    | 2              | STD Shaft: 20 or 25 mm |

## PRRMBH

MEMBRANE REMOVAL HEAD  
BIT: CARBIDE

Specially designed head for membrane removal and overlay head (cladding removal)



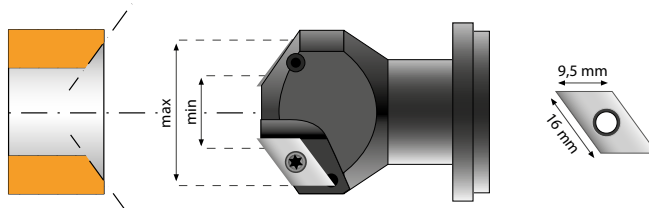
| HEAD NR    | TUBE CAPACITY |        | RANGE [INCH] |       | RANGE [MM] |        | INSERT | NO. OF INSERTS |
|------------|---------------|--------|--------------|-------|------------|--------|--------|----------------|
|            | [INCH]        | [MM]   | MIN          | MAX   | MIN        | MAX    |        |                |
| PRRMBH-254 | 1,000         | 25,40  | 1,000        | 1,630 | 25,40      | 41,40  | PO8    | 4              |
| PRRMBH-288 | 1,125         | 28,58  | 1,134        | 1,764 | 28,80      | 44,80  | PO8    | 5              |
| PRRMBH-317 | 1,250         | 31,75  | 1,248        | 1,878 | 31,70      | 47,70  | PO8    | 5              |
| PRRMBH-381 | 1,500         | 38,10  | 1,500        | 2,130 | 38,10      | 54,10  | PO8    | 6              |
| PRRMBH-444 | 1,750         | 44,45  | 1,748        | 2,378 | 44,40      | 60,40  | PO8    | 6              |
| PRRMBH-508 | 2,000         | 50,80  | 2,000        | 2,630 | 50,80      | 66,80  | PO8    | 7              |
| PRRMBH-571 | 2,250         | 57,15  | 2,252        | 2,882 | 57,20      | 73,20  | PO8    | 7              |
| PRRMBH-603 | 2,375         | 60,33  | 2,374        | 3,004 | 60,30      | 76,30  | PO8    | 7              |
| PRRMBH-635 | 2,500         | 63,50  | 2,500        | 3,130 | 63,50      | 79,50  | PO8    | 7              |
| PRRMBH-762 | 3,000         | 76,20  | 3,000        | 3,630 | 76,20      | 92,20  | PO8    | 8              |
| PRRMBH-889 | 3,500         | 88,90  | 3,500        | 4,130 | 88,90      | 104,90 | PO8    | 8              |
| PRRMBH-101 | 4,000         | 101,60 | 4,000        | 4,630 | 101,60     | 117,60 | PO8    | 9              |

# PrepMill and HyperMill Special Heads

## STWRPM

STRENGTH WELD REMOVAL  
BIT: HSS 6% Cobalt  
DEGREE: 37.5°

Custom designed head dedicated for strength weld removal. The heads are sized per tube diameter and are precisely engineered so that the inserts cannot damage the shaft or locking jaws. Simple, trouble-free set up makes these heads very advantageous.

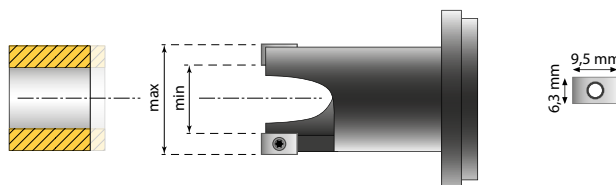


| HEAD NR    | TUBE CAPACITY |        |       | RANGE [INCH] |       | RANGE [MM] |        | INSERT | NO. OF INSERTS | SHAFT                  |
|------------|---------------|--------|-------|--------------|-------|------------|--------|--------|----------------|------------------------|
|            | [INCH]        | [MM]   | BWG   | MIN          | MAX   | MIN        | MAX    |        |                |                        |
| STWRPM-190 | 0,750         | 19,05  | 12-23 | 0,530        | 1,46  | 13,50      | 37,00  | WRI    | 2              | STD Shaft: 20 mm       |
| STWRPM-222 | 0,875         | 22,23  | 12-23 | 0,650        | 1,496 | 16,50      | 38,00  | WRI    | 2              | STD Shaft: 20 or 25 mm |
| STWRPM-254 | 1,000         | 25,40  | 10-23 | 0,732        | 1,654 | 18,60      | 42,00  | WRI    | 2              | STD Shaft: 20 or 25 mm |
| STWRPM-285 | 1,125         | 28,58  | 10-23 | 0,858        | 1,772 | 21,80      | 45,00  | WRI    | 2              | STD Shaft: 20 or 25 mm |
| STWRPM-317 | 1,250         | 31,75  | 9-23  | 0,945        | 1,850 | 24,00      | 47,00  | WRI    | 2              | STD Shaft: 20 or 25 mm |
| STWRPM-381 | 1,500         | 38,10  | 8-23  | 1,142        | 2,047 | 29,00      | 52,00  | WRI    | 2              | STD Shaft: 20 or 25 mm |
| STWRPM-444 | 1,750         | 44,45  | 8-23  | 1,417        | 2,244 | 36,00      | 57,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| STWRPM-508 | 2,000         | 50,80  | 6-23  | 1,575        | 2,480 | 40,00      | 63,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| STWRPM-571 | 2,250         | 57,15  | 6-23  | 1,811        | 2,717 | 46,00      | 69,00  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| STWRPM-603 | 2,375         | 60,33  | 6-23  | 1,949        | 2,854 | 49,50      | 72,50  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| STWRPM-635 | 2,500         | 63,50  | 6-23  | 2,067        | 2,972 | 52,50      | 75,50  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| STWRPM-762 | 3,000         | 76,20  | 6-23  | 2,579        | 3,484 | 65,50      | 88,50  | CDI    | 2              | STD Shaft: 20 or 25 mm |
| STWRPM-889 | 3,500         | 88,90  | 6-23  | 3,071        | 3,976 | 78,00      | 101,00 | CDI    | 2              | STD Shaft: 20 or 25 mm |
| STWRPM-900 | 4,000         | 101,60 | 6-23  | 3,563        | 4,469 | 90,50      | 113,50 | CDI    | 2              | STD Shaft: 20 or 25 mm |

## TFPM

TUBE FACING MILLING HEAD  
BIT: HSS 6% Cobalt  
DEGREE: 90.0°

A tube facing milling head created for facing tubes made of any type of material. Utilizes 6% cobalt inserts.



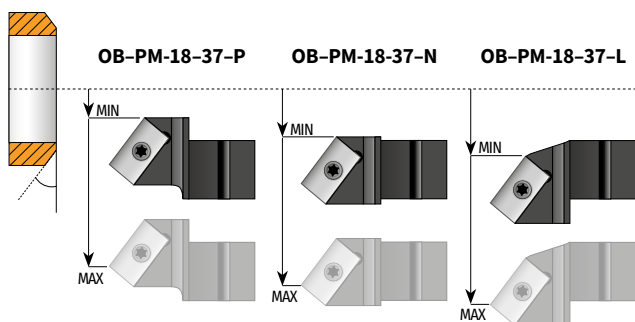
| HEAD NR  | TUBE CAPACITY |       |       | RANGE [INCH] |       | RANGE [MM] |       | INSERT | NO. OF INSERTS | SHAFT                  |
|----------|---------------|-------|-------|--------------|-------|------------|-------|--------|----------------|------------------------|
|          | [INCH]        | [MM]  | BWG   | MIN          | MAX   | MIN        | MAX   |        |                |                        |
| TFPM-285 | 1,125         | 28,58 | 11-23 | 0,854        | 1,307 | 21,70      | 33,20 | CSS    | 2              | STD Shaft 20 mm        |
| TFPM-317 | 1,250         | 31,75 | 9-23  | 0,949        | 1,366 | 24,10      | 34,70 | CSS    | 2              | STD Shaft 20 mm        |
| TFPM-381 | 1,500         | 38,10 | 9-23  | 1,197        | 1,614 | 30,40      | 41,00 | CSS    | 2              | STD Shaft: 20 or 25 mm |
| TFPM-444 | 1,750         | 44,45 | 9-23  | 1,449        | 1,862 | 36,80      | 47,30 | CS     | 2              | STD Shaft: 20 or 25 mm |
| TFPM-508 | 2,000         | 50,80 | 9-23  | 1,701        | 2,114 | 43,20      | 53,70 | CS     | 2              | STD Shaft: 20 or 25 mm |

# Holders for PanelMill heads

It is highly recommended to use inserts made by KRAIS with ALNOVA coating by OERLIKON on this machine.

## OUTSIDE BEVELING HOLDERS

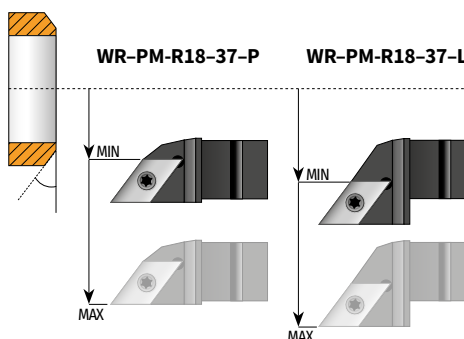
Cutting edge length: 12 mm, standard angle: 37,5° (others on request)



| HOLDER NO.    | BIT | HEAD | RANGE [MM] |        | RANGE [INCH] |       | DEGREE*         |
|---------------|-----|------|------------|--------|--------------|-------|-----------------|
|               |     |      | MIN        | MAX    | MIN          | MAX   |                 |
| OB-PM-18-37-P | CDI | 64   | 0,00       | 47,00  | 0,000        | 1,850 | 30; <b>37,5</b> |
|               | CDI | 99   | 0,00       | 85,00  | 0,000        | 3,346 | 30; <b>37,5</b> |
| OB-PM-18-37-N | CDI | 64   | 11,00      | 56,50  | 0,433        | 2,224 | 30; <b>37,5</b> |
|               | CDI | 99   | 11,00      | 95,00  | 0,433        | 3,740 | 30; <b>37,5</b> |
| OB-PM-18-37-L | CDI | 64   | 20,00      | 65,50  | 0,787        | 2,579 | 30; <b>37,5</b> |
|               | CDI | 99   | 20,00      | 104,00 | 0,787        | 4,094 | 30; <b>37,5</b> |

## OUTSIDE BEVELING HOLDERS

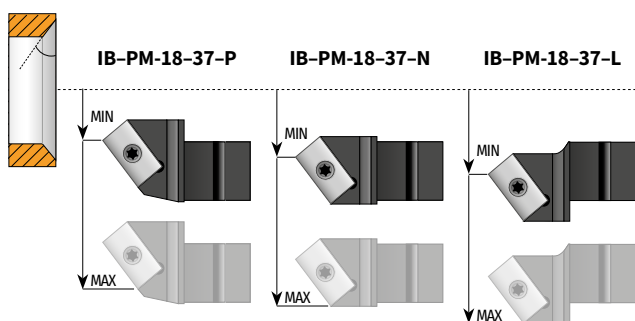
Cutting edge length: 10 mm, standard angle: 37,5° (others on request)



| HOLDER NO.     | BIT  | HEAD | RANGE [MM] |        | RANGE [INCH] |       | DEGREE*         |
|----------------|------|------|------------|--------|--------------|-------|-----------------|
|                |      |      | MIN        | MAX    | MIN          | MAX   |                 |
| WR-PM-R18-37-P | WRIL | 64   | 28,00      | 62,00  | 1,102        | 2,441 | 30; <b>37,5</b> |
| WR-PM-R18-37-L | WRIL | 64   | 36,00      | 70,00  | 1,417        | 2,756 | 30; <b>37,5</b> |
| WR-PM-R18-37-L | WRIL | 99   | 36,00      | 116,00 | 1,417        | 4,567 | 30; <b>37,5</b> |

## INSIDE BEVELING HOLDERS

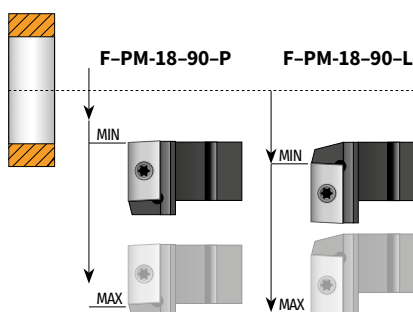
Cutting edge length: 12 mm, standard angle: 37,5° (others on request)



| HOLDER NO.    | BIT | HEAD | RANGE [MM] |        | RANGE [INCH] |       | DEGREE*         |
|---------------|-----|------|------------|--------|--------------|-------|-----------------|
|               |     |      | MIN        | MAX    | MIN          | MAX   |                 |
| IB-PM-18-37-P | CDI | 64   | 10,00      | 56,00  | 0,394        | 2,205 | 30; <b>37,5</b> |
|               | CDI | 99   | 10,00      | 95,00  | 0,394        | 3,740 | 30; <b>37,5</b> |
| IB-PM-18-37-N | CDI | 64   | 20,00      | 65,00  | 0,787        | 2,559 | 30; <b>37,5</b> |
|               | CDI | 99   | 20,00      | 104,00 | 0,787        | 4,094 | 30; <b>37,5</b> |
| IB-PM-18-37-L | CDI | 64   | 35,00      | 79,00  | 1,378        | 3,110 | 30; <b>37,5</b> |
|               | CDI | 99   | 35,00      | 115,00 | 1,378        | 4,528 | 30; <b>37,5</b> |

## FACING HOLDERS

Cutting edge length: 15 mm, standard angle: 90,0°



| HOLDER NO.   | BIT | HEAD | RANGE [MM] |        | RANGE [INCH] |       | DEGREE* |
|--------------|-----|------|------------|--------|--------------|-------|---------|
|              |     |      | MIN        | MAX    | MIN          | MAX   |         |
| F-PM-18-90-P | CDI | 64   | 0,00       | 53,00  | 0,000        | 2,087 | 90      |
|              | CDI | 99   | 0,00       | 88,00  | 0,000        | 3,465 | 90      |
| F-PM-18-90-L | CDI | 64   | 20,00      | 80,00  | 0,787        | 3,150 | 90      |
|              | CDI | 99   | 20,00      | 116,00 | 0,787        | 4,567 | 90      |



# Pipe Beveling Machines



# MiniLathe

- Most powerful machine within this size range on the market today. Utilises a powerful 2.2kW (3 HP) pneumatic motor that is entirely engineered and manufactured by KRAIS for the largest end prep systems.
- MiniLathe comes with one of 3 gearboxes as a standard. It gives a wide choice for operator. No need for extra gearbox that reduces the RPM and multiplies the torque - it comes as standard!
- Innovative 6 point locking system assures maximum stability during all machining operations.
- Self-centering 2,75" one piece locking shaft with build in jaws, eliminates the issue of broken or loosening retaining springs and o-rings.
- Only one mandrel and 10 Jaw sets needed to cover machines entire range.
- Wide clamps produce superior clamping force for chatter free end preps.
- Fully portable for on-site and Fab-shop work.
- Available for sale or rent.



| STANDARD WORKING RANGE |                         | FEED STROKE | POWER   | FREE SPEED         | TORQUE             |
|------------------------|-------------------------|-------------|---------|--------------------|--------------------|
| APPLICATION RANGE      | LOCKING RANGE (ID)      |             |         |                    |                    |
| 72 - 406 mm            | 70 - 400 mm             | 50 mm       | 3,0 Hp  | DEPENDS ON GEARBOX |                    |
| 2,800 - 16,000"        | 2,755 - 15,700"         | 2"          |         |                    |                    |
| 70 cfm                 | 2,2 m <sup>3</sup> /min | 90 PSI      | 6,2 Bar | 25 x 13 x 12"      | 640 x 330 x 300 mm |
|                        |                         |             |         | 75 Lbs             | 35 kg              |

## LOCKING RANGES WITH STANDARD JAWS

### JAWS: ML-42

| RANGE [MM] |     | RANGE [INCH] |        | SEGMENT                    |         |         |
|------------|-----|--------------|--------|----------------------------|---------|---------|
| MIN        | MAX | MIN          | MAX    | A                          | B       | C       |
| 70         | 85  | 2,756        | 3,346  |                            |         |         |
| 85         | 100 | 3,346        | 3,937  | ML-42-A-75                 |         |         |
| 100        | 115 | 3,937        | 4,528  | ML-42-A-150                |         |         |
| 115        | 130 | 4,528        | 5,118  | ML-42-A-225                |         |         |
| 130        | 145 | 5,118        | 5,709  | ML-42-A-300                |         |         |
| 145        | 160 | 5,709        | 6,299  | ML-42-A-375                |         |         |
| 160        | 175 | 6,299        | 6,890  |                            |         | ML-42-C |
| 175        | 190 | 6,890        | 7,480  | ML-42-A-75                 |         | ML-42-C |
| 190        | 205 | 7,480        | 8,071  | ML-42-A-150                |         | ML-42-C |
| 205        | 220 | 8,071        | 8,661  | ML-42-A-225                |         | ML-42-C |
| 220        | 235 | 8,661        | 9,252  | ML-42-A-300                |         | ML-42-C |
| 235        | 250 | 9,252        | 9,843  | ML-42-A-375                |         | ML-42-C |
| 250        | 265 | 9,843        | 10,433 |                            | ML-42-B | ML-42-C |
| 265        | 280 | 10,433       | 11,024 | ML-42-A-75                 | ML-42-B | ML-42-C |
| 280        | 295 | 11,024       | 11,614 | ML-42-A-150                | ML-42-B | ML-42-C |
| 295        | 310 | 11,614       | 12,205 | ML-42-A-225                | ML-42-B | ML-42-C |
| 310        | 325 | 12,205       | 12,795 | ML-42-A-300                | ML-42-B | ML-42-C |
| 325        | 340 | 12,795       | 13,386 | ML-42-A-375                | ML-42-B | ML-42-C |
| 340        | 355 | 13,386       | 13,976 | ML-42-A-300<br>ML-42-A-150 | ML-42-B | ML-42-C |
| 355        | 370 | 13,976       | 14,567 | ML-42-A-300<br>ML-42-A-225 | ML-42-B | ML-42-C |
| 370        | 385 | 14,567       | 15,157 | ML-42-A-375<br>ML-42-A-225 | ML-42-B | ML-42-C |
| 385        | 400 | 15,157       | 15,748 | ML-42-A-375<br>ML-42-A-300 | ML-42-B | ML-42-C |

## AVAILABLE GEARBOX

This tool comes with one of 3 gearboxes as a standard. Torque/speed depends on gear configuration.

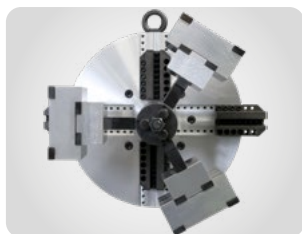
|                   |        |         |             |
|-------------------|--------|---------|-------------|
| GEARBOX <b>11</b> | 11 RPM | 3850 Nm | 2840 Ft.Lbs |
| GEARBOX <b>15</b> | 15 RPM | 2615 Nm | 1960 Ft.Lbs |
| GEARBOX <b>21</b> | 21 RPM | 1770 Nm | 1327 Ft.Lbs |

# MiniLathe

## AVAILABLE HOLDERS

| Facing                                                                            | Inside bevelling and boring                                                       | Outside bevelling                                                                 | J-Prep                                                                            | Compound bevelling                                                                  |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |  |  |  |
| F-45-90<br>BIT:<br>2CDI                                                           | IB-45-37<br>IB-45-10<br>BIT:<br>2CDI                                              | OB-45-45<br>OB-45-37<br>OB-45-30<br>OB-45-10<br>BIT:<br>2CDI                      | JP-45-45<br>JP-45-37<br>JP-45-30<br>BIT:<br>2CDJ-5                                | CB-1037<br>(OTHERS ON REQUEST)<br>BIT:<br>CB-45                                     |

## ADVANTAGES OF MINILATHE



### 6 POINT LOCKING JAWS

150 mm (5,9") shaft, assures rigidity when machining heavy wall pipe. The jaws are fully contained within the shaft with no need for retaining springs or O-rings that easily brake or get lost.



### POWERFUL MOTOR UNIT

Powerful and efficient drives dedicated for our Lathe series beveling machines. 11 rpm and 3850 Nm (2840 Ft.Lbs) torque on the cutter blade is a standard feature.



### HEAVY DUTY PENDANT

Machine is equipped with a heavy duty pendant. This can be attached to both sides of the motor for operator convenience.



### SLIDE BEARING

As an option we can supply a bronze slide bearing that delivers more stability and rigidity while machining a very hard materials and heavy wall pipes.

## OPTIONAL MOTOR UNITS



### DUDE-2000-4-SPEED

For thin wall application (up to 1" / 25,4 mm) is an electric motor DUDE-2000-4-SPEED, which offers 4 speed: 120-210-380-650 RPM



### PDE MOTOR

The PipeLathe can also be supplied as an electric version, with a 3200 Watt heavy duty motor.



### PDH MOTOR

Optional super strong hydraulic motor. Constructed on the basis of a small hydraulic motor and multistage planetary gear box. HyperLathe version generates 11 rpm and up to 8200 Nm (6050 Ft.Lbs) torque on cutter blade at constant cutting speed.



### PDU MOTOR

Powerful and efficient drive dedicated for our Lathe series beveling machines. 0-5 rpm and 12500 Nm (9219 ft.lbs) torque on the cutter blade is a standard feature.

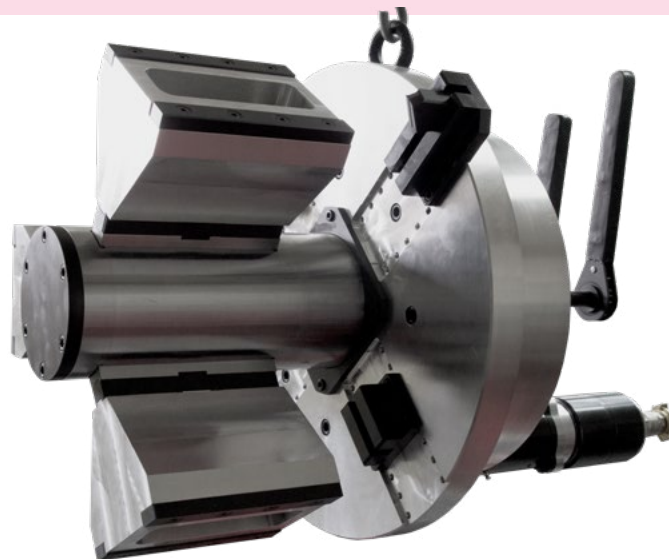
## EXAMPLE TOOL APPLICATION



In order to facilitate the assembly of the machine in the pipe, the machine optionally can be equipped with a double-sided yoke with removable extensions so that two people can freely install into the processed pipe.

# PipeLathe

- Powerful 3.5 HP pneumatic drive generating 12500 Nm (9259 ft.lbs) torque on the cutter blade. Variable speed control 0-5 rpm.
- No need for extra gear box that reduces the rpm and multiplies the torque. It comes as standard!
- 150 mm (5,9") One piece locking shaft with build in jaws, eliminates the issue of broken or loosening retaining springs and o-rings.
- One mandrel covers complete working range.
- Innovative 6 point locking system assures maximum stability during all machining operations.
- Only one mandrel and 6 Jaw sets needed to cover machines entire range.
- Self-centering shaft with build in jaws.
- Wide Clamps produce superior clamping force for chatter free end preps.
- Fully portable for on-site and Fab-shop work.
- Available for sale or rent.



| STANDARD WORKING RANGE |               | FEED STROKE  | POWER   | FREE SPEED      | TORQUE             |             |        |
|------------------------|---------------|--------------|---------|-----------------|--------------------|-------------|--------|
| APPLICATION RANGE      | LOCKING RANGE |              |         |                 |                    |             |        |
| 180 - 609 mm           | 175 - 600 mm  | 60 mm        | 3,5 hp  | 5 Rpm           | 12500 Nm           |             |        |
| 7,0 - 24,0"            | 6,889 - 23,6" | 2,4"         |         |                 | 9219 Ft.lbs        |             |        |
| AIR USE                |               | AIR PRESSURE |         | BODY DIMENSIONS |                    | BODY WEIGHT |        |
| 85 cfm                 | 2,8 m³/min    | 90 PSI       | 6,2 Bar | 38 x 22 x 22"   | 950 x 550 x 500 mm | 495 Lbs     | 225 kg |

## LOCKING RANGES WITH STANDARD JAWS

### JAWS: PL-42

| RANGE [MM] |       | RANGE [INCH] |        | SEGMENT     |         |         |
|------------|-------|--------------|--------|-------------|---------|---------|
| MIN        | MAX   | MIN          | MAX    | A           | B       | C       |
| 175,0      | 200,0 | 6,890        | 7,874  |             |         |         |
| 200,0      | 225,0 | 7,874        | 8,858  | PL-42-A-125 |         |         |
| 225,0      | 250,0 | 8,858        | 9,843  | PL-42-A-250 |         |         |
| 250,0      | 275,0 | 9,843        | 10,827 | PL-42-A-375 |         |         |
| 275,0      | 300,0 | 10,827       | 11,811 | PL-42-A-500 |         |         |
| 300,0      | 325,0 | 11,811       | 12,795 | PL-42-A-500 |         |         |
| 325,0      | 350,0 | 12,795       | 13,780 | PL-42-A-500 |         |         |
| 350,0      | 375,0 | 13,780       | 14,764 |             | PL-42-B |         |
| 375,0      | 400,0 | 14,764       | 15,748 | PL-42-A-125 | PL-42-B |         |
| 400,0      | 425,0 | 15,748       | 16,732 | PL-42-A-250 | PL-42-B |         |
| 425,0      | 450,0 | 16,732       | 17,717 | PL-42-A-375 | PL-42-B |         |
| 450,0      | 475,0 | 17,717       | 18,701 | PL-42-A-500 | PL-42-B |         |
| 475,0      | 500,0 | 18,701       | 19,685 |             |         | PL-42-C |
| 500,0      | 525,0 | 19,685       | 20,669 | PL-42-A-125 |         | PL-42-C |
| 525,0      | 550,0 | 20,669       | 21,654 | PL-42-A-250 |         | PL-42-C |
| 550,0      | 575,0 | 21,654       | 22,638 | PL-42-A-375 |         | PL-42-C |
| 575,0      | 600,0 | 22,638       | 23,622 | PL-42-A-500 |         | PL-42-C |

## EXAMPLE TOOL APPLICATION



PipeLathe is the strongest machine from all KRAIS Lathe tools. It allows for machining tubes up to 24" (600 mm) OD.

# PipeLathe

## AVAILABLE HOLDERS

| Facing                                                                            | Inside bevelling and boring                                                       | Outside bevelling                                                                 | J-Prep                                                                            | Compound bevelling                                                                  |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |  |  |  |
| F-45-90<br>BIT:<br>2CDI                                                           | IB-45-37<br>IB-45-10<br>BIT:<br>2CDI                                              | OB-45-45<br>OB-45-37<br>OB-45-30<br>OB-45-10<br>BIT:<br>2CDI                      | JP-45-45<br>JP-45-37<br>JP-45-30<br>BIT:<br>2CDJ-5                                | CB-1037<br>(OTHERS ON REQUEST)<br>BIT:<br>CB-45                                     |

## ADVANTAGES OF HYPERLATHE



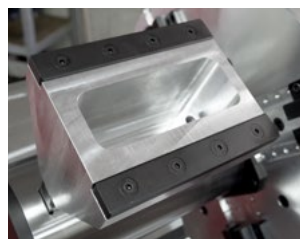
### HEAVY DUTY DESIGN

All the Lathe series machine design is based on long steel spindle which assure maximum rigidity because the locking shaft is fully mounted into that spindle instead partially into the main aluminium body what is casing adverse vibration due to a lot of tension on it.



### POWERFUL MOTOR UNIT

Powerful and efficient drive dedicated for our Lathe series beveling machines. 0-5 rpm and 12500 Nm (9219 ft.lbs) torque on the cutter blade is a standard feature.



### 6 POINT LOCKING JAWS

150 mm (5,9") shaft, assures rigidity when machining heavy wall pipe. The jaws are fully contained within the shaft with no need for retaining springs or O-rings that easily brake or get lost.



### HEAVY DUTY PENDANT

Machine is equipped with a heavy duty pendant. This can be attached to both sides of the motor for operator convenience.

## OPTIONAL MOTOR UNITS



### MOTOR PDE

The PipeLathe can also be supplied as an electric version, with a 3200 Watt heavy duty motor.



### MOTOR PDH

Optional super strong hydraulic motor. Constructed on the basis of a small hydraulic motor and multistage planetary gear box. PipeLathe version generates 6 rpm and up to 14200 Nm (10475 Ft.Lbs) torque on cutter blade at constant cutting speed.



# PipeLathe 24

PipeLathe 24 is strong and versatile facing lathe in the KRAIS line, engineered for precision machining of pipes up to 24" (600 mm) OD, including the most demanding materials such as P91, Super Duplex, SMO-254, Inconel, and high-alloy stainless steels.

The new generation introduces a fundamental upgrade: full multi-drive compatibility, with the ability to work using hydraulic, electric PMSM, or pneumatic drives, either in single-motor or dual synchronized motor configuration.

This gives operators the freedom to optimise torque, speed, and cutting dynamics depending on the application - from heavy wall machining to clean, highly repeatable bevels in stainless steels.

**THREE FULLY SUPPORTED DRIVE OPTIONS**

- Hydraulic drive - extreme torque for heavy-wall machining and hard alloys.
- Electric PMSM drive - high efficiency, constant torque across the full speed range, ideal for stainless steels.
- Pneumatic drive - lightweight, dynamic, EX-safe, and easy to service.



**SINGLE- OR DUAL-MOTOR OPERATION FOR ALL DRIVES**

Two synchronized drives significantly increase torque capacity and ensure stable cutting conditions on wall thicknesses up to 3 inches.



| STANDARD WORKING RANGE |               | FEED STROKE  | POWER<br>(ONE PNEUMATIC) | FREE SPEED<br>(ONE PNEUMATIC) | TORQUE<br>(ONE PNEUMATIC) |             |        |
|------------------------|---------------|--------------|--------------------------|-------------------------------|---------------------------|-------------|--------|
| APPLICATION RANGE      | LOCKING RANGE |              |                          |                               |                           |             |        |
| 180 - 609 mm           | 175 - 600 mm  | 60 mm        | 3,5 hp                   | 5 Rpm                         | 12500 Nm                  |             |        |
| 7,0 - 24,0"            | 6,889 - 23,6" | 2,4"         |                          |                               | 9219 Ft.lbs               |             |        |
| AIR USE                |               | AIR PRESSURE |                          | BODY DIMENSIONS               |                           | BODY WEIGHT |        |
| 85 cfm                 | 2,8 m³/min    | 90 PSI       | 6,2 Bar                  | 38 x 22 x 22"                 | 950 x 550 x 500 mm        | 495 Lbs     | 225 kg |

**KEY FEATURES OF PIPELATHE 24**

- High rigidity and mechanical stability
- 150 mm (5.9") one-piece locking shaft with integrated jaws — no springs, no O-rings.
- 6-point locking system providing maximum stiffness and vibration-free cutting.
- One mandrel and six jaw sets cover the entire working range.

Wide machining capability

- 10–37° compound bevel
- J-Prep (all standard angles)
- V-bevel, U-bevel, facing, boring
- Internal and external beveling
- Up to 3" wall thickness

**DRIVE CONFIGURATIONS**



**HYDRAULIC DRIVE  
(SINGLE OR DUAL)**

Provides the highest torque output and unmatched stability. Ideal for:

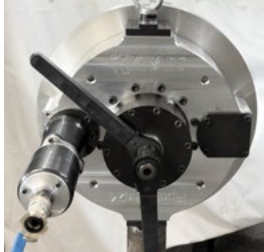
- Heavy wall up to 3"
- Cutting operations with strong heat build-up



**PMSM ELECTRIC DRIVE  
(SINGLE OR DUAL)**

Constant torque even at low RPM

- Smooth, quiet operation
- Excellent surface finish and high process repeatability
- Perfect for stainless steels and high-alloy applications



**PNEUMATIC DRIVE  
(SINGLE OR DUAL)**

Best choice in EX-restricted zones

- Lightweight, dynamic acceleration
- Easy to maintain and economical to operate

# PipeLathe 24

## AVAILABLE HOLDERS

| Facing                                                                            | Inside bevelling and boring                                                       | Outside bevelling                                                                 | J-Prep                                                                              | Compound bevelling                                                                  |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |  |  |  |
| F-45-90<br>BIT:<br>2CDI                                                           | IB-45-37<br>IB-45-10<br>BIT:<br>2CDI                                              | OB-45-45<br>OB-45-37<br>OB-45-30<br>OB-45-10<br>BIT:<br>2CDI                      | JP-45-45<br>JP-45-37<br>JP-45-30<br>BIT:<br>2CDJ-5                                  | CB-1037<br>(OTHERS ON REQUEST)<br>BIT:<br>CB-45                                     |

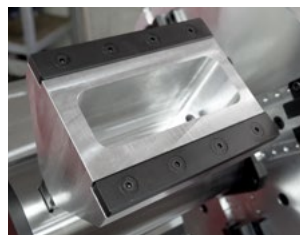
## ADVANTAGES OF PIPELATHE 24



### HEAVY DUTY DESIGN

The PipeLathe24 is engineered specifically to excel in the harshest industrial environments. At the heart of this series is a robust, extended steel spindle which serves as the foundation for maximum structural rigidity.

Unlike conventional designs where the locking shaft is only partially seated within a softer aluminum body—a flaw that creates stress points and leads to adverse vibration due to excessive tension—our locking shaft is fully mounted and supported within the hardened steel spindle.



### 6 POINT LOCKING JAWS

150 mm (5,9") shaft, assures rigidity when machining heavy wall pipe. The jaws are fully contained within the shaft with no need for retaining springs or O-rings that easily brake or get lost.



### HEAVY DUTY PENDANT

Machine is equipped with a heavy duty pendant. This can be attached to both sides of the motor for operator convenience.

## LOCKING RANGES WITH STANDARD JAWS

### JAWS: PL-42

| RANGE [MM] |       | RANGE [INCH] |        | SEGMENT                    |         |         |
|------------|-------|--------------|--------|----------------------------|---------|---------|
| MIN        | MAX   | MIN          | MAX    | A                          | B       | C       |
| 175,0      | 200,0 | 6,890        | 7,874  |                            |         |         |
| 200,0      | 225,0 | 7,874        | 8,858  | PL-42-A-125                |         |         |
| 225,0      | 250,0 | 8,858        | 9,843  | PL-42-A-250                |         |         |
| 250,0      | 275,0 | 9,843        | 10,827 | PL-42-A-375                |         |         |
| 275,0      | 300,0 | 10,827       | 11,811 | PL-42-A-500                |         |         |
| 300,0      | 325,0 | 11,811       | 12,795 | PL-42-A-500<br>PL-42-A-125 |         |         |
| 325,0      | 350,0 | 12,795       | 13,780 | PL-42-A-500<br>PL-42-A-250 |         |         |
| 350,0      | 375,0 | 13,780       | 14,764 |                            | PL-42-B |         |
| 375,0      | 400,0 | 14,764       | 15,748 | PL-42-A-125                | PL-42-B |         |
| 400,0      | 425,0 | 15,748       | 16,732 | PL-42-A-250                | PL-42-B |         |
| 425,0      | 450,0 | 16,732       | 17,717 | PL-42-A-375                | PL-42-B |         |
| 450,0      | 475,0 | 17,717       | 18,701 | PL-42-A-500                | PL-42-B |         |
| 475,0      | 500,0 | 18,701       | 19,685 |                            |         | PL-42-C |
| 500,0      | 525,0 | 19,685       | 20,669 | PL-42-A-125                |         | PL-42-C |
| 525,0      | 550,0 | 20,669       | 21,654 | PL-42-A-250                |         | PL-42-C |
| 550,0      | 575,0 | 21,654       | 22,638 | PL-42-A-375                |         | PL-42-C |
| 575,0      | 600,0 | 22,638       | 23,622 | PL-42-A-500                |         | PL-42-C |

## EXAMPLE TOOL APPLICATION



# PipeLathe 40

- Powerful hydraulic drive generating 14500 Nm (10800 ft.lbs) of torque on the cutter blade.
- Variable speed control 0-5 RPM. There is no need for an extra gear box that reduces the RPM and multiplies the torque. It comes as standard!
- 150 mm (5,9") locking shaft with built-in jaws eliminates the issue of broken or loosening retaining springs and o-rings.
- An innovative 6-point locking system with wide clamps assures maximum stability during machining.
- Only one mandrel and a set of six jaws cover the entire working range.
- Fully portable for on-site and fab-shop work. Available for sale or rent.



## MACHINE PERFORMANCE

PipeLathe 40 is the biggest internal mounted machine from all KRAIS Lathe tools. It allows for machining tubes up to 40" (600 mm) OD. Picture shows PipeLathe 40 machining 36" tube.

| STANDARD WORKING RANGE |            |               |         | FEED STROKE     | POWER              | FREE SPEED  | TORQUE      |
|------------------------|------------|---------------|---------|-----------------|--------------------|-------------|-------------|
| APPLICATION RANGE      |            | LOCKING RANGE |         |                 |                    |             |             |
| 305 - 1016 mm          |            | 300 - 972 mm  |         | 60 mm           | 3,5 hp             | 5 Rpm       | 12500 Nm    |
| 12,0" - 40,0"          |            | 11,8" - 38,3" |         | 2,4"            |                    |             | 9219 Ft.lbs |
| AIR USE                |            | AIR PRESSURE  |         | BODY DIMENSIONS |                    | BODY WEIGHT |             |
| 85 cfm                 | 2,8 m³/min | 90 PSI        | 6,2 Bar | 38 x 22 x 22"   | 950 x 550 x 500 mm | 495 Lbs     | 225 kg      |

## LOCKING RANGES WITH STANDARD JAWS

### JAWS: PL-42

| RANGE [MM] |     | RANGE [INCH] |      | SEGMENT                    |         |         |   |   |  |
|------------|-----|--------------|------|----------------------------|---------|---------|---|---|--|
| MIN        | MAX | MIN          | MAX  | A                          | B       | C       | D | E |  |
| 300        | 325 | 11,8         | 12,8 | PL-42-A-500<br>PL-42-A-125 |         |         |   |   |  |
| 325        | 350 | 12,8         | 13,8 | PL-42-A-500<br>PL-42-A-250 |         |         |   |   |  |
| 350        | 375 | 13,8         | 14,8 |                            | PL-42-B |         |   |   |  |
| 375        | 400 | 14,8         | 15,7 | PL-42-A-125                | PL-42-B |         |   |   |  |
| 400        | 425 | 15,7         | 16,7 | PL-42-A-250                | PL-42-B |         |   |   |  |
| 425        | 450 | 16,7         | 17,7 | PL-42-A-375                | PL-42-B |         |   |   |  |
| 450        | 475 | 17,7         | 18,7 | PL-42-A-500                | PL-42-B |         |   |   |  |
| 475        | 500 | 18,7         | 19,7 |                            |         | PL-42-C |   |   |  |
| 500        | 525 | 19,7         | 20,7 | PL-42-A-125                |         | PL-42-C |   |   |  |
| 525        | 550 | 20,7         | 21,7 | PL-42-A-250                |         | PL-42-C |   |   |  |
| 550        | 575 | 21,7         | 22,6 | PL-42-A-375                |         | PL-42-C |   |   |  |
| 575        | 600 | 22,6         | 23,6 | PL-42-A-500                |         | PL-42-C |   |   |  |
| 593        | 622 | 23,3         | 24,5 | PL-42-A-500<br>PL-42-A-125 |         | PL-42-C |   |   |  |
| 621        | 647 | 24,4         | 25,5 | PL-42-A-500<br>PL-42-A-250 |         | PL-42-C |   |   |  |

| RANGE [MM] |     | RANGE [INCH] |      | SEGMENT                    |   |         |         |         |  |
|------------|-----|--------------|------|----------------------------|---|---------|---------|---------|--|
| MIN        | MAX | MIN          | MAX  | A                          | B | C       | D       | E       |  |
| 646        | 671 | 25,4         | 26,4 | PL-42-A-500<br>PL-42-A-375 |   | PL-42-C |         |         |  |
| 667        | 693 | 26,3         | 27,3 |                            |   | PL-42-C | PL-42-D |         |  |
| 692        | 716 | 27,2         | 28,2 | PL-42-A-125                |   | PL-42-C | PL-42-D |         |  |
| 715        | 739 | 28,1         | 29,1 | PL-42-A-250                |   | PL-42-C | PL-42-D |         |  |
| 738        | 762 | 29,1         | 30,0 | PL-42-A-375                |   | PL-42-C | PL-42-D |         |  |
| 761        | 786 | 30,0         | 30,9 | PL-42-A-500                |   | PL-42-C | PL-42-D |         |  |
| 787        | 811 | 31,0         | 31,9 |                            |   | PL-42-C |         | PL-42-E |  |
| 810        | 834 | 31,9         | 32,8 | PL-42-A-125                |   | PL-42-C |         | PL-42-E |  |
| 833        | 856 | 32,8         | 33,7 | PL-42-A-250                |   | PL-42-C |         | PL-42-E |  |
| 856        | 879 | 33,7         | 34,6 | PL-42-A-375                |   | PL-42-C |         | PL-42-E |  |
| 878        | 903 | 34,6         | 35,6 | PL-42-A-500                |   | PL-42-C |         | PL-42-E |  |
| 902        | 925 | 35,5         | 36,4 | PL-42-A-500<br>PL-42-A-125 |   | PL-42-C |         | PL-42-E |  |
| 924        | 949 | 36,4         | 37,4 | PL-42-A-500<br>PL-42-A-250 |   | PL-42-C |         | PL-42-E |  |
| 948        | 972 | 37,3         | 38,3 | PL-42-A-500<br>PL-42-A-375 |   |         |         | PL-42-E |  |

# SlimFit Split Frame Clamshells



KRAIS SFSF portable SLIM FIT Clamshell series are designed for strength and easy handling. Each of the machine from the SFSF series have a height of 3,248" (82,5 mm) up 24" and 4,47" (113,7 mm) up to 48" and a width of 2.5" (63,5 mm) resulting narrow body low profile design that makes the SFSF series the ideal choice in tight spaces .

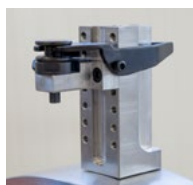
- 】 15 Standard models cover a range from 1." (33,4 mm) to 48" (1219 mm) OD
- 】 Pneumatic, hydraulic and electric drive options are available .
- 】 Motor mount on keyways to prevent the motor to twist and potential damage on gear ring .
- 】 Several different drive options are available to best position the motor for a specific machining application
- 】 All pneumatic and electric motors are design and Manufactured by KRAIS after 20 years experience of manufacturing pneumatic drives for boiler and heat exchangers tube rolling motors.
- 】 SFSF series clamshells can be equipped a wide range of accessories to increase performance and expand capabilities.
- 】 Adjustable locator pads minimize the number of locators.



## FEATURES



Choice of 3 positions with different travel length tool holder with heat treated slights.



Lever type tripper module for operator safety.



Steel plates on the back part for machine squaring on the pipe .

## AIR TREATMENT MODULE



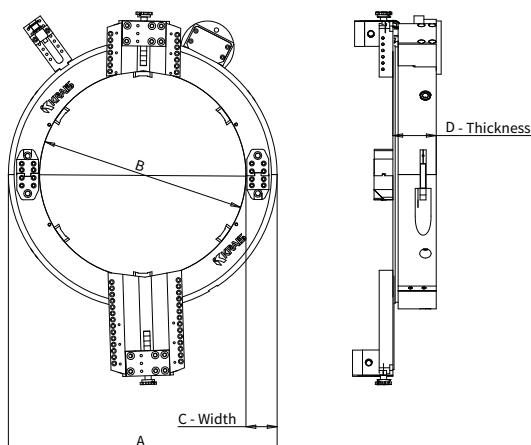
Optional module (ATM) provides air treatment capability for KRAIS pneumatic powered split frames.



# SlimFit Split Frame Clamshells

General technical machine information to enable to make the right choice to suit your application.

