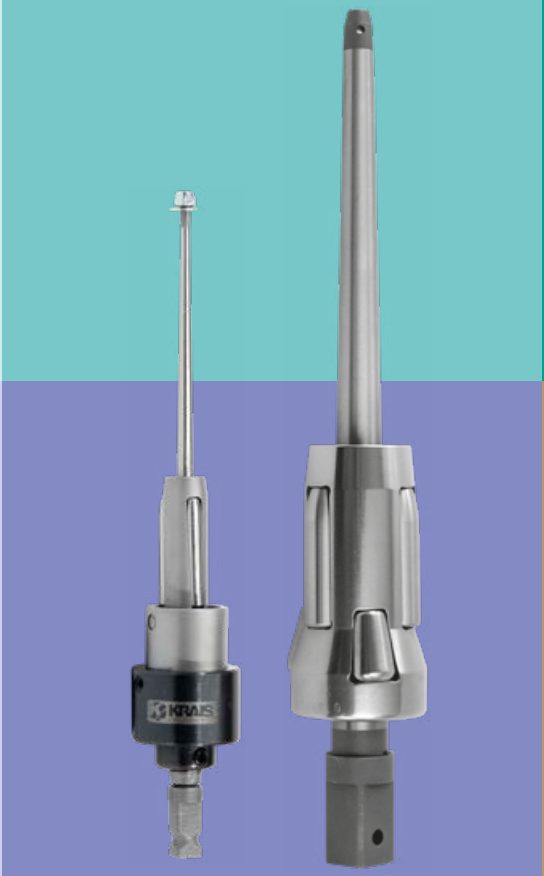
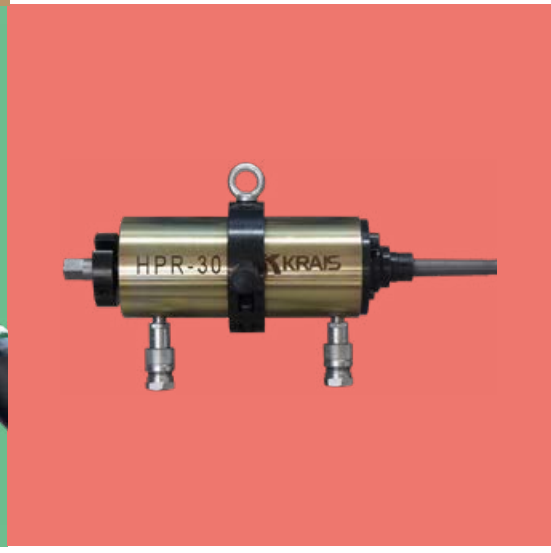
krais.com



Product Catalog

2018



KRAIS
Tube & Pipe Tools

Tube&Pipe
Professional Tools

KRAIS

Tube & Pipe Tools

Original Manufacturer of the Products

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.

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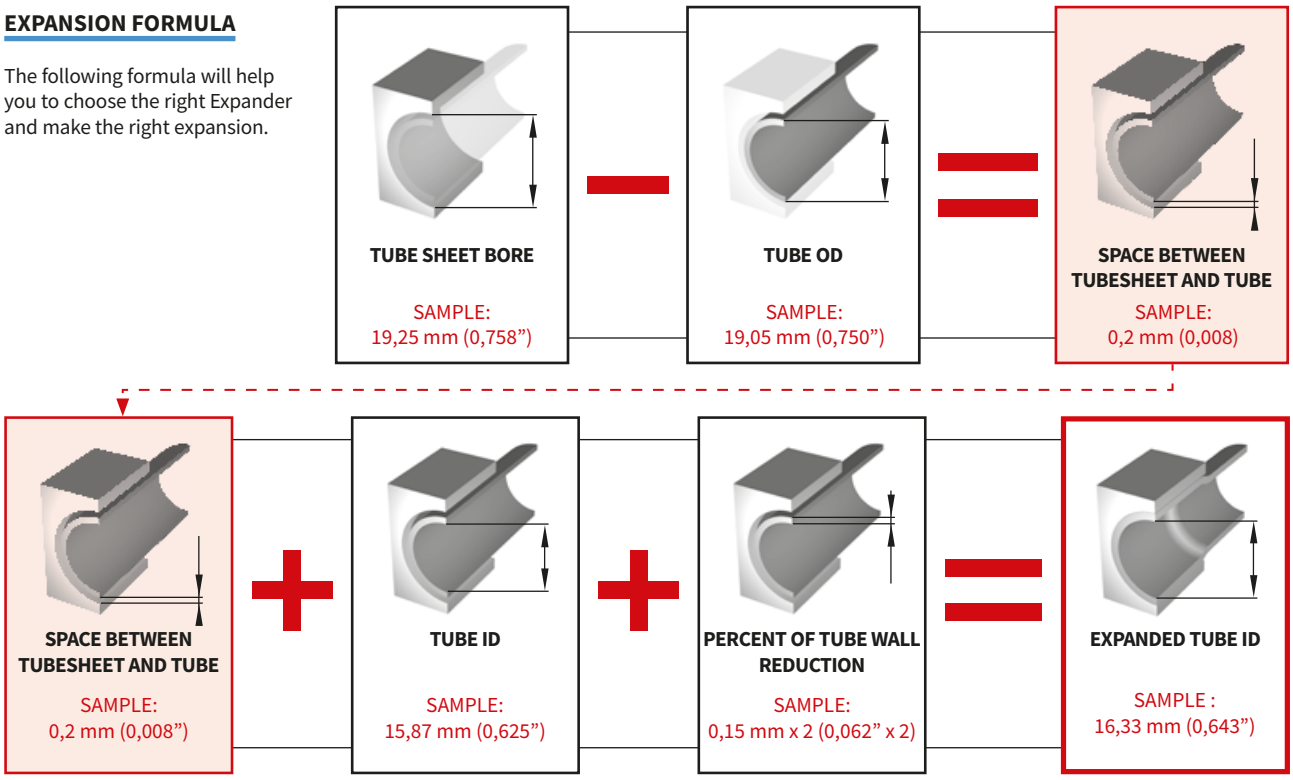
TABLE OF CONTEST

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.

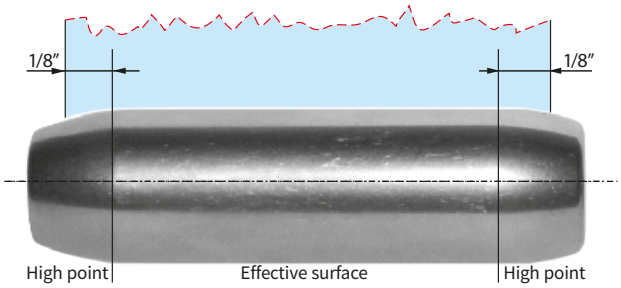
In order to calculate this reduction we must take into account the variances between the Tube OD, Tube Wall Thickness and Tube Sheet Hole Diameter. We must also consider the differing types of materials being used for both Tubes and Tube Sheets, however as a general rule, percentage wall reduction ranges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

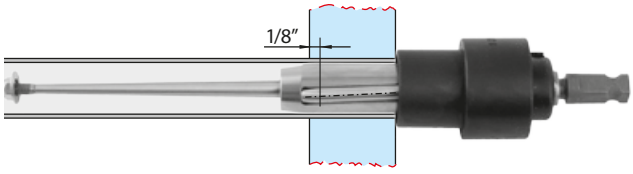
NOTE!
Reroll all test tubes that were under size. To ensure the best tool life and the highest quality tube to tube sheet contact, periodic cleaning of the expander is necessary. Proper lubrication of the rolls, mandrel and thrust bearing is a must!

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.

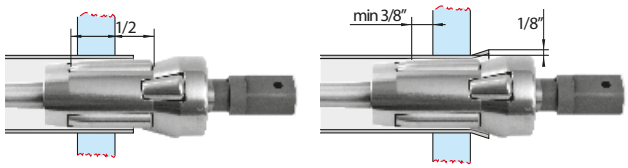
1. Tubes to protrude inside drum 1/4” minimum to 3/4” maximum.
2. Outside diameter of flare to be 1/8” larger than tube sheet hole.
3. Tube to be rolled past back of tube sheet 1/4” to 3/8”.

SETTING CONDENSER EXPANDER



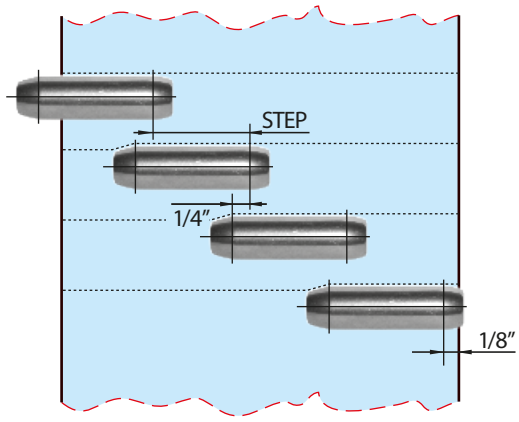
Locate high point of roll approx 1/8” inside back of tube sheet and thrust collar must be touching tube sheet.

SETTING BOILER EXPANDER



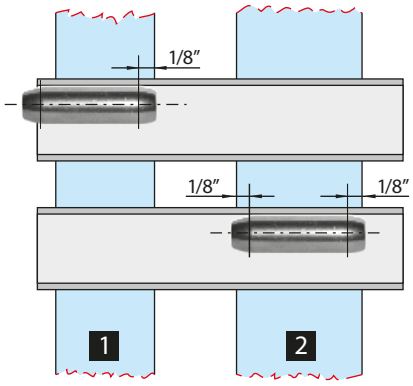
Short straight roll set approx half way into tube sheet. Tube rolled 3/8” back of tube sheet. Flared tube diameter 1/8” larger than tube sheet hole.

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.

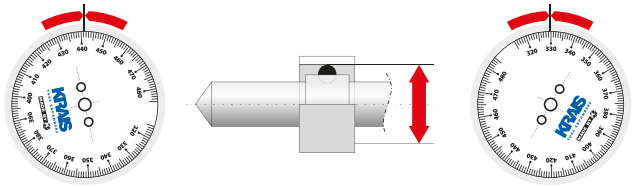
TUBE HOLE GAGE

Tube Hole Gages 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.

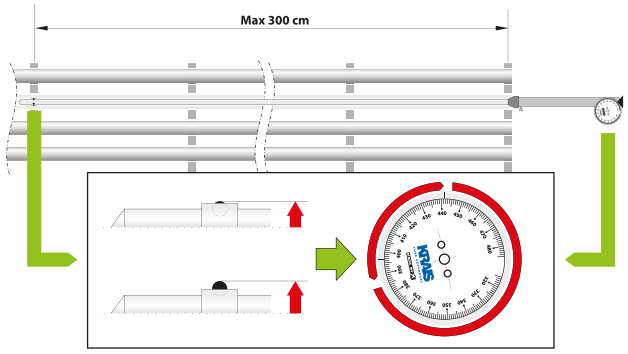
SIZE*		ID RANGE				TOOL NUMBER	REACH		SETTING RING	MANDREL EXTENSION	BODY EXTENSION
		MIN		MAX							
[INCH]	[MM]	[INCH]	[MM]	[INCH]	[MM]		[INCH]	[MM]			
3/8	9,53	0,290	0,350	7,37	8,89	K200-95	4	101,6	SR-3/8	K200-95-ME	K200-95-BE
1/2	12,70	0,350	0,450	8,89	11,43	K200-127	4	101,6	SR-1/2	K200-127-ME	K200-127-BE
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*

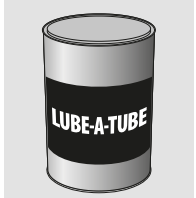
FREE GAUGE ADJUSTMENT



LONG VERSION (UP TO 3M)



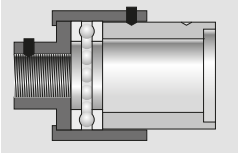
LUBE-A-TUBE FOR BETTER ROLLING



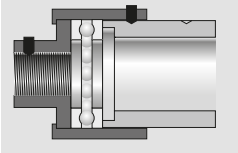
Special water soluble grease for rolling tube ends into tube sheets. Easy application: just apply directly to the inside of the tube ends; and easy removal: all Lube-A-Tube excess will be completely removed during any hydro test or boil-out operations.

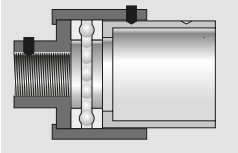
- Lube-A-Tube is easy to apply. Stays in the tube during whole rolling operation - it will not leak.
- Lube-A-Tube does not carbonize under the heat and pressure found during the tube rolling operation.
- Lube-A-Tube keeps the expanding tool cool what gives a long tool life.
- Lube-A-Tube is effective 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.

TYPICAL THRUST COLLARS

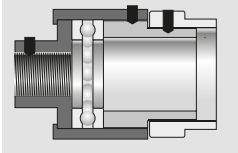


STC
Fixed recessed thrust collar 1/8“. One flip type thrust collar for 1200&800 series tube expanders.

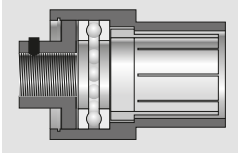




FRTC
Full recessed thrust collar.

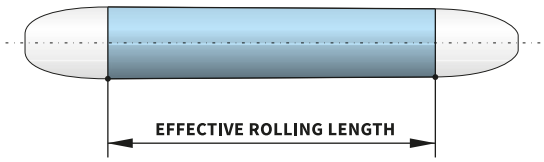


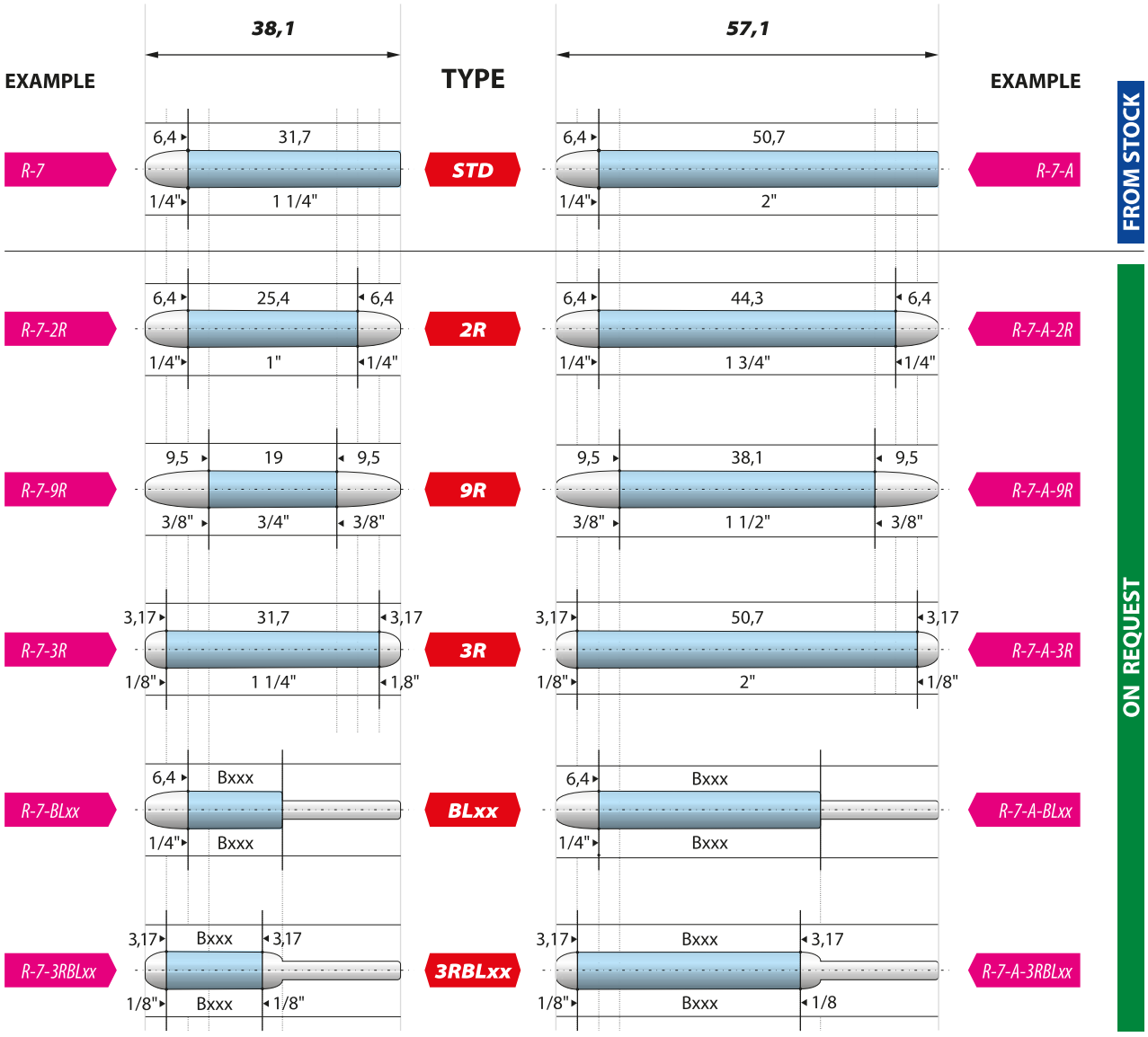
ARTC
Adjustable recess thrust collar 0,025 – 0,5“.



TWTC
Thin wall thrust collar.

ROLLS FOR CONDENSER EXPANDERS





900 SERIES CONDENSER TUBE EXPANDERS

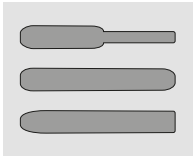
BASIC INFO

Tools for expanding tubes in condensers, chillers, heat exchangers, fin fan coolers, feedwater heaters and surface condensers.

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"	0,25" - 1,25"

OPTIONAL SPARES AND ACCESSORIES



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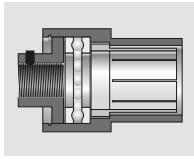

THRUST COLLARS
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TUBE OD		TUBE GAUGE			TUBE ID		EXPANSION RANGE				TUBE SHEET THICKNESS				MANDREL	MANDREL SQUARE		PNEUMATIC MOTOR *	ELECTRIC MOTOR *
							[INCH]		[MM]		1/4 TO 3/4"		3/4 TO 1-1/4"						
											6.3 TO 19 MM		19 TO 31.7 MM						
[INCH]	[MM]	[BWG]	[INCH]	[MM]	[INCH]	[MM]	MIN	MAX	MIN	MAX	TOOL NO.	ROLL NO.	TOOL NO.	ROLL NO.		[INCH]	[MM]		
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 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 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 CONDENSER TUBE EXPANDERS

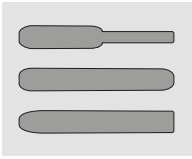
BASIC INFO

Tools for expanding tubes in condensers, chillers, heat exchangers, fin fan coolers, feedwater heaters and surface condensers.

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”	0,75” - 3,50”

OPTIONAL SPARES AND ACCESSORIES



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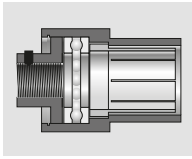

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TUBE OD		TUBE GAUGE			TUBE ID		EXPANSION RANGE				TUBE SHEET THICKNESS				MANDREL	MANDREL SQUARE		PNEUMATIC MOTOR	ELECTRIC MOTOR
							[INCH]		[MM]		1/4 TO 3/4"		3/4 TO 1-1/4"						
											6.3 TO 19 MM		19 TO 31.7 MM						
[INCH]	[MM]	[BWG]	[INCH]	[MM]	[INCH]	[MM]	MIN	MAX	MIN	MAX	TOOL NO.	ROLL NO.	TOOL NO.	ROLL NO.		[INCH]	[MM]		
3/8	9,5	15	0,072	1,83	0,231	5,87	0,230	0,265	5,84	6,73	**1315**	**1315**	**1316**	**1316**	**M-86**	1/4”	6,3	K20-1800	TES3000 S3000
		16	0,065	1,65	0,245	6,22	0,240	0,275	6,10	6,99	**1319**	**1315**	**1319-L**	**916-L**	**M-86**	1/4”	6,3		
		17	0,058	1,47	0,259	6,58	0,255	0,289	6,48	7,34	**1317**	**903**	**1318**	**904**	**M-88**	1/4”	6,3		
		18	0,049	1,24	0,277	7,04	0,272	0,307	6,91	7,80	**1301**	**903**	**1302**	**904**	**M-80**	1/4”	6,3		
		19	0,042	1,07	0,291	7,39	0,286	0,320	7,26	8,13	**1303**	**903**	**1304**	**904**	**M-81**	1/4”	6,3		
		20	0,035	0,89	0,305	7,75	0,300	0,334	7,62	8,48	**1305**	**907**	**1306**	**908**	**M-82**	1/4”	6,3		
		21	0,032	0,81	0,311	7,90	0,306	0,340	7,77	8,64	**1307**	**907**	**1308**	**908**	**M-83**	1/4”	6,3		
		22	0,028	0,71	0,319	8,10	0,314	0,349	7,98	8,86	**1309**	**909**	**1310**	**910**	**M-84**	1/4”	6,3		
		23	0,025	0,64	0,325	8,26	0,320	0,357	8,13	9,07	**1311**	**911**	**1312**	**912**	**M-84**	1/4”	6,3		
		24	0,022	0,56	0,331	8,41	0,319	0,357	8,10	9,07	**1311**	**911**	**1312**	**912**	**M-84**	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 CONDENSER TUBE EXPANDERS

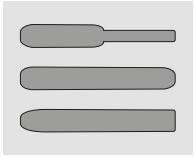
BASIC INFO

Tools for expanding tubes in condensers, chillers, heat exchangers, fin fan coolers, feedwater heaters and surface condensers.
As a standard expanders are supplied with STC collar. Available in regular and long reaches and as the 5-rolls version for rolling thin walls.
Many different shaped rolls are available.

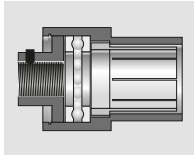
WORKING RANGE

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" – 1-1/2"	0,50" - 2,25"

OPTIONAL SPARES AND ACCESSORIES



ROLLS ON REQUEST
→ PAGE 9



THRUST COLLARS
→ PAGE 9

ROLLING MOTORS
→ CHAPTER PAGE 36

TUBE OD		TUBE GAUGE			TUBE ID		EXPANSION RANGE				TUBE SHEET THICKNESS				MANDREL	MANDREL SQUARE		PNEUMATIC MOTOR *	ELECTRIC MOTOR *
							[INCH]		[MM]		1/2 TO 1-1/2" 12,7 TO 38,1 MM		1-1/4 TO 2-1/4" 31,7 TO 57,1 MM						
[INCH]	[MM]	[BWG]	[INCH]	[MM]	[INCH]	[MM]	MIN	MAX	MIN	MAX	TOOL NO.	ROLL NO.	TOOL NO.	ROLL NO.		[INCH]	[MM]		
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	K20-500	TES300 S1500 or TESMini2 HT0
		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	K20-1800	
		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		
		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		
5/8	15,8	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	K50-600	TES3000 G1450 or TesMini2 ES2
		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		
		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	K50-1250	TES3000 G1000 or TESMini2 DUO
		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**	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		
		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		
		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		
3/4	19	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	K60-900	TES3000 + G1000 TESMini 2 +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		
		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	K50-400	TES3000 G1450 or TESMini2 ES2
		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	K50-600	
		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		
		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		

TUBE OD		TUBE GAUGE			TUBE ID		EXPANSION RANGE				TUBE SHEET THICKNESS				MANDREL	MANDREL SQUARE		PNEUMATIC MOTOR *	ELECTRIC MOTOR *
							[INCH]		[MM]		1/2 TO 1-1/2"		1-1/4 TO 2-1/4"						
											12,7 TO 38,1 MM		31,7 TO 57,1 MM						
[INCH]	[MM]	[BWG]	[INCH]	[MM]	[INCH]	[MM]	MIN	MAX	MIN	MAX	TOOL NO.	ROLL NO.	TOOL NO.	ROLL NO.		[INCH]	[MM]		
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	K50-600	
		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		
		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	K50-1250	TES3000 G1450 or TESMini2 ES2
		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		
		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	K50-600	
		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		
		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		
1-1/8	28,5	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	K60-400	TES3000 G1000 or TESMini2 DU1
		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		
		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		
		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		
1-1/4	31,7	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	K60-400	TES3000 G1000 or TESMini2 DU1
		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		
1-3/8	34,9	8	0,165	4,19	1,045	26,54	1,026	1,135	26,06	28,83	**877**	**R-31**	**878**	**R-31-A**	**M-17**	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	**873**	**R-29**	**874**	**R-29-A**	**M-17**	1/2	12,7		
		10	0,134	3,40	1,107	28,12	1,087	1,196	27,61	30,38	**875**	**R-30**	**876**	**R-30-A**	**M-17**	1/2	12,7		
		11	0,120	3,05	1,135	28,83	1,115	1,224	28,32	31,09	**879**	**R-30**	**880**	**R-30-A**	**M-18**	1/2	12,7		
		12	0,109	2,77	1,157	29,39	1,133	1,242	28,78	31,55	**881**	**R-32**	**882**	**R-32-A**	**M-18**	1/2	12,7		
		13	0,095	2,41	1,185	30,10	1,160	1,275	29,46	32,39	**883**	**R-33**	**884**	**R-33-A**	**M-19**	1/2	12,7	K60-400	
		14	0,083	2,11	1,209	30,71	1,179	1,294	29,95	32,87	**885**	**R-34**	**886**	**R-34-A**	**M-20**	1/2	12,7		
		15	0,072	1,83	1,231	31,27	1,206	1,321	30,63	33,55	**887**	**R-35**	**888**	**R-35-A**	**M-20**	1/2	12,7		
		16	0,065	1,65	1,245	31,62	1,206	1,321	30,63	33,55	**887**	**R-35**	**888**	**R-35-A**	**M-20**	1/2	12,7		

TUBE OD		TUBE GAUGE			TUBE ID		EXPANSION RANGE				TUBE SHEET THICKNESS				MANDREL	MANDREL SQUARE		PNEUMATIC MOTOR *	ELECTRIC MOTOR *
							[INCH]		[MM]		1/2 TO 1-1/2"		1-1/4 TO 2-1/4"						
											12,7 TO 38,1 MM		31,7 TO 57,1 MM						
[INCH]	[MM]	[BWG]	[INCH]	[MM]	[INCH]	[MM]	MIN	MAX	MIN	MAX	TOOL NO.	ROLL NO.	TOOL NO.	ROLL NO.		[INCH]	[MM]		
1-1/2	38,1	8	0,165	4,19	1,170	29,72	1,145	1,260	29,08	32,00	**889**	**R-34**	**890**	**R-34-A**	**M-19**	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	**885**	**R-34**	**886**	**R-34-A**	**M-20**	1/2	12,7		
		10	0,134	3,40	1,232	31,29	1,206	1,321	30,63	33,55	**887**	**R-35**	**888**	**R-35-A**	**M-20**	1/2	12,7		
		11	0,120	3,05	1,260	32,00	1,235	1,350	31,37	34,29	**891**	**R-36**	**892**	**R-36-A**	**M-20**	1/2	12,7		
		12	0,109	2,77	1,282	32,56	1,257	1,372	31,93	34,85	**893**	**R-37**	**894**	**R-37-A**	**M-20**	1/2	12,7		
		13	0,095	2,41	1,310	33,27	1,285	1,400	32,64	35,56	**895**	**R-37**	**896**	**R-37-A**	**M-21**	1/2	12,7	K60-400	
		14	0,083	2,11	1,334	33,88	1,285	1,400	32,64	35,56	**895**	**R-37**	**896**	**R-37-A**	**M-21**	1/2	12,7		
		15	0,072	1,83	1,356	34,44	1,331	1,446	33,81	36,73	**897**	**R-38**	**898**	**R-38-A**	**M-21**	1/2	12,7		
		16	0,065	1,65	1,370	34,80	1,331	1,446	33,81	36,73	**897**	**R-38**	**898**	**R-38-A**	**M-21**	1/2	12,7		
		17	0,058	1,47	1,384	35,15	1,331	1,472	33,81	37,39	**899**	**R-38**	**900**	**R-38-A**	**M-22**	1/2	12,7		
		18	0,049	1,24	1,402	35,61	1,331	1,472	33,81	37,39	**899**	**R-38**	**900**	**R-38-A**	**M-22**	1/2	12,7		
		19	0,042	1,07	1,416	35,97	1,331	1,472	33,81	37,39	**899**	**R-38**	**900**	**R-38-A**	**M-22**	1/2	12,7		
		20	0,035	0,89	1,430	36,32	1,331	1,472	33,81	37,39	**899**	**R-38**	**900**	**R-38-A**	**M-22**	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.*

800-5 FIVE ROLL SERIES CONDENSER TUBE EXPANDERS

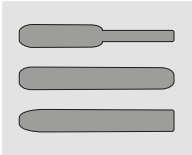
BASIC INFO

Tools for expanding tubes in condensers, chillers, heat exchangers, fin fan coolers, feedwater heaters and surface condensers.
As a standard expanders are supplied with STC collar. Available in regular and long reaches and as the 3-rolls version. Many different shaped rolls are available.

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" – 1-1/2"	1/2" - 2 1/4"

OPTIONAL SPARES AND ACCESSORIES



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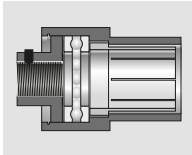

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TUBE OD		TUBE GAUGE			TUBE ID		EXPANSION RANGE				TUBE SHEET THICKNESS				MANDREL	MANDREL SQUARE		PNEUMATIC MOTOR *	ELECTRIC MOTOR *
							[INCH]		[MM]		1/2" TO 1-1/2"		1-1/4" TO 2-1/4"						
											12,7 TO 38,1 MM		31,7 TO 57,1MM						
[INCH]	[MM]	[BWG]	[INCH]	[MM]	[INCH]	[MM]	MIN	MIAX	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	**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 DU0
		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		

TUBE OD		TUBE GAUGE			TUBE ID		EXPANSION RANGE				TUBE SHEET THICKNESS				MANDREL	MANDREL SQUARE		PNEUMATIC MOTOR *	ELECTRIC MOTOR *
							[INCH]		[MM]		1/2" TO 1-1/2"		1-1/4" TO 2-1/4"						
											12,7 TO 38,1 MM		31,7 TO 57,1MM						
[INCH]	[MM]	[BWG]	[INCH]	[MM]	[INCH]	[MM]	MIN	MIAX	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.*

1200 SERIES CONDENSER TUBE EXPANDERS

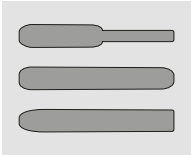
BASIC INFO

Tools for expanding tubes in condensers, chillers, heat exchangers, fin fan coolers, feedwater heaters and surface condensers.
As a standard expanders are supplied with STC collar. Available in regular and long reaches (some diameters, up to 5m) and as the 5-rolls version for rolling thin walls. Many different shaped rolls are available.

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" – 1-1/2"	

OPTIONAL SPARES AND ACCESSORIES



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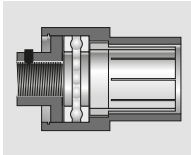

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TUBE SHEET THICKNESS

ROLLS	REACH	TUBE SHEET THICKNESS [INCH]	TUBE SHEET THICKNESS [MM]
1½" 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
2¼" 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 *
							[INCH]		[MM]		1/2" TO 6"		2-1/4" TO 6-3/4"						
											38,1 TO 152,4 MM		57,1 TO 171,4 MM						
[INCH]	[MM]	[BWG]	[INCH]	[MM]	[INCH]	[MM]	MIN	MAX	MIN	MAX	TOOL NO.	ROLL NO.	TOOL NO.	ROLL NO.		[INCH]	[MM]		
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	K20-500	TES300 S1500 or TESMini2 HT0
		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	K20-1800	
		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		
		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		
		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-57**	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		

TUBE OD		TUBE GAUGE			TUBE ID		EXPANSION RANGE				TUBE SHEET THICKNESS				MANDREL	MANDREL SQUARE		PNEUMATIC MOTOR *	ELECTRIC MOTOR *
							[INCH]		[MM]		1/2" TO 6"		2-1/4" TO 6-3/4"						
											38,1 TO 152,4 MM		57,1 TO 171,4 MM						
[INCH]	[MM]	[BWG]	[INCH]	[MM]	[INCH]	[MM]	MIN	MAX	MIN	MAX	TOOL NO.	ROLL NO.	TOOL NO.	ROLL NO.		[INCH]	[MM]		
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		
		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	K50-1250	TES3000 + G1450 TESMini2 ES2
		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		
1	25,4	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	K60-400	TES3000 G1000 or TESMini2 ES2
		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	K50-400	
		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	K50-600	
		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		
		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		
		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		
1-1/8	28,5	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	K60-400	TES3000 G1000 or TESMini2 DU1
		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		

TUBE OD		TUBE GAUGE			TUBE ID		EXPANSION RANGE				TUBE SHEET THICKNESS				MANDREL	MANDREL SQUARE		PNEUMATIC MOTOR *	ELECTRIC MOTOR *
							[INCH]		[MM]		1/2" TO 6"		2-1/4" TO 6-3/4"						
											38,1 TO 152,4 MM		57,1 TO 171,4 MM						
[INCH]	[MM]	[BWG]	[INCH]	[MM]	[INCH]	[MM]	MIN	MAX	MIN	MAX	TOOL NO.	ROLL NO.	TOOL NO.	ROLL NO.		[INCH]	[MM]		
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		
		18	0,049	1,24	1,152	29,26	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		
		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	K60-400	
		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		
		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	K60-400	
		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.*

1200-5 FIVE ROLL SERIES CONDENSER TUBE EXPANDERS

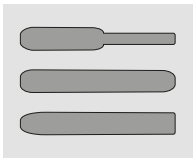
BASIC INFO

Tools for expanding tubes in condensers, chillers, heat exchangers, fin fan coolers, feedwater heaters and surface condensers.
As a standard expanders are supplied with STC collar but for 5-roll versions, especially for 19 to 22 GA tubes, TWTC thin wall thrust collar is recommended.
Expanders are available in regular and long reaches (some diameters, up to 5 m) and as the 3-rolls version. Many different shaped rolls are available.