For our SFSF clamshells we offer a wide range of pneumatic, electric made 100% in house and hydraulic choose by our engineers or upon customer preference. Such a big range and variety of parameters allow us to select motor to achieve to best and most post suitable cutting speed to machined pipe material and diameter.



| MODEL     | PIPE CAPACITY |         |         | DIMENSIONS |         |         |       |        |                |                |                | LOCATOR PADS | GEAR RING RATIO |
|-----------|---------------|---------|---------|------------|---------|---------|-------|--------|----------------|----------------|----------------|--------------|-----------------|
|           | UNIT          | MIN OD  | MAX OD  | UNIT       | A       | B       | C     | D      | 1" SLIDE SWING | 3" SLIDE SWING | 6" SLIDE SWING |              |                 |
| SFSF-0204 | NPS           | 2,000   | 4,000   | [inch]     | 9,685   | 4,736   | 2,500 | 3,248  | 12,165         | 16,165         | -              | 4            | 4,6:1           |
|           | Metric        | 60,32   | 127,00  | [mm]       | 246,00  | 120,30  | 63,50 | 82,50  | 309,00         | 410,60         | -              |              |                 |
| SFSF-0256 | NPS           | 2,500   | 6,000   | [inch]     | 11,831  | 6,858   | 2,500 | 3,248  | 14,339         | 18,339         | -              | 4            | 5,7:1           |
|           | Metric        | 73,02   | 168,27  | [mm]       | 300,50  | 174,20  | 63,50 | 82,50  | 364,20         | 465,80         | -              |              |                 |
| SFSF-0358 | NPS           | 3,500   | 8,000   | [inch]     | 13,819  | 8,846   | 2,500 | 3,248  | 16,339         | 20,339         | 26,339         | 4            | 6,7:1           |
|           | Metric        | 101,60  | 219,07  | [mm]       | 351,00  | 224,70  | 63,50 | 82,50  | 415,00         | 516,60         | 669,00         |              |                 |
| SFSF-0410 | NPS           | 4,500   | 10,000  | [inch]     | 16,220  | 11,236  | 2,500 | 3,248  | 18,756         | 22,756         | 28,756         | 4            | 7,8:1           |
|           | Metric        | 127,00  | 273,05  | [mm]       | 412,00  | 285,40  | 63,50 | 82,50  | 476,40         | 578,00         | 730,40         |              |                 |
| SFSF-0612 | NPS           | 6,000   | 12,000  | [inch]     | 18,150  | 13,236  | 2,500 | 3,248  | 20,843         | 24,843         | 30,843         | 4            | 8,9:1           |
|           | Metric        | 168,27  | 323,85  | [mm]       | 461,00  | 336,20  | 63,50 | 82,50  | 529,40         | 631,00         | 783,40         |              |                 |
| SFSF-0814 | NPS           | 8,000   | 14,000  | [inch]     | 19,488  | 14,484  | 2,500 | 3,248  | 22,063         | 26,063         | 32,063         | 6            | 9,5:1           |
|           | Metric        | 219,07  | 355,60  | [mm]       | 495,00  | 367,90  | 63,50 | 82,50  | 560,40         | 662,00         | 814,40         |              |                 |
| SFSF-1016 | NPS           | 10,000  | 16,000  | [inch]     | 21,457  | 16,484  | 2,500 | 3,287  | 24,102         | 28,102         | 34,102         | 6            | 10,6:1          |
|           | Metric        | 273,05  | 406,40  | [mm]       | 545,00  | 418,70  | 63,50 | 83,50  | 612,20         | 713,80         | 866,20         |              |                 |
| SFSF-1218 | NPS           | 12,000  | 18,000  | [inch]     | 23,504  | 18,484  | 2,500 | 3,287  | 26,224         | 30,224         | 36,224         | 6            | 11,6:1          |
|           | Metric        | 323,85  | 457,20  | [mm]       | 597,00  | 469,50  | 63,50 | 83,50  | 666,10         | 767,70         | 920,10         |              |                 |
| SFSF-1420 | NPS           | 14,000  | 20,000  | [inch]     | 25,472  | 20,848  | 2,500 | 3,287  | 28,150         | 32,150         | 38,150         | 6            | 12,6:1          |
|           | Metric        | 355,60  | 508,00  | [mm]       | 647,00  | 520,30  | 63,50 | 83,50  | 715,00         | 816,60         | 969,00         |              |                 |
| SFSF-1624 | NPS           | 16,000  | 24,000  | [inch]     | 29,488  | 24,406  | 2,500 | 3,287  | 32,268         | 36,268         | 42,268         | 10           | 14,6:1          |
|           | Metric        | 406,40  | 609,60  | [mm]       | 749,00  | 619,90  | 63,50 | 83,50  | 819,60         | 921,20         | 1073,60        |              |                 |
| SFSF-2028 | NPS           | 20,000  | 28,000  | [inch]     | 33,900  | 28,750  | 2,757 | 4,476  | 36,516         | 40,516         | 46,516         | 10           | 16,9:1          |
|           | Metric        | 508,00  | 711,20  | [mm]       | 861,10  | 730,30  | 65,40 | 113,70 | 927,50         | 1029,10        | 1181,50        |              |                 |
| SFSF-2432 | NPS           | 24,000  | 32,000  | [inch]     | 38,150  | 33,000  | 2,757 | 4,476  | 40,787         | 44,787         | 50,787         | 10           | 19:1            |
|           | Metric        | 609,60  | 812,80  | [mm]       | 969,00  | 838,20  | 65,40 | 113,70 | 1036,00        | 1137,60        | 1290,00        |              |                 |
| SFSF-2836 | NPS           | 28,000  | 36,000  | [inch]     | 42,150  | 37,000  | 2,757 | 4,476  | 44,913         | 48,913         | 54,913         | 10           | 21:1            |
|           | Metric        | 711,20  | 914,40  | [mm]       | 1070,60 | 939,80  | 65,40 | 113,70 | 1140,80        | 1242,40        | 1394,80        |              |                 |
| SFSF-3442 | NPS           | 34,000  | 42,000  | [inch]     | 48,150  | 43,000  | 2,757 | 4,476  | 50,906         | 54,906         | 60,906         | 10           | 24,2:1          |
|           | Metric        | 863,60  | 1066,80 | [mm]       | 1223,00 | 1092,20 | 65,40 | 113,70 | 1293,00        | 1394,60        | 1547,00        |              |                 |
| SFSF-4048 | NPS           | 40,000  | 48,000  | [inch]     | 54,402  | 49,525  | 2,757 | 4,476  | 57,276         | 61,276         | 67,276         | 12           | 27,3:1          |
|           | Metric        | 1016,00 | 1219,20 | [mm]       | 1381,80 | 1251,00 | 65,40 | 113,70 | 1454,80        | 1556,40        | 1708,80        |              |                 |

# SFSF clamshells motors

## PNEUMATIC MOTORS

B50-100X



B50-xxx-RA



HM-xxx



K7x-LT-xxx



PDx48U



| MOTOR      | RIGHT-ANGLE | SPEED | POWER | TORQUE | AIR CONSUMPTION |     | AIR PRESSURE |     |
|------------|-------------|-------|-------|--------|-----------------|-----|--------------|-----|
|            |             | RPM   | HP    | NM     | LT/MIN          | CFM | BAR          | PSI |
| B50-100X   | -           | 200   | 1,3   | 70     | 1300            | 55  | 6,2          | 90  |
| B50-115-RA | YES         | 115   | 1,3   | 186    | 1300            | 55  | 6,2          | 90  |
| B50-210-RA | YES         | 210   | 1,3   | 102    | 1300            | 55  | 6,2          | 90  |
| B50-290-RA | YES         | 290   | 1,3   | 74     | 1300            | 55  | 6,2          | 90  |
| HM-198     | -           | 198   | 2,2   | 186    | 2200            | 75  | 6,2          | 90  |
| HM-252     | -           | 252   | 2,2   | 150    | 2200            | 75  | 6,2          | 90  |
| HM-379     | -           | 379   | 2,2   | 105    | 2200            | 75  | 6,2          | 90  |
| HM-498     | -           | 498   | 2,2   | 83     | 2200            | 75  | 6,2          | 90  |
| K72-LT-90  | YES         | 90    | 2,2   | 405    | 2200            | 75  | 6,2          | 90  |
| K73-LT-190 | YES         | 190   | 2,2   | 200    | 2200            | 75  | 6,2          | 90  |
| PD248U     | -           | 185   | 3,5   | 416    | 2800            | 95  | 6,2          | 90  |
| PD348U     | -           | 60    | 3,5   | 1250   | 2800            | 95  | 6,2          | 90  |

## RECOMMENDATIONS

Only proposal and subject to change upon customer requirement and application

## PNEUMATIC MOTORS

| UNIT  | MOTOR*    | POWER | WEIGHT |
|-------|-----------|-------|--------|
|       |           | HP    | KG     |
| SF-4  | B50-100X  | 1,3   | 11     |
| SF-6  | HM-252    | 2,2   | 17     |
| SF-8  | HM-252    | 2,2   | 20     |
| SF-10 | HM-252    | 2,2   | 27     |
| SF-12 | HM-252    | 2,2   | 23     |
| SF-14 | HM-198    | 2,2   | 28     |
| SF-16 | HM-198    | 2,2   | 32     |
| SF-18 | K72-LT-90 | 2,2   | 36     |
| SF-20 | K72-LT-90 | 2,2   | 39     |
| SF-24 | PD248U    | 3,5   | 52     |
| SF-28 | PD248U    | 3,5   | 95     |
| SF-32 | PD248U    | 3,5   | 107    |
| SF-36 | PD248U    | 3,5   | 118    |
| SF-42 | PD248U    | 3,5   | 137    |
| SF-48 | PD248U    | 3,5   | 153    |

## HYDRAULIC MOTOR



| MOTOR   | SPEED | POWER | TORQUE | OIL PRESSURE |      | MIN. OIL FLOW RATE |     |
|---------|-------|-------|--------|--------------|------|--------------------|-----|
|         | RPM   | HP    | NM     | BAR          | PSI  | LT/MIN             | GPM |
| HTB-165 | 343   | 16,7  | 273    | 190          | 2750 | 57                 | 15  |

## HYDRAULIC MOTORS

| UNIT  | MOTOR*  | POWER | WEIGHT |
|-------|---------|-------|--------|
|       |         | HP    | KG     |
| SF-16 | HTB-165 | 16,7  | 32     |
| SF-18 | HTB-165 | 16,7  | 36     |
| SF-20 | HTB-165 | 16,7  | 39     |
| SF-24 | HTB-165 | 16,7  | 52     |
| SF-28 | HTB-165 | 16,7  | 95     |
| SF-32 | HTB-165 | 16,7  | 107    |
| SF-36 | HTB-165 | 16,7  | 118    |
| SF-42 | HTB-165 | 16,7  | 137    |
| SF-48 | HTB-165 | 16,7  | 153    |

## ELECTRIC MOTORS



PDEC-3200



DUDE 2000



K90Exxx

| MOTOR             | REVERSIBLE | RIGHTANGLE | MOTOR SPEED        | POWER | TORQUE | VOLTAGE |
|-------------------|------------|------------|--------------------|-------|--------|---------|
|                   |            |            | RPM                | WATT  | OUT    | VOLT    |
| PDEC-3200/100     | -          | -          | 100                | 3200  | 800 Nm | 110/230 |
| PDEC-3200/145     | -          | -          | 145                | 3200  | 540 Nm | 110/230 |
| PDEC-3200/185     | -          | -          | 185                | 3200  | 420 Nm | 110/230 |
| DUDE-2000-4-speed | YES        | -          | 120, 210, 380, 650 | 2000  | 240 Nm | 110/230 |
| K90E90            | -          | YES        | 90                 | 1150  | 510 Nm | 110/230 |
| K90E190           | -          | YES        | 190                | 1150  | 260 Nm | 110/230 |
| K90E280           | -          | YES        | 280                | 1150  | 190 Nm | 110/230 |

## ELECTRIC MOTORS

**First choice electric drive:** PDEC-3200 - high-torque motor with built-in controller for precise speed control. Similar to servo motors, this drive does not slow down and does not tighten under load, but generates up to 5 times more torque than a servo motor which translates into high machining stability. Offers additionally a bunch of indicators: for overload, overheating and brush worn.

## HIGH-END ELECTRIC SERVO DRIVE WITH CONTROL BOX (3 PHASE)



|          | NOMINAL POWER | VOLTAGE [V] |
|----------|---------------|-------------|
| NSD-1500 | 1500 W        | 110 / 230 V |

| UNIT  | MOTOR* | POWER | WEIGHT |
|-------|--------|-------|--------|
|       |        | WATT  | KG     |
| SF-4  | PDEC   | 3200  | 11     |
| SF-6  | PDEC   | 3200  | 17     |
| SF-8  | PDEC   | 3200  | 20     |
| SF-10 | PDEC   | 3200  | 27     |
| SF-12 | PDEC   | 3200  | 23     |
| SF-14 | PDEC   | 3200  | 28     |
| SF-16 | PDEC   | 3200  | 32     |

# Clamshell K70 Drives

The KRAIS 70 series pneumatic drive motors are the perfect option for all your clamshell needs. They have undergone more than 20 years of rigorous field testing that guarantee's quality and maximum tool life.

The KRAIS 70 series motors and associated spare parts have been designed to be compatible with Cleco 75 series Nutrunners. This allows convenient parts interchangeability of existing motors as used by E.H.Wachs, D.L.Ricci / Hydratight, H&S and other popular clamshell manufacturers.

Both right angle and Inline versions are available.



Cleco® is a registered trademark of Apex Brands, Inc.  
DL Ricci® and Hydratight® are a registered trademark of Enerpac  
E.H. Wachs® is a registered trademark of ITW, Inc.  
H&S® is a registered trademark of Climax

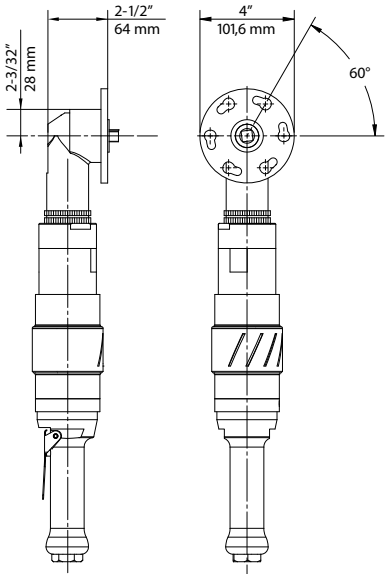
| MODEL NUMBER        | REVERSIBLE | SQUARE DRIVE | TORQUE  |     | FREE SPEED | LENGTH |     | WEIGHT |     | HEAD HEIGHT |    | ANGLE HEAD SIZE |
|---------------------|------------|--------------|---------|-----|------------|--------|-----|--------|-----|-------------|----|-----------------|
|                     |            |              | FT.LBS. | NM  | RPM        | IN     | MM  | LBS    | KG  | IN          | MM |                 |
| RIGHT ANGLE VERSION |            |              |         |     |            |        |     |        |     |             |    |                 |
| K75-RL-3V-375       | Yes        | 1/2"         | 82      | 111 | 375        | 19,35  | 491 | 12,7   | 5,8 | 2,5         | 64 | V               |
| K75-RL-3V-280       | Yes        | 1/2"         | 104     | 141 | 280        | 19,35  | 491 | 12,7   | 5,8 | 2,5         | 64 | V               |
| K75-RL-3V-190       | Yes        | 1/2"         | 140     | 190 | 190        | 19,35  | 491 | 12,7   | 5,8 | 2,5         | 64 | V               |
| K75-RL-3V-152       | Yes        | 1/2"         | 180     | 244 | 152        | 19,35  | 491 | 12,7   | 5,8 | 2,5         | 64 | V               |
| K75-RL-3V-100       | Yes        | 1/2"         | 283     | 384 | 101        | 20,10  | 511 | 16,5   | 6,4 | 2,5         | 64 | V               |
| K75-RL-3V-50        | Yes        | 1/2"         | 544     | 738 | 50         | 20,10  | 511 | 16,5   | 6,4 | 2,5         | 64 | V               |
| K75-NL-3V-190       | No         | 1/2"         | 165     | 225 | 190        | 19,35  | 491 | 12,7   | 5,8 | 2,5         | 64 | V               |
| IN LINE VERSION     |            |              |         |     |            |        |     |        |     |             |    |                 |
| L75-RL-488          | Yes        | 1/2"         | 63      | 86  | 488        | 11,00  | 279 | 8,8    | 4,0 | 2,5         | 64 | -               |
| L75-RL-364          | Yes        | 1/2"         | 80      | 108 | 364        | 11,00  | 279 | 8,8    | 4,0 | 2,5         | 64 | -               |
| L75-RL-247          | Yes        | 1/2"         | 108     | 146 | 247        | 11,00  | 279 | 8,8    | 4,0 | 2,5         | 64 | -               |
| L75-RL-198          | Yes        | 1/2"         | 138     | 188 | 198        | 11,00  | 279 | 8,8    | 4,0 | 2,5         | 64 | -               |
| L75-RL-131          | Yes        | 1/2"         | 218     | 295 | 131        | 13,40  | 340 | 10,0   | 4,6 | 2,5         | 64 | -               |
| L75-RL-65           | Yes        | 1/2"         | 418     | 567 | 65         | 13,40  | 340 | 10,0   | 4,6 | 2,5         | 64 | -               |
| L75-NL-247          | No         | 1/2"         | 127     | 225 | 247        | 11,00  | 279 | 8,8    | 4,0 | 2,5         | 64 | -               |

**Where:** R - reversible | N - non reversible | L - lever valve | V - angle head | xxx - free speed  
**Air use:** air inlet NPT: 1/2"; minimal hose ID: 1/2", 70 scfm

## MOUNTING FLANGE



Our mounting flange is manufactured to align with popular E.H.Wachs or D.L.Ricci/Hydratight machines. Custom mounting flanges can be manufactured upoun request.



## FLEXIBLE CONFIG

KRAIS 70 Series Drives are available in both right angle and inline configurations. Electric and Hydraulic options are also available. Please consult factory.

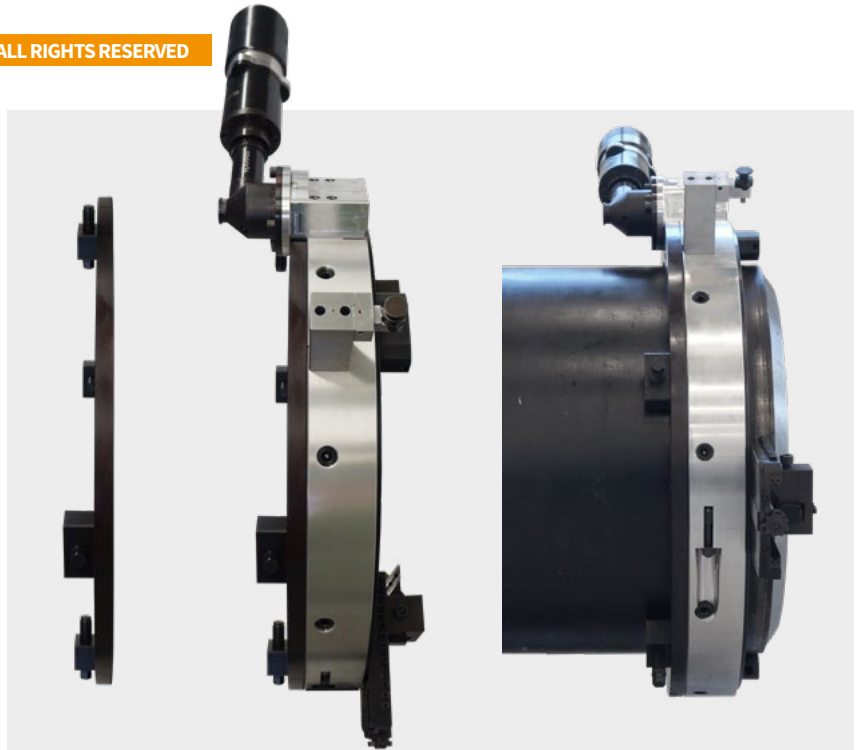


# Reaction ring for SFSF clamshells

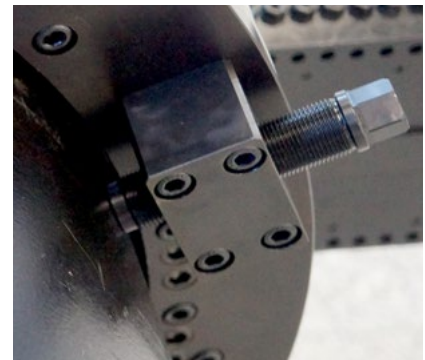
KRAIS SFSC REACTION RING IS PATENT PENDING! ALL RIGHTS RESERVED



For super heavy applications with super heavy wall and/or hard alloy pipes, consider our ORR to enhance axial and linear stability. We manufacture the ORR steel ring, which mounts on the rear of the aluminium ring. The ORR is also equipped with 4 steel location stabilizers to enhance the range and rigidity of the machine for those heavy duty applications. The ORR dramatically increases the axial stability and rigidity when cutting and/or bevelling. This solution can help to save time and expense for clamshells completely made out of steel – ask your representative for more details.



SFSF-1624 with ORR mounted on the 24" pipe schedule 120.



ORR mounted on the rear on the existing threaded holes in the aluminium ring.



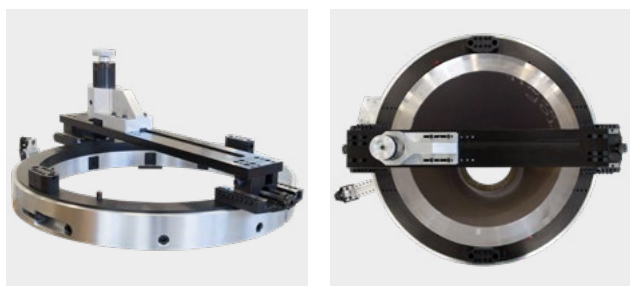
# SFSF clamshells add-ons

## TOOL SLIDES



KRAIS Tool Slides are rugged and built for strength and durability tool slides. Standard sizes are 1", 3" and 6". Other on request. Out-of-round and axial-feed tool slides are also available. Built with the same quality: for strength and durability as other KRAIS tool slides. KRAIS Slide construction dramatically eases tool slide mounting and locating.

## BCS - BRIDGE CROSS SLIDES



Bridge Cross Slides are available for all KRAIS Split Frame SlimFit series machines. Whether flange facing or single point heavy wall machining, the BCS quickly and easily bolts onto the split frame ring.

| BCS<br>NUMBER | RANGE [MM] |        | RANGE [INCH] |        |
|---------------|------------|--------|--------------|--------|
|               | MIN        | MAX    | MIN          | MAX    |
| BCS-0814      | 203,2      | 355,6  | 8,000        | 14,000 |
| BCS-1416      | 355,6      | 406,4  | 14,000       | 16,000 |
| BCS-1618      | 406,4      | 457,2  | 16,000       | 18,000 |
| BCS-1820      | 457,2      | 508,0  | 18,000       | 20,000 |
| BCS-2024      | 508,0      | 609,6  | 20,000       | 24,000 |
| BCS-2832      | 609,6      | 812,8  | 24,000       | 32,000 |
| BCS-3236      | 812,8      | 914,4  | 32,000       | 36,000 |
| BCS-3642      | 914,4      | 1066,8 | 36,000       | 42,000 |
| BCS-4248      | 1066,8     | 1117,6 | 42,000       | 44,000 |

## SUPPORT HINGE



Accessory for convenient folding and unfolding of the device. It also allows the use of cranes and lifts that make work easier.

## SFSF-CBA UNIVERSAL COUNTERBORE ATTACHMENT



Designed for the precision counterboring of tube and pipe inside diameters. The Universal counterbore is manufactured with both 6" (SFSF-CBA-150) and 10" (SFSF-CBA-254) long sleeves, and attaches directly to all KRAIS Split Frame SlimFit clamshells. The Universal Counterbore Attachment utilizes a simple and effective hand wheel to precisely control the counterboring process. Both versions (6" and 10") can be mounted directly to the tool slide or Bridge Cross Slide.

## SFSF-SCBA SWIVEL HEAD COUNTERBORING ATTACHMENT



Designed for the precision counterboring of tube and pipe inside diameters. The swivel head attachment can also be used for flange facing, OD beveling and flange facing grooving. The Swivel counterbore is manufactured with both 6" (SFSF-SCBA-150) and 10" (SFSF-SCBA-254) long sleeves, and attaches directly to all KRAIS Split Frame SlimFit clamshells. The Universal Counterbore Attachment utilizes a simple and effective hand wheel to precisely control the counterboring process. Both versions (6" and 10") can be mounted directly to the tool slide or Bridge Cross Slide.

## OUT OF ROUND TOOL SLIDES



Out of round tool slides - can be solution for all misshapen tubes and pipes. Out of round slides feature durable springs and tracking module that follows the contours of a deformed or less than perfectly round pipe. Built with the same quality: for strength and durability as other KRAIS tool slides.

# SFSF clamshells bits and holders

## HSS CUTTERS

All cutters are made out of regular High Speed Steel. All of them are also available with increased content of Cobalt. Sever holders are available in two standard lengths: 200 and 160 mm. For other shapes please send your request.

| Sever (90° cutting)                                                               |                                                                                   | Beveling (37,5°)                                                                  |                                                                                   | Compound (10° & 37,5°)                                                            |                                                                                   |                                                                                     |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |  |  |  |  |  |
| HSS-625-HSS                                                                       | HSS-625-HSS-CO                                                                    | HSS-2525-OB-37                                                                    | HSS-2525-OB-37                                                                    | HSS-2525-CB-1037                                                                  | HSS-2525-CB-1037                                                                  | HSS-2525-2B                                                                         |

## CUTTING BITS FOR USING WITH HOLDERS

Inserts are made out of High Speed Steel with 6% Cobalt and are available with ALNOVE hard coating also. For other tool bits please send your request.

|                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |   |                                                                                     |                                                                                     |                                                                                     |
| CSS-1                                                                               | CSS-2                                                                               | 2CDJ-5-SF                                                                           |                                                                                     |                                                                                     |                                                                                     |
|  |  |  |  |  |  |
| WRI-45                                                                              | WRIL-45                                                                             | CB-45                                                                               | CBL-45                                                                              | CB-46                                                                               | CBL-46                                                                              |

## SEVER HOLDERS (90° CUTTING)

Sever holders are made in two lengths: 225 and 180 mm. Twin sets have a special rotated bits for better chip removal. Another lengths are available on special request.

|                                                                                     |                                                                                      |                                                                                       |                                                                                      |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  |  |  |  |
| SFSC-525-180<br>BIT:<br>CSS-1                                                       | SFSC-525-225<br>BIT:<br>CSS-1                                                        | SFSC-525-180-TWEEN1<br>SFSC-525-180-TWEEN2<br>BITS:<br>CSS-2 & CSS-2                  | SFSC-525-225-TWEEN1<br>SFSC-525-225-TWEEN2<br>BITS:<br>CSS-2 & CSS-2                 |

## BEVELING HOLDERS

High quality, wide range of holders to work with KRAIS inserts. For other tool bits please send your request.

| Beveling (30°)                                                                      |                                                                                     | Beveling (37,5°)                                                                    |                                                                                     | Compound (10° & 37,5°)                                                              |                                                                                     |                                                                                       | J-Prep                                                                                |                                                                                       |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |  |  |  |  |  |  |  |
| SFRB-30<br>BIT:<br>WRI-45                                                           | SFLB-30<br>BIT:<br>WRIL-45                                                          | SFRB-37<br>BIT:<br>WRI-45                                                           | SFLB-37<br>BIT:<br>WRIL-45                                                          | SFRB-1037<br>BIT:<br>CB-45                                                          | SFLB-1037<br>BIT:<br>CBL-45                                                         | SFRLB-2X1037<br>BITS:<br>CB-46 & CBL-46                                               | SFRLB-2X37<br>BITS:<br>WRI-46 & WRIL-46                                               | SFJP-37-R5<br>BIT:<br>2CDJ-5-SF                                                       |







# Flange Management

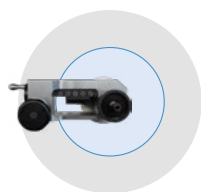


# Manual FlangeMill

Basic, simple and cost-effective solution for ID mount flange facing. It is a quick and easy way to reface a damaged flat, grooves in pipe flanges on site. Manual FlangeMill size and body is designed and built to allow quick and convenient processing of small flanges in awkward or dangerous locations.

With its robust cage-type frame, the MFM ensures exceptional stiffness and precision, unmatched by other hand-operated flange milling machines in the market.

## TOOL SWING DIAMETERS



FACING RANGE

BODY SWING DIAMETER



| FACING RANGE    | LOCKING RANGE   | MAX V TOOL TRAVEL | MAX H TOOL TRAVEL | BODY SWING DIAMETER |             |        |
|-----------------|-----------------|-------------------|-------------------|---------------------|-------------|--------|
| 30 – 350 mm     | 25,4 - 254,0 MM | 10 MM             | 55 MM             | 457,2 MM            |             |        |
| 1,750 – 14,000" | 1 - 10"         | 0,395"            | 2,165"            | 18"                 |             |        |
| DRIVE           | BODY WIDTH      |                   | BODY LENGHT       |                     | BODY WEIGHT |        |
| Manual          | 6,5"            | 165 mm            | 12,8"             | 325 mm              | 19,4 Lbs    | 8,8 kg |

## MFM TOOL BITS AND HOLDER



Manual Flange Mill uses one just type of holders: MFMH-7-L and MFMH-7-R with carbide insert CI7 (screw MHS-2,7)

|           |   |   |
|-----------|---|---|
| CI7<br>mm | A | B |
|           | 7 | 7 |

## MFM ADVANTAGES



**PRECISE DEPTH ADJUSTMENT**  
The tool depth can be can be adjusted (10 mm stroke) thru spindle to define cut depth and the correct finish.



**EASE OF USE**  
The tool arm is rotated by hand using a worm-gear mechanism to provide a perfect spiral finish.



**SMOOTH OPERATION**  
Quick adjustment handle to move the cutter to groove position



**MACHINING IN EVERY POSITION**  
Manual FlangeMill can be freely rotated to work in every position. Remachining damaged flat, grooves and raised faced flanges on site is possible in every position.

## TOOLING CHART

| HOLDER   | INSERT | SCREW   | TORX |
|----------|--------|---------|------|
| MFMH-7-L | CI7    | MHS-2,7 | TX-8 |
| MFMH-7-R | CI7    | MHS-2,7 | TX-8 |

## EXAMPLE TOOL APPLICATION

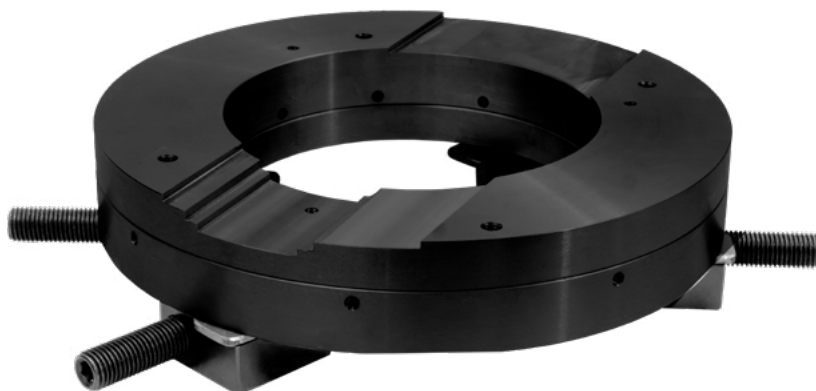


# MFM-OMM Module

## Outside mounting module for MFM

Expand the capabilities of your KRAIS Manual FlangeMill with the MFM-OMM conversion module. This compact and purpose-built solution enables secure outside mounting, allowing you to face flanges even in situations where internal mounting is not possible—such as with very small diameter flanges or restricted access areas.

With the MFM-OMM, there's no need to invest in additional mini facers or dedicated outside-mount tools. The module lets you easily switch between internal and external mounting configurations without compromising on performance or precision.



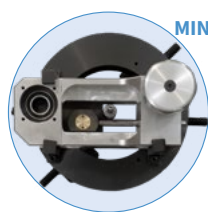
### FEATURES

- **Rigidity** - significantly greater compared to mini flange facers, which are used on small-diameter miniature shafts that tend to bend under the pressure during the rotational force of a long arm.
- **Cost-effective** - eliminates the need for additional, expensive tools
- **Versatile** - quick and easy switching between mounting setups
- **Compact design** - ideal for small flanges and hard-to-reach locations

The MFM-OMM is designed exclusively for the Manual FlangeMill 14.

| WORKING PARAMETERS FOR MANUAL FLANGEMILL WITH THE MODULE |            |                  |             |             |             |                 |
|----------------------------------------------------------|------------|------------------|-------------|-------------|-------------|-----------------|
| FACING RANGE                                             |            | OD LOCKING RANGE |             | FEED STROKE |             | ADJUSTABLE JAWS |
| 0 to 127 mm                                              |            | 95,3 to 155,4 mm |             | 31,70 MM    |             | 4               |
| 0" to 5"                                                 |            | 3,752" to 6,118" |             | 1,248"      |             |                 |
| DRIVE                                                    | BODY WIDTH |                  | BODY LENGHT |             | BODY WEIGHT |                 |
| Manual                                                   | 6,5"       | 165 mm           | 12,8"       | 325 mm      | 19,4 Lbs    | 8,8 kg          |

### TOOL SWING DIAMETERS



Tool without crank, with bit in position 0 mm



Tool with crank, bit in position 127 mm

### OUTSIDE-MOUNTED - READY TO FACE



The MFM-OMM module securely installed on a pipe flange with the Manual FlangeMill. Designed for field use, this setup allows precise facing of small flanges directly from the outside—ideal for tight or inaccessible locations.

### QUICK CONVERSION

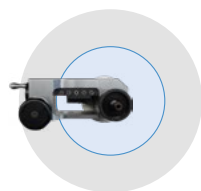
Switching your Manual FlangeMill to outside mounting is fast and simple – just tighten four clamps and you're ready to face flanges from the outside. No need for disassembly or additional tools.



# Manual FlangeMill Long

Long version of simple and cost-effective solution for ID mount flange facing. It is a quick and easy way to reface a damaged flat, grooves in pipe flanges on site. The L(ong) version FlangeMill size and body is designed and built to allow quick and convenient processing of mid sized flanges in awkward or dangerous locations.

## TOOL SWING DIAMETERS



FACING RANGE

BODY SWING DIAMETER



| FACING RANGE  | LOCKING RANGE | MAX V TOOL TRAVEL | MAX H TOOL TRAVEL | BODY SWING DIAMETER |             |        |
|---------------|---------------|-------------------|-------------------|---------------------|-------------|--------|
| 51 – 650 mm   | 51 - 550 MM   | 10 MM             | 55 MM             | 757 MM              |             |        |
| 2,01 – 25,60" | 2,01 - 21,65" | 0,395"            | 2,165"            | 30"                 |             |        |
| DRIVE         | BODY WIDTH    |                   | BODY HEIGHT       |                     | BODY WEIGHT |        |
| Manual        | 6,5"          | 165 mm            | 18,7"             | 475 mm              | 19,4 Lbs    | 8,8 kg |

## MFM TOOL BITS AND HOLDER



Manual Flange Mill uses one just type of holders: MFMH-7-L and MFMH-7-R with carbide insert CI7 (screw MHS-2,7)

|        | A | B |
|--------|---|---|
| CI7 mm | 7 | 7 |

## MFM ADVANTAGES



**PRECISE DEPTH ADJUSTMENT**  
The tool depth can be adjusted (10 mm stroke) thru spindle to define cut depth and the correct finish.



**EASE OF USE**  
The tool arm is rotated by hand using a worm-gear mechanism to provide a perfect spiral finish.



**SMOOTH OPERATION**  
Quick adjustment handle to move the cutter to groove position



**MACHINING IN EVERY POSITION**  
Manual FlangeMill can be freely rotated to work in every position. Remachining damaged flat, grooves and raised faced flanges on site is possible in every position.

## TOOLING CHART

| HOLDER   | INSERT | SCREW   | TORX |
|----------|--------|---------|------|
| MFMH-7-L | CI7    | MHS-2,7 | TX-8 |
| MFMH-7-R | CI7    | MHS-2,7 | TX-8 |

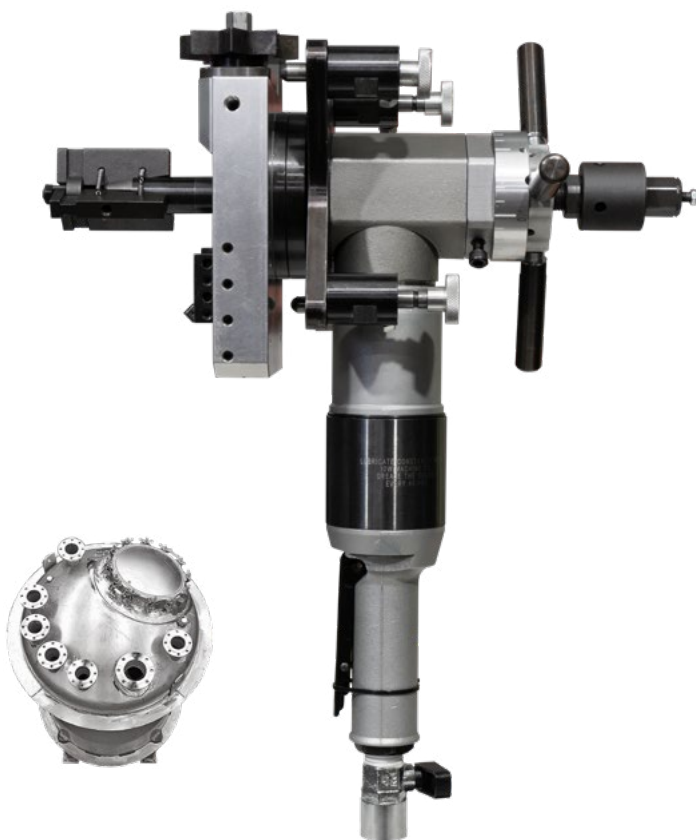
# MFF-125, Mini Flange Facer

Highly efficient and lightweight flange facing machine – among the most compact options available today.

- ▶ Minimal clearance required
- ▶ Suitable for flat and raised face flanges
- ▶ Reinforced stainless steel body for enhanced machine stability
- ▶ Robust aluminum facing head, bolstered by multiple bearings
- ▶ Durable mandrel shaft with a secure jaw set for firm mounting
- ▶ Precision-engineered, hardened, and ground tool slides
- ▶ Available with a 1.3 Hp pneumatic drive or 750 W electric motor, equipped with a multi-stage planetary gearbox

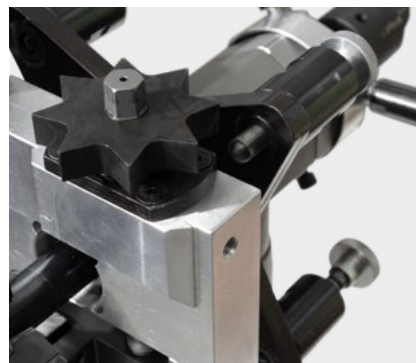
## PREMIUM COMPONENTS

- ▶ The pneumatic motor is fully equipped with a filter, lubricator, and flow control system.
- ▶ Streamlined, low-profile drive system designed to deliver exceptional power-to-weight efficiency.
- ▶ Built with a sturdy main body, heavy-duty bearings, sealed lubrication, and a solid mounting system for reliable performance.

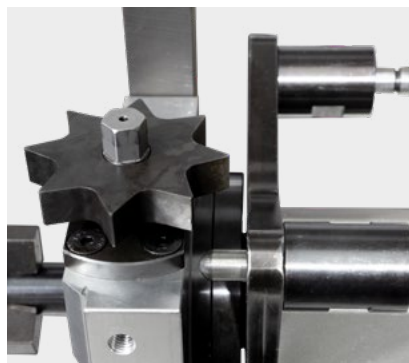


| FACING RANGE   |            | LOCKING RANGE  |          | VERTICAL<br>FEED STROKE |          | MACHINING<br>FEED RATE |        | POWER          |        |
|----------------|------------|----------------|----------|-------------------------|----------|------------------------|--------|----------------|--------|
| 20 – 125 mm    |            | 20 – 88 mm     |          | 13 mm                   |          | 0,125 to 0,5 mm        |        | 1,3 Hp         |        |
| 0.787 – 4.921" |            | 0.787 – 3.465" |          | 0,5"                    |          | 0,005 to 0,019"        |        |                |        |
| AIR USE        |            | WEIGHT         |          | HEIGHT                  |          | LENGTH                 |        | SWING DIAMETER |        |
| 55 cfm         | 1,3 m³/min | 23,81 Lbs      | 10,80 kg | 14,5"                   | 372,0 mm | 11,8"                  | 300 mm | 8,86"          | 225 mm |

## AUTOMATIC FEED



The tool is equipped with automatic feed system. The feed rate is set in a simple and quick manner.



## FEED TRIPPERS

The machine is equipped with four trippers, allowing to make four feed rates to produce cores and fine surfaces. Using two or more trippers simulates the gramophone groove.

- 1 strike 0,125 mm per rev / 203 rev per 1"
- 2 strikes 0,250 mm oer rev / 101 rev per 1"
- 3 strikes 0,375 mm per rev / 67 rev per 1"
- 4 strikes 0,500 mm per rev / 51 rev per 1"



# MFF-125, Mini Flange Facer

**EASY SETUP**



The device has clear markings that help to precisely set the required machining and grooving depth.

**RIGID LOCKING SYSTEM**



Precise flange machining is also achieved thanks to the three jaws with six locking points, which hold it very securely inside the tube.



Handy depth feed locking system to prevent accidental movement of the handle during flange processing.

**TOOL HOLDERS RANGES**

MFF-125 is a low clearance flange facing machine. To achieve this multiple tool holders are required to cove full range.

| HOLDER    | INSERT | SCREW | TORX  |
|-----------|--------|-------|-------|
| MFF-V11-L | CI-3-1 | MHS-4 | TX-15 |
| MFF-V11-P |        |       |       |

**MFF-125-E**

Electric version of regular tool. A standard machine covers the same flange sizes and comes with the same cutting head. The electric motor, made by Makita with 3 stage planetary gear box made by KRAIS has variable speed control and produce enormous torque. Is interchangeable with pneumatic drive and can be purchased separately at any time. Also available with battery driven motor!

Free Speed..... 115 RPM  
Power..... 750 W  
Torque..... 360 Nm (266 Ft.Lbs)



**BATTERY OPTION**

The machine is also available with a portable electric drive 18 Volt 5.2 Ah 93.6 Wh Li-Lon battery. The machine can operate up to 15-20 minutes on one battery. Machining itself of one flange takes about 3-4 minutes of motor operation, so the operating time on one battery may suffice on 3-4 flanges. It is possible to have many charged batteries. Comfortable and easy to use in any place where compressed air and electricity is not available or even impossible to use as for example oil refinery.



# NBFF – Narrow Body Flange Face

*\*Patent pending*

NBFF – the flange facing machine with a slim line gantry profile for mounting in tight spaces. An operator can mount NBFF tool on-site within demanding conditions such as flanges close to walls or pipe racks.

The unique design of NBFF allows the operator to mount the machine and perform a repair in locations that popular, standard equipment could not fit. The machine conforms to all the necessary standards and is extremely easy to use. Light and robust to quickly mount and repair damaged faces on flanges. NBFF can maximize production and uptime in all flange management jobs.

## SUPER NARROW BODY

Thanks to unique, a true narrow design NBFF tool is fully usable within demanding conditions such as flanges close to walls or pipe racks.



|          | FACING RANGE [MM] |     | FACING RANGE [INCH] |        | CLAMPING RANGE [MM] |     | CLAMPING RANGE [INCH] |        | MAX. SWING DIAMETER |        | TOOL POST TRAVEL |        | FREE SPEED [RPM] | POWER |      |
|----------|-------------------|-----|---------------------|--------|---------------------|-----|-----------------------|--------|---------------------|--------|------------------|--------|------------------|-------|------|
|          | MIN               | MAX | MIN                 | MAX    | MIN                 | MAX | MIN                   | MAX    | [MM]                | [INCH] | [MM]             | [INCH] |                  | [KW]  | [HP] |
| NBFF-115 | 0                 | 125 | 0"                  | 4,921  | 89                  | 170 | 3,504                 | 6,693  | 125                 | 4,921  | 62,5             | 2,461  | 100              | 0,97  | 1,3  |
| NBFF-160 | 0                 | 185 | 0"                  | 7,283  | 89                  | 280 | 3,504                 | 11,024 | 185                 | 7,283  | 92,5             | 3,642  | 115              | 1,6   | 2,2  |
| NBFF-300 | 0                 | 310 | 0"                  | 12,205 | 108                 | 356 | 4,252                 | 14,016 | 310                 | 12,205 | 155              | 6,102  | 85               | 1,6   | 2,2  |
| NBFF-600 |                   |     |                     |        |                     |     |                       |        |                     |        |                  |        |                  |       |      |

|          | AIR USE |                       | DIMENSIONS           |                                 | WEIGHT |       |
|----------|---------|-----------------------|----------------------|---------------------------------|--------|-------|
|          | [CFM]   | [M <sup>3</sup> /MIN] | [MM]                 | [INCH]                          | [KG]   | [LBS] |
| NBFF-115 | 55      | 1,3                   | 65 (100) x 460 x 260 | 2,55" (3,93") x 18,11" x 10,23" | 25     | 55,11 |
| NBFF-160 | 75      | 2,2                   | 70 (100) x 510 x 340 | 2,75" (3,93") x 20,07" x 13,38" | 27     | 59,5  |
| NBFF-300 | 75      | 2,2                   | 70 (100) x 510 x 470 | 2,75" (3,93") x 20,07" x 18,50" | 32     | 70,5  |
| NBFF-600 |         |                       |                      |                                 |        |       |

## FEED RATES

| Feed rates pitch mm |      |    |      |
|---------------------|------|----|------|
| 0,5                 | 0,75 | 1* | 1,25 |
| Grooves per inch    |      |    |      |
| 104                 | 69   | 52 | 41   |

\* standard feed screw supplied with machine

## CHOICE OF THREE

All versions of NBFF deliver the same advantage over standard flange facers: despite working size all are narrow and fit perfectly in tight spaces.



## TOOLING CHART

| HOLDER   | INSERT | SCREW   | TORX |
|----------|--------|---------|------|
| NBFF-C17 | C17    | MHS-2,7 | TX-8 |

# NBFF – Narrow Body Flange Facer

## STANDARD LOCKING SYSTEM



The standard locking system consists of two jaws. One of them is a stabilizing jaw with two adjustable screws to fit the outer diameter of the flange. The second jaw has three clamping screws. Both jaws are equipped with pair top pads for levelling on the sealing surface of the flange. Pads at the bottom, are for tension the machine to the flange surface. Pads help to fix the machine in any position and protect it from falling out of the flange in case of a collision.



Pads at the bottom, are for tension the machine to the flange surface and protect it from falling out of the flange in case of a collision.

Top pads are for levelling on the sealing surface of the flange.

## REAL LIFE EXAMPLE



Example of really tight flange – NBFF is the only tool suitable here.

## NBFF-E

NBFF-E is electric version of NBFF. A standard machine covers the same flange sizes and comes with the same cutting head. The electric motor, made by Makita with 3 stage planetary gear box made by KRAIS has variable speed control and produce enormous torque. Is interchangeable with pneumatic drive and can be purchased separately at any time.

Free Speed..... 115 RPM  
Power..... 750 W  
Torque..... 360 Nm (266 Ft.Lbs)



## FLANGE2FLANGE LOCKING OPTION



Additional, special flange type locking system is made to suit the application more. NBFF machine is still mounted on the flange outside diameter, but the locking system is equipped with additional studs to be mounted in the flange holes to provide easy operation and perfect centring.

## NBFF IN ACTION



## BATTERY OPTION

The machine is also available with a portable electric drive 18 Volt 5.2 Ah 93.6 Wh Li-Lon battery. The machine can operate up to 15-20 minutes on one battery. Machining itself of one flange takes about 3-4 minutes of motor operation, so the operating time on one battery may suffice on 3-4 flanges.

It is possible to have many charged batteries. Comfortable and easy to use in any place where compressed air and electricity is not available or even impossible to use as for example oil refinery.



# OMFM-305

The OMFM-305 is a high-performance, externally mounted machine tool designed for demanding flange machining applications. With its lightweight yet super-rigid construction, the OMFM-305 combines portability with the heavy-duty strength required for precision machining of various flange faces, seal grooves, weld preparations, and counterbores. Its robust design, featuring heavy-duty steel and aluminum components, ensures exceptional durability and reliability in the toughest environments.

## KEY FEATURES:

- ▶ Externally mounted, lightweight yet heavy-duty machine.
- ▶ Heavy-duty steel/aluminum construction for durability and precision.
- ▶ High rigidity due to cast steel body and steel body plate.
- ▶ Continuous groove facing feed with 2-speed gearbox for precision finishes.
- ▶ Swivel tool post for grooves, RTJ flanges, and bevels.
- ▶ Complete toolkit with CE certification.



| STANDARD WORKING RANGE |                 | FACING FEEDS                 |                                | FREE SPEED      | POWER    |
|------------------------|-----------------|------------------------------|--------------------------------|-----------------|----------|
| FACING RANGE           | LOCKING RANGE   | COARSE FEED                  | FINE FEED                      |                 |          |
| 0 - 305 mm             | 50,8 - 305,4 mm | 0,5 mm (0,020") / Revolution | 0,125 mm (0,005") / Revolution | 30 Rpm          | 2,2 Hp   |
| 0" to 12"              | 2" - 12"        | 50 Grooves per inch          | 203 Grooves per inch           |                 | 1,6 kW   |
| AIR USE                |                 | MACHINE WEIGHT               |                                | DRIVE WEIGHT    |          |
| 75 cfm                 | 2,2 m³/min      | 43 kg                        | 95 Lbs                         | 5 kg            | 11,0 Lbs |
|                        |                 | SHIPPING BOX                 |                                | SHIPPING WEIGHT |          |
|                        |                 | 75 x 55 x 35 cm              | 30" x 22" x 14"                | 86 kg           | 189 Lbs  |

## COMPLETE TOOLING PACKAGE

The OMFM-305 comes with a comprehensive toolkit, including all necessary tools, inserts, an air filter lubricator, a hose connection, mounting feet, and extensions. The machine is supplied with a storage and shipping box for easy transport and protection. Additionally, the package includes a CE certificate, packing list, and user manual, ensuring compliance with industry standards and providing operators with all the information needed for safe and effective use.

## TOOLING CHART

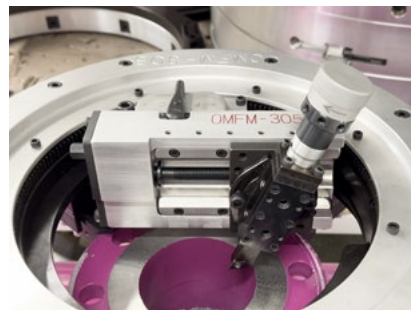
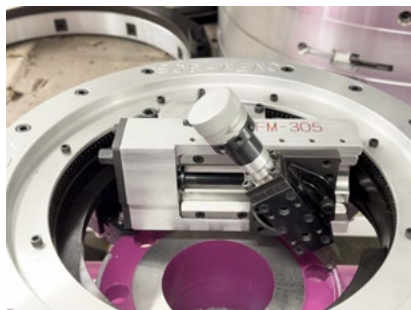
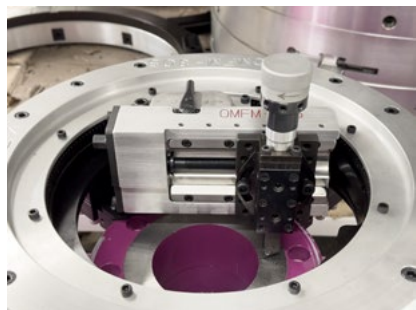
| HOLDER       | INSERT     | SCREW | TORX  |
|--------------|------------|-------|-------|
| IMFM24-V11-L | CIV-11-3-1 | MHS-4 | TX-15 |
| IMFM24-V11-N | CIV-11-3-1 | MHS-4 | TX-15 |
| IMFM24-V11-P | CIV-11-3-1 | MHS-4 | TX-15 |



# OMFM-305

## SWIVEL TOOL

Swivel tool post for grooves, RTJ flanges, and bevels



## ELECTRIC DRIVE

As an option, we can deliver the electric motor, made by Makita. With 3 stage planetary gear box made by KRAIS, the drive has variable speed control and produce enormous torque. Is interchangeable with pneumatic drive and can be purchased separately at any time. Also available with battery driven motor!

Free Speed..... 115 RPM  
Power..... 750 W  
Torque..... 360 Nm (266 Ft.Lbs)



## CONVENIENT JAWS



Special jaw set for easy and quick levelling and centring machine. A special mechanism allows convenient adjustment of the mounting plane relative to the pipe.

## TIGHT SPACES

The OMFM-305 is also highly effective in hard-to-reach areas. It allows for the drive motor to be mounted on either side of the machine, making it ideal for machining flanges in confined spaces. Additionally, the optional angle module enables horizontal motor installation for even greater flexibility.



## EFFICIENT ON-SITE OPERATION

The OMFM-305 is the ideal solution for professionals requiring a rugged and reliable machine for high-precision flange machining tasks. Its lightweight design, combined with heavy-duty construction and easy setup, makes it a versatile tool for a wide range of industrial applications.



# IMFM-24/30

Internally mounted, lightweight, super rigid yet super heavy-duty machine tool. Ideal for machining all types of flange faces, seal grooves, weld preparations and counterbores.