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 – 1-1/2”	

OPTIONAL SPARES AND ACCESSORIES



ROLLS ON REQUEST
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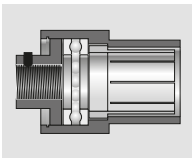

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TUBE SHEET THICKNESS

ROLLS	REACH	TUBE SHEET THICKNESS	
		[INCH]	[MM]
1-1/2" 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" 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 *
							[INCH]		[MM]		1/2" TO 6" 38,1 TO 152,4 MM		2-1/4" TO 6-3/4" 57,1 TO 171,4 MM						
[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		
		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		

TUBE OD		TUBE GAUGE			TUBE ID		EXPANSION RANGE				TUBE SHEET THICKNESS				MANDREL	MANDREL SQUARE		PNEUMATIC MOTOR *	ELECTRIC MOTOR *
							[INCH]		[MM]		1/2" TO 6"		2-1/4" TO 6-3/4"						
											38,1 TO 152,4 MM		57,1 TO 171,4 MM						
[INCH]	[MM]	[BWG]	[INCH]	[MM]	[INCH]	[MM]	MIN	MAX	MIN	MAX	TOOL NO.	ROLL NO.	TOOL NO.	ROLL NO.		[INCH]	[MM]		
7/8	22,2	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	K50-600	TES3000 G1450 or TESMini2 ES2
		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	K50-1250	TES3000 G1000 or TESMini2 DU0
		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		
		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		
		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		
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 G1450 or TESMini2 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	K50-1250	TES3000 G1000 or TESMini2 DU0
		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		
		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**	**1282-5**	**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**	**1282-5**	**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**	**1282-5**	**R-15-A-5**	**M-71-3/8**	3/8	9,5	K60-400	TES3000 G1000 or TESMini2 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		
		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		
1-1/4	31,7	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	K60-400	TES3000 G1000 or TESMini2 DU1
		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		
		22	0,028	0,71	1,194	30,33	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 G1000 or TESMini2 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.*

F600 SERIES FLARE TYPE TUBE EXPANDERS

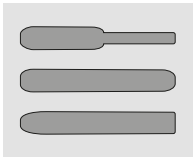
BASIC INFO

Tools for simultaneously expanding and flaring tubes in condensers, chillers, heat exchangers, fin fan coolers, feedwater heaters and surface condensers. Recommended for stainless steel, titanium, and other exotic thin wall tubes from GA 18 (1,2 mm) and less.
Expanders are supplied as a standard with STC collar but for 5-roll expanders, especially for 19 to 22 GA tubes, TWTC thin wall thrust collar is recommended. Many different shaped rolls are available.

WORKING RANGE

TUBE ID	TUBE OD	TUBE SHEET
13,51 – 22,45 mm	51 - 550,0 MM	38,1 - 57,1 MM
0,532 - 0,884"	⅝ - 1"	1½ - 2¼"

OPTIONAL SPARES AND ACCESSORIES



ROLLS ON REQUEST
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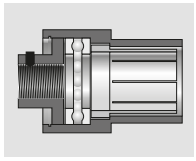

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ROLLING MOTORS
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TUBE ID		ROLL LENGTH 1-1/2" (38,1 MM)		ROLL LENGTH 2-1/4" (57,1 MM)		EXPANSION RANGE [INCH]		EXPANSION RANGE [MM]		FLARE ROLL	MANDREL	RECCOMENDED DRIVE*	
[INCH]	[MM]	TOOL NO.	ROLL 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.*

8012 SERIES CONDENSER TUBE EXPANDERS

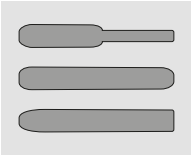
BASIC INFO

Tools for expanding tubes in condensers, chillers, heat exchangers, fin fan coolers, feedwater heaters and surface condensers.
Expanders are available in regular and long reaches (some diameters, up to 30 cm) and as the 5-rolls version. Many different shaped rolls are available.

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"	13/4 - 3"	11/2 - 21/4"

OPTIONAL SPARES AND ACCESSORIES



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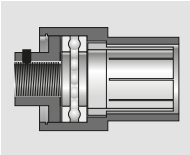

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TUBE OD		TUBE GAUGE			TUBE ID		EXPANSION RANGE [INCH]		EXPANSION RANGE [MM]		TOOL NO.	ROLL NO.	MANDREL	MANDREL	PNEUMATIC MOTOR *	ELECTRIC MOTOR *
[INCH]	[MM]	[BWG]	[INCH]	[MM]	[INCH]	[MM]	MIN	MAX	MIN	MAX				[INCH]		
1-3/4	44,4	8	0,165	4,19	1,42	36,07	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		
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 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		

TUBE OD		TUBE GAUGE			TUBE ID		EXPANSION RANGE [INCH]		EXPANSION RANGE [MM]		TOOL NO.	ROLL NO.	MANDREL	MANDREL	PNEUMATIC MOTOR *	ELECTRIC MOTOR *
[INCH]	[MM]	[BWG]	[INCH]	[MM]	[INCH]	[MM]	MIN	MAX	MIN	MAX				[INCH]		
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 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 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.*

TACK CONICAL EXPANDERS SERIES

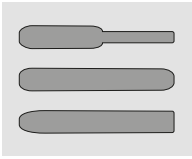
BASIC INFO

Special, conical expanders to expand the tube on the short length before welding.

WORKING RANGE

TUBE ID	TUBE OD
8,0 - 50,0 mm	9,5 - 50,8 mm
0,315 - 1,969”	0,374 - 2,000”

OPTIONAL SPARES AND ACCESSORIES



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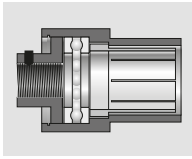

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EXPANSION RANGE				TOOL	ROLLS	MANDREL	MANDREL SQUARE		RECOMMENDED MOTOR *	
[MM]		[INCH]								
MIN	MAX	MIN	MAX				[MM]	[INCH]	AIR	ELECTRIC
7,80	9,90	0,307	0,390	**TRE-797**	**R-797**	**M-797**	9,5	3/8	K20-1800	TesMini 2 with HT-0
8,60	11,00	0,339	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-8012-2-8**	**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-21/4-10**	**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.*

VERNON "S-TYPE" TUBE EXPANDERS

BASIC INFO

Vernon's hydraulic tube rolling system creates a quality leak-proof joint in three to five seconds – 1/4 the time of competitive machines. Continuous mandrel rotation, coupled with automatic axial movement, eliminates time lost by other systems that reverse mandrel rotation for traction.

WORKING RANGE

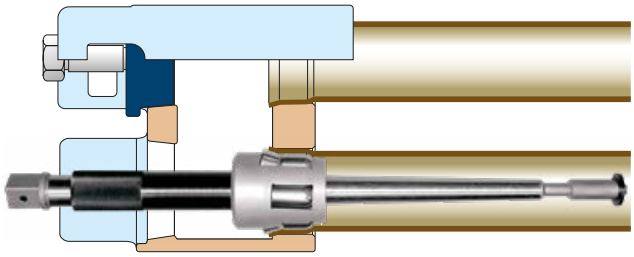
TUBE ID	TUBE OD
8,48 – 22,91 mm	12,70 - 25,4 MM
0,334 - 0,902"	½ - 1"

TUBE OD		BWG	TUBE ID		EFFECTIV ROLL LENGTH		EXPANDER NUMBER	PART NUMBER	MANDREL NUMBER	PART NUMBER	ROLL NUMBER	PART NUMBER
[INCH]	[MM]	[GA]	[INCH]	[MM]	[INCH]	[MM]						
1/2	12,70	14	0,334	8,48	1 1/8	28,58	**4 14 S X 6**	**5524238**	**4 S X 6**	**2998377**	**001-S**	**2998382**
		17	0,384	9,75	1 1/8	28,58	**5 11 S X 6**	**5524265**	**3 S X 6**	**2998376**	**1/2-S**	**2998383**
		18	0,402	10,21	1 3/16	30,16	**4 18 S X 6**	**5524239**	**3 S X 6**	**2998376**	**0-S**	**2998384**
		19	0,416	10,57	1 3/16	30,16	**4 18 S X 6**	**5524239**	**3 S X 6**	**2998376**	**0-S**	**2998384**
		20	0,430	10,92	1 3/16	30,16	**5 13 S X 6**	**5524240**	**5 S X 6**	**2998378**	**1-S**	**2998385**
5/8	15,88	12	0,407	10,34	1 5/16	33,34	**4 18 S X 6**	**5524239**	**3 S X 6**	**2998376**	**0-S**	**2998364**
		13	0,435	11,05	1 5/16	33,34	**5 13 S X 6**	**5524240**	**3 S X 6**	**2998376**	**1-S**	**2998385**
		14	0,459	11,66	1 5/16	33,34	**5 14 S X 6**	**5524241**	**5 S X 6**	**2998378**	**2-S**	**2998386**
		15	0,481	12,22	1 5/16	33,34	**5 15 S X 6**	**5524242**	**5 S X 6**	**2998378**	**3-S**	**2998387**
		16	0,495	12,57	1 5/16	33,34	**5 16 S X 6**	**5524243**	**5 S X 6**	**2998378**	**4-S**	**2998388**
		17	0,509	12,93	1 5/16	33,34	**5 17 S X 6**	**5524244**	**5 S X 6**	**2998378**	**5-S**	**2997559**
		18	0,527	13,39	1 5/16	33,34	**5 18 S X 6**	**5524245**	**5 S X 6**	**2998378**	**6-S**	**2998389**
3/4	19,05	10	0,482	12,24	1 5/16	33,34	**5 15 S X 6**	**5524242**	**5 S X 6**	**2998378**	**3-S**	**2998387**
		11	0,510	12,95	1 5/16	33,34	**5 17 S X 6**	**5524244**	**5 S X 6**	**2998378**	**5-S**	**2997559**
		12	0,532	13,51	1 5/16	33,34	**5 18 S X 6**	**5524245**	**5 S X 6**	**2998378**	**6-S**	**2998389**
		13	0,560	14,22	1 7/16	36,51	**6 13 S X 6**	**5524155**	**6 S X 6**	**2998269**	**9-S**	**2998270**
		14	0,564	14,33	1 7/16	36,51	**6 14 S X 6**	**5524154**	**6 S X 6**	**2998269**	**10-S**	**2998271**
		15	0,606	15,39	1 7/16	36,51	**6 15 S X 6**	**5524246**	**6 S X 6**	**2998269**	**11-S**	**2998390**
		16	0,620	15,75	1 7/16	36,51	**6 16 S X 6**	**5524247**	**6 S X 6**	**2998269**	**12-S**	**2998391**
		17	0,634	16,10	1 7/16	36,51	**6 16 S X 6**	**5524247**	**8 S X 6**	**2998380**	**12-S**	**2998391**
		18	0,652	16,56	1 7/16	36,51	**6 18 S X 6**	**5524248**	**8 S X 6**	**2998380**	**10-S**	**2998271**
7/8	22,23	9	0,579	14,71	1 7/16	36,51	**6 18 S X 6**	**5524248**	**6 S X 6**	**2998269**	**10-S**	**2998271**
		10	0,607	15,42	1 7/16	36,51	**6 15 S X 6**	**5524246**	**6 S X 6**	**2998269**	**11-S**	**2998390**
		11	0,635	16,13	1 7/16	36,51	**6 15 S X 6**	**5524246**	**8 S X 6**	**2998380**	**11-S**	**2998390**
		12	0,657	16,69	1 7/16	36,51	**6 18 S X 6**	**5524248**	**8 S X 6**	**2998380**	**10-S**	**2998271**
		13	0,685	17,40	1 7/16	36,51	**6 18 S X 6**	**5524248**	**8 S X 6**	**2998380**	**10-S**	**2998271**
		14	0,709	18,01	1 7/16	36,51	**8 9 S X 6**	**5524250**	**7 S X 6**	**2998379**	**13-S**	**2998393**
		15	0,731	18,57	1 7/16	36,51	**8 10 S X 6**	**5524251**	**7 S X 6**	**2998379**	**14-S**	**2998394**
		16	0,745	18,92	1 7/16	36,51	**8 10 S X 6**	**5524251**	**7 S X 6**	**2998379**	**14-S**	**2998394**
		17	0,759	19,28	1 7/16	36,51	**8 11 S X 6**	**5524252**	**7 S X 6**	**2998379**	**15-S**	**2998395**
		18	0,777	19,74	1 7/16	36,51	**8 12 S X 6**	**5524253**	**7 S X 6**	**2998379**	**16-S**	**2998396**
1	25,40	8	0,670	17,02	1 7/16	36,51	**8 8 S X 6**	**5524249**	**7 S X 6**	**2998379**	**12.5-S**	**2998392**
		9	0,704	17,88	1 7/16	36,51	**8 9 S X 6**	**5524250**	**7 S X 6**	**2998379**	**13-S**	**2998393**
		10	0,732	18,59	1 7/16	36,51	**8 10 S X 6**	**5524251**	**7 S X 6**	**2998379**	**14-S**	**2998394**
		11	0,760	19,30	1 7/16	36,51	**8 11 S X 6**	**5524252**	**7 S X 6**	**2998379**	**15-S**	**2998395**
		12	0,782	19,86	1 7/16	36,51	**8 12 S X 8**	**5524253**	**7 S X 6**	**2998379**	**16-S**	**2998396**
		13	0,810	20,57	1 7/16	36,51	**8 13 S X 6**	**5524254**	**8 S X 6**	**2998380**	**20-S**	**2998399**
		14	0,834	21,18	1 7/16	36,51	**8 14 S X 8**	**5524255**	**8 S X 6**	**2998380**	**18-S**	**2998397**
		15	0,856	21,74	1 7/16	36,51	**8 15 S X 6**	**5524256**	**8 S X 6**	**2998380**	**19-S**	**2998398**
		16	0,870	22,10	1 7/16	36,51	**8 16 S X 8**	**5524257**	**10 S X 8**	**2998381**	**20-S**	**2998399**
		17	0,884	22,45	1 7/16	36,51	**8 16 S X 8**	**5524257**	**10 S X 8**	**2998381**	**20-S**	**2998399**
		18	0,902	22,91	1 7/16	36,51	**8 18 S X 8**	**5524258**	**10 S X 8**	**2998381**	**18-S**	**2998397**

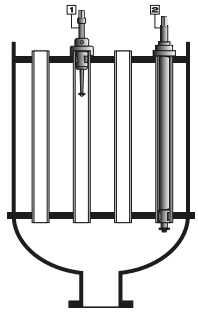
SPECIAL TUBE EXPANDERS

REFINERY TUBE EXPANDER

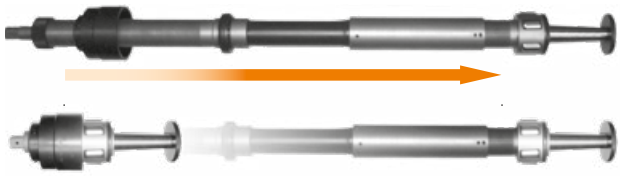
Tube expander for straight rolling or rolling and flaring very thick-walled tubes in cracking furnace tube seats for tubes outside diameter from 50 to 250 mm (2”-10”) and gauges from 6 to 15 mm (0,19” to 0,59”). Flaring 10 to 15 degree. Roll length 38,1 to 101 mm (1-1/2” - 4”). Made on request to drawing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

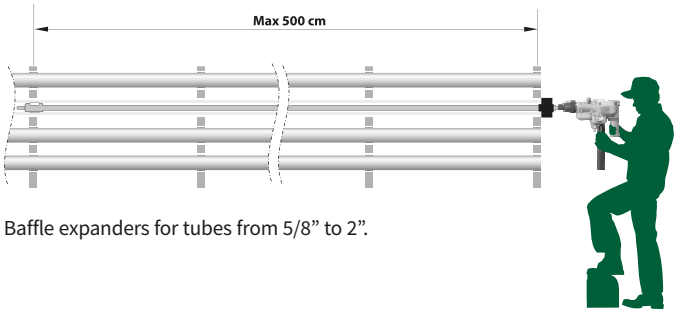
LUBRICATION-COOLING BOX

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

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.

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 prodect to the tubes from the scratches. Used for tytanium tubes.

RECOMMENDED MOTORS FOR BOILER TUBE EXPANDERS

Varies depending upon tube material, gauge, and tube sheet thickness. For tubes above 4" (101,6 mm) we recommend model K77-RT-25

TOOL NO	K73-RT-375	K73-RT-280	K73-RT-190	TESMINI K90-E-190	K72-RT-90	K90-E-90
KS Series						
KS-19	OK					
KS-20	OK					
KS-22	OK					
KS-23	OK					
KS-24	OK					
KS-25	OK					
KS-27	OK					
KS-28	OK	OK		OK		
KS-29	OK	OK		OK		
KS-30	OK	OK		OK		
KS-32	OK	OK	OK	OK		
KS-35	OK	OK	OK	OK		OK
KS-37	OK	OK	OK	OK		OK
KS-40	OK	OK	OK	OK	OK	OK
KS-42	OK	OK	OK	OK	OK	OK
KS-44		OK	OK	OK	OK	OK
KS-47		OK	OK	OK	OK	OK
KS-49		OK	OK	OK	OK	OK
KS-52		OK	OK	OK	OK	OK
KS-54			OK	OK	OK	OK
KS-57			OK	OK	OK	OK
KS-60					OK	OK
KS-65					OK	OK
KS-68					OK	OK
KS-72					OK	OK
KS-77					OK	OK
KS-82					OK	OK
KS-86					OK	OK
KS-90					OK	OK
KS-96					OK	OK
PZ Series						
PZ-19	OK					
PZ-20	OK					
PZ-22	OK					
PZ-25	OK					
PZ-28	OK	OK		OK		
PZ-29	OK	OK		OK		

TOOL NO	K73-RT-375	K73-RT-280	K73-RT-190	TESMINI K90-E-190	K72-RT-90	K90-E-90
PZ-30	OK	OK		OK		
PZ-32	OK	OK	OK	OK		
PZ-35	OK	OK	OK	OK		
PZ-37	OK	OK	OK	OK		
PZ-40	OK	OK	OK	OK	OK	OK
PZ-42	OK	OK	OK	OK	OK	OK
PZ-44		OK	OK	OK	OK	OK
PZ-47		OK	OK	OK	OK	OK
PZ-49		OK	OK	OK	OK	OK
PZ-52		OK	OK	OK	OK	OK
PZ-54			OK	OK	OK	OK
PZ-57			OK	OK	OK	OK
PZ-60					OK	OK
PZ-65					OK	OK
PZ-68					OK	OK
PZ-72					OK	OK
PZ-77					OK	OK
PZ-82					OK	OK
PZ-86					OK	OK
PZ-90					OK	OK
PZ-96					OK	OK
P2 Series						
P2-280		OK		OK		
P2-290		OK		OK		
P2-300		OK		OK		
P2-320		OK	OK	OK		
P2-350		OK	OK	OK		OK
P2-370		OK	OK	OK		OK
P2-400		OK	OK	OK	OK	OK
P2-420		OK	OK	OK	OK	OK
P2-440		OK	OK	OK	OK	OK
P2-470		OK	OK	OK	OK	OK
P2-490		OK	OK	OK	OK	OK
P2-520			OK	OK	OK	OK
P2-540			OK	OK	OK	OK
P2-570					OK	OK
P2-600					OK	OK
P2-650					OK	OK

TOOL NO	K73-RT-375	K73-RT-280	K73-RT-190	TESMINI K90-E-190	K72-RT-90	K90-E-90
P2-680					OK	OK
FTKS Series						
FTKS-508			OK			OK
FTKS-635			OK		OK	OK
FTKS-762					OK	OK
FTPZ Series						
FTPZ-508			OK			OK
FTPZ-635			OK		OK	OK
FTPZ-762					OK	OK
UCRBT Series						
K-41633-00					OK	OK
K-42158-00					OK	OK
K-41359-00					OK	OK

SHORT MANDREL'S EXPANSION RANGE

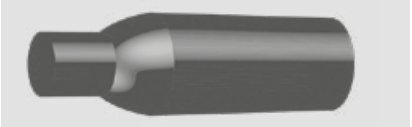
MANDREL SET	EXPANSION RANGE ON THE EACH MANDREL												PROTRUDING FROM THE FRONT OF CAGE		SQUARE
	A				B				C						
	[MM]		[INCH]		[MM]		[INCH]		[MM]		[INCH]				
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MM	INCH	
TKK-19	19	20	0,748	0,787	20	21	0,787	0,827	21	22	0,827	0,866	40	1,575	½"
TKK-20	20	21	0,787	0,826	21	22	0,827	0,866	22	23	0,866	0,906	40	1,575	½"
TKK-22	22	23	0,866	0,905	23	24	0,906	0,945	24	25	0,945	0,984	40	1,575	½"
TKK-23	23	24	0,906	0,944	24	25	0,945	0,984	25	26	0,984	1,024	40	1,575	½"
TKK-24	24	25	0,945	0,984	25	26	0,984	1,024	26	27	1,024	1,063	40	1,575	½"
TKK-25	25	26	0,984	1,023	26	27	1,024	1,063	27	28	1,063	1,102	40	1,575	½"
TKK-27	27	28	1,063	1,102	28	29	1,102	1,142	29	30	1,142	1,181	40	1,575	½"
TKK-28	28	29,3	1,102	1,153	29,3	30,6	1,154	1,205	30,6	32	1,205	1,260	50	1,969	½"
TKK-29	29	30,3	1,142	1,192	30,3	31,6	1,193	1,244	31,6	33	1,244	1,299	50	1,969	½"
TKK-30	30	31,3	1,181	1,232	31,3	32,6	1,232	1,283	32,6	34	1,283	1,339	50	1,969	½"
TKK-32	32	33,3	1,260	1,311	33,3	34,6	1,311	1,362	34,6	36	1,362	1,417	50	1,969	½"
TKK-37[*1]	35	37	1,378	1,456	37	39	1,457	1,535	39	41	1,535	1,614	65	2,559	¾"
TKK-37	37	39	1,457	1,535	39	41	1,535	1,614	41	43	1,614	1,693	65	2,559	¾"
TKK-42[*2]	40	42	1,575	1,653	42	44	1,654	1,732	44	46	1,732	1,811	65	2,559	¾"
TKK-42	42	44	1,654	1,732	44	46	1,732	1,811	46	48	1,811	1,890	65	2,559	¾"
TKK-44	44	46	1,732	1,811	46	48	1,811	1,890	48	50	1,890	1,969	65	2,559	¾"
TKK-47	47	49,4	1,850	1,944	49,4	51,7	1,945	2,035	51,7	54	2,035	2,126	75	2,953	¾"
TKK-49	49	51,4	1,929	2,023	51,4	53,7	2,024	2,114	53,7	56	2,114	2,205	75	2,953	¾"
TKK-49[*3]	52	54,6	2,047	2,149	54,4	56,9	2,142	2,240	57,7	59,2	2,272	2,331	75	2,953	¾"
TKK-54	54	56,6	2,126	2,228	56,6	59,3	2,228	2,335	59,3	62	2,335	2,441	82	3,228	¾"
TKK-57	57	60	2,244	2,362	60	63	2,362	2,480	63	66	2,480	2,598	90	3,543	¾"
TKK-65[*4]	60	63	2,362	2,480	63	66	2,480	2,598	66	69	2,598	2,717	90	3,543	¾"
TKK-65	65	68	2,559	2,677	68	71	2,677	2,795	71	74	2,795	2,913	90	3,543	¾"
TKK-72[*5]	68	71,4	2,677	2,811	71,4	74,7	2,811	2,941	74,7	78	2,941	3,071	100	3,937	1"
TKK-72	72	75,3	2,835	2,964	75,4	78,6	2,969	3,094	78,7	82	3,098	3,228	100	3,937	1"
TKK-77	77	80,4	3,031	3,165	80,4	83,7	3,165	3,295	83,7	87	3,295	3,425	100	3,937	1"
TKK-82	82	85,4	3,228	3,362	85,4	88,7	3,362	3,492	88,7	92	3,492	3,622	100	3,937	1"
TKK-86	86	89,4	3,386	3,519	89,4	92,7	3,520	3,650	92,7	96	3,650	3,780	100	3,937	1"
TKK-90	90	94	3,543	3,700	94	98	3,701	3,858	98	102	3,858	4,016	115	4,528	1"
TKK-96	96	100	3,780	3,937	100	104	3,937	4,094	104	108	4,094	4,252	115	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

AVAILABLE ROLLS LENGTH

ROLLS	ROLL LENGTH		TUBE SHEET THICKNESS	
	[INCH]	[MM]	[INCH]	[MM]
A	1,574	40	½" - 3/4"	12 - 19
B	2,362	60	⅞" – 1¼"	22 - 32
C	3,149	80	1⅜" - 1¾"	35 - 45
D	3,937	100	1⅞" - 2¼"	48 - 58

BOTTLE ROLLS



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

Three expansion rolls with three flare rolls, self feeding boiler expanders. This expanders simultaneously expand and flare the tube. An excellent expander for re-rolling leaky tubes and for new constructions of water tube boilers, fire tube boilers, economizers, air heaters. Expanders with 6 expansion rolls and 3 flare rolls are available on request. K70's right-angle rolling motors are recommended to be used with this expanders.

TUBE OD		TUBE GAUGE	TOOL NO.	EXPANSION RANGE				STDANDARD ROLLS			OTHER ROLL LENGTH PAGE C3	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]	[INCH]	[MM]
1	25,40	9-11	**KS-19**	19	22	0,75	0,87	**RR12RK5**	42	1,65	**A**	**TK19**	195	7,68	**-**	-	-	1/2	12,7
		13-14	**KS-20**	20	23	0,79	0,91	**RR12RK5**	42	1,65	**A**	**TK20**	195	7,68	**-**	-	-	1/2	12,7
1 1/4	31,75	7	**KS-22**	22	25	0,87	0,98	**RR12RK5**	42	1,65	**A**	**TK22**	195	7,68	**-**	-	-	1/2	12,7
		9	**KS-23**	23	26	0,91	1,02	**RR13RK6**	42	1,65	**A**	**TK23**	195	7,68	**-**	-	-	1/2	12,7
		10	**KS-24**	24	27	0,94	1,06	**RR13RK6**	42	1,65	**A**	**TK24**	195	7,68	**-**	-	-	1/2	12,7
		11-13	**KS-25**	25	28	0,98	1,10	**RR13RK6**	42	1,65	**A**	**TK25**	195	7,68	**-**	-	-	1/2	12,7
		12-14	**KS-26**	26	29	1,02	1,14	**RR13RK6**	42	1,65	**A**	**TK26**	195	7,68	**-**	-	-	1/2	12,7
		14-15	**KS-27**	27	30	1,06	1,18	**RR15RK7**	42	1,65	**A**	**TK27**	200	7,87	**-**	-	-	1/2	12,7
		16	**KS-28**	28	32	1,10	1,26	**RR16RK8**	42	1,65	**B C**	**TK28**	260	10,24	**TKK28**	175	6,89	3/4	19,0
1 1/2	38,10	7-10	**KS-29**	29	33	1,14	1,30	**RR16RK8**	42	1,65	**B C**	**TK29**	260	10,24	**TKK29**	175	6,89	3/4	19,0
		10-12	**KS-30**	30	34	1,18	1,34	**RR16RK8**	42	1,65	**B C**	**TK30**	260	10,24	**TKK30**	175	6,89	3/4	19,0
		12-14	**KS-32**	32	36	1,26	1,42	**RR17RK9**	42	1,65	**B C**	**TK32**	260	10,24	**TKK32**	175	6,89	3/4	19,0
		13-20	**KS-33**	33	38	1,99	1,49	**RP33RR33**	42	1,65	**B C**	**TK33**	290	11,41	**TKK33**	181	7,12	3/4	19,0
1 3/4	44,45	8-9	**KS-35**	35	41	1,38	1,61	**RR21RK35**	42	1,65	**B C**	**TK37**	310	12,20	**TKK37**	188	7,40	3/4	19,0
		10-12	**KS-37**	37	43	1,46	1,69	**RR22RK10**	42	1,65	**B C**	**TK37**	310	12,20	**TKK37**	188	7,40	3/4	19,0
		12-18	**KS-39**	39	45	1,53	1,77	**RR40RK40**	42	1,65	**B C**	**TK37**	310	12,20	**TKK37**	188	7,40	3/4	19,0
2	50,80	7-9	**KS-40**	40	46	1,57	1,81	**RR40RK40**	50	1,97	**A B C D**	**TK42**	310	12,20	**TKK42**	205	8,07	3/4	19,0
		10-13	**KS-42**	42	48	1,65	1,89	**RR23RK11**	50	1,97	**A B C D**	**TK42**	310	12,20	**TKK42**	205	8,07	3/4	19,0
		12-14	**KS-44**	44	50	1,73	1,97	**RR23RK11**	50	1,97	**A B C D**	**TK44**	310	12,20	**TKK44**	205	8,07	3/4	19,0
			KS-47	47	54	1,85	2,13	**RR24RK12**	50	1,97	**A B C D**	**TK47**	338	13,31	**TKK47**	218	8,58	3/4	19,0
2 1/4	57,15	10-13	**KS-49**	49	56	1,93	2,20	**RR24RK12**	50	1,97	**A B C D**	**TK49**	338	13,31	**TKK49**	218	8,58	3/4	19,0
		14-16	**KS-52**	52	59	2,05	2,32	**RR25RK13**	50	1,97	**A B C D**	**TK49**	338	13,31	**TKK49**	218	8,58	3/4	19,0
2 1/2	63,50	8-13	**KS-54**	54	62	2,13	2,44	**RR26RK14**	50	1,97	**A B C D**	**TK54**	375	14,76	**TKK54**	230	9,06	3/4	19,0
		12-16	**KS-57**	57	66	2,24	2,60	**RR27RK15**	50	1,97	**A B C D**	**TK57**	395	15,55	**TKK57**	235	9,25	3/4	19,0
2 3/4	69,85	7-11	**KS-60**	60	69	2,36	2,72	**RR28RK16**	50	1,97	**A B C D**	**TK57**	395	15,55	**TKK57**	235	9,25	3/4	19,0
3	76,20	7-8	**KS-65**	65	74	2,56	2,91	**RR29RK17**	50	1,97	**A B C D**	**TK65**	395	15,55	**TKK65**	235	9,25	3/4	19,0
		10-14	**KS-68**	68	78	2,68	3,07	**RR30RK18**	50	1,97	**A B C D**	**TK72**	425	16,73	**TKK72**	255	10,04	1	25,4
3 1/4	82,55	7-11	**KS-72**	72	82	2,83	3,23	**RR31RK19**	50	1,97	**A B C D**	**TK72**	425	16,73	**TKK72**	255	10,04	1	25,4
	82,55	15-16	**KS-77**	77	87	3,03	3,43	**RR32RK20**	50	1,97	**A B C D**	**TK77**	425	16,73	**TKK77**	255	10,04	1	25,4
3 1/2	88,90	10-13	**KS-82**	82	92	3,23	3,62	**RR33RK21**	50	1,97	**A B C D**	**TK82**	425	16,73	**TKK82**	255	10,04	1	25,4
3 3/4	95,25	8-12	**KS-86**	86	96	3,39	3,78	**RR34RK22**	50	1,97	**A B C D**	**TK86**	425	16,73	**TKK86**	255	10,04	1	25,4
4	101,60	9-12	**KS-90**	90	102	3,54	4,02	**RR34RK22**	50	1,97	**A B C D**	**TK90**	485	19,09	**TKK90**	275	10,83	1	25,4
		16	**KS-96**	96	108	3,78	4,25	**RR35RK23**	50	1,97	**A B C D**	**TK96**	485	19,09	**TKK96**	275	10,83	1	25,4

If you order expander KS-54 with rolls of 50 mm you should specify KS-5450, with 60 mm KS-5460, etc.
Short mandrel set with shorter length on request.

PZ SERIES

Three expansion rolls, self feeding tube expanders. An excellent expander for re-rolling leaky tubes and for new constructions of water tube boilers, fire tube boilers, economizers and air heaters.
Expanders with 4, 5 and 7 rolls are available on request.
Our K70's right-angle rolling motors are recommended to be used with this expanders.