- ▶ Heavy-duty steel/aluminium all design.
- ▶ Heavy-duty cast steel body and steel body plate.
- ▶ Solid construction and high rigidity of the machine concerning the dimension and weight.
- ▶ Continuous groove facing feed, 2-speed gearbox.
- ▶ Swivel tool post for grooves, RTJ flanges, and bevels.
- ▶ Quick-set independent bases for improved on-site operation.
- ▶ Fast mounted arm with spindle for the very convenient measure of levelling and centring.
- ▶ Super quick machine fixing to the locking base.
- ▶ Special jaw set for easy and quick levelling and centring machine; jaws are interchangeable with all IMFM series Flange Facers.
- ▶ CE certificate.



| STANDARD WORKING RANGE |            |                |          | FACING FEEDS   |                |                     |          |                       | FREE SPEED | POWER          |           |
|------------------------|------------|----------------|----------|----------------|----------------|---------------------|----------|-----------------------|------------|----------------|-----------|
| FACING RANGE           |            | LOCKING RANGE  |          | 1,75 MM SCREW  | 1,25 MM SCREW  | 1,00 MM SCREW       |          |                       |            |                |           |
| 145 – 762 mm           |            | 140 - 670 mm   |          | 0,2 / 0,8 mm   | 0,14 / 0,57 mm | 0,15 / 0,45 mm      |          | 20 - 42 Rpm           | 2,2 Hp     |                |           |
| 5" - 30"               |            | 5-1/2" - 26"   |          | 0,008 / 0,031" | 0,006 / 0,022" | 0,004 / 0,018"      |          |                       | 1,6 kW     |                |           |
| AIR USE                |            | MACHINE WEIGHT |          | DRIVE WEIGHT   |                | MAX BIG BASE WEIGHT |          | MAX SMALL BASE WEIGHT |            | COUNTER WEIGHT |           |
| 75 cfm                 | 2,2 m³/min | 26 kg          | 57,4 Lbs | 5 kg           | 11,0 Lbs       | 18 kg               | 39,7 Lbs | 4 kg                  | 8,82 Lbs   | 6 kg           | 13,23 Lbs |

|  | SHIPPING BOX    |                 | SHIPPING WEIGHT |         |
|-------------------------------------------------------------------------------------|-----------------|-----------------|-----------------|---------|
|                                                                                     | 75 x 55 x 35 cm | 30" x 22" x 14" | 80 kg           | 177 Lbs |

## TOOLING CHART

| HOLDER     | INSERT     | SCREW | TORX  |
|------------|------------|-------|-------|
| IMFM24-V11 | CIV-11-3-1 | MHS-4 | TX-15 |

## COMPLETE PACKAGE

As standard IMFM is supplied with the complete toolkit, including cutting tool and inserts and hose connection, required jaws to cover the full range, user manual and storage shipping box.  
For IMFM, besides standard pneumatic 2,2 Hp drive, we offer a wide choice of pneumatic and electric drives.

## UNIQUE RIGIDITY

High rigidity of the machine in relation to the dimension and weight by applying Heavy-duty cast steel body and steel body plate.



## WIDE RANGE

Machine is equipped with 2 locking bases  
Big 250-700 mm  
Small 140 – 290 mm



# IMFM-24/30

## SWIVEL TOOL

Swivel tool post for grooves, RTJ flanges, and bevels



## CONVENIENT JAWS

Special jaw set for easy and quick levelling and centring machine. A special mechanism allows convenient adjustment of the mounting plane relative to the pipe. Jaws are interchangeable with all IMFM series Flange Facers.



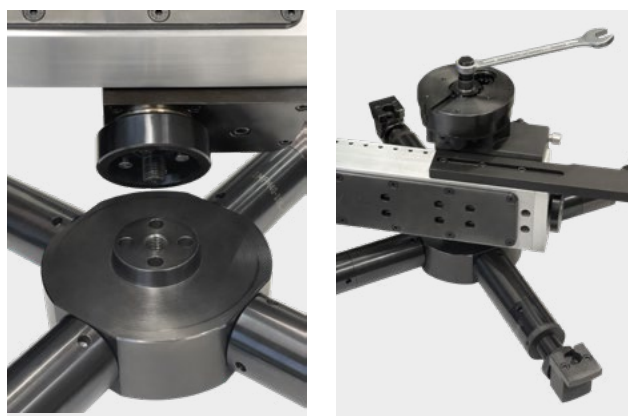
## PRECISE MOUNTING



Fast mounted arm with spindle for the very convenient measure of levelling and cantering

## FAST FIXING

Super fast machine fixing with locking base by means of a taper in the locking base and taper seat in the spindle fastened with a central locking screw



## RIGHT ANGLE HEAD



This optional add-on allows for fastening drive in alternate positions. The useful option in tight spaces.

## ELECTRIC DRIVE

As an option, we can deliver the electric motor, made by Makita. With 3 stage planetary gear box made by KRAIS, the drive has variable speed control and produce enormous torque. Is interchangeable with pneumatic drive and can be purchased separately at any time. Also available with battery driven motor!

Free Speed..... 115 RPM  
Power..... 750 W  
Torque..... 360 Nm (266 Ft.Lbs)



# IMFM-24 Internal Mounted Flange Mill

Internally mounted, lightweight and durable machine tool. Ideal for machining all types of flange faces, seal grooves, weld preparations and counterbores.

## Features:

- ▶ Heavy-duty steel/aluminium design
- ▶ High rigidity of the machine in relation to the dimension and weight
- ▶ Solid but lightweight construction
- ▶ Continuous groove facing feeds
- ▶ Swivel tool post for grooves, RTJ flanges and bevels
- ▶ Easy levelling and centering system with built-in fast centre feature
- ▶ Quick clamping with solid, 50 mm self-centering steel shaft
- ▶ CE certificate

As standard IMFM is supplied with the complete toolkit, including cutting tool and inserts and hose connection, required jaws to cover the full range, paper manual and storage/shipping box. Beside standard pneumatic 2,2 Hp drive, for IMFM we offer a wide choice of pneumatic and electric drives.



| STANDARD WORKING RANGE |               | FACING FEEDS                                      |                |                | FREE SPEED  | POWER  |
|------------------------|---------------|---------------------------------------------------|----------------|----------------|-------------|--------|
| FACING RANGE           | LOCKING RANGE | 1,75 MM SCREW                                     | 1,25 MM SCREW  | 1,00 MM SCREW  |             |        |
| 63 – 610 mm            | 57 - 508 mm   | 0,2 / 0,8 mm                                      | 0,14 / 0,57 mm | 0,15 / 0,45 mm | 20 - 42 Rpm | 2,2 Hp |
| 2,50 - 24,00"          | 2,25 - 20,00" | 0,008 / 0,031"                                    | 0,006 / 0,022" | 0,004 / 0,018" |             | 1,6 kW |
| AIR USE                |               | BODY WIDTH                                        |                | BODY HEIGHT    | BODY WEIGHT |        |
| 75 cfm                 | 2,2 m³/min    | Depends on motor configuration, see drawing below |                |                | 99 Lbs      | 45 kg  |

## LEVELLING & CENTERING



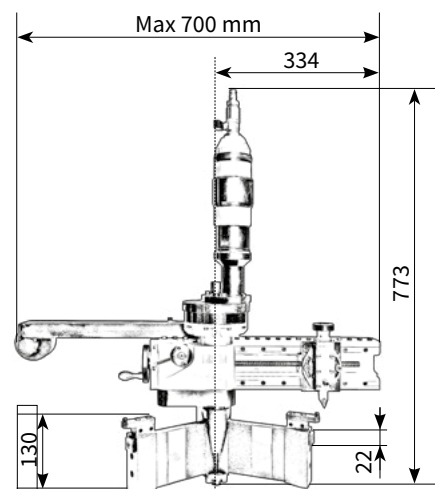
Special jaw set for easy and quick levelling and centering machines on the flange

## TOOLING CHART

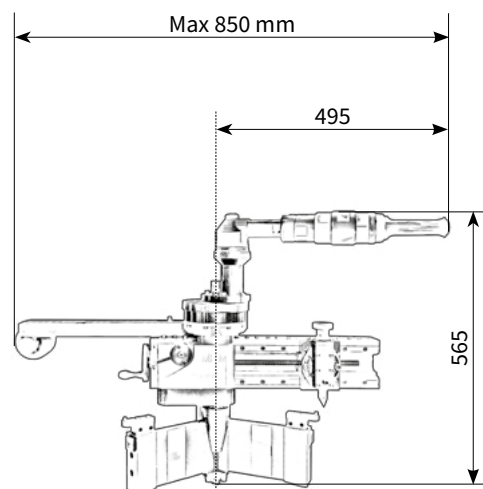
| HOLDER     | INSERT     | SCREW | TORX  |
|------------|------------|-------|-------|
| IMFM24-V11 | CIV-11-3-1 | MHS-4 | TX-15 |

## DIMENSIONS

### INLINE VERSION



### RIGHTANGLE VERSION





# IMFM-40 Internal Mounted FlangeMill

Internally mounted, lightweight and durable machine tool. Ideal for machining all types of flange faces, seal grooves, weld preparations and counterbores.

- ▶ Heavy-duty steel/aluminium design with solid but lightweight construction
- ▶ High rigidity of the machine in relation to the dimension and weight
- ▶ Continuous groove facing feeds
- ▶ Swivel tool post for grooves, RTJ flanges and bevels
- ▶ Easy levelling and centering system with built-in self-centre feature
- ▶ Quick clamping with solid, 50 mm self-centering steel shaft
- ▶ CE certificate

As standard IMFM is supplied with the complete toolkit, including cutting tool and inserts and hose connection, required jaws to cover the full range, paper manual and storage/shipping box. Beside standard pneumatic 2,2 Hp drive, for IMFM we offer a wide choice of pneumatic and electric drives.



| STANDARD WORKING RANGE |            |                |     | MAX SWING<br>DIAMETER | TOOL POST<br>TRAVEL | FEED RATES      | FREE<br>SPEED | POWER       |         |                 |         |
|------------------------|------------|----------------|-----|-----------------------|---------------------|-----------------|---------------|-------------|---------|-----------------|---------|
| FACING RANGE           |            | CLAMPING RANGE |     |                       |                     |                 |               |             |         |                 |         |
| 152 – 1016 mm          |            | 120 - 820 mm   |     | 1220 mm               | 102 mm              | See table       | 0 - 24 Rpm    | 2,2 Hp      |         |                 |         |
| 6 - 39,70"             |            | 4,72 - 32,20"  |     | 32"                   | 4"                  |                 |               | 1,6 kW      |         |                 |         |
| AIR USE                |            | SHIPPING WIDTH |     | SHIPPING HEIGHT       |                     | SHIPPING LENGTH |               | BODY WEIGHT |         | SHIPPING WEIGHT |         |
| 75 cfm                 | 2,2 m³/min | 600 mm         | 24" | 725 mm                | 28,5"               | 845 mm          | 34"           | 145 kg      | 319 Lbs | 210 kg          | 462 Lbs |

## FACING FEED RATES (3 OFF IN/OUT)

| Direction | Gear | mm/rev | inch/rev | grooves per cm | grooves per inch |
|-----------|------|--------|----------|----------------|------------------|
| Out       | 1    | 0,139  | 0,005    | 72             | 183              |
|           | 2    | 0,217  | 0,009    | 46             | 117              |
|           | 3    | 0,528  | 0,021    | 19             | 48               |
| In        | 1    | 0,165  | 0,006    | 61             | 154              |
|           | 2    | 0,258  | 0,010    | 39             | 98               |
|           | 3    | 0,628  | 0,025    | 16             | 40               |

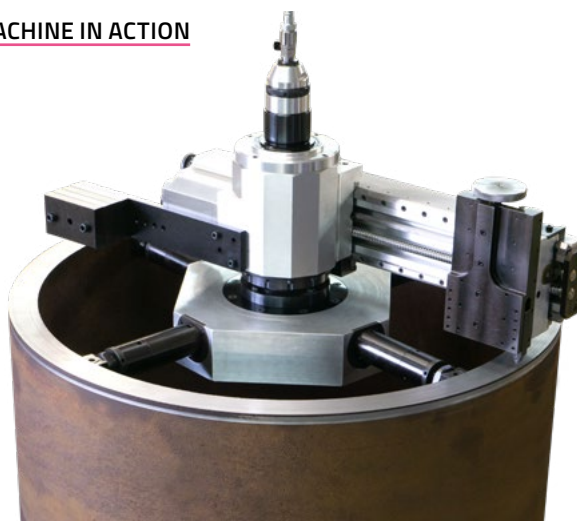
## BORING FEED RATES (3 OFF UP/DOWN)

| mm/rev             | inches/rev            |
|--------------------|-----------------------|
| 0.05 – 0.10 – 0.20 | 0.002 – 0.004 – 0.008 |

## TOOLING CHART

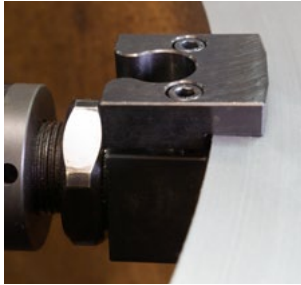
| HOLDER      | INSERT     | SCREW | TORX  |
|-------------|------------|-------|-------|
| IMFM40F-V11 | CIV-11-3-1 | MHS-4 | TX-15 |
| IMFM40P-V11 | CIV-11-3-1 | MHS-4 | TX-15 |
| IMFM40L-V11 | CIV-11-3-1 | MHS-4 | TX-15 |

## MACHINE IN ACTION



# IMFM-40 and IMFM-60 features

## LEVELLING AND CENTERING



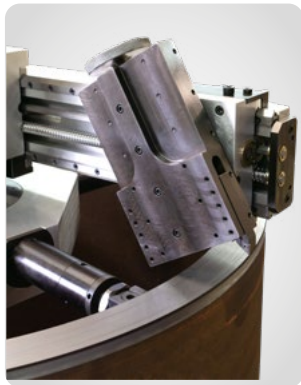
Both machines are equipped with special jaw set for easy, quick levelling and centering. A special mechanism allows convenient adjustment of the mounting plane relative to the pipe. Built-in self-centering locking system significantly facilitates the coarse setting of the machine.

## ELECTRIC DRIVE



As an alternative, we offer an electric drive for IMFM40&60. The motor provides similar parameters to the pneumatic one.

## SWIVEL TOOL AS A STANDARD



Standard configuration of IMFM is equipped with swivel tool post for grooves, RTJ flanges and bevels

## TWO LOCKING PLATES



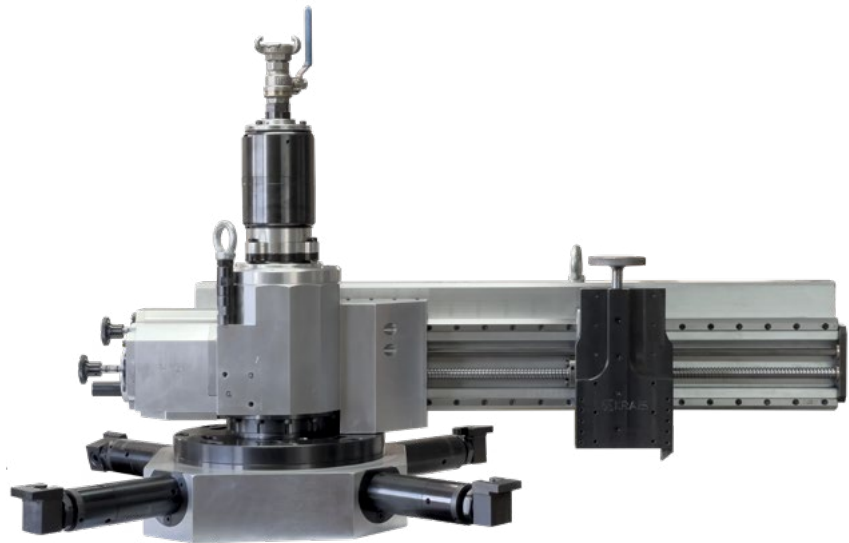
The offer includes two sizes of locking system. Thanks to the matching dimensions of the rigid body, stable mounting and smooth machining of face surfaces and flanges in all pipe sizes is possible.

# IMFM-60 Internal Mounted FlangeMill

Internally mounted, lightweight and durable machine tool. Ideal for machining all types of flange faces, seal grooves, weld preparations and counterbores.

- ▶ Heavy-duty steel/aluminium design with solid but lightweight construction
- ▶ High rigidity of the machine in relation to the dimension and weight
- ▶ Continuous groove facing feeds
- ▶ Swivel tool post for grooves, RTJ flanges and bevels
- ▶ Easy levelling and centering system with built-in self- centre feature
- ▶ Quick clamping with solid, 50 mm self-centering steel shaft
- ▶ CE certificate

As standard IMFM is supplied with the complete toolkit, including cutting tool and inserts and hose connection, required jaws to cover the full range, paper manual and storage/shipping box. Beside pneumatic 4,0 Hp drive, for IMFM we offer a wide choice of pneumatic and electric drives.



| STANDARD WORKING RANGE |             |                |     | MAX SWING<br>DIAMETER | TOOL POST<br>TRAVEL | FEED RATES      | FREE<br>SPEED | POWER       |         |                 |          |
|------------------------|-------------|----------------|-----|-----------------------|---------------------|-----------------|---------------|-------------|---------|-----------------|----------|
| FACING RANGE           |             | CLAMPING RANGE |     |                       |                     |                 |               |             |         |                 |          |
| 305 – 1525 mm          |             | 290 - 1400 mm  |     | 765 mm                | 102 mm              | See table       | 0 - 22 Rpm    | 4,0 Hp      |         |                 |          |
| 12" - 60"              |             | 11,4" - 55"    |     | 30,1"                 | 4"                  |                 |               | 3,0 kW      |         |                 |          |
| AIR USE                |             | SHIPPING WIDTH |     | SHIPPING HEIGHT       |                     | SHIPPING LENGTH |               | BODY WEIGHT |         | SHIPPING WEIGHT |          |
| 98 cfm                 | 2,69 m³/min | 820 mm         | 32" | 830 mm                | 33"                 | 1230 mm         | 48"           | 412 kg      | 906 Lbs | 499 kg          | 1010 Lbs |

## FACING FEED RATES (3 OFF IN/OUT)

| Direction | Gear | mm/rev | inch/rev | grooves per cm | grooves per inch |
|-----------|------|--------|----------|----------------|------------------|
| Out       | 1    | 0,130  | 0,005    | 76             | 195              |
|           | 2    | 0,203  | 0,008    | 49             | 125              |
|           | 3    | 0,494  | 0,019    | 20             | 51               |
| In        | 1    | 0,155  | 0,006    | 65             | 164              |
|           | 2    | 0,241  | 0,009    | 41             | 105              |
|           | 3    | 0,588  | 0,023    | 17             | 43               |

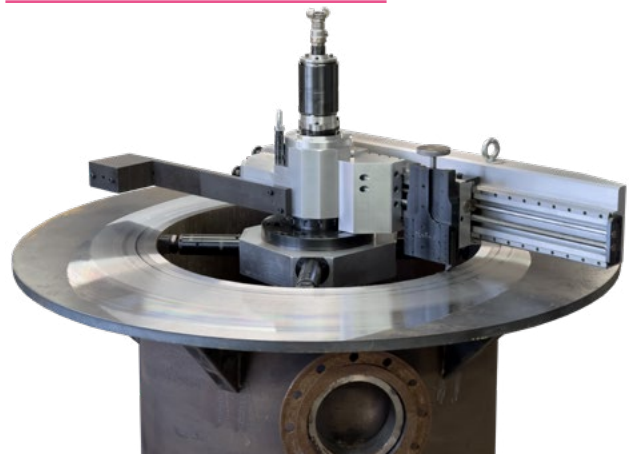
## BORING FEED RATES (3 OFF UP/DOWN)

| mm/rev             | inches/rev            |
|--------------------|-----------------------|
| 0.05 – 0.10 – 0.20 | 0.002 – 0.004 – 0.008 |

## TOOLING CHART

| HOLDER      | INSERT     | SCREW | TORX  |
|-------------|------------|-------|-------|
| IMFM60F-V11 | CIV-11-3-1 | MHS-4 | TX-15 |
| IMFM60P-V11 | CIV-11-3-1 | MHS-4 | TX-15 |
| IMFM60L-V11 | CIV-11-3-1 | MHS-4 | TX-15 |

## MACHINE FACING 60" FLANGE RING



# SFFM Flange Facer

SFFM series Flange Facing Machines are mounted on the outer diameter of the flange. The precise, synchronized radial and axial feed mechanism allows for a high quality machining, resulting in one continuous groove producing a true gramophone finish.

SFFM Flange Facing Machines are suitable for various flange types:

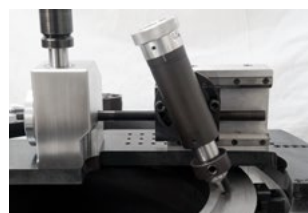
- ▶ Flat Face
- ▶ Raised Face
- ▶ Ring Type Joints (RTJ)
- ▶ Tongue & Groove
- ▶ Lens Ring
- ▶ Grayloc® (hub profile)
- ▶ Compact Flanges

SFFM Flange Facers are suitable for the oil and gas industry, power plants, chemical plants, oil rigs and many others. They are prepared to implement applications complying with ASME standards.



| MODEL     | WORKING RANGE |        |         | DIMENSIONS |          |          |             |        | WEIGHT | JAWS |
|-----------|---------------|--------|---------|------------|----------|----------|-------------|--------|--------|------|
|           | UNIT          | MIN OD | MAX OD  | UNIT       | FRAME OD | FRAME ID | FRAME WIDTH | HEIGHT |        |      |
| SFFM-0410 | NPS           | 2,00   | 10,00   | [inch]     | 16,22    | 11,24    | 2,50        | 17,3"  | 57     | 4    |
|           | Metric        | 50,00  | 250,00  | [mm]       | 412,00   | 285,40   | 63,50       | 440    |        |      |
| SFFM-1016 | NPS           | 2,00   | 15,00   | [inch]     | 21,46    | 16,48    | 2,50        | 17,3"  | 68     | 6    |
|           | Metric        | 50,00  | 370,00  | [mm]       | 545,00   | 418,70   | 63,50       | 440    |        |      |
| SFFM-1624 | NPS           | 4,00   | 23,00   | [inch]     | 29,49    | 24,41    | 2,50        | 17,3"  | 103    | 10   |
|           | Metric        | 100,00 | 580,00  | [mm]       | 749,00   | 619,90   | 63,50       | 440    |        |      |
| SFFM-2836 | NPS           | 8,00   | 35,00   | [inch]     | 42,15    | 37,00    | 2,76        | 17,3"  | 180    | 10   |
|           | Metric        | 200,00 | 890,00  | [mm]       | 1070,60  | 939,80   | 65,40       | 440    |        |      |
| SFFM-4048 | NPS           | 10,00  | 47,00   | [inch]     | 54,40    | 49,53    | 2,76        | 17,3"  | 260    | 12   |
|           | Metric        | 250,00 | 1200,00 | [mm]       | 1381,80  | 1251,00  | 65,40       | 440    |        |      |

## FEATURES OF MACHINE



### CUTTING GROOVES

The machine offers a simple way of execution of the RTJ grooves by using the single point swivel head or formed tools



### GRAMOPHONE GROOVE

The design of the feed attachment assures the automatic and variable feed rate on radial axis producing proper gramophone groove.



### STRONG DRIVES

Machine can be driven with a wide range of motors, pneumatic, hydraulic and electrical, including servo drives - all made by KRAIS.



### AVAILABLE AS MODULE

For owners of our regular SFSF machines we offer special module, allowing to convert the standard SFSF into regular flange facing module

## TOOLING CHART

| HOLDER   | INSERT     | SCREW | TORX  |
|----------|------------|-------|-------|
| SFFM-V11 | CIV-11-3-1 | MHS-4 | TX-15 |

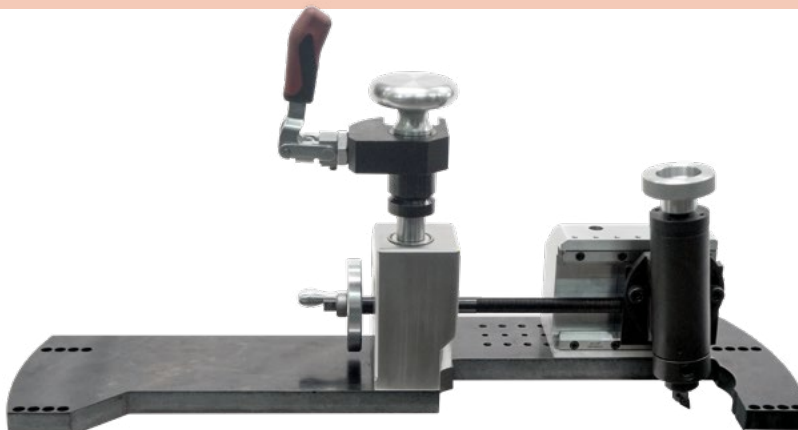


# SFFM Module

SFFM Module can be mounted on all our SFSF clamshells and convert the regular Clamshell into OD mount flange facing machine. SFSF clamshell combined with the module widens the scope of its application and still providing the same functionality as the machine SFFM.

Purchasing the SFFM Module allows to save a lot of money by avoiding the purchase of two separate machine tools.

Time needed for the machine changeover is only 20 minutes.



| SFSF MODEL | WORKING RANGE WITH MODULE |        |         | DIMMENSIONS |          |          |             |             | WEIGHT* | JAWS |
|------------|---------------------------|--------|---------|-------------|----------|----------|-------------|-------------|---------|------|
|            | UNIT                      | MIN OD | MAX OD  | UNIT.       | FRAME OD | FRAME ID | FRAME WIDTH | BOTH HEIGHT |         |      |
| SFSF-0410  | NPS                       | 0,80   | 8,80    | [inch]      | 16,22    | 11,24    | 2,50        | 16,25       | 57,00   | 4    |
|            | Metric                    | 20,00  | 224,00  | [mm]        | 412,00   | 285,40   | 63,50       | 412,5       |         |      |
| SFSF-0612  | NPS                       | 1,60   | 10,50   | [inch]      | 18,15    | 13,24    | 2,50        | 16,25       | 59,00   | 4    |
|            | Metric                    | 40,00  | 270,00  | [mm]        | 461,00   | 336,20   | 63,50       | 412,5       |         |      |
| SFSF-0814  | NPS                       | 1,60   | 12,00   | [inch]      | 19,49    | 14,48    | 2,50        | 16,25       | 61,00   | 6    |
|            | Metric                    | 40,00  | 305,00  | [mm]        | 495,00   | 367,90   | 63,50       | 412,5       |         |      |
| SFSF-1016  | NPS                       | 1,60   | 14,00   | [inch]      | 21,46    | 16,48    | 2,50        | 16,29       | 68,00   | 6    |
|            | Metric                    | 40,00  | 356,00  | [mm]        | 545,00   | 418,70   | 63,50       | 413,5       |         |      |
| SFSF-1218  | NPS                       | 2,00   | 16,80   | [inch]      | 23,50    | 18,48    | 2,50        | 16,29       | 83,00   | 6    |
|            | Metric                    | 50,00  | 427,00  | [mm]        | 597,00   | 469,50   | 63,50       | 413,5       |         |      |
| SFSF-1420  | NPS                       | 2,00   | 20,00   | [inch]      | 25,47    | 20,85    | 2,50        | 16,29       | 90,00   | 6    |
|            | Metric                    | 50,00  | 508,00  | [mm]        | 647,00   | 520,30   | 63,50       | 413,5       |         |      |
| SFSF-1624  | NPS                       | 2,00   | 22,70   | [inch]      | 29,49    | 24,41    | 2,50        | 16,29       | 103,00  | 10   |
|            | Metric                    | 50,00  | 578,00  | [mm]        | 749,00   | 619,90   | 63,50       | 413,5       |         |      |
| SFSF-2028  | NPS                       | 4,00   | 26,80   | [inch]      | 33,90    | 28,75    | 2,76        | 17,48       | 145,00  | 10   |
|            | Metric                    | 100,00 | 681,00  | [mm]        | 861,10   | 730,30   | 65,40       | 443,7       |         |      |
| SFSF-2432  | NPS                       | 8,00   | 30,70   | [inch]      | 38,15    | 33,00    | 2,76        | 17,48       | 158,00  | 10   |
|            | Metric                    | 200,00 | 782,00  | [mm]        | 969,00   | 838,20   | 65,40       | 443,7       |         |      |
| SFSF-2836  | NPS                       | 8,00   | 34,80   | [inch]      | 42,15    | 37,00    | 2,76        | 17,48       | 180,00  | 10   |
|            | Metric                    | 200,00 | 884,00  | [mm]        | 1070,60  | 939,80   | 65,40       | 443,7       |         |      |
| SFSF-3442  | NPS                       | 10,00  | 40,70   | [inch]      | 48,15    | 43,00    | 2,76        | 17,48       | 202,00  | 10   |
|            | Metric                    | 250,00 | 1036,00 | [mm]        | 1223,00  | 1092,20  | 65,40       | 443,7       |         |      |
| SFSF-4048  | NPS                       | 10,00  | 46,80   | [inch]      | 54,40    | 49,53    | 2,76        | 17,48       | 260,00  | 12   |
|            | Metric                    | 250,00 | 1189,00 | [mm]        | 1381,80  | 1251,00  | 65,40       | 443,7       |         |      |

\*depends on machine configuration

## SURFACE FINISH



The Modul is equipped as standard with feed gearbox in order to generate both, fine or coarse surface finish by simple switch on the gear box.

## TOOLING CHART

| HOLDER   | INSERT     | SCREW | TORX  |
|----------|------------|-------|-------|
| SFFM-V11 | CIV-11-3-1 | MHS-4 | TX-15 |

# MicroDrill-SOFD

## Studding outlet flange drilling tool

MicroDrill-SOFD machine is specifically designed for this problem. It can fit even on 1" studding outlet flanges and, with its low-speed, high-torque operation, can drill holes up to 20 mm, making it perfect for precise drilling in tight spaces.

The locking shafts are 150 mm long as standard and 300 mm as optional. Other lengths are available on request.

Studding Outlet Flanges, also known as "pad flanges" (ANSI B16.5 ASTM A182), are often installed inside or outside vessels and tanks. A common issue arises when a stud breaks or shears, requiring the flange to be drilled out and re-threaded.

### KEY FEATURES

#### UP TO 20 MM (2.4") DRILLING

Covers most heat exchanger tube sheets; suitable for various equipment types.

#### COMPACT BODY

Machine is lightweight and can be used in very tight spaces.

#### TORQUE-REACTIVE PLATFORM

Firm clamping absorbs machining forces, improving safety and control.

#### OPERATOR SAFETY

Designed for quick, safe plug removal with minimal risk.



| WORKING RANGE  |             | LOCKING RANGE               |       | POWER       |        | TORQUE                                              |        |
|----------------|-------------|-----------------------------|-------|-------------|--------|-----------------------------------------------------|--------|
| 12,5– 38,0 mm  |             | According<br>to the drawing |       | 0,98 Hp     |        | 18 Nm / 300 RPM<br>(55 Nm / 100 RPM*)               |        |
| 0,492 – 1,496" |             |                             |       |             |        | 13,28 Ft-lbs / 300 RPM<br>(40,57 Ft-lbs / 100 RPM*) |        |
| AIR USE        |             | BODY WIDTH                  |       | BODY HEIGHT |        | BODY LENGTH                                         |        |
| 17 cfm         | 0,48 m³/min | 1,73"                       | 44 mm | 10,82"      | 275 mm | 12,2"                                               | 310 mm |

\*with 3x Speed Reducer

### STABILITY AND DURABILITY



MiniDrill-SOFD features a robust steel frame for stability and durability. Precision locking plates ensure perfect centering on any flange size for stud drilling and thread prep. It also handles oversized holes with ease.

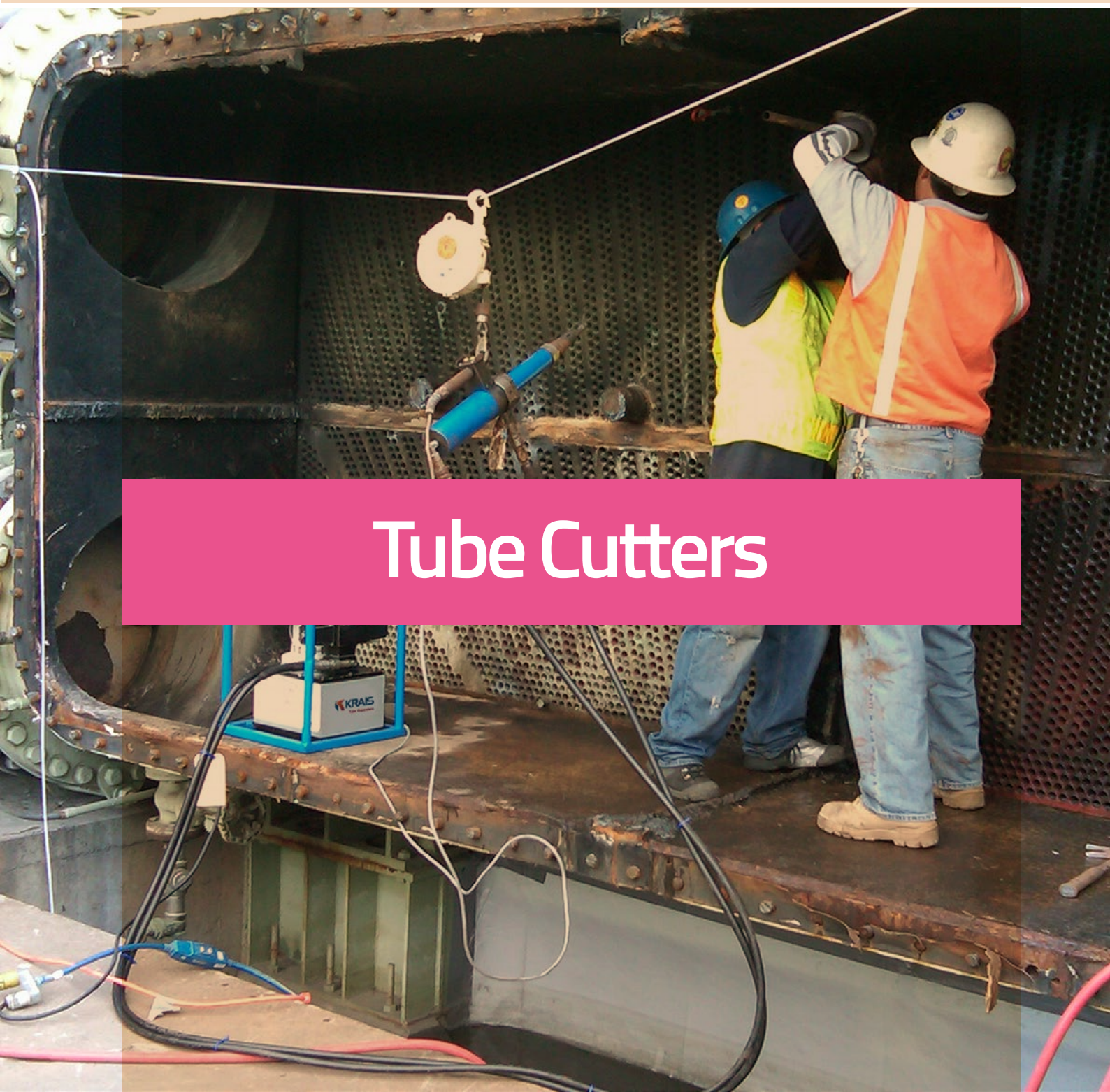
### STANDARD TOOL



The machine is equipped with a standard ER25 collet chuck with the Weldon-type holder for quick and efficient tool changes. If needed, other configurations can be provided upon request to suit specific applications.







# Tube Cutters



# MiniCut Tools

## MiniCut 100 for heat exchangers

MiniCut 100 is recommended for use in cutting alloy and ferrous tubing up to 1-1/4" O.D. Heavy wall tubing up to 10 BWG can be cut quickly and efficiently. Tool uses one cutting bit to cut any material tubes. The MiniCut 100 tool is equipped with star wheel feed for smooth, positive power transmission to the cutting bit. Tool is available as electric version. MiniCut 100E covers the same tube sizes and comes with the same cutting head.



| CUTTING RANGE   |            | POWER  |       | FREE SPEED |        | TORQUE     |        |
|-----------------|------------|--------|-------|------------|--------|------------|--------|
| Up to 1-1/4" OD |            | 1,3 Hp |       | 100 Rpm    |        | 105 Ft.Lbs |        |
| Up to 31,7 mm   |            |        |       |            |        | 140 Nm     |        |
| AIR USE         |            | WIDTH  |       | HEIGHT     |        | WEIGHT     |        |
| 55 cfm          | 1,3 m³/min | 2,32"  | 59 mm | 13,1"      | 335 mm | 9 Lbs      | 4,5 kg |

### MINICUT 100 E

Tool is driven by electric motor made by Makita with 3 stage planetary gear box made by KRAIS and has variable speed control. Is interchangeable with pneumatic drive and can be purchased separately at any time.

Free Speed.....120 RPM

Power.....750 W

Torque.....360 Nm (266 Ft.Lbs)

Feed Stroke .....25 mm (1")



## MiniCut 300 for condenser and chillers

The MiniCut 300 is recommended for use in cutting tubes within condensers, chillers and similar vessels with non-ferrous tubes. Tool uses one cutting bit, can cut 1" x 16 BWG brass tubes in just a few seconds. This machine is equipped with lever feed handle as standard. Tool is available as electric version. MiniCut 300E covers the same tube sizes and comes with the same cutting head.



| CUTTING RANGE |            | POWER  |       | FREE SPEED |        | TORQUE    |        |
|---------------|------------|--------|-------|------------|--------|-----------|--------|
| Up to 1" OD   |            | 1,3 Hp |       | 300 Rpm    |        | 18 Ft.Lbs |        |
| Up to 25,4 mm |            |        |       |            |        | 24 Nm     |        |
| AIR USE       |            | WIDTH  |       | HEIGHT     |        | WEIGHT    |        |
| 55 cfm        | 1,3 m³/min | 2,32"  | 59 mm | 13,1"      | 335 mm | 9 Lbs     | 4,5 kg |

### MINICUT 300 E

Tool is driven by electric motor made by Makita with 3 stage planetary gear box made by KRAIS and has variable speed control. Is interchangeable with pneumatic drive and can be purchased separately at any time.

Free Speed.....300 RPM

Power.....750 W

Torque.....122 Nm (92 Ft.Lbs)

Feed Stroke .....25 mm (1")



# MiniCut Tools

## MiniCut 101/AF with automatic feed

MiniCut 101/AF tube cutting machine with Automatic Feed. Alloy and ferrous tubes up to 1-1/4" with heavy wall up to 10 BWG can be cut quickly, consistently efficiently and effortlessly within 15-40 second depending on diameter and wall thickness. The MiniCut 101/AF tool is equipped with pneumatic/hydraulic automatic feed for positive power transmission to the cutting bit.

| CUTTING RANGE   |            | POWER                   | FREE SPEED        | TORQUE     |         |
|-----------------|------------|-------------------------|-------------------|------------|---------|
| Up to 1-1/4" OD |            | 1,3 Hp                  | 100 Rpm           | 105 Ft.Lbs |         |
| Up to 31,7 mm   |            |                         |                   | 140 Nm     |         |
| AIR USE         |            | DIMENSIONS              |                   | WEIGHT     |         |
| 55 cfm          | 1,3 m³/min | 2,44" x 14,96" x 21,25" | 62 x 380 x 540 mm | 25,35 Lbs  | 11,5 kg |



### MINICUT 101/AF-RB OPTION



The most convenient version can be delivered with reaction bar with two locking shafts. The reaction bar is universal and allows to precise tool alignment to the tubes pitch. Dim: 250 x 330 x 54 mm / 9,84 x 14,96 x 21,25" Weight: 13,5 kg / 29,76 Lbs



## Tube Cutters for MiniCut Machines

Tools are available in 3" standard length, other upon order: 6" and 14"



| TUBE OD |      | TUBE GAUGE | TUBE ID       | TOOL NO.       | CUTTER BIT NO. | BODY DIAMETER | NUMBER OF BLADES |
|---------|------|------------|---------------|----------------|----------------|---------------|------------------|
| [INCH]  | [MM] | [BWG]      |               |                |                |               |                  |
| 5/8     | 15,8 | 12-13      | 10,3 - 10,05  | PTMC-158-3"-12 | K-25186        | 10,00         | 1                |
| 5/8     | 15,8 | 14-15      | 11,66 - 12,22 | PTMC-158-3"-14 | K-25186        | 11,30         | 1                |
| 5/8     | 15,8 | 16-17      | 12,57 - 12,93 | PTMC-158-3"-16 | K-25186        | 12,20         | 1                |
| 5/8     | 15,8 | 18-19      | 13,40 - 13,74 | PTMC-158-3"-18 | K-25186        | 13,10         | 1                |
| 5/8     | 15,8 | 20-22      | 14,10 - 14,45 | PTMC-158-3"-20 | K-25186        | 13,80         | 1                |
| 3/4     | 19,0 | 14-15      | 14,80 - 15,40 | PTMC-190-3"-14 | K-25186        | 14,50         | 1                |
| 3/4     | 19,0 | 16-17      | 15,75 - 16,10 | PTMC-190-3"-16 | K-25186        | 15,40         | 1                |
| 3/4     | 19,0 | 18-19      | 16,56 - 16,90 | PTMC-190-3"-18 | K-25186        | 16,15         | 1                |
| 3/4     | 19,0 | 20-22      | 17,27 - 17,63 | PTMC-190-3"-20 | K-25186        | 17,00         | 1                |
| 7/8     | 22,2 | 10-11      | 15,42 - 16,13 | PTMC-222-3"-10 | K-25194        | 15,00         | 1                |
| 7/8     | 22,2 | 12-13      | 16,69 - 17,40 | PTMC-222-3"-12 | K-25194        | 16,20         | 1                |
| 7/8     | 22,2 | 14-15      | 18,01 - 18,57 | PTMC-222-3"-14 | K-25194        | 17,60         | 1                |
| 7/8     | 22,2 | 16-17      | 18,92 - 19,28 | PTMC-222-3"-16 | K-25194        | 18,50         | 1                |
| 7/8     | 22,2 | 18-20      | 19,74 - 20,42 | PTMC-222-3"-18 | K-25194        | 19,40         | 1                |
| 1       | 25,4 | 8-9        | 17,02 - 17,88 | PTMC-254-3"-8  | K-25199        | 16,60         | 1                |
| 1       | 25,4 | 10-11      | 18,59 - 19,30 | PTMC-254-3"-10 | K-25199        | 18,20         | 1                |
| 1       | 25,4 | 12-13      | 19,86 - 20,57 | PTMC-254-3"-12 | K-25199        | 19,40         | 1                |

| TUBE OD |      | TUBE GAUGE | TUBE ID       | TOOL NO.       | CUTTER BIT NO. | BODY DIAMETER | NUMBER OF BLADES |
|---------|------|------------|---------------|----------------|----------------|---------------|------------------|
| [INCH]  | [MM] | [BWG]      |               |                |                |               |                  |
| 1       | 25,4 | 14-15      | 21,18 - 21,74 | PTMC-254-3"-14 | K-25199        | 20,80         | 1                |
| 1       | 25,4 | 16-17      | 22,10 - 22,45 | PTMC-254-3"-16 | K-25199        | 21,70         | 1                |
| 1       | 25,4 | 18-19      | 22,91 - 23,27 | PTMC-254-3"-18 | K-25199        | 22,50         | 1                |
| 1       | 25,4 | 20-22      | 23,62 - 23,89 | PTMC-254-3"-20 | K-25199        | 23,20         | 1                |
| 1-1/8   | 28,5 | 13-14      | 23,75 - 24,36 | PTMC-285-3"-13 | K-25199        | 23,40         | 1                |
| 1-1/8   | 28,5 | 15-16      | 24,92 - 25,27 | PTMC-285-3"-14 | K-25199        | 24,50         | 1                |
| 1-1/8   | 28,5 | 17-18      | 25,63 - 26,09 | PTMC-285-3"-17 | K-25199        | 25,10         | 1                |
| 1-1/4   | 31,7 | 12-13      | 26,21 - 26,92 | PTMC-317-3"-12 | K-25206        | 25,80         | 1                |
| 1-1/4   | 31,7 | 14-15      | 27,53 - 28,09 | PTMC-317-3"-14 | K-25206        | 27,10         | 1                |
| 1-1/4   | 31,7 | 16-17      | 28,45 - 28,80 | PTMC-317-3"-16 | K-25206        | 28,00         | 1                |
| 1-1/4   | 31,7 | 18-20      | 29,26 - 29,92 | PTMC-317-3"-20 | K-25206        | 28,80         | 1                |
| 1-1/2   | 38,1 | 8-9        | 29,72 - 30,58 | PTMC-381-3"-8  | K-25206        | 29,30         | 1                |
| 1-1/2   | 38,1 | 10-11      | 31,29 - 32,00 | PTMC-381-3"-10 | K-25206        | 30,08         | 1                |
| 1-1/2   | 38,1 | 12-13      | 32,56 - 33,27 | PTMC-381-3"-12 | K-25206        | 32,10         | 1                |
| 1-1/2   | 38,1 | 14-15      | 33,88 - 34,44 | PTMC-381-3"-14 | K-25206        | 33,40         | 1                |
| 1-1/2   | 38,1 | 16-17      | 34,80 - 35,15 | PTMC-381-3"-16 | K-25206        | 34,40         | 1                |
| 1-1/2   | 38,1 | 18-20      | 35,51 - 36,32 | PTMC-381-3"-18 | K-25206        | 35,10         | 1                |

# KDM Pneumatic drill

KRAIS KDM is high torque, pneumatic, low-speed drilling machine for any application. Recommended for use with KRAIS PTTC Tube Cutters, PTTT Tube Trimmers, TEF Tube End Facers and JGS Grooving Tools.

| MODEL   | RPM | TORQUE |        | POWER | AIR USE |       | WEIGHT |      |
|---------|-----|--------|--------|-------|---------|-------|--------|------|
|         |     | NM     | FT/LBS | HP    | CFM     | L/MIN | KG     | LBS  |
| 70-KDM  | 70  | 188    | 138    | 1,3   | 48      | 1200  | 6,5    | 14,3 |
| 130-KDM | 130 | 105    | 78     | 1,3   | 48      | 1200  | 6,5    | 14,3 |
| 180-KDM | 180 | 79     | 58     | 1,3   | 48      | 1200  | 6,5    | 14,3 |
| 400-KDM | 400 | 36     | 27     | 1,3   | 48      | 1200  | 6,5    | 14,3 |

KDM Pneumatic Drill can be used as a portable drive for many typical tube works. In connection with proper tools offers a wide range of uses.



## PTTC Universal



This tools are used with KDM Pneumatic drill

| TUBE OD |      | TUBE GAUGE | TOOL NO.   | CUTTER BIT NO. | NUMBER OF BLADES | DRIVE SHANK |
|---------|------|------------|------------|----------------|------------------|-------------|
| [INCH]  | [MM] | [BWG]      |            |                |                  |             |
| 5/8     | 15,8 | 16-22      | PTTC-U-158 | K-25186        | 1                | HEX-1/2"    |
| 3/4     | 19   | 14-22      | PTTC-U-190 | K-25186        | 1                | HEX-1/2"    |
| 7/8     | 22,2 | 11-22      | PTTC-U-222 | K-25194        | 1                | HEX-1/2"    |
| 1       | 25,4 | 11-13      | PTTC-U-222 | K-25194        | 1                | HEX-1/2"    |
|         |      | 14-22      | PTTC-U-254 | K-25199        | 2                | HEX-1/2"    |
| 1-1/4   | 31,7 | 14-22      | PTTC-U-317 | K-25206        | 2                | HEX-5/8"    |
| 1-1/2   | 38,1 | 10-20      | PTTC-U-381 | K-25206        | 2                | HEX-5/8"    |
| 2       | 50,8 | 8-20       | PTTC-U-508 | K-25221        | 2                | SQ-3/4"     |
| 2-1/2   | 63,5 | 8-12       | PTTC-U-635 | K-25223        | 2                | SQ-3/4"     |

## PTTT - Tube trimmer



This tools are used with KDM Pneumatic drill

| TUBE OD |      | TUBE GAUGE | TOOL NO. | CUTTER BIT NO. | NUMBER OF BLADES | DRIVE SHANK |
|---------|------|------------|----------|----------------|------------------|-------------|
| [INCH]  | [MM] | [BWG]      |          |                |                  |             |
| 5/8     | 15,8 | 16-22      | PTTT-158 | K-25186        | 1                | HEX-1/2"    |
| 3/4     | 19   | 14-22      | PTTT-190 | K-25186        | 1                | HEX-1/2"    |
| 7/8     | 22,2 | 11-22      | PTTT-222 | K-25194        | 1                | HEX-1/2"    |
| 1       | 25,4 | 11-13      | PTTT-222 | K-25194        | 1                | HEX-1/2"    |
|         |      | 14-22      | PTTT-254 | K-25199        | 2                | HEX-1/2"    |
| 1-1/4   | 31,7 | 14-22      | PTTT-317 | K-25206        | 2                | HEX-5/8"    |
| 1-1/2   | 38,1 | 10-20      | PTTT-381 | K-25206        | 2                | HEX-5/8"    |
| 2       | 50,8 | 8-20       | PTTT-508 | K-25221        | 2                | SQ-3/4"     |
| 2-1/2   | 63,5 | 8-12       | PTTT-635 | K-25223        | 2                | SQ-3/4"     |

# Solid body PTTC

The PTTC cutter blade depth can be adjusted to cut through the tube. The tool uses one or two HSS blades. The front pilot under the cutter keeps it centered and prevents jams, as chips move forward into the tube. Also available as a tube trimmer and push-type trimmer.



This tools are used with KDM Pneumatic drill

| TUBE OD |      | TUBE GAUGE | TUBE ID [MM] |       | TUBE ID [INCH] |       | CUTTER BODY DIAMETER | TOOL NO.       | CUTTER BIT NO. | NUMBER OF BLADES | DRIVE SHANK |
|---------|------|------------|--------------|-------|----------------|-------|----------------------|----------------|----------------|------------------|-------------|
| [INCH]  | [MM] | [BWG]      | MIN          | MAX   | MIN            | MAX   |                      |                |                |                  |             |
| 3/8"    | 9,5  | 22-24      | 8,10         | 8,40  | 0,319          | 0,331 | 7,8                  | PTTC-95-3"-22  | K-25210-78     | 1                | HEX-1/2"    |
| 1/2"    | 12,7 | 14-15      | 8,50         | 9,04  | 0,335          | 0,356 | 8,2                  | PTTC-127-3"-14 | K-25210        | 1                | HEX-1/2"    |
|         |      | 16-17      | 9,40         | 9,75  | 0,370          | 0,384 | 9,2                  | PTTC-127-3"-16 | K-25210        | 1                | HEX-1/2"    |
| 5/8"    | 15,8 | 12-13      | 10,30        | 10,05 | 0,406          | 0,396 | 10                   | PTTC-158-3"-12 | K-25186-A      | 1                | HEX-1/2"    |
|         |      | 14-15      | 11,66        | 12,22 | 0,459          | 0,481 | 11,3                 | PTTC-158-3"-14 | K-25186-B      | 1                | HEX-1/2"    |
|         |      | 16-17      | 12,57        | 12,93 | 0,495          | 0,509 | 12,2                 | PTTC-158-3"-16 | K-25186-B      | 1                | HEX-1/2"    |
|         |      | 18-19      | 13,40        | 13,74 | 0,528          | 0,541 | 13,1                 | PTTC-158-3"-18 | K-25186        | 1                | HEX-1/2"    |
|         |      | 20-22      | 14,10        | 14,45 | 0,555          | 0,569 | 13,8                 | PTTC-158-3"-20 | K-25186        | 1                | HEX-1/2"    |
| 3/4"    | 19   | 14-15      | 14,80        | 15,40 | 0,583          | 0,606 | 14,5                 | PTTC-190-3"-14 | K-25186        | 1                | HEX-1/2"    |
|         |      | 16-17      | 15,75        | 16,10 | 0,620          | 0,634 | 15,4                 | PTTC-190-3"-16 | K-25186        | 1                | HEX-1/2"    |
|         |      | 18-19      | 16,56        | 16,90 | 0,652          | 0,665 | 16,15                | PTTC-190-3"-18 | K-25186        | 1                | HEX-1/2"    |
|         |      | 20-22      | 17,27        | 17,63 | 0,680          | 0,694 | 17                   | PTTC-190-3"-20 | K-25186        | 1                | HEX-1/2"    |
| 7/8"    | 22,2 | 10-11      | 15,42        | 16,13 | 0,607          | 0,635 | 15                   | PTTC-222-3"-10 | K-25194        | 1                | HEX-1/2"    |
|         |      | 12-13      | 16,69        | 17,40 | 0,657          | 0,685 | 16,2                 | PTTC-222-3"-12 | K-25194        | 1                | HEX-1/2"    |
|         |      | 14-15      | 18,01        | 18,57 | 0,709          | 0,731 | 17,6                 | PTTC-222-3"-14 | K-25194        | 1                | HEX-1/2"    |
|         |      | 16-17      | 18,92        | 19,28 | 0,745          | 0,759 | 18,5                 | PTTC-222-3"-16 | K-25194        | 1                | HEX-1/2"    |
|         |      | 18-20      | 19,74        | 20,42 | 0,777          | 0,804 | 19,4                 | PTTC-222-3"-18 | K-25194        | 1                | HEX-1/2"    |
| 1"      | 25,4 | 8-9        | 17,02        | 17,88 | 0,670          | 0,704 | 16,6                 | PTTC-254-3"-8  | K-25199-A      | 1                | HEX-1/2"    |
|         |      | 10-11      | 18,59        | 19,30 | 0,732          | 0,760 | 18,2                 | PTTC-254-3"-10 | K-25199-B      | 1                | HEX-1/2"    |
|         |      | 12-13      | 19,86        | 20,57 | 0,782          | 0,810 | 19,4                 | PTTC-254-3"-12 | K-25199-B      | 1                | HEX-1/2"    |
|         |      | 14-15      | 21,18        | 21,74 | 0,834          | 0,856 | 20,8                 | PTTC-254-3"-14 | K-25199        | 1                | HEX-1/2"    |
|         |      | 16-17      | 22,10        | 22,45 | 0,870          | 0,884 | 21,7                 | PTTC-254-3"-16 | K-25199        | 1                | HEX-1/2"    |
|         |      | 18-19      | 22,91        | 23,27 | 0,902          | 0,916 | 22,5                 | PTTC-254-3"-18 | K-25199        | 1                | HEX-1/2"    |
| 1-1/8"  | 28,5 | 20-22      | 23,62        | 23,89 | 0,930          | 0,941 | 23,2                 | PTTC-254-3"-20 | K-25199        | 1                | HEX-1/2"    |
|         |      | 13-14      | 23,75        | 24,36 | 0,935          | 0,959 | 23,4                 | PTTC-285-3"-13 | K-25199        | 1                | HEX-5/8"    |
|         |      | 15-16      | 24,92        | 25,27 | 0,981          | 0,995 | 24,5                 | PTTC-285-3"-14 | K-25199        | 1                | HEX-5/8"    |
| 1-1/4"  | 31,7 | 17-18      | 25,63        | 26,09 | 1,009          | 1,027 | 25,1                 | PTTC-285-3"-17 | K-25199        | 1                | HEX-5/8"    |
|         |      | 12-13      | 26,21        | 26,92 | 1,032          | 1,060 | 25,8                 | PTTC-317-3"-12 | K-25206        | 1                | HEX-5/8"    |
|         |      | 14-15      | 27,53        | 28,09 | 1,084          | 1,106 | 27,1                 | PTTC-317-3"-14 | K-25206        | 1                | HEX-5/8"    |
|         |      | 16-17      | 28,45        | 28,80 | 1,120          | 1,134 | 28                   | PTTC-317-3"-16 | K-25206        | 1                | HEX-5/8"    |
| 1-1/2"  | 38,1 | 18-20      | 29,26        | 29,92 | 1,152          | 1,178 | 28,8                 | PTTC-317-3"-20 | K-25206        | 1                | HEX-5/8"    |
|         |      | 8-9        | 29,72        | 30,58 | 1,170          | 1,204 | 29,3                 | PTTC-381-3"-8  | K-25206        | 1                | HEX-5/8"    |
|         |      | 10-11      | 31,29        | 32,00 | 1,232          | 1,260 | 30,08                | PTTC-381-3"-10 | K-25206        | 1                | HEX-5/8"    |
|         |      | 12-13      | 32,56        | 33,27 | 1,282          | 1,310 | 32,1                 | PTTC-381-3"-12 | K-25206        | 1                | HEX-5/8"    |
|         |      | 14-15      | 33,88        | 34,44 | 1,334          | 1,356 | 33,4                 | PTTC-381-3"-14 | K-25206        | 1                | HEX-5/8"    |
|         |      | 16-17      | 34,80        | 35,15 | 1,370          | 1,384 | 34,4                 | PTTC-381-3"-16 | K-25206        | 1                | HEX-5/8"    |
| 2"      | 50,8 | 18-20      | 35,51        | 36,32 | 1,398          | 1,430 | 35,1                 | PTTC-381-3"-18 | K-25206        | 1                | HEX-5/8"    |
|         |      | 8          | 42,42        |       | 1,670          |       | 42                   | PTTC-508-3"-8  | K-25221        | 1                | SQ-3/4"     |
|         |      | 9          | 43,28        |       | 1,704          |       | 42,8                 | PTTC-508-3"-9  | K-25221        | 1                | SQ-3/4"     |
|         |      | 10         | 44,00        |       | 1,732          |       | 43,6                 | PTTC-508-3"-10 | K-25221        | 1                | SQ-3/4"     |
|         |      | 11         | 44,70        |       | 1,760          |       | 44,3                 | PTTC-508-3"-11 | K-25221        | 1                | SQ-3/4"     |
|         |      | 12         | 45,26        |       | 1,782          |       | 44,8                 | PTTC-508-3"-12 | K-25221        | 1                | SQ-3/4"     |
|         |      | 13         | 46,00        |       | 1,811          |       | 45,6                 | PTTC-508-3"-13 | K-25221        | 1                | SQ-3/4"     |
|         |      | 14         | 46,60        |       | 1,835          |       | 46,2                 | PTTC-508-3"-14 | K-25221        | 1                | SQ-3/4"     |
| 2-1/2"  | 63,5 | 15         | 47,14        |       | 1,856          |       | 46,7                 | PTTC-508-3"-15 | K-25221        | 1                | SQ-3/4"     |
|         |      | 16-20      | 47,50        | 48,94 | 1,870          | 1,927 | 47,1                 | PTTC-508-3"-16 | K-25221        | 1                | SQ-3/4"     |
|         |      | 8          | 55,12        |       | 2,170          |       | 54,7                 | PTTC-635-3"-8  | K-25223        | 1                | SQ-3/4"     |
|         |      | 9          | 55,98        |       | 2,204          |       | 55,6                 | PTTC-635-3"-9  | K-25223        | 1                | SQ-3/4"     |
|         |      | 10         | 56,70        |       | 2,232          |       | 56,3                 | PTTC-635-3"-10 | K-25223        | 1                | SQ-3/4"     |
|         |      | 11         | 57,40        |       | 2,260          |       | 57                   | PTTC-635-3"-11 | K-25223        | 1                | SQ-3/4"     |
|         |      | 12         | 57,96        |       | 2,282          |       | 57,5                 | PTTC-635-3"-12 | K-25223        | 1                | SQ-3/4"     |



# ORTC - One Revolution Tube Cutter

Tools designed for cutting both ferrous and non-ferrous tubes commonly found in heat exchangers, boilers and condensers. Standard tool length is adjustable from 1"-6" (25-155 mm). Longer reach tools are available in 10" (254 mm) increments. The tool is designed to be used with a hand or ratchet wrench only. Impact wrenches should never be used with these tools. The Cutting of the tube is based on the eccentric principle, where the cutter bit moves out to the tube wall as the cutter is rotated. Continued clockwise rotation will puncture and cut the tube in one revolution. Simply rotating the tool counterclockwise closes the bit and the tool can be removed from the tube.



## ORTCC - ONE REVOLUTION TUBE CUTTER VERSION C

One Revolution Tube Cutter version C is used for piercing heavy wall, carbon steel tubes for ventilation prior to plugging the leaky tubes. Delivered in two length version 6" and 12".

| TUBE OD |       | TUBE GAUGE | TUBE ID |       |        |       | TOOL NO.  | TOOL BIT |
|---------|-------|------------|---------|-------|--------|-------|-----------|----------|
|         |       |            | [MM]    |       | [INCH] |       |           |          |
| [INCH]  | [MM]  | [BWG]      | MIN     | MAX   | MIN    | MAX   |           |          |
| 1/2     | 12,70 | 18-19      | 10,20   | 10,70 | 0,402  | 0,421 | ORTCC-100 | N-625-4  |
|         |       | 20         | 11,00   | 11,30 | 0,433  | 0,445 | ORTCC-108 | N-625-4  |
| 5/8     | 15,88 | 14         | 11,40   | 11,90 | 0,449  | 0,469 | ORTCC-113 | N-625-3  |
|         |       | 15-16      | 12,00   | 12,90 | 0,472  | 0,508 | ORTCC-119 | N-625-3  |
|         |       | 17-18      | 12,70   | 13,50 | 0,500  | 0,531 | ORTCC-123 | N-625-2  |
|         |       | 19-20      | 13,50   | 14,20 | 0,531  | 0,559 | ORTCC-131 | N-625-2  |
|         |       | 22         | 14,00   | 14,70 | 0,551  | 0,579 | ORTCC-139 | N-750-2  |
| 3/4     | 19,05 | 14-15      | 14,70   | 15,50 | 0,579  | 0,610 | ORTCC-145 | N-750-2  |
|         |       | 16-18      | 15,20   | 16,50 | 0,598  | 0,650 | ORTCC-153 | N-750-2  |
|         |       | 19-20      | 16,70   | 17,50 | 0,657  | 0,689 | ORTCC-163 | N-1000-1 |
| 7/8     | 22,23 | 14-15      | 17,80   | 18,50 | 0,701  | 0,728 | ORTCC-174 | N-1000-1 |
|         |       | 16-17      | 18,80   | 19,50 | 0,740  | 0,768 | ORTCC-184 | N-1000-1 |
|         |       | 18-20      | 19,30   | 20,60 | 0,760  | 0,811 | ORTCC-193 | N-1000-2 |
| 1       | 25,40 | 12         | 19,80   | 20,60 | 0,780  | 0,811 | ORTCC-193 | N-1000-2 |
|         |       | 14         | 20,80   | 21,60 | 0,819  | 0,850 | ORTCC-205 | N-1000-2 |
| 1       | 25,40 | 15         | 21,30   | 22,10 | 0,839  | 0,870 | ORTC-210  | N-1000-2 |
|         |       | 16-17      | 21,80   | 22,60 | 0,858  | 0,890 | ORTC-215  | N-1000-2 |
|         |       | 18-20      | 22,60   | 23,10 | 0,890  | 0,909 | ORTC-223  | N-1000-2 |
|         |       | 22         | 23,90   | 24,60 | 0,941  | 0,969 | ORTC-232  | N-1000-2 |
| 1-1/4   | 31,75 | 10-11      | 24,90   | 25,60 | 0,980  | 1,008 | ORTC-245  | N-1000-2 |
|         |       | 12         | 25,90   | 26,70 | 1,020  | 1,051 | ORTC-255  | N-1000-2 |
|         |       | 13-14      | 26,70   | 27,40 | 1,051  | 1,079 | ORTC-264  | N-1000-2 |
|         |       | 15-16      | 27,90   | 28,70 | 1,098  | 1,130 | ORTC-274  | N-1000-2 |
|         |       | 17-19      | 28,70   | 29,60 | 1,130  | 1,165 | ORTC-283  | N-1000-2 |

| TUBE OD |       | TUBE GAUGE | TUBE ID |       |        |       | TOOL NO. | TOOL BIT |
|---------|-------|------------|---------|-------|--------|-------|----------|----------|
|         |       |            | [MM]    |       | [INCH] |       |          |          |
| [INCH]  | [MM]  | [BWG]      | MIN     | MAX   | MIN    | MAX   |          |          |
| 1-1/2   | 38,10 | 10-11      | 31,30   | 32,10 | 1,232  | 1,264 | ORTC-309 | N-1500-1 |
|         |       | 12-13      | 32,50   | 33,30 | 1,280  | 1,311 | ORTC-320 | N-1500-1 |
|         |       | 14-15      | 33,80   | 34,50 | 1,331  | 1,358 | ORTC-333 | N-1500-1 |
|         |       | 16-17      | 34,50   | 35,30 | 1,358  | 1,390 | ORTC-339 | N-1500-1 |
|         |       | 18-19      | 35,30   | 36,10 | 1,390  | 1,421 | ORTC-350 | N-1500-1 |
| 1-3/4   | 44,45 | 10-11      | 37,00   | 38,50 | 1,457  | 1,516 | ORTC-369 | N-1500-1 |
|         |       | 12-14      | 38,80   | 40,30 | 1,528  | 1,587 | ORTC-383 | N-1500-1 |
|         |       | 15-16      | 40,80   | 41,20 | 1,606  | 1,622 | ORTC-403 | N-1500-1 |
|         |       | 17-18      | 41,30   | 42,00 | 1,626  | 1,654 | ORTC-410 | N-1500-1 |
| 2       | 50,80 | 10         | 44,00   | 44,00 | 1,732  | 1,732 | ORTC-435 | N-1500-1 |
|         |       | 11         | 44,70   | 44,70 | 1,760  | 1,760 | ORTC-442 | N-1500-1 |
|         |       | 12-13      | 45,00   | 46,00 | 1,772  | 1,811 | ORTC-447 | N-1500-1 |
|         |       | 14-15      | 46,20   | 48,20 | 1,819  | 1,898 | ORTC-457 | N-1500-1 |
|         |       | 16-17      | 47,20   | 48,20 | 1,858  | 1,898 | ORTC-468 | N-1500-1 |
|         |       | 18-19      | 48,00   | 49,00 | 1,890  | 1,929 | ORTC-476 | N-1500-1 |
| 2-1/4   | 57,15 | 10         | 50,30   | 50,30 | 1,980  | 1,980 | ORTC-497 | N-2250-1 |
|         |       | 11         | 51,00   | 51,00 | 2,008  | 2,008 | ORTC-505 | N-2250-1 |
|         |       | 12-13      | 51,60   | 52,30 | 2,031  | 2,059 | ORTC-511 | N-2250-1 |
|         |       | 14-15      | 52,90   | 53,50 | 2,083  | 2,106 | ORTC-524 | N-2250-1 |
|         |       | 16-17      | 53,80   | 54,80 | 2,118  | 2,157 | ORTC-533 | N-2250-1 |
|         |       | 18-19      | 54,60   | 55,60 | 2,150  | 2,189 | ORTC-541 | N-2250-1 |
| 2-1/2   | 63,50 | 10         | 56,70   | 56,70 | 2,232  | 2,232 | ORTC-562 | N-2250-1 |
|         |       | 11         | 57,40   | 57,40 | 2,260  | 2,260 | ORTC-569 | N-2250-1 |
|         |       | 12-13      | 57,60   | 58,60 | 2,268  | 2,307 | ORTC-572 | N-2250-1 |
|         |       | 14-15      | 58,90   | 60,00 | 2,319  | 2,362 | ORTC-585 | N-2250-1 |
|         |       | 16-17      | 60,00   | 61,00 | 2,362  | 2,402 | ORTC-586 | N-2250-1 |
|         |       | 18-19      | 60,70   | 61,70 | 2,390  | 2,429 | ORTC-602 | N-2250-1 |

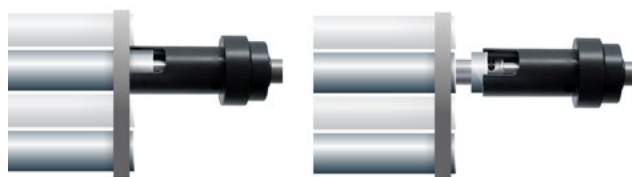
# 1WTTC-1000 Wheel Type Tube Cutter

The 1WTTC-1000 greatly reduces cutting time by utilizing the special 1 point self-centering cutter wheel design and works with 3/4", thru 1-1/4" O.D. tubes (after changing cutter body wheels and pilots). The tool does not create any chips during the cutting process!



| CUTTING RANGE   |            | REACH           |       | POWER   | FREE SPEED |        | TORQUE     |
|-----------------|------------|-----------------|-------|---------|------------|--------|------------|
| 5/8" to 4"      |            | 3" & 6"         |       | 1,3 Hp  | 100 Rpm    |        | 105 Ft.Lbs |
| 15,8 - 101,6 mm |            | 76,2 & 152,4 mm |       | 0,97 kW |            |        | 140 Nm     |
| AIR USE         |            | WIDTH           |       | HEIGHT  |            | WEIGHT |            |
| 55 cfm          | 1,3 m³/min | 2,32"           | 59 mm | 13,1"   | 335 mm     | 15 Lbs | 6,8 kg     |

## TRIMMING ATTACHMENT



Tube projection can be cut quickly without generating any chips!

## OPTIONAL FEED SYSTEMS



Lever feed handle



Crank arm with double feed stroke

| TUBE OD |       | TUBE GAUGE | TOOL NR      | WHEEL HOLDER | WHEEL PIN | CUTTING      |            |               | TRIMMING        |              |                 | BODY        |
|---------|-------|------------|--------------|--------------|-----------|--------------|------------|---------------|-----------------|--------------|-----------------|-------------|
| [INCH]  | [MM]  | [BWG]      |              |              |           | CUTTER WHEEL | PILOT      | THRUST COLLAR | TRIMMING COLLAR | PILOT        | PILOT EXTENSION |             |
| 3/4     | 19,05 | 13         | 1WTTC-750-13 | 1CCWH-190    | CP-20     | CW-21        | Solid Body | SWTC-750-13   | WTTA-750-13     | Solid body   | Solid body      | 1WTB-750-13 |
|         |       | 14         | 1CCWH-190    | CW-21        |           | P-008        | SWTC-750   | WTTA-750      | T-8             | PE-1WTTC-190 | 1WTB-750        |             |
|         |       | 15         |              | CW-21        |           | P-009        |            |               | T-9             |              |                 |             |
|         |       | 16         |              | CW-21        |           | P-010        |            |               | T-10            |              |                 |             |
|         |       | 17         |              | CW-21        |           | P-011        |            |               | T-11            |              |                 |             |
|         |       | 18         | 1CCWH-19-2   | CW-21        |           | P-012        |            |               | T-12            |              |                 |             |
|         |       | 19         |              | CW-21        |           | P-013        |            |               | T-13            |              |                 |             |
|         |       | 20         |              | CW-21        |           | P-014        |            |               | T-14            |              |                 |             |
|         |       | 21         |              | CW-21        |           | P-015        |            |               | T-15            |              |                 |             |
|         |       | 22         |              | CW-21        |           | P-016        |            |               | T-16            |              |                 |             |
|         |       | 23         |              | CW-21        |           | P-017        |            |               | T-17            |              |                 |             |
|         |       | 24         | CW-31        | P-018        |           | T-18         |            |               |                 |              |                 |             |
| 7/8     | 22,23 | 14         | 1WTTC-875    | 1CCWH-222    | CP-21     | CW-25        |            |               | P-019           |              |                 | SWTC-875    |
|         |       | 15         |              |              |           | CW-25        | P-020      | T-20          |                 |              |                 |             |
|         |       | 16         |              |              |           | CW-25        | P-021      | T-21          |                 |              |                 |             |
|         |       | 17         |              |              |           | CW-25        | P-022      | T-22          |                 |              |                 |             |
|         |       | 18         |              | 1CCWH-222-2  |           | CW-25        | P-023      | T-23          |                 |              |                 |             |
|         |       | 19         |              |              |           | CW-25        | P-024      | T-24          |                 |              |                 |             |
|         |       | 20         |              |              |           | CW-25        | P-025      | T-25          |                 |              |                 |             |
|         |       | 21         |              |              |           | CW-25        | P-026      | T-26          |                 |              |                 |             |
|         |       | 22         |              |              |           | CW-25        | P-027      | T-27          |                 |              |                 |             |
|         |       | 23         |              |              |           | CW-25        | P-028      | T-28          |                 |              |                 |             |

\* For 3/4" GA13 the cutting machine needs complete solid body tube cutter 1WTTC-750-13

# 1WTTC-1000 Wheel Type Tube Cutter

| TUBE OD |       | TUBE GAUGE | TOOL NR     | WHEEL HOLDER | WHEEL PIN | CUTTING      |         |               | TRIMMING        |        |                 | BODY      |
|---------|-------|------------|-------------|--------------|-----------|--------------|---------|---------------|-----------------|--------|-----------------|-----------|
| [INCH]  | [MM]  | [BWG]      |             |              |           | CUTTER WHEEL | PILOT   | THRUST COLLAR | TRIMMING COLLAR | PILOT  | PILOT EXTENSION |           |
| 1       | 25.40 | 12         | 1WTTC-1000  | 1CCWH-254    | CP-25     | CW-31        | P-029-1 | SWTC-1000     | WTTA-1000       | T-29-1 | PE-1WTTC-254    | 1WTB-1000 |
|         |       | 13         |             |              |           | CW-31        | P-029-2 |               |                 | T-29-2 |                 |           |
|         |       | 14         |             |              |           | CW-31        | P-029   |               |                 | T-29   |                 |           |
|         |       | 15         |             |              |           | CW-31        | P-030   |               |                 | T-30   |                 |           |
|         |       | 16         |             |              |           | CW-31        | P-031   |               |                 | T-31   |                 |           |
|         |       | 17         |             |              |           | CW-31        | P-032   |               |                 | T-32   |                 |           |
|         |       | 18         | 1CCWH-254-2 | CW-31        |           | P-033        | T-33    |               |                 |        |                 |           |
|         |       | 19         |             | CW-31        |           | P-034        | T-34    |               |                 |        |                 |           |
|         |       | 20         |             | CW-31        |           | P-035        | T-35    |               |                 |        |                 |           |
|         |       | 21         |             | CW-31        |           | P-036        | T-36    |               |                 |        |                 |           |
|         |       | 22         |             | CW-31        |           | P-037        | T-37    |               |                 |        |                 |           |
|         |       | 23         |             | CW-31        |           | P-038        | T-38    |               |                 |        |                 |           |
|         |       | 24         |             | CW-31        |           | P-039        | T-39    |               |                 |        |                 |           |
| 1 1/8   | 28.58 | 12         | 1WTTC-1125  | 1CCWH-286    | CP-25     | CW-34        | P-040-1 | SWTC-1125     | WTTA-1125       | T-40-1 | PE-1WTTC-286    | 1WTB-1125 |
|         |       | 13         |             |              |           | CW-34        | P-040-2 |               |                 | T-40-2 |                 |           |
|         |       | 14         |             |              |           | CW-34        | P-040   |               |                 | T-40   |                 |           |
|         |       | 15         |             |              |           | CW-34        | P-041   |               |                 | T-41   |                 |           |
|         |       | 16         |             |              |           | CW-34        | P-042   |               |                 | T-42   |                 |           |
|         |       | 17         |             |              |           | CW-34        | P-043   |               |                 | T-43   |                 |           |
|         |       | 18         | 1CCWH-286-2 | CW-34        |           | P-044        | T-44    |               |                 |        |                 |           |
|         |       | 19         |             | CW-34        |           | P-045        | T-45    |               |                 |        |                 |           |
|         |       | 20         |             | CW-34        |           | P-046        | T-46    |               |                 |        |                 |           |
|         |       | 21         |             | CW-34        |           | P-047        | T-47    |               |                 |        |                 |           |
|         |       | 22         |             | CW-34        |           | P-048        | T-48    |               |                 |        |                 |           |
|         |       | 23         |             | CW-34        |           | P-049        | T-49    |               |                 |        |                 |           |
|         |       | 24         |             | CW-34        |           | P-050        | T-50    |               |                 |        |                 |           |
| 1 1/4   | 31.75 | 12         | 1WTTC-1250  | 1CCWH-317    | CP-30     | CW-37        | P-051   | SWTC-1250     | WTTA-1250       | T-51   | PE-1WTTC-317    | 1WTB-1250 |
|         |       | 13         |             |              |           | CW-37        | P-052   |               |                 | T-52   |                 |           |
|         |       | 14         |             |              |           | CW-37        | P-053   |               |                 | T-53   |                 |           |
|         |       | 15         |             |              |           | CW-37        | P-054   |               |                 | T-54   |                 |           |
|         |       | 16         |             |              |           | CW-37        | P-055   |               |                 | T-55   |                 |           |
|         |       | 17         |             |              |           | CW-37        | P-056   |               |                 | T-56   |                 |           |
|         |       | 18         | 1CCWH-317-2 | CW-37        |           | P-057        | T-57    |               |                 |        |                 |           |
|         |       | 19         |             | CW-37        |           | P-058        | T-58    |               |                 |        |                 |           |
|         |       | 20         |             | CW-37        |           | P-059        | T-59    |               |                 |        |                 |           |
|         |       | 21         |             | CW-37        |           | P-060        | T-60    |               |                 |        |                 |           |
|         |       | 22         |             | CW-37        |           | P-061        | T-61    |               |                 |        |                 |           |
|         |       | 23         |             | CW-37        |           | P-062        | T-62    |               |                 |        |                 |           |
|         |       | 24         |             | CW-37        |           | P-063        | T-63    |               |                 |        |                 |           |
| 1 1/2   | 38,1  | 10         | 1WTTC-1500  | 1CCWH-381    | CP-4      | CW-41        | P-064   | SWTC-1500     | WTTA-1500       | T-64   | PE-1WTTC-381    | 1WBT-1500 |
|         |       | 11         |             |              |           | CW-41        | P-065   |               |                 | T-65   |                 |           |
|         |       | 12         |             |              |           | CW-41        | P-066   |               |                 | T-66   |                 |           |
|         |       | 13         |             |              |           | CW-41        | P-067   |               |                 | T-67   |                 |           |
|         |       | 14         |             |              |           | CW-41        | P-068   |               |                 | T-68   |                 |           |
|         |       | 15         |             |              |           | CW-41        | P-069   |               |                 | T-69   |                 |           |
|         |       | 16         |             |              |           | CW-41        | P-070   |               |                 | T-70   |                 |           |
|         |       | 17         | 1CCWH-383   | CW-41        |           | P-071        | T-71    |               |                 |        |                 |           |
|         |       | 18         |             | CW-41        |           | P-072        | T-72    |               |                 |        |                 |           |
|         |       | 19         |             | CW-41        |           | P-073        | T-73    |               |                 |        |                 |           |
|         |       | 20         |             | CW-41        |           | P-074        | T-74    |               |                 |        |                 |           |
|         |       | 21         |             | CW-41        |           | P-075        | T-75    |               |                 |        |                 |           |
|         |       | 22         |             | CW-41        |           | P-076        | T-76    |               |                 |        |                 |           |
|         |       | 23         |             | CW-41        |           | P-077        | T-77    |               |                 |        |                 |           |
|         |       | 24         |             | CW-41        |           | P-078        | T-78    |               |                 |        |                 |           |

# 1WTTC-1000 Wheel Type Tube Cutter

| TUBE OD |       | TUBE GAUGE | TOOL NR    | WHEEL HOLDER | WHEEL PIN | CUTTING      |       |               | TRIMMING        |           |                 | BODY         |           |
|---------|-------|------------|------------|--------------|-----------|--------------|-------|---------------|-----------------|-----------|-----------------|--------------|-----------|
| [INCH]  | [MM]  | [BWG]      |            |              |           | CUTTER WHEEL | PILOT | THRUST COLLAR | TRIMMING COLLAR | PILOT     | PILOT EXTENSION |              |           |
| 1 3/4   | 44,45 | 8          | 1WTTC-1750 | 1CCWH-444    | CP-4      | CW-45        | P-079 | SWTC-1750     | WTTA-1750       | T-79      | PE-1WTTC-444    | 1WBT-1750    |           |
|         |       | CW-45      |            |              |           | P-080        | T-80  |               |                 |           |                 |              |           |
|         |       | CW-45      |            |              |           | P-081        | T-81  |               |                 |           |                 |              |           |
|         |       | CW-45      |            |              |           | P-082        | T-82  |               |                 |           |                 |              |           |
|         |       | CW-45      |            |              |           | P-083        | T-83  |               |                 |           |                 |              |           |
|         |       | CW-45      |            |              |           | P-084        | T-84  |               |                 |           |                 |              |           |
|         |       | 14         |            | 1CCWH-445    |           | CW-45        | P-085 |               |                 | T-85      |                 |              |           |
|         |       | 15         |            |              |           | CW-45        | P-086 |               |                 | T-86      |                 |              |           |
|         |       | 16         |            |              |           | CW-45        | P-087 |               |                 | T-87      |                 |              |           |
|         |       | 17         |            |              |           | CW-45        | P-088 |               |                 | T-88      |                 |              |           |
|         |       | 18         |            |              |           | CW-45        | P-089 |               |                 | T-89      |                 |              |           |
|         |       | 19         |            |              |           | CW-45        | P-090 |               |                 | T-90      |                 |              |           |
| 20      | CW-45 | P-091      | T-91       |              |           |              |       |               |                 |           |                 |              |           |
| 2       | 50,8  | 6          | 1WTTC-2000 | 1CCWH-508    | CP-4      | CW-51        | P-092 | SWTC-2000     | WTTA-2000       | T-92      | PE-1WTTC-508    | 1WBT-2000    |           |
|         |       | CW-51      |            |              |           | P-093        | T-93  |               |                 |           |                 |              |           |
|         |       | CW-51      |            |              |           | P-094        | T-94  |               |                 |           |                 |              |           |
|         |       | CW-51      |            |              |           | P-095        | T-95  |               |                 |           |                 |              |           |
|         |       | CW-51      |            |              |           | P-096        | T-96  |               |                 |           |                 |              |           |
|         |       | CW-51      |            |              |           | P-097        | T-97  |               |                 |           |                 |              |           |
|         |       | 12         |            | 1CCWH-506    |           | CW-51        | P-098 |               |                 | T-98      |                 |              |           |
|         |       | 13         |            |              |           | CW-51        | P-099 |               |                 | T-99      |                 |              |           |
|         |       | 14         |            |              |           | CW-51        | P-100 |               |                 | T-100     |                 |              |           |
|         |       | 15         |            |              |           | CW-51        | P-101 |               |                 | T-101     |                 |              |           |
|         |       | 16         |            |              |           | CW-51        | P-102 |               |                 | T-102     |                 |              |           |
|         |       | 17         |            |              |           | 1CCWH-504    | CW-51 |               |                 | P-103     |                 |              | T-103     |
| 18      | CW-51 | P-104      | T-104      |              |           |              |       |               |                 |           |                 |              |           |
| 19      | CW-51 | P-105      | T-105      |              |           |              |       |               |                 |           |                 |              |           |
| 20      | CW-51 | P-106      | T-106      |              |           |              |       |               |                 |           |                 |              |           |
| 2 1/4   | 57,1  | 6          | 1WTTC-2000 | 1CCWH-571    | CP-4      |              | CW-51 | P-107         | SWTC-2250       | WTTA-2250 | T-107           | PE-1WTTC-508 | 1WBT-2000 |
|         |       | CW-51      |            |              |           |              | P-108 | T-108         |                 |           |                 |              |           |
|         |       | CW-51      |            |              |           | P-109        | T-109 |               |                 |           |                 |              |           |
|         |       | CW-51      |            |              |           | P-110        | T-110 |               |                 |           |                 |              |           |
|         |       | CW-51      |            |              |           | P-111        | T-111 |               |                 |           |                 |              |           |
|         |       | CW-51      |            |              |           | P-112        | T-112 |               |                 |           |                 |              |           |
|         |       | 12         |            | 1CCWH-573    |           | CW-51        | P-113 | T-113         |                 |           |                 |              |           |
|         |       | 13         |            |              |           | CW-51        | P-114 | T-114         |                 |           |                 |              |           |
|         |       | 14         |            |              |           | CW-51        | P-115 | T-115         |                 |           |                 |              |           |
|         |       | 15         |            |              |           | CW-51        | P-116 | T-116         |                 |           |                 |              |           |
|         |       | 16         |            |              |           | 1CCWH-575    | CW-51 | P-117         |                 |           | T-117           |              |           |
|         |       | 17         |            |              |           |              | CW-51 | P-118         |                 |           | T-118           |              |           |
| 18      | CW-51 | P-119      | T-119      |              |           |              |       |               |                 |           |                 |              |           |
| 19      | CW-51 | P-120      | T-120      |              |           |              |       |               |                 |           |                 |              |           |
| 20      | CW-51 | P-121      | T-121      |              |           |              |       |               |                 |           |                 |              |           |



# 1WTTC-1000 Wheel Type Tube Cutter

| TUBE OD |       | TUBE GAUGE | TOOL NR    | WHEEL HOLDER | WHEEL PIN | CUTTING      |       |               | TRIMMING        |       |                 | BODY      |
|---------|-------|------------|------------|--------------|-----------|--------------|-------|---------------|-----------------|-------|-----------------|-----------|
| [INCH]  | [MM]  | [BWG]      |            |              |           | CUTTER WHEEL | PILOT | THRUST COLLAR | TRIMMING COLLAR | PILOT | PILOT EXTENSION |           |
| 2,5     | 63,5  | 6          | 1WTTC-2000 | 1CCWH-635    | CP-4      | CW-51        | P-122 | SWTC-2500     | WTTA-2500       | T-122 | PE-1WTTC-508    | 1WBT-2000 |
|         |       | 7          |            |              |           | CW-51        | P-123 |               |                 | T-123 |                 |           |
|         |       | 8          |            |              |           | CW-51        | P-124 |               |                 | T-124 |                 |           |
|         |       | 9          |            |              |           | CW-51        | P-125 |               |                 | T-125 |                 |           |
|         |       | 10         |            |              |           | CW-51        | P-126 |               |                 | T-126 |                 |           |
|         |       | 11         |            |              |           | CW-51        | P-127 |               |                 | T-127 |                 |           |
|         |       | 12         |            | 1CCWH-637    |           | CW-51        | P-128 |               |                 | T-128 |                 |           |
|         |       | 13         |            |              |           | CW-51        | P-129 |               |                 | T-129 |                 |           |
|         |       | 14         |            |              |           | CW-51        | P-130 |               |                 | T-130 |                 |           |
|         |       | 15         |            | 1CCWH-639    |           | CW-51        | P-131 |               |                 | T-131 |                 |           |
|         |       | 16         |            |              |           | CW-51        | P-132 |               |                 | T-132 |                 |           |
|         |       | 17         |            |              |           | CW-51        | P-133 |               |                 | T-133 |                 |           |
|         |       | 18         |            |              |           | CW-51        | P-134 |               |                 | T-134 |                 |           |
|         |       | 19         |            |              |           | CW-51        | P-135 |               |                 | T-135 |                 |           |
|         |       | 20         |            |              |           | CW-51        | P-136 |               |                 | T-136 |                 |           |
| 3       | 76,2  | 6          | 1WTTC-2000 | 1CCWH-762    | CP-4      | CW-51        | P-137 | SWTC-3000     | WTTA-3000       | T-137 | PE-1WTTC-508    | 1WBT-2000 |
|         |       | 7          |            |              |           | CW-51        | P-138 |               |                 | T-138 |                 |           |
|         |       | 8          |            |              |           | CW-51        | P-139 |               |                 | T-139 |                 |           |
|         |       | 9          |            |              |           | CW-51        | P-140 |               |                 | T-140 |                 |           |
|         |       | 10         |            |              |           | CW-51        | P-141 |               |                 | T-141 |                 |           |
|         |       | 11         |            |              |           | CW-51        | P-142 |               |                 | T-142 |                 |           |
|         |       | 12         |            | 1CCWH-764    |           | CW-51        | P-143 |               |                 | T-143 |                 |           |
|         |       | 13         |            |              |           | CW-51        | P-144 |               |                 | T-144 |                 |           |
|         |       | 14         |            |              |           | CW-51        | P-145 |               |                 | T-145 |                 |           |
|         |       | 15         |            | 1CCWH-766    |           | CW-51        | P-146 |               |                 | T-146 |                 |           |
|         |       | 16         |            |              |           | CW-51        | P-147 |               |                 | T-147 |                 |           |
|         |       | 17         |            |              |           | CW-51        | P-148 |               |                 | T-148 |                 |           |
|         |       | 18         |            |              |           | CW-51        | P-149 |               |                 | T-149 |                 |           |
|         |       | 19         |            |              |           | CW-51        | P-150 |               |                 | T-150 |                 |           |
|         |       | 20         |            |              |           | CW-51        | P-151 |               |                 | T-151 |                 |           |
| 4       | 101,6 | 6          | 1WTTC-2000 | 1CCWH-101    | CP-4      | CW-51        | P-152 | SWTC-4000     | WTTA-4000       | T-152 | PE-1WTTC-508    | 1WBT-2000 |
|         |       | 7          |            |              |           | CW-51        | P-153 |               |                 | T-153 |                 |           |
|         |       | 8          |            |              |           | CW-51        | P-154 |               |                 | T-154 |                 |           |
|         |       | 9          |            |              |           | CW-51        | P-155 |               |                 | T-155 |                 |           |
|         |       | 10         |            |              |           | CW-51        | P-156 |               |                 | T-156 |                 |           |
|         |       | 11         |            |              |           | CW-51        | P-157 |               |                 | T-157 |                 |           |
|         |       | 12         |            | 1CCWH-103    |           | CW-51        | P-158 |               |                 | T-158 |                 |           |
|         |       | 13         |            |              |           | CW-51        | P-159 |               |                 | T-159 |                 |           |
|         |       | 14         |            |              |           | CW-51        | P-160 |               |                 | T-160 |                 |           |
|         |       | 15         |            | 1CCWH-105    |           | CW-51        | P-161 |               |                 | T-161 |                 |           |
|         |       | 16         |            |              |           | CW-51        | P-162 |               |                 | T-162 |                 |           |
|         |       | 17         |            |              |           | CW-51        | P-163 |               |                 | T-163 |                 |           |
|         |       | 18         |            |              |           | CW-51        | P-164 |               |                 | T-164 |                 |           |
|         |       | 19         |            |              |           | CW-51        | P-165 |               |                 | T-165 |                 |           |
|         |       | 20         |            |              |           | CW-51        | P-166 |               |                 | T-166 |                 |           |

# 2WTTC-1500 Two Wheels Type Tube Cutter

The 2WTTC-1500 greatly reduces cutting time by utilizing the special 2 point self-centering cutter wheel design and works from 1-1/2" up to 2" O.D. tubes. The tool does not create any chips during the cutting process!



| CUTTING RANGE  |            | REACH    |       | POWER   | FREE SPEED | TORQUE     |        |
|----------------|------------|----------|-------|---------|------------|------------|--------|
| 1-1/2" to 2"   |            | 4"       |       | 1,3 Hp  | 100 Rpm    | 105 Ft.Lbs |        |
| 38,1 - 50,8 mm |            | 101,6 mm |       | 0,97 kW |            | 140 Nm     |        |
| AIR USE        |            | WIDTH    |       | HEIGHT  |            | WEIGHT     |        |
| 55 cfm         | 1,3 m³/min | 2,32"    | 59 mm | 13,1"   | 335 mm     | 21 Lbs     | 9,5 kg |

## OPTIONAL FEED SYSTEMS

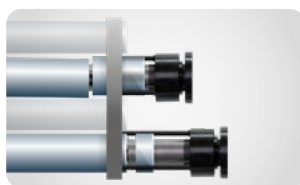


Lever feed handle



Crank arm single feed stroke

## ALL-PURPOSE TOOL



Tube cutting and tube trimming setup-set-up

| TUBE OD |       | TUBE GAUGE | CUTTER WHEEL | WHEEL HOLDER | WHEEL PIN | PILOT  | SUPPORT PILOT | THRUST COLLAR | COLAR DEPTH STOP |        |
|---------|-------|------------|--------------|--------------|-----------|--------|---------------|---------------|------------------|--------|
| [INCH]  | [MM]  | [BWG]      |              |              |           |        |               |               | LONG             | SHORT  |
| 1 1/2   | 38.1  | 12         | CW-13        | 2CWH-15      | CP-3      | 2P-29  | SP-29         | TC-300        | TCDS-L           | TCDS-S |
|         |       | 13         |              |              |           | 2P-291 | SP-291        |               |                  |        |
|         |       | 14         |              |              |           | 2P-30  | SP-30         |               |                  |        |
|         |       | 15         |              |              |           | 2P-301 | SP-301        |               |                  |        |
|         |       | 16         |              |              |           | 2P-31  | SP-31         |               |                  |        |
|         |       | 17         |              |              |           | 2P-311 | SP-311        |               |                  |        |
|         |       | 18         |              |              |           | 2P-32  | SP-32         |               |                  |        |
|         |       | 19         |              |              |           | 2P-321 | SP-321        |               |                  |        |
|         |       | 20         |              |              |           | 2P-33  | SP-33         |               |                  |        |
|         |       | 21         |              |              |           | 2P-331 | SP-331        |               |                  |        |
|         |       | 22         |              |              |           | 2P-332 | SP-332        |               |                  |        |
|         |       | 23         |              |              |           | 2P-333 | SP-333        |               |                  |        |
| 1 3/4   | 44.45 | 24         | CW-16        | 2CWH-18      | CP-4      | 2P-334 | SP-334        | TC-250        | TCDS-L           | TCDS-S |
|         |       | 12         |              |              |           | 2P-35  | SP-35         |               |                  |        |
|         |       | 13         |              |              |           | 2P-351 | SP-351        |               |                  |        |
|         |       | 14         |              |              |           | 2P-36  | SP-36         |               |                  |        |
|         |       | 15         |              |              |           | 2P-361 | SP-361        |               |                  |        |
|         |       | 16         |              |              |           | 2P-37  | SP-37         |               |                  |        |
|         |       | 17         |              |              |           | 2P-371 | SP-371        |               |                  |        |
|         |       | 18         |              |              |           | 2P-38  | SP-38         |               |                  |        |
|         |       | 19         |              |              |           | 2P-381 | SP-381        |               |                  |        |
|         |       | 20         |              |              |           | 2P-382 | SP-382        |               |                  |        |
|         |       | 21         |              |              |           | 2P-383 | SP-383        |               |                  |        |
|         |       | 22         |              |              |           | 2P-384 | SP-384        |               |                  |        |
|         |       | 23         |              |              |           | 2P-385 | SP-385        |               |                  |        |
|         |       | 24         |              |              |           | 2P-386 | SP-386        |               |                  |        |

2WTTC-1500 Two Wheels Type Tube Cutter

| TUBE OD |       | TUBE GAUGE | CUTTER WHEEL | WHEEL HOLDER | WHEEL PIN | PILOT  | SUPPORT PILOT | THRUST COLLAR | COLAR DEPTH STOP |        |
|---------|-------|------------|--------------|--------------|-----------|--------|---------------|---------------|------------------|--------|
| [INCH]  | [MM]  | [BWG]      |              |              |           |        |               |               | LONG             | SHORT  |
| 2       | 50.80 | 8          | CW-17        | 2CWH-20      | CP-4      | 2P-40  | SP-40         | TC-200        | TCDS-L           | TCDS-S |
|         |       | 9          |              |              |           | 2P-401 | SP-401        |               |                  |        |
|         |       | 10         |              |              |           | 2P-41  | SP-41         |               |                  |        |
|         |       | 11         |              |              |           | 2P-411 | SP-411        |               |                  |        |
|         |       | 12         |              |              |           | 2P-42  | SP-42         |               |                  |        |
|         |       | 13         |              |              |           | 2P-421 | SP-421        |               |                  |        |
|         |       | 14         |              |              |           | 2P-43  | SP-43         |               |                  |        |
|         |       | 15         |              |              |           | 2P-431 | SP-431        |               |                  |        |
|         |       | 16         |              |              |           | 2P-44  | SP-44         |               |                  |        |
|         |       | 17         |              |              |           | 2P-441 | SP-441        |               |                  |        |
|         |       | 18         |              |              |           | 2P-45  | SP-45         |               |                  |        |
|         |       | 19         |              |              |           | 2P-451 | SP-451        |               |                  |        |
|         |       | 20         |              |              |           | 2P-46  | SP-46         |               |                  |        |
|         |       | 21         |              |              |           | 2P-461 | SP-461        |               |                  |        |
|         |       | 22         |              |              |           | 2P-47  | SP-47         |               |                  |        |
|         |       | 23         |              |              |           | 2P-471 | SP-471        |               |                  |        |
|         |       | 24         |              |              |           | 2P-48  | SP-48         |               |                  |        |

# 3WTTC-2000 Three Wheels Type Tube Cutter

The 3WTTC-2000 greatly reduces cutting time by utilizing the special 3 point self-centering cutter wheel design and works with 2", thru 4" O.D. tubes. The tool does not create any chips during the cutting process!