TUBE OD		TUBE GAUGE	TOOL NO.	EXPANSION RANGE				STDANDARD ROLLS			OTHER ROLL LENGTH PAGE C3	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]	[INCH]	[MM]
1	25,40	11-12	**PZ-19**	19	22	0,75	0,87	**RR12**	42	1,654	**A**	**TK19**	195	7,677	-	-	-	12,7	1/2
		13-16	**PZ-20**	20	23	0,79	0,93	**RR12**	42	1,654	**A**	**TK20**	208	8,189	-	-	-	12,7	1/2
1-1/8	28,58	12-14	**PZ-22**	22	25	0,87	0,98	**RR12**	42	1,654	**A**	**TK22**	220	8,661	-	-	-	12,7	1/2
		14-16	**PZ-23**	23	26	0,91	1,02	**RR13**	42	1,564	**A**	**TK23**	220	8,661	-	-	-	12,7	1/2
		15-17	**PZ-24**	24	27	0,94	1,06	**RR13**	42	1,564	**A**	**TK24**	220	8,661	-	-	-	12,7	1/2
		16	**PZ-25**	25	28	0,98	1,14	**RR13**	42	1,654	**A**	**TK25**	220	8,661	-	-	-	12,7	1/2
1-1/4	31,75	12-14	**PZ-26**	26	29	1,02	1,14	**RR13**	42	1,654	**A**	**TK26**	220	8,661	-	-	-	12,7	1/2
		12-17	**PZ-27**	27	30	1,06	1,18	**RR15**	42	1,654	**A**	**TK27**	220	8,661	-	-	-	12,7	1/2
		16	**PZ-28**	28	32	1,10	1,26	**RR16**	42	1,654	**B C**	**TK28**	285	11,220	-	-	-	19,0	3/4
1-1/2	38,10	7-11	**PZ-29**	29	33	1,14	1,34	**RR16**	42	1,654	**B C**	**TK29**	285	11,220	-	-	-	19,0	3/4
		10-12	**PZ-30**	30	34	1,18	1,38	**RR16**	42	1,654	**B C**	**TK30**	285	11,220	-	-	-	19,0	3/4
		13-16	**PZ-32**	32	36	1,26	1,42	**RR17**	42	1,654	**B C**	**TK32**	260	10,236	-	-	-	19,0	3/4
		13-20	**PZ-33**	33	38	1,99	1,49	**RP33**	42	1,65	**B C**	**TK33**	290	11,41	**TKK33**	181,00	7,12	19,0	3/4
1-3/4	44,45	8-9	**PZ-35**	35	41	1,38	1,61	**RR21**	42	1,654	**B C**	**TK37**	310	12,205	**TKK37**	188,00	7,402	19,0	3/4
		10-16	**PZ-37**	37	43	1,46	1,69	**RR22**	42	1,654	**B C**	**TK37**	310	12,205	**TKK37**	188,00	7,402	19,0	3/4
		12-18	**PZ-39**	39	45	1,53	1,77	**RR40**	42	1,654	**B C**	**TK37**	310	12,205	**TKK37**	188,00	7,402	19,0	3/4
2	50,80	7-10	**PZ-40**	40	46	1,57	1,81	**RR40**	50	1,969	**A B C D**	**TK42**	310	12,205	**TKK42**	205,00	8,071	19,0	3/4
		11-12	**PZ-42**	42	48	1,65	1,89	**RR23**	50	1,969	**A B C D**	**TK42**	310	12,205	**TKK42**	205,00	8,071	19,0	3/4
		13-15	**PZ-44**	44	50	1,73	1,97	**RR23**	50	1,969	**A B C D**	**TK44**	310	12,205	**TKK44**	205,00	8,071	19,0	3/4
		16	**PZ-47**	47	54	1,85	2,13	**RR24**	50	1,969	**A B C D**	**TK47**	338	13,307	**TKK47**	218,00	8,583	19,0	3/4
2-1/4	57,15	10-12	**PZ-49**	49	56	1,93	2,20	**RR24**	50	1,969	**A B C D**	**TK49**	338	13,307	**TKK49**	218,00	8,583	19,0	3/4
		14-16	**PZ-52**	52	59	2,05	2,32	**RR25**	50	1,969	**A B C D**	**TK49**	338	13,307	**TKK49**	218,00	8,583	19,0	3/4
2-1/2	63,50	11-12	**PZ-54**	54	62	2,13	2,44	**RR26**	50	1,969	**A B C D**	**TK54**	375	14,764	**TKK54**	230,00	9,055	19,0	3/4
		13-16	**PZ-57**	57	66	2,24	2,60	**RR27**	50	1,969	**A B C D**	**TK57**	395	15,551	**TKK57**	235,00	9,252	19,0	3/4
2-3/4	69,85	7-11	**PZ-60**	60	69	2,36	2,72	**RR28**	50	1,969	**A B C D**	**TK57**	395	15,551	**TKK57**	235,00	9,252	19,0	3/4
3	76,20	7-11	**PZ-65**	65	74	2,56	2,91	**RR29**	50	1,969	**A B C D**	**TK65**	395	15,551	**TKK65**	235,00	9,252	19,0	3/4
3		12-13	**PZ-68**	68	78	2,68	3,07	**RR30**	50	1,969	**A B C D**	**TK72**	425	16,732	**TKK72**	255,00	10,039	25,40	1
3-1/4	82,55	7-12	**PZ-72**	72	82	2,83	3,23	**RR31**	50	1,969	**A B C D**	**TK72**	425	16,732	**TKK72**	255,00	10,039	25,40	1
		13-16	**PZ-77**	77	87	3,03	3,43	**RR32**	50	1,969	**A B C D**	**TK77**	425	16,732	**TKK77**	255,00	10,039	25,40	1
3-1/2	88,90	10-16	**PZ-82**	82	92	3,23	3,62	**RR33**	50	1,969	**A B C D**	**TK82**	425	16,732	**TKK82**	255,00	10,039	25,40	1
3-3/4	95,25	7-12	**PZ-86**	86	96	3,39	3,78	**RR34**	50	1,969	**A B C D**	**TK86**	425	16,732	**TKK86**	255,00	10,039	25,40	1
4	101,60	8-12	**PZ-90**	90	102	3,54	4,02	**RR34**	50	1,969	**A B C D**	**TK90**	485	19,094	**TKK90**	275,00	10,827	25,40	1
		13-16	**PZ-96**	96	108	3,78	4,25	**RR35**	50	1,969	**A B C D**	**TK96**	485	19,094	**TKK96**	275,00	10,827	25,40	1

If you order expander PZ-54 with rolls of 50 mm you should specify PZ-5450, with 60 mm PZ-5460.
Short mandrel set with shorter length on request.

P2 SERIES

Three rolls, self feeding adjustable reach tube expander for deep reach expansion. Parallel rolling with long effective double radius rolls. Rolls are self retained in the cage. An excellent expander for use as touch-up expansion as well as a hard rolling and re-rolling a leaky tubes and for new constructions of water tube boilers, fire tube boilers, economizers, air heaters.
Expanders with 4, 5 rolls, with longer rolls or longer reach with 2 inch increments are available on request.
Our K70's right-angle rolling motors are recommended to be used with this expanders. Tube rolling accessories refer to the page I-2.

TUBE OD		TUBE GAUGE	TOOL NO.	EXPANSION RANGE				STDANDARD ROLLS			MANDREL	SQUARE	
				[INCH]		[MM]		NO.	LENGHT				
[INCH]	[MM]	[BWG]		MIN	MAX	MIN	MAX		[MM]	[INCH]		[INCH]	[MM]
1-1/4"	31.7	16	**P2-280**	1.100	1.299	27.80	33.00	**998**	60	2,362	**T-290**	1/2"	12.7
1-1/2"	38.1	7-11	**P2-290**	1.140	1.330	28.80	34.00	**1048**	60	2,362	**T-290**	1/2"	12.7
		10-12	**P2-300**	1.173	1.337	29.80	35.00	**1089**	60	2,362	**T-290**	1/2"	12.7
		13-16	**P2-320**	1.251	1.456	31.80	37.00	**1143**	60	2,362	**T-320**	1/2"	12.7
1-3/4"	44.4	8-9	**P2-350**	1.370	1.614	34.80	41.00	**RR21A**	60	2,362	**T-370**	3/4"	19
		10-16	**P2-370**	1.448	1.692	36.80	43.00	**RR22A**	60	2,362	**T-370**	3/4"	19
2"	50.8	7-10	**P2-400**	1.566	1.811	39.80	46.00	**RR40A**	60	2,362	**T-420**	3/4"	19
		11-12	**P2-420**	1.645	1.889	41.80	48.00	**RR23A**	60	2,362	**T-420**	3/4"	19
		13-15	**P2-440**	1.724	1.968	43.80	50.00	**RR23A**	60	2,362	**T-440**	3/4"	19
		16	**P2-470**	1.842	2.125	46.80	54.00	**RR24A**	60	2,362	**T-470**	3/4"	19
2-1/4"	57.1	10-12	**P2-490**	1.921	2.204	48.80	56.00	**RR24A**	60	2,362	**T-490**	3/4"	19
		14-16	**P2-520**	2.039	2.332	51.80	59.00	**RR25A**	60	2,362	**T-490**	3/4"	19
2-1/2"	63.5	11-12	**P2-540**	2.118	2.440	53.80	62.00	**RR26A**	60	2,362	**T-540**	3/4"	19
		13-16	**P2-570**	2.236	2.598	56.80	66.00	**RR27A**	60	2,362	**T-570**	3/4"	19
2-3/4"	69.8	7-11	**P2-600**	2.354	2.716	59.80	69.00	**RR28A**	60	2,362	**T-570**	3/4"	19
3"	76.2	7-11	**P2-650**	2.551	2.952	64.80	74.00	**RR29A**	60	2,362	**T-650**	3/4"	19
		13-15	**P2-680**	2.669	3.070	67.80	78.00	**RR30A**	60	2,362	**T-720**	1"	25.4
3-1/4"	82.55	7-12	**P2-720**	2,834	3,228	72,00	82,00	**RR31A**	60	2,362	**T-720**	1"	25,4
		13-16	**P2-770**	3,030	3,430	77,00	87,00	**RR32A**	60	2,362	**T-770**	1"	25,4
3-1/2"	88.9	10-16	**P2-820**	3,228	3,622	82,00	92,00	**RR33A**	60	2,362	**T-820**	1"	25,4
3-3/4"	95.25	7-12	**P2-860**	3,385	3,779	86,00	96,00	**RR34A**	60	2,362	**T-860**	1"	25,4
4"	101.6	8-12	**P2-900**	3,543	4,015	90,00	102,00	**RR34A**	60	2,362	**T-900**	1"	25,4
		13-16	**P2-960**	3,779	4,409	96,00	108,00	**RR35A**	60	2,362	**T-960**	1"	25,4

Expanders P2 are also availble with 80 mm rolls. Examples of order:
- P2-420 - regular expander with 60 mm rolls
- P2-420/80 - expander with 80 mm rolls
- P2-420/80+3" - expander with 80 mm rolls and extended length for 3"

FIRETUBE BOILER FLARING TUBE EXPANDERS

Three expansion rolls and three flare rolls, self feeding tube expanders with adjustable thrust collar for friction free operation and long tool life, as well as allow to adjust the flare length. This expander will simultaneously expand and flare the tube. Adjustable collar allows consistent flare length. An excellent expander for re-rolling a leaky tubes and for new constructions of water tube boilers, fire tube boilers, economizers, air heaters.
Expanders with 6 rolling rolls and 3 flare rolls are available on request.

TUBE OD		TUBE GAUGE	TOOL NO.	EXPANSION RANGE				ROLL SET NO.	MANDREL NO.	SHORT MANDREL SET	MANDREL SQUARE	
				[INCH]		[INCH]						
[INCH]	[MM]	[BWG]		MIN	MAX	MIN	MAX				[INCH]	[MM]
2	50,8	10-14	**FTKS-508**	1,653	41,99	1,889	47,98	**RR23RK11**	**TF-42**	**TFKK-42**	3/4	19
2-1/2	63,5	10-14	**FTKS-635**	2,125	53,98	2,440	61,98	**RR25RK14**	**TF-54**	**TFKK-54**	3/4	19
3	76,2	10-14	**FTKS-762**	2,559	65,00	2,952	74,98	**RR29RK17**	**TF-65**	**TFKK-65**	3/4	19

PARALLEL EXPANSION FIRETUBE EXPANDERS

Three rolls, self feeding tube expanders. Flip type thrust collar, accommodate tube sheets of 3/8” to 1” thick. An excellent expander for re-rolling a leaky tubes and for new constructions of water tube boilers, fire tube boilers, economizers, air Heaters.
Expanders with 4, 5 and 7 rolls are available on request.

TUBE OD		TUBE GAUGE	TOOL NO.	EXPANSION RANGE				ROLL SET NO.	MANDREL NO.	SHORT MANDREL SET	MANDREL SQUARE	
				[INCH]		[MM]						
[INCH]	[MM]	[BWG]		MIN	MAX	MIN	MAX				[INCH]	[MM]
2	50,8	10-14	**FTPZ-508**	1,653	1,889	41,99	47,98	**RR23**	**TK-42**	**TKK-42**	3/4	19
2-1/2	63,5	10-14	**FTPZ-635**	2,125	2,440	53,98	61,98	**RR25**	**TK-54**	**TKK-54**	3/4	19
3	76,2	10-14	**FTPZ-762**	2,559	2,952	65,00	74,98	**RR29**	**TK-65**	**TKK-65**	3/4	19

UNIVERSAL COMBINATION ROLLER BEADING

This tool is designed primarily for the fabrication and maintenance of Fire Tube Boilers with Tubes of 2”-3” OD. This self feeding, straight roll tool, is capable of simultaneously expanding and forming a uniform bead tight upon the tube sheet. For the best results we recommend a tube projection of 3/16” (5 mm).

TUBE OD		TUBE GAUGE	TOOL NO.	EXPANSION RANGE				ROLLS	BEADING ROLLS	FRONT PILOT	MANDREL	MANDREL SQUARE	
				[INCH]		[MM]							
[INCH]	[MM]	[BWG]		MIN	MAX	MIN	MAX					[INCH]	[MM]
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

COLONS EXPANDER

Non parallel self feeding boiler tube expanders from ½" to 4". Suitable for new erection or repair work that have thin tube sheet or just touch up a leaky joints. Recommended for tube sheets from 1/8" to 5/8" (3 mm to 16 mm).

TUBE OD		GAUGE	TUBE ID				TOOL NO.	EXPANSION RANGE				MANDREL NO.	ROLLS NO.	MANDREL SQUARE	
			[INCH]		[MM]			[INCH]		[MM]					
[INCH]	[MM]	[BWG]	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX			[INCH]	[MM]
1/2	12,70	16-17	0,370	0,384	9,40	9,76	**CBTE-10**	0,352	0,435	8,94	11,05	**MS-22**	**RS-13**	3/8	9,52
		18-19	0,402	0,416	10,22	10,56	**CBTE-11**	0,382	0,465	9,70	11,81	**MS-23**	**RS-13**	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	**MS-24**	**RS-14**	3/8	9,52
		15-17	0,481	0,509	12,21	12,93	**CBTE-15**	0,462	0,566	11,73	14,37	**MS-25**	**RS-15**	3/8	9,52
		18-19	0,527	0,541	13,39	13,73	**CBTE-17**	0,490	0,620	12,44	15,74	**MS-26**	**RS-15**	3/8	9,52
3/4	19,05	10	0,482	0,482	12,25	12,25	**CBTE-15**	0,462	0,566	11,73	14,37	**MS-25**	**RS-15**	3/8	9,52
		11-12	0,510	0,532	12,95	13,51	**CBTE-17**	0,490	0,620	12,44	15,74	**MS-26**	**RS-15**	3/8	9,52
		13-15	0,560	0,606	14,23	15,39	**CBTE-19**	0,538	0,688	13,66	17,47	**MS-26**	**RS-16**	3/8	9,52
		16-17	0,620	0,634	15,75	16,11	**CBTE-21**	0,596	0,752	15,13	19,10	**MS-27**	**RS-17**	3/8	9,52
		18-19	0,652	0,916	16,57	23,26	**CBTE-22**	0,620	0,776	15,75	19,71	**MS-27**	**RS-18**	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	**MS-27**	**RS-17**	3/8	9,52
		12	0,657	0,657	16,68	16,68	**CBTE-22**	0,620	0,776	15,75	19,71	**MS-27**	**RS-18**	3/8	9,52
		13-14	0,685	0,709	17,40	18,00	**CBTE-23**	0,650	0,806	16,51	20,47	**MS-27**	**RS-19**	3/8	9,52
		15-17	0,731	0,759	18,56	19,28	**CBTE-24**	0,710	0,866	18,03	21,99	**MS-28**	**RS-19**	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	**MS-27**	**RS-19**	3/8	9,52
		10-11	0,732	0,760	18,60	19,30	**CBTE-24**	0,710	0,866	18,03	21,99	**MS-28**	**RS-19**	1/2	12,70
		12-13	0,782	0,810	19,86	20,58	**CBTE-25**	0,760	0,916	19,30	23,26	**MS-28**	**RS-20**	1/2	12,70
		14-16	0,834	0,870	21,18	22,10	**CBTE-26**	0,812	0,968	20,62	24,58	**MS-28**	**RS-21**	1/2	12,70
		17-18	0,884	0,902	22,46	22,92	**CBTE-27**	0,861	1,018	21,88	25,85	**MS-28**	**RS-22**	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	**MS-28**	**RS-22**	1/2	12,70
		13-17	0,937	1,008	23,80	25,60	**CBTE-29**	0,890	1,173	22,60	29,80	**MS-29**	**RS-24**	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	**MS-29**	**RS-24**	1/2	12,70
		13-16	1,058	1,118	26,88	28,40	**CBTE-30**	1,016	1,291	25,80	32,80	**MS-29**	**RS-25**	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	**MS-29**	**RS-26**	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	**MS-29**	**RS-26**	1/2	12,70
1 1/2	38,10	13-16	1,310	1,370	33,28	34,80	**CBTE-32**	1,274	1,524	32,35	38,70	**MS-30**	**RS-26**	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	**MS-30**	**RS-27**	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	**MS-30**	**RS-28**	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	**MS-31**	**RS-29**	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	**MS-31**	**RS-30**	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	**MS-31**	**RS-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	**MS-32**	**RS-31**	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	**MS-32**	**RS-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	**MS-32**	**RS-33**	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	**MS-33**	**RS-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	**MS-33**	**RS-34**	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	**MS-33**	**RS-35**	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	**MS-35**	**RS-34**	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	**MS-35**	**RS-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	**MS-35**	**RS-36**	1	25,40

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 - 12.7mm 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 CAPACITY OD		FREE SPEED	MINIMUM TORQUE		MAXIMUM TORQUE		WEIGHT		LENGTH		AIR CONSUMPTION		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 Kgs) with an ergonomically correct push/pull throttle. Automatically stops tube expansion at defined settings.

AK50 FULL 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 expender 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)

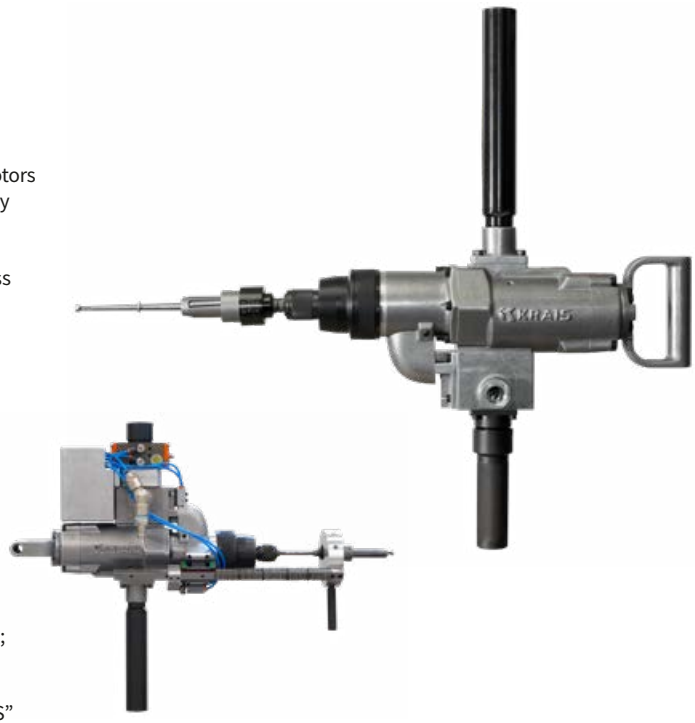
All the other features are the same as for standard K50 rolling motors.

	TUBE CAPACITY OD		FREE SPEED	MINIMUM TORQUE		MAXIMUM TORQUE		WEIGHT		LENGTH		AIR CONSUMPTION		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"
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"
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 K50-600	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"
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"

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



AK60 FULL AUTOMATIC ROLLING MOTOR

AK60 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 expender 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 K60 rolling motors.

	TUBE CAPACITY OD		FREE SPEED	MINIMUM TORQUE		MAXIMUM TORQUE		WEIGHT		LENGTH		AIR CONSUMPTION		SQUARE	CHUCKS	
	[INCH]	[MM]	[RPM]	[IN.LBS]	[NM]	[IN.LBS]	[NM]	[LBS]	[KG]	[INCH]	[MM]	[CFM]	[L/MIN]		STD.	OPT.
K60-900	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 K60-900	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
K60-400	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
AUTO K60-400	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
K60-250	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
AUTO K60-250	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

K60 & AUTO K60 ON SITE

Auto K60 fastened on the Flexpander.

K60 fastened on the rope balancer.

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 WITH OPTIONAL ACCESSORIES

Right angle gear drive

Parallel gear drive

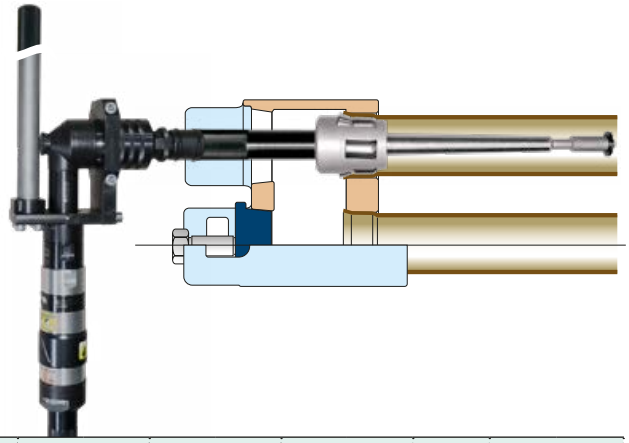
Single universal joint

	TUBE CAPACITY OD		FREE SPEED	MINIMUM TORQUE		MAXIMUM TORQUE		WEIGHT		LENGTH		HIGHT 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

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



	TUBE CAPACITY OD		FREE SPEED	MINIMUM TORQUE		MAXIMUM TORQUE		WEIGHT		LENGTH		HIGHT 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

MULTIPLEEXPAND AP-S2

Two spindle, air driven torque control tube expansion system with adjustable tube pitch. Designed for all type of coolers that suit to the motor torque capacity. One air lever valve activates all motors and the whole expanding process goes automatically and independently on every motor.

ME-AP-L1800-2S

STANDARD FEATURES

- Up to twice performance
- 2 spindles working simultaneously but independently
- Working range covers tubes from 1/4" up to 1/2" (5/8"*)
- Adjustable tube pitch 51 - 90 mm (2"- 3,54")
- **Spindle with reverse compensation feature in case of non simultaneous return**
- Precise torque control tube rolling with automatic reverse
- Commonality of parts with other K20 rolling motors

** varies depending on tube material , gauge and tube sheet thickness*

ADJUSTABLE TUBE PITCH

AVAILABLE MOTORS

The L20 rolling motors is based on K20 rolling motors and the all parts are interchangeable.

MOTOR	TUBE CAPACITY* OD		FREE SPEED	MINIMUM TORQUE		MAXIMUM TORQUE		AIR CONSUMPTION		WEIGHT		LENGTH		CHUCKS		CHUCKS OPT	
	[INCH]	[MM]	[RPM]	[FT.LBS]	[NM]	[FT.LBS]	[NM]	[CFM]	[L/MIN]	[LBS]	[KG]	[INCH]	[MM]	[INCH]	[MM]	[INCH]	[MM]
L20-550	1/2	12,70	550	0,166	0,225	6,25	8,474	17	480	2,64	1,20	9,409	239,0	1/4	6,35	3/8	9,53
L20-1800	3/8	9,53	1800	0,166	0,225	2,25	3,051	17	480	2,42	1,10	8,858	225,0	1/4	6,35	3/8	9,53
L20-2500	1/4	6,35	2500	0,166	0,225	0,66	0,895	17	480	2,29	1,04	8,858	225,0	1/4	6,35	3/8	9,53
L30-1000	3/4	19,05	1000	1,180	1,580	11,20	15,5	60	1700	11,0	4,95	13,700	350,0	3/8	9,5	1/2"	12,70

** Tube capacity 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.*

EXAMPLE APPLICATION

MULTIPLEEXPAND NAP-S4

Four spindle*, air driven torque control tube expansion system with non adjustable tube pitch. Designed for all type of coolers that suit to the motor torque capacity. One air lever valve activates all motors and the whole expanding process goes automatically and independently on every motor.

STANDARD FEATURES

- Up to four** times performance
- 4 spindles working simultaneously
- Working range covers tubes from 1/4” up to 1/2” (5/8”***)
- Fixed tube pitch
- **Spindle with reverse compensation feature in case of not simultaneous return**
- Precise torque control tube rolling with automatic reverse
- Commonality of parts with other K20 rolling motors

Available with other number of spindles - on request.

** can be less or more spindle*
*** depend number of working spindles*
**** varies depending on tube material , gauge and tube sheet thickness*

ME-NA-L1800-S4

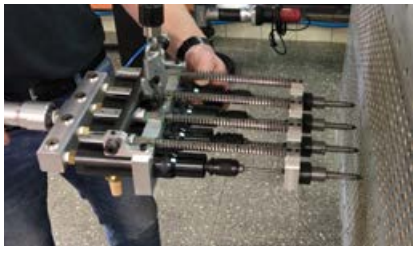
AVAILABLE MOTORS

The L20 rolling motors is based on K20 rolling motors and the all parts are interchangeable.

MOTOR	TUBE CAPACITY* OD		FREE SPEED	MINIMUM TORQUE		MAXIMUM TORQUE		AIR CONSUMPTION		WEIGHT		LENGTH		CHUCKS		CHUCKS OPT	
	INCH	MM	RPM	FT.LBS	NM	FT.LBS	NM	CFM	L/MIN	LBS	KG	INCH	MM	INCH	MM	INCH	MM
L20-550	1/2	12,70	550	0,166	0,225	6,25	8,474	17	480	2,64	1,20	9,409	239,0	1/4	6,35	3/8	9,53
L20-1800	3/8	9,53	1800	0,166	0,225	2,25	3,051	17	480	2,42	1,10	8,858	225,0	1/4	6,35	3/8	9,53
L20-2500	1/4	6,35	2500	0,166	0,225	0,66	0,895	17	480	2,29	1,04	8,858	225,0	1/4	6,35	3/8	9,53

** Tube capacity 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.*

EXAMPLE APPLICATIONS



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 form 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

CONVENIENT WORKPLACE

The FLEXHolder truck has a built-in compartment. Large capacity allows you to maintain order in the workplace.

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

SUPPORT FOR WHOLE RANGE OF KRAIS MOTORS

Auto K50 Series rolling motors

EB-1 Rolling Motors operated by TES100

E-1 Rolling Motors operated by TES100

S1-S5 Servo Motors (synchronous) operated by TES1000

B1-B5 Servo Motors (synchronous) operated by TES1000

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 (±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

102 mm

230 mm

140 mm

Weight 2,0 kg (2,4lbs)

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.

MOTOR TYPE		TUBE CAPACITY*		FREE SPEED	MAX RPM UNDER LOAD	MOTOR POWER	TORQUE				WEIGHT	
							[NM]		[FT-LBS]			
		MIN	MAX				MIN	MAX	MIN	MAX	[KG]	[LBS]
	**HT-0**	1/4	1/2	2300	1700	460 W	0,70	10,00	0,50	7,40	1,2	2,4
	**ES-0**	5/8	1 1/4	680	450	1150 W	12,00	45,00	8,85	33,00	3,2	7,0
	ES-2	5/8	1 1/8	650 1200	430 760	1150 W	8,00	43,00	6,00	32,00	3,2	7,0
	**DU-0**	5/8	1	628 2100	450 1550	650 W	3,00	42,00	2,21	30,50	2,0	4,4
	**DU-1**	3/4	2	150 250 445 720	120 219 380 650	2000 W	12,00	250,00	8,85	185,00	8,6	17,6
	**K90-E-90**	2	5	90	81	1150 W	70,00	510,00	51,63	376,16	10,0	22,0
	K90-E-190	1 1/2	3	142	129	1150 W	50,00	260,00	36,88	191,77	10,0	22,0
	K90-E-280	1 1/4	2 1/2	274	250	1150 W	40,00	190,00	29,50	140,14	10,0	22,0

* Tube Capacisty depends on material and technical condition of tube

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

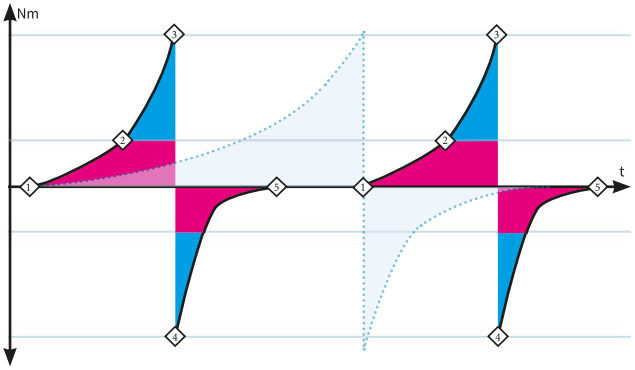
- Purely digital and modular system.
- High tech servo drive and motor assure accuracy, high quality and repeatability of the results and efficient work.
- Extremely easy and user friendly interface on 7" touch screen.
- Supported languages: English, Korean, German, Spanish, Portuguese, Chinese, Polish.
- 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.

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 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)

TES3000 AND B2 SERVO DRIVE

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.

MOTOR TYPE		PHASE VOLTAGE	WEIGHT	MAX RPM	TORQUE RANGE WITH TES-3000			
					NM		FT.LB	
					MIN	MAX	MIN	MAX
	**S3000**	1/230V	5,0 kg	3000	0,2	2,5	0,10	1,80
	S6000		5,0 kg	6000	0,2	2,5	0,10	1,80
	S5		5,0 kg	1662	0,4	8,6	0,20	6,30
	S4		5,0 kg	1500	0,5	9,5	0,30	7,00
	S3		5,0 kg	1091	0,6	13,0	0,40	9,50
	S2		5,0 kg	800	0,9	18,0	0,60	13,20
	S1		5,0 kg	600	1,2	24,0	0,80	17,70
	**B5**		8,0 kg	1453	1,8	27,0	1,30	19,90
	B4		8,0 kg	1000	2,6	39,0	1,90	28,70
	B3		8,0 kg	736	3,5	53,0	2,50	39,00
	B2		8,0 kg	400	6,5	92,5	4,70	68,20
	B1		8,0 kg	300	9,0	123,0	6,60	90,70
	G1455	3/400V	9,0 kg	1453	2,3	70	1,6	51,6
	G1000		9,0 kg	1000	3,4	102	2,5	75,2
	G400		9,5 kg	400	7,5	240	5,5	177

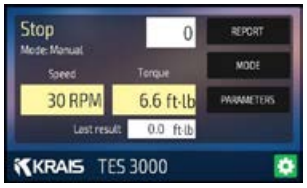
TELESCOPIC SHAFT

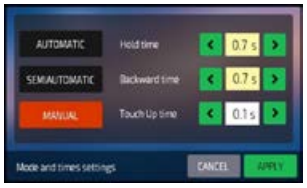
Optional telescopic shaft for motors G-1000, G-400 and G-1450

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: Expandings counter, Color status lamps, Metric and imperial units available, Translated to many languages.

SWIFTROLL X1

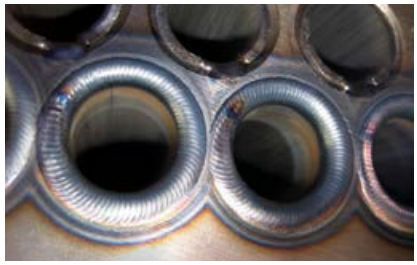
Fully automatic Robot-Setup for tube expansion, facing, tube cutting and orbital tube to tube sheet welding.
Based on 6 axis FANUC robot, a special version of TES3000 for CNC – digital controller for speed and expansion managing and KRAIS dual function, dual-geared, 3 KW servo drive. All works under Fanuc R30iB system. SwiftRoll has an overload system in the event of a collision to prevent damages.
SwiftRoll X1 is delivered with built-in HMI software and PC laptop with custom CAM software for easy tube sheet programming. SwiftRoll X1 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.

ROBOT 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.

TIPTIG WELDING UNIT



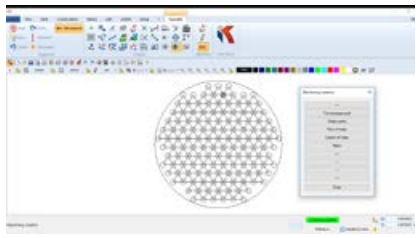
SwiftRoll as an option can be integrated with a tube to tube sheet welding equipment as cooperation with the most modern, most sophisticated and fastest welding system available these days - made by company TipTig.

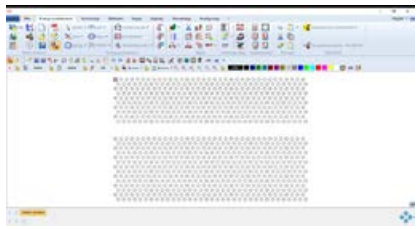
CUSTOM HMI SOFTWARE

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.

CUSTOM CAM FOR EASY PROGRAMMING

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 on hour setup, all work is done totally automatically.

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.

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

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).

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"
JGS-375	3/8	ST-3703-S	ST-3703	ST-3703-SPEC
JGS-500	1/2	ST-5003-S	ST-5003	ST-5003-SPEC
JGS-625	5/8	ST-6203-S	ST-6203	ST-6203-SPEC
JGS-750	3/4	ST-7503-S	ST-7503	ST-7503-SPEC
JGS-875	7/8	ST-7503-S	ST-7503	ST-7503-SPEC
JGS-1000	1	ST-7503-S	ST-7503	ST-7503-SPEC
JGS-1250	1 1/4	ST-7503-S	ST-7503	ST-7503-SPEC
JGS-1500	1 1/2	ST-7503-S	ST-7503	ST-7503-SPEC
JGS-2000	2	ST-7503-S	ST-7503	ST-7503-SPEC
JGS-2500	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
JGS-375-10	10,00	GS-106	GS-109	GS-103
JGS-500-12	12,00	GS-206	GS-209	GS-203
JGS-625-16	16,00	GS-306	GS-309	GS-303
JGS-750-20	20,00	GS-406	GS-409	GS-403
JGS-875-22	22,00	GS-406	GS-409	GS-403
JGS-1000-25	25,00	GS-406	GS-409	GS-403
JGS-1250-32	32,00	GS-406	GS-409	GS-403
JGS-1500-38	38,00	GS-406	GS-409	GS-403
JGS-2000-51	51,00	GS-406	GS-409	GS-403

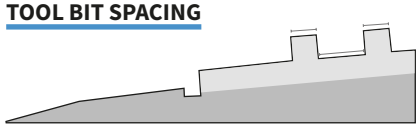
Other sizes and bits on request.

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!