Depending on operator experience and tube material the KRAIS 3WTTC-2000 can cut 2" GA 12 in between 6 to 12 seconds. Real tube to tube cycle time is approximately 30 seconds, giving unmatched productivity.



| CUTTING RANGE   |            | REACH    |       | POWER   | FREE SPEED | TORQUE     |          |
|-----------------|------------|----------|-------|---------|------------|------------|----------|
| 2" - 4"         |            | 4"       |       | 1,3 Hp  | 100 Rpm    | 105 Ft.Lbs |          |
| 50,8 - 101,6 mm |            | 101,6 mm |       | 0,97 kW |            | 140 Nm     |          |
| AIR USE         |            | WIDTH    |       | HEIGHT  |            | WEIGHT     |          |
| 55 cfm          | 1,3 m³/min | 2,32"    | 59 mm | 13,1"   | 335 mm     | 23 Lbs     | 10,42 kg |

## OPTIONAL FEED SYSTEMS

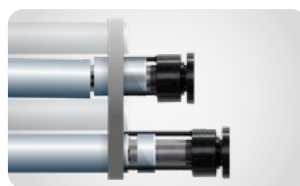


Lever feed handle



Crank arm single feed stroke

## ALL-PURPOSE TOOL



Tube cutting and tube trimming setup-set-up



On demand we offer 3WTTC with reach up to 5 m.

| TUBE OD |       | TUBE GAUGE | CUTTER WHEEL | WHEEL HOLDER | WHEEL PIN | PILOT EXTENSION | PILOT | THRUST COLLAR | COLAR DEPTH STOP |        |
|---------|-------|------------|--------------|--------------|-----------|-----------------|-------|---------------|------------------|--------|
| [INCH]  | [MM]  | [BWG]      |              |              |           |                 |       |               | LONG             | SHORT  |
| 2       | 50.8  | 10         | CW-16        | CCWH-20      | CP-4      | PE-WTTC         | P42   | TC-200        | TCDS-L           | TCDS-S |
|         |       | 11         |              |              |           |                 | P43   |               |                  |        |
|         |       | 12         |              |              |           |                 | P44   |               |                  |        |
|         |       | 13         |              |              |           |                 | P45   |               |                  |        |
|         |       | 14         |              |              |           |                 | P46   |               |                  |        |
|         |       | 15         |              |              |           |                 | P461  |               |                  |        |
|         |       | 16         |              |              |           |                 | P47   |               |                  |        |
|         |       | 17         |              |              |           |                 | P471  |               |                  |        |
|         |       | 18         |              |              |           |                 | P48   |               |                  |        |
|         |       | 19         |              |              |           |                 | P481  |               |                  |        |
| 2 1/4   | 57,15 | 20         | CW-17        | CCWH-22      | CP-4      | PE-WTTC         | P49   | TC-200        | TCDS-L           | TCDS-S |
|         |       | 9          |              |              |           |                 | P51   |               |                  |        |
|         |       | 10         |              |              |           |                 | P52   |               |                  |        |
|         |       | 11         |              |              |           |                 | P53   |               |                  |        |
|         |       | 12         |              |              |           |                 | P54   |               |                  |        |
|         |       | 13         |              |              |           |                 | P55   |               |                  |        |
|         |       | 14         |              |              |           |                 | P56   |               |                  |        |
|         |       | 15         |              |              |           |                 | P561  |               |                  |        |
|         |       | 16         |              |              |           |                 | P57   |               |                  |        |
|         |       | 17         |              |              |           |                 | P571  |               |                  |        |
|         |       | 18         |              |              |           |                 | P58   |               |                  |        |
|         |       | 19         |              |              |           |                 | P581  |               |                  |        |
|         |       | 20         |              |              |           |                 | P59   |               |                  |        |



# 3WTTC-2000 Three Wheels Type Tube Cutter

| TUBE OD |        | TUBE GAUGE | CUTTER WHEEL | WHEEL HOLDER | WHEEL PIN | PILOT EXTENSION | PILOT | THRUST COLLAR | COLAR DEPTH STOP |        |
|---------|--------|------------|--------------|--------------|-----------|-----------------|-------|---------------|------------------|--------|
| [INCH]  | [MM]   | [BWG]      |              |              |           |                 |       |               | LONG             | SHORT  |
| 2 1/2   | 63.50  | 9          | CW-17        | CCWH-25      | CP-4      | PE-WTTC         | P51   | TC-200        | TCDS-L           | TCDS-S |
|         |        | 10         |              |              |           |                 | P52   |               |                  |        |
|         |        | 11         |              |              |           |                 | P53   |               |                  |        |
|         |        | 12         |              |              |           |                 | P54   |               |                  |        |
|         |        | 13         |              |              |           |                 | P55   |               |                  |        |
|         |        | 14         |              |              |           |                 | P56   |               |                  |        |
|         |        | 15         |              |              |           |                 | P561  |               |                  |        |
|         |        | 16         |              |              |           |                 | P57   |               |                  |        |
|         |        | 17         |              |              |           |                 | P571  |               |                  |        |
|         |        | 18         |              |              |           |                 | P58   |               |                  |        |
|         |        | 19         |              |              |           |                 | P581  |               |                  |        |
|         |        | 20         |              |              |           |                 | P59   |               |                  |        |
| 3       | 76.20  | 9          | CW-17        | CCWH-30      | CP-4      | PE-WTTC         | P61   | TC-200        | TCDS-L           | TCDS-S |
|         |        | 10         |              |              |           |                 | P62   |               |                  |        |
|         |        | 11         |              |              |           |                 | P63   |               |                  |        |
|         |        | 12         |              |              |           |                 | P64   |               |                  |        |
|         |        | 13         |              |              |           |                 | P65   |               |                  |        |
|         |        | 14         |              |              |           |                 | P66   |               |                  |        |
|         |        | 15         |              |              |           |                 | P661  |               |                  |        |
|         |        | 16         |              |              |           |                 | P67   |               |                  |        |
|         |        | 17         |              |              |           |                 | P671  |               |                  |        |
|         |        | 18         |              |              |           |                 | P68   |               |                  |        |
|         |        | 19         |              |              |           |                 | P681  |               |                  |        |
|         |        | 20         |              |              |           |                 | P69   |               |                  |        |
| 3 1/2   | 88.90  | 9          | CW-17        | CCWH-35      | CP-4      | PE-WTTC         | P71   | TC-400        | TCDS-L           | TCDS-S |
|         |        | 10         |              |              |           |                 | P72   |               |                  |        |
|         |        | 11         |              |              |           |                 | P73   |               |                  |        |
|         |        | 12         |              |              |           |                 | P74   |               |                  |        |
|         |        | 13         |              |              |           |                 | P75   |               |                  |        |
|         |        | 14         |              |              |           |                 | P76   |               |                  |        |
|         |        | 15         |              |              |           |                 | P761  |               |                  |        |
|         |        | 16         |              |              |           |                 | P77   |               |                  |        |
|         |        | 17         |              |              |           |                 | P771  |               |                  |        |
|         |        | 18         |              |              |           |                 | P78   |               |                  |        |
|         |        | 19         |              |              |           |                 | P781  |               |                  |        |
|         |        | 20         |              |              |           |                 | P79   |               |                  |        |
| 4       | 101.60 | 9          | CW-17        | CCWH-40      | CP-4      | PE-WTTC         | P81   | TC-400        | TCDS-L           | TCDS-S |
|         |        | 10         |              |              |           |                 | P82   |               |                  |        |
|         |        | 11         |              |              |           |                 | P83   |               |                  |        |
|         |        | 12         |              |              |           |                 | P84   |               |                  |        |
|         |        | 13         |              |              |           |                 | P85   |               |                  |        |
|         |        | 14         |              |              |           |                 | P86   |               |                  |        |
|         |        | 15         |              |              |           |                 | P861  |               |                  |        |
|         |        | 16         |              |              |           |                 | P87   |               |                  |        |
|         |        | 17         |              |              |           |                 | P871  |               |                  |        |
|         |        | 18         |              |              |           |                 | P88   |               |                  |        |
|         |        | 19         |              |              |           |                 | P881  |               |                  |        |
|         |        | 20         |              |              |           |                 | P89   |               |                  |        |

# 3WTTC-3000 Three Wheels Tube Cutter

The 3WTTC-3000 greatly reduces cutting time by utilizing the special 3 point self-centering cutter wheel design and works with 2-1/2", thru 5" O.D. tubes. The tool does not create any chips during the cutting process! "Real life" tube to tube cycle time is approximately 30 seconds, giving unmatched productivity.



| CUTTING RANGE   |            | REACH    | POWER   | FREE SPEED | TORQUE     |
|-----------------|------------|----------|---------|------------|------------|
| 2,5" - 5"       |            | 4"       | 1,3 Hp  | 55 Rpm     | 207 Ft.Lbs |
| 63,5 - 127,0 mm |            | 101,6 mm | 0,97 kW |            | 280 Nm     |
| AIR USE         |            | WIDTH    |         | HEIGHT     | WEIGHT     |
| 55 cfm          | 1,3 m³/min | 2,32"    | 59 mm   | 19"        | 485 mm     |
|                 |            |          |         | 36,3 Lbs   | 16,5 kg    |

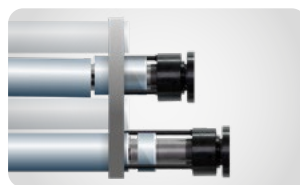
## OPTIONAL FEED SYSTEMS



Lever feed handle



Crank arm with double feed stroke



Tube cutting and tube trimming setup-set-up

## ALL-PURPOSE TOOL

| TUBE OD |       | TUBE GAUGE | CUTTER WHEEL | WHEEL HOLDER | WHEEL PIN | PILOT EXTENSION | PILOT | THRUST COLLAR | COLLAR DEPTH |        |
|---------|-------|------------|--------------|--------------|-----------|-----------------|-------|---------------|--------------|--------|
| [INCH]  | [MM]  | [BWG]      |              |              |           |                 |       |               | LONG         | SHORT  |
| 2 1/2   | 63.50 | 8          | CW-19        | CCWH-55      | CP-4      | PE-WTTC-3       | P350  | TC-3200       | TCDS-L       | TCDS-S |
|         |       | 9          |              |              |           |                 | P351  |               |              |        |
|         |       | 10         |              |              |           |                 | P352  |               |              |        |
|         |       | 11         |              |              |           |                 | P353  |               |              |        |
|         |       | 12         |              |              |           |                 | P354  |               |              |        |
|         |       | 13         |              |              |           |                 | P355  |               |              |        |
|         |       | 14         |              |              |           |                 | P356  |               |              |        |
|         |       | 15         |              |              |           |                 | P561  |               |              |        |
|         |       | 16         |              |              |           |                 | P357  |               |              |        |
|         |       | 17         |              |              |           |                 | P3571 |               |              |        |
|         |       | 18         |              |              |           |                 | P358  |               |              |        |
|         |       | 19         |              |              |           |                 | P3581 |               |              |        |
|         |       | 20         |              |              |           |                 | P359  |               |              |        |
| 3       | 76.20 | 6          | CW-22        | CCWH-60      | CP-5      | PE-WTTC-3       | P3606 | TC-3200       | TCDS-L       | TCDS-S |
|         |       | 7          |              |              |           |                 | P3607 |               |              |        |
|         |       | 8          |              |              |           |                 | P360  |               |              |        |
|         |       | 9          |              |              |           |                 | P361  |               |              |        |
|         |       | 10         |              |              |           |                 | P362  |               |              |        |
|         |       | 11         |              |              |           |                 | P363  |               |              |        |
|         |       | 12         |              |              |           |                 | P364  |               |              |        |
|         |       | 13         | CW-22        | CCWH-60      | CP-5      | PE-WTTC-3       | P365  | TC-3200       | TCDS-L       | TCDS-S |
|         |       | 14         |              |              |           |                 | P366  |               |              |        |
|         |       | 15         |              |              |           |                 | P3661 |               |              |        |
|         |       | 16         |              |              |           |                 | P367  |               |              |        |
|         |       | 17         |              |              |           |                 | P3671 |               |              |        |
|         |       | 18         |              |              |           |                 | P368  |               |              |        |
|         |       | 19         |              |              |           |                 | P3681 |               |              |        |
|         |       | 20         |              |              |           |                 | P369  |               |              |        |

# 3WTTC-3000 Three Wheels Tube Cutter

| TUBE OD |        | TUBE GAUGE | CUTTER WHEEL | WHEEL HOLDER | WHEEL PIN | PILOT EXTENSION | PILOT | THRUST COLLAR | COLAR DEPTH |        |
|---------|--------|------------|--------------|--------------|-----------|-----------------|-------|---------------|-------------|--------|
| [INCH]  | [MM]   | [BWG]      |              |              |           |                 |       |               | LONG        | SHORT  |
| 3 1/2   | 88.90  | 6          | CW-22        | CCWH-65      | CP-5      | PE-WTTC-3       | P3716 | TC-3400       | TCDS-L      | TCDS-S |
|         |        | 7          |              |              |           |                 | P3717 |               |             |        |
|         |        | 8          |              |              |           |                 | P370  |               |             |        |
|         |        | 9          |              |              |           |                 | P371  |               |             |        |
|         |        | 10         |              |              |           |                 | P372  |               |             |        |
|         |        | 11         |              |              |           |                 | P373  |               |             |        |
|         |        | 12         |              |              |           |                 | P374  |               |             |        |
|         |        | 13         |              |              |           |                 | P375  |               |             |        |
|         |        | 14         |              |              |           |                 | P376  |               |             |        |
|         |        | 15         |              |              |           |                 | P3761 |               |             |        |
|         |        | 16         |              |              |           |                 | P377  |               |             |        |
|         |        | 17         |              |              |           |                 | P3771 |               |             |        |
|         |        | 18         |              |              |           |                 | P378  |               |             |        |
|         |        | 19         |              |              |           |                 | P3781 |               |             |        |
|         |        | 20         |              |              |           |                 | P379  |               |             |        |
| 4       | 101.60 | 6          | CW-22        | CCWH-70      | CP-5      | PE-WTTC-3       | P3806 | TC-3400       | TCDS-L      | TCDS-S |
|         |        | 7          |              |              |           |                 | P3807 |               |             |        |
|         |        | 8          |              |              |           |                 | P380  |               |             |        |
|         |        | 9          |              |              |           |                 | P381  |               |             |        |
|         |        | 10         |              |              |           |                 | P382  |               |             |        |
|         |        | 11         |              |              |           |                 | P383  |               |             |        |
|         |        | 12         |              |              |           |                 | P384  |               |             |        |
|         |        | 13         |              |              |           |                 | P385  |               |             |        |
|         |        | 14         |              |              |           |                 | P386  |               |             |        |
|         |        | 15         |              |              |           |                 | P3861 |               |             |        |
|         |        | 16         |              |              |           |                 | P387  |               |             |        |
|         |        | 17         |              |              |           |                 | P3871 |               |             |        |
|         |        | 18         |              |              |           |                 | P388  |               |             |        |
|         |        | 19         |              |              |           |                 | P3881 |               |             |        |
|         |        | 20         |              |              |           |                 | P389  |               |             |        |
| 5       | 127    | 6          | CW-22        | CCWH-80      | CP-5      | PE-WTTC-3       | P3906 | TC-3500       | TCDS-L      | TCDS-S |
|         |        | 7          |              |              |           |                 | P3907 |               |             |        |
|         |        | 8          |              |              |           |                 | P390  |               |             |        |
|         |        | 9          |              |              |           |                 | P391  |               |             |        |
|         |        | 10         |              |              |           |                 | P392  |               |             |        |
|         |        | 11         |              |              |           |                 | P393  |               |             |        |
|         |        | 12         |              |              |           |                 | P394  |               |             |        |
|         |        | 13         |              |              |           |                 | P395  |               |             |        |
|         |        | 14         |              |              |           |                 | P396  |               |             |        |
|         |        | 15         |              |              |           |                 | P3961 |               |             |        |
|         |        | 16         |              |              |           |                 | P397  |               |             |        |
|         |        | 17         |              |              |           |                 | P3971 |               |             |        |
|         |        | 18         |              |              |           |                 | P398  |               |             |        |
|         |        | 19         |              |              |           |                 | P3981 |               |             |        |
|         |        | 20         |              |              |           |                 | P399  |               |             |        |

# MWTTC – Manual Tube Cutter

Tool designed to cut or partially cut the tubes in the center support sheet of condensers, similar in design to those manufactured by Trane, Carrier and JCI.

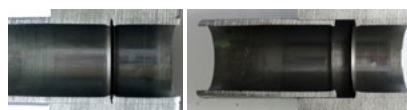
The MWTTC has adjustable wheel travel that accurately controls the amount of tube wall the operator can cut. Typically 98% or less is easily set up. The MWTTC comes as standard with 120" reach (3m). On request we can manufacture up to 196" reach (5m).

We recommend our MCP-100 Manual Collet Puller as a companion tool to the MWTTC, this allows quick and trouble free stub and tube extraction.



| CUTTING RANGE | REACH   | POWER  |
|---------------|---------|--------|
| 19-25 mm      | 3000 mm | Manual |
| 3/4" - 1"     | 120"    |        |

## CUTTING WITHOUT CHIPS



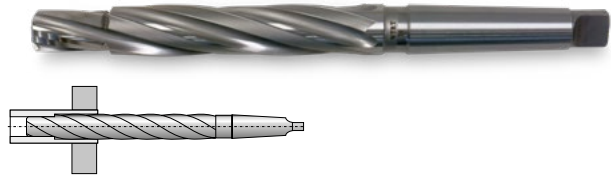
| TUBE OD |       | TUBE GAUGE | TOOL NR    | WHEEL HOLDER | WHEEL PIN | CUTTING      |         |               |  |
|---------|-------|------------|------------|--------------|-----------|--------------|---------|---------------|--|
| [INCH]  | [MM]  | [BWG]      |            |              |           | CUTTER WHEEL | PILOT   | THRUST COLLAR |  |
| 3/4     | 19.05 | 14         | MWTTC-750  | 1CCWH-190    | CP-20     | CW-21        | P-008   | MWTC-750      |  |
|         |       | 15         |            |              |           | CW-21        | P-009   |               |  |
|         |       | 16         |            |              |           | CW-21        | P-010   |               |  |
|         |       | 17         |            |              |           | CW-21        | P-011   |               |  |
|         |       | 18         |            |              |           | CW-21        | P-012   |               |  |
|         |       | 19         |            |              |           | CW-21        | P-013   |               |  |
|         |       | 20         |            | 1CCWH-19-2   |           | CW-21        | P-014   |               |  |
|         |       | 21         |            |              |           | CW-21        | P-015   |               |  |
|         |       | 22         |            |              |           | CW-21        | P-016   |               |  |
|         |       | 23         |            |              |           | CW-21        | P-017   |               |  |
|         |       | 24         |            |              |           | CW-31        | P-018   |               |  |
|         |       |            |            |              |           |              |         |               |  |
| 7/8     | 22.23 | 14         | MWTTC-875  | 1CCWH-222    | CP-25     | CW-25        | P-019   | MWTC-875      |  |
|         |       | 15         |            |              |           | CW-25        | P-020   |               |  |
|         |       | 16         |            |              |           | CW-25        | P-021   |               |  |
|         |       | 17         |            |              |           | CW-25        | P-022   |               |  |
|         |       | 18         |            |              |           | CW-25        | P-023   |               |  |
|         |       | 19         |            |              |           | CW-25        | P-024   |               |  |
|         |       | 20         |            | 1CCWH-222-2  |           | CW-25        | P-025   |               |  |
|         |       | 21         |            |              |           | CW-25        | P-026   |               |  |
|         |       | 22         |            |              |           | CW-25        | P-027   |               |  |
|         |       | 23         |            |              |           | CW-25        | P-028   |               |  |
|         |       |            |            |              |           |              |         |               |  |
|         |       |            |            |              |           |              |         |               |  |
| 1       | 25.40 | 12         | MWTTC-1000 | 1CCWH-254    | CP-25     | CW-31        | P-029-1 | MWTC-1000     |  |
|         |       | 13         |            |              |           | CW-31        | P-029-2 |               |  |
|         |       | 14         |            |              |           | CW-31        | P-029   |               |  |
|         |       | 15         |            |              |           | CW-31        | P-030   |               |  |
|         |       | 16         |            |              |           | CW-31        | P-031   |               |  |
|         |       | 17         |            |              |           | CW-31        | P-032   |               |  |
|         |       | 18         |            | 1CCWH-254-2  |           | CW-31        | P-033   |               |  |
|         |       | 19         |            |              |           | CW-31        | P-034   |               |  |
|         |       | 20         |            |              |           | CW-31        | P-035   |               |  |
|         |       | 21         |            |              |           | CW-31        | P-036   |               |  |
|         |       | 22         |            |              |           | CW-31        | P-037   |               |  |
|         |       | 23         |            |              |           | CW-31        | P-038   |               |  |
|         |       |            |            |              |           |              |         |               |  |
|         |       |            |            |              |           |              |         |               |  |



# Tube wall reducing tool

It is a special reamer made out of high speed steel, it has a Morse Taper shank and a centralizing pilot specially grinded according to the tube gauge. This tools are used to reduce the gauge of tube to be removed from the tube sheet. Tubes should be drilled in about 80% of the length of the tube sheet.

This tools are used with KDM Pneumatic drill



| TUBE O.D. |      | TUBE GAUGE | TUBE I.D. |       | TOOL NO. | MORSE TAPER | TUBE SHEET THICKNESS |      |
|-----------|------|------------|-----------|-------|----------|-------------|----------------------|------|
| [INCH]    | [MM] | [BWG]      | [INCH]    | [MM]  |          |             | [INCH]               | [MM] |
| 1/2       | 12,7 | 16         | 0,370     | 9,40  | WTRT-1   | 2           | 2-7/8"               | 73   |
|           |      | 17         | 0,384     | 9,75  | WTRT-2   | 2           | 2-7/8"               | 73   |
|           |      | 18         | 0,402     | 10,21 | WTRT-3   | 2           | 2-7/8"               | 73   |
|           |      | 19         | 0,415     | 10,56 | WTRT-4   | 2           | 2-7/8"               | 73   |
| 5/8       | 15,8 | 12         | 0,407     | 10,34 | WTRT-5   | 2           | 3-3/8"               | 86   |
|           |      | 13         | 0,435     | 11,05 | WTRT-6   | 2           | 3-3/8"               | 86   |
|           |      | 14         | 0,459     | 11,66 | WTRT-7   | 2           | 3-3/8"               | 86   |
|           |      | 15         | 0,481     | 12,22 | WTRT-8   | 2           | 3-3/8"               | 86   |
|           |      | 16         | 0,495     | 12,57 | WTRT-9   | 2           | 3-3/8"               | 86   |
|           |      | 18         | 0,527     | 13,39 | WTRT-10  | 2           | 3-3/8"               | 86   |
| 3/4       | 19   | 10         | 0,482     | 12,24 | WTRT-11  | 2           | 4-3/8"               | 111  |
|           |      | 11         | 0,510     | 12,95 | WTRT-12  | 2           | 4-3/8"               | 111  |
|           |      | 12         | 0,532     | 13,51 | WTRT-13  | 2           | 4-3/8"               | 111  |
|           |      | 13         | 0,560     | 14,22 | WTRT-14  | 2           | 4-3/8"               | 111  |
|           |      | 14         | 0,584     | 14,83 | WTRT-15  | 2           | 4-3/8"               | 111  |
|           |      | 15         | 0,606     | 15,39 | WTRT-16  | 2           | 4-3/8"               | 111  |
|           |      | 16         | 0,620     | 15,75 | WTRT-17  | 2           | 4-3/8"               | 111  |
|           |      | 18         | 0,652     | 16,56 | WTRT-18  | 2           | 4-3/8"               | 111  |
| 7/8       | 22,2 | 10         | 0,607     | 15,42 | WTRT-19  | 2           | 4-5/8"               | 117  |
|           |      | 11         | 0,635     | 16,13 | WTRT-20  | 2           | 4-5/8"               | 117  |
|           |      | 12         | 0,657     | 16,69 | WTRT-21  | 2           | 4-5/8"               | 117  |
|           |      | 13         | 0,685     | 17,40 | WTRT-22  | 2           | 4-5/8"               | 117  |
|           |      | 14         | 0,709     | 18,01 | WTRT-23  | 2           | 4-5/8"               | 117  |
|           |      | 15         | 0,731     | 18,57 | WTRT-24  | 2           | 4-5/8"               | 117  |
|           |      | 16         | 0,745     | 18,92 | WTRT-25  | 2           | 4-5/8"               | 117  |
|           |      | 18         | 0,777     | 19,74 | WTRT-26  | 2           | 4-5/8"               | 117  |
| 1         | 25,4 | 8          | 0,670     | 17,02 | WTRT-27  | 3           | 5-1/2"               | 140  |
|           |      | 10         | 0,732     | 18,59 | WTRT-28  | 3           | 5-1/2"               | 140  |
|           |      | 11         | 0,760     | 19,30 | WTRT-29  | 3           | 5-1/2"               | 140  |
|           |      | 12         | 0,782     | 19,86 | WTRT-30  | 3           | 5-1/2"               | 140  |
|           |      | 13         | 0,810     | 20,57 | WTRT-31  | 3           | 5-1/2"               | 140  |
|           |      | 14         | 0,834     | 21,18 | WTRT-32  | 3           | 5-1/2"               | 140  |
|           |      | 15         | 0,856     | 21,74 | WTRT-33  | 3           | 5-1/2"               | 140  |
|           |      | 16         | 0,870     | 22,10 | WTRT-34  | 3           | 5-1/2"               | 140  |
|           |      | 18         | 0,902     | 22,91 | WTRT-35  | 3           | 5-1/2"               | 140  |

| TUBE O.D. |      | TUBE GAUGE | TUBE I.D. |       | TOOL NO. | MORSE TAPER | TUBE SHEET THICKNESS |      |
|-----------|------|------------|-----------|-------|----------|-------------|----------------------|------|
| [INCH]    | [MM] | [BWG]      | [INCH]    | [MM]  |          |             | [INCH]               | [MM] |
| 1-1/4     | 31,7 | 8          | 0,92      | 23,37 | WTRT-36  | 3           | 5-1/2"               | 140  |
|           |      | 10         | 0,982     | 24,94 | WTRT-37  | 3           | 5-1/2"               | 140  |
|           |      | 11         | 1,010     | 25,65 | WTRT-38  | 3           | 5-1/2"               | 140  |
|           |      | 12         | 1,032     | 26,21 | WTRT-39  | 3           | 5-1/2"               | 140  |
|           |      | 13         | 1,060     | 26,92 | WTRT-40  | 3           | 5-1/2"               | 140  |
|           |      | 14         | 1,084     | 27,53 | WTRT-41  | 3           | 5-1/2"               | 140  |
|           |      | 16         | 1,12      | 28,45 | WTRT-42  | 3           | 5-1/2"               | 140  |
|           |      | 18         | 1,152     | 29,26 | WTRT-43  | 4           | 5-1/2"               | 140  |
| 1-1/2     | 38,1 | 8          | 1,170     | 29,72 | WTRT-44  | 4           | 5-1/2"               | 140  |
|           |      | 10         | 1,232     | 31,29 | WTRT-45  | 4           | 5-1/2"               | 140  |
|           |      | 11         | 1,260     | 32,00 | WTRT-46  | 4           | 5-1/2"               | 140  |
|           |      | 12         | 1,282     | 32,56 | WTRT-47  | 4           | 5-1/2"               | 140  |
|           |      | 13         | 1,310     | 33,27 | WTRT-48  | 4           | 5-1/2"               | 140  |
|           |      | 14         | 1,334     | 33,88 | WTRT-49  | 4           | 5-1/2"               | 140  |
|           |      | 16         | 1,370     | 34,80 | WTRT-50  | 4           | 5-1/2"               | 140  |

# MiniDrill-500-WTRT

## High-Performance Tube Wall Reduction Machine

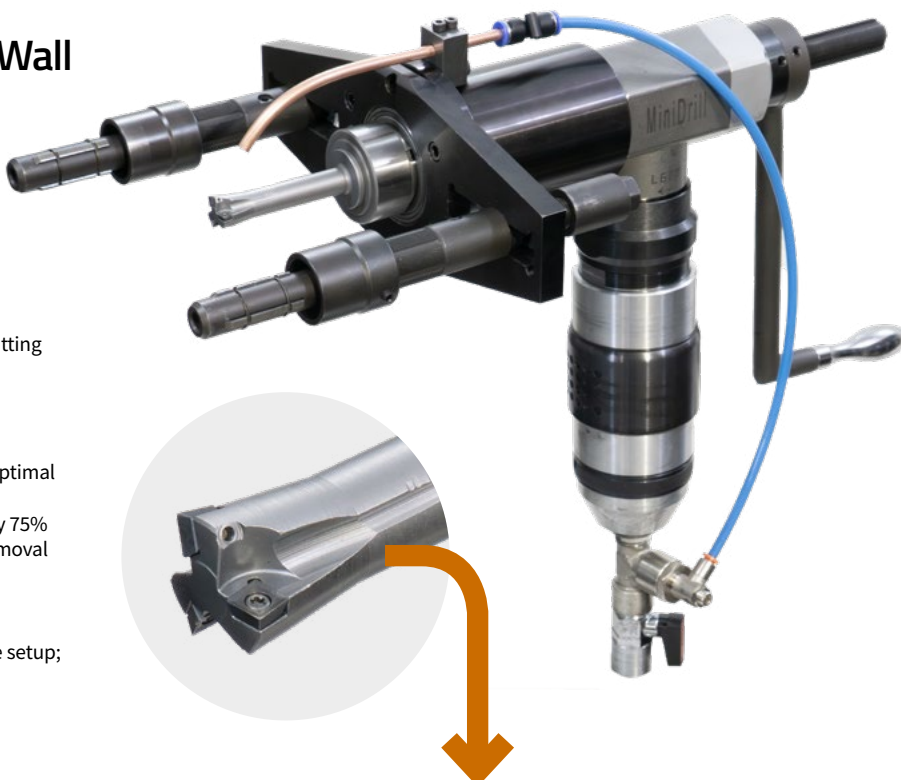
The MiniDrill-500-WTRT-AC is engineered for rapid and reliable tube wall reduction across a variety of demanding materials — from carbon steel and stainless steel to tough alloys like Inconel in the heat exchanger

### KEY FEATURES:

- ▶ Three carbide cutting inserts, each with four cutting edges for maximum durability and efficiency.
- ▶ Operating speed: 500 RPM
- ▶ Torque output: 120 Nm – ensures strong and consistent cutting performance
- ▶ Standard air cooling system – helps maintain optimal cutting temperature and prolong tool life.
- ▶ Efficient Tension Relief: Releases approximately 75% of expansion tension, allowing for easy stub removal using a TD tube drift or CT collapsing tool.

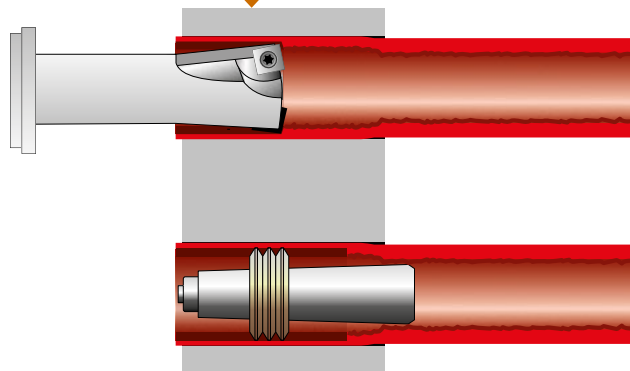
Optional fast-change configuration includes:

- ▶ two pneumatic locks for quick, secure machine setup;
- ▶ ideal for high-throughput maintenance tasks.



### TYPICAL USE CASES

- ▶ Tube wall reduction for easy removal from the heat exchanger tube sheet.
- ▶ Perfect for removing corrosion and reaming out damaged tube ends in heat exchangers to prepare the surface for secure and effective plugging.
- ▶ Especially useful in power plants, refineries, and chemical processing facilities where quick maintenance turnaround is critical.



### TOOLING CHART

| TUBE OD |       | TOOL NUMBER | TOOL DIAMETER |      | DRILLING LENGTH |         | NO. OF INSERTS |
|---------|-------|-------------|---------------|------|-----------------|---------|----------------|
| [INCH]  | [MM]  |             | [INCH]        | [MM] | [INCH]          | [MM]    |                |
| 5/8"    | 15,88 | MDWTRT-148  | 0,583         | 14,8 | 2,5"            | 63,5 mm | 2              |
| 3/4"    | 19,05 | MDWTRT-180  | 0,709         | 18,0 | 2,5"            | 63,5 mm | 3              |
| 7/8"    | 22,22 | MDWTRT-210  | 0,827         | 21,0 | 2,5"            | 63,5 mm | 3              |
| 1"      | 25,40 | MDWTRT-245  | 0,965         | 24,5 | 2,5"            | 63,5 mm | 3              |
| 1-1/4"  | 31,75 | MDWTRT-307  | 1,209         | 30,7 | 2,5"            | 63,5 mm | 3              |
| 1-1/2"  | 38,10 | MDWTRT-371  | 1,461         | 37,1 | 2,5"            | 63,5 mm | 3              |

### TOOLS FOR FIN-FAN COOLERS

A dedicated version is also available for Fin-Fan coolers, with length customized to fit the header size—perfect for retubing 1" tubes with ease and precision.



### PRECISION LOCKING SYSTEM INCLUDED

The machine comes standard with two locking plates:

- ▶ For 3/4" tubes with 1" hole pitch
- ▶ For 1" tubes with 1-1/4" hole pitch



**Other configurations are available upon request.** To ensure maximum accuracy and protect the tube sheet, we machine the tube to 0.5 mm (0.019") clearance. For this reason, we do not recommend using adjustable locking plates, as improper adjustment can lead to tube sheet hole damage.

### OPTIONAL PNEUMATIC LOCKING SYSTEM

For even faster setup and improved efficiency, we offer an optional set of two pneumatic locks. This upgrade enables quick and secure locking, saving valuable time during operations—especially useful in high-volume or repetitive tasks.



# Pneumatic Chipping hammer

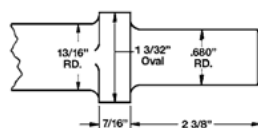
TD Tube Drifts and CT Collapsing tools are very good tools for quick removal of tube stubs from the tube sheet. For tube 1/2" to 1" OD tools are made as standard. The tools are equipped with shank 06. Other sizes available on request. The 01 shank and tool with reach longer the 6" available on request. Other sizes, up to 2" available on request.



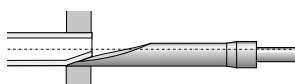
| RAM STROKE |           | RAM FREQUENCY       |        | RAM DIAMETER |        |
|------------|-----------|---------------------|--------|--------------|--------|
| 80 mm      |           | 33 Hz               |        | 40 mm        |        |
| 3,149"     |           |                     |        | 1,574"       |        |
| AIR USE    |           | LENGTH WITHOUT TOOL |        | BODY WEIGHT  |        |
| ### cfm    | 25 m³/min | 16,141"             | 410 mm | 948 Lbs      | 4,3 kg |



## SHANK TYPE 06



## CT Collapsing tool



| TUBE O.D. |       | TUBE GAUGE |             |               | TOOL WITH SHANK 06 |
|-----------|-------|------------|-------------|---------------|--------------------|
| [INCH]    | [MM]  | [BWG]      | [MM]        | [INCH]        |                    |
| 3/8"      | 10    | 16 - 20    | 1,65 - 0,89 | 0,065 - 0,035 | CT-375-06          |
| 1/2"      | 12,7  |            |             |               | CT-500-06          |
| 5/8"      | 15,8  |            |             |               | CT-625-06          |
| 3/4"      | 19,05 |            |             |               | CT-750-06          |
| 7/8"      | 22,2  |            |             |               | CT-875-06          |
| 1"        | 25,4  |            |             |               | CT-1000-06         |
| 1-1/4"    | 31,7  |            |             |               | CT-1125-06         |
| 1-1/2"    | 38,1  |            |             |               | CT-1500-06         |
| 1-3/4"    | 44,4  |            |             |               | CT-1750-06         |
| 2"        | 50,8  |            |             |               | CT-2000-06         |

## TD Tube drift



| TUBE O.D. |      | TUBE GAUGE |        |      | TUBE I.D. |       | TOOL WITH SHANK 06 |
|-----------|------|------------|--------|------|-----------|-------|--------------------|
| [INCH]    | [MM] | [BWG]      | [INCH] | [MM] | [INCH]    | [MM]  |                    |
| 1/2       | 12,7 | 12         | 0,109  | 2,77 | 0,281     | 7,16  | TD-500-12-06       |
|           |      | 14         | 0,083  | 2,11 | 0,333     | 8,48  | TD-500-14-06       |
|           |      | 16         | 0,065  | 1,65 | 0,370     | 9,40  | TD-500-16-06       |
|           |      | 18         | 0,049  | 1,24 | 0,402     | 10,22 | TD-500-18-06       |
|           |      | 20         | 0,035  | 0,89 | 0,429     | 10,92 | TD-500-20-01       |
| 5/8       | 15,8 | 12         | 0,109  | 2,77 | 0,407     | 10,34 | TD-625-12-06       |
|           |      | 13         | 0,095  | 2,41 | 0,435     | 11,05 | TD-625-13-06       |
|           |      | 14         | 0,083  | 2,11 | 0,459     | 11,66 | TD-625-14-06       |
|           |      | 15         | 0,072  | 1,83 | 0,481     | 12,22 | TD-625-15-06       |
|           |      | 16         | 0,065  | 1,65 | 0,495     | 12,57 | TD-625-16-06       |
|           |      | 17         | 0,058  | 1,47 | 0,509     | 12,93 | TD-625-17-06       |
|           |      | 18         | 0,049  | 1,24 | 0,527     | 13,39 | TD-625-18-06       |
|           |      | 19         | 0,042  | 1,07 | 0,541     | 13,74 | TD-625-19-06       |
| 3/4       | 19   | 20         | 0,035  | 0,89 | 0,555     | 14,10 | TD-625-20-06       |
|           |      | 10         | 0,134  | 3,40 | 0,482     | 12,24 | TD-750-10-06       |
|           |      | 12         | 0,109  | 2,77 | 0,532     | 13,51 | TD-750-12-06       |
|           |      | 13         | 0,095  | 2,41 | 0,560     | 14,22 | TD-750-13-06       |
|           |      | 14         | 0,083  | 2,11 | 0,584     | 14,83 | TD-750-14-06       |
|           |      | 15         | 0,072  | 1,83 | 0,606     | 15,39 | TD-750-15-06       |
|           |      | 16         | 0,065  | 1,65 | 0,620     | 15,75 | TD-750-16-06       |
|           |      | 17         | 0,058  | 1,47 | 0,634     | 16,10 | TD-750-17-06       |
|           |      | 18         | 0,049  | 1,24 | 0,652     | 16,56 | TD-750-18-06       |
|           |      | 19         | 0,042  | 1,07 | 0,666     | 16,92 | TD-750-19-06       |
|           |      | 20         | 0,035  | 0,89 | 0,680     | 17,27 | TD-750-20-06       |
| 7/8"      | 22,2 | 12         | 0,109  | 2,77 | 0,657     | 16,69 | TD-875-12-06       |
|           |      | 14         | 0,083  | 2,11 | 0,709     | 18,01 | TD-875-14-06       |
|           |      | 15         | 0,072  | 1,83 | 0,731     | 18,57 | TD-875-15-06       |
|           |      | 16         | 0,065  | 1,65 | 0,745     | 18,92 | TD-875-16-06       |
|           |      | 18         | 0,049  | 1,24 | 0,777     | 19,74 | TD-875-18-06       |
| 1         | 25,4 | 8          | 0,165  | 4,19 | 0,670     | 17,02 | TD-1000-8-06       |
|           |      | 9          | 0,148  | 3,76 | 0,704     | 17,88 | TD-1000-9-06       |
|           |      | 10         | 0,134  | 3,40 | 0,732     | 18,59 | TD-1000-10-06      |
|           |      | 11         | 0,120  | 3,05 | 0,760     | 19,30 | TD-1000-11-06      |
|           |      | 12         | 0,109  | 2,77 | 0,782     | 19,86 | TD-1000-12-06      |
|           |      | 13         | 0,095  | 2,41 | 0,810     | 20,57 | TD-1000-13-06      |
|           |      | 14         | 0,083  | 2,11 | 0,834     | 21,18 | TD-1000-14-06      |
|           |      | 15         | 0,072  | 1,83 | 0,856     | 21,74 | TD-1000-15-06      |
|           |      | 16         | 0,065  | 1,65 | 0,870     | 22,10 | TD-1000-16-06      |
|           |      | 17         | 0,058  | 1,47 | 0,884     | 22,45 | TD-1000-17-06      |
|           |      | 18         | 0,049  | 1,24 | 0,902     | 22,91 | TD-1000-18-06      |
|           |      | 19         | 0,042  | 1,07 | 0,916     | 23,27 | TD-1000-19-06      |
|           |      | 20         | 0,035  | 0,89 | 0,930     | 23,62 | TD-1000-20-06      |

# HyperDrill BSR

HyperDrill BSR is a unique machining platform. The machine is designed to carry out many machining operations on boilers and similar thermal exchange equipment. With 80 mm (3.150") tool travel, this machine is ideally suited for most plants and is designed with operator safety in mind.

The system is fully torque-resistant with 2 or 3 clamping shafts that are independent of one another and can accommodate most pitch configurations. Once locked into the drum, the HyperDrill BSR is exceptionally stable.



**AVAILABLE DRIVES**



**HYDRAULIC MOTOR (RECOMMENDED)**

| MOTOR   | SPEED | POWER | TORQUE | OIL PRESSURE |      | MIN. OIL FLOW RATE |     |
|---------|-------|-------|--------|--------------|------|--------------------|-----|
|         | RPM   | HP    | NM     | BAR          | PSI  | LT/MIN             | GPM |
| HTB-165 | 343   | 16,7  | 273    | 190          | 2750 | 57                 | 15  |



**PNEUMATIC MOTOR**

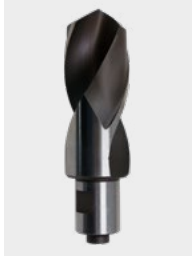
| MOTOR         | REVER-SIBLE | RIGHT-ANGLE | SPEED | TORQUE |        | SQUARE DRIVE       |
|---------------|-------------|-------------|-------|--------|--------|--------------------|
|               |             |             | RPM   | NM     | FT.LBS |                    |
| K75-RL-3V-190 | YES         | YES         | 190   | 190    | 140    | 120, 210, 380, 650 |



**ELECTRIC MOTOR**

| MOTOR                | REVER-SIBLE | RIGHT-ANGLE | SPEED              | POWER | TORQUE | VOLTAGE |
|----------------------|-------------|-------------|--------------------|-------|--------|---------|
|                      |             |             | RPM                | WATT  | NM     | V       |
| DUDE-2000<br>4 speed | YES         | YES         | 120, 210, 380, 650 | 2000  | 240    | 110/230 |



**AVAILABLE TOOLING**

Solid drill (on request)



Drilling heads with inserts for stub wall reduction (1-1/4" to 4-1/2")



Adjustable boring heads for oversizing damaged holes (1-1/4" to 5")



Grooving tools (1-1/4" to 4")



Weld removal heads (1-1/4" to 4-1/2")

**OPTIONAL ACCESORIES****FAST CLAMPING SYSTEM**

System offers rapid tube to tube cycle time, increased productivity (up to 4x) with little operator fatigue. Ideal for large amount of end preps.

**EXAMPLE APPLICATIONS**

- ▶ boiler tube and stubs wall reduction before punching it down;
- ▶ weld removal from stubs outside of the drum, especially for thin wall drums where the end prep machine can't be locked;
- ▶ boring the drum holes with a precise head for oversizing them for the repair of damaged or oval holes;
- ▶ trepanation of the drum or pipes;
- ▶ drilling holes (need chain clamping).







# Pulling Equipment



# HETT – Tube Taping Machine

The HETT tapping machine solves problems with retubing heat exchangers tubes made of hard alloyed steel such as Inconel, duplex, other stainless steel or thick-walled carbon steel tubes. The unique characteristic of the HETT machine is a high torque, up to 450 Nm, and the tool is easy to operate by one person.

The machine uses the short version of standard machine tapping tools.



Using the HETT solution eliminates the traditional taper spears and noisy impact wrenches. Once the thread is ready, an operator can use any tube of pullers, such as HPR-30, SupperJenny, ACTP, or custom made CP-1000 puller.



The only difference is that a threaded drawbar is used, which guarantees a strong connection with pulled tubes and a long tool lifetime in comparing the traditional tube spear.



## WORK EXAMPLES



Another advantage of threading tube end in the tube sheet is that by cutting grooves in the tube wall, we weaken the expanded connection, making it much easier to break that expansion with a tube puller.

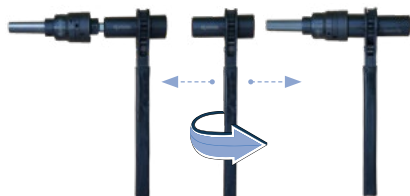
# Manual Tube Pullers

## Manual Tube Puller



| TUBE OD |       | [BWG] | WALL THKS |      | TUBE ID |       | TUBE PULLER NO      | SPARE SPEARS NO |
|---------|-------|-------|-----------|------|---------|-------|---------------------|-----------------|
| [INCH]  | [MM]  |       | [INCH]    | [MM] | [INCH]  | [MM]  |                     |                 |
| 1/2     | 12,7  | 14    | 0,08      | 2,11 | 0,334   | 8,48  | <b>KSPN 500-14</b>  | KSP 1/2-14      |
|         |       | 16    | 0,07      | 1,65 | 0,370   | 9,40  | <b>KSPN500-16</b>   | KSP 1/2-16      |
|         |       | 18    | 0,05      | 1,24 | 0,402   | 10,21 | <b>KSPN 500-18</b>  | KSP 1/2-18      |
|         |       | 20    | 0,04      | 0,89 | 0,430   | 10,92 | <b>KSPN 500-20</b>  | KSP 1/2-20      |
| 5/8     | 15,88 | 14    | 0,08      | 2,11 | 0,459   | 11,66 | <b>KSPN 625-14</b>  | KSP 5/8-14      |
|         |       | 16    | 0,07      | 1,65 | 0,495   | 12,57 | <b>KSPN 625-16</b>  | KSP 5/8-16      |
|         |       | 18    | 0,05      | 1,24 | 0,527   | 13,39 | <b>KSPN 625-18</b>  | KSP 5/8-18      |
|         |       | 20    | 0,04      | 0,89 | 0,555   | 14,10 | <b>KSPN 625-20</b>  | KSP 5/8-20      |
| 3/4     | 19,05 | 14    | 0,08      | 2,11 | 0,585   | 14,86 | <b>KSPN 750-14</b>  | KSP 3/4-14      |
|         |       | 16    | 0,07      | 1,65 | 0,620   | 15,75 | <b>KSPN 750-16</b>  | KSP 3/4-16      |
|         |       | 18    | 0,05      | 1,24 | 0,652   | 16,56 | <b>KSPN 750-18</b>  | KSP 3/4-18      |
|         |       | 20    | 0,04      | 0,89 | 0,680   | 17,27 | <b>KSPN 750-20</b>  | KSP 3/4-20      |
| 7/8     | 22,2  | 14    | 0,08      | 2,11 | 0,709   | 18,01 | <b>KSPN 875-14</b>  | KSP 7/8-14      |
|         |       | 16    | 0,07      | 1,65 | 0,745   | 18,92 | <b>KSPN 875-16</b>  | KSP 7/8-16      |
|         |       | 18    | 0,05      | 1,24 | 0,777   | 19,74 | <b>KSPN 875-18</b>  | KSP 7/8-18      |
|         |       | 20    | 0,04      | 0,89 | 0,805   | 20,45 | <b>KSPN 875-20</b>  | KSP 7/8-20      |
| 1       | 25,4  | 14    | 0,08      | 2,11 | 0,834   | 21,18 | <b>KSPN 1000-14</b> | KSP 1-14        |
|         |       | 16    | 0,07      | 1,65 | 0,870   | 22,10 | <b>KSPN 1000-16</b> | KSP 1-16        |
|         |       | 18    | 0,05      | 1,24 | 0,902   | 22,91 | <b>KSPN 1000-18</b> | KSP 1-18        |
|         |       | 20    | 0,04      | 0,89 | 0,930   | 23,62 | <b>KSPN 1000-20</b> | KSP 1-20        |

### 2-FUNCTION RATCHED HANDLE



## MSP-100 Manual Spear Puller



Easy and economical way for tube removal.

- Easy to use by inserting the spear into the tube and removing required just a hand wrench or our universal ratched handle design for this operation (the drive handle it's a separate item and must be ordered separately).
- No external power required.
- Durable - all parts made out of high strength steel and are heat treated.
- Only one tool body required to cover the range form 1/2" to 1". Required only spears and nose pieces.

| TUBE OD |       | TUBE GAUGE | SPEARS              | NOSE PIECE    |
|---------|-------|------------|---------------------|---------------|
| [INCH]  | [MM]  | [BWG]      |                     |               |
| 1/2     | 12,7  | 14-15      | <b>CPS-12-14-15</b> | CPS-10-06A-12 |
|         |       | 16-17      | <b>CPS-12-16-17</b> |               |
|         |       | 18-19      | <b>CPS-12-18-19</b> |               |
|         |       | 20-22      | <b>CPS-12-20-22</b> |               |
|         |       | 22-24      | <b>CPS-12-22-24</b> |               |
| 5/8     | 15,88 | 10-11      | <b>CPS-58-10-11</b> | CPS-10-06A-34 |
|         |       | 12-13      | <b>CPS-58-12-13</b> |               |
|         |       | 14-15      | <b>CPS-58-14-15</b> |               |
|         |       | 16-17      | <b>CPS-58-16-17</b> |               |
| 3/4     | 19,05 | 10-11      | <b>CPS-34-10-11</b> | CPS-10-06A-34 |
|         |       | 12-13      | <b>CPS-34-12-13</b> |               |
|         |       | 14-15      | <b>CPS-34-14-15</b> |               |
|         |       | 16-17      | <b>CPS-34-16-17</b> |               |
| 7/8     | 22,23 | 10-11      | <b>CPS-78-10-11</b> | CPS-10-06A-78 |
|         |       | 12-13      | <b>CPS-78-12-13</b> |               |
|         |       | 14-15      | <b>CPS-78-14-15</b> |               |
|         |       | 16-17      | <b>CPS-78-16-17</b> |               |
| 1       | 25,4  | 10-11      | <b>CPS-1-10-11</b>  | CPS-10-06A-1  |
|         |       | 12-13      | <b>CPS-1-12-13</b>  |               |
|         |       | 14-15      | <b>CPS-1-14-15</b>  |               |
|         |       | 16-17      | <b>CPS-1-16-17</b>  |               |



# Manual Tube Pullers

## MCP-100 Manual Collet Puller

MCP-100 manual collet type tube puller for quick and easy tube stub removal from heat exchanges, condensers, chillers and other tubular pressure vessels.

Manually operated develop up to 10 Tons pulling force (depend on the arm length of the ratchet wrench), with 4" stroke. Can be used for tubes form 5/8" (16mm ) to 1" (25 mm) O.D.

Recommended for smaller amount of tube to be pulled.



| TUBE OD |       | TUBE GAUGE | GRIPPER SET      | DRAW MANDREL | NOSE PIECE    | LOCK NUT    | ADJUST NUT  | JAW O'RING | C O'RING |
|---------|-------|------------|------------------|--------------|---------------|-------------|-------------|------------|----------|
| [INCH]  | [MM]  | [BWG]      |                  |              |               |             |             |            |          |
| 5/8"    | 15,88 | 16-17      | CP-1000-01-58-16 | CP-10S-03-58 | CP-10S-06A-58 | CP-10-LN-58 | CP-10-AN-58 | CP-2220    | CP-1724  |
|         |       | 18-19      | CP-1000-01-58-18 | CP-10S-03-58 | CP-10S-06A-58 | CP-10-LN-58 | CP-10-AN-58 | CP-2220    | CP-1724  |
|         |       | 20-21      | CP-1000-01-58-20 | CP-10S-03-58 | CP-10S-06A-58 | CP-10-LN-58 | CP-10-AN-58 | CP-2220    | CP-1724  |
|         |       | 22-23      | CP-1000-01-58-22 | CP-10S-03-58 | CP-10S-06A-58 | CP-10-LN-58 | CP-10-AN-58 | CP-2220    | CP-1724  |
| 3/4"    | 19,05 | 16-17      | CP-1000-01-34-16 | CP-10S-03-34 | CP-10S-06A-34 | CP-10-LN-34 | CP-10-AN-34 | CP-2220    | CP-1724  |
|         |       | 18-19      | CP-1000-01-34-18 | CP-10S-03-34 | CP-10S-06A-34 | CP-10-LN-34 | CP-10-AN-34 | CP-2220    | CP-1724  |
|         |       | 20-21      | CP-1000-01-34-20 | CP-10S-03-34 | CP-10S-06A-34 | CP-10-LN-34 | CP-10-AN-34 | CP-2220    | CP-1724  |
|         |       | 22-23      | CP-1000-01-34-22 | CP-10S-03-34 | CP-10S-06A-34 | CP-10-LN-34 | CP-10-AN-34 | CP-2220    | CP-1724  |
| 7/8"    | 22,23 | 16-17      | CP-1000-01-78-16 | CP-10S-03-78 | CP-10S-06A-78 | CP-10-LN-78 | CP-10-AN-78 | CP-2220    | CP-1724  |
|         |       | 18-19      | CP-1000-01-78-18 | CP-10S-03-78 | CP-10S-06A-78 | CP-10-LN-78 | CP-10-AN-78 | CP-2220    | CP-1724  |
|         |       | 20-21      | CP-1000-01-78-20 | CP-10S-03-78 | CP-10S-06A-78 | CP-10-LN-78 | CP-10-AN-78 | CP-2220    | CP-1724  |
|         |       | 22-23      | CP-1000-01-78-22 | CP-10S-03-78 | CP-10S-06A-78 | CP-10-LN-78 | CP-10-AN-78 | CP-2220    | CP-1724  |
| 1"      | 25,4  | 16-17      | CP-1000-01-1-16  | CP-10S-03-1  | CP-10S-06A-1  | CP-10-LN-1  | CP-10-AN-1  | CP-2220    | CP-1724  |
|         |       | 18-19      | CP-1000-01-1-18  | CP-10S-03-1  | CP-10S-06A-1  | CP-10-LN-1  | CP-10-AN-1  | CP-2220    | CP-1724  |
|         |       | 20-21      | CP-1000-01-1-20  | CP-10S-03-1  | CP-10S-06A-1  | CP-10-LN-1  | CP-10-AN-1  | CP-2220    | CP-1724  |
|         |       | 22-23      | CP-1000-01-1-22  | CP-10S-03-1  | CP-10S-06A-1  | CP-10-LN-1  | CP-10-AN-1  | CP-2220    | CP-1724  |

# Tube Puller CP-1200

Shortened version of our model CP-1000. This unit has been designed to remove both ferrous and non-ferrous tubing from condensers, chillers and heat exchangers. Capacity from 5/8" to 1-1/2" O.D. gage 16 to 24 (16 to 38 mm O.D. wall 0,5 to 1,6 mm) from tube sheet up to 2" (50 mm)



| PULLING FORCE   | PULLING STROKE | PULLING SPEED     |
|-----------------|----------------|-------------------|
| 120 kN          | 160 mm         | 17 mm/sec         |
| 12 T            | 6"             | 0,7"/sec.         |
| BODY DIMENSIONS |                | BODY WEIGHT       |
| 3,38" x 26,77"  | 86 x 680 mm    | 30 Lbs<br>13,5 kg |

## CPSCK-1000



For this tool we offer a spears type conversion kit.

| TUBE OD |       | TUBE GAUGE | MIN ENTER DIM AFTER EXP. |       | MAX ENTER DIM AFTER EXP. |       | GRIPPER SET       | DRAW MANDREL  | NOSE PIECE     | LOCK NUT     | ADJUST NUT   | JAW O'RING | C O'RING |
|---------|-------|------------|--------------------------|-------|--------------------------|-------|-------------------|---------------|----------------|--------------|--------------|------------|----------|
| [INCH]  | [MM]  |            | [INCH]                   | [MM]  | [INCH]                   | [MM]  |                   |               |                |              |              |            |          |
| 5/8     | 15,88 | 16-17      | 0,506                    | 12,85 | 0,545                    | 13,84 | CP-1000-01-58-16  | CP-10S-03-58  | CP-10S-06A-58  | CP-10-LN-58  | CP-10-AN-58  | CP-2220    | CP-1724  |
|         |       | 18-19      | 0,535                    | 13,59 | 0,574                    | 14,58 | CP-1000-01-58-18  |               |                |              |              |            |          |
|         |       | 20-21      | 0,562                    | 14,27 | 0,602                    | 15,29 | CP-1000-01-58-20  |               |                |              |              |            |          |
|         |       | 22-23      | 0,576                    | 14,63 | 0,616                    | 15,65 | CP-1000-01-58-22  |               |                |              |              |            |          |
| 3/4     | 19,05 | 16-17      | 0,631                    | 16,03 | 0,671                    | 17,04 | CP-1000-01-34-16  | CP-10S-03-34  | CP-10S-06A-34  | CP-10-LN-34  | CP-10-AN-34  | CP-2220    | CP-1724  |
|         |       | 18-19      | 0,665                    | 16,89 | 0,704                    | 17,88 | CP-1000-01-34-18  |               |                |              |              |            |          |
|         |       | 20-21      | 0,692                    | 17,58 | 0,732                    | 18,59 | CP-1000-01-34-20  |               |                |              |              |            |          |
|         |       | 22-23      | 0,706                    | 17,93 | 0,746                    | 18,95 | CP-1000-01-34-22  |               |                |              |              |            |          |
| 7/8     | 22,23 | 16-17      | 0,755                    | 19,18 | 0,795                    | 20,19 | CP-1000-01-78-16  | CP-10S-03-78  | CP-10S-06A-78  | CP-10-LN-78  | CP-10-AN-78  | CP-2220    | CP-1724  |
|         |       | 18-19      | 0,787                    | 19,99 | 0,826                    | 20,98 | CP-1000-01-78-18  |               |                |              |              |            |          |
|         |       | 20-21      | 0,815                    | 20,70 | 0,854                    | 21,69 | CP-1000-01-78-20  |               |                |              |              |            |          |
|         |       | 22-23      | 0,828                    | 21,03 | 0,868                    | 22,05 | CP-1000-01-78-22  |               |                |              |              |            |          |
| 1       | 25,4  | 16-17      | 0,881                    | 22,38 | 0,921                    | 23,39 | CP-1000-01-1-16   | CP-10S-03-1   | CP-10S-06A-1   | CP-10-LN-1   | CP-10-AN-1   | CP-2220    | CP-1724  |
|         |       | 18-19      | 0,913                    | 23,19 | 0,952                    | 24,18 | CP-1000-01-1-18   |               |                |              |              |            |          |
|         |       | 20-21      | 0,941                    | 23,90 | 0,980                    | 24,89 | CP-1000-01-1-20   |               |                |              |              |            |          |
|         |       | 22-23      | 0,972                    | 24,69 | 1,011                    | 25,68 | CP-1000-01-1-22   |               |                |              |              |            |          |
| 1-1/4*  | 31,75 | 16-17      | 1,133                    | 28,78 | 1,173                    | 29,79 | CP-1000-01-114-16 | CP-10S-03-114 | CP-10S-06A-114 | CP-10-LN-114 | CP-10-AN-114 | CP-2220    | CP-1724  |
|         |       | 18-19      | 1,165                    | 29,59 | 1,204                    | 30,58 | CP-1000-01-114-18 |               |                |              |              |            |          |
|         |       | 20-21      | 1,194                    | 30,33 | 1,234                    | 31,34 | CP-1000-01-114-20 |               |                |              |              |            |          |
|         |       | 22-23      | 1,208                    | 30,68 | 1,248                    | 31,70 | CP-1000-01-114-22 |               |                |              |              |            |          |
| 1-1/2*  | 38,10 | 16-17      | 1,385                    | 35,18 | 1,425                    | 36,20 | CP-1000-01-112-16 | CP-10S-03-112 | CP-10S-06A-112 | CP-10-LN-112 | CP-10-AN-112 | CP-2220    | CP-1724  |
|         |       | 18-19      | 1,417                    | 35,99 | 1,456                    | 36,98 | CP-1000-01-112-18 |               |                |              |              |            |          |
|         |       | 20-21      | 1,444                    | 36,68 | 1,484                    | 37,69 | CP-1000-01-112-20 |               |                |              |              |            |          |
|         |       | 22-23      | 1,458                    | 37,03 | 1,498                    | 38,05 | CP-1000-01-112-22 |               |                |              |              |            |          |

\* For tubes 1-1/4" i 1-1/2" SS7-381 adapter and SS10-381 joint are required!

# Tube Puller CP-1200-CC



This is our lightweight unit, specifically designed for the condenser and chiller markets. An ideal tool for working within the water box of a surface condenser or within the channel head of a chiller, you can remove 4-6 tubes a minute quickly and effortlessly. Capacity from 5/8" to 1" OD, gage 16 to 24 (16 to 25 mm OD, wall 0,5 to 1,6 mm) from tube sheet up to 2" (50 mm).

| PULLING FORCE   |  | PULLING STROKE |             | PULLING SPEED  |  |
|-----------------|--|----------------|-------------|----------------|--|
| 150 kN          |  | 160 mm         |             | 17 mm/sec      |  |
| 15 T            |  | 6"             |             | 0,7"/sec.      |  |
| BODY DIMENSIONS |  |                | BODY WEIGHT |                |  |
| 3,38" x 26,77"  |  | 86 x 680 mm    |             | 26,4 Lbs 12 kg |  |

| TUBE OD |       | TUBE GAUGE | MIN ENTER DIM AFTER EXP. |       | MAX ENTER DIM AFTER EXP. |       | GRIPPER SET      | DRAW MANDREL | NOSE PIECE    | LOCK NUT    | ADJUST NUT  | JAW O'RING | C O'RING |
|---------|-------|------------|--------------------------|-------|--------------------------|-------|------------------|--------------|---------------|-------------|-------------|------------|----------|
| [INCH]  | [MM]  |            | [INCH]                   | [MM]  | [INCH]                   | [MM]  |                  |              |               |             |             |            |          |
| 5/8     | 15,88 | 16-17      | 0,506                    | 12,85 | 0,545                    | 13,84 | CP-1000-01-58-16 | CP-10S-03-58 | CP-10L-06A-58 | CP-10-LN-58 | CP-10-AN-58 | CP-2220    | CP-1724  |
|         |       | 18-19      | 0,535                    | 13,59 | 0,574                    | 14,58 | CP-1000-01-58-18 |              |               |             |             |            |          |
|         |       | 20-21      | 0,562                    | 14,27 | 0,602                    | 15,29 | CP-1000-01-58-20 |              |               |             |             |            |          |
|         |       | 22-23      | 0,576                    | 14,63 | 0,616                    | 15,65 | CP-1000-01-58-22 |              |               |             |             |            |          |
| 3/4     | 19,05 | 16-17      | 0,631                    | 16,03 | 0,671                    | 17,04 | CP-1000-01-34-16 | CP-10S-03-34 | CP-10L-06A-34 | CP-10-LN-34 | CP-10-AN-34 | CP-2220    | CP-1724  |
|         |       | 18-19      | 0,665                    | 16,89 | 0,704                    | 17,88 | CP-1000-01-34-18 |              |               |             |             |            |          |
|         |       | 20-21      | 0,692                    | 17,58 | 0,732                    | 18,59 | CP-1000-01-34-20 |              |               |             |             |            |          |
|         |       | 22-23      | 0,706                    | 17,93 | 0,746                    | 18,95 | CP-1000-01-34-22 |              |               |             |             |            |          |
| 7/8     | 22,23 | 16-17      | 0,755                    | 19,18 | 0,795                    | 20,19 | CP-1000-01-78-16 | CP-10S-03-78 | CP-10L-06A-78 | CP-10-LN-78 | CP-10-AN-78 | CP-2220    | CP-1724  |
|         |       | 18-19      | 0,787                    | 19,99 | 0,826                    | 20,98 | CP-1000-01-78-18 |              |               |             |             |            |          |
|         |       | 20-21      | 0,815                    | 20,70 | 0,854                    | 21,69 | CP-1000-01-78-20 |              |               |             |             |            |          |
|         |       | 22-23      | 0,828                    | 21,03 | 0,868                    | 22,05 | CP-1000-01-78-22 |              |               |             |             |            |          |
| 1       | 25,4  | 16-17      | 0,881                    | 22,38 | 0,921                    | 23,39 | CP-1000-01-1-16  | CP-10S-03-1  | CP-10L-06A-1  | CP-10-LN-1  | CP-10-AN-1  | CP-2220    | CP-1724  |
|         |       | 18-19      | 0,913                    | 23,19 | 0,952                    | 24,18 | CP-1000-01-1-18  |              |               |             |             |            |          |
|         |       | 20-21      | 0,941                    | 23,90 | 0,980                    | 24,89 | CP-1000-01-1-20  |              |               |             |             |            |          |
|         |       | 22-23      | 0,972                    | 24,69 | 1,011                    | 25,68 | CP-1000-01-1-22  |              |               |             |             |            |          |

Non standard sizes on request

## RECOMMENDED PUMPS

Three pump choice with parameters of 700 bar (1000 psi) oil delivery at high pressure 0,9 to 1,1 l/min:

- ▶ electric 230 V standard type
- ▶ electric 230 V with oil cooler
- ▶ pneumatic 1,4 cu.m/min at 6 bar



# Tube Puller CP-1200-FF



This unit has all the features of our Standard Model CP-1000 with the additional advantage of being able to remove stubs from the waterbox of Fin Fan Coolers as well as tubes/stubs close to the shell or pass partition plates within thermal exchange units. A standard waterbox depth of X is furnished with custom depths available upon request. Capacity from 5/8" to 1-1/2" O.D. gage 16 to 38 (16 to 38 mm O.D. wall 0,5 to 1,6 mm) from tube sheet up to 2" (50 mm)

| PULLING FORCE   | PULLING STROKE | PULLING SPEED  |
|-----------------|----------------|----------------|
| 150 kN          | 160 mm         | 17 mm/sec      |
| 15 T            | 6"             | 0,7"/sec.      |
| BODY DIMENSIONS |                | BODY WEIGHT    |
| 3,38" x 36,61"  | 86 x 930 mm    | 32 Lbs 14,5 kg |

| TUBE OD |       | TUBE GAUGE | MIN ENTER DIM AFTER EXP. |       | MAX ENTER DIM AFTER EXP. |       | GRIPPER SET       | DRAW MANDREL  | NOSE PIECE     | LOCK NUT     | ADJUST NUT   | JAW O'RING | C O'RING | JAWS HOLDER   | MANDREL EXT. |
|---------|-------|------------|--------------------------|-------|--------------------------|-------|-------------------|---------------|----------------|--------------|--------------|------------|----------|---------------|--------------|
| [INCH]  | [MM]  |            | [INCH]                   | [MM]  | [INCH]                   | [MM]  |                   |               |                |              |              |            |          |               |              |
| 5/8     | 15,88 | 16-17      | 0,506                    | 12,85 | 0,545                    | 13,84 | CP-1000-01-58-16  | CP-10L-03-58  | CP-10S-06A-58  | CP-10-LN-58  | CP-10-AN-58  | CP-2220    | CP-1724  | CP-JH-58-10"  | CP-10-DM-EXT |
|         |       | 18-19      | 0,535                    | 13,59 | 0,574                    | 14,58 | CP-1000-01-58-18  |               |                |              |              |            |          |               |              |
|         |       | 20-21      | 0,562                    | 14,27 | 0,602                    | 15,29 | CP-1000-01-58-20  |               |                |              |              |            |          |               |              |
|         |       | 22-23      | 0,576                    | 14,63 | 0,616                    | 15,65 | CP-1000-01-58-22  |               |                |              |              |            |          |               |              |
| 3/4     | 19,05 | 16-17      | 0,631                    | 16,03 | 0,671                    | 17,04 | CP-1000-01-34-16  | CP-10L-03-34  | CP-10S-06A-34  | CP-10-LN-34  | CP-10-AN-34  | CP-2220    | CP-1724  | CP-JH-34-10"  | CP-10-DM-EXT |
|         |       | 18-19      | 0,665                    | 16,89 | 0,704                    | 17,88 | CP-1000-01-34-18  |               |                |              |              |            |          |               |              |
|         |       | 20-21      | 0,692                    | 17,58 | 0,732                    | 18,59 | CP-1000-01-34-20  |               |                |              |              |            |          |               |              |
|         |       | 22-23      | 0,706                    | 17,93 | 0,746                    | 18,95 | CP-1000-01-34-22  |               |                |              |              |            |          |               |              |
| 7/8     | 22,23 | 16-17      | 0,755                    | 19,18 | 0,795                    | 20,19 | CP-1000-01-78-16  | CP-10L-03-78  | CP-10S-06A-78  | CP-10-LN-78  | CP-10-AN-78  | CP-2220    | CP-1724  | CP-JH-78-10"  | CP-10-DM-EXT |
|         |       | 18-19      | 0,787                    | 19,99 | 0,826                    | 20,98 | CP-1000-01-78-18  |               |                |              |              |            |          |               |              |
|         |       | 20-21      | 0,815                    | 20,70 | 0,854                    | 21,69 | CP-1000-01-78-20  |               |                |              |              |            |          |               |              |
|         |       | 22-23      | 0,828                    | 21,03 | 0,868                    | 22,05 | CP-1000-01-78-22  |               |                |              |              |            |          |               |              |
| 1       | 25,4  | 16-17      | 0,881                    | 22,38 | 0,921                    | 23,39 | CP-1000-01-1-16   | CP-10L-03-1   | CP-10S-06A-1   | CP-10-LN-1   | CP-10-AN-1   | CP-2220    | CP-1724  | CP-JH-1-10"   | CP-10-DM-EXT |
|         |       | 18-19      | 0,913                    | 23,19 | 0,952                    | 24,18 | CP-1000-01-1-18   |               |                |              |              |            |          |               |              |
|         |       | 20-21      | 0,941                    | 23,90 | 0,980                    | 24,89 | CP-1000-01-1-20   |               |                |              |              |            |          |               |              |
|         |       | 22-23      | 0,972                    | 24,69 | 1,011                    | 25,68 | CP-1000-01-1-22   |               |                |              |              |            |          |               |              |
| 1-1/4   | 31,75 | 16-17      | 1,133                    | 28,78 | 1,173                    | 29,79 | CP-1000-01-114-16 | CP-10L-03-114 | CP-10S-06A-114 | CP-10-LN-114 | CP-10-AN-114 | CP-2220    | CP-1724  | CP-JH-58-114" | CP-10-DM-EXT |
|         |       | 18-19      | 1,165                    | 29,59 | 1,204                    | 30,58 | CP-1000-01-114-18 |               |                |              |              |            |          |               |              |
|         |       | 20-21      | 1,194                    | 30,33 | 1,234                    | 31,34 | CP-1000-01-114-20 |               |                |              |              |            |          |               |              |
|         |       | 22-23      | 1,208                    | 30,68 | 1,248                    | 31,70 | CP-1000-01-114-22 |               |                |              |              |            |          |               |              |
| 1-1/2   | 38,10 | 16-17      | 1,385                    | 35,18 | 1,425                    | 36,20 | CP-1000-01-112-16 | CP-10L-03-112 | CP-10S-06A-112 | CP-10-LN-112 | CP-10-AN-112 | CP-2220    | CP-1724  | CP-JH-58-114" | CP-10-DM-EXT |
|         |       | 18-19      | 1,417                    | 35,99 | 1,456                    | 36,98 | CP-1000-01-112-18 |               |                |              |              |            |          |               |              |
|         |       | 20-21      | 1,444                    | 36,68 | 1,484                    | 37,69 | CP-1000-01-112-20 |               |                |              |              |            |          |               |              |
|         |       | 22-23      | 1,458                    | 37,03 | 1,498                    | 38,05 | CP-1000-01-112-22 |               |                |              |              |            |          |               |              |

We can supply the FF conversion kit to your specifications on all models of the CP-1000 and CP-1000-S.

# Tube Puller HPR20-CP1000

HPR20-CP1000 is a machine designed to pull tube stubs from heat exchangers in the oil refinery industry, and we recommend it for removing heavy wall tubes. The device uses modern spear-type jaws for smooth and fast pulling. HPR20-CP1000 is convenient and fast in operation with low operating costs. HPR20-CP1000 delivers capacity from 5/8" to 1" gauge 10 to 16, with max pulling force up to 20 tons from the tube sheet up to 2,5" (63 mm)



| WORKING RANGE   | PULLING FORCE | PULLING STROKE | PULLING SPEED |
|-----------------|---------------|----------------|---------------|
| 15,8 to 25,4 mm | 200 kN        | 100 mm         | 34 mm/sec     |
| 5/8" to 1"      | 20 T          | 4"             | 1,33"/sec.    |
| BODY DIMENSIONS |               | BODY WEIGHT    |               |
| 4,7" x 31,5"    | 120 x 800 mm  | 85 Lbs         | 22 kg         |

## UNIQUE DESIGN

The device uses modern spear-type jaws for smooth and fast pulling and offers high capacity in operating range.



| Tube OD |       | Tube gauge | Gripper Set      | Draw Mandrel | Nose Piece  | Jaw o'ring | NS Joint    | Adapter     | Max Force | Pump      |
|---------|-------|------------|------------------|--------------|-------------|------------|-------------|-------------|-----------|-----------|
| [inch]  | [mm]  | [BWG]      |                  |              |             |            |             |             |           | (700 Bar) |
| 5/8"    | 15,8  | 14         | CP-1500-01-58-14 | CP-15-02-58  | CP-15-03-58 | CP-15-058  | CP-15-06-58 | CP-15-07-34 | 15 ton    | CPPZ-4W   |
|         |       | 15         | CP-1500-01-58-15 | CP-15-02-58  | CP-15-03-58 | CP-15-058  | CP-15-06-58 | CP-15-07-34 | 15 ton    | CPPZ-4W   |
|         |       | 16         | CP-1500-01-58-16 | CP-15-02-58  | CP-15-03-58 | CP-15-058  | CP-15-06-58 | CP-15-07-34 | 15 ton    | CPPZ-4W   |
|         |       | 17         | CP-1500-01-58-17 | CP-15-02-58  | CP-15-03-58 | CP-15-058  | CP-15-06-58 | CP-15-07-34 | 15 ton    | CPPZ-4W   |
|         |       | 18         | CP-1500-01-58-18 | CP-15-02-58  | CP-15-03-58 | CP-15-058  | CP-15-06-58 | CP-15-07-34 | 15 ton    | CPPZ-4W   |
|         |       | 19         | CP-1500-01-58-19 | CP-15-02-58  | CP-15-03-58 | CP-15-058  | CP-15-06-58 | CP-15-07-34 | 15 ton    | CPPZ-4W   |
|         |       | 20         | CP-1500-01-58-20 | CP-15-02-58  | CP-15-03-58 | CP-15-058  | CP-15-06-58 | CP-15-07-34 | 15 ton    | CPPZ-4W   |
|         |       | 21         | CP-1500-01-58-21 | CP-15-02-58  | CP-15-03-58 | CP-15-058  | CP-15-06-58 | CP-15-07-34 | 15 ton    | CPPZ-4W   |
| 3/4"    | 19,05 | 22         | CP-1500-01-58-22 | CP-15-02-58  | CP-15-03-58 | CP-15-058  | CP-15-06-58 | CP-15-07-34 | 15 ton    | CPPZ-4W   |
|         |       | 12         | CP-1500-01-34-12 | CP-15-02-34  | CP-15-03-34 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 20 ton    | CPPZ-4W   |
|         |       | 13         | CP-1500-01-34-13 | CP-15-02-34  | CP-15-03-34 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 20 ton    | CPPZ-4W   |
|         |       | 14         | CP-1500-01-34-14 | CP-15-02-34  | CP-15-03-34 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 20 ton    | CPPZ-4W   |
|         |       | 15         | CP-1500-01-34-15 | CP-15-02-34  | CP-15-03-34 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 20 ton    | CPPZ-4W   |
|         |       | 16         | CP-1500-01-34-16 | CP-15-02-34  | CP-15-03-34 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 20 ton    | CPPZ-4W   |
|         |       | 17         | CP-1500-01-34-17 | CP-15-02-34  | CP-15-03-34 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 20 ton    | CPPZ-4W   |
|         |       | 18         | CP-1500-01-34-18 | CP-15-02-34  | CP-15-03-34 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 20 ton    | CPPZ-4W   |
| 7/8"    | 22,2  | 19         | CP-1500-01-34-19 | CP-15-02-34  | CP-15-03-34 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 20 ton    | CPPZ-4W   |
|         |       | 20         | CP-1500-01-34-20 | CP-15-02-34  | CP-15-03-34 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 20 ton    | CPPZ-4W   |
|         |       | 21         | CP-1500-01-34-21 | CP-15-02-34  | CP-15-03-34 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 20 ton    | CPPZ-4W   |
|         |       | 22         | CP-1500-01-34-22 | CP-15-02-34  | CP-15-03-34 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 20 ton    | CPPZ-4W   |
|         |       | 12         | CP-1500-01-78-12 | CP-15-02-78  | CP-15-03-78 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 20 ton    | CPPZ-4W   |
|         |       | 13         | CP-1500-01-78-13 | CP-15-02-78  | CP-15-03-78 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 20 ton    | CPPZ-4W   |
| 7/8"    | 22,2  | 14         | CP-1500-01-78-14 | CP-15-02-78  | CP-15-03-78 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 20 ton    | CPPZ-4W   |
|         |       | 15         | CP-1500-01-78-15 | CP-15-02-78  | CP-15-03-78 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 20 ton    | CPPZ-4W   |
|         |       | 16         | CP-1500-01-78-16 | CP-15-02-78  | CP-15-03-78 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 20 ton    | CPPZ-4W   |
|         |       | 17         | CP-1500-01-78-17 | CP-15-02-78  | CP-15-03-78 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 20 ton    | CPPZ-4W   |
|         |       | 18         | CP-1500-01-78-18 | CP-15-02-78  | CP-15-03-78 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 20 ton    | CPPZ-4W   |



# Tube Puller HPR20-CP1000

| Tube OD |      | Tube gauge | Gripper Set     | Draw Mandrel | Nose Piece | Jaw o'ring | NS Joint    | Adapter     | Max Force | Pump      |
|---------|------|------------|-----------------|--------------|------------|------------|-------------|-------------|-----------|-----------|
| [inch]  | [mm] | [BWG]      |                 |              |            |            |             |             |           | (700 Bar) |
| 1"      | 25,4 | 8          | CP-1500-01-1-8  | CP-15-02-1   | CP-15-03-1 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 30 ton    | CPPZ-4W   |
|         |      | 8          | CP-1500-01-1-9  | CP-15-02-1   | CP-15-03-1 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 30 ton    | CPPZ-4W   |
|         |      | 10         | CP-1500-01-1-10 | CP-15-02-1   | CP-15-03-1 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 30 ton    | CPPZ-4W   |
|         |      | 11         | CP-1500-01-1-11 | CP-15-02-1   | CP-15-03-1 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 30 ton    | CPPZ-4W   |
|         |      | 12         | CP-1500-01-1-12 | CP-15-02-1   | CP-15-03-1 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 30 ton    | CPPZ-4W   |
|         |      | 13         | CP-1500-01-1-13 | CP-15-02-1   | CP-15-03-1 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 30 ton    | CPPZ-4W   |
|         |      | 14         | CP-1500-01-1-14 | CP-15-02-1   | CP-15-03-1 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 30 ton    | CPPZ-4W   |
|         |      | 15         | CP-1500-01-1-15 | CP-15-02-1   | CP-15-03-1 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 30 ton    | CPPZ-4W   |
|         |      | 16         | CP-1500-01-1-16 | CP-15-02-1   | CP-15-03-1 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 30 ton    | CPPZ-4W   |
|         |      | 17         | CP-1500-01-1-17 | CP-15-02-1   | CP-15-03-1 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 30 ton    | CPPZ-4W   |
|         |      | 18         | CP-1500-01-1-18 | CP-15-02-1   | CP-15-03-1 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 30 ton    | CPPZ-4W   |
|         |      | 19         | CP-1500-01-1-19 | CP-15-02-1   | CP-15-03-1 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 30 ton    | CPPZ-4W   |
|         |      | 20         | CP-1500-01-1-20 | CP-15-02-1   | CP-15-03-1 | CP-15-034  | CP-15-06-34 | CP-15-07-34 | 30 ton    | CPPZ-4W   |

## RECOMMENDED PUMPS

Three pump choice with parameters of 700 bar (1000 psi) oil delivery at high pressure 0,9 to 1,1 l/min:

- ▶ electric 230 V standard type
- ▶ electric 230 V with oil cooler
- ▶ pneumatic 1,4 cu.m/min at 6 bar



## SPINAIR COMPATIBILITY



Tube puller may cooperate with SpinAir-2H with spherical rolls .

# HPR-CP2000 Tube Puller

HPR-CP2000 KRAIS gripper-type tube puller is designed for pulling 1-1/4" thru 2-1/2" OD tubes in heat exchangers and fire tube boilers. This gripper type tube puller makes tube pulling faster and easier. See selection charts below for ordering grippers, draw bars and components for the tube sizes being pulled.



| PULLING FORCE   | PULLING STROKE | PULLING SPEED |
|-----------------|----------------|---------------|
| 300 kN          | 160 mm         | 34 mm/sec     |
| 30 T            | 6"             | 1,33"/sec.    |
| BODY DIMENSIONS |                | BODY WEIGHT   |
| 4,7" x 31,5"    | 120 x 800 mm   | 85 Lbs 39 kg  |

| TUBE OD |       | TUBE GAUGE | GRIPPER SET       | DRAW MANDREL | NOSE PIECE   | LOCK NUT     | ADJUST NUT   | JAW O'RING | JOINT        | ADAPTER      | JAWS LOCKING RING | SPRING       |
|---------|-------|------------|-------------------|--------------|--------------|--------------|--------------|------------|--------------|--------------|-------------------|--------------|
| [INCH]  | [MM]  |            |                   |              |              |              |              |            |              |              |                   |              |
| 1-1/4   | 31,75 | 12         | CP-2000-01-114-12 | CP-30-02-114 | CP-30-03-114 | CP-30-04-114 | CP-30-05-114 | CP-30-0114 | CP-30-06-112 | CP-30-07-112 | CP-30-08-112      | CP-30-09-112 |
|         |       | 13         | CP-2000-01-114-13 |              |              |              |              |            |              |              |                   |              |
|         |       | 14         | CP-2000-01-114-14 |              |              |              |              |            |              |              |                   |              |
|         |       | 15-16      | CP-2000-01-114-15 |              |              |              |              |            |              |              |                   |              |
|         |       | 17-18      | CP-2000-01-114-17 |              |              |              |              |            |              |              |                   |              |
| 1-1/2   | 38,10 | 8          | CP-2000-01-112-8  | CP-30-02-112 | CP-30-03-112 | CP-30-04-112 | CP-30-05-112 | CP-30-0112 | CP-30-06-112 | CP-30-07-112 | CP-30-08-112      | CP-30-09-112 |
|         |       | 9          | CP-2000-01-112-9  |              |              |              |              |            |              |              |                   |              |
|         |       | 10         | CP-2000-01-112-10 |              |              |              |              |            |              |              |                   |              |
|         |       | 11         | CP-2000-01-112-11 |              |              |              |              |            |              |              |                   |              |
|         |       | 12         | CP-2000-01-112-12 |              |              |              |              |            |              |              |                   |              |
|         |       | 13         | CP-2000-01-112-13 |              |              |              |              |            |              |              |                   |              |
|         |       | 14         | CP-2000-01-112-14 |              |              |              |              |            |              |              |                   |              |
|         |       | 15-16      | CP-2000-01-112-15 |              |              |              |              |            |              |              |                   |              |
|         |       | 17-18      | CP-2000-01-112-17 |              |              |              |              |            |              |              |                   |              |
| 1-3/4   | 44,45 | 19-20      | CP-2000-01-112-19 |              |              |              |              |            |              |              |                   |              |
|         |       | 8          | CP-2000-01-175-8  | CP-30-02-175 | CP-30-03-175 | CP-30-04-175 | CP-30-05-175 | CP-30-0175 | CP-30-06-200 | CP-30-07-200 | CP-30-08-200      | CP-30-09-200 |
|         |       | 9          | CP-2000-01-175-9  |              |              |              |              |            |              |              |                   |              |
|         |       | 10         | CP-2000-01-175-10 |              |              |              |              |            |              |              |                   |              |
|         |       | 11         | CP-2000-01-175-11 |              |              |              |              |            |              |              |                   |              |
|         |       | 12         | CP-2000-01-175-12 |              |              |              |              |            |              |              |                   |              |
|         |       | 13         | CP-2000-01-175-13 |              |              |              |              |            |              |              |                   |              |
|         |       | 14         | CP-2000-01-175-14 |              |              |              |              |            |              |              |                   |              |
|         |       | 15-16      | CP-2000-01-175-15 |              |              |              |              |            |              |              |                   |              |
|         |       | 17-18      | CP-2000-01-175-17 |              |              |              |              |            |              |              |                   |              |
| 2       | 50,80 | 6          | CP-2000-01-200-6  | CP-30-02-200 | CP-30-03-200 | CP-30-04-200 | CP-30-05-200 | CP-30-0200 | CP-30-06-200 | CP-30-07-200 | CP-30-08-200      | CP-30-09-200 |
|         |       | 7          | CP-2000-01-200-7  |              |              |              |              |            |              |              |                   |              |
|         |       | 8          | CP-2000-01-200-8  |              |              |              |              |            |              |              |                   |              |
|         |       | 9          | CP-2000-01-200-9  |              |              |              |              |            |              |              |                   |              |
|         |       | 10         | CP-2000-01-200-10 |              |              |              |              |            |              |              |                   |              |
|         |       | 11         | CP-2000-01-200-11 |              |              |              |              |            |              |              |                   |              |
|         |       | 12         | CP-2000-01-200-12 |              |              |              |              |            |              |              |                   |              |
|         |       | 13         | CP-2000-01-200-13 |              |              |              |              |            |              |              |                   |              |
|         |       | 14         | CP-2000-01-200-14 |              |              |              |              |            |              |              |                   |              |
|         |       | 15-16      | CP-2000-01-200-15 |              |              |              |              |            |              |              |                   |              |
|         |       | 17-18      | CP-2000-01-200-17 |              |              |              |              |            |              |              |                   |              |

| TUBE OD |       | TUBE GAUGE | GRIPPER SET       | DRAW MANDREL | NOSE PIECE   | LOCK NUT     | ADJUST NUT   | JAW O'RING | JOINT        | ADAPTER      | JAWS LOCKING RING | SPRING       |
|---------|-------|------------|-------------------|--------------|--------------|--------------|--------------|------------|--------------|--------------|-------------------|--------------|
| [INCH]  | [MM]  |            |                   |              |              |              |              |            |              |              |                   |              |
| 2-1/4   | 57,15 | 6          | CP-2000-01-225-6  | CP-30-02-225 | CP-30-03-225 | CP-30-04-225 | CP-30-05-225 | CP-30-0225 | CP-30-06-250 | CP-30-07-250 | CP-30-08-250      | CP-30-09-250 |
|         |       | 7          | CP-2000-01-225-7  |              |              |              |              |            |              |              |                   |              |
|         |       | 8          | CP-2000-01-225-8  |              |              |              |              |            |              |              |                   |              |
|         |       | 9          | CP-2000-01-225-9  |              |              |              |              |            |              |              |                   |              |
|         |       | 10         | CP-2000-01-225-10 |              |              |              |              |            |              |              |                   |              |
|         |       | 11         | CP-2000-01-225-11 |              |              |              |              |            |              |              |                   |              |
|         |       | 12         | CP-2000-01-225-12 |              |              |              |              |            |              |              |                   |              |
|         |       | 13         | CP-2000-01-225-13 |              |              |              |              |            |              |              |                   |              |
|         |       | 14         | CP-2000-01-225-14 |              |              |              |              |            |              |              |                   |              |
|         |       | 15-16      | CP-2000-01-225-15 |              |              |              |              |            |              |              |                   |              |
|         |       | 17-18      | CP-2000-01-225-17 |              |              |              |              |            |              |              |                   |              |
| 2-1/2   | 63,50 | 6          | CP-2000-01-250-6  | CP-30-02-250 | CP-30-03-250 | CP-30-04-250 | CP-30-05-250 | CP-30-0250 | CP-30-06-250 | CP-30-07-250 | CP-30-08-250      | CP-30-09-250 |
|         |       | 7          | CP-2000-01-250-7  |              |              |              |              |            |              |              |                   |              |
|         |       | 8          | CP-2000-01-250-8  |              |              |              |              |            |              |              |                   |              |
|         |       | 9          | CP-2000-01-250-9  |              |              |              |              |            |              |              |                   |              |
|         |       | 10         | CP-2000-01-250-10 |              |              |              |              |            |              |              |                   |              |
|         |       | 11         | CP-2000-01-250-11 |              |              |              |              |            |              |              |                   |              |
|         |       | 12         | CP-2000-01-250-12 |              |              |              |              |            |              |              |                   |              |
|         |       | 13         | CP-2000-01-250-13 |              |              |              |              |            |              |              |                   |              |
|         |       | 14         | CP-2000-01-250-14 |              |              |              |              |            |              |              |                   |              |
|         |       | 15-16      | CP-2000-01-250-15 |              |              |              |              |            |              |              |                   |              |
|         |       | 17-18      | CP-2000-01-250-16 |              |              |              |              |            |              |              |                   |              |

### RECOMMENDED PUMPS

Three pump choice with parameters of 700 bar (1000 psi) oil delivery at high pressure 0,9 to 1,1 l/min:

- ▶ electric 230 V standard type
- ▶ electric 230 V with oil cooler
- ▶ pneumatic 1,4 cu.m/min at 6 bar



# Super-Jenny Semi-Automatic Tube Puller

Super-Jenny Series of hydraulic, semi-automatic tube pullers, allows the user to continuously pull tubes through heat exchangers, condensers and boilers, without the use of hammers or winches etc. The key to the system is the OD gripping jaw that will pull the tube as the operator actuates the ram.

## 12-TON "MINI-JENNY"

Smallest puller, has been specifically designed for chiller and condenser work. Weighing in at just 18 lbs. (6 kg), this 10-ton capacity ram can pull up to 1" OD tubes. With a 3" stroke, this unit is exceptionally quick, and is ideal for tight access applications.

## 20-TON "SUPER-JENNY"

Available with either a 3" or 6" stroke. This tool is capable of pulling 5/8" – 1" tubes continuously.

## 30-TON "SUPER-JENNY"

30-ton puller is the workhorse of industry. Available with either a 3" or 6" stroke. This tool is capable of pulling 5/8" – 1-1/4" tubes continuously. It can even pull up to 3" stubs in specific applications.

## 60-TON "SUPER-JENNY"

Biggest 60-ton "Super-Jenny" has been designed to pull tubes in the toughest applications. As standard, the unit can pull 1 1/2"-2" tubes. As a special, an adapter is offered which will allow the operator to pull smaller diameter tubes with up to 60 tons of pulling force. For example, a tube extraction of 1 1/4" x 10 BWG with a 7" tube sheet was noted to pull at 52 tons of pulling force.



## 12 TON "MINI-JENNY"

| TUBE OD |       | TUBE GAUGE | PULLING SPEAR | PULLING JAW | NOSE COLLAR | O-RING | JAW SPRING | SPEAR-MALE |
|---------|-------|------------|---------------|-------------|-------------|--------|------------|------------|
| [INCH]  | [MM]  |            |               |             |             |        |            |            |
| 5/8"    | 15,88 | 13-16      | K-6011        | K-3031      | K-0625M     | K-0046 | K-0302     | 1/2"       |
|         |       | 18-24      | K-6012        | K-3031      | K-0625M     | K-0046 | K-0302     | 1/2"       |
| 3/4"    | 19,05 | 10-12      | K-6020        | K-3041      | K-0750M     | K-0046 | K-0302     | 5/8"       |
|         |       | 13-16      | K-6021        | K-3041      | K-0750M     | K-0046 | K-0302     | 5/8"       |
|         |       | 18-24      | K-6022        | K-3041      | K-0750M     | K-0046 | K-0302     | 5/8"       |
|         |       | 10-12      | K-6030        | K-3046      | K-0875M     | K-0046 | K-0302     | 5/8"       |
| 7/8"    | 22,23 | 13-16      | K-6031        | K-3046      | K-0875M     | K-0046 | K-0302     | 5/8"       |
|         |       | 18-24      | K-6032        | K-3046      | K-0875M     | K-0046 | K-0302     | 5/8"       |
|         |       | 10-12      | K-6040        | K-3051      | K-1000M     | K-0046 | K-0302     | 3/4"       |
| 1"      | 25,4  | 13-16      | K-6041        | K-3051      | K-1000M     | K-0046 | K-0302     | 3/4"       |
|         |       | 18-24      | K-6042        | K-3051      | K-1000M     | K-0046 | K-0302     | 3/4"       |

## 20 & 30 TON "SUPER-JENNY"

| TUBE OD |       | TOOL             | TUBE GAUGE | PULLING SPEAR | PULLING JAW | NOSE COLLAR | O-RING | JAW SPRING | SPEAR-MALE |
|---------|-------|------------------|------------|---------------|-------------|-------------|--------|------------|------------|
| [INCH]  | [MM]  |                  |            |               |             |             |        |            |            |
| 5/8"    | 15,88 | 20 Ton<br>30 Ton | 13-16      | K-6011        | K-3032      | K-0625      | K-0006 | K-0303     | 1/2"       |
| 3/4"    | 19,05 |                  | 18-24      | K-6012        | K-3032      | K-0625      | K-0006 | K-0303     | 1/2"       |
|         |       |                  | 10-12      | K-6020        | K-3042      | K-0750      | K-0006 | K-0303     | 5/8"       |
|         |       |                  | 13-16      | K-6021        | K-3042      | K-0750      | K-0006 | K-0303     | 5/8"       |
|         |       |                  | 18-24      | K-6022        | K-3042      | K-0750      | K-0006 | K-0303     | 5/8"       |
| 7/8"    | 22,23 |                  | 10-12      | K-6030        | K-3047      | K-0875      | K-0006 | K-0303     | 5/8"       |
|         |       |                  | 13-16      | K-6031        | K-3047      | K-0875      | K-0006 | K-0303     | 5/8"       |
|         |       |                  | 18-24      | K-6032        | K-3047      | K-0875      | K-0006 | K-0303     | 5/8"       |
|         |       |                  | 10-12      | K-6040        | K-3052      | K-1000      | K-0006 | K-0303     | 3/4"       |
| 1"      | 25,4  |                  | 13-16      | K-6041        | K-3052      | K-1000      | K-0006 | K-0303     | 3/4"       |
|         |       |                  | 18-24      | K-6042        | K-3052      | K-1000      | K-0006 | K-0303     | 3/4"       |
|         |       |                  | 10-12      | K-6060        | K-3072      | K-1250      | K-0006 | K-0303     | 1"         |
| 1-1/4"  | 31,75 | 30 Ton           | 13-16      | K-6061        | K-3072      | K-1250      | K-0006 | K-0303     | 1"         |
|         |       |                  | 18-24      | K-6062        | K-3072      | K-1250      | K-0006 | K-0303     | 1"         |

## RECOMMENDED PUMPS

Three pump choice with parameters of 700 bar (1000 psi) oil delivery at high pressure 0,9 to 1,1 l/min:

- ▶ electric 230 V standard type
- ▶ electric 230 V with oil cooler
- ▶ pneumatic 1,4 cu.m/min at 6 bar



## 60 TON "SUPER-JENNY"

| TUBE OD |       | TUBE GAUGE | PULLING SPEAR | PULLING JAW | NOSE COLLAR | O-RING | JAW SPRING | SPEAR-MALE |
|---------|-------|------------|---------------|-------------|-------------|--------|------------|------------|
| [INCH]  | [MM]  |            |               |             |             |        |            |            |
| 1-1/2"  | 38,10 | 10-12      | K-6070        | K-3211      | K-3212      | K-0015 | 18.2321    | 1"         |
|         |       | 13-16      | K-6071        | K-3211      | K-3212      | K-0015 | 18.2321    | 1"         |
|         |       | 18-24      | K-6072        | K-3211      | K-3212      | K-0015 | 18.2321    | 1"         |
| 1-3/4"  | 44,45 | 10-12      | K-6080        | K-3216      | K-3217      | K-0015 | 18.2321    | 1"         |
|         |       | 13-16      | K-6081        | K-3216      | K-3217      | K-0015 | 18.2321    | 1"         |
|         |       | 18-24      | K-6082        | K-3216      | K-3217      | K-0015 | 18.2321    | 1"         |
| 2"      | 63,50 | 7-8        | K-6090        | K-3221      | K-3222      | K-0015 | 18.2321    | 1"         |
|         |       | 10-12      | K-6091        | K-3221      | K-3222      | K-0015 | 18.2321    | 1"         |
|         |       | 13-16      | K-6092        | K-3221      | K-3222      | K-0015 | 18.2321    | 1"         |

# ACTP - Automatic, continuous tube pulling

The KRAIS ACTP is an automatic tube pulling system consists of a very fast pump and pulling gun. It is designed for continuous removal of tubes from boilers, condensers and heat exchangers.

Automation provides significant time savings compared to conventional systems. Tubes can be continuously pulled from between 16 mm (5/8") OD and 63 mm (2,5") OD. A choice of super heavy duty 17, 36 and 45 Ton pulling gun options are available.

The basic version ACTP is a fully hydraulic system - it guarantees safety and eliminates the need for electric wires between the pump and the gun. ACTP is also available with a choice of the electric or pneumatic drive for use in potentially explosive environments.