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 usues 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	120 RPM
Power	1,3 Hp
Torque	360 Nm (266 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

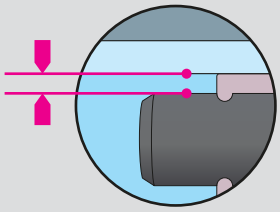
TUBE SIZE	TOOL NUMBER	TOOL BIT 1/8X1/4X1/8"	TOOL BIT 3X6X3 MM	TOOL BIT SPRING	MANDREL	TURNING ROLS
1/2"	**JGS-MWR-127**	ST-5003-S	GS-206	ST-5011	GS-MWR-127	-
5/8"	**JGS-MWR-158**	ST-6203-S	GS-306	ST-6211	GS-MWR-158	-
16 mm	**JGS-MWR-160**	ST-6203-S	GS-306	ST-6211	GS-MWR-160	-
3/4"	**JGS-MWR-190-R**	ST-7503-S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

** tool needs speed reducer*

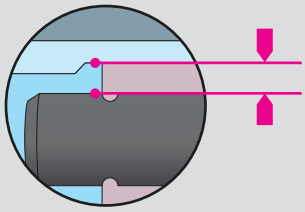
HOW TO PROPER LOCK BEVELING MACHINES

FOR: MINIMILL 101, MINIMILL 200, MINIMILL 300LP AND AUTO MINIMILL WITH MINISHAFT.
In order to obtain the best possible centering 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.

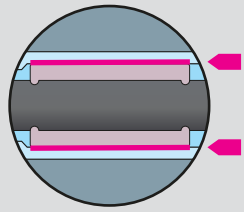
Correct (REGULAR TUBE)
Gap between shaft and tube ID should be max 0,3 mm



Correct (EXPANDED TUBE)
Gap between shaft and tube ID should be max 0,3 mm

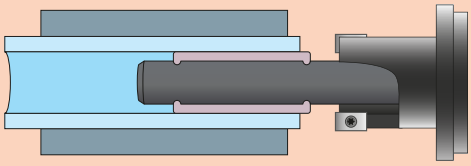


Correct mounting
Contact between jaws and tube is over the entire surface

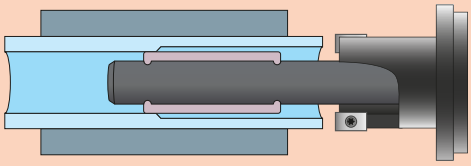


WRONG JAWS SETUP

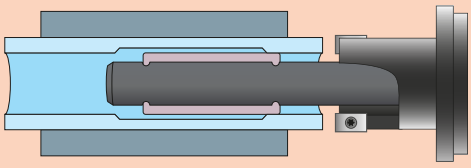
Facing before expanding



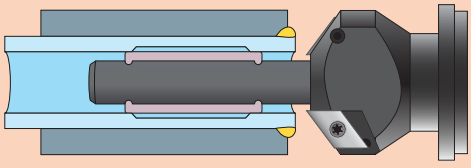
Facing after expanding



Facing after expansion with double radius rolls

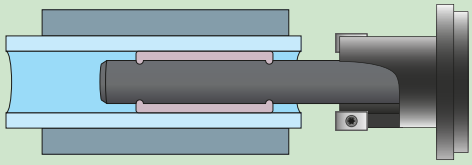


Strength weld removal aplication

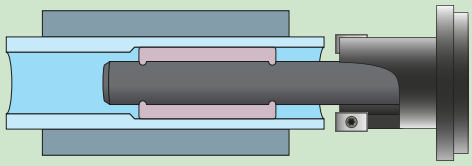


CORRECT JAWS SETUP

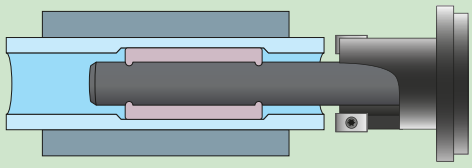
Facing before expanding



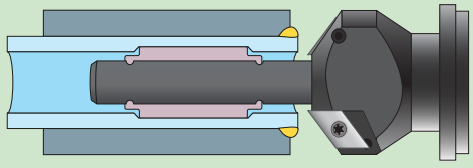
Facing after expanding



Facing after expansion with double radius rolls



Strength weld removal aplication



CORRECT SHAFT CHOICE

FOR: MINIMILL 101, MINIMILL 200, MINIMILL 300LP AND AUTO MINIMILL WITH MINISHAFT.
In order to obtain the best possible centering 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.

IMPORTANT NOTE!
If the shaft is too thin it is exposed to large probability that the MiniMill will be installed non parallel to the axis of the tube. As well as the jaws may not fully grip the tube with its full face but with the corners only, and will result a non-square face of the tube to the tube sheet as well as there is a big probability that it may result the breaking of guide shaft as the machine might be forced into strong vibration what may created a sudden collision with tube or tube sheet. We strongly recommend to look on this, specially for tubes ¾" O.D.

IMPORTANT NOTE!
The guide shafts in the chart are selected for non-expanded tubes. If the tubes are expanded, a different, bigger diameter shaft has to be considered. As well as the contact length of the locking jaws has to be shorter than the length of the effective expansion length . It is unacceptable if the jaws are longer than the expansion and lock only partially on non-expanded part of tube. In that circumstances the locking jaws must be shaped to be able to lock only on the expanded part of the tube.

MICROSHAFT NUMBERS

SHAFT	[INCH]	[MM]	SPRING
800 MM#151	0,354	9,00	O-7
801 MM#151	0,394	10,00	DW-8,5
805 MM#151	0,453	11,00	DW-10

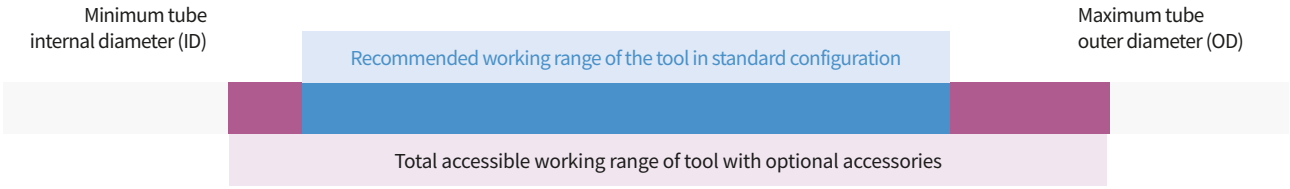
MINISHAFT NUMBERS

TUBE OD	BWG	SHAFT NUMBER	SIZE [MM]	SIZE [INCH]	SPRING
3/4"	11	901 MM#151	12,40	0,492	DW-11
	11	911 MM#151	12,60	0,496	DW-11
	12	912 MM#151	13,20	0,519	DW-11
	13	905 MM#151	13,90	0,547	DW-12,5
	14	914 MM#151	14,50	0,570	DW-12,5
	15	9151 MM#151	15,10	0,594	DW-12,5
	16	916 MM#151	15,50	0,610	DW-12,5
	17	917 MM#151	15,70	0,622	DW-12,5
	18	918 MM#151	16,30	0,641	DW-15,5
	20	909 MM#151	16,80	0,661	DW-15,5
7/8"	10	9151 MM#151	15,10	0,594	DW-12,5
	11	917 MM#151	15,70	0,622	DW-12,5
	12	922 MM#151	16,40	0,645	DW-15,5
	13	923 MM#151	17,10	0,673	DW-15,5
	14	924 MM#151	17,70	0,696	DW-15,5
	15	925 MM#151	18,30	0,700	DW-15,5
	16	926 MM#151	18,60	0,732	DW-15,5
	18	928 MM#151	19,50	0,767	DW-15,5
1"	8	909 MM#151	16,80	0,661	DW-15,5
	9	938 MM#151	17,50	0,688	DW-15,5
	10	925 MM#151	18,30	0,700	DW-15,5
	11	931 MM#151	19,00	0,748	O-16
	12	932 MM#151	19,60	0,771	O-16
	13	915 MM#151	20,00	0,787	O-17
	14	934 MM#151	20,90	0,822	O-17
	16	936 MM#151	21,80	0,858	O-17
	18	938 MM#151	22,60	0,889	O-7

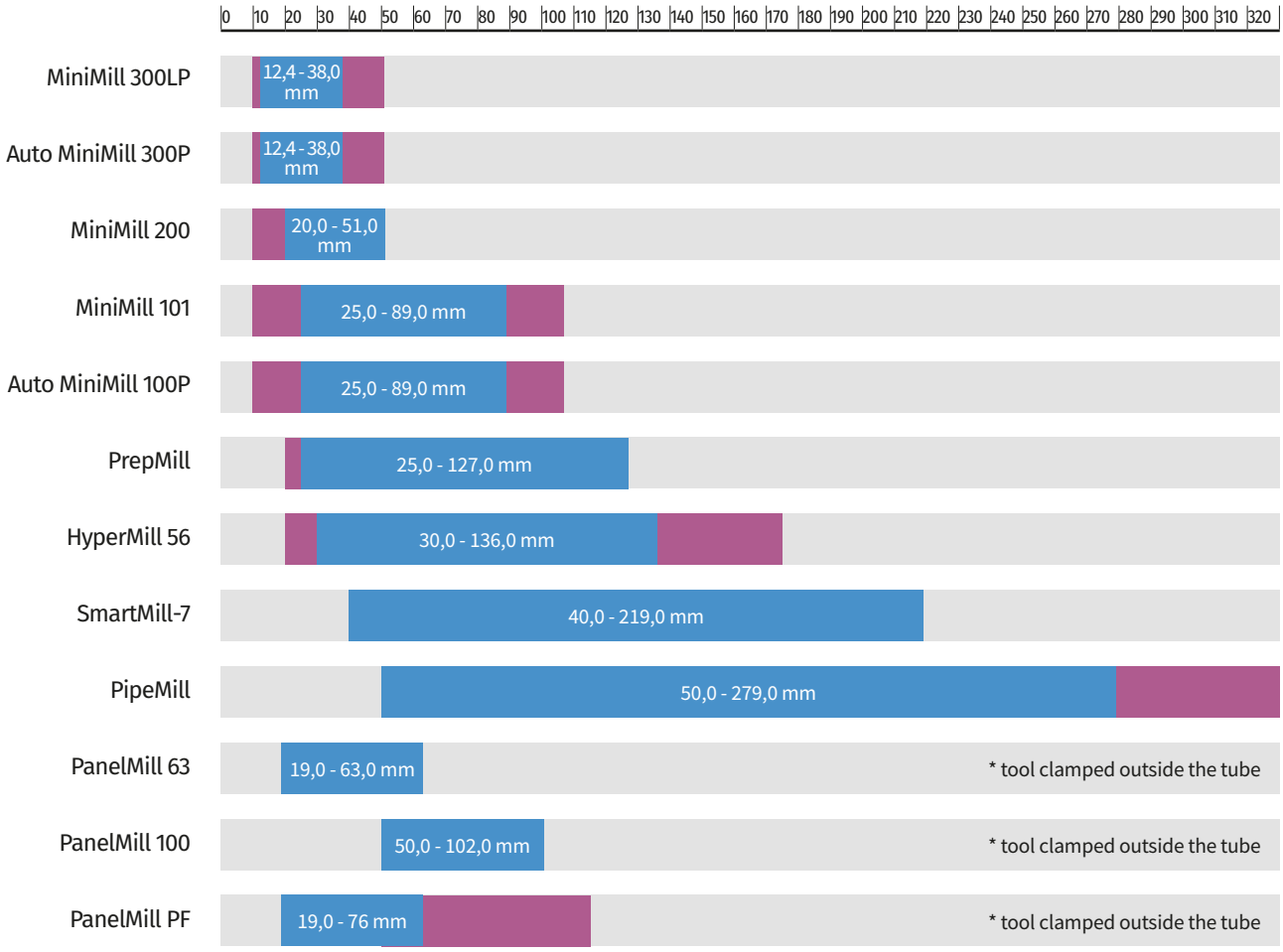
We do offer non-standard size and non-standard shaped jaws upon receiving a drawing of the tube expansion details. As standard the machine is equipped with 3 shafts with numbers 901, 905 and 909MM#151.

WORKING RANGES FOR UNIVERSAL BEVELING TOOLS

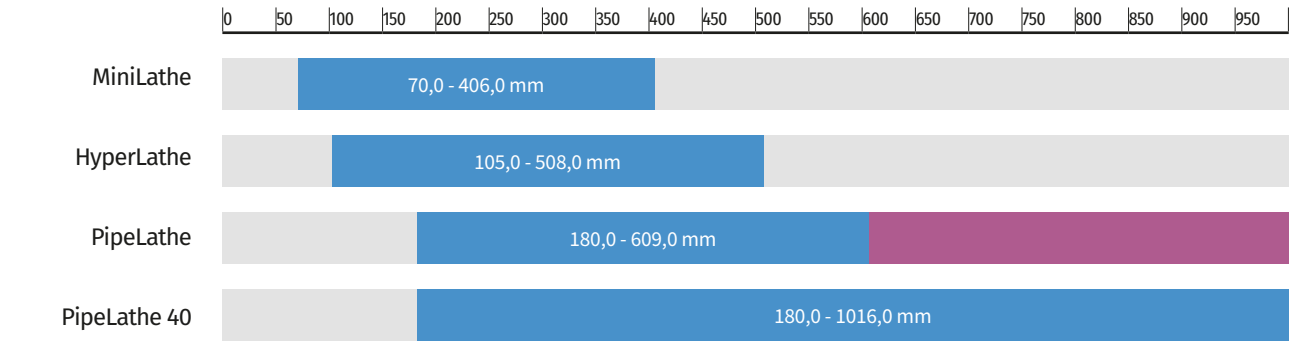
HOW TO READ IT



MILL SERIE WORKING RANGES (UNIVERSAL TOOLS)



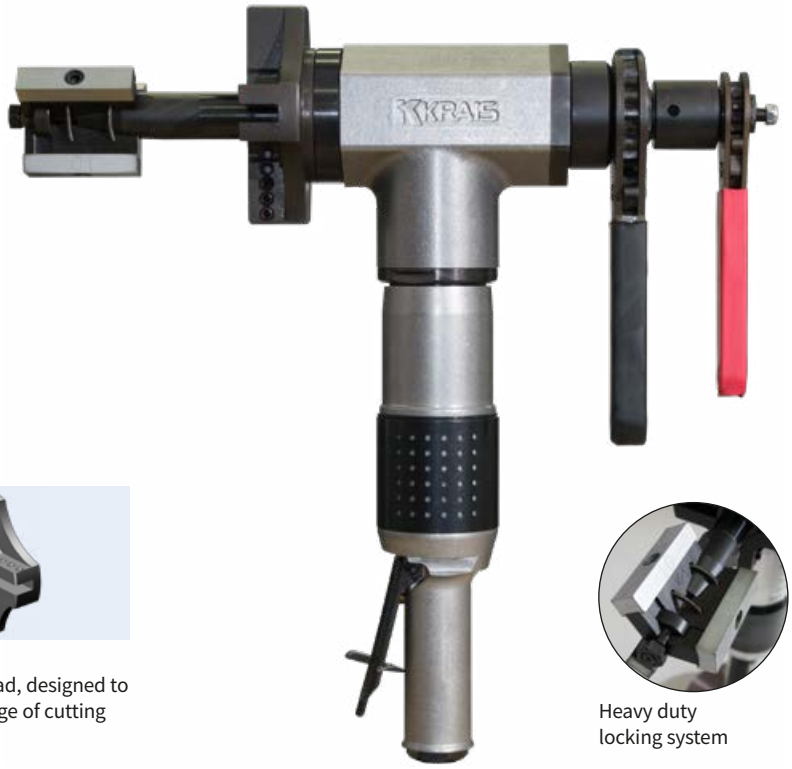
LATHE SERIE WORKING RANGES (UNIVERSAL TOOLS)



PREPMILL

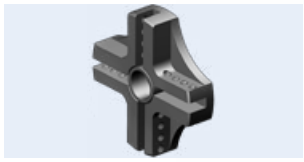
SIGNATURE BEVELER FOR BOILER-WORKS. BUILT TO LAST!

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

STANDARD WORKING RANGE		TOTAL WORKING RANGE	
APPLICATION RANGE	STANDARD LOCKING	APPLICATION RANGE	STANDARD LOCKING
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

AIR USE		BODY WIDTH		BODY HEIGHT		BODY WEIGHT	
55 cfm	1,3 m^3/min	2,59"	66 mm	14,5"	370 mm	20,5 Lbs	9,5 kg

LOCKING RANGE IN STANDARD SET UP

SHAFT: SHAFT25

RANGE [MM]		RANGE [INCH]		JAWS	EXT.	SPRING	
MIN	MAX	MIN	MAX			NUMBER	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
62	67	2,441	2,638	NS-5	NS-10	SP-25	2
67	72	2,638	2,835	NS-6	NS-10	SP-25	2
72	77	2,835	3,031	NS-7	NS-10	SP-25	2
77	82	3,031	3,228	NS-8	NS-10	SP-25	2

RANGE [MM]		RANGE [INCH]		JAWS	EXT.	SPRING	
MIN	MAX	MIN	MAX			NUMBER	QTY.
82	87	3,228	3,425	NS-5	NS-20	SP-25	2
87	92	3,425	3,622	NS-6	NS-20	SP-25	2
92	97	3,622	3,819	NS-7	NS-20	SP-25	2
97	102	3,819	4,016	NS-8	NS-20	SP-25	2
102	107	4,016	4,213	NS-5	NS-30	SP-25	2
107	112	4,213	4,409	NS-6	NS-30	SP-25	2
112	117	4,409	4,606	NS-7	NS-30	SP-25	2
117	122	4,606	4,803	NS-8	NS-30	SP-25	2

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 79

PRRMBH
Head for membrane and overlay removal. Efficiently remove material between boiler tubes.
→ TABLE PAGE 79

STWRPM
Head dedicated for strength weld removal. Heads are easy to align and sized per tube diameter.
→ TABLE PAGE 80

TFPM
Tube facing milling head for tubes made of any type of material. Utilizes 6% cobalt inserts.
→ TABLE PAGE 80

OPT. SHAFT

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

OTHER OPTIONAL ACCESSORIES

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

SPEED ADJUSTMENT VALVE SAV-500
The solution for all pneumatic drove beveling machines. Allows adjusting cutting speed to suit to the machined tube diameter.

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.

LOCKING RANGE WITH OPTIONAL JAWS

SHAFT: SHAFT20

RANGE [MM]		RANGE [INCH]		JAWS	EXT.	SPRING	
MIN	MAX	MIN	MAX			NUMBER	QTY.
20	24	0,787	0,945	NS-0	-	SP-19	1
24	28	0,945	1,102	NS-1	-	SP-19	1

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.

Free Speed ..... 120 RPM
Power..... 1500 W
Torque ..... 360 Nm (266 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.

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. Our standard machine can be used for pipe sizes of 20 - 74 mm i.d. (0.787" - 2.913") and comes with a 88 mm cutting head.

IMPORTANT!
Read how to properly lock on page 51

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.

Heavy duty locking system

STANDARD WORKING RANGE - RECOMMENDED		OPTIONAL WORKING RANGE	
APPLICATION RANGE	STANDARD LOCKING	APPLICATION RANGE	STANDARD LOCKING
25 – 89 mm	25 – 77 mm	10 – 107 mm	10 – 102 mm
0,984 – 3,504"	0,984 – 3,031"	0,394 – 4,213"	0,394 – 4,016"

FEED STROKE		POWER	FREE SPEED	TORQUE	
20 mm	0,787"	1,3 hp	120 rpm	140 Nm	105 Ft.lbs

AIR USE		BODY WIDTH		BODY HEIGHT		BODY WEIGHT	
55 cfm	1,3 m^3/min	2,32"	59 mm	13,1"	335 mm	11,4 Lbs	5,2 kg

LOCKING RANGE IN STANDARD SET UP

SHAFT: SHAFT25

RANGE [MM]		RANGE [INCH]		JAWS	EXT.	SPRING	
MIN	MAX	MIN	MAX			NUMBER	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
62	67	2,441	2,638	NS-5	NS-10	SP-25	2
67	72	2,638	2,835	NS-6	NS-10	SP-25	2
72	77	2,835	3,031	NS-7	NS-10	SP-25	2

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.

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

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 77

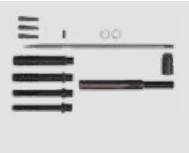
SWROTC
Seal weld removal head over tube circumference prior to re-welding the damaged joint without removing the tube.
→ TABLE PAGE 78

STWRMH
Head dedicated for strength weld removal. Heads are easy to align and sized per tube diameter.
→ TABLE PAGE 76

TFMH
Tube facing milling head for tubes made of any type of material. Utilizes 6% cobalt inserts.
→ TABLE PAGE 76

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.

SPEED ADJUSTMENT VALVE SAV-500
The solution for all pneumatic drove beveling machines. Allows adjusting cutting speed to suit to the machined tube diameter.

LOCKING RANGE WITH OPTIONAL JAWS

SHAFT: SHAFT20

RANGE [MM]		RANGE [INCH]		JAWS	EXT.	SPRING	
MIN	MAX	MIN	MAX			NUMBER	QTY.
20	24	0,787	0,945	NS-0	-	SP-19	1
24	28	0,945	1,102	NS-1	-	SP-19	1

SHAFT: SHAFT25

RANGE [MM]		RANGE [INCH]		JAWS	EXT.	SPRING	
MIN	MAX	MIN	MAX			NUMBER	QTY.
77	82	3,031	3,228	NS-8	NS-10	SP-25	2
82	87	3,228	3,425	NS-5	NS-20	SP-25	2
87	92	3,425	3,622	NS-6	NS-20	SP-25	2
92	97	3,622	3,819	NS-7	NS-20	SP-25	2
97	102	3,819	4,016	NS-8	NS-20	SP-25	2
102	107	4,016	4,213	NS-5	NS-30	SP-25	2

SHAFT: MICROSHAFT

RANGE [MM]		RANGE [INCH]		JAWS
MIN	MAX	MIN	MAX	
10,00	11,00	0,394	0,433	301 MM#36
11,00	12,00	0,433	0,472	303 MM#36
12,00	13,00	0,472	0,512	305 MM#36
13,00	14,00	0,512	0,551	307 MM#36
14,00	15,00	0,551	0,591	309 MM#36

SHAFT: MINISHAFT

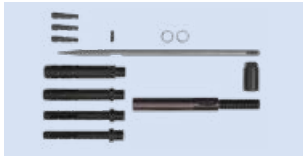
RANGE [MM]		RANGE [INCH]		JAWS
MIN	MAX	MIN	MAX	
12,40	14,50	0,488	0,571	201 MM#36
13,90	16,00	0,547	0,630	203 MM#36
15,90	18,00	0,626	0,709	205 MM#36
16,90	19,00	0,665	0,748	207 MM#36
18,90	21,00	0,744	0,827	209 MM#36
19,90	22,00	0,783	0,866	211 MM#36
20,90	23,00	0,823	0,906	213 MM#36
21,90	24,00	0,862	0,944	214 MM#36
23,60	25,60	0,929	1,008	215 MM#36
25,20	27,20	0,992	1,071	217 MM#36
26,80	28,80	1,055	1,134	219 MM#36
28,40	30,40	1,118	1,197	221 MM#36
30,00	32,00	1,181	1,260	223 MM#36
31,60	33,60	1,244	1,323	225 MM#36
33,20	35,20	1,307	1,386	227 MM#36
34,80	36,80	1,370	1,449	229 MM#36
36,40	38,40	1,433	1,512	231 MM#36
38,00	40,00	1,496	1,575	233 MM#36
39,60	41,60	1,559	1,638	235 MM#36
41,20	43,20	1,622	1,701	237 MM#36
42,80	44,80	1,685	1,764	239 MM#36
44,40	46,40	1,748	1,827	241 MM#36
46,00	48,00	1,811	1,890	243 MM#36

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.

IMPORTANT!
Read how to properly lock on page 51

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.

STANDARD WORKING RANGE – RECOMMENDED		OPTIONAL WORKING RANGE	
APPLICATION RANGE	STANDARD LOCKING	APPLICATION RANGE	STANDARD LOCKING
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

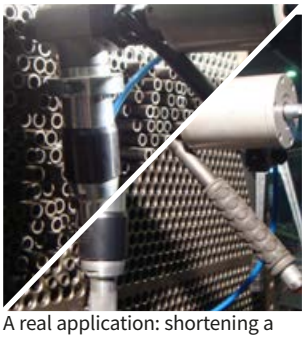
AIR USE		BODY WIDTH		BODY HEIGHT		BODY WEIGHT	
55 cfm	1,3 m^3/min	2,32"	59 mm	13,1"	335 mm	15,4 Lbs	7 kg

LOCKING RANGES WITH STANDARD SET UP

SHAFT: MINISHAFT

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

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.

OPTIONAL HEADS

TFMH
Tube facing milling head for tubes made of any type of material. Utilizes 6% cobalt inserts.
→ TABLE PAGE 76

MMFH
Tube facing milling head for tubes made of hardest type of materials. Utilizes carbide inserts with 4 blades.
→ TABLE PAGE 78

STWRMH
Head dedicated for strength weld removal. Heads are easy to align and sized per tube diameter.
→ TABLE PAGE 76

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 ADJUSTMENT VALVE SAV-500
The solution for all pneumatic drove beveling machines. Allows adjusting cutting speed to suit to the machined tube diameter.

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.

LOCKING RANGE WITH OPTIONAL JAWS

SHAFT: MINISHAFT (OPTIONAL RANGE)

RANGE [MM]		RANGE [INCH]		JAWS NR
MIN	MAX	MIN	MAX	
23,60	25,60	0,929	1,008	215 MM#36
25,20	27,20	0,992	1,071	217 MM#36
26,80	28,80	1,055	1,134	219 MM#36
28,40	30,40	1,118	1,197	221 MM#36
30,00	32,00	1,181	1,260	223 MM#36
31,60	33,60	1,244	1,323	225 MM#36
33,20	35,20	1,307	1,386	227 MM#36
34,80	36,80	1,370	1,449	229 MM#36
36,40	38,40	1,433	1,512	231 MM#36
38,00	40,00	1,496	1,575	233 MM#36
39,60	41,60	1,559	1,638	235 MM#36
41,20	43,20	1,622	1,701	237 MM#36
42,80	44,80	1,685	1,764	239 MM#36
44,40	46,40	1,748	1,827	241 MM#36
46,00	48,00	1,811	1,890	243 MM#36

SHAFT: MICROSHAFT

RANGE [MM]		RANGE [INCH]		JAWS NR
MIN	MAX	MIN	MAX	
10,00	11,00	0,394	0,433	301 MM#36
11,00	12,00	0,433	0,472	303 MM#36
12,00	13,00	0,472	0,512	305 MM#36
13,00	14,00	0,512	0,551	307 MM#36
14,00	15,00	0,551	0,591	309 MM#36

SHAFT: SHAFT20

RANGE [MM]		RANGE [INCH]		JAWS	EXT.	SPRING	
MIN	MAX	MIN	MAX			NUMBER	QTY.
20	24	0,787	0,945	NS-0	-	SP-19	1
24	28	0,945	1,102	NS-1	-	SP-19	1
28	33	1,102	1,299	NS-2	-	SP-19	1
33	38	1,299	1,496	NS-3	-	SP-20	2
38	43	1,496	1,693	NS-4	-	SP-20	2
43	48	1,693	1,890	NS-5	-	SP-20	2

PANELMILL PF

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

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 CLAMPING 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 CLAMPING JAWS

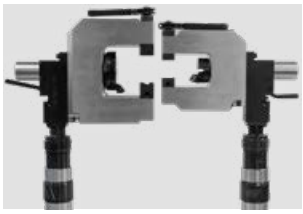
JAWS NO.	TUBE OD	
	[MM]	[INCH]
300 PM#2	19,05	0,750
301 PM#2	20,00	0,787
304 PM#2	22,20	0,874
309 PM#2	25,00	0,984
312 PM#2	28,80	1,134
313 PM#2	30,00	1,181
318 PM#2	34,90	1,374
326 PM#2	44,40	1,748
331 PM#2	51,00	2,008
334 PM#2	57,10	2,248
338 PM#2	60,30	2,374

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:	1500 W	1500 W
Torque:	360 Nm	420 Nm
Gearbox:	2-stage	3-stage

OPTIONAL PARTS AND ACCESSORIES



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)
PanelMill PF is not the only portable tool for on site applications! Thanks to Bench Mount Plate, it is possible to attach it 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.

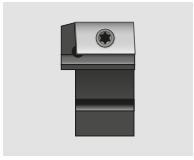
TWO VARIANTS

RIGHT-ANGLE AND IN-LINE
PanellMill-PF is available in two versions: right angle and in-line. Depending on application and preferences you can choose the version, which suits better for your needs. Both models have exactly the same parameters.

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.
→ TABLE PAGE 87

SPECIALIZED CUTTER HEADS

PRRMBH-PF
Membrane removal and overlay head with carbide bits.
→ TABLE PAGE 82

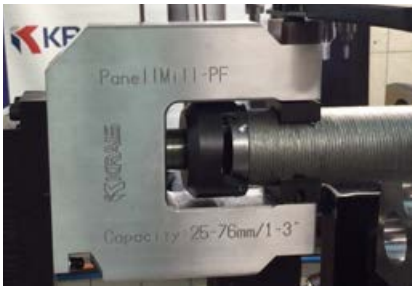
CRH-PF
Cladding removal head with carbide bits.
→ TABLEPAGE 82

OBPMH-PF
Outside bevelling head (37,5°) for tubes without membranes, with HSS 6% cobalt bits.
→ TABLE PAGE 82

PANELMILL PF PERFORMANCE

Facing/beveling application

Membrane removal application on 1” length



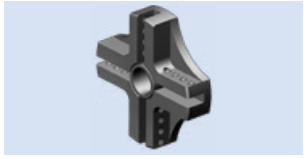
Inconel cladding removal application on 1” length

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 – RECOMMENDED		OPTIONAL WORKING RANGE	
APPLICATION RANGE	STANDARD LOCKING	APPLICATION RANGE	STANDARD LOCKING
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

AIR USE		BODY WIDTH		BODY HEIGHT		BODY WEIGHT	
55 cfm	1,3 m^3/min	3,22"	82 mm	15"	385 mm	19 Lbs	9 kg

LOCKING RANGES WITH STANDARD SET UP

SHAFT: SHAFT30

RANGE [MM]		RANGE [INCH]		JAWS	EXT.	SPRING	
MIN	MAX	MIN	MAX			NUMBER	QTY.
30,0	34,0	1,181	1,339	NS-1		SP-29	1
34,0	39,0	1,339	1,535	NS-2		SP-29	1
39,0	44,0	1,535	1,732	NS-3		SP-30	2
44,0	49,0	1,732	1,929	NS-4		SP-30	2
49,0	54,0	1,929	2,126	NS-5		SP-30	2
54,0	59,0	2,126	2,323	NS-6		SP-30	2
59,0	64,0	2,323	2,520	NS-7		SP-30	2
64,0	69,0	2,520	2,717	NS-8		SP-30	2
66,0	71,0	2,598	2,795	NS-5	NS-10	SP-30	2
71,0	76,0	2,795	2,992	NS-6	NS-10	SP-30	2
76,0	81,0	2,992	3,189	NS-7	NS-10	SP-30	2
81,0	86,0	3,189	3,386	NS-8	NS-10	SP-30	2
86,0	91,0	3,386	3,583	NS-5	NS-20	SP-30	2
91,0	96,0	3,583	3,780	NS-6	NS-20	SP-30	2
96,0	101,0	3,780	3,976	NS-7	NS-20	SP-30	2
101,0	106,0	3,976	4,173	NS-8	NS-20	SP-30	2
106,0	111,0	4,173	4,370	NS-5	NS-30	SP-30	2
111,0	116,0	4,370	4,567	NS-6	NS-30	SP-30	2
116,0	121,0	4,567	4,764	NS-7	NS-30	SP-30	2
121,0	126,0	4,764	4,961	NS-8	NS-30	SP-30	2
126,0	131,0	4,961	5,157	NS-5	NS-40	SP-30	2
131,0	136,0	5,157	5,354	NS-6	NS-40	SP-30	2

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.

Free Speed ..... 58 RPM
Power..... 1500 W
Torque ..... 720 Nm (530 Ft.Lbs)
Feed Stroke ..... 40 mm (1,6")

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.

MMRBMH
Head for membrane and overlay removal. Efficiently remove material between boiler tubes.
→ TABLE PAGE 59

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.

OTHER OPTIONAL ACCESSORIES

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

SPEED ADJUSTMENT VALVE SAV-500
The solution for all pneumatic drove beveling machines. Allows adjusting cutting speed to suit to the machined tube diameter.

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.

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

EXAMPLE TOOL APPLICATION

LOCKING RANGE WITH OPTIONAL JAWS

SHAFT: SHAFT20

RANGE [MM]		RANGE [INCH]		JAWS	EXT.	SPRING	
MIN	MAX	MIN	MAX			NUMBER	QTY.
20,0	24,0	0,787	0,945	NS-0		SP-19	1
24,0	28,0	0,945	1,102	NS-1		SP-19	1
28,0	33,0	1,102	1,299	NS-2		SP-19	1
33,0	38,0	1,299	1,496	NS-3		SP-20	2

SHAFT: SHAFT30 (OPTIONAL RANGE)

RANGE [MM]		RANGE [INCH]		JAWS	EXT.	SPRING	
MIN	MAX	MIN	MAX			NUMBER	QTY.
136,0	141,0	5,354	5,551	NS-7	NS-40	SP-30	2
141,0	146,0	5,551	5,748	NS-8	NS-40	SP-30	2
146,0	151,0	5,748	5,945	NS-5	NS-50	SP-30	2
151,0	156,0	5,945	6,142	NS-6	NS-50	SP-30	2
156,0	161,0	6,142	6,339	NS-7	NS-50	SP-30	2
161,0	166,0	6,339	6,535	NS-8	NS-50	SP-30	2

SHAFT: SHAFT25

RANGE [MM]		RANGE [INCH]		JAWS	EXT.	SPRING	
MIN	MAX	MIN	MAX			NUMBER	QTY.
25,0	30,0	0,984	1,181	NS-1		SP-24	1
30,0	35,0	1,181	1,378	NS-2		SP-24	1
35,0	40,0	1,378	1,575	NS-3		SP-25	2
40,0	45,0	1,575	1,772	NS-4		SP-25	2
45,0	50,0	1,772	1,969	NS-5		SP-25	2
50,0	55,0	1,969	2,165	NS-6		SP-25	2
55,0	60,0	2,165	2,362	NS-7		SP-25	2
60,0	65,0	2,362	2,559	NS-8		SP-25	2
62,0	67,0	2,441	2,638	NS-5	NS-10	SP-25	2
67,0	72,0	2,638	2,835	NS-6	NS-10	SP-25	2
72,0	77,0	2,835	3,031	NS-7	NS-10	SP-25	2
77,0	82,0	3,031	3,228	NS-8	NS-10	SP-25	2
82,0	87,0	3,228	3,425	NS-5	NS-20	SP-25	2
87,0	92,0	3,425	3,622	NS-6	NS-20	SP-25	2
92,0	97,0	3,622	3,819	NS-7	NS-20	SP-25	2
97,0	102,0	3,819	4,016	NS-8	NS-20	SP-25	2

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 STROKE	FREE SPEED	POWER	TORQUE
APPLICATION RANGE (ID-OD)	LOCKING RANGE (ID)				
12,5– 51,0 mm	ZGODNE Z PROJEKTEM	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 m^3/min	2,32”	59 mm	13,1”	335 mm	13,2Lbs	6 kg

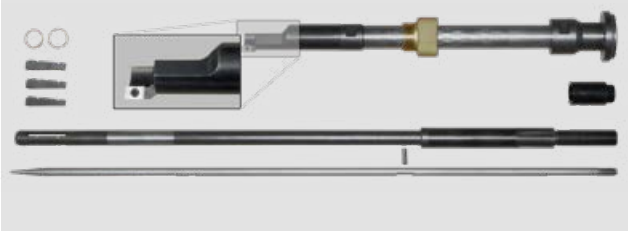
FINFAN ATTACHMENT PART NUMBERS

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”

OPTIONAL ATACHMENT



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.

EXAMPLE TOOL APPLICATION

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

OTHER OPTIONAL ACCESSORIES

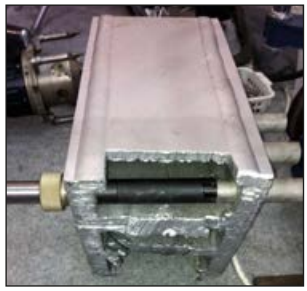
SPEED REDUCER
Easy to use gearbox for 3x speed reduction. Increases the torque, enabling the machine to generate a thick chip whilst reducing the cutting time.

SPEED ADJUSTMENT VALVE SAV-500
The solution for all pneumatic drove beveling machines. Allows adjusting cutting speed to suit to the machined tube diameter.

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



Water box demonstration of the simplicity of machine operation.

An operator trimming back tubes prior to seal welding.

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 provide by customer with order.

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

STANDARD WORKING RANGE		FEED STROKE	FREE SPEED	POWER	TORQUE
APPLICATION RANGE (ID-OD)	LOCKING RANGE (ID)				
12 TPI	ZGODNE Z GWINTEM	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 m^3/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.

GASKET SEAT FACING HEAD NUMBERS

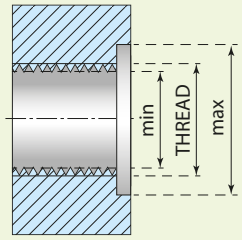
HEAD TYPE	PLUG SIZE			NEST DIAMETER				INSERT	NO. OF INSERTS
	[INCH]	[MM]	TPI	MIN [INCH]	MAX [INCH]	MIN [MM]	MAX [MM]		
FFGSMH-1125	1,125	28,58	12	0,940	1,496	24,00	38,00	CI 5x5	4
FFGSMH-1250	1,250	31,75	12	1,063	1,614	27,00	41,00	CI 5x5	4
FFGSMH-1350	1,375	34,93	12	1,220	1,772	31,00	45,00	CI 5x5	4
FFGSMH-1500	1,500	38,10	12	1,339	1,890	34,00	48,00	CI 5x5	4
FFGSMH-1625	1,625	41,27	12	1,457	2,008	37,00	51,00	CI 5x5	4
FFGSMH-1750	1,750	44,45	12	1,590	2,140	40,40	54,40	CI 5x5	4
FFGSMH-1875	1,875	47,62	12	1,720	2,270	43,60	57,60	CI 5x5	4

JAWS FOR GASKET SEAT FACING

JAWS SET NUMBER	PLUG SIZE		TPI	PILOT
	[INCH]	[MM]		
701MM #36-1-1/8-GFF	1,125	28,575	12	PGFF-1125
703MM #36-1-1/4-GFF	1,250	31,750	12	PGFF-1250
705MM #36-1-3/8-GFF	1,375	34,925	12	PGFF-1350
707MM #36-1-1/2-GFF	1,500	38,100	12	PGFF-1500
709MM #36-1-5/8-GFF	1,625	41,275	12	PGFF-1625
711MM #36-1-3/4-GFF	1,750	44,450	12	PGFF-1750
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”.

NEST DIAMETER DIAGRAM



OTHER OPTIONAL ACCESSORIES

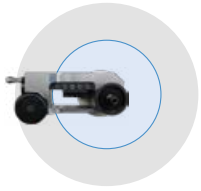
FAST CLAMPING SYSTEM
System offers rapid tube to tube cycle time, increased productivity (up to 4x) with little operator fatigue. Ideal for large amount of end preps.

SPEED ADJUSTMENT VALVE SAV-500
The solution for all pneumatic drove beveling machines. Allows adjusting cutting speed to suit to the machined tube diameter.

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.
FlangeMill is available in two versions: short (MFM) and long (MFM-L).

TOOL SWING DIAMETERS



FACING RANGE

BODY SWING DIAMETER

STANDARD MANUAL FLANGE MILL

STANDARD WORKING RANGE		MAX V TOOL TRAVEL	MAX H TOOL TRAVEL	BODY SWING DIAMETER
FACING RANGE	LOCKING RANGE			
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 HEIGHT		BODY WEIGHT	
Manual	6,5”	165 mm	12,8”	325 mm	19,4 Lbs	8,8 kg

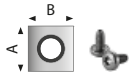
LONG MANUAL FLANGE MILL

STANDARD WORKING RANGE		MAX V TOOL TRAVEL	MAX H TOOL TRAVEL	BODY SWING DIAMETER
FACING RANGE	LOCKING RANGE			
51 – 650 mm	51 - 550,0 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)



CI7	A	B
mm	7	7

FLANGEMILL

FlangeMill is ID mount flange facing machines. It is a quick and easy way to re-machine damaged flat and raised faced flanges on site. The machine comes factory configured. FlangeMill is designed and built on the basis of the HyperMill-55.

ELECTRIC VERSION: FLANGEMILL-E

FlangeMill-E is electric version of regular FlangeMill. An electric machine cover the same working range and can be delivered witx the same configuration. 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.

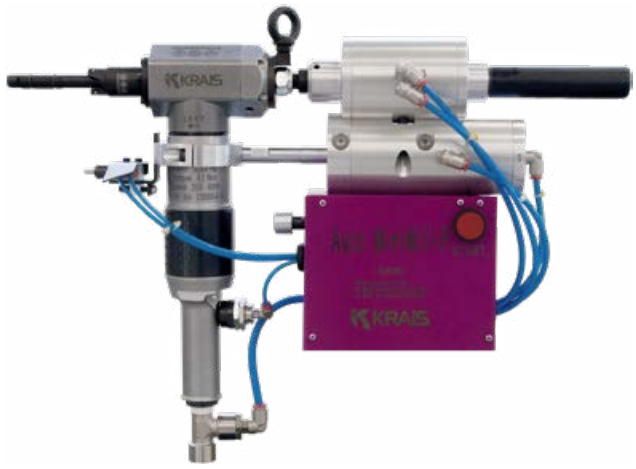
Free Speed .....115 RPM
Power.....1,1 Hp
Torque .....366 NM (280 Ft.Lbs)
Feed Stroke .....38 mm (0,787")

STANDARD WORKING RANGE		FEED STROKE	FEED SPEED	FREE SPEED	POWER	TORQUE
APPLICATION RANGE (ID-OD)	SURFACE FINISH					
44 – 356 mm	63 to 250 RMS	38 MM	0,15 MM/PIN	55 Rpm	1,7 HP	280 Nm
1,750 – 14,000"		1,500"	0,005"/PIN			210 Ft.Lbs

AIR USE		BODY WIDTH		BODY HEIGHT		BODY WEIGHT	
55 cfm	1,3 m^3/min	2,32"	59 mm	13,1"	335 mm	30,6 Lbs	13,9 kg

AUTO MINIMILL 101P & 301P

Auto MiniMill 101P and 301P are a fully automatic machines, 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 (100 Rpm configuration).
AutoMiniMIll is specially designed for trimming and weld removal.
This tool is based on the standard MiniMill; it is a fast facing and end preparation lathe designed for various tubes including stainless and other high chromium alloys. It works with all MiniMill cutter heads.



WORKING RANGE FOR AUTO MINIMILL 101P

STANDARD WORKING RANGE		FEED STROKE	FREE SPEED
APPLICATION	LOCKING		
25 - 89 mm	25 - 77 mm	20 mm	100 Rpm
0,984 - 3,504”	0,984 - 3,031”	0,787”	

WORKING RANGE FOR AUTO MINIMILL 101P

STANDARD WORKING RANGE		FEED STROKE	FREE SPEED
APPLICATION	LOCKING		
12,4 - 38,0 mm	12,4 - 24,0 mm	20 mm	300 Rpm
0,488 - 1,496”	0,488 - 0,945”	0,787”	

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”)

WORKING RANGE		OPTIONAL RANGE	
APPLICATION	LOCKING	APPLICATION	LOCKING
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”

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 WORKING RANGE	
APPLICATION RANGE (ID-OD)	LOCKING RANGE (ID)
25 - 127 mm	25 - 122 mm
0,984 - 5,000”	0,984 - 4,803”

PANELMILL

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.

PANELMILL 65EXT WORKING RANGE

APPLICATION RANGE	CLAMP CLEARANCE	CLADDING REMOVAL
19 - 63,5 mm	70 mm	44,4 mm
0,75 - 2,50"	2,75"	1,75"

PANELMILL 65EXT-M WORKING RANGE

APPLICATION RANGE	CLAMP CLEARANCE	CLADDING REMOVAL
50 - 63,5 mm + 63,5 MEMBRANE	84 mm	63,5
0,75 - 2,50" + 2,50" MEMBRANE	3,3"	2,5"

PANELMILL 101 WORKING RANGE

APPLICATION RANGE	CLAMP CLEARANCE	CLADDING REMOVAL
50 - 101 mm	122 mm	88,9 mm
2 - 4"	4,8	3,5"

MINIDRILL

TOOL MADE TO ORDER ONLY!

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.

SMARTMILL-7

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-7 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-7 is available for sale or rent.

OPTIONAL ELECTRIC MOTOR UNIT

Machine can be driven by high quality electric motor. The electric version covers the same pipe sizes and uses the same cutting head.

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)

STANDARD WORKING RANGE		FEED STROKE	FREE SPEED
APPLICATION	LOCKING		
40 - 219 mm	40 - 203,5 mm	50 mm	39 Rpm
1,574 - 8,622"	1,574 - 8,012"	2"	

PIPEMILL

PipeMill is a pneumatic powered tube facing, bevelling and weld removal machine. The PipeMill is a rugged, fast and powerful weld end preparation lathe for various pipes including stainless steel and other exotic alloys. A standard machine is equipped with a locking system to cover sizes of 50,8 to 172 mm ID (2.000" to 6.800") with a 250 mm cutting head.

OPTIONAL ELECTRIC MOTOR UNIT

Machine can be driven by high quality electric motor. The electric version covers the same pipe sizes and uses the same cutting head.

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)

WORKING RANGE		OPTIONAL RANGE	
APPLICATION	LOCKING	APPLICATION	LOCKING
50 – 279 mm	50 – 319 mm	50 – 319 mm	50 – 319 mm
1,97 – 10,98"	1,97 – 12,56"	1,97 – 12,56"	1,97 – 12,56"

MINILATHE

- Most powerful machine, 2.2kW (3 HP), within this size range on the market today.
- Comes with extra gearbox that reduces the RPM and multiplies the torque - it comes as standard!
- Self-centering 2,75" one piece locking shaft with build in jaws
- 6 point locking system assures maximum stability during work. Wide clamps produce superior clamping force for chatter free end preps.
- Only one mandrel with 10 Jaw sets covers machine entire range.
- Machine can be driven by wide range of motors. We offer high quality electric, pneumatic and hydraulic drives.
- Fully portable for on-site and Fab-shop work.
- Available for sale or rent.

STANDARD WORKING RANGE		FEED STROKE	FREE SPEED
APPLICATION	LOCKING		
72 - 406 mm	70 - 400 mm	50 mm	DEPENDS ON GEARBOX
2,80 - 16,00"	2,75 - 15,70"	2"	

HYPERLATHE

- Powerful 3.5 HP pneumatic drive generating 7500 Nm (5,530 ft.lbs) torque on the cutter blade. Variable speed control 0-10 rpm.
- Comes with extra gearbox that reduces the RPM and multiplies the torque - standard!
- Self-centering 4" one piece locking shaft with build in jaws
- 6 point locking system assures maximum stability during work. Wide clamps produce superior clamping force for chatter free end preps.
- Only one mandrel with 10 Jaw sets covers machine entire range.
- Machine can be driven by wide range of motors. We offer high quality electric, pneumatic and hydraulic drives.
- Fully portable for on-site and Fab-shop work.
- Available for sale or rent.

STANDARD WORKING RANGE		FEED STROKE	FREE SPEED
APPLICATION	LOCKING		
105 - 508 mm	100 - 460 mm	60 mm	10 Rpm
4,00 - 20,00"	3,94 - 18,11"	2,4"	

PIPELATHE

- Powerful 3.5 HP pneumatic drive generating 12500 Nm (9259 ft.lbs) torque on the cutter blade. Variable speed control 0-5 rpm.
- Comes with extra gearbox that reduces the RPM and multiplies the torque - standard!
- Self-centering 5,9" one piece locking shaft with build in jaws
- 6 point locking system assures maximum stability during work. Wide clamps produce superior clamping force for chatter free end preps.
- Only one mandrel with 6 Jaw sets covers machine entire range.
- Machine can be driven by wide range of motors. We offer high quality electric, pneumatic and hydraulic drives.
- Fully portable for on-site and Fab-shop work.
- Available for sale or rent.

STANDARD WORKING RANGE		FEED STROKE	FREE SPEED
APPLICATION	LOCKING		
180 - 609 mm	175 - 600 mm	60 mm	5 Rpm
7,0 - 24,0"	6,89 - 23,60"	2,4"	

PIPELATHE 40

- Powerful hydraulic drive generating 14500 Nm (10800 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") locking shaft with build in jaws, eliminates the issue of broken or loosening retaining springs and o-rings.
- Innovative 6 point locking system with wide clamps assures maximum stability during machining.
- Only one mandrel and 6 Jaws set covers entire working range.
- Fully portable for on-site and Fab-shop work.
- Available for sale or rent.

STANDARD WORKING RANGE		FEED STROKE	FREE SPEED
APPLICATION	LOCKING		
180 - 1016 mm	175 - 972 mm	2,4"	5 Rpm
7,0 - 40,0"	6,9 - 38,3"	60 mm	

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 .
- Several different drive options are available to best position the motor for a specific machining application
- 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.
- Motor mount on keyways to prevent the motor to twist and potential damage on gear ring.

MODEL	PIPE CAPACITY (OD)			
	NPS [INCH]		METRIC [MM]	
	MIN	MAX	MIN	MAX
SFSF-0204	2,000	4,000	60,32	127,00
SFSF-0256	2,500	6,000	73,02	168,27
SFSF-0358	3,500	8,000	101,60	219,07
SFSF-0410	4,500	10,000	127,00	273,05
SFSF-0612	6,000	12,000	168,27	323,85
SFSF-0814	8,000	14,000	219,07	355,60
SFSF-1016	10,000	16,000	273,05	406,40
SFSF-1218	12,000	18,000	323,85	457,20
SFSF-1420	14,000	20,000	355,60	508,00
SFSF-1624	16,000	24,000	406,40	609,60
SFSF-2028	20,000	28,000	508,00	711,20
SFSF-2432	24,000	32,000	609,60	812,80
SFSF-2836	28,000	36,000	711,20	914,40
SFSF-3442	34,000	42,000	863,60	1066,80
SFSF-4048	40,000	48,000	1016,00	1219,20

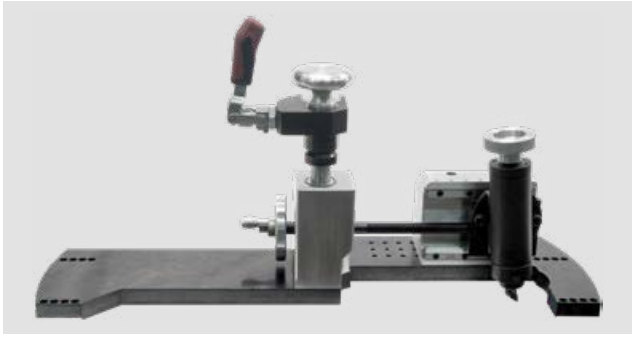
SFFM FLANGE FACER

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.

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 widen 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.

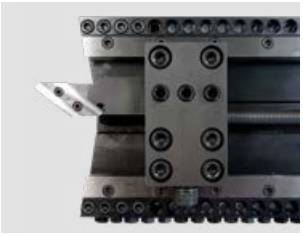
REACTION RING FOR SFSF CLAMSHELLS

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 OOR 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.

SFSF CLAMSHELLS OTHER ADD-ONS

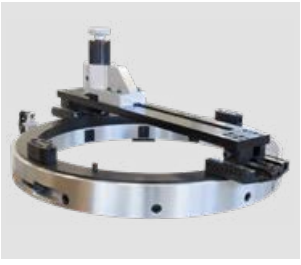
TOOL SLIDES

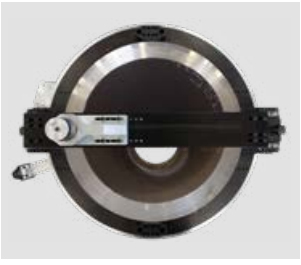


OUT OF ROUND TOOL SLIDES

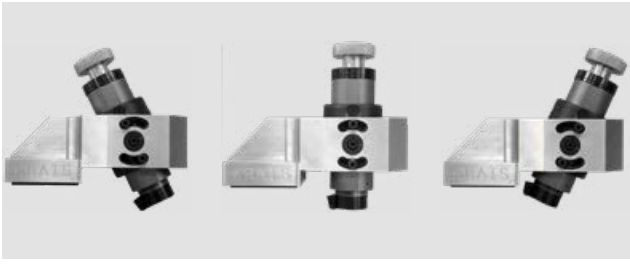
SFSF-CBA UNIVERSAL COUNTERBORE ATTACHMENT

BCS - BRIDGE CROSS SLIDES





SFSF-SCBA SWIVEL HEAD COUNTERBORING ATTACHMENT

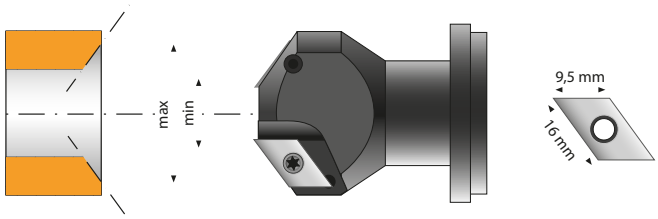


SPECIAL HEADS FOR MINIMILL/HYPERMILL

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.

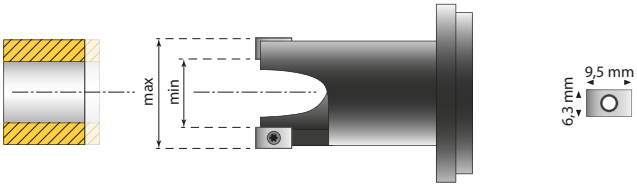


HEAD NR	TUBE CAPACITY			RANGE [INCH]		RANGE [MM]		INSERT	NO. OF INSERTS	SHAFT
	[INCH]	[MM]	BWG	MIN	MAX	MIN	MAX			
STWRMH-190	0,750	19,05	12-23	0,530	1,46	13,50	37,00	WRI	2	901 MM#151 12,4 mm
STWRMH-222	0,875	22,23	12-23	0,650	1,496	16,50	38,00	WRI	2	905 MM#151 13,9 mm
STWRMH-254	1,000	25,40	10-23	0,732	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	915 MM#151 20 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 MILING 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.

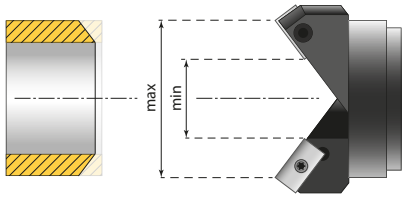


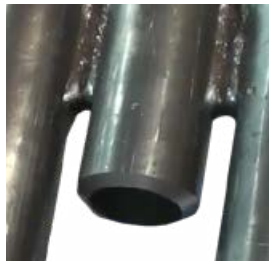
HEAD NR	RURA			RANGE [INCH]		RANGE [MM]		INSERT	NO. OF INSERTS	SHAFT
	[INCH]	[MM]	BWG	MIN	MAX	MIN	MAX			
TFMH-145	0,570	14,48	16-23	0,441	0,870	11,2	22,1	CSZ	2	801 MM#151 Micro 10,0MM
TFMH-158	0,625	15,88	16-23	0,500	0,933	12,70	23,70	CSZ	2	805 MM#151 Micro 11,5 MM
TFMH-190	0,750	19,05	12-23	0,531	1,004	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

OBMH

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

Dedicated for the outside bevelling 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.



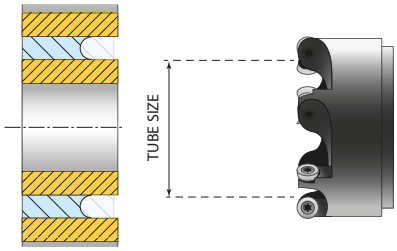


HEAD NR	TUBE CAPACITY			RANGE [INCH]		RANGE [MM]		INSERT	NO. OF INSERTS	SHAFT
	[INCH]	[MM]	BWG	MIN	MAX	MIN	MAX			
OBMH-190	0,750	19,05	14-23	0,5826	0,866	14,80	22,00	CS	2	901 MM#151 12,4 mm
OBMH-222	0,875	22,23	12-23	0,654	1,004	16,60	25,50	CS	2	905 MM#151 13,9 mm
OBMH-254	1,000	25,40	11-23	0,764	1,122	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

MMRBMH

MEMBRANE REMOVAL HEAD
BIT: CARBIDE

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

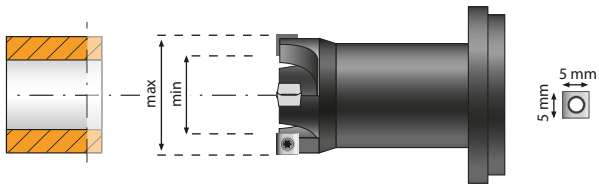


HEAD NR	TUBE CAPACITY		RANGE [INCH]		RANGE [MM]		INSERT	NO. OF INSERTS
	[INCH]	[MM]	MIN	MAX	MIN	MAX		
MMRBMH-254	1,000	25,40	1,000	1,630	25,40	41,40	PO8	4
MMRBMH-288	1,125	28,58	1,134	1,764	28,80	44,80	PO8	5
MMRBMH-317	1,250	31,75	1,248	1,878	31,70	47,70	PO8	5
MMRBMH-381	1,500	38,10	1,500	2,130	38,10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

SWRMH

SEAL WELD REMOVAL HEAD
BIT: CARBIDE
DEGREE: 90.0°

Size specific heads designed for seal weld removal on tubes. Suitable for weld removal on carbon, duplex, inconel and other exotic alloys. Utilizes 4 sided carbide inserts.

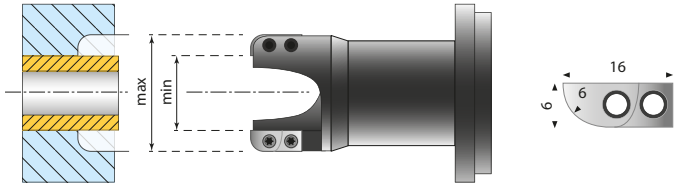


HEAD NR	TUBE CAPACITY			RANGE [INCH]		RANGE [MM]		INSERT	NO. OF INSERTS	SCREW
	[INCH]	[MM]	BWG	MIN	MAX	MIN	MAX			
SWRMH-160	0,625	15,88	17-22	0,500	1,100	12,70	28,00	CI 5x5	4	MHS-2
SWRMH-190	0,750	19,05	11-22	0,510	1,140	13,00	29,00	CI 5x5	4	MHS-2
SWRMH-222	0,875	22,23	10-22	0,710	1,300	18,00	33,00	CI 5x5	4	MHS-2
SWRMH-254	1,000	25,40	8-20	0,810	1,380	20,50	35,00	CI 5x5	4	MHS-2

SWROTC

TUBE FACING MILING HEAD
BIT: HSS 6% Cobalt

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

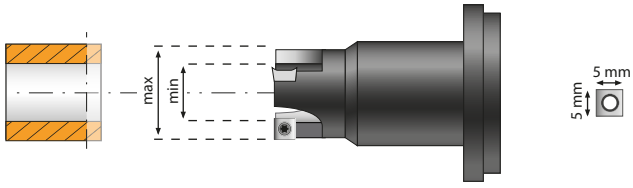


HEAD NR	TUBE CAPACITY		RANGE [INCH]		RANGE [MM]		INSERT	NO. OF INSERTS	SHAFT
	[INCH]	[MM]	MIN	MAX	MIN	MAX			
SWROTC-190	0,750	19,05	0,750	1,222	19,05	31,05	CSWR	2	901 MM#151 12,4 mm
SWROTC-222	0,875	22,23	0,874	1,346	22,20	34,20	CSWR	2	905 MM#151 13,9 mm
SWROTC-254	1,000	25,40	1,000	1,472	25,40	37,40	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

MMFH

TUBE FACING MILING HEAD
BIT: CARBIDE
DEGREE: 90.0°

A tube facing milling head suitable for machining tubes manufactured from very hard materials such as duplex, inconel and other exotic alloys. Utilizes 4 sided carbide inserts.



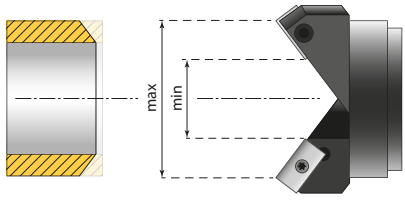
HEAD NR	TUBE CAPACITY			RANGE [INCH]		RANGE [MM]		INSERT	NO. OF INSERTS	SHAFT
	[INCH]	[MM]	BWG	MIN	MAX	MIN	MAX			
MMFH-145	0,550	14,00	17-23	0,440	0,807	11,20	20,5	CI 5x5	2	801 MM#151 Micro 10,0 MM
MMFH-158	0,625	15,88	16-23	0,500	0,866	12,70	22,00	CI 5x5	2	805 MM#151 Micro 11,5 MM
MMFH-190	0,750	19,05	13-23	0,559	0,906	14,20	23,00	CI 5x5	3	901 MM#151 12,4 mm
MMFH-222	0,875	22,23	12-23	0,654	0,965	16,60	24,50	CI 5x5	3	905 MM#151 13,9 mm
MMFH-254	1,000	25,40	11-23	0,764	1,087	19,40	27,50	CI 5x5	3	909 MM#151 16,9 mm
MMFH-285	1,125	28,58	11-23	0,886	1,213	22,50	30,80	CI 5x5	3	915 MM#151 20,0 mm

SPECIAL HEADS FOR PREPMILL

OBPM

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

Custom, precisely designed head. Dedicated for the outside bevelling 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.

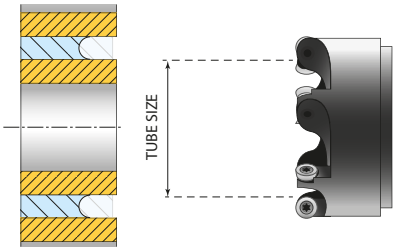


HEAD NR	TUBE CAPACITY			RANGE [INCH]		RANGE [MM]		INSERT	NO. OF INSERTS	SHAFT
	[INCH]	[MM]	BWG	MIN	MAX	MIN	MAX			
OBPM-190	0,750	19,05	14-23	0,5826	0,866	14,80	22,00	CS	2	915 MM#151 20 mm
OBPM-222	0,875	22,23	12-23	0,654	1,004	16,60	25,50	CS	2	STD Shaft: 20 or 25 mm
OBPM-254	1,000	25,40	11-23	0,764	1,122	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)

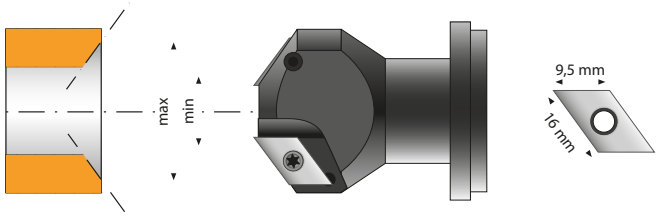


HEAD NR	TUBE CAPACITY		RANGE [INCH]		RANGE [MM]		INSERT	NO. OF INSERTS
	[INCH]	[MM]	MIN	MAX	MIN	MAX		
PRRBMH-254	1,000	25,40	1,000	1,630	25,40	41,40	PO8	4
PRRBMH-288	1,125	28,58	1,134	1,764	28,80	44,80	PO8	5
PRRBMH-317	1,250	31,75	1,248	1,878	31,70	47,70	PO8	5
PRRBMH-381	1,500	38,10	1,500	2,130	38,10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

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.

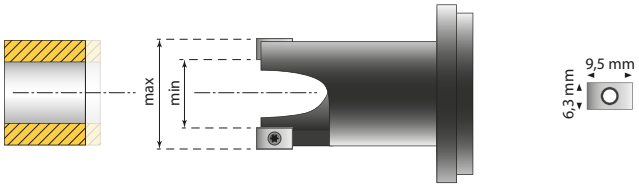


HEAD NR	TUBE CAPACITY			RANGE [INCH]		RANGE [MM]		INSERT	NO. OF INSERTS	SHAFT
	[INCH]	[MM]	BWG	MIN	MAX	MIN	MAX			
STWRPM-190	0,750	19,05	12-23	0,530	1,46	13,50	37,00	WRI	2	STD Shaft: 20 mm
STWRPM-222	0,875	22,23	12-23	0,650	1,496	16,50	38,00	WRI	2	STD Shaft: 20 or 25 mm
STWRPM-254	1,000	25,40	10-23	0,732	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 MILING 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.



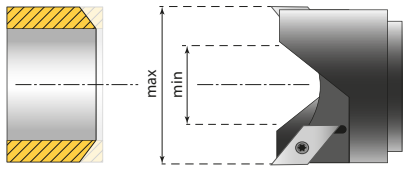
HEAD NR	TUBE CAPACITY			RANGE [INCH]		RANGE [MM]		INSERT	NO. OF INSERTS	SHAFT
	[INCH]	[MM]	BWG	MIN	MAX	MIN	MAX			
TFMP-285	1,125	28,58	11-23	0,854	1,307	21,70	33,20	CSS	2	STD Shaft 20 mm
TFMP-317	1,250	31,75	9-23	0,949	1,366	24,10	34,70	CSS	2	STD Shaft 20 mm
TFMP-381	1,500	38,10	9-23	1,197	1,614	30,40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

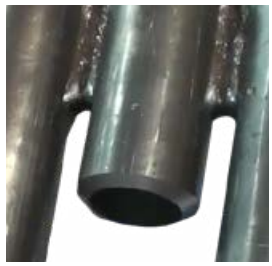
SPECIAL HEADS FOR PANELMILL

OBPMH

OUTSIDE BEVEL MILING HEAD
BIT: HSS 6% COBALT
DEGREE: 37,5°

OBPMH bevelling head for bevelling tubes without membranes in a boiler waterwall.



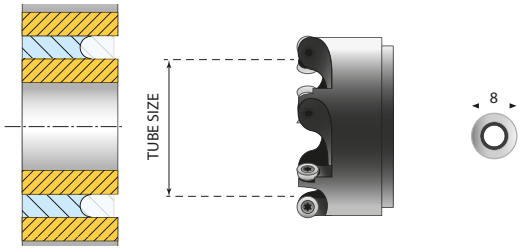


HEAD NR	TUBE CAPACITY			RANGE [INCH]		RANGE [MM]		INSERT	NO. OF INSERTS
	[INCH]	[MM]	BWG	MIN	MAX	MIN	MAX		
OBPMH-190	0,750	19,05	14-23	0,5826	0,866	14,80	22,00	WRIL	2
OBPMH-222	0,875	22,23	12-23	0,654	1,004	16,60	25,50	WRIL	2
OBPMH-254	1,000	25,40	11-23	0,764	1,122	19,40	28,50	WRIL	2
OBPMH-285	1,125	28,58	11-23	0,890	1,240	22,60	31,50	WRIL	2
OBPMH-317	1,250	31,75	8-23	0,917	1,732	23,30	44,00	WRIL	2
OBPMH-381	1,500	38,10	6-23	0,984	1,850	25,00	47,00	WRIL	2
OBPMH-444	1,750	44,45	6-23	1,024	1,890	26,00	48,00	WRIL	2
OBPMH-508	2,000	50,80	6-23	1,181	2,047	30,00	52,00	WRIL	2
OBPMH-571	2,250	57,15	6-23	1,417	2,283	36,00	58,00	WRIL	2
OBPMH-603	2,375	60,33	6-23	1,535	2,402	39,00	61,00	WRIL	2
OBPMH-635	2,500	63,50	6-23	1,654	2,559	42,00	65,00	WRIL	2
OBPMH-889	3,500	88,90	6-23	2,677	3,543	68,00	90,00	WRIL	2

PMRBMH

MEMBRANE REMOVAL HEAD
BIT: CARBIDE

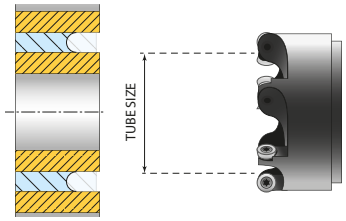
Specially designed head for membrane removal and overlay head (cladding removal)



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

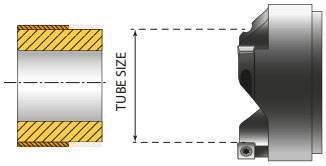
SPECIAL HEADS FOR PANELMILL PF

PRRMBH-PF
Membrane removal and overlay head with carbide bits.