## ADVANTAGES OF KRAIS ACTP

- ▶ tubes extraction takes place without damaging the tube sheet,
- ▶ hydraulic RAM ensures smooth and stable operation,
- ▶ automatic switching from low pressure to high depending on the RAM demand,
- ▶ high power translates into a short duration of the extraction cycle,
- ▶ the possibility of using different pulling guns with the same pump,
- ▶ compact design, short installation time and ease of use.



| PULLING GUN | POWER  | PULLING STROKE |        | PULLING SPEED |            | TUBE OD [MM] |      | TUBE OD [INCH] |        | WEIGHT |
|-------------|--------|----------------|--------|---------------|------------|--------------|------|----------------|--------|--------|
|             |        | [MM]           | [INCH] | [M/MIN]       | [INCH/MIN] | MIN          | MAX  | MIN            | MAX    |        |
| ACTP-17     | 17 ton | 150            | 6"     | 7             | 275        | 12,7         | 25,4 | 1/2"           | 1"     | 34 kg  |
| ACTP-36     | 36 ton | 150            | 6"     | 3,5           | 137        | 15,9         | 38,0 | 5/8"           | 1-1/2" | 64 kg  |
| ACTP-45     | 45 ton | 100            | 4"     | 1,5           | 60         | 38,0         | 63,0 | 1-1/2"         | 2-1/2" | 83 kg  |

## PUMP CHOICE



ACTP is available with a choice of electric or pneumatic drive for use in potentially explosive environments.

## EASY TO USE CONNECTORS



Pumps for ACTP are equipped with convenient meters and connectors with easy and convenient access. All parts are made with high attention to details.



# ACTP - Automatic, continuous tube pulling



**CONSUMABLES FOR ACPG-4 (4 TON)**

| TUBE OD |       | BWG   | PULLING SPEAR | PULLING JAWS | FRONT SPRING | HOLD JAWS | BACK SPRING |
|---------|-------|-------|---------------|--------------|--------------|-----------|-------------|
| [INCH]  | [MM]  |       |               |              |              |           |             |
| 5/8"    | 15,88 | 13-16 | K-6011        | K-3031       | K-0302       | K-3031    | K-0302      |
|         |       | 18-24 | K-6012        |              |              |           |             |
| 3/4"    | 19,05 | 10-12 | K-6020        | K-3041       | K-0302       | K-3041    | K-0302      |
|         |       | 13-16 | K-6021        |              |              |           |             |
|         |       | 18-24 | K-6022        |              |              |           |             |
|         |       | 10-12 | K-6030        |              |              |           |             |
| 7/8"    | 22,23 | 13-16 | K-6031        | K-3046       | K-0302       | K-3046    | K-0302      |
|         |       | 18-24 | K-6032        |              |              |           |             |
|         |       | 10-12 | K-6040        |              |              |           |             |
| 1"      | 25,4  | 13-16 | K-6041        | K-3051       | K-0302       | K-3051    | K-0302      |
|         |       | 18-24 | K-6042        |              |              |           |             |



**CONSUMABLES FOR ACPG-17 (17 TON)**

| TUBE OD |       | BWG   | PULLING SPEAR | PULLING JAWS | FRONT SPRING | HOLD JAWS | BACK SPRING |
|---------|-------|-------|---------------|--------------|--------------|-----------|-------------|
| [INCH]  | [MM]  |       |               |              |              |           |             |
| 5/8"    | 15,88 | 13-16 | K-6011        | K-3032       | K-0302       | K-3031    | K-0303      |
|         |       | 18-24 | K-6012        |              |              |           |             |
| 3/4"    | 19,05 | 10-12 | K-6020        | K-3042       | K-0302       | K-3041    | K-0303      |
|         |       | 13-16 | K-6021        |              |              |           |             |
|         |       | 18-24 | K-6022        |              |              |           |             |
|         |       | 10-12 | K-6030        |              |              |           |             |
| 7/8"    | 22,23 | 13-16 | K-6031        | K-3047       | K-0302       | K-3046    | K-0303      |
|         |       | 18-24 | K-6032        |              |              |           |             |
|         |       | 10-12 | K-6040        |              |              |           |             |
| 1"      | 25,4  | 13-16 | K-6041        | K-3052       | K-0302       | K-3051    | K-0303      |
|         |       | 18-24 | K-6042        |              |              |           |             |



**CONSUMABLES FOR ACPG-36 (36 TON)**

| TUBE OD |       | BWG   | PULLING SPEAR | PULLING JAWS | FRONT SPRING | HOLD JAWS | BACK SPRING |
|---------|-------|-------|---------------|--------------|--------------|-----------|-------------|
| [INCH]  | [MM]  |       |               |              |              |           |             |
| 5/8"    | 15,88 | 13-16 | K-6011        | K-3030       | K-0303       | K-3032    | K-0303      |
|         |       | 18-24 | K-6012        |              |              |           |             |
| 3/4"    | 19,05 | 10-12 | K-6020        | K-3040       | K-0303       | K-3042    | K-0303      |
|         |       | 13-16 | K-6021        |              |              |           |             |
|         |       | 18-24 | K-6022        |              |              |           |             |
|         |       | 10-12 | K-6030        |              |              |           |             |
| 7/8"    | 22,23 | 13-16 | K-6031        | K-3045       | K-0303       | K-3047    | K-0303      |
|         |       | 18-24 | K-6032        |              |              |           |             |
|         |       | 10-12 | K-6040        |              |              |           |             |
| 1"      | 25,4  | 13-16 | K-6041        | K-3050       | K-0303       | K-3052    | K-0303      |
|         |       | 18-24 | K-6042        |              |              |           |             |
| 1-1/4"  | 31,75 | 10-12 | K-6060        | K-3070       | K-0303       | K-3072    | K-0303      |
|         |       | 13-16 | K-6061        |              |              |           |             |
|         |       | 18-24 | K-6062        |              |              |           |             |
| 1-1/2"  | 38,10 | 10-12 | K-6070        | K-3090       | K-0303       | K-3092    | K-0303      |
|         |       | 13-16 | K-6071        |              |              |           |             |
|         |       | 18-24 | K-6072        |              |              |           |             |



**CONSUMABLES FOR ACPG-45 (45 TON)**

| TUBE OD |       | BWG   | PULLING SPEAR | PULLING JAWS | FRONT SPRING | HOLD JAWS | BACK SPRING |
|---------|-------|-------|---------------|--------------|--------------|-----------|-------------|
| [INCH]  | [MM]  |       |               |              |              |           |             |
| 1-1/2"  | 38,10 | 10-12 | K-6070        | K-3210       | K-2321       | K-3211    | K-2321      |
|         |       | 13-16 | K-6071        |              |              |           |             |
|         |       | 18-24 | K-6072        |              |              |           |             |
| 1-3/4"  | 44,45 | 10-12 | K-6080        | K-3215       | K-2321       | K-3216    | K-2321      |
|         |       | 13-16 | K-6081        |              |              |           |             |
|         |       | 18-24 | K-6082        |              |              |           |             |
| 2"      | 50,8  | 7-8   | K-6090        | K-3220       | K-2321       | K-3221    | K-2321      |
|         |       | 10-12 | K-6091        |              |              |           |             |
|         |       | 13-16 | K-6092        |              |              |           |             |
| 2-1/4"  | 57,1  | 10-12 | K-7000        | K-3230       | K-2321       | K-3231    | K-2321      |
|         |       | 13-16 | K-7001        |              |              |           |             |
|         |       | 18-24 | K-7002        |              |              |           |             |
| 2-1/2"  | 63,5  | 10-12 | K-7010        | K-3240       | K-2321       | K-3241    | K-2321      |
|         |       | 13-16 | K-7011        |              |              |           |             |
|         |       | 18-24 | K-7012        |              |              |           |             |

# HPR Tube Pullers



## HPR-20 Tube Puller

HPR-20 is a heavy-duty, 20 Ton Pulling Ram. This tool has been engineered with a 6" pull stroke for challenging tube removal applications. It is fitted with a flush face, non-drip, couplings and its own custom suspension and handling bracket. In conjunction with Double Pull Adaptor, this machine has the captivity to pull the tubes from 1/2" to 1" from the tube sheet.

### TUBE SPEARS FOR HPR20 & HPR-30 TUBE PULLERS

Length 8,750" (223 mm) with 7/8 flat size (hex), spear sizes of up to 3" on request



| TUBE SIZE |       |       | TOOL NO.        | SMALL END DIAMETER |      | LARGE END DIAMETER |      |
|-----------|-------|-------|-----------------|--------------------|------|--------------------|------|
| [INCH]    | [MM]  | GA    |                 | [INCH]             | [MM] | [INCH]             | [MM] |
| 1/2"      | 12,70 | 20    | ATS-500-20      | 0,427              | 10,8 | 0,499              | 12,7 |
| 5/8"      | 15,88 | 12-13 | ATS-625-12-13   | 0,402              | 10,2 | 0,610              | 15,5 |
|           |       | 14-15 | ATS-625-14-15   | 0,454              | 11,5 | 0,662              | 16,8 |
|           |       | 16-17 | ATS-625-16-17   | 0,489              | 12,4 | 0,625              | 15,9 |
|           |       | 18-19 | ATS-625-18-19   | 0,521              | 13,2 | 0,625              | 15,9 |
|           |       | 20    | ATS-625-20      | 0,545              | 13,8 | 0,620              | 15,7 |
|           |       | 10    | ATS-750-10      | 0,454              | 11,5 | 0,662              | 16,8 |
| 3/4"      | 19,05 | 11-13 | ATS-750-11-13   | 0,505              | 12,8 | 0,713              | 18,1 |
|           |       | 14-15 | ATS-750-14-15   | 0,597              | 15,2 | 0,750              | 19,1 |
|           |       | 16-17 | ATS-750-16-17   | 0,614              | 15,6 | 0,750              | 19,1 |
|           |       | 18-19 | ATS-750-18-19   | 0,646              | 16,4 | 0,750              | 19,1 |
|           |       | 20    | ATS-750-20      | 0,670              | 17,0 | 0,745              | 18,9 |
| 7/8"      | 22,23 | 14-15 | ATS-875-14-15   | 0,699              | 17,8 | 0,875              | 22,2 |
|           |       | 16-18 | ATS-875-16-18   | 0,740              | 18,8 | 0,948              | 24,1 |
|           |       | 20    | ATS-875-20      | 0,800              | 20,3 | 0,874              | 22,2 |
| 1"        | 25,4  | 9-10  | ATS-1 000-9-10  | 0,699              | 17,8 | 0,875              | 22,2 |
|           |       | 11-13 | ATS-1000-11-13  | 0,755              | 19,2 | 0,963              | 24,5 |
|           |       | 12-13 | ATS-1000-12-1 3 | 0,777              | 19,7 | 0,985              | 25,0 |
|           |       | 14-15 | ATS-1000-14-15  | 0,829              | 21,1 | 1,000              | 25,4 |
|           |       | 16-17 | ATS-1000-16-17  | 0,869              | 22,1 | 1,000              | 25,4 |
|           |       | 18-20 | ATS-1000-18-20  | 0,896              | 22,8 | 1,000              | 25,4 |

## HPR-30 Tube Puller

HPR-30 is a heavy-duty, 30 Ton Pulling Ram. This tool has been engineered with a 6" pull stroke for challenging tube removal applications. It is fitted with a flush face, non-drip, couplings and its own custom suspension and handling bracket. In conjunction with Double Pull Adaptor, this machine has the captivity to pull the tube 9" from the tube sheet.

### TUBE SPEARS FOR HPR-30 TUBE PULLERS

Only for HPR-30. Length 5,433" (138 mm) with 1-1/4 flat size (hex), spear sizes of up to 3" on request



| TUBE SIZE |       |       | TOOL NO.       | SMALL END DIAMETER |      | LARGE END DIAMETER |      |
|-----------|-------|-------|----------------|--------------------|------|--------------------|------|
| [INCH]    | [MM]  | GA    |                | [INCH]             | [MM] | [INCH]             | [MM] |
| 1-1/4"    | 31,75 | 7-8   | ATS-1250-7-8   | 0,856              | 21,7 | 1,114              | 28,3 |
|           |       | 10-11 | ATS-1250-10-11 | 0,977              | 24,8 | 1,206              | 30,6 |
|           |       | 12-13 | ATS-1250-10-11 | 1,027              | 26,1 | 1,256              | 31,9 |
|           |       | 14-15 | ATS-1250-14-15 | 1,079              | 27,4 | 1,308              | 33,2 |
|           |       | 16-18 | ATS-1250-16-18 | 1,115              | 28,3 | 1,344              | 34,1 |
| 1-1/2"    | 38,10 | 10-11 | ATS-1500-10-11 | 1,227              | 31,2 | 1,456              | 37,0 |
|           |       | 12-13 | ATS-1500-12-13 | 1,227              | 31,2 | 1,500              | 38,1 |
|           |       | 14    | ATS-1500-14    | 1,329              | 33,8 | 1,500              | 38,1 |

### RECOMMENDED PUMPS

Three pump choice with parameters of 700 bar (1000 psi) oil delivery at high pressure 0,9 to 1,1 l/min.



► Electric, 230 V standard type



► Pneumatic 1,4 cu.m/min at 6 bar



► Electric, 230 V with oil cooler

# HPR Tube Pullers

## HPR Accesories

### D-3055-7 RAM CHAIR



| TUBE SIZE | TOOL NO   |
|-----------|-----------|
| 1-1/4"    | D-3055-7  |
| 1-1/2"    | D-3055-8  |
| 1-3/4"    | D-3055-9  |
| 2"        | D-3055-10 |
| 2-1/2"    | D-3055-11 |

For tube sizes from 3/8" to 1" the following are required:

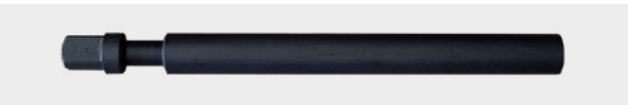
- ▶ Either Single or Double Pull Adaptor
- ▶ Tube Puffing Spear to suit
- ▶ Horse Shoe Lock Adaptor
- ▶ Load Cap

For tube sizes from 1-1/8" to 2-1/2" the following are required:

- ▶ Either Single or Double Pull Adaptor
- ▶ Tube Pulling Spear to suit
- ▶ Male x Male Adaptor
- ▶ Horse Shoe Lock Adaptor
- ▶ Ram Chair of Choice

**NOTE!**  
M x F Adaptors are used when additional reach is required in 12" increments. An example of this is when pulling tubes close to shell, and having the puller operating 24" away from the Tube Sheet In this instance 2 each M x F Adaptors would be used in conjunction with either a single or double pull adaptor. For this example a strong back or extended ram chair would also be required.

### D-3055-2 SINGLE PULL ADAPTOR



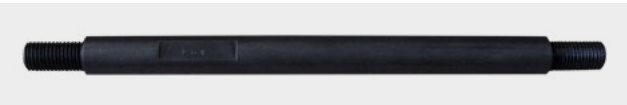
### D-3055-3D DOUBLE ADAPTOR



### D-3055-6 MALE X FEMALE ADAPTOR



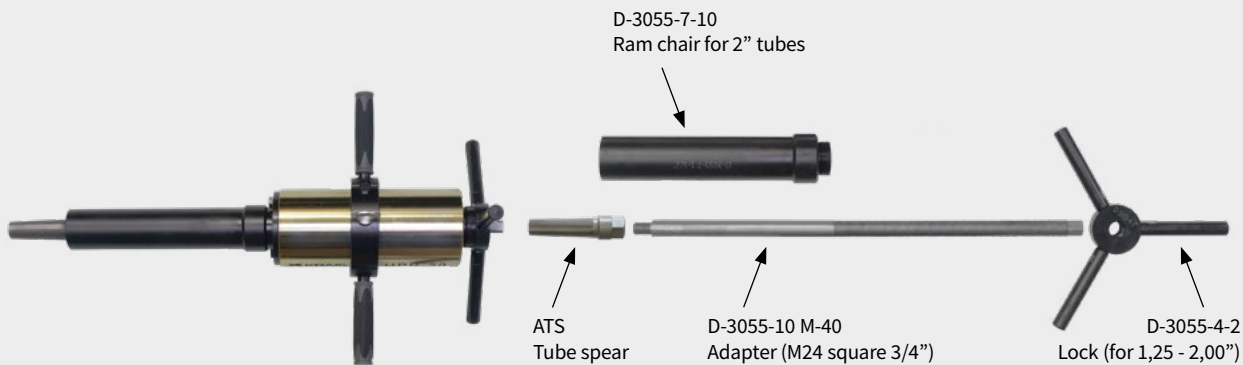
### D-3055-5 MALE X MALE ADAPTOR



### D-3055-4 HORSE SHOE LOCK D-3055-1 LOAD CAP



## HPR-30 Setup for stubs 1 1/4" and up

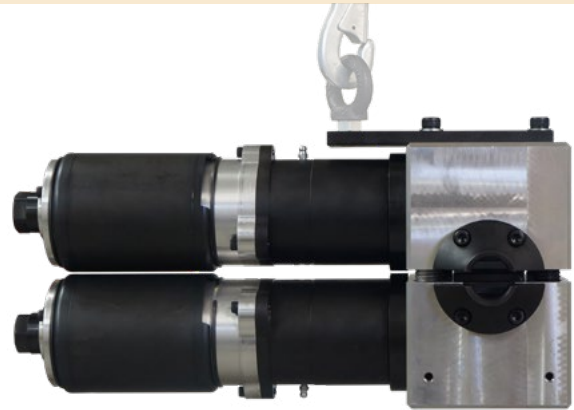


# Tube SpinAIR

Pneumatic tube spinner is designed to remove and flatten non ferrous tubes from 5/8" to 1 1/4" OD. Can also be used to extract ferrous tubes from 5/8" to 1 1/2" OD using special shaped rolls sized to fit each tube.

## SPINAIR FEATURES

- ▶ Pulling rolls are made from tool steel and hardened for extended life.
- ▶ High quality, strength construction body is made from aircraft grade aluminium and is anodized for high corrosion resistance.
- ▶ Nose piece and bearing caps are made from stainless steel for corrosion resistance
- ▶ Fully sealed bearings guarantee thousands of hours trouble free operation!



## SELECTION GUIDE

|                        | PULLING SPEED | TORQUE  |               | PULLING FORCE | AIR CONSUMPTION |            | AIR PRESSURE |        | MAX MOTOR POWER |
|------------------------|---------------|---------|---------------|---------------|-----------------|------------|--------------|--------|-----------------|
| <b>TUBE SPINAIR-12</b> | 12 m/min      | 1183 Nm | 872,25 Ft.Lbs | 2,50 Ton      | 2 x 2300 l/min  | 2 x 75 cfm | 6,2 bar      | 90 psi | 2 x 3,0 Hp      |
| <b>TUBE SPINAIR-20</b> | 20 m/min      | 886 Nm  | 653,48 Ft.Lbs | 1,80 Ton      | 2 x 2300 l/min  | 2 x 75 cfm | 6,2 bar      | 90 psi | 2 x 3,0 Hp      |
| <b>TUBE SPINAIR-40</b> | 40 m/min      | 960 Nm  | 708,06 Ft.Lbs | 1,95 Ton      | 2 x 2800 l/min  | 2 x 95 cfm | 6,2 bar      | 90 psi | 2 x 3,5 Hp      |

## TUBE SPINAIR HYDRAULIC



Hydraulic tube spinner SpinAir H is designed to perform the same tasks as the pneumatic version.

### SpinAir H specification

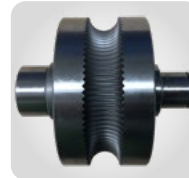
Pulling speed: up to 70 m per minute (depends on pump)  
 Standard configuration: 1" non ferrous tubes  
 Body construction: aircraft grade aluminium, tool steel stainless.  
 Weight: 50 kg  
 Size: 160 x 220 x 350 mm

### Pump Requirements

Min: 40 l/min at 2000 psi (gives approximately 30 m/min);  
 Max: 100 l/min at 2250 psi (gives approximately 70 m/min);  
 Forward and reverse oil flow.

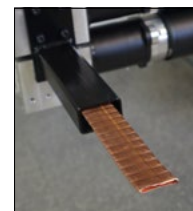
It is recommended that the pump should be controlled by pedant with a forward and reverse lever attached to the Tube Traveller head. Variable flow control preferred.

## SPHERICAL ROLLS



Optional, spherical rolls for tubes bigger than GA16.

## TUBE SPINAIR AT WORK



## HPP18E FLEX HYDRAULIC POWER PACK

Dimensions 805 x 625 x 704 mm  
 Weight 155 kg  
 Oil flow 20-30-40-46 LPM  
 Max pressure 160 bar

Motor  
 Type Hoyer HMA3 132M2  
 Power 13,2 kW (35A)  
 Voltage 3x400/480V, 50/60 Hz

Sound level L<sub>Wa</sub> 99 dB



# Pumps

Three pump choice with parameters of 700 bar (1000 psi) oil delivery at high pressure 0,9 to 1,1 l/min



**ELECTRIC 230 V WITH OIL COOLER**



**ELECTRIC 230 V STANDARD TYPE**



**PNEUMATIC 1,4 CU.M/MIN AT 6 BAR**

## PUMPS RECOMMENDATIONS

Above pumps are recommended for wide range of pullers



**CP-1200**



**CP-1200-CC**



**CP-1200-FF**



**HPR20-CP-1000**



**HPR-CP2000**



**Super-Jenny**



**HPR 12 and HPR-30**



A photograph of industrial machinery, likely a tube and pipe tool, featuring large red and blue cylindrical components and yellow pipes. The machinery is set in a workshop environment with metal shelving in the background.

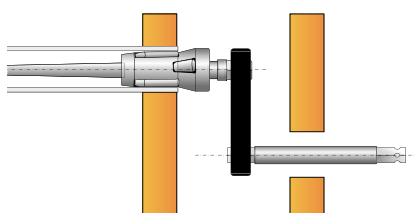
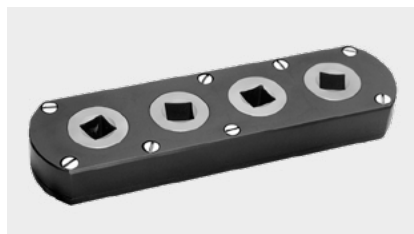
# Accessories

# Accessories

## PARALLEL GEAR DRIVE

**L=235 W=33 H=70 MM**

For use inside the header boxes where hand holes are not in line with tube centerline.

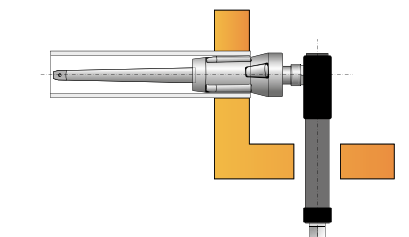


| SQUARE DRIVE |             | TOOL               |
|--------------|-------------|--------------------|
| [INCH]       | [MM]        |                    |
| 1/2" x 1/2"  | 12,7 x 12,7 | <b>P-Drive-127</b> |
| 3/4" x 3/4"  | 19,0 x 19,0 | <b>P-Drive-190</b> |
| 1" x 1"      | 25,4 x 25,4 | <b>P-Drive-254</b> |

## RIGHT ANGLE GEAR DRIVE

**L=292 W=45 H=98 MM**

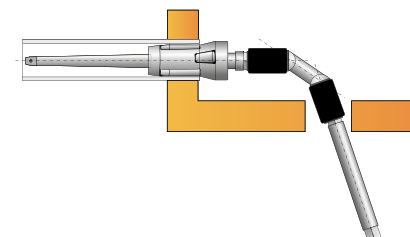
For use inside header boxes where handholds are at right angle to the tube centerline. For hand and power use.



| SQUARE DRIVE |             | TOOL                |
|--------------|-------------|---------------------|
| [INCH]       | [MM]        |                     |
| 1/2" x 1/2"  | 12,7 x 12,7 | <b>RA-Drive-127</b> |
| 3/4" x 3/4"  | 19 x 19     | <b>RA-Drive-190</b> |
| 3/4" x 1"    | 19 x 25,4   | <b>RA-Drive-254</b> |

## DOUBLE UNIVERSAL JOINT

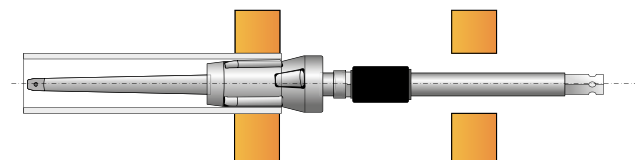
Double Universal Joint and Double Universal Joint with Quick Change Chuck.



| SQUARE DRIVE | TOOL               | CHUCK |
|--------------|--------------------|-------|
| 3/8"         | <b>DUJ-3/8</b>     | -     |
|              | <b>DUJ-3/8-QCC</b> | QCC   |
| 1/2"         | <b>DUJ-1/2</b>     | -     |
|              | <b>DUJ-1/2-QCC</b> | QCC   |
| 3/4"         | <b>DUJ-3/4</b>     | FxF   |
| 1"           | <b>DUJ-1</b>       | FxF   |

## EXTENSIONS

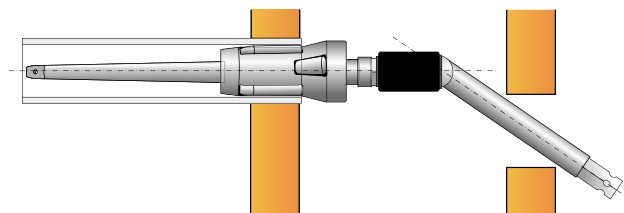
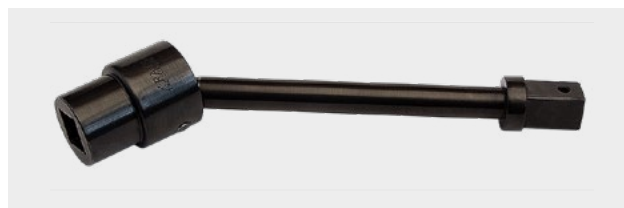
Extensions and extensions with Quick Change Chuck (QCC), single and double.



| SQUARE DRIVE<br>[INCH] | TOOL                | LENGTHS       |                    | QCC |
|------------------------|---------------------|---------------|--------------------|-----|
|                        |                     | [INCH]        | [MM]               |     |
| 3/8"                   | <b>Ext-3/8</b>      | 8; 12; 24; 36 | 200; 300; 600; 900 | -   |
|                        | <b>Ext-3/8-QCC</b>  | 8; 12; 24; 36 | 200; 300; 600; 900 | 1   |
|                        | <b>Ext-3/8-2QCC</b> | 8; 12; 24; 36 | 200; 300; 600; 900 | 2   |
| 1/2"                   | <b>Ext-1/2</b>      | 8; 12; 24; 36 | 200; 300; 600; 900 | -   |
|                        | <b>Ext-1/2-QCC</b>  | 8; 12; 24; 36 | 200; 300; 600; 900 | 1   |
|                        | <b>Ext-1/2-2QCC</b> | 8; 12; 24; 36 | 200; 300; 600; 900 | 2   |
| 3/4"                   | <b>Ext-3/4</b>      | 8; 12; 24; 36 | 200; 300; 600; 900 | -   |
| 1"                     | <b>Ext-1</b>        | 8; 12; 24; 36 | 200; 300; 600; 900 | -   |

## SINGLE UNIVERSAL JOINT

Single Universal Joint and Single Universal joint with Quick Change Chuck (QCC).

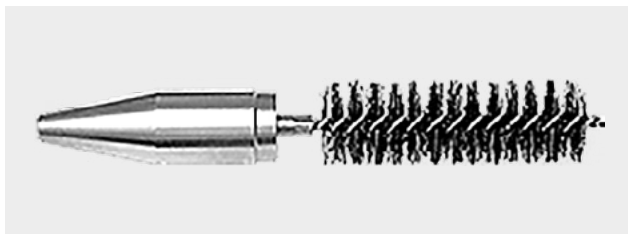


| SQUARE<br>[INCH] | TOOL               | AVAILABLE LENGTHS |                    | QCC |
|------------------|--------------------|-------------------|--------------------|-----|
|                  |                    | [INCH]            | [MM]               |     |
| 3/8              | <b>SUJ-3/8</b>     | 8; 12; 24; 36     | 200; 300; 600; 900 | -   |
|                  | <b>SUJ-3/8-QCC</b> | 8; 12; 24; 36     | 200; 300; 600; 900 | +   |
| 1/2              | <b>SUJ-1/2</b>     | 8; 12; 24; 36     | 200; 300; 600; 900 | -   |
|                  | <b>SUJ-1/2-QCC</b> | 8; 12; 24; 36     | 200; 300; 600; 900 | +   |
| 3/4              | <b>SUJ-3/4</b>     | 8; 12; 24         | 200; 300; 600      | -   |
| 1                | <b>SUJ-1</b>       | 8; 12; 24         | 200; 300; 600      | -   |

# Accessories

## TUBE GUIDE

The Tube Guide consist of a steel or aluminium or plastic tapered head and an replaceable nylon brush, and it's used to guide tubes through the sheets and the tube support plates during tube bundles assembling. The nylon brush fits in the tube end, holding pilot firmly in place.



| TUBE OD |       | TUBE GAUGE | TUBE GUIDE   |
|---------|-------|------------|--------------|
| [INCH]  | [MM]  |            |              |
| 1/2     | 12,7  | 16-18      | <b>TG-1</b>  |
|         |       | 19-20      | <b>TG-2</b>  |
|         |       | 21-23      | <b>TG-3</b>  |
| 5/8     | 15,88 | 12-13      | <b>TG-4</b>  |
|         |       | 14-16      | <b>TG-5</b>  |
|         |       | 17-20      | <b>TG-6</b>  |
|         |       | 22-24      | <b>TG-7</b>  |
| 3/4     | 19,05 | 10-12      | <b>TG-8</b>  |
|         |       | 13-16      | <b>TG-9</b>  |
|         |       | 17-20      | <b>TG-10</b> |
|         |       | 21-22      | <b>TG-11</b> |
| 7/8     | 22,2  | 10-12      | <b>TG-12</b> |
|         |       | 13-16      | <b>TG-13</b> |
|         |       | 17-20      | <b>TG-14</b> |
|         |       | 22-24      | <b>TG-15</b> |
| 1       | 25,4  | 8-9        | <b>TG-16</b> |
|         |       | 10-12      | <b>TG-17</b> |
|         |       | 13-16      | <b>TG-18</b> |
|         |       | 17-20      | <b>TG-19</b> |
|         |       | 21-23      | <b>TG-20</b> |
| 1-1/4   | 31,7  | 15.        | <b>TG-21</b> |
|         |       | 16-        | <b>TG-22</b> |
| 1-1/2   | 38,1  | 15.        | <b>TG-23</b> |
|         |       | 16-        | <b>TG-24</b> |

## MOTOR COUPLING

Motor coupling and Motor coupling with Quick Change Chuck (QCC)



| SQUARE | TOOL                 | LENGTH | QCC |
|--------|----------------------|--------|-----|
| 3/8    | <b>MT-2x3/8"</b>     | 2"     |     |
|        | <b>MT-2x3/8"-QCC</b> | 2"     | YES |
| 1/2    | <b>MT-2x1/2</b>      | 2"     |     |
|        | <b>MT-2x1/2"-QCC</b> | 2"     | YES |
| 3/8    | <b>MT-2x3/8"</b>     | 2"     |     |
| 1/2    | <b>MT-3x1/2"</b>     | 3"     |     |
| 3/4    | <b>MT-3x3/4"</b>     | 3"     |     |
| 1      | <b>MT-4x1"</b>       | 4"     |     |

## URH-1925 UNIVERSAL RATCHET HANDLE

Manual drive for tube expanders. One side 3/4" square drive, other side 1" square drive. Allows rotation transmitted by a ratched mechanism.



# Testing pumps

All testing pumps are delivered „ready for use” and equipped with:

- ▶ tank (Except PEM 30),
- ▶ pressure gauge,
- ▶ drain valve,
- ▶ flexible hose. 16” long. (3” for PEM 30 / 6” for PEM 40)

The seals used are made for usage with water, fluid oil or gas-oil.  
Please call us any other liquids.

## PEM HAND OPERATED PUMP



## LE-PTP ELECTRIC PUMP



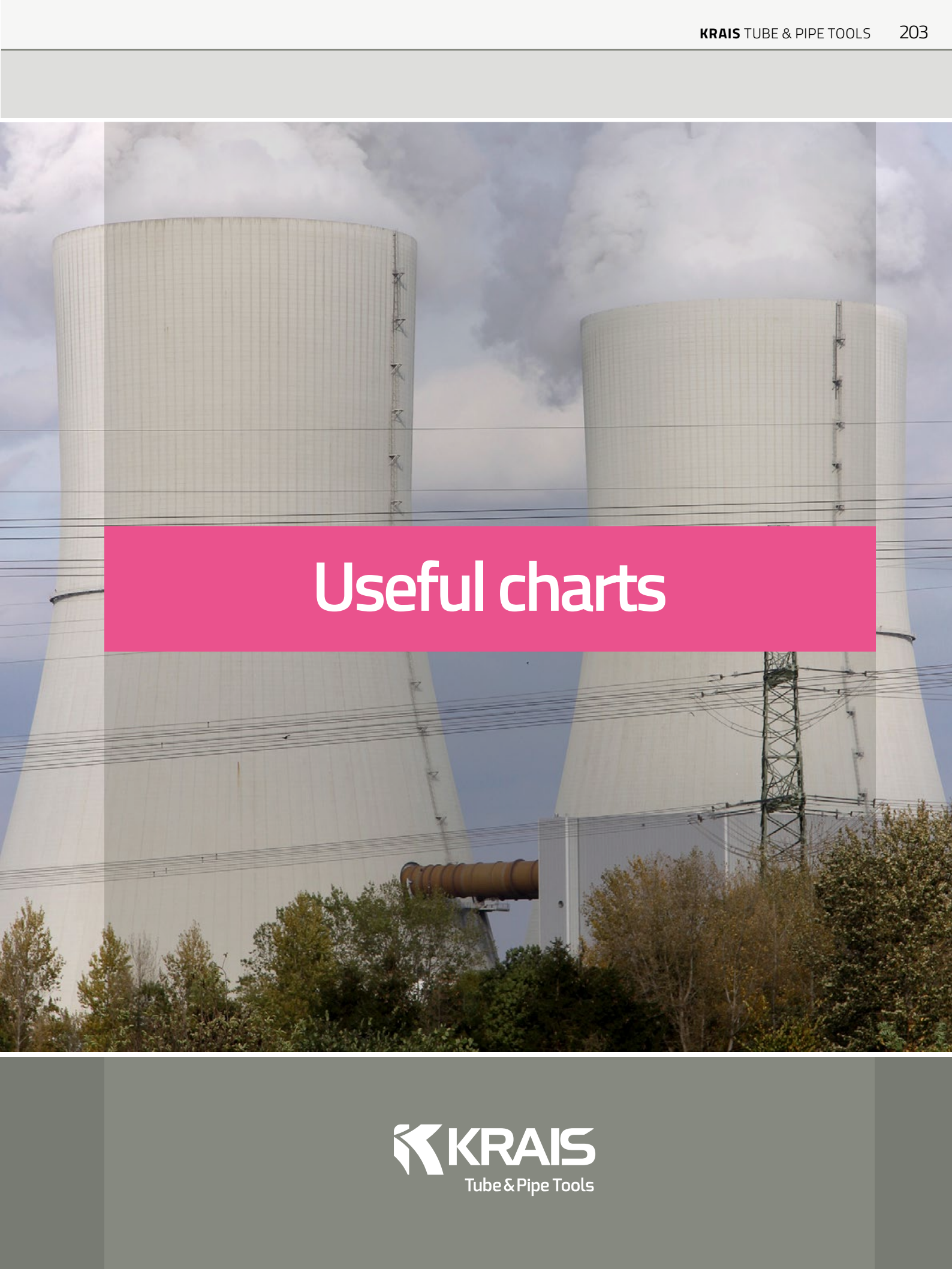
## PTP1201 PNEUMATIC PUMP



| MODEL      | DRIVEN    | SERVICE PRESSURE |        | DIAMETER | STROKE | VOLUME PER STROKE |                 | TANK CAPACITY |       | WEIGHT |       |
|------------|-----------|------------------|--------|----------|--------|-------------------|-----------------|---------------|-------|--------|-------|
|            |           | BAR              | PSI    | MM       | MM     | CM <sup>3</sup>   | IN <sup>3</sup> | LITRES        | U.S.G | KG     | LBS   |
| PEM 30     | Hand      | 30               | 400    | 14       | 400    | 61                | 3,7             | -             | -     | 4,2    | 9,3   |
| PEM 40     |           | 60               | 850    | 20       | 34     | 10                | 0,6             | 14            | 3,7   | 6,3    | 14    |
| PEM 50     |           | 50               | 700    | 30       | 40     | 28                | 1,7             | 45            | 11,9  | 13     | 29    |
| PEM 100    |           | 100              | 1400   | 22       | 40     | 15                | 0,9             | 45            | 11,9  | 13     | 29    |
| PEM 200    |           | 200              | 2800   | 50x16    | 40     | 78x8              | 48x0,5          | 45            | 11,9  | 18     | 40    |
| PEM 600    |           | 600              | 8500   | 32x12    | 40     | 32x4              | 2x0,25          | 60            | 15,9  | 35     | 77,8  |
| PEM 1000   |           | 1000             | 14000  | 32x8     | 40     | 32x2              | 2x0,12          | 60            | 15,9  | 35     | 77,8  |
| LE-PTP 180 | ELECTIRC  | 180              | 2548   | -        | -      | -                 | -               | 100           | 26,45 | 60     | 132,3 |
| PTP 1201   | PNEUMATIC | 720*             | 10200* | -        | -      | -                 | -               | 10            | 2,64  | 21     | 46,3  |

\* depends on air pressure





# Useful charts



THICKNESS OF WALL IN BIRMINGHAM WIRE GAGE AND IN DECIMAL INCHES

| TUBE  |      | 20    | 19    | 18    | 17    | 16    | 15    | 14    | 13    | 12    | 11    | 10    | 9     | 8     | 7     | 6     | 5     | 4     | 3     | 2     | 1     | 0     |
|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| O.D.  | I.D. | .035  | .042  | .049  | .058  | .065  | .072  | .083  | .095  | .109  | .120  | .134  | .148  | .165  | .180  | .203  | .220  | .238  | .259  | .284  | .300  | .340  |
| 1/2   | Min. | .422  | .408  | .392  | .373  | .357  | .342  | .318  | .291  | .260  | .236  |       |       |       |       |       |       |       |       |       |       |       |
|       | Nom. | .430  | .416  | .402  | .384  | .370  | .356  | .334  | .310  | .282  | .260  |       |       |       |       |       |       |       |       |       |       |       |
| 5/8   | Min. | .547  | .533  | .517  | .498  | .482  | .467  | .443  | .417  | .385  | .361  | .330  | .299  | .262  | .229  |       |       |       |       |       |       |       |
|       | Nom. | .555  | .541  | .527  | .509  | .495  | .481  | .459  | .435  | .407  | .385  | .357  | .329  | .295  | .265  |       |       |       |       |       |       |       |
| 3/4   | Min. | .672  | .658  | .642  | .623  | .607  | .592  | .568  | .542  | .510  | .486  | .455  | .424  | .387  | .354  | .303  | .266  | .226  | .180  |       |       |       |
|       | Nom. | .680  | .666  | .652  | .634  | .620  | .606  | .584  | .560  | .532  | .510  | .482  | .454  | .420  | .390  | .344  | .310  | .274  | .232  |       |       |       |
| 7/8   | Min. | .797  | .783  | .767  | .747  | .732  | .717  | .693  | .666  | .636  | .611  | .580  | .549  | .512  | .479  | .428  | .391  | .351  | .305  |       |       |       |
|       | Nom. | .805  | .791  | .777  | .759  | .745  | .731  | .709  | .685  | .657  | .635  | .607  | .579  | .545  | .515  | .469  | .435  | .399  | .357  |       |       |       |
| 1     | Min. | .922  | .908  | .892  | .873  | .857  | .842  | .818  | .791  | .761  | .736  | .706  | .675  | .637  | .604  | .553  | .516  | .476  | .430  | .375  | .340  | .252  |
|       | Nom. | .930  | .916  | .902  | .884  | .870  | .856  | .834  | .810  | .782  | .760  | .732  | .704  | .670  | .640  | .594  | .560  | .524  | .482  | .432  | .400  | .320  |
| 1-1/8 | Min. | 1.047 | 1.033 | 1.017 | .997  | .982  | .967  | .943  | .916  | .886  | .861  | .831  | .800  | .762  | .729  | .678  | .641  | .601  | .555  | .500  | .465  | .377  |
|       | Nom. | 1.055 | 1.041 | 1.027 | 1.009 | .995  | .981  | .959  | .935  | .907  | .885  | .857  | .829  | .795  | .765  | .719  | .685  | .649  | .607  | .557  | .525  | .445  |
| 1-1/4 | Min. | 1.172 | 1.158 | 1.142 | 1.122 | 1.107 | 1.092 | 1.068 | 1.041 | 1.011 | .986  | .956  | .925  | .887  | .854  | .803  | .766  | .726  | .680  | .625  | .590  | .502  |
|       | Nom. | 1.180 | 1.166 | 1.152 | 1.134 | 1.120 | 1.106 | 1.084 | 1.060 | 1.032 | .1010 | .982  | .954  | .920  | .890  | .844  | .810  | .774  | .732  | .682  | .650  | .570  |
| 1-3/8 | Min. | 1.297 | 1.283 | 1.267 | 1.247 | 1.232 | 1.217 | 1.192 | 1.166 | 1.136 | .111  | 1.081 | .049  | 1.012 | .979  | .928  | .891  | .851  | .805  | .750  | .715  | .627  |
|       | Nom. | 1.305 | 1.291 | 1.277 | 1.259 | 1.245 | 1.231 | 1.209 | 1.185 | 1.157 | 1.135 | 1.107 | .079  | 1.045 | 1.015 | .969  | .935  | .899  | .857  | .807  | .775  | .695  |
| 1-1/2 | Min. | 1.422 | 1.408 | 1.392 | 1.372 | 1.357 | 1.342 | 1.318 | 1.291 | 1.260 | 1.236 | 1.205 | 1.174 | 1.137 | 1.104 | 1.053 | 1.016 | .976  | .930  | .875  | .840  | .752  |
|       | Nom. | 1.430 | 1.426 | 1.402 | 1.384 | 1.370 | 1.356 | 1.334 | 1.310 | 1.282 | 1.260 | 1.232 | 1.204 | 1.170 | 1.140 | 1.094 | 1.060 | 1.024 | .982  | .932  | .900  | .820  |
| 1-3/4 | Min. | 1.672 | 1.658 | 1.642 | 1.622 | 1.607 | 1.592 | 1.568 | 1.541 | 1.510 | 1.486 | 1.455 | 1.424 | 1.387 | 1.354 | 1.303 | 1.266 | 1.226 | 1.180 | 1.125 | 1.090 | 1.002 |
|       | Nom. | 1.680 | 1.666 | 1.652 | 1.634 | 1.620 | 1.606 | 1.584 | 1.560 | 1.532 | 1.510 | 1.482 | 1.454 | 1.420 | 1.390 | 1.344 | 1.310 | 1.274 | 1.232 | 1.182 | 1.150 | 1.070 |
| 2     | Min. | 1.922 | 1.908 | 1.892 | 1.872 | 1.857 | 1.842 | 1.817 | 1.791 | 1.760 | 1.736 | 1.705 | 1.674 | 1.637 | 1.604 | 1.553 | 1.516 | 1.476 | 1.430 | 1.375 | 1.340 | 1.252 |
|       | Nom. | 1.930 | 1.916 | 1.902 | 1.884 | 1.870 | 1.856 | 1.834 | 1.810 | 1.782 | 1.760 | 1.732 | 1.704 | 1.670 | 1.640 | 1.594 | 1.560 | 1.524 | 1.482 | 1.432 | 1.400 | 1.320 |
| 2-1/4 | Min. | 2.172 | 2.158 | 2.142 | 2.122 | 2.107 | 2.092 | 2.067 | 2.041 | 2.010 | 1.986 | 1.955 | 1.924 | 1.887 | 1.854 | 1.803 | 1.766 | 1.726 | 1.680 | 1.625 | 1.590 | 1.502 |
|       | Nom. | 2.180 | 2.166 | 2.152 | 2.134 | 2.120 | 2.106 | 2.084 | 2.060 | 2.032 | 2.010 | 1.982 | 1.954 | 1.920 | 1.890 | 1.844 | 1.810 | 1.774 | 1.732 | 1.682 | 1.650 | 1.570 |
| 2-1/2 | Min. | 2.422 | 2.408 | 2.392 | 2.372 | 2.357 | 2.342 | 2.317 | 2.291 | 2.260 | 2.236 | 2.205 | 2.174 | 2.137 | 2.104 | 2.053 | 2.016 | 1.976 | 1.930 | 1.875 | 1.840 | 1.752 |
|       | Nom. | 2.430 | 2.416 | 2.402 | 2.384 | 2.370 | 2.356 | 2.334 | 2.310 | 2.282 | 2.260 | 2.232 | 2.204 | 2.170 | 2.140 | 2.094 | 2.060 | 2.024 | 1.982 | 1.932 | 1.900 | 1.820 |
| 2-3/4 | Min. | 2.672 | 2.658 | 2.642 | 2.622 | 2.607 | 2.592 | 2.567 | 2.541 | 2.510 | 2.486 | 2.455 | 2.424 | 2.387 | 2.354 | 2.303 | 2.266 | 2.226 | 2.180 | 2.125 | 2.090 | 2.002 |
|       | Nom. | 2.680 | 2.666 | 2.652 | 2.634 | 2.620 | 2.606 | 2.584 | 2.560 | 2.532 | 2.510 | 2.482 | 2.454 | 2.420 | 2.390 | 2.344 | 2.310 | 2.274 | 2.232 | 2.182 | 2.150 | 2.070 |
| 3     | Min. | 2.922 | 2.908 | 2.892 | 2.872 | 2.857 | 2.842 | 2.817 | 2.791 | 2.760 | 2.736 | 2.705 | 2.674 | 2.636 | 2.604 | 2.553 | 2.516 | 2.476 | 2.430 | 2.375 | 2.340 | 2.252 |
|       | Nom. | 2.930 | 2.916 | 2.902 | 2.884 | 2.870 | 2.856 | 2.834 | 2.810 | 2.782 | 2.760 | 2.732 | 2.704 | 2.670 | 2.640 | 2.594 | 2.560 | 2.524 | 2.482 | 2.432 | 2.400 | 2.320 |
| 3-1/4 | Min. | 3.172 | 3.158 | 3.142 | 3.122 | 3.107 | 3.092 | 3.067 | 3.041 | 3.010 | 2.986 | 2.955 | 2.924 | 2.887 | 2.854 | 2.803 | 2.766 | 2.726 | 2.680 | 2.625 | 2.590 | 2.502 |
|       | Nom. | 3.180 | 3.166 | 3.152 | 3.134 | 3.120 | 3.106 | 3.084 | 3.060 | 3.032 | 3.010 | 2.982 | 2.954 | 2.920 | 2.890 | 2.844 | 2.810 | 2.774 | 2.732 | 2.682 | 2.650 | 2.570 |
| 3-1/2 | Min. | 3.422 | 3.408 | 3.392 | 3.372 | 3.357 | 3.342 | 3.317 | 3.291 | 3.260 | 3.236 | 3.205 | 3.174 | 3.137 | 3.104 | 3.053 | 3.016 | 2.976 | 2.930 | 2.875 | 2.840 | 2.752 |
|       | Nom. | 3.430 | 3.416 | 3.402 | 3.384 | 3.370 | 3.356 | 3.334 | 3.310 | 3.282 | 3.260 | 3.232 | 3.204 | 3.170 | 3.140 | 3.094 | 3.060 | 3.024 | 2.982 | 2.932 | 2.900 | 2.820 |
| 3-3/4 | Min. | 3.672 | 3.658 | 3.642 | 3.622 | 3.607 | 3.592 | 3.567 | 3.541 | 3.510 | 3.486 | 3.455 | 3.424 | 3.387 | 3.354 | 3.303 | 3.266 | 3.226 | 3.180 | 3.125 | 3.090 | 3.002 |
|       | Nom. | 3.680 | 3.666 | 3.652 | 3.634 | 3.620 | 3.606 | 3.584 | 3.560 | 3.532 | 3.510 | 3.482 | 3.454 | 3.420 | 3.390 | 3.344 | 3.310 | 3.274 | 3.232 | 3.182 | 3.150 | 3.070 |
| 4     | Min. | 3.922 | 3.908 | 3.892 | 3.872 | 3.857 | 3.842 | 3.817 | 3.791 | 3.760 | 3.736 | 3.705 | 3.674 | 3.637 | 3.604 | 3.553 | 3.516 | 3.476 | 3.430 | 3.375 | 3.340 | 3.252 |
|       | Nom. | 3.930 | 3.916 | 3.902 | 3.884 | 3.870 | 3.856 | 3.834 | 3.810 | 3.782 | 3.760 | 3.732 | 3.704 | 3.670 | 3.640 | 3.594 | 3.560 | 3.524 | 3.482 | 3.432 | 3.400 | 3.320 |
| 4-1/2 | Min. | 4.422 | 4.408 | 4.392 | 4.372 | 4.357 | 4.342 | 4.317 | 4.291 | 4.260 | 4.236 | 4.205 | 4.174 | 4.137 | 4.104 | 4.053 | 4.016 | 3.976 | 3.930 | 3.875 | 3.840 | 3.752 |
|       | Nom. | 4.430 | 4.416 | 4.402 | 4.384 | 4.370 | 4.356 | 4.334 | 4.310 | 4.282 | 4.260 | 4.232 | 4.204 | 4.170 | 4.140 | 4.094 | 4.060 | 4.024 | 3.982 | 3.932 | 3.900 | 3.820 |
| 5     | Min. | 4.922 | 4.908 | 4.892 | 4.872 | 4.857 | 4.842 | 4.817 | 4.791 | 4.760 | 4.736 | 4.705 | 4.674 | 4.637 | 4.604 | 4.553 | 4.516 | 4.476 | 4.430 | 4.375 | 4.340 | 4.252 |
|       | Nom. | 4.930 | 4.916 | 4.902 | 4.884 | 4.870 | 4.856 | 4.834 | 4.810 | 4.782 | 4.780 | 4.732 | 4.704 | 4.670 | 4.640 | 4.594 | 4.560 | 4.524 | 4.482 | 4.432 | 4.400 | 4.320 |

ADDITIONAL BIRMINGHAM WIRE GAGES

| NUMBER  | 36   | 35   | 34   | 33   | 32   | 31   | 30   | 29   | 28   | 27   | 26   | 25   | 24   | 23   | 22   | 21   | 00   | 000  | 0000 | 00000 |
|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|
| DECIMAL | .004 | .005 | .007 | .008 | .009 | .010 | .012 | .013 | .014 | .016 | .018 | .020 | .022 | .025 | .028 | .032 | .380 | .425 | .454 | .500  |

**THICKNESS OF WALL IN BIRMINGHAM WIRE GAGE IN MILLIMETERS**

| TUBE  |      | 20    | 19    | 18    | 17    | 16    | 15    | 14    | 13    | 12    | 11    | 10    | 9     | 8     | 7     | 6     | 5     | 4     | 3     | 2     | 1     | 0     |
|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| O.D.  | I.D. | .9    | 1.1   | 1.2   | 1.5   | 1.7   | 1.8   | 2.1   | 2.4   | 2.8   | 3.0   | 3.4   | 3.8   | 4.2   | 4.6   | 5.2   | 5.6   | 6.0   | 6.6   | 7.2   | 7.6   | 8.6   |
| 127   | Min. | 10.7  | 10.4  | 10.0  | 9.5   | 9.1   | 8.7   | 8.1   | 7.4   | 6.6   | 6.0   |       |       |       |       |       |       |       |       |       |       |       |
|       | Nom. | 10.9  | 10.6  | 10.2  | 9.8   | 9.4   | 9.0   | 8.5   | 7.9   | 7.2   | 6.6   |       |       |       |       |       |       |       |       |       |       |       |
| 159   | Min. | 13.9  | 13.5  | 13.1  | 12.6  | 12.2  | 11.9  | 11.3  | 10.6  | 9.8   | 9.2   | 8.4   | 7.6   | 6.7   | 5.8   |       |       |       |       |       |       |       |
|       | Nom. | 14.1  | 13.7  | 13.4  | 12.9  | 12.6  | 12.2  | 11.7  | 11.0  | 10.3  | 9.8   | 9.1   | 8.4   | 7.5   | 6.7   |       |       |       |       |       |       |       |
| 191   | Min. | 17.1  | 16.7  | 16.3  | 15.8  | 15.4  | 15.0  | 14.4  | 13.8  | 13.0  | 12.3  | 11.6  | 10.8  | 9.8   | 9.0   | 7.7   | 6.8   | 5.7   | 4.6   |       |       |       |
|       | Nom. | 17.3  | 16.9  | 16.6  | 16.1  | 15.7  | 15.4  | 14.8  | 14.2  | 13.5  | 13.0  | 12.2  | 11.5  | 10.7  | 9.9   | 8.7   | 7.9   | 7.0   | 5.9   |       |       |       |
| 222   | Min. | 20.2  | 19.9  | 19.5  | 19.0  | 18.6  | 18.2  | 17.6  | 16.9  | 16.2  | 15.5  | 14.7  | 13.9  | 13.0  | 12.2  | 10.9  | 9.9   | 8.9   | 7.7   |       |       |       |
|       | Nom. | 20.4  | 20.1  | 19.7  | 19.3  | 18.9  | 18.6  | 18.0  | 17.4  | 16.7  | 16.1  | 15.4  | 14.7  | 13.8  | 13.1  | 11.9  | 11.0  | 10.1  | 9.1   |       |       |       |
| 254   | Min. | 23.4  | 23.1  | 22.7  | 22.2  | 21.8  | 21.4  | 20.8  | 20.1  | 19.3  | 18.7  | 17.9  | 17.1  | 16.2  | 15.3  | 14.0  | 13.1  | 12.1  | 10.9  | 9.5   | 8.6   | 6.4   |
|       | Nom. | 23.6  | 23.3  | 22.9  | 22.5  | 22.1  | 21.7  | 21.2  | 20.6  | 19.9  | 19.3  | 18.6  | 17.9  | 17.0  | 16.3  | 15.1  | 14.2  | 13.3  | 12.2  | 11.0  | 10.2  | 8.1   |
| 286   | Min. | 26.6  | 26.2  | 25.8  | 25.3  | 24.9  | 24.6  | 24.0  | 23.3  | 22.5  | 21.9  | 21.1  | 20.3  | 19.4  | 18.5  | 17.2  | 16.3  | 15.3  | 14.1  | 12.7  | 11.8  | 9.6   |
|       | Nom. | 26.8  | 26.4  | 26.1  | 25.6  | 25.3  | 24.9  | 24.4  | 23.7  | 23.0  | 22.5  | 21.8  | 21.1  | 20.2  | 19.4  | 18.3  | 17.4  | 16.5  | 15.4  | 14.1  | 13.3  | 11.3  |
| 318   | Min. | 29.8  | 29.4  | 29.0  | 28.5  | 28.1  | 27.7  | 27.1  | 26.4  | 25.7  | 25.0  | 24.3  | 23.5  | 22.5  | 21.7  | 20.4  | 19.5  | 18.4  | 17.3  | 15.9  | 15.0  | 12.8  |
|       | Nom. | 30.0  | 29.6  | 29.3  | 28.8  | 28.4  | 28.1  | 27.5  | 26.9  | 26.2  | 25.7  | 24.9  | 24.2  | 23.4  | 22.6  | 21.4  | 20.6  | 19.7  | 18.6  | 17.3  | 16.5  | 14.5  |
| 349   | Min. | 32.9  | 32.6  | 32.2  | 31.7  | 31.3  | 30.9  | 30.3  | 29.6  | 28.9  | 28.2  | 27.5  | 26.6  | 25.7  | 24.9  | 23.6  | 22.6  | 21.6  | 20.4  | 19.1  | 18.2  | 15.9  |
|       | Nom. | 33.1  | 32.8  | 32.4  | 32.0  | 31.6  | 31.3  | 30.7  | 30.1  | 29.4  | 28.8  | 28.1  | 27.4  | 26.5  | 25.8  | 24.6  | 23.7  | 22.8  | 21.8  | 20.5  | 19.7  | 17.7  |
| 381   | Min. | 36.1  | 35.8  | 35.4  | 34.8  | 34.5  | 34.1  | 33.5  | 32.8  | 32.0  | 31.4  | 30.6  | 29.8  | 28.9  | 28.0  | 26.7  | 25.8  | 24.8  | 23.6  | 22.2  | 21.3  | 19.1  |
|       | Nom. | 36.3  | 36.2  | 35.6  | 35.2  | 34.8  | 34.4  | 33.9  | 33.3  | 32.6  | 32.0  | 31.3  | 30.6  | 29.7  | 29.0  | 27.8  | 26.9  | 26.0  | 24.9  | 23.7  | 22.9  | 20.8  |
| 44.5  | Min. | 42.5  | 42.1  | 41.7  | 41.2  | 40.8  | 40.4  | 39.8  | 39.1  | 38.4  | 37.7  | 37.0  | 36.2  | 35.2  | 34.4  | 33.1  | 32.2  | 31.1  | 30.0  | 28.6  | 27.7  | 25.5  |
|       | Nom. | 42.7  | 42.3  | 42.0  | 41.5  | 41.1  | 40.8  | 40.2  | 39.6  | 38.9  | 38.4  | 37.6  | 36.9  | 36.1  | 35.3  | 34.1  | 33.3  | 32.4  | 31.3  | 30.0  | 29.2  | 27.2  |
| 50.8  | Min. | 48.8  | 48.5  | 48.1  | 47.5  | 47.2  | 46.8  | 46.2  | 45.5  | 44.7  | 44.1  | 43.3  | 42.5  | 41.6  | 40.7  | 39.4  | 38.5  | 37.5  | 36.3  | 34.9  | 34.0  | 31.8  |
|       | Nom. | 49.0  | 48.7  | 48.3  | 47.9  | 47.5  | 47.1  | 46.6  | 46.0  | 45.3  | 44.7  | 44.0  | 43.3  | 42.4  | 41.7  | 40.5  | 39.6  | 38.7  | 37.6  | 36.4  | 35.6  | 33.5  |
| 57.2  | Min. | 55.2  | 54.8  | 54.4  | 53.9  | 53.5  | 53.1  | 52.5  | 51.8  | 51.1  | 50.4  | 49.7  | 48.9  | 47.9  | 47.1  | 45.8  | 44.9  | 43.8  | 42.7  | 41.3  | 40.4  | 38.2  |
|       | Nom. | 55.4  | 55.0  | 54.7  | 54.2  | 53.8  | 53.5  | 52.9  | 52.3  | 51.6  | 51.1  | 50.3  | 49.6  | 48.8  | 48.0  | 46.8  | 46.0  | 45.1  | 44.0  | 42.7  | 41.9  | 39.9  |
| 63.5  | Min. | 61.5  | 61.2  | 60.8  | 60.2  | 59.9  | 59.5  | 58.9  | 58.2  | 57.4  | 56.8  | 56.0  | 55.2  | 54.3  | 53.4  | 52.1  | 51.2  | 50.2  | 49.0  | 47.6  | 46.7  | 44.5  |
|       | Nom. | 61.7  | 61.4  | 61.0  | 60.6  | 60.2  | 59.8  | 59.3  | 58.7  | 58.0  | 57.4  | 56.7  | 56.0  | 55.1  | 54.4  | 53.2  | 52.3  | 51.4  | 50.3  | 49.1  | 48.3  | 46.2  |
| 69.9  | Min. | 67.9  | 67.5  | 67.1  | 66.6  | 66.2  | 65.8  | 65.2  | 64.5  | 63.8  | 63.1  | 62.4  | 61.6  | 60.6  | 59.8  | 58.5  | 57.6  | 56.5  | 55.4  | 54.0  | 53.1  | 50.9  |
|       | Nom. | 68.1  | 67.7  | 67.4  | 66.9  | 66.5  | 66.2  | 65.6  | 65.0  | 64.3  | 63.8  | 63.0  | 62.3  | 61.5  | 60.7  | 59.5  | 58.7  | 57.8  | 56.7  | 55.4  | 54.6  | 52.6  |
| 76.2  | Min. | 74.2  | 73.9  | 73.5  | 72.9  | 72.6  | 72.2  | 71.6  | 70.9  | 70.1  | 69.5  | 68.7  | 67.9  | 67.0  | 66.1  | 64.8  | 63.9  | 62.9  | 61.7  | 60.3  | 59.4  | 57.2  |
|       | Nom. | 74.4  | 74.1  | 73.7  | 73.3  | 72.9  | 72.5  | 72.0  | 71.4  | 70.7  | 70.1  | 69.4  | 68.7  | 67.8  | 67.1  | 65.9  | 65.0  | 64.1  | 63.0  | 61.8  | 61.0  | 58.9  |
| 82.6  | Min. | 80.6  | 80.2  | 79.8  | 79.3  | 78.9  | 78.5  | 77.9  | 77.2  | 76.5  | 75.8  | 75.1  | 74.3  | 73.3  | 72.5  | 71.2  | 70.3  | 69.2  | 68.1  | 66.7  | 65.8  | 63.6  |
|       | Nom. | 80.8  | 80.4  | 80.1  | 79.6  | 79.2  | 78.9  | 78.3  | 77.7  | 77.0  | 76.5  | 75.7  | 75.0  | 74.2  | 73.4  | 72.2  | 71.4  | 70.5  | 69.4  | 68.1  | 67.3  | 65.3  |
| 88.9  | Min. | 86.9  | 86.6  | 86.2  | 85.6  | 85.3  | 84.9  | 84.3  | 83.6  | 82.8  | 82.2  | 81.4  | 80.6  | 79.7  | 78.8  | 77.5  | 76.6  | 75.6  | 74.4  | 73.0  | 72.1  | 69.9  |
|       | Nom. | 87.1  | 86.8  | 86.4  | 86.0  | 85.6  | 85.2  | 84.7  | 84.1  | 83.4  | 82.8  | 82.1  | 81.4  | 80.5  | 79.8  | 78.6  | 77.7  | 76.8  | 75.7  | 74.5  | 73.7  | 71.6  |
| 95.3  | Min. | 93.3  | 92.9  | 92.5  | 92.0  | 91.6  | 91.2  | 90.6  | 89.9  | 89.2  | 88.5  | 87.8  | 87.0  | 86.0  | 85.2  | 83.9  | 83.0  | 81.9  | 80.8  | 79.4  | 78.5  | 76.3  |
|       | Nom. | 93.5  | 93.1  | 92.8  | 92.3  | 91.9  | 91.6  | 91.0  | 90.4  | 89.7  | 89.2  | 88.4  | 87.7  | 86.9  | 86.1  | 84.9  | 84.1  | 83.2  | 82.1  | 80.8  | 80.0  | 78.0  |
| 101.6 | Min. | 99.6  | 99.3  | 98.9  | 98.3  | 98.0  | 97.6  | 97.0  | 96.3  | 95.5  | 94.9  | 94.1  | 93.3  | 92.4  | 91.5  | 90.2  | 89.3  | 88.3  | 87.1  | 85.7  | 84.8  | 82.6  |
|       | Nom. | 99.8  | 99.5  | 99.1  | 98.7  | 98.3  | 97.9  | 97.4  | 96.8  | 96.1  | 95.5  | 94.8  | 94.1  | 93.2  | 92.5  | 91.3  | 90.4  | 89.5  | 88.4  | 87.2  | 86.4  | 84.3  |
| 114.3 | Min. | 112.3 | 112.0 | 111.6 | 111.0 | 110.7 | 110.3 | 109.7 | 109.0 | 108.2 | 107.6 | 106.8 | 106.0 | 105.1 | 104.2 | 102.9 | 102.0 | 101.0 | 99.8  | 98.4  | 97.5  | 95.3  |
|       | Nom. | 112.5 | 112.2 | 111.8 | 111.4 | 111.0 | 110.6 | 110.1 | 109.5 | 108.8 | 108.2 | 107.5 | 106.8 | 105.9 | 105.2 | 104.0 | 103.1 | 102.2 | 101.1 | 99.9  | 99.1  | 97.0  |
| 127.3 | Min. | 125.0 | 124.7 | 124.3 | 123.7 | 123.4 | 123.0 | 122.4 | 121.7 | 120.9 | 120.3 | 119.5 | 118.7 | 117.8 | 116.9 | 115.6 | 114.7 | 113.7 | 112.5 | 111.1 | 110.2 | 108.0 |
|       | Nom. | 125.2 | 124.9 | 124.5 | 124.1 | 123.7 | 123.3 | 122.8 | 122.2 | 121.5 | 120.9 | 120.2 | 119.5 | 118.6 | 117.9 | 116.7 | 115.8 | 114.9 | 113.8 | 112.6 | 111.8 | 109.7 |

**ADDITIONAL BIRMINGHAM WIRE GAGES**

| NUMBER | 36 | 35 | 34 | 33 | 32 | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 00  | 000  | 0000 | 00000 |
|--------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|------|------|-------|
| MM     | .1 | .1 | .2 | .2 | .2 | .3 | .3 | .3 | .4 | .4 | .5 | .5 | .6 | .6 | .7 | .8 | 9.7 | 10.8 | 11.5 | 12.7  |

Pipe Chart [inch]

| SIZE  | OUTER DIAMETER |                 | SCHEDULE 5 | SCHEDULE 10 | SCHEDULE 20 | SCHEDULE 30 | SCHEDULE 40 | STANDARD | SCHEDULE 60 | SCHEDULE 80 | X-HEAVY | SCHEDULE 100 | SCHEDULE 120 | SCHEDULE 140 | SCHEDULE 160 | XX-HEAVY |
|-------|----------------|-----------------|------------|-------------|-------------|-------------|-------------|----------|-------------|-------------|---------|--------------|--------------|--------------|--------------|----------|
| 1/8   | 0,405          | Wall thickness  | 0,035      | 0,049       |             |             | 0,068       | 0,068    |             | 0,095       | 0,095   |              |              |              |              |          |
|       |                | Inside diameter | 0,335      |             |             |             | 0,269       | 0,269    |             | 0,215       | 0,215   |              |              |              |              |          |
| 1/4   | 0,540          | Wall thickness  | 0,049      | 0,065       |             |             | 0,088       | 0,088    |             | 0,119       | 0,119   |              |              |              |              |          |
|       |                | Inside diameter | 0,442      | 0,410       |             |             | 0,364       | 0,364    |             | 0,302       | 0,302   |              |              |              |              |          |
| 3/8   | 0,675          | Wall thickness  | 0,049      | 0,065       |             |             | 0,091       | 0,091    |             | 0,126       | 0,126   |              |              |              |              |          |
|       |                | Inside diameter | 0,577      | 0,545       |             |             | 0,493       | 0,493    |             | 0,423       | 0,423   |              |              |              |              |          |
| 1/2   | 0,840          | Wall thickness  | 0,065      | 0,083       |             |             | 0,109       | 0,109    |             | 0,147       | 0,147   |              |              |              | 0,187        | 0,294    |
|       |                | Inside diameter | 0,710      | 0,674       |             |             | 0,622       | 0,622    |             | 0,546       | 0,546   |              |              |              | 0,466        | 0,442    |
| 3/4   | 1,050          | Wall thickness  | 0,065      | 0,083       |             |             | 0,113       | 0,113    |             | 0,154       | 0,154   |              |              |              | 0,218        | 0,308    |
|       |                | Inside diameter | 0,920      | 0,884       |             |             | 0,824       | 0,824    |             | 0,742       | 0,742   |              |              |              | 0,614        | 0,434    |
| 1     | 1,315          | Wall thickness  | 0,065      | 0,190       |             |             | 0,133       | 0,133    |             | 0,179       | 0,179   |              |              |              | 0,250        | 0,358    |
|       |                | Inside diameter | 1,185      | 0,935       |             |             | 1,049       | 1,049    |             | 0,957       | 0,957   |              |              |              | 0,815        | 0,599    |
| 1 1/4 | 1,660          | Wall thickness  | 0,065      | 0,109       |             |             | 0,140       | 0,140    |             | 0,191       | 0,191   |              |              |              | 0,250        | 0,382    |
|       |                | Inside diameter | 1,530      | 1,442       |             |             | 1,380       | 1,380    |             | 1,278       | 1,278   |              |              |              | 1,160        | 0,896    |
| 1 1/2 | 1,900          | Wall thickness  | 0,065      | 0,109       |             |             | 0,145       | 0,145    |             | 0,200       | 0,200   |              |              |              | 0,281        | 0,400    |
|       |                | Inside diameter | 1,770      | 1,682       |             |             | 1,610       | 1,610    |             | 1,500       | 1,500   |              |              |              | 1,338        | 1,100    |
| 2     | 2,375          | Wall thickness  | 0,065      | 0,109       |             |             | 0,154       | 0,154    |             | 0,218       | 0,218   |              |              |              | 0,343        | 0,436    |
|       |                | Inside diameter | 2,245      | 2,157       |             |             | 2,067       | 2,067    |             | 1,939       | 1,939   |              |              |              | 1,689        | 1,503    |
| 2 1/2 | 2,875          | Wall thickness  | 0,083      | 0,120       |             |             | 0,203       | 0,203    |             | 0,276       | 0,276   |              |              |              | 0,375        | 0,552    |
|       |                | Inside diameter | 2,709      | 2,635       |             |             | 2,469       | 2,469    |             | 2,323       | 2,323   |              |              |              | 2,125        | 1,771    |
| 3     | 3,500          | Wall thickness  | 0,083      | 0,120       |             |             | 0,216       | 0,216    |             | 0,300       | 0,300   |              |              |              | 0,437        | 0,600    |
|       |                | Inside diameter | 3,334      | 3,260       |             |             | 3,068       | 3,068    |             | 2,900       | 2,900   |              |              |              | 2,626        | 2,300    |
| 3 1/2 | 4,000          | Wall thickness  | 0,083      | 0,120       |             |             | 0,226       | 0,226    |             | 0,318       | 0,318   |              |              |              |              | 0,636    |
|       |                | Inside diameter | 3,834      | 3,760       |             |             | 3,548       | 3,548    |             | 3,364       | 3,364   |              |              |              |              | 2,728    |
| 4     | 4,500          | Wall thickness  | 0,083      | 0,120       |             |             | 0,237       | 0,237    | 0,281       | 0,337       | 0,337   |              | 0,437        |              | 0,531        | 0,674    |
|       |                | Inside diameter | 4,334      | 4,260       |             |             | 4,026       | 4,026    | 3,938       | 3,826       | 3,826   |              | 3,626        |              | 3,438        | 3,152    |
| 4 1/2 | 5,000          | Wall thickness  |            |             |             |             |             | 0,247    |             |             | 0,355   |              |              |              |              | 0,710    |
|       |                | Inside diameter |            |             |             |             |             | 4,506    |             |             | 4,290   |              |              |              |              | 3,580    |
| 5     | 5,563          | Wall thickness  | 0,109      | 0,134       |             |             | 0,258       | 0,258    |             | 0,375       | 0,375   |              | 0,500        |              | 0,625        | 0,750    |
|       |                | Inside diameter | 5,345      | 5,295       |             |             | 5,047       | 5,047    |             | 4,813       | 4,813   |              |              |              | 4,313        | 4,063    |
| 6     | 6,625          | Wall thickness  | 0,109      | 0,134       |             |             | 0,280       | 0,280    |             | 0,432       | 0,432   |              | 0,562        |              | 0,718        | 0,864    |
|       |                | Inside diameter | 6,407      | 6,357       |             |             | 6,065       | 6,065    |             | 5,761       | 5,761   |              |              |              | 5,189        | 4,897    |
| 7     | 7,625          | Wall thickness  |            |             |             |             |             | 0,301    |             |             | 0,500   |              |              |              |              | 0,875    |
|       |                | Inside diameter |            |             |             |             |             | 7,023    |             |             | 6,625   |              |              |              |              | 5,875    |
| 8     | 8,625          | Wall thickness  | 0,109      | 0,148       | 0,250       | 0,277       | 0,322       | 0,322    | 0,406       | 0,500       | 0,500   | 0,593        | 0,718        | 0,812        | 0,906        | 0,875    |
|       |                | Inside diameter | 8,407      | 8,329       | 8,125       | 8,071       | 7,981       | 7,981    | 7,813       | 7,625       | 7,625   | 7,439        | 7,189        | 7,001        | 6,813        | 6,875    |
| 9     | 9,625          | Wall thickness  |            |             |             |             |             | 0,342    |             |             | 0,500   |              |              |              |              |          |
|       |                | Inside diameter |            |             |             |             |             | 8,941    |             |             | 8,625   |              |              |              |              |          |
| 10    | 10,750         | Wall thickness  | 0,134      | 0,165       | 0,250       | 0,307       | 0,365       | 0,365    | 0,500       | 0,593       | 0,500   | 0,718        | 0,843        | 1,000        | 1,125        |          |
|       |                | Inside diameter | 10,482     | 10,420      | 10,250      | 10,136      | 10,020      | 10,020   | 9,750       | 9,564       | 9,750   | 9,314        | 9,064        | 8,750        | 8,500        |          |
| 11    | 11,750         | Wall thickness  |            |             |             |             |             | 0,375    |             |             | 0,500   |              |              |              |              |          |
|       |                | Inside diameter |            |             |             |             |             | 11,000   |             |             | 10,750  |              |              |              |              |          |
| 12    | 12,750         | Wall thickness  | 0,156      | 0,180       | 0,250       | 0,330       | 0,406       | 0,375    | 0,562       | 0,687       | 0,500   | 0,843        | 1,000        | 1,125        | 1,312        |          |
|       |                | Inside diameter | 12,438     | 12,390      | 12,250      | 12,090      | 11,938      | 12,000   | 11,626      | 11,376      | 11,750  | 11,064       | 10,750       | 10,500       | 10,126       |          |
| 14    | 14,000         | Wall thickness  | 0,156      | 0,250       | 0,312       | 0,375       | 0,437       | 0,375    | 0,593       | 0,750       | 0,500   | 0,937        | 1,0930       | 1,250        | 1,406        |          |
|       |                | Inside diameter | 13,688     | 13,500      | 13,376      | 13,250      | 13,126      | 13,250   | 12,814      | 12,500      | 13,000  | 12,126       | -7,860       | 11,500       | 11,188       |          |
| 16    | 16,000         | Wall thickness  | 0,165      | 0,250       | 0,312       | 0,375       | 0,500       | 0,375    | 0,656       | 0,843       | 0,500   | 1,031        | 1,218        | 1,437        | 1,593        |          |
|       |                | Inside diameter | 15,670     | 15,500      | 15,376      | 15,250      | 15,000      | 15,250   | 14,688      | 14,314      | 15,000  | 13,938       | 13,564       | 13,126       | 12,814       |          |
| 18    | 18,000         | Wall thickness  | 0,165      | 0,250       | 0,312       | 0,437       | 0,562       | 0,375    | 0,750       | 0,937       | 0,500   | 1,156        | 1,375        | 1,562        | 1,781        |          |
|       |                | Inside diameter | 17,670     | 17,500      | 17,376      | 17,126      | 16,876      | 17,250   | 16,500      | 16,126      | 17,000  | 15,688       | 15,250       | 14,876       | 14,438       |          |
| 20    | 20,000         | Wall thickness  | 0,188      | 0,250       | 0,375       | 0,500       | 0,593       | 0,375    | 0,812       | 1,031       | 0,500   | 1,280        | 1,500        | 1,750        | 1,968        |          |
|       |                | Inside diameter | 19,624     | 19,500      | 19,250      | 19,000      | 18,814      | 19,250   | 18,376      | 17,938      | 19,000  | 17,440       | 17,000       | 16,500       | 16,064       |          |
| 24    | 24,000         | Wall thickness  | 0,218      | 0,250       | 0,375       | 0,562       | 0,687       | 0,375    | 0,968       | 1,218       | 0,500   | 1,531        | 1,812        | 2,062        | 2,343        |          |
|       |                | Inside diameter | 23,564     | 23,500      | 23,250      | 22,876      | 22,626      | 23,250   | 22,064      | 21,564      | 23,000  | 20,938       | 20,376       | 19,876       | 19,314       |          |
| 26    | 26,000         | Wall thickness  |            | 0,312       | 0,500       |             |             | 0,375    |             |             | 0,500   |              |              |              |              |          |
|       |                | Inside diameter |            | 25,376      | 25,000      |             |             | 25,250   |             |             | 25,000  |              |              |              |              |          |
| 28    | 28,000         | Wall thickness  |            | 0,312       | 0,500       | 0,625       |             | 0,375    |             |             | 0,500   |              |              |              |              |          |
|       |                | Inside diameter |            | 27,376      | 27,000      | 26,750      |             | 27,250   |             |             | 27,000  |              |              |              |              |          |
| 30    | 30,000         | Wall thickness  | 0,250      | 0,312       | 0,500       | 0,625       |             | 0,375    |             |             | 0,500   |              |              |              |              |          |
|       |                | Inside diameter | 29,500     | 29,376      | 29,000      | 28,750      |             | 29,250   |             |             | 29,000  |              |              |              |              |          |
| 32    | 32,000         | Wall thickness  |            | 0,312       | 0,500       | 0,625       | 0,688       | 0,375    |             |             | 0,500   |              |              |              |              |          |
|       |                | Inside diameter |            | 31,376      | 31,000      | 30,750      | 30,624      | 31,250   |             |             | 31,000  |              |              |              |              |          |
| 34    | 34,000         | Wall thickness  |            | 0,344       | 0,500       | 0,625       | 0,688       | 0,375    |             |             | 0,500   |              |              |              |              |          |
|       |                | Inside diameter |            | 33,312      | 33,000      | 32,750      | 32,624      | 33,250   |             |             |         |              |              |              |              |          |
| 36    | 36,000         | Wall thickness  |            | 0,312       | 0,500       | 0,625       | 0,750       | 0,375    |             |             | 0,500   |              |              |              |              |          |
|       |                | Inside diameter |            | 35,376      | 35,000      | 34,750      | 34,500      | 35,250   |             |             | 35,000  |              |              |              |              |          |
| 42    | 42,000         | Wall thickness  |            |             |             |             |             | 0,375    |             |             | 0,500   |              |              |              |              |          |
|       |                | Inside diameter |            |             |             |             |             | 41,250   |             |             | 41,000  |              |              |              |              |          |
| 48    | 48,000         | Wall thickness  |            |             |             |             |             | 0,375    |             |             | 0,500   |              |              |              |              |          |
|       |                | Inside diameter |            |             |             |             |             | 47,250   |             |             | 47,000  |              |              |              |              |          |

# Pipe Chart [mm]

| SIZE  | OUTER DIAMETER |                 | SCHEDULE 5 | SCHEDULE 10 | SCHEDULE 20 | SCHEDULE 30 | SCHEDULE 40 | STANDARD | SCHEDULE 60 | SCHEDULE 80 | X-HEAVY  | SCHEDULE 100 | SCHEDULE 120 | SCHEDULE 140 | SCHEDULE 160 | X-HEAVY |
|-------|----------------|-----------------|------------|-------------|-------------|-------------|-------------|----------|-------------|-------------|----------|--------------|--------------|--------------|--------------|---------|
| 1/8   | 10,28          | Wall thickness  | 0,89       | 1,24        |             |             | 1,73        | 1,73     |             | 2,41        | 2,41     |              |              |              |              |         |
|       |                | Inside diameter | 8,51       |             |             |             | 6,83        | 6,83     |             | 5,46        | 5,46     |              |              |              |              |         |
| 1/4   | 13,71          | Wall thickness  | 1,24       | 1,65        |             |             | 2,24        | 2,24     |             | 3,02        | 3,02     |              |              |              |              |         |
|       |                | Inside diameter | 11,23      | 10,41       |             |             | 9,25        | 9,25     |             | 7,67        | 7,67     |              |              |              |              |         |
| 3/8   | 17,14          | Wall thickness  | 1,24       | 1,65        |             |             | 2,31        | 2,31     |             | 3,20        | 3,20     |              |              |              |              |         |
|       |                | Inside diameter | 14,66      | 13,84       |             |             | 12,52       | 12,52    |             | 10,74       | 10,74    |              |              |              |              |         |
| 1/2   | 21,33          | Wall thickness  | 1,65       | 2,11        |             |             | 2,77        | 2,77     |             | 3,73        | 3,73     |              |              |              | 4,75         | 7,47    |
|       |                | Inside diameter | 18,03      | 17,12       |             |             | 15,80       | 15,80    |             | 13,87       | 13,87    |              |              |              | 11,84        | 11,23   |
| 3/4   | 26,67          | Wall thickness  | 1,65       | 2,11        |             |             | 2,87        | 2,87     |             | 3,91        | 3,91     |              |              |              | 5,54         | 7,82    |
|       |                | Inside diameter | 23,37      | 22,45       |             |             | 20,93       | 20,93    |             | 18,85       | 18,85    |              |              |              | 15,60        | 11,02   |
| 1     | 33,40          | Wall thickness  | 1,65       | 4,83        |             |             | 3,38        | 3,38     |             | 4,55        | 4,55     |              |              |              | 6,35         | 9,09    |
|       |                | Inside diameter | 30,10      | 23,75       |             |             | 26,64       | 26,64    |             | 24,31       | 24,31    |              |              |              | 20,70        | 15,21   |
| 1 1/4 | 42,16          | Wall thickness  | 1,65       | 2,77        |             |             | 3,56        | 3,56     |             | 4,85        | 4,85     |              |              |              | 6,35         | 9,70    |
|       |                | Inside diameter | 38,86      | 36,63       |             |             | 35,05       | 35,05    |             | 32,46       | 32,46    |              |              |              | 29,46        | 22,76   |
| 1 1/2 | 48,26          | Wall thickness  | 1,65       | 2,77        |             |             | 3,68        | 3,68     |             | 5,08        | 5,08     |              |              |              | 7,14         | 10,16   |
|       |                | Inside diameter | 44,96      | 42,72       |             |             | 40,89       | 40,89    |             | 38,10       | 38,10    |              |              |              | 33,99        | 27,94   |
| 2     | 60,32          | Wall thickness  | 1,65       | 2,77        |             |             | 3,91        | 3,91     |             | 5,54        | 5,54     |              |              |              | 8,71         | 11,07   |
|       |                | Inside diameter | 57,02      | 54,79       |             |             | 52,50       | 52,50    |             | 49,25       | 49,25    |              |              |              | 42,90        | 38,18   |
| 2 1/2 | 73,02          | Wall thickness  | 2,11       | 3,05        |             |             | 5,16        | 5,16     |             | 7,01        | 7,01     |              |              |              | 9,53         | 14,02   |
|       |                | Inside diameter | 68,81      | 66,93       |             |             | 62,71       | 62,71    |             | 59,00       | 59,00    |              |              |              | 53,98        | 44,98   |
| 3     | 88,90          | Wall thickness  | 2,11       | 3,05        |             |             | 5,49        | 5,49     |             | 7,62        | 7,62     |              |              |              | 11,10        | 15,24   |
|       |                | Inside diameter | 84,68      | 82,80       |             |             | 77,93       | 77,93    |             | 73,66       | 73,66    |              |              |              | 66,70        | 58,42   |
| 3 1/2 | 101,60         | Wall thickness  | 2,11       | 3,05        |             |             | 5,74        | 5,74     |             | 8,08        | 8,08     |              |              |              |              | 16,15   |
|       |                | Inside diameter | 97,38      | 95,50       |             |             | 90,12       | 90,12    |             | 85,45       | 85,45    |              |              |              |              | 69,29   |
| 4     | 114,30         | Wall thickness  | 2,11       | 3,05        |             |             | 6,02        | 6,02     | 7,14        | 8,56        | 8,56     |              | 11,10        |              | 13,49        | 17,12   |
|       |                | Inside diameter | 110,08     | 108,20      |             |             | 102,26      | 102,26   | 100,03      | 97,18       | 97,18    |              | 92,10        |              | 87,33        | 80,06   |
| 4 1/2 | 127,00         | Wall thickness  |            |             |             |             |             | 6,27     |             |             | 9,02     |              |              |              |              | 18,03   |
|       |                | Inside diameter |            |             |             |             |             | 114,45   |             |             | 108,97   |              |              |              |              | 90,93   |
| 5     | 141,30         | Wall thickness  | 2,77       | 3,40        |             |             | 6,55        | 6,55     |             | 9,53        | 9,53     |              | 12,70        |              | 15,88        | 19,05   |
|       |                | Inside diameter | 135,76     | 134,49      |             |             | 128,19      | 128,19   |             | 122,25      | 122,25   |              |              |              | 109,55       | 103,20  |
| 6     | 168,27         | Wall thickness  | 2,77       | 3,40        |             |             | 7,11        | 7,11     |             | 10,97       | 10,97    |              | 14,27        |              | 18,24        | 21,95   |
|       |                | Inside diameter | 162,74     | 161,47      |             |             | 154,05      | 154,05   |             | 146,33      | 146,33   |              |              |              | 131,80       | 124,38  |
| 7     | 193,67         | Wall thickness  |            |             |             |             |             | 7,65     |             |             | 12,70    |              |              |              |              | 22,23   |
|       |                | Inside diameter |            |             |             |             |             | 178,38   |             |             | 168,28   |              |              |              |              | 149,23  |
| 8     | 219,07         | Wall thickness  | 2,77       | 3,76        | 6,35        | 7,04        | 8,18        | 8,18     | 10,31       | 12,70       | 12,70    | 15,06        | 18,24        | 20,62        | 23,01        | 22,23   |
|       |                | Inside diameter | 213,54     | 211,56      | 206,38      | 205,00      | 202,72      | 202,72   | 198,45      | 193,68      | 193,68   | 188,95       | 182,60       | 177,83       | 173,05       | 174,63  |
| 9     | 244,47         | Wall thickness  |            |             |             |             |             | 8,69     |             |             | 12,70    |              |              |              |              |         |
|       |                | Inside diameter |            |             |             |             |             | 227,10   |             |             | 219,08   |              |              |              |              |         |
| 10    | 273,05         | Wall thickness  | 3,40       | 4,19        | 6,35        | 7,80        | 9,27        | 9,27     | 12,70       | 15,06       | 12,70    | 18,24        | 21,41        | 25,40        | 28,58        |         |
|       |                | Inside diameter | 266,24     | 264,67      | 260,35      | 257,45      | 254,51      | 254,51   | 247,65      | 242,93      | 247,65   | 236,58       | 230,23       | 222,25       | 215,90       |         |
| 11    | 298,45         | Wall thickness  |            |             |             |             |             | 9,53     |             |             | 12,70    |              |              |              |              |         |
|       |                | Inside diameter |            |             |             |             |             | 279,40   |             |             | 273,05   |              |              |              |              |         |
| 12    | 323,85         | Wall thickness  | 3,96       | 4,57        | 6,35        | 8,38        | 10,31       | 9,53     | 14,27       | 17,45       | 12,70    | 21,41        | 25,40        | 28,58        | 33,32        |         |
|       |                | Inside diameter | 315,93     | 314,71      | 311,15      | 307,09      | 303,23      | 304,80   | 295,30      | 288,95      | 298,45   | 281,03       | 273,05       | 266,70       | 257,20       |         |
| 14    | 355,60         | Wall thickness  | 3,96       | 6,35        | 7,92        | 9,53        | 11,10       | 9,53     | 15,06       | 19,05       | 12,70    | 23,80        | 27,62        | 31,75        | 35,71        |         |
|       |                | Inside diameter | 347,68     | 342,90      | 339,75      | 336,55      | 333,40      | 336,55   | 325,48      | 317,50      | 330,20   | 308,00       | -199,64      | 292,10       | 284,18       |         |
| 16    | 406,40         | Wall thickness  | 4,19       | 6,35        | 7,92        | 9,53        | 12,70       | 9,53     | 16,66       | 21,41       | 12,70    | 26,19        | 30,94        | 36,50        | 40,46        |         |
|       |                | Inside diameter | 398,02     | 393,70      | 390,55      | 387,35      | 381,00      | 387,35   | 373,08      | 363,58      | 381,00   | 354,03       | 344,53       | 333,40       | 325,48       |         |
| 18    | 457,20         | Wall thickness  | 4,19       | 6,35        | 7,92        | 11,10       | 14,27       | 9,53     | 19,05       | 23,80       | 12,70    | 29,36        | 34,93        | 39,67        | 45,24        |         |
|       |                | Inside diameter | 448,82     | 444,50      | 441,35      | 435,00      | 428,65      | 438,15   | 419,10      | 409,60      | 431,80   | 398,48       | 387,35       | 377,85       | 366,73       |         |
| 20    | 508,00         | Wall thickness  | 4,78       | 6,35        | 9,53        | 12,70       | 15,06       | 9,53     | 20,62       | 26,19       | 12,70    | 32,51        | 38,10        | 44,45        | 49,99        |         |
|       |                | Inside diameter | 498,45     | 495,30      | 488,95      | 482,60      | 477,88      | 488,95   | 466,75      | 455,63      | 482,60   | 442,98       | 431,80       | 419,10       | 408,03       |         |
| 24    | 609,60         | Wall thickness  | 5,54       | 6,35        | 9,53        | 14,27       | 17,45       | 9,53     | 24,59       | 30,94       | 12,70    | 38,89        | 46,02        | 52,37        | 59,51        |         |
|       |                | Inside diameter | 598,53     | 596,90      | 590,55      | 581,05      | 574,70      | 590,55   | 560,43      | 547,73      | 584,20   | 531,83       | 517,55       | 504,85       | 490,58       |         |
| 26    | 660,40         | Wall thickness  |            | 7,92        | 12,70       |             |             | 9,53     |             |             | 12,70    |              |              |              |              |         |
|       |                | Inside diameter |            | 644,55      | 635,00      |             |             | 641,35   |             |             | 635,00   |              |              |              |              |         |
| 28    | 711,20         | Wall thickness  |            | 7,92        | 12,70       | 15,88       |             | 9,53     |             |             | 12,70    |              |              |              |              |         |
|       |                | Inside diameter |            | 695,35      | 685,80      | 679,45      |             | 692,15   |             |             | 685,80   |              |              |              |              |         |
| 30    | 762,00         | Wall thickness  | 6,35       | 7,92        | 12,70       | 15,88       |             | 9,53     |             |             | 12,70    |              |              |              |              |         |
|       |                | Inside diameter | 749,30     | 746,15      | 736,60      | 730,25      |             | 742,95   |             |             | 736,60   |              |              |              |              |         |
| 32    | 812,80         | Wall thickness  |            | 7,92        | 12,70       | 15,88       | 17,48       | 9,53     |             |             | 12,70    |              |              |              |              |         |
|       |                | Inside diameter |            | 796,95      | 787,40      | 781,05      | 777,85      | 793,75   |             |             | 787,40   |              |              |              |              |         |
| 34    | 863,60         | Wall thickness  |            | 8,74        | 12,70       | 15,88       | 17,48       | 9,53     |             |             | 12,70    |              |              |              |              |         |
|       |                | Inside diameter |            | 846,12      | 838,20      | 831,85      | 828,65      | 844,55   |             |             |          |              |              |              |              |         |
| 36    | 914,40         | Wall thickness  |            | 7,92        | 12,70       | 15,88       | 19,05       | 9,53     |             |             | 12,70    |              |              |              |              |         |
|       |                | Inside diameter |            | 898,55      | 889,00      | 882,65      | 876,30      | 895,35   |             |             | 889,00   |              |              |              |              |         |
| 42    | 1 066,80       | Wall thickness  |            |             |             |             |             | 9,53     |             |             | 12,70    |              |              |              |              |         |
|       |                | Inside diameter |            |             |             |             |             | 1 047,75 |             |             | 1 041,40 |              |              |              |              |         |
| 48    | 1 219,20       | Wall thickness  |            |             |             |             |             | 9,53     |             |             | 12,70    |              |              |              |              |         |
|       |                | Inside diameter |            |             |             |             |             | 1 200,15 |             |             | 1 193,80 |              |              |              |              |         |

**WEIGHTS**

| GIVEN     | MULTIPLY BY | TO OBTAIN |
|-----------|-------------|-----------|
| Grams     | 0.001       | Kilograms |
| Grams     | 0.0353      | Ounces    |
| Grams     | 0.0022      | Pounds    |
| Kilograms | 1 000.0     | Grams     |
| Kilograms | 35.2740     | Ounces    |
| Kilograms | 2.2046      | Pounds    |
| Ounces    | 28.3495     | Grams     |
| Ounces    | 0.0283      | Kilograms |
| Ounces    | 0.0625      | Pounds    |
| Pounds    | 453.5924    | Grams     |
| Pounds    | 0.4536      | Kilograms |
| Pounds    | 16.0        | Ounces    |

**MEASURES**

| GIVEN       | MULTIPLY BY | TO OBTAIN   |
|-------------|-------------|-------------|
| Centimeters | 0.0328      | Feet        |
| Centimeters | 0.3937      | Inches      |
| Centimeters | 10.0        | Millimeters |
| Centimeters | 0.01        | Meters      |
| Feet        | 30.4801     | Centimeters |
| Feet        | 12.0        | Inches      |
| Feet        | 304.801     | Millimeters |
| Feet        | 0.3048      | Meters      |
| Inches      | 2.5400      | Centimeters |
| Inches      | 0.0833      | Feet        |
| Inches      | 25.400      | Millimeters |
| Inches      | 0.0254      | Meters      |
| Millimeters | 0.1         | Centimeters |
| Millimeters | 0.00328     | Feet        |
| Millimeters | 0.03937     | Inches      |
| Millimeters | 0.001       | Meters      |
| Meters      | 100.0       | Centimeters |
| Meters      | 3.2808      | Feet        |
| Meters      | 39.370      | Inches      |
| Meters      | 1 000.0     | Millimeters |

**FLOW RATE**

| GIVEN                       | MULTIPLY BY | TO OBTAIN                   |
|-----------------------------|-------------|-----------------------------|
| Cubic feet per minute (CFM) | 0.0283      | Cubic meters per minute     |
| Cubic feet per minute (CFM) | 7.4805      | Gallons per minute (GPM)    |
| Cubic feet per minute (CFM) | 28.3163     | Liters per minute           |
| Cubic meters per minute     | 35.3133     | Cubic feet per minute (CFM) |
| Cubic meters per minute     | 264.170     | Gallons per minute (GPM)    |
| Cubic meters per minute     | 1 000.0     | Liters per minute           |
| Gallons per minute (GPM)    | 0.1337      | Cubic feet per minute (CFM) |
| Gallons per minute (GPM)    | 0.0038      | Cubic meters per minute     |
| Gallons per minute (GPM)    | 3.7878      | Liters per minute           |
| Liters per minute           | 0.0353      | Cubic feet per minute (CFM) |
| Liters per minute           | 0.001       | Cubic meters per minute     |
| Liters per minute           | 0.2641      | Gallons per minute (GPM)    |

**PRESSURE**

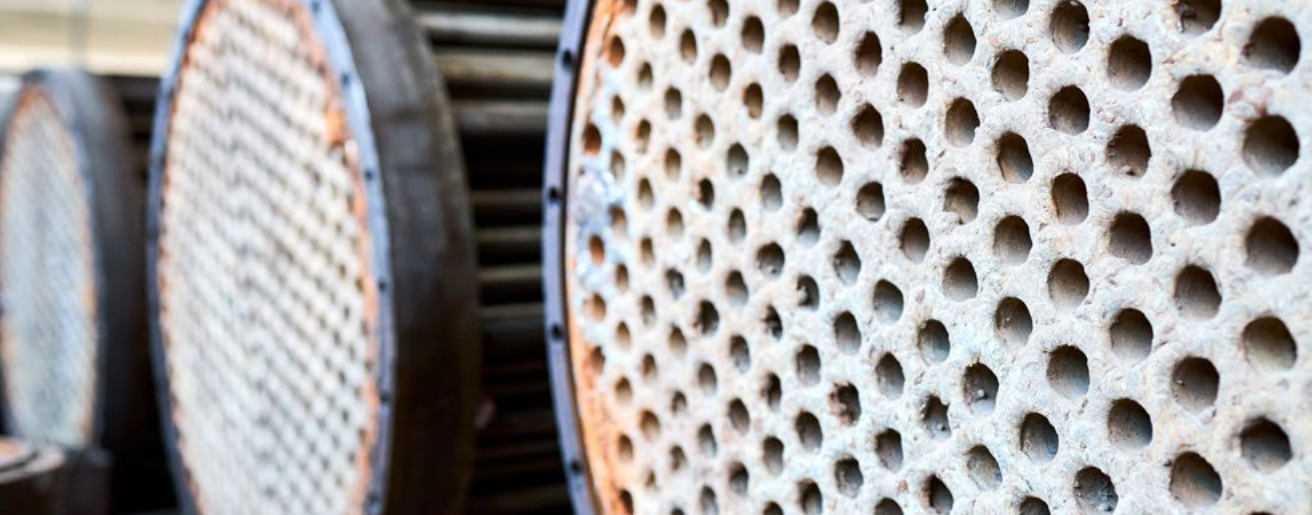
| GIVEN                           | MULTIPLY BY | TO OBTAIN                       |
|---------------------------------|-------------|---------------------------------|
| Bar                             | 1.0197      | Kilograms per square centimeter |
| Bar                             | 14.5038     | Pounds per square inch          |
| Kilograms per square centimeter | .9807       | Bar                             |
| Kilograms per square centimeter | 14.22       | Pounds per square inch          |
| Pounds per square inch          | .0689       | Bar                             |
| Pounds per square inch          | .0703       | Kilograms per square centimeter |



A large area of horizontal dotted lines, intended for writing or drawing. The lines are evenly spaced and cover most of the page area below the header and above the footer.

Blank chart area with horizontal dotted lines.





## KRAIS Tube&Pipe Tools

Poland, 55-106 Zawonia, Czachowo 15

tel. +48 71 312 05 96, fax +48 71 387 03 32

email: [export@krais.com](mailto:export@krais.com)

[www.krais.com](http://www.krais.com)



 [facebook.com/KraisTubeExpanders/](https://facebook.com/KraisTubeExpanders/)

 [linkedin.com/company/krais/](https://linkedin.com/company/krais/)