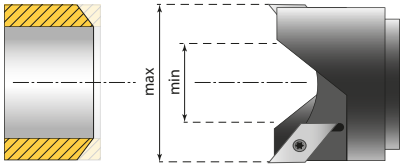
HEAD NR	TUBE CAPACITY		INSERT	NO. OF INSERTS
	[INCH]	[MM]		
PRRBMH-PF-508	2,000	50,80	PO8	7
PRRBMH-PF-571	2,250	57,15	PO8	7
PRRBMH-PF-603	2,375	60,33	PO8	7
PRRBMH-PF-635	2,500	63,50	PO8	7
PRRBMH-PF-762	3,000	76,20	PO8	9

CRH-PF
Cladding removal head with carbide bits.



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

OBPMH-PF
Outside bevelling head (37,5°) for tubes without membranes, with HSS 6% cobalt bits.

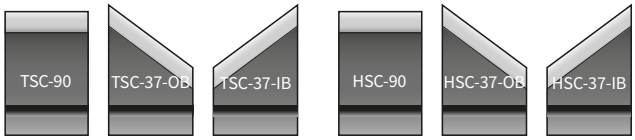


HEAD NR	TUBE CAPACITY			RANGE [INCH]		RANGE [MM]		INSERT	NO. OF INSERTS
	[INCH]	[MM]	BWG	MIN	MAX	MIN	MAX		
OBPMH-PF-285	1,125	28,58	11-23	0,890	1,240	22,60	31,50	WRIL	2
OBPMH-PF-317	1,250	31,75	8-23	0,917	1,732	23,30	44,00	WRIL	2
OBPMH-PF-381	1,500	38,10	6-23	0,984	1,850	25,00	47,00	WRIL	2
OBPMH-PF-444	1,750	44,45	6-23	1,024	1,890	26,00	48,00	WRIL	2
OBPMH-PF-508	2,000	50,80	6-23	1,181	2,047	30,00	52,00	WRIL	2
OBPMH-PF-571	2,250	57,15	6-23	1,417	2,283	36,00	58,00	WRIL	2
OBPMH-PF-603	2,375	60,33	6-23	1,535	2,402	39,00	61,00	WRIL	2
OBPMH-PF-635	2,500	63,50	6-23	1,654	2,559	42,00	65,00	WRIL	2
OBPMH-PF-889	3,500	88,90	6-23	2,677	3,543	68,00	90,00	WRIL	2

CUTTERS AND INSERTS

STANDARD CUTTERS

FOR USE WITHOUT HOLDERS
BIT: HSS and HSS Cobalt



Cutters for use with MiniMill series

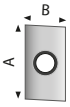
Cutters for use with HyperMill series

INSERTS

Inserts for use only with holders or special heads, all inserts made by KRAIS have ALNOVA coating by OERLIKON .

CS	A	B
mm	9,5	9,5

MAT: **HSS 6% Cobalt**
SCREW: **MHS-4**

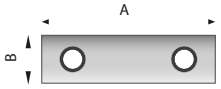


CDI	A	B
mm	18	9,5

MAT: **HSS 6% Cobalt**
SCREW: **MHS-4**

CI7	A	B
mm	7	7

MAT: **CARBIDE**
SCREW: **MHS-2,7**

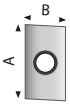


2CDI	A	B
mm	45	12,7

MAT: **HSS 6% Cobalt**
SCREW: **MHS-4**

CI	A	B
mm	5	5

MAT: **CARBIDE**
SCREW: **MHS-2**



CDI-CB	A	B
mm	18	9,5

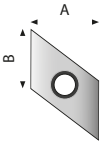
MAT: **HSS 6% Carbride**
SCREW: **MHS-4**

PO8	R
mm	8

MAT: **CARBIDE**
SCREW: **MHS-2,7**

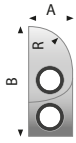
CSZ	A	B
mm	5,8	9,5

MAT: **HSS 6% Cobalt**
SCREW: **MHS-2,5**



WRIL	A	B
mm	13,5	9,5

MAT: **HSS 6% Cobalt**
SCREW: **MHS-4**



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

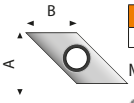
MAT: **HSS 6% Cobalt**
SCREW: **MHS-2,5**

CDK	A	B
mm	25	9,5

MAT: **HSS 6% Cobalt**
SCREW: **MHS-4**

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

MAT: **HSS 6% Carbride**
SCREW: **MHS-2,5**



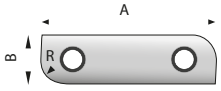
WRK	A	B
mm	10	9,5

MAT: **HSS 6% Cobalt**
SCREW: **MHS-4**

[mm]	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

* on request

MAT: **HSS 6% Cobalt**
SCREW: **MHS-4**

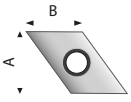


2CDJ-5	A	B	R
mm	45	12,7	4,7

MAT: **HSS 6% Cobalt**
SCREW: **MHS-4**

CSS	A	B
mm	6,3	9,5

MAT: **HSS 6% Cobalt**
SCREW: **MHS-2,5**



WRI	A	B
mm	13,5	9,5

MAT: **HSS 6% Cobalt**
SCREW: **MHS-4**

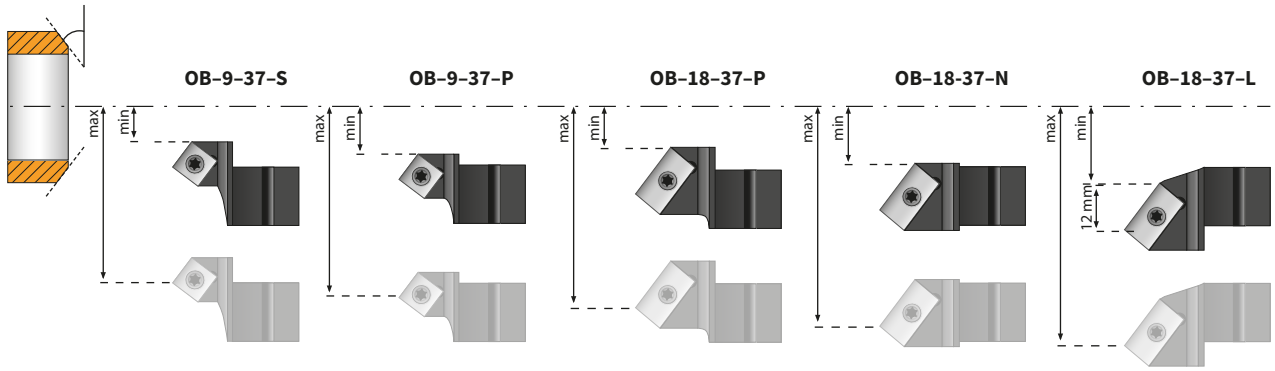
CSS-127	Min	Max
mm	9,5	15,0

MAT: **HSS 6% Cobalt**

HOLDERS

OUTSIDE BEVELING HOLDERS

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

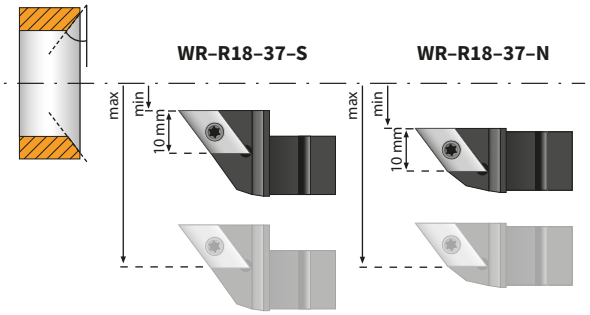


HOLDER NO.	BIT	HEAD	RANGE [MM]		RANGE [INCH]		DEGREE*
			MIN	MAX	MIN	MAX	
OB-9-37-S	CS	60	16,00	26,00	0,630	1,024	20; 30; **37,5;** 45
		88	16,00	51,00	0,630	2,008	20; 30; **37,5;** 45
OB-9-37-P	CS	60	24,00	34,00	0,945	1,339	20; 30; **37,5;** 45
		88	24,00	58,00	0,945	2,283	20; 30; **37,5;** 45
		106	28,00	72,00	1,102	2,835	20; 30; **37,5;** 45
OB-18-37-P	CDI	60	24,00	47,00	0,945	1,850	20; 30; **37,5;** 45
		88	24,00	71,00	0,945	2,795	20; 30; **37,5;** 45
		106	28,00	85,00	1,102	3,346	20; 30; **37,5;** 45
		114	31,00	88,00	1,220	3,465	20; 30; **37,5;** 45
		135	31,00	109,00	1,220	4,291	20; 30; **37,5;** 45
		175	31,00	149,00	1,220	5,866	20; 30; **37,5;** 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; **37,5;** 45
		88	34,00	80,00	1,339	3,150	20; 30; **37,5;** 45
		106	38,00	94,00	1,496	3,701	20; 30; **37,5;** 45
		114	43,00	101,00	1,693	3,976	20; 30; **37,5;** 45
		135	43,00	122,00	1,693	4,803	20; 30; **37,5;** 45
		175	43,00	162,00	1,693	6,378	20; 30; **37,5;** 45
OB-18-37-L	CDI	60	40,00	63,00	1,575	2,480	20; 30; **37,5;** 45
		88	40,00	87,00	1,575	3,425	20; 30; **37,5;** 45
		106	44,00	101,00	1,732	3,976	20; 30; **37,5;** 45
		114	47,00	104,00	1,850	4,094	20; 30; **37,5;** 45
		135	47,00	125,00	1,850	4,921	20; 30; **37,5;** 45
		175	47,00	165,00	1,850	6,496	20; 30; **37,5;** 45

WELD REMOVAL HOLDERS

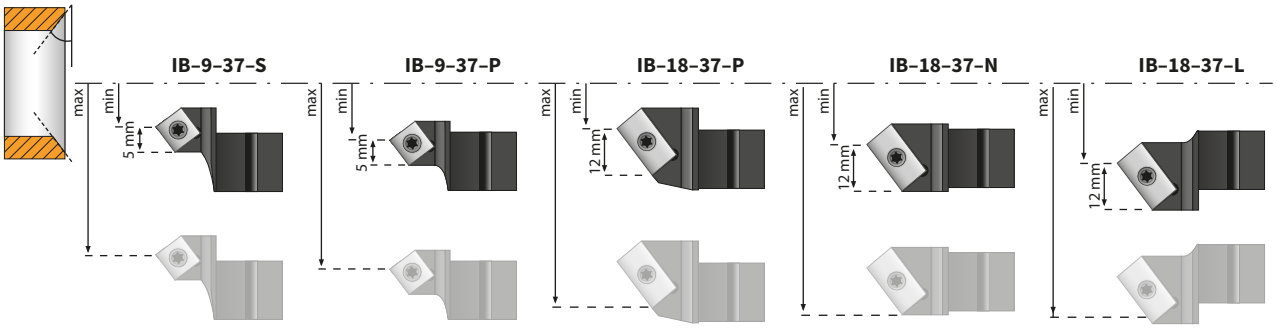
STANDARD: 37,5°; OTHER ANGLES ONLY ON REQUEST



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; **37,5;** 45
		88	15,50	61,00	0,610	2,402	20; 30; **37,5;** 45
		106	19,50	75,00	0,768	2,953	20; 30; **37,5;** 45
WR-R18-37-N	WRI	60	30,00	50,00	1,181	1,969	20; 30; **37,5;** 45
		88	30,00	75,00	1,181	2,953	20; 30; **37,5;** 45
		106	34,00	89,00	1,339	3,504	20; 30; **37,5;** 45
		114	37,00	94,00	1,457	3,701	20; 30; **37,5;** 45
		135	37,00	115,00	1,457	4,528	20; 30; **37,5;** 45
		175	37,00	155,00	1,457	6,102	20; 30; **37,5;** 45

INSIDE BEVELING HOLDERS

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

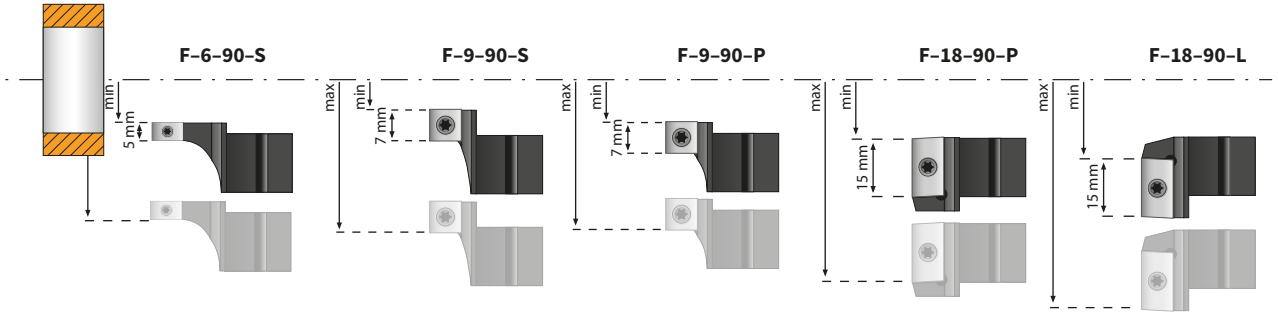


HOLDER NO.	BIT	HEAD	RANGE [MM]		RANGE [INCH]		DEGREE*
			MIN	MAX	MIN	MAX	
IB-9-37-S	CS	60	29,00	39,00	1,142	1,535	20; 30; **37,5;** 45
		88	29,00	63,00	1,142	2,480	20; 30; **37,5;** 45
		106	33,00	77,00	1,299	3,031	20; 30; **37,5;** 45
IB-9-37-P	CS	60	35,50	45,50	1,398	1,791	20; 30; **37,5;** 45
		88	35,50	70,00	1,398	2,756	20; 30; **37,5;** 45
		106	39,50	84,00	1,555	3,307	20; 30; **37,5;** 45
IB-18-37-P	CDI	60	35,50	58,00	1,398	2,283	20; 30; **37,5;** 45
		88	35,50	82,50	1,398	3,248	20; 30; **37,5;** 45
		106	39,50	96,50	1,555	3,799	20; 30; **37,5;** 45
		114	42,00	102,00	1,654	4,016	20; 30; **37,5;** 45
		135	42,00	123,00	1,654	4,843	20; 30; **37,5;** 45
		175	42,00	163,00	1,654	6,417	20; 30; **37,5;** 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; **37,5;** 45
		88	44,50	92,00	1,752	3,622	20; 30; **37,5;** 45
		106	48,50	106,00	1,909	4,173	20; 30; **37,5;** 45
		114	51,00	111,00	2,008	4,370	20; 30; **37,5;** 45
		135	51,00	132,00	2,008	5,197	20; 30; **37,5;** 45
		175	51,00	172,00	2,008	6,772	20; 30; **37,5;** 45
IB-18-37-L	CDI	60	53,00	76,00	2,087	2,992	20; 30; **37,5;** 45
		88	53,00	100,00	2,087	3,937	20; 30; **37,5;** 45
		106	57,00	114,00	2,244	4,488	20; 30; **37,5;** 45
		114	60,00	120,00	2,362	4,724	20; 30; **37,5;** 45
		135	60,00	141,00	2,362	5,551	20; 30; **37,5;** 45
		175	60,00	181,00	2,362	7,126	20; 30; **37,5;** 45

FACING HOLDERS

Standard: 90,0°

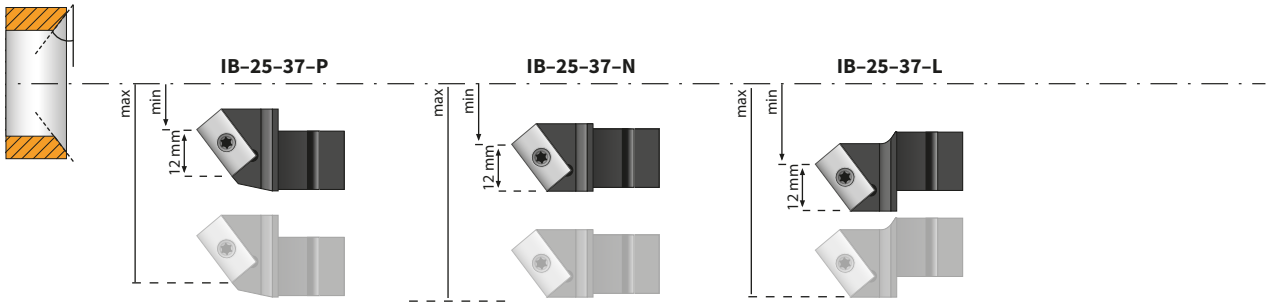


HOLDER NO.	BIT	HEAD	RANGE [MM]		RANGE [INCH]		DEGREE*
			MIN	MAX	MIN	MAX	
F-6-90-S	CSS	60	14,50	24,50	0,571	0,965	90
F-9-90-S	CS	60	16,00	30,00	0,630	1,181	90
F-9-90-P	CS	60	24,00	38,00	0,945	1,496	90
		88	24,00	62,00	0,945	2,441	90
		106	28,00	75,00	1,102	2,953	90
		114	31,00	80,00	1,220	3,150	90
F-18-90-P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

INSIDE BEVELING HOLDERS

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

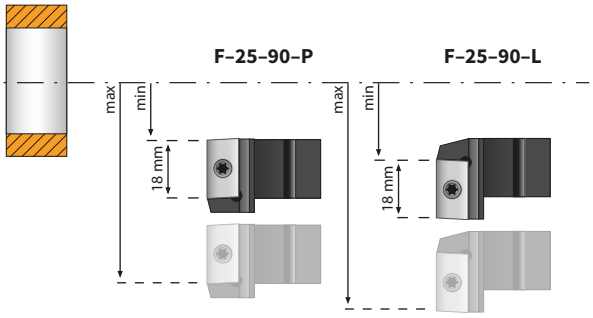


HOLDER NO.	BIT	HEAD	RANGE [MM]		RANGE [INCH]		DEGREE*
			MIN	MAX	MIN	MAX	
IB-25-37-P	CDI	60	35,50	63,00	1,398	2,480	20; 30; **37,5;** 45
		88	35,50	87,50	1,398	3,444	20; 30; **37,5;** 45
		106	39,50	101,50	1,555	3,996	20; 30; **37,5;** 45
		114	42,00	107,00	1,654	4,212	20; 30; **37,5;** 45
		135	42,00	128,00	1,654	5,039	20; 30; **37,5;** 45
		175	42,00	168,00	1,654	6,614	20; 30; **37,5;** 45
IB-25-37-N	CDK	60	44,50	72,50	1,752	2,854	20; 30; **37,5;** 45
		88	44,50	97,00	1,752	3,818	20; 30; **37,5;** 45
		106	48,50	111,00	1,909	4,370	20; 30; **37,5;** 45
		114	51,00	116,00	2,008	4,566	20; 30; **37,5;** 45
		135	51,00	137,00	2,008	5,393	20; 30; **37,5;** 45
		175	51,00	177,00	2,008	6,969	20; 30; **37,5;** 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; **37,5;** 45
		88	53,00	105,00	2,087	4,133	20; 30; **37,5;** 45
		106	57,00	119,00	2,244	4,685	20; 30; **37,5;** 45
		114	60,00	125,00	2,362	4,921	20; 30; **37,5;** 45
		135	60,00	146,00	2,362	5,748	20; 30; **37,5;** 45
		175	60,00	186,00	2,362	7,322	20; 30; **37,5;** 45

FACING HOLDERS

Standard: 90,0°



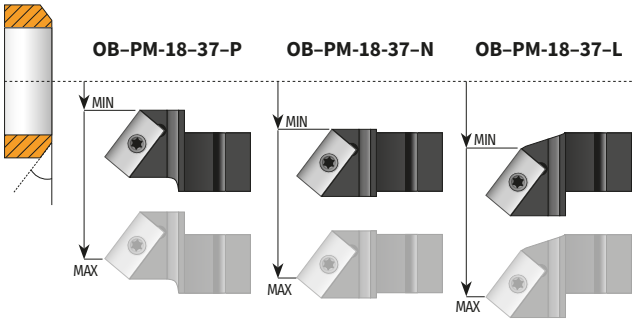
HOLDER NO.	BIT	HEAD	RANGE [MM]		RANGE [INCH]		DEGREE*
			MIN	MAX	MIN	MAX	
F-25-90-P	CD7	60	24,00	61,00	0,945	2,401	90
		88	24,00	86,00	0,945	3,385	90
		106	28,00	102,00	1,102	4,015	90
	CDK	114	31,00	105,00	1,220	4,133	90
		135	31,00	126,00	1,220	4,960	90
		175	31,00	166,00	1,220	6,535	90
F-25-90-L	CDI	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

PANELMILL & PANELMILL PF HOLDERS

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

OUTSIDE BEVELING HOLDERS

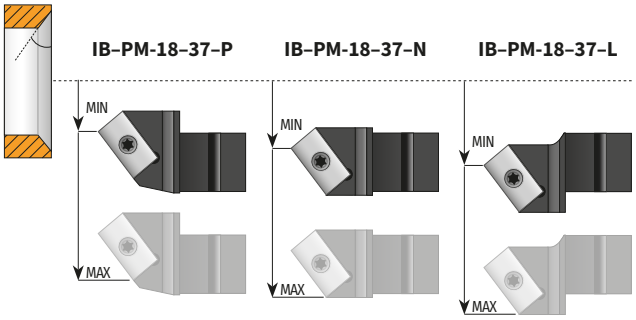
Cutting edge length: 12 mm, standard angle: 37,5° (others on request)



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; **37,5**
	CDI	99	0,00	85,00	0,000	3,346	30; **37,5**
OB-PM-18-37-N	CDI	64	11,00	56,50	0,433	2,224	30; **37,5**
	CDI	99	11,00	95,00	0,433	3,740	30; **37,5**
OB-PM-18-37-L	CDI	64	20,00	65,50	0,787	2,579	30; **37,5**
	CDI	99	20,00	104,00	0,787	4,094	30; **37,5**

INSIDE BEVELING HOLDERS

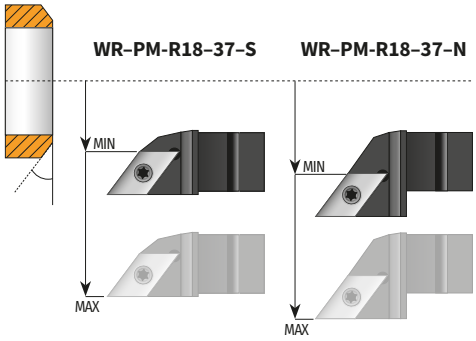
Cutting edge length: 12 mm, standard angle: 37,5° (others on request)



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; **37,5**
	CDI	99	10,00	95,00	0,394	3,740	30; **37,5**
IB-PM-18-37-N	CDI	64	20,00	65,00	0,787	2,559	30; **37,5**
	CDI	99	20,00	104,00	0,787	4,094	30; **37,5**
IB-PM-18-37-L	CDI	64	35,00	79,00	1,378	3,110	30; **37,5**
	CDI	99	35,00	115,00	1,378	4,528	30; **37,5**

OUTSIDE BEVELING HOLDERS

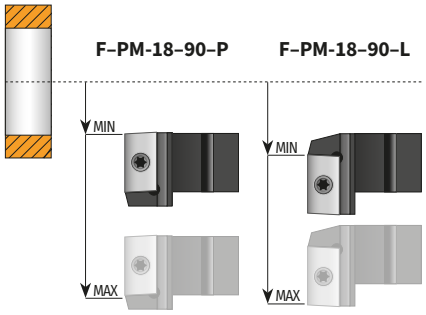
Cutting edge length: 10 mm, standard angle: 37,5° (others on request)



HOLDER NO.	BIT	HEAD	RANGE [MM]		RANGE [INCH]		DEGREE*
			MIN	MAX	MIN	MAX	
WR-PM-R18-37-S	WRIL	64	22,00	66,00	0,866	2,598	30; **37,5**
WR-PM-R18-37-N	WRIL	64	36,00	80,00	1,417	3,150	30; **37,5**
WR-PM-R18-37-N	WRIL	99	36,00	116,00	1,417	4,567	30; **37,5**

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

MINICUT 100 – HEAT EXCHANGER

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 300 - CONDENSER AND CHILLERS

The MiniCut 600 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

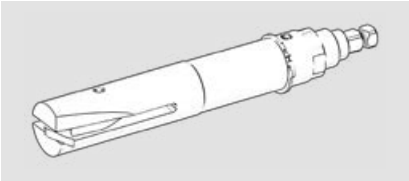
MINICUT 100 E

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.....1,3 Hp
Torque .....360 Nm (266 Ft.Lbs)
Feed Stroke .....25 mm (1")

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.....1,3 Hp
Torque .....122 Nm (92 Ft.Lbs)
Feed Stroke .....25 mm (1")

TUBE CUTTERS FOR MINICUT



Standard length: 3”
Other available upon order: 6” and 14”
This tools are used with MiniCut only

TUBE OD		TUBE GAUGE	TUBE ID	CUTTER BODY DIAMETER	TOOL NO.	CUTTER BIT NO.	NUMBER OF BLADES
[INCH]	[MM]	[BWG]					
5/8	15,8	12-13	10,3 - 10.05	10,00	**PTMC-158-3”-12**	K-25186	1
		14-15	11,66 - 12,22	11,30	**PTMC-158-3”-14**	K-25186	1
		16-17	12,57 - 12,93	12,20	**PTMC-158-3”-16**	K-25186	1
		18-19	13,40 - 13,74	13,10	**PTMC-158-3”-18**	K-25186	1
		20-22	14,10 - 14,45	13,80	**PTMC-158-3”-20**	K-25186	1
¾	19	14-15	14,80 - 15,40	14,50	**PTMC-190-3”-14**	K-25186	1
		16-17	15,75 - 16,10	15,40	**PTMC-190-3”-16**	K-25186	1
		18-19	16,56 - 16,90	16,15	**PTMC-190-3”-18**	K-25186	1
		20-22	17,27 - 17,63	17,00	**PTMC-190-3”-20**	K-25186	1
7/8	22,2	10-11	15,42 - 16,13	15,00	**PTMC-222-3”-10**	K-25194	1
		12-13	16,69 - 17,40	16,20	**PTMC-222-3”-12**	K-25194	1
		14-15	18,01 - 18,57	17,60	**PTMC-222-3”-14**	K-25194	1
		16-17	18,92 - 19,28	18,50	**PTMC-222-3”-16**	K-25194	1
		18-20	19,74 - 20,42	19,40	**PTMC-222-3”-18**	K-25194	1
1	25,4	8-9	17,02 - 17,88	16,60	**PTMC-254-3”-8**	K-25199	1
		10-11	18,59 - 19,30	18,20	**PTMC-254-3”-10**	K-25199	1
		12-13	19,86 - 20,57	19,40	**PTMC-254-3”-12**	K-25199	1
		14-15	21,18 - 21,74	20,80	**PTMC-254-3”-14**	K-25199	1
		16-17	22,10 - 22,45	21,70	**PTMC-254-3”-16**	K-25199	1
		18-19	22,91 - 23,27	22,50	**PTMC-254-3”-18**	K-25199	1
		20-22	23,62 - 23,89	23,20	**PTMC-254-3”-20**	K-25199	1
1-1/8	28,5	13-14	23,75 - 24,36	23,40	**PTMC-285-3”-13**	K-25199	1
		15-16	24,92 - 25,27	24,50	**PTMC-285-3”-14**	K-25199	1
		17-18	25,63 - 26,09	25,10	**PTMC-285-3”-17**	K-25199	1
1-1/4	31,7	12-13	26,21 - 26,92	25,80	**PTMC-317-3”-12**	K-25206	1
		14-15	27,53 - 28,09	27,10	**PTMC-317-3”-14**	K-25206	1
		16-17	28,45 - 28,80	28,00	**PTMC-317-3”-16**	K-25206	1
		18-20	29,26 - 29,92	28,80	**PTMC-317-3”-20**	K-25206	1
1-1/2	38,1	8-9	29,72 - 30, 58	29,30	**PTMC-381-3”-8**	K-25206	1
		10-11	31,29 - 32,00	30,08	**PTMC-381-3”-10**	K-25206	1
		12-13	32,56 - 33,27	32,10	**PTMC-381-3”-12**	K-25206	1
		14-15	33,88 - 34,44	33,40	**PTMC-381-3”-14**	K-25206	1
		16-17	34,80 - 35,15	34,40	**PTMC-381-3”-16**	K-25206	1
		18-20	35,51 - 36,32	35,10	**PTMC-381-3”-18**	K-25206	1

PTTC UNIVERSAL

This tools are used with low speed drills

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”

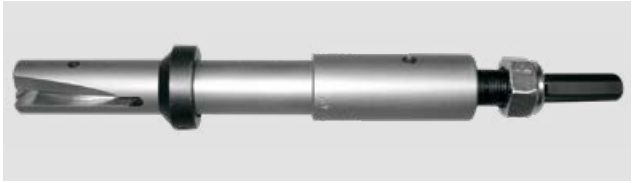
PTTT - TUBE TRIMMER

This tools are used with low speed drills

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 allow the tube to be cut through. Tool uses one or two blades made ut of the HSS. The front pilot mounted under the cutter keeps the cutter in the center of the tube and prevent the cutter to be jammed as the chips must go forward into the tube. Also available as tube trimmer and push type tube trimmer.



This tools are used with low speed drills

TUBE OD		TUBE GAUGE	TUBE ID	CUTTER BODY DIAMETER	TOOL NO.	CUTTER BIT NO.	NUMBER OF BLADES	DRIVE SHANK
[INCH]	[MM]	[BWG]						
3/8	9,5	22-24	8,10 - 8,40	7,8	**PTTC-95-3"-22**	K-25210-78	1	HEX-1/2"
½	12,7	14-15	8,50 - 9,04	8,20	**PTTC-127-3"-14**	K-25210	1	HEX-1/2"
		16-17	9,40 - 9,75	9,20	**PTTC-127-3"-16**	K-25210	1	HEX-1/2"
5/8	15,8	12-13	10,3 - 10.05	10,00	**PTTC-158-3"-12**	K-25186-A	1	HEX-1/2"
		14-15	11,66 - 12,22	11,30	**PTTC-158-3"-14**	K-25186-B	1	HEX-1/2"
		16-17	12,57 - 12,93	12,20	**PTTC-158-3"-16**	K-25186-B	1	HEX-1/2"
		18-19	13,40 - 13,74	13,10	**PTTC-158-3"-18**	K-25186	1	HEX-1/2"
		20-22	14,10 - 14,45	13,80	**PTTC-158-3"-20**	K-25186	1	HEX-1/2"
¾	19	14-15	14,80 - 15,40	14,50	**PTTC-190-3"-14**	K-25186	1	HEX-1/2"
		16-17	15,75 - 16,10	15,40	**PTTC-190-3"-16**	K-25186	1	HEX-1/2"
		18-19	16,56 - 16,90	16,15	**PTTC-190-3"-18**	K-25186	1	HEX-1/2"
		20-22	17,27 - 17,63	17,00	**PTTC-190-3"-20**	K-25186	1	HEX-1/2"
7/8	22,2	10-11	15,42 - 16,13	15,00	**PTTC-222-3"-10**	K-25194	1	HEX-1/2"
		12-13	16,69 - 17,40	16,20	**PTTC-222-3"-12**	K-25194	1	HEX-1/2"
		14-15	18,01 - 18,57	17,60	**PTTC-222-3"-14**	K-25194	1	HEX-1/2"
		16-17	18,92 - 19,28	18,50	**PTTC-222-3"-16**	K-25194	1	HEX-1/2"
		18-20	19,74 - 20,42	19,40	**PTTC-222-3"-18**	K-25194	1	HEX-1/2"
1	25,4	8-9	17,02 - 17,88	16,60	**PTTC-254-3"-8**	K-25199-A	1	HEX-1/2"
		10-11	18,59 - 19,30	18,20	**PTTC-254-3"-10**	K-25199-B	1	HEX-1/2"
		12-13	19,86 - 20,57	19,40	**PTTC-254-3"-12**	K-25199-B	1	HEX-1/2"
		14-15	21,18 - 21,74	20,80	**PTTC-254-3"-14**	K-25199	1	HEX-1/2"
		16-17	22,10 - 22,45	21,70	**PTTC-254-3"-16**	K-25199	1	HEX-1/2"
		18-19	22,91 - 23,27	22,50	**PTTC-254-3"-18**	K-25199	1	HEX-1/2"
		20-22	23,62 - 23,89	23,20	**PTTC-254-3"-20**	K-25199	1	HEX-1/2"
1-1/8	28,5	13-14	23,75 - 24,36	23,40	**PTTC-285-3"-13**	K-25199	1	HEX-5/8"
		15-16	24,92 - 25,27	24,50	**PTTC-285-3"-14**	K-25199	1	HEX-5/8"
		17-18	25,63 - 26,09	25,10	**PTTC-285-3"-17**	K-25199	1	HEX-5/8"
1-1/4	31,7	12-13	26,21 - 26,92	25,80	**PTTC-317-3"-12**	K-25206	1	HEX-5/8"
		14-15	27,53 - 28,09	27,10	**PTTC-317-3"-14**	K-25206	1	HEX-5/8"
		16-17	28,45 - 28,80	28,00	**PTTC-317-3"-16**	K-25206	1	HEX-5/8"
		18-20	29,26 - 29,92	28,80	**PTTC-317-3"-20**	K-25206	1	HEX-5/8"
1-1/2	38,1	8-9	29,72 - 30, 58	29,30	**PTTC-381-3"-8**	K-25206	1	HEX-5/8"
		10-11	31,29 - 32,00	30,08	**PTTC-381-3"-10**	K-25206	1	HEX-5/8"
		12-13	32,56 - 33,27	32,10	**PTTC-381-3"-12**	K-25206	1	HEX-5/8"
		14-15	33,88 - 34,44	33,40	**PTTC-381-3"-14**	K-25206	1	HEX-5/8"
		16-17	34,80 - 35,15	34,40	**PTTC-381-3"-16**	K-25206	1	HEX-5/8"
		18-20	35,51 - 36,32	35,10	**PTTC-381-3"-18**	K-25206	1	HEX-5/8"
2	50,8	8	42,42	42,00	**PTTC-508-3"-8**	K-25221	1	SQ-3/4"
		9	43,28	42,80	**PTTC-508-3"-9**	K-25221	1	SQ-3/4"
		10	44,00	43,60	**PTTC-508-3"-10**	K-25221	1	SQ-3/4"
		11	44,70	44,30	**PTTC-508-3"-11**	K-25221	1	SQ-3/4"
		12	45,26	44,80	**PTTC-508-3"-12**	K-25221	1	SQ-3/4"
		13	46,00	45,60	**PTTC-508-3"-13**	K-25221	1	SQ-3/4"
		14	46,60	46,20	**PTTC-508-3"-14**	K-25221	1	SQ-3/4"
		15	47,14	46,70	**PTTC-508-3"-15**	K-25221	1	SQ-3/4"
		16-20	47,50 - 48,94	47,10	**PTTC-508-3"-16**	K-25221	1	SQ-3/4"
2-1/2	63,5	8	55,12	54,70	**PTTC-635-3"-8**	K-25223	1	SQ-3/4"
		9	55,98	55,60	**PTTC-635-3"-9**	K-25223	1	SQ-3/4"
		10	56,70	56,30	**PTTC-635-3"-10**	K-25223	1	SQ-3/4"
		11	57,40	57,00	**PTTC-635-3"-11**	K-25223	1	SQ-3/4"
		12	57,96	57,50	**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.

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	**ORTC-100**	N-625-4
		20	11,00	11,30	0,433	0,445	**ORTC-108**	N-625-4
5/8	15,88	14	11,40	11,90	0,449	0,469	**ORTC-113**	N-625-3
		15-16	12,00	12,90	0,472	0,508	**ORTC-119**	N-625-3
		17-18	12,70	13,50	0,500	0,531	**ORTC-123**	N-625-2
		19-20	13,50	14,20	0,531	0,559	**ORTC-131**	N-625-2
		22	14,00	14,70	0,551	0,579	**ORTC-139**	N-750-2
3/4	19,05	14-15	14,70	15,50	0,579	0,610	**ORTC-145**	N-750-2
		16	15,20	16,50	0,598	0,650	**ORTC-151**	N-750-2
		17-18	15,90	16,50	0,626	0,650	**ORTC-153**	N-750-2
		19-20	16,70	17,50	0,657	0,689	**ORTC-163**	N-1000-1
7/8	22,23	14-15	17,80	18,50	0,701	0,728	**ORTC-174**	N-1000-1
		16-17	18,80	19,50	0,740	0,768	**ORTC-184**	N-1000-1
		18	19,30	20,00	0,760	0,787	**ORTC-190**	N-1000-1
		19-20	19,80	20,60	0,780	0,811	**ORTC-193**	N-1000-2
1	25,40	12	19,80	20,60	0,780	0,811	**ORTC-193**	N-1000-2
		14	20,80	21,60	0,819	0,850	**ORTC-205**	N-1000-2
		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

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 I.D.	TOOL NO.	TOOL BIT
[INCH]	[MM]	[BWG]	[MM]		
3/4	19,0	10-16	12-12,9	**ORTCC-119**	N-625-3-HSS
		11-18	12,7-13,5	**ORTCC-123**	N-625-2-HSS
		12-20	13,5-14,2	**ORTCC-131**	N-625-2-HSS
		13-22	14,0-14,7	**ORTCC-139**	N-750-2-HSS
		14-15	14,7-15,5	**ORTCC-145**	N-750-2-HSS
7/8	22,2	10-16	15,2-16,5	**ORTCC-151**	N-750-2-HSS
		12-18	15,9-16,5	**ORTCC-153**	N-750-2-HSS
		13-20	16,7-17,5	**ORTCC-163**	N-1 000-1-HSS
1	25,4	10-15	17,8-18,5	**ORTCC-174**	N-1000-1-HSS
		11-17	18,8-19,5	**ORTCC-184**	N-1000-1-HSS
		12-18	19,3-20	**ORTCC-190**	N-1000-1-HSS
		13-20	19,8-20,6	**ORTCC-193**	N-1000-2-HSS
		14	20,8-21,6	**ORTCC-205**	N-1000-2-HSS

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 m^3/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-190-3	CP-19	CW-20	Solid Body	SWTC-750-13	WTTA-750-13	Solid body	Solid body	1WTB-750-13
		14	**1WTTC-750**	1CCWH-190	CP-20	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	WTTA-875	T-19	PE-1WTTC-222	1WTB-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 1WTC-750-13*

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		1CCWH-383		CW-41	P-070			T-70		
		17				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		

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
		9				CW-45	P-080			T-80		
		10				CW-45	P-081			T-81		
		11				CW-45	P-082			T-82		
		12				CW-45	P-083			T-83		
		13				CW-45	P-084			T-84		
		14				CW-45	P-085			T-85		
		15				CW-45	P-086			T-86		
		16		1CCWH-445		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
		7				CW-51	P-093			T-93		
		8				CW-51	P-094			T-94		
		9				CW-51	P-095			T-95		
		10				CW-51	P-096			T-96		
		11				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		1CCWH-504		CW-51	P-102			T-102		
		17				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
		7				CW-51	P-108			T-108		
		8				CW-51	P-109			T-109		
		9				CW-51	P-110			T-110		
		10				CW-51	P-111			T-111		
		11				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		

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				CW-51	P-131			T-131		
		16		1CCWH-639		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				CW-51	P-146			T-146		
		16		1CCWH-766		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				CW-51	P-161			T-161		
		16		1CCWH-105		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

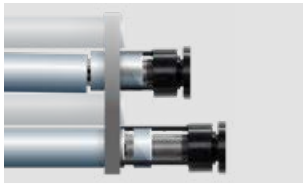
AIR USE		WIDTH		HEIGHT		WEIGHT	
55 cfm	1,3 m³/min	2,32"	59 mm	13,1"	335 mm	21 Lbs	9,5 kg

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	WHEEL HOLDER	CUTTER WHEEL	WHEEL PIN	PILOT	SUPPORT PILOT	THRUST COLLAR	COLAR DEPTH STOP	
[INCH]	[MM]	[BWG]							LONG	SHORT
1 1/2	38.1	12	2CWH-15	CW-13	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			
		24				2P-334	SP-334			
1 3/4	44.45	12	2CWH-18	CW-16	CP-4	2P-35	SP-35	TC-250	TCDS-L	TCDS-S
		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			

TUBE OD		TUBE GAUGE	WHEEL HOLDER	CUTTER WHEEL	WHEEL PIN	PILOT	SUPPORT PILOT	THRUST COLLAR	COLAR DEPTH STOP	
[INCH]	[MM]	[BWG]							LONG	SHORT
2	50.80	8	2CWH-20	CW-17	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

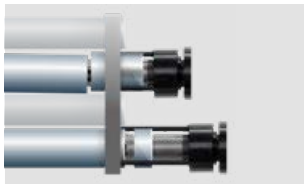
AIR USE		WIDTH		HEIGHT		WEIGHT	
55 cfm	1,3 m³/min	2,32"	59 mm	13,1"	335 mm	23 Lbs	10,42 kg

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 HOLDER	CUTTER WHEEL	WHEEL PIN	PILOT EXTENSION	PILOT	THRUST COLLAR	COLAR DEPTH STOP	
[INCH]	[MM]	[BWG]							LONG	SHORT
2	50.8	10	CCWH-20	CW-16	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			
		20					P49			
2 1/2	63.50	9	CCWH-25	CW-17	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			

TUBE OD		TUBE GAUGE	CUTTER WHEEL HOLDER	CUTTER WHEEL	WHEEL PIN	PILOT EXTENSION	PILOT	THRUST COLLAR	COLAR DEPTH STOP	
[INCH]	[MM]	[BWG]							LONG	SHORT
3	76.20	9	CCWH-30	CW-17	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	CCWH-35	CW-17	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	CCWH-40	CW-17	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

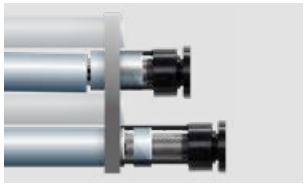
AIR USE		WIDTH		HEIGHT		WEIGHT	
55 cfm	1,3 m^3/min	2,32"	59 mm	19"	485 mm	36,3 Lbs	16,5 kg

OPTIONAL FEED SYSTEMS

Lever feed handle

Crank arm with double feed stroke

ALL-PURPOSE TOOL



Tube cutting and tube trimming setup-set-up

TUBE OD		TUBE GAUGE	CUTTER WHEEL HOLDER	CUTTER WHEEL	WHEEL PIN	PILOT EXTENSION	PILOT	THRUST COLLAR	COLAR DEPTH	
[INCH]	[MM]	[BWG]							LONG	SHORT
2 1/2	63.50	8	CCWH-55	CW-19	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	CCWH-60	CW-22	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	CCWH-60	CW-22	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			

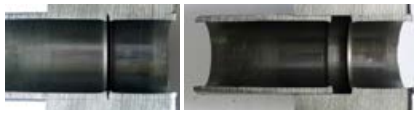
TUBE OD		TUBE GAUGE	CUTTER WHEEL HOLDER	CUTTER WHEEL	WHEEL PIN	PILOT EXTENSION	PILOT	THRUST COLLAR	COLAR DEPTH	
[INCH]	[MM]	[BWG]							LONG	SHORT
3 1/2	88.90	6	CCWH-65	CW-22	CP-5	PE-WTTC-3	P3716	TC-3400	TCDS-L	TCDS-S
		7					P3717			
		8					P370			
		9					P371			
		10					P372			
		11					P373			
		12					P374			
		13					P375			
		14					P376			
		15					P3761			
		16					P377			
		17					P3771			
		18					P378			
		19					P3781			
		20					P379			
4	101.60	6	CCWH-70	CW-22	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	CCWH-80	CW-22	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
0,75" - 1"	120"	Manual
19-25 mm	3000 mm	0,97 kW

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		1CCWH-19-2		CW-21	P-012	
		19				CW-21	P-013	
		20				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		1CCWH-222-2		CW-25	P-023	
		19				CW-25	P-024	
		20				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	
		24				CW-31	P-039	

MWR – MINI WALL REDUCER

First in the world for the quick and efficient spot reduction of heavy wall carbon and alloy tubing in refinery heat exchangers, FinFan coolers and other tubular vessels. This unique system safely reduces the tube wall in the form of a slot so that a One Revolution Tube Cutter can then pierce and cut a ventilation slot at the appropriate 90 or 180 degrees, prior to plugging the leaking tube. Mini Wall reducer uses one cutting bit and can be used for any material tubes.

CUTTING RANGE	FREE SPEED	POWER	TORQUE
Up to 31,75 mm	100 Rpm	1,3 Hp	140 Nm
Up to 1,250"			105 Ft.Lbs

AIR USE		BODY WIDTH		BODY HEIGHT:		BODY WEIGHT:	
55 cfm	1,3 m^3/min	2,32"	59 mm	13,1"	335 mm	9 Lbs	4,5 kg

MWR 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 ON FINFAN COOLER

MWR with optional shafts for FinFan coolers lock in the plug holes with special jaws that do not damage the thread.

Locking plate has 2 reaction shafts and can be rotated through 180 degrees to accommodate partition plates, channel heads etc.

MWR E

MWR E is the electric version of the MWR and 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 .....120 RPM
Power.....1,3 Hp
Torque .....360 Nm (266 Ft.Lbs)
Feed Stroke .....25 mm (1")

MWR ON FINFAN HEADER MOCK-UP

We recommend the use of dedicated locking plates to suit specific tube sheet or water box header pitch.

PTWR FOR MINI WALL REDUCER

ORTCS FOR MINI WALL REDUCER

TUBE OD		TUBE GAUGE	TUBE ID	BODY DIAMETER	PTWR TOOL NR			ORTC TOOL NR		
[INCH]	[MM]	*00* MIN WALL			6" REACH	14" REACH	TOOL BIT	6" REACH	14" REACH	TOOL BIT
3/4"	19,05	*10*	11,6	11,3	**PTWR-190-6-9**	**PTWR-190-14-9**	W-25186-3	n/a	n/a	n/a
		10	12,2	11,9	**PTWR-190-6-10**	**PTWR-190-14-10**	W-25186-3	**ORTCS-119-6**	**ORTCS-119-14**	S-750-2
		12	13,0	12,7	**PTWR-190-6-11**	**PTWR-190-14-11**	W-25186-3	**ORTCS-127-6**	**ORTCS-127-14**	S-750-2
		12	13,5	13,2	**PTWR-190-6-12**	**PTWR-190-14-12**	W-25186-3	**ORTCS-132-6**	**ORTCS-132-14**	S-750-2
		14	14,4	14.1	**PTWR-190-6-13**	**PTWR-190-14-13**	W-25186-3	**ORTCS-141-6**	**ORTCS-141-14**	S-750-2
		14	14,8	14,5	**PTWR-190-6-14**	**PTWR-190-14-14**	W-25186-3	**ORTCS-145-6**	**ORTCS-145-14**	S-750-2
7/8"	22,22	*10*	14,7	14,4	**PTWR-222-6-9**	**PTWR-222-14-9**	W-25194-4	**ORTCS-144-6**	**ORTCS-144-14**	S-1000-1
		10	15,4	15,1	**PTWR-222-6-10**	**PTWR-222-14-10**	W-25194-4	**ORTCS-151-6**	**ORTCS-151-14**	S-1000-1
		12	16,2	15,9	**PTWR-222-6-11**	**PTWR-222-14-11**	W-25194-4	**ORTCS-159-6**	**ORTCS-159-14**	S-1000-1
		12	16,7	16,4	**PTWR-222-6-12**	**PTWR-222-14-12**	W-25194-4	**ORTCS-164-6**	**ORTCS-164-14**	S-1000-1
		14	17,6	17,3	**PTWR-222-6-13**	**PTWR-222-14-13**	W-25194-4	**ORTCS-173-6**	**ORTCS-173-14**	S-1000-1
		14	18.0	17,7	**PTWR-222-6-14**	**PTWR-222-14-14**	W-25194-4	**ORTCS-177-6**	**ORTCS-177-14**	S-1000-1
1"	25,40	*8*	16,2	15,9	**PTWR-254-6-7**	**PTWR-254-14-7**	W-25199-5	**ORTCS-159-6**	**ORTCS-159-14**	S-1000-2
		8	17.0	16.7	**PTWR-254-6-8**	**PTWR-254-14-8**	W-25199-5	**ORTCS-167-6**	**ORTCS-167-14**	S-1000-2
		10	17,9	17.6	**PTWR-254-6-9**	**PTWR-254-14-9**	W-25199-5	**ORTCS-176-6**	**ORTCS-176-14**	S-1000-2
		10	18,6	18.3	**PTWR-254-6-10**	**PTWR-254-14-10**	W-25199-5	**OTRCS-183-6**	**OTRCS-183-14**	S-1000-2
		12	19,3	19.0	**PTWR-254-6-11**	**PTWR-254-14-11**	W-25199-5	**ORTCS-190-6**	**ORTCS-190-14**	S-1000-2
		12	19,9	19.7	**PTWR-254-6-12**	**PTWR-254-14-12**	W-25199-5	**OTRCS-197-6**	**OTRCS-197-14**	S-1000-2
		14	20,8	20.5	**PTWR-254-6-13**	**PTWR-254-14-13**	W-25199-5	**ORTCS-205-6**	**ORTCS-205-14**	S-1000-2
		14	21,2	20.9	**PTWR-254-6-14**	**PTWR-254-14-14**	W-25199-5	**OTRCS-209-6**	**OTRCS-209-14**	S-1000-2
1-1/8"	28,60	*8*	19,4	19.1	**PTWR-285-6-7**	**PTWR-285-14-7**	W-25199-5	**ORTCS-191-6**	**ORTCS-191-14**	S-1000-2
		8	20,2	19.9	**PTWR-285-6-8**	**PTWR-285-14-8**	W-25199-5	**ORTCS-199-6**	**ORTCS-199-14**	S-1000-2
		10	21,1	20.8	**PTWR-285-6-9**	**PTWR-285-14-9**	W-25199-5	**ORTCS-208-6**	**ORTCS-208-14**	S-1000-2
		10	21,8	21.5	**PTWR-285-6-10**	**PTWR-285-14-10**	W-25199-5	**ORTCS-215-6**	**ORTCS-215-14**	S-1000-2
		12	22,5	22.3	**PTWR-285-6-11**	**PTWR-285-14-11**	W-25199-5	**ORTCS-223-6**	**ORTCS-223-14**	S-1000-2
		12	23.0	22.7	**PTWR-285-6-12**	**PTWR-285-14-12**	W-25199-5	**ORTCS-227-6**	**ORTCS-227-14**	S-1000-2
		14	24.0	23.7	**PTWR-285-6-13**	**PTWR-285-14-13**	W-25199-5	**ORTCS-237-6**	**ORTCS-237-14**	S-1000-2
		14	24.4	24,1	**PTWR-285-6-14**	**PTWR-285-14-14**	W-25199-5	**ORTCS-241-6**	**ORTCS-241-14**	S-1000-2
1-1/4"	31,75	*8*	22.5	22,2	**PTWR-317-6-7**	**PTWR-317-14-7**	W-25206-6	**ORTCS-222-6**	**ORTCS-222-14**	S-1000-2
		8	23.4	23,1	**PTWR-317-6-8**	**PTWR-317-14-8**	W-25206-6	**ORTCS-231-6**	**ORTCS-231-14**	S-1000-2
		10	24.3	24.0	**PTWR-317-6-9**	**PTWR-317-14-9**	W-25206-6	**ORTCS-240-6**	**ORTCS-240-14**	S-1000-2
		10	24.9	24.6	**PTWR-317-6-10**	**PTWR-317-14-10**	W-25206-6	**ORTCS-246-6**	**ORTCS-246-14**	S-1000-2
		12	25,7	25.4	**PTWR-317-6-11**	**PTWR-317-14-11**	W-25206-6	**ORTCS-254-6**	**ORTCS-254-14**	S-1000-2
		12	26,2	25.9	**PTWR-317-6-12**	**PTWR-317-14-12**	W-25206-6	**ORTCS-259-6**	**ORTCS-259-14**	S-1000-2
		14	27,1	26.8	**PTWR-317-6-13**	**PTWR-317-14-13**	W-25206-6	**ORTCS-268-6**	**ORTCS-268-14**	S-1000-2
		14	27,5	27.2	**PTWR-317-6-14**	**PTWR-317-14-14**	W-25206-6	**ORTCS-272-6**	**ORTCS-272-14**	S-1000-2
1-3/8"	34,92	*8*	25,7	25.3	**PTWR-349-6-7**	**PTWR-349-14-7**	W-25206-6	**ORTCS-253-6**	**ORTCS-253-14**	S-1500-1
		8	26,5	26.2	**PTWR-349-6-8**	**PTWR-349-14-8**	W-25206-6	**ORTCS-262-6**	**ORTCS-262-14**	S-1500-1
		10	27,5	27.2	**PTWR-349-6-9**	**PTWR-349-14-9**	W-25206-6	**ORTCS-272-6**	**ORTCS-272-14**	S-1500-1
		10	28.1	27,8	**PTWR-349-6-10**	**PTWR-349-14-10**	W-25206-6	**ORTCS-278-6**	**ORTCS-278-14**	S-1500-1
		12	28,9	28,6	**PTWR-349-6-11**	**PTWR-349-14-11**	W-25206-6	**ORTCS-286-6**	**ORTCS-286-14**	S-1500-1
		12	29,4	29,4	**PTWR-349-6-12**	**PTWR-349-14-12**	W-25206-6	**ORTCS-291-6**	**ORTCS-291-14**	S-1500-1
		14	30,3	30.0	**PTWR-349-6-13**	**PTWR-349-14-13**	W-25206-6	**ORTCS-300-6**	**ORTCS-300-14**	S-1500-1
		14	30,7	30.4	**PTWR-349-6-14**	**PTWR-349-14-14**	W-25206-6	**ORTCS-304-6**	**ORTCS-304-14**	S-1500-1
1-1/2"	38,10	*8*	28,9	28,6	**PTWR-381-6-7**	**PTWR-381-14-7**	W-25206-6	**ORTCS-286-6**	**ORTCS-286-14**	S-1500-1
		8	29,7	29,4	**PTWR-381-6-8**	**PTWR-381-14-8**	W-25206-6	**ORTCS-294-6**	**ORTCS-294-14**	S-1500-1
		10	30,6	30.3	**PTWR-381-6-9**	**PTWR-381-14-9**	W-25206-6	**ORTCS-303-6**	**ORTCS-303-14**	S-1500-1
		10	31,3	31.0	**PTWR-381-6-10**	**PTWR-381-14-10**	W-25206-6	**ORTCS-310-6**	**ORTCS-310-14**	S-1500-1
		12	32.0	31,7	**PTWR-381-6-11**	**PTWR-381-14-11**	W-25206-6	**ORTCS-317-6**	**ORTCS-317-14**	S-1500-1
		12	32.6	32,3	**PTWR-381-6-12**	**PTWR-381-14-12**	W-25206-6	**ORTCS-323-6**	**ORTCS-323-14**	S-1500-1
		14	33.5	33,2	**PTWR-381-6-13**	**PTWR-381-14-13**	W-25206-6	**ORTCS-332-6**	**ORTCS-332-14**	S-1500-1
		14	33.9	33,6	**PTWR-381-6-14**	**PTWR-381-14-14**	W-25206-6	**ORTCS-336-6**	**ORTCS-336-14**	S-1500-1

ORTCS are recommended for hand use only. No Impact wrenches or other high torque tools are to be used in its operation. These tools are ideal for puncturing tubes prior to tube plugging. This tool is intended for use on all non-ferrous materials and some ferrous tubes.

- Cutter Blade: Recommend quantity of 1 per 100 brass or copper tube cuts or 1 per 50 tube cuts of other materials.
- Cutter Pin: Recommend quantity of 1 pin for every 2 cutter blades.

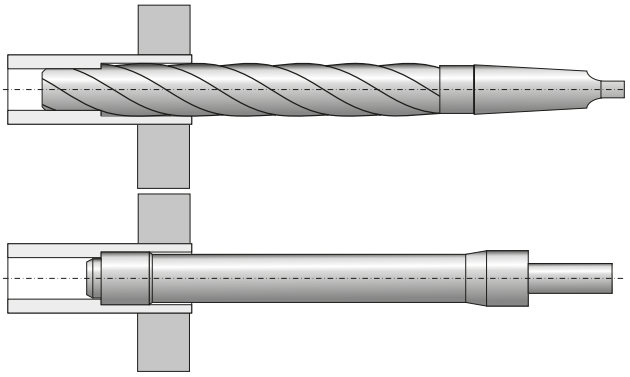
We recommend the use of a high quality cutting oil to maximize the life of the cutter bit.

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. After the drilling, tube can be removed be the tube drift, page G-26.

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



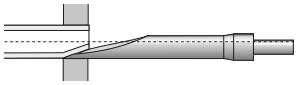
PNEUMATIC CHIPPING HAMMER

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 availbale 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	9,48 Lbs	4,3 kg

CT COLLAPSING TOOLS

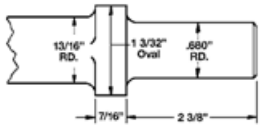


TUBE O.D.		TUBE GAUGE			TOOL WITH SHANK 06
[INCH]	[MM]	[BWG]	[MM]	[INCH]	
3/8"	10	16 - 20	1,65 - 0,89	0,065 - 0,035	**CT-375-06**
1/2"	12,7				**CT-500-06**
5/8"	15,8				**CT-625-06**
3/4"	19,05				**CT-750-06**
7/8"	22,2				**CT-875-06**
1"	25,4				**CT-1000-06**
1-1/4"	31,7				**CT-1125-06**
1-1/2"	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**
		20	0,035	0,89	0,555	14,10	**TD-625-20-06**
3/4	19	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-1000-18-06**
		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-1000-20-16**

SHANK TYPE 06



MANUAL TUBE PULLER

TUBE OD		TUBE GAUGE	WALL THKS		TUBE ID		TUBE PULLER NO	SPARE SPEARS NO
[INCH]	[MM]	[BWG]	[INCH]	[MM]	[INCH]	[MM]		
1/2	12,7	14	0,08	2,11	0,334	8,48	**KSP 500-14**	KSP 1/2-14
		16	0,07	1,65	0,370	9,40	**KSP500-16**	KSP 1/2-16
		18	0,05	1,24	0,402	10,21	**KSP 500-18**	KSP 1/2-18
		20	0,04	0,89	0,430	10,92	**KSP 500-20**	KSP 1/2-20
5/8	15,88	14	0,08	2,11	0,459	11,66	**KSP 625-14**	KSP 5/8-14
		16	0,07	1,65	0,495	12,57	**KSP 625-16**	KSP 5/8-16
		18	0,05	1,24	0,527	13,39	**KSP 625-18**	KSP 5/8-18
		20	0,04	0,89	0,555	14,10	**KSP 625-20**	KSP 5/8-20
3/4	19,05	14	0,08	2,11	0,585	14,86	**KSP 750-14**	KSP 3/4-14
		16	0,07	1,65	0,620	15,75	**KSP 750-16**	KSP 3/4-16
		18	0,05	1,24	0,652	16,56	**KSP 750-18**	KSP 3/4-18
		20	0,04	0,89	0,680	17,27	**KSP 750-20**	KSP 3/4-20
7/8	22,2	14	0,08	2,11	0,709	18,01	**KSP 875-14**	KSP 7/8-14
		16	0,07	1,65	0,745	18,92	**KSP 875-16**	KSP 7/8-16
		18	0,05	1,24	0,777	19,74	**KSP 875-18**	KSP 7/8-18
		20	0,04	0,89	0,805	20,45	**KSP 875-20**	KSP 7/8-20
1	25,4	14	0,08	2,11	0,834	21,18	**KSP 1000-14**	KSP 1-14
		16	0,07	1,65	0,870	22,10	**KSP 1000-16**	KSP 1-16
		18	0,05	1,24	0,902	22,91	**KSP 1000-18**	KSP 1-18
		20	0,04	0,89	0,930	23,62	**KSP 1000-20**	KSP 1-20

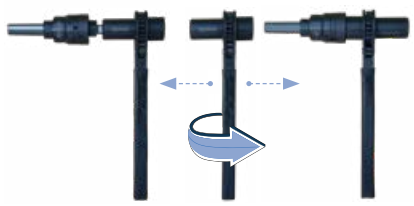
MSP-100 MANUAL SPEAR PULLER

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 retched 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 treaded.
- 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	**CPS-12-14-15**	CPS-10-06A-12
		16-17	**CPS-12-16-17**	
		18-19	**CPS-12-18-10**	
		20-22	**CPS-12-20-22**	
		22-24	**CPS-12-22-24**	
5/8	15,88	10-11	**CPS-58-10-11**	CPS-10-06A-34
		12-13	**CPS-58-12-13**	
		14-15	**CPS-58-14-15**	
		16-17	**CPS-58-16-17**	
3/4	19,05	10-11	**CPS-34-10-11**	CPS-10-06A-34
		12-13	**CPS-34-12-13**	
		14-15	**CPS-34-14-15**	
		16-17	**CPS-34-16-17**	
7/8	22,23	10-11	**CPS-78-10-11**	CPS-10-06A-78
		12-13	**CPS-78-12-13**	
		14-15	**CPS-78-14-15**	
		16-17	**CPS-78-16-17**	
1	25,4	10-11	**CPS-1-10-11**	CPS-10-06A-1
		12-13	**CPS-1-12-13**	
		14-15	**CPS-1-14-15**	
		16-17	**CPS-1-16-17**	

2-FUNCTION RATCHED HANDLE



MCP-100

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						
		20-21	CP-1000-01-58-20						
		22-23	CP-1000-01-58-22						
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						
		20-21	CP-1000-01-34-20						
		22-23	CP-1000-01-34-22						
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						
		20-21	CP-1000-01-78-20						
		22-23	CP-1000-01-78-22						
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						
		20-21	CP-1000-01-1-20						
		22-23	CP-1000-01-1-22						

TUBE PULLER CP-1000-S

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
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	30 Lbs	13,5 kg

CPSCK-1000

For this tool we offer a spears type conversion kit.

TUBE OD		TUBE GAUGE	GRIPPER SET	MIN ENTER DIM AFTER EXP.		MAX ENTER DIM AFTER EXP.		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	CP-1000-01-58-16	0,506	12,85	0,545	13,84	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	0,535	13,59	0,574	14,58						
		20-21	CP-1000-01-58-20	0,562	14,27	0,602	15,29						
		22-23	CP-1000-01-58-22	0,576	14,63	0,616	15,65						
3/4	19,05	16-17	CP-1000-01-34-16	0,631	16,03	0,671	17,04	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	0,665	16,89	0,704	17,88						
		20-21	CP-1000-01-34-20	0,692	17,58	0,732	18,59						
		22-23	CP-1000-01-34-22	0,706	17,93	0,746	18,95						
7/8	22,23	16-17	CP-1000-01-78-16	0,755	19,18	0,795	20,19	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	0,787	19,99	0,826	20,98						
		20-21	CP-1000-01-78-20	0,815	20,70	0,854	21,69						
		22-23	CP-1000-01-78-22	0,828	21,03	0,868	22,05						
1	25,4	16-17	CP-1000-01-1-16	0,881	22,38	0,921	23,39	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	0,913	23,19	0,952	24,18						
		20-21	CP-1000-01-1-20	0,941	23,90	0,980	24,89						
		22-23	CP-1000-01-1-22	0,972	24,69	1,011	25,68						
1-1/4	31,75	16-17	CP-1000-01-114-16	1,133	28,78	1,173	29,79	CP-10S-03-114	CP-10S-06A-114	CP-10-LN-114	CP-10-AN-114	CP-2220	CP-1724
		18-19	CP-1000-01-114-18	1,165	29,59	1,204	30,58						
		20-21	CP-1000-01-114-20	1,194	30,33	1,234	31,34						
		22-23	CP-1000-01-114-22	1,208	30,68	1,248	31,70						
1-1/2	38,10	16-17	CP-1000-01-112-16	1,385	35,18	1,425	36,20	CP-10S-03-112	CP-10S-06A-112	CP-10-LN-112	CP-10-AN-112	CP-2220	CP-1724
		18-19	CP-1000-01-112-18	1,417	35,99	1,456	36,98						
		20-21	CP-1000-01-112-20	1,444	36,68	1,484	37,69						
		22-23	CP-1000-01-112-22	1,458	37,03	1,498	38,05						

TUBE PULLER 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. gauge 16 to 24 (16 to 38 mm O.D. wall 0,5 to 1,6 mm) for tube sheets up to 2" (50 mm).

This tool version is made to order only!

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 32,67"	86 x 830 mm	32 Lbs	14,5 kg

TUBE OD		TUBE GAUGE	GRIPPER SET	MIN ENTER DIM AFTER EXP.		MAX ENTER DIM AFTER EXP.		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	CP-1000-01-58-16	0,506	12,85	0,545	13,84	CP-10L-03-58	CP-10L-06A-58	CP-10-LN-58	CP-10-AN-58	CP-2220	CP-1724
		18-19	CP-1000-01-58-18	0,535	13,59	0,574	14,58						
		20-21	CP-1000-01-58-20	0,562	14,27	0,602	15,29						
		22-23	CP-1000-01-58-22	0,576	14,63	0,616	15,65						
3/4	19,05	16-17	CP-1000-01-34-16	0,631	16,03	0,671	17,04	CP-10L-03-34	CP-10L-06A-34	CP-10-LN-34	CP-10-AN-34	CP-2220	CP-1724
		18-19	CP-1000-01-34-18	0,665	16,89	0,704	17,88						
		20-21	CP-1000-01-34-20	0,692	17,58	0,732	18,59						
		22-23	CP-1000-01-34-22	0,706	17,93	0,746	18,95						
7/8	22,23	16-17	CP-1000-01-78-16	0,755	19,18	0,795	20,19	CP-10L-03-78	CP-10L-06A-78	CP-10-LN-78	CP-10-AN-78	CP-2220	CP-1724
		18-19	CP-1000-01-78-18	0,787	19,99	0,826	20,98						
		20-21	CP-1000-01-78-20	0,815	20,70	0,854	21,69						
		22-23	CP-1000-01-78-22	0,828	21,03	0,868	22,05						
1	25,4	16-17	CP-1000-01-1-16	0,881	22,38	0,921	23,39	CP-10L-03-1	CP-10L-06A-1	CP-10-LN-1	CP-10-AN-1	CP-2220	CP-1724
		18-19	CP-1000-01-1-18	0,913	23,19	0,952	24,18						
		20-21	CP-1000-01-1-20	0,941	23,90	0,98	24,89						
		22-23	CP-1000-01-1-22	0,972	24,69	1,011	25,68						
1-1/4	31,75	16-17	CP-1000-01-114-16	1,133	28,78	1,173	29,79	CP-10L-03-114	CP-10L-06A-114	CP-10-LN-114	CP-10-AN-114	CP-2220	CP-1724
		18-19	CP-1000-01-114-18	1,165	29,59	1,204	30,58						
		20-21	CP-1000-01-114-20	1,194	30,33	1,234	31,34						
		22-23	CP-1000-01-114-22	1,208	30,68	1,248	31,70						
1-1/2	38,10	16-17	CP-1000-01-112-16	1,385	35,18	1,425	36,20	CP-10L-03-112	CP-10L-06A-112	CP-10-LN-112	CP-10-AN-112	CP-2220	CP-1724
		18-19	CP-1000-01-112-18	1,417	35,99	1,456	36,98						
		20-21	CP-1000-01-112-20	1,444	36,68	1,484	37,69						
		22-23	CP-1000-01-112-22	1,458	37,03	1,498	38,05						

TUBE PULLER CP-1000-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	GRIPPER SET	MIN ENTER DIM AFTER EXP.		MAX ENTER DIM AFTER EXP.		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	CP-1000-01-58-16	0,506	12,85	0,545	13,84	CP-10S-03-58	CP-10L-06A-58	CP-10-LN-58	CP-10-AN-58	CP-2220	CP-1724
		18-19	CP-1000-01-58-18	0,535	13,59	0,574	14,58						
		20-21	CP-1000-01-58-20	0,562	14,27	0,602	15,29						
		22-23	CP-1000-01-58-22	0,576	14,63	0,616	15,65						
3/4	19,05	16-17	CP-1000-01-34-16	0,631	16,03	0,671	17,04	CP-10S-03-34	CP-10L-06A-34	CP-10-LN-34	CP-10-AN-34	CP-2220	CP-1724
		18-19	CP-1000-01-34-18	0,665	16,89	0,704	17,88						
		20-21	CP-1000-01-34-20	0,692	17,58	0,732	18,59						
		22-23	CP-1000-01-34-22	0,706	17,93	0,746	18,95						
7/8	22,23	16-17	CP-1000-01-78-16	0,755	19,18	0,795	20,19	CP-10S-03-78	CP-10L-06A-78	CP-10-LN-78	CP-10-AN-78	CP-2220	CP-1724
		18-19	CP-1000-01-78-18	0,787	19,99	0,826	20,98						
		20-21	CP-1000-01-78-20	0,815	20,70	0,854	21,69						
		22-23	CP-1000-01-78-22	0,828	21,03	0,868	22,05						
1	25,4	16-17	CP-1000-01-1-16	0,881	22,38	0,921	23,39	CP-10S-03-1	CP-10L-06A-1	CP-10-LN-1	CP-10-AN-1	CP-2220	CP-1724
		18-19	CP-1000-01-1-18	0,913	23,19	0,952	24,18						
		20-21	CP-1000-01-1-20	0,941	23,90	0,980	24,89						
		22-23	CP-1000-01-1-22	0,972	24,69	1,011	25,68						

Non standard sizes on request

TUBE PULLER CPS-1000

Our short spear type puller has been designed to pull ferrous, non-ferrous and alloy tubing & stubs from heat exchangers, chillers, condensers and similar thermal exchange equipment. Capacity from 1/2" to 1" O.D. of any gauge up to the units 15 Ton Capacity. (12 to 25 mm O.D. any wall thickness up to the units 15T Capacity) from tube sheet up to 2,25" (57 mm)
Utilizing economical short spear technology, our patented extraction system, automatically grips and releases the spear at the end of its cycle.
This system is simple and cost efficient to own & operate, due to the small amount of consumable required to extract a tube when compared to other pulling technologies.

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	SPEARS	NOSE PIECE
[INCH]	[MM]			
5/8	15,88	10-11	CPS-58-10-11	CPS-10-06A-34
		12-13	CPS-58-12-13	
		14-15	CPS-58-14-15	
		16-17	CPS-58-16-17	
3/4	19,05	10-11	CPS-34-10-11	CPS-10-06A-34
		12-13	CPS-34-12-13	
		14-15	CPS-34-14-15	
		16-17	CPS-34-16-17	
7/8	22,23	10-11	CPS-78-10-11	CPS-10-06A-78
		12-13	CPS-78-12-13	
		14-15	CPS-78-14-15	
		16-17	CPS-78-16-17	
1	25,4	10-11	CPS-1-10-11	CPS-10-06A-1
		12-13	CPS-1-12-13	
		14-15	CPS-1-14-15	
		16-17	CPS-1-16-17	

TUBE PULLER CP-1000-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	GRIPPER SET	MIN ENTER DIM AFTER EXP.		MAX ENTER DIM AFTER EXP.		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	CP-1000-01-58-16	0,506	12,85	0,545	13,84	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	CP-1000-01-58-18	0,535	13,59	0,574	14,58								
		20-21	CP-1000-01-58-20	0,562	14,27	0,602	15,29								
		22-23	CP-1000-01-58-22	0,576	14,63	0,616	15,65								
3/4	19,05	16-17	CP-1000-01-34-16	0,631	16,03	0,671	17,04	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	CP-1000-01-34-18	0,665	16,89	0,704	17,88								
		20-21	CP-1000-01-34-20	0,692	17,58	0,732	18,59								
		22-23	CP-1000-01-34-22	0,706	17,93	0,746	18,95								
7/8	22,23	16-17	CP-1000-01-78-16	0,755	19,18	0,795	20,19	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	CP-1000-01-78-18	0,787	19,99	0,826	20,98								
		20-21	CP-1000-01-78-20	0,815	20,70	0,854	21,69								
		22-23	CP-1000-01-78-22	0,828	21,03	0,868	22,05								
1	25,4	16-17	CP-1000-01-1-16	0,881	22,38	0,921	23,39	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	CP-1000-01-1-18	0,913	23,19	0,952	24,18								
		20-21	CP-1000-01-1-20	0,941	23,90	0,980	24,89								
		22-23	CP-1000-01-1-22	0,972	24,69	1,011	25,68								
1-1/4	31,75	16-17	CP-1000-01-114-16	1,133	28,78	1,173	29,79	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	CP-1000-01-114-18	1,165	29,59	1,204	30,58								
		20-21	CP-1000-01-114-20	1,194	30,33	1,234	31,34								
		22-23	CP-1000-01-114-22	1,208	30,68	1,248	31,70								
1-1/2	38,10	16-17	CP-1000-01-112-16	1,385	35,18	1,425	36,20	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	CP-1000-01-112-18	1,417	35,99	1,456	36,98								
		20-21	CP-1000-01-112-20	1,444	36,68	1,484	37,69								
		22-23	CP-1000-01-112-22	1,458	37,03	1,498	38,05								

We can supply the FF conversion kit to your specifications on all models of the CP-1000 and CP-1000-S.

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-O114	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-O112	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									
		19-20	CP-2000-01-112-19									
1-3/4	44,45	8	CP-2000-01-175-8	CP-30-02-175	CP-30-03-175	CP-30-04-175	CP-30-05-175	CP-30-O175	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-O200	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-O225	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-O250	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									

HPR-CP2000/M CONVERSION MODULE

HPR-CP2000/M is the tube pulling gripper type module to modify all the existing 30 Ton pulling RAMs called the "Pine Jenny", "Stub Tugger " or other similar used as the spears type tube puller.
Simply remove from the RAM all the attached parts and in 15 min your RAM is becoming the HPR-CP2000 Gripper type puller.
You are sill using the same HP hoses and your 10000 PSA (700 bar) pump to run the NEW puller.

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.

30-TON "SUPER-JENNY" TOOLING CHART

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.

TUBE OD		TUBE GAUGE	PULLING SPEAR	PULLING JAW	NOSE COLLAR	O-RING	JAW SPRING	SPEAR-MALE
[INCH]	[MM]							
5/8"	15,88	13-16 18-24	K-6011 K-6012	K-3032 K-3032	K-0625 K-0625	K-0006 K-0006	K-0303 K-0303	1/2" 1/2"
3/4"	19,05	10-12 13-16 18-24	K-6020 K-6021 K-6022	K-3042 K-3042 K-3042	K-0750 K-0750 K-0750	K-0006 K-0006 K-0006	K-0303 K-0303 K-0303	5/8" 5/8" 5/8"
7/8"	22,23	10-12 13-16 18-24	K-6030 K-6031 K-6032	K-3047 K-3047 K-3047	K-0875 K-0875 K-0875	K-0006 K-0006 K-0006	K-0303 K-0303 K-0303	5/8" 5/8" 5/8"
1"	25,4	10-12 13-16 18-24	K-6040 K-6041 K-6042	K-3052 K-3052 K-3052	K-1000 K-1000 K-1000	K-0006 K-0006 K-0006	K-0303 K-0303 K-0303	3/4" 3/4" 3/4"
1-1/4"	31,75	10-12 13-16 18-24	K-6060 K-6061 K-6062	K-3072 K-3072 K-3072	K-1250 K-1250 K-1250	K-0006 K-0006 K-0006	K-0303 K-0303 K-0303	1" 1" 1"

10-TON "MINI-JENNY" TOOLING CHART

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.

TUBE OD		TUBE GAUGE	PULLING SPEAR	PULLING JAW	NOSE COLLAR	O-RING	JAW SPRING	SPEAR-MALE
[INCH]	[MM]							
5/8"	15,88	13-16 18-24	K-6011 K-6012	K-3031 K-3031	K-0625M K-0625M	K-0046 K-0046	K-0302 K-0302	1/2" 1/2"
3/4"	19,05	10-12 13-16 18-24	K-6020 K-6021 K-6022	K-3041 K-3041 K-3041	K-0750M K-0750M K-0750M	K-0046 K-0046 K-0046	K-0302 K-0302 K-0302	5/8" 5/8" 5/8"
7/8"	22,23	10-12 13-16 18-24	K-6030 K-6031 K-6032	K-3046 K-3046 K-3046	K-0875M K-0875M K-0875M	K-0046 K-0046 K-0046	K-0302 K-0302 K-0302	5/8" 5/8" 5/8"
1"	25,4	10-12 13-16 18-2	K-6040 K-6041 K-6042	K-3051 K-3051 K-3051	K-1000M K-1000M K-1000M	K-0046 K-0046 K-0046	K-0302 K-0302 K-0302	3/4" 3/4" 3/4"

60-TON "SUPER-JENNY" TOOLING CHART

Biggest 60-ton "Super-Jenny" has been designed to pull tubes in the toughest applications. As standard, the unit can pull 1 ½"-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 ¼" x 10 BWG with a 7" tube sheet was noted to pull at 52 tons of pulling force.

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 13-16 18-24	K-6070 K-6071 K-6072	K-3211 K-3211 K-3211	K-3212 K-3212 K-3212	K-0015 K-0015 K-0015	18.2321 18.2321 18.2321	1" 1" 1"
1-3/4"	44,45	10-12 13-16 18-24	K-6080 K-6081 K-6082	K-3216 K-3216 K-3216	K-3217 K-3217 K-3217	K-0015 K-0015 K-0015	18.2321 18.2321 18.2321	1" 1" 1"
2"	63,50	7-8 10-12 13-16	K-6090 K-6091 K-6092	K-3221 K-3221 K-3221	K-3222 K-3222 K-3222	K-0015 K-0015 K-0015	18.2321 18.2321 18.2321	1" 1" 1"

ACTP-1000 - AUTOMATIC CONTINUES TUBE PULLER

COMING SOON!

Fast and automatic tube pulling machine and is designed for continuous, and stub removal of tubes from heat exchangers, condensers and boilers. Significant saving of time and money over conventional systems.

- Hydraulic Tube Pulling RAM communicate with power pack with 9 Volt DC or Pneumatic remote control depending on version of the pump. This ensures safety and eliminates the need of electrical cord between pump and gun that other manufacturers provide.
- Available with a choice of electric or pneumatic system for hazardous, explosive working environments.
- Microprocessor (for electric system) controls on powerpack and hydraulic tube pulling gun ensure trouble free life.
- Removes tube without damaging to tube sheet.
- High power & high speed automatic cycling – for highest speed of tube puller available worldwide.
- Compact design, low setup time and ease of operation.
- Auto switchover from low pressure high flow to high pressure low flow on load and again back to low pressure high flow when load is released.
- Automatic high pressure slow start feature to minimize risk of breaking tube puller and to conserve consumables.
- Interchangeable tube pulling guns with same powerpack. 15 ton gun for light duty high speed work, 30 ton gun for heavy duty tube puller and 45 ton gun for tubes upto 3" O.D.
- Hydraulic Tube Pulling up to 3" OD tubes continuously depanding the RAM
- Unit will pull tube continuously through the gun effortlessly, one man for operation only .

HPR-30 TUBE PULLER

HPR-30 is a Heavy duty, 30 Ton Pulling Ram. This tool has been engineered with a 6'' Pull Stoke for tough tube removal applications. It is fitted with flush face, non-drip, couplings and its own custom suspension and handling bracket. In conjunction with our Double Pull Adaptor, this Puller has the captivity to pull the tube 9'' from the tube sheet, (see Pulling Spear Selection)

For HPR-30 Tube puller we reccomend CPPZ-1000 pump

TUBE SPEARS FOR HPR TUBE PULLER

LENGTH 5,433" (138 MM) WITH 1-1/4 FLAT SIZE (HEX)

TUBE SIZE			PART 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

LENGTH 8,750" (223 MM) WITH 7/8 FLAT SIZE (HEX)

TUBE SIZE			PART 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
3/4"	19,05	10	ATS-750-10	0,454	11,5	0,662	16,8
		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

Spear sizes of up to 3" on request

ACCESSORIES FOR HPR-30 TUBE PULLERS

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 beused 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

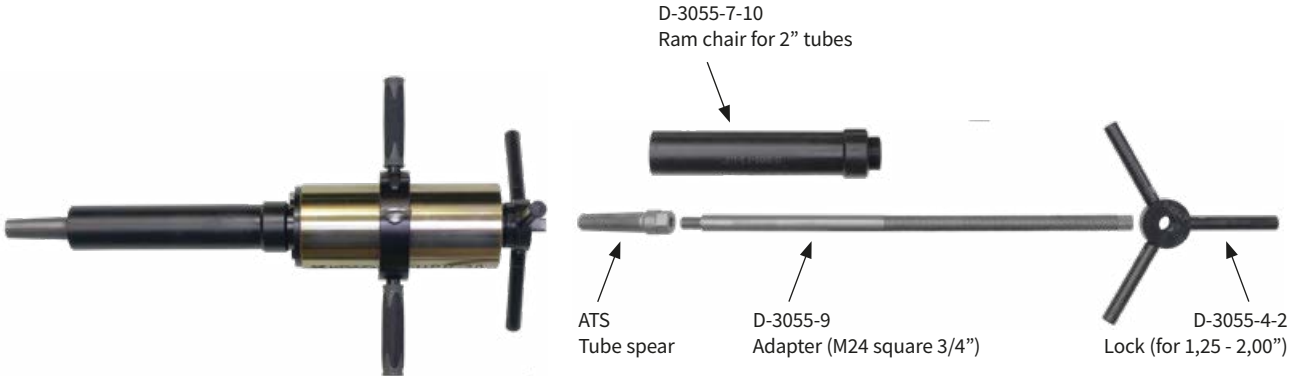
D-3055-6 MALE X FEMALE ADAPTOR

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 ¼" OD. Can also be used to extract ferrous tubes from 5/8" to 1 ½" 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
TUBE SPINAIR-12	12 m/min	1183 Nm	872,25 Ft.Lbs	2,50 Ton	2 x 2300 l/min	2 × 75 cfm	6,2 bar	90 psi	2 × 3,0 Hp
TUBE SPINAIR-20	20 m/min	886 Nm	653,48 Ft.Lbs	1,80 Ton	2 x 2300 l/min	2 × 75 cfm	6,2 bar	90 psi	2 × 3,0 Hp
TUBE SPINAIR-40	40 m/min	960 Nm	708,06 Ft.Lbs	1,95 Ton	2 x 2800 l/min	2 × 95 cfm	6,2 bar	90 psi	2 × 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

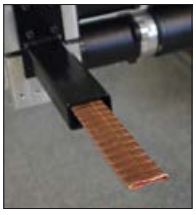
Min: 40 l/min at 2000 psi (gives approximately 30 m/min);
Max: 100 l/min at 2250 psi (gives approximately 70 m/min);
Forward and reverse oil flow.

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



CPPZ-1000

KRAIS Hydraulic Pumps have been designed to exacting standards to provide the maximum productivity from a lightweight pump, specifically designed for tough tube pulling applications.

STANDARD FEATURES

- Two Speed Pump for High Performance
- Light Weight and Portable
- Safe Cage as Standard
- 10 ft. Remote Pendant
- 2-1/2 Gallon (9,5 liter) Metal Reservoir
- Large Pressure Gauge

SELECTION GUIDE FOR PUMPS

MODEL NUMBER	MAX OUTPUT		AMP DRAW FOR MAX OUTPUT	OIL DELIVERY			
	PSI	BAR		100 PSI | 6,9 BAR	1015 PSI | 70 BAR	5 000 PSI | 350 BAR	10 000 PSI | 690 BAR
CPPZ-1000 Electric	10000	690	25 Amps 230V & 110V	678 inch³/min 11,3 l/min	426 inch³/min 4,7 l/min	72 inch³/min 1,2 l/min	54 inch³/min 1,1 l/min
PE-554 Electric	10000	690	25 Amps 230V	678 inch³/min 11,3 l/min	426 inch³/min 7,1 l/min	72 inch³/min 1,2 l/min	54 inch³/min 1,1 l/min
PA-554 Pneumatic	10000	690	Required 1,4 CU.M/MIN at 6 Bar	678 inch³/min 11,3 l/min	426 inch³/min 7,1 l/min	72 inch³/min 1,2 l/min	54 inch³/min 0,9 l/min

CPPZ-1000 - RECOMMENDATION

The most popular pump for wide range of pullers is CPPZ-1000.

Super Jenny

HPR-30

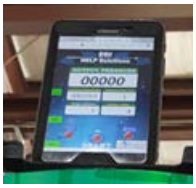
CP 1000 SERIES

EV-HS72 – HYDRAULIC EXPANSION SYSTEM

The Evolution system brings new technologies and ease of operation to hydraulic expansion as never seen before. Featuring stainless steel construction in a compact console. Employing a color touchscreen interface, digital & analog readouts, and a remote tablet. Our system can overcome the most difficult alloys out there with up to a 72k psi capability. Our small form factor makes the system easy to de-ploy and maneuver in congested shop environments (less than 100 kg). A full color touchscreen provides intuitive controls along with a full library of documents and videos. Directly from the machine an operator can access drawings, how to videos, and answers to common FAQ's. This additional functionality allows even new operators to quickly become proficient at machine operation and provide answers to technical questions.
EGI Help Solution's Evolution Bladder tooling makes the EV-HS72 the easiest system on the market to deploy. Gone are the days of hunting for segment pieces on the ground and re-banding with expensive assembly tools. Eliminated are the days of having a drawer full of different O-rings sizes for one job. The Evolution tooling line is also compatible with most hydraulic systems on the market. The tool is fully assembled from one end eliminating unnecessary components along with a metal to metal cone fitting for seal on the primary end of the shaft. Fixed or adjustable collars are available in a size range covering most common tube sizes. Tools are configured based on ID tube dimensions and sold in 1/2 millimeter increments ranging from 9.5mm-44.50mm diameters. Custom applications are possible, please consult with factory.

Stainless Steel mandrel holder with integral LED indicator/operator button

Stainless Steel console with interior lighting with room for power cord and mandrel holder storage

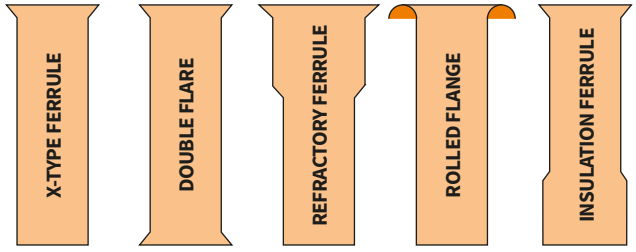


Remote Display tablet allows for convenient monitoring of system operation

EV-SS30 – HYDRAULIC SLEEVING SYSTEM

The EV-SS30 unique computer controlled expansion process controls both volume and pressure delivering a sleeve installation that will not come loose, provides optimum heat transfer characteristics, conforms to irregularly shaped tubes from erosion, and won't disturb the original factory tube expansion.
Robust stainless steel construction with quality components, remote tablet, and report generation capabilities provide years of service in the harshest of environments. Our process provides the most residual stress between the sleeve and parent tube providing the most sealing power to bring failed tubes back into service.
Sleeve & Liners provide a viable repair option for common problems like inlet erosion, corrosion issues. They also have a variety of other applications such as sacrificial barriers installed in new units, galvanic anodes that provide necessary elements for some processes, as a way to stagger heat load into a unit to overcome undersized tube sheet designs.
EGI HELP Solutions manufactures sleeves & liners in a variety of design formats and materials. We supply them in a full range of alloys from duplex, cupro nickel, carbon, Inconel, etc. Tube sleeving restores new life to tubes with a new layer of skin. Typical installations occur in the first 12-24" of the tube inlet where some 90% of heat exchanger failures take place. Additionally, depending on the nature of the failures, the sleeves can be made from an upgraded alloy to provide an additional measure of protection. Parameters must be carefully considered when employing a sleeving repair, our experienced staff have the skills to navigate these challenges. Full length liners are another solution that provide a "bridge" from Tube sheet face to Tube sheet face. A full length liner can bring severed tubes back online, secure failed tubes eliminating fretting and damage to adjacent tubes while running. A hydraulically expanded liner provides intimate contact throughout the full length of the parent tube maintaining heat transfer properties. Liners can also be seal welded to the face of the sheet providing another level of sealing in some applications.

TYPICAL SLEEVE FORMATS

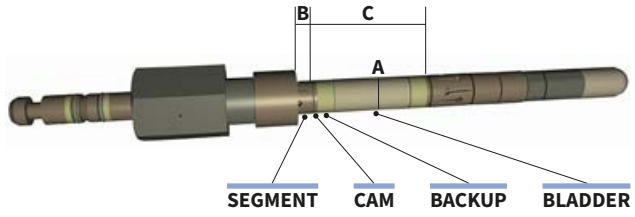


EVOLUTION HYDRAULIC TOOLING

The Evolution line of hydraulic expansion tooling employs some unique design elements simplifying and reducing the overall cost of hydraulic expansion.

- The Bladder design eliminates the need for multiple O-ring sizes along with difficult insertion of the tool into tubes.
- The Band-less segments eliminate the need to purchase expensive banding tools along with the cumbersome time consuming process of re-banding segments.
- Single cam design eliminates the need to position the segment within the confines of the tube sheet allowing the expansion zone to be tailored right up to the face of the tube sheet.
- Our greater expansion range allows for us to size all jobs to the nearest 1/2 mm increment eliminating the need for custom 1/4 mm increment sizes.
- Our tools feature a metal to metal sealing joint eliminating secondary "O-ring joints" and leak paths associated with other tooling brands
- The evolution tooling line also features single end assembly. When changing a bladder or other components all components are slid onto the shaft from the secondary end. Bladder change times are similar to changing a set of rolls in a mechanical expander.

SAMPLE MANDREL PART NUMBER: HLP-MA1550-10-60



A=**1550** Actual tube ID minus 1/4-1/2 mm (round down to nearest 1/2 mm increment)
B=**10** Primary extension (distance from face of tubesheet to begin expansion zone)
C=**60** Expansion zone length

EVOLUTION TRU-TORQ PLUGS

The Evolution Tru-Torq plugs provide superior sealing without causing tube damage or causing ovalisation of the tube sheet hole. Employing a cam and wedge design, tough nut plugs can withstand pressures up to 6,000 PSI (maximum operating pressure and temperature are dependent on size and material of plug) . They are easily installed with only a torque wrench and end wrench. Evolution plugs can be manufactured from virtually any material specified. These plugs are an effective solution to your plugging needs providing quick headache free installation.

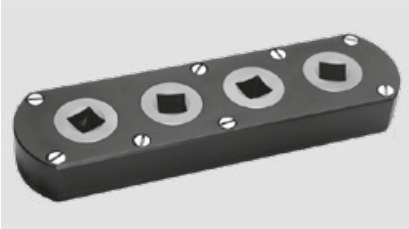
PLUG PART NO	EXPANSION RANGE [MM]		EXPANSION RANGE [INCH]		TUBE OD AND WALL RANGE							
	MIN	MAX	MIN	MAX	1/2"	5/8"	3/4"	7/8"	1"	1 -1/8"	1 -1/4"	1 -1/2"
HLP-EP3944-XXX	9,91	11,18	0,390	0,440	18-20	12-13						
HLP-EP4348-XXX	10,92	12,19	0,430	0,480	22-24	14						
HLP-EP4752-XXX	11,94	14,48	0,470	0,570		15-17	10-11					
HLP-EP5158-XXX	12,95	14,73	0,510	0,580		18-20	12-13	8				
HLP-EP5764-XXX	14,48	16,26	0,570	0,640		22-24	14-17	10-11				
HLP-EP6370-XXX	16,00	17,78	0,630	0,700			18-24	12-13	8			
HLP-EP6976-XXX	17,53	19,30	0,690	0,760				14-16	10-11			
HLP-EP7582-XXX	19,05	20,83	0,750	0,820				17-20	12-13	8		
HLP-EP8188-XXX	20,57	22,35	0,810	0,880				22-24	14-16	10-11		
HLP-EP8794-XXX	22,10	23,88	0,870	0,940					17-20	12-13	8	
HLP-EP9310-XXX	23,62	25,40	0,930	1,000					22-24	14-16	10	
HLP-EP99106-XXX	25,15	26,92	0,990	1,060						17-19	11-13	
HLP-EP105120-XXX	26,67	3,05	1,050	0,120						20-24	14-16	
HLP-EP111118-XXX	28,19	29,97	1,110	1,180							17-19	8
HLP-EP117124-XXX	29,72	31,50	1,170	1,240							20-24	10
HLP-EP123130-XXX	31,24	28,70	1,230	1,130								11-12
HLP-EP129136-XXX	32,77	34,54	1,290	1,360								13-14
HLP-EP135142-XXX	34,29	36,07	1,350	1,420								15-18
HLP-EP141148-XXX	35,81	37,59	1,410	1,480								19-24

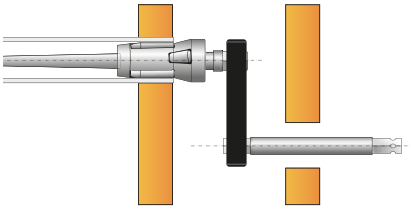
Where XXX is material designator.

ACCESORIES

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.

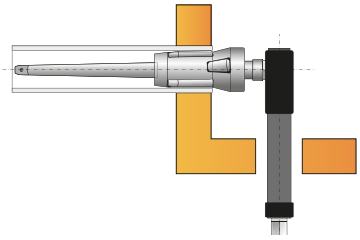




SQUARE DRIVE		TOOL
[INCH]	[MM]	
1/2" x 1/2"	12,7 x 12,7	**P-Drive-127**
3/4" x 3/4"	19,0 x 19,0	**P-Drive-190**
1" x 1"	25,4 x 25,4	**P-Drive-254**

RIGHT ANGLE GEAR DRIVE

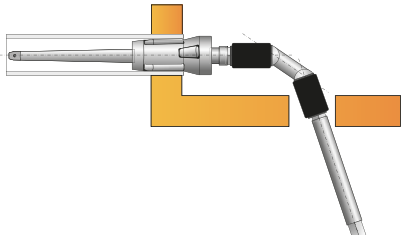
L=292 W=45 H=98 MM
For use inside header boxes where handholds are at right angle to the tube centerline. For hand and power use.



SQUARE DRIVE		TOOL
[INCH]	[MM]	
1/2" x 1/2"	12,7 x 12,7	**RA-Drive-127**
3/4" x 3/4"	19 x 19	**RA-Drive-190**
3/4" x 1"	19 x 25,4	**RA-Drive-254**

DOUBLE UNIVERSAL JOINT

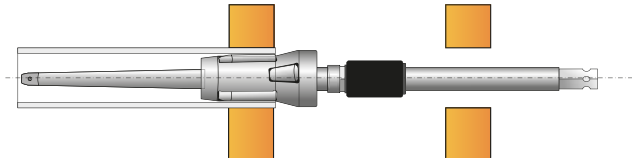
Double Universal Joint and Double Universal Joint with Quick Change Chuck.



SQUARE DRIVE	TOOL	CHUCK
3/8"	**DUJ-3/8**	-
	DUJ-3/8-QCC	QCC
1/2"	**DUJ-1/2**	-
	DUJ-1/2-QCC	QCC
3/4"	**DUJ-3/4**	FxF
1"	**DUJ-1**	FxF

EXTENSIONS

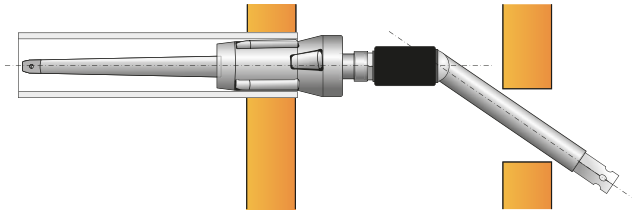
Extensions and extensions with Quick Change Chuck (QCC), single and double.



SQUARE DRIVE	TOOL	LENGTHS		QCC
[INCH]		[INCH]	[MM]	
3/8"	**Ext-3/8**	8; 12; 24; 36	200; 300; 600; 900	-
	Ext-3/8-QCC	8; 12; 24; 36	200; 300; 600; 900	1
	Ext-3/8-2QCC	8; 12; 24; 36	200; 300; 600; 900	2
1/2"	**Ext-1/2**	8; 12; 24; 36	200; 300; 600; 900	-
	Ext-1/2-QCC	8; 12; 24; 36	200; 300; 600; 900	1
	Ext-1/2-2QCC	8; 12; 24; 36	200; 300; 600; 900	2
3/4"	**Ext-3/4**	8; 12; 24; 36	200; 300; 600; 900	-
1"	**Ext-1**	8; 12; 24; 36	200; 300; 600; 900	-

SINGLE UNIVERSAL JOINT

Single Universal Joint and Single Universal joint with Quick Change Chuck (QCC).



SQUARE	TOOL	AVAILABLE LENGTHS		QCC
[INCH]		[INCH]	[MM]	
3/8	**SUJ-3/8**	8; 12; 24; 36	200; 300; 600; 900	-
	SUJ-3/8-QCC	8; 12; 24; 36	200; 300; 600; 900	+
1/2	**SUJ-1/2**	8; 12; 24; 36	200; 300; 600; 900	-
	SUJ-1/2-QCC	8; 12; 24; 36	200; 300; 600; 900	+
3/4	**SUJ-3/4**	8; 12; 24	200; 300; 600	-
1	**SUJ-1**	8; 12; 24	200; 300; 600	-

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	**TG-1**
		19-20	**TG-2**
		21-23	**TG-3**
5/8	15,88	12-13	**TG-4**
		14-16	**TG-5**
		17-20	**TG-6**
		22-24	**TG-7**
3/4	19,05	10-12	**TG-8**
		13-16	**TG-9**
		17-20	**TG-10**
		21-22	**TG-11**
7/8	22,2	10-12	**TG-12**
		13-16	**TG-13**
		17-20	**TG-14**
		22-24	**TG-15**
1	25,4	8-9	**TG-16**
		10-12	**TG-17**
		13-16	**TG-18**
		17-20	**TG-19**
		21-23	**TG-20**
1-1/4	31,7	15.	**TG-21**
		16-	**TG-22**
1-1/2	38,1	15.	**TG-23**
		16-	**TG-24**

URH-1925 UNIVERSAL RATCHET HANDLE

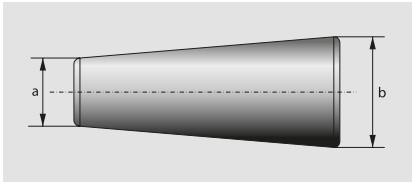
Manual drive for tube expanders. One side 3/4" square drive, other side 1" square drive. Allows rotation transmitted by a retched mechanism.

MOTOR COUPLING

Motor coupling and Motor coupling with Quick Change Chuck (QCC)

SQUARE	TOOL	LENGTH	QCC
3/8	**MT-2x3/8"**	2"	
	MT-2x3/8"-QCC	2"	YES
1/2	**MT-2x1/2**	2"	
	MT-2x1/2"-QCC	2"	YES
3/8	**MT-2x3/8"**	2"	
1/2	**MT-3x1/2"**	3"	
3/4	**MT-3x3/4"**	3"	
1	**MT-4x1"**	4"	

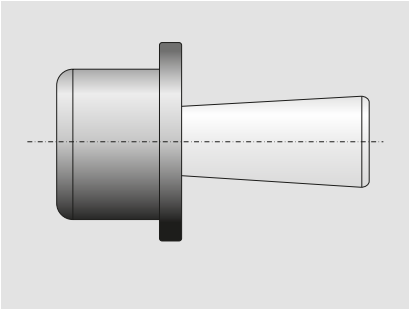
ONE PIECE TUBE PLUGS



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	**TP-1-****
1/2	12,7	11-14	0,176	4,48	0.388	9,87	**TP-1-****
		15-22	0,301	7,65	0,513	13,00	**TP-2-****
5/8	15,8	11-14	0,301	7,66	0,513	13,01	**TP-2-****
		15-22	0,426	10,82	0,638	16,20	**TP-3-****
3/4	19,05	11-14	0,426	10,83	0,638	16,21	**TP-3-****
		15-22	0,551	14,00	0,763	1938	**TP-4-****
7/8	22,22	11-14	0,551	14,01	0,763	1939	**TP-4-****
		15-22	0,676	17,17	0,888	22,56	**TP-5-****
1	25,4	11-14	0,676	17,18	0,888	22,57	**TP-5-****
		15-22	0,801	20,35	1,013	25,73	**TP-6-****
1-1/8	28,6	11-14	0,801	20,36	1,013	25,74	**TP-6-****
		15-22	0,926	23,52	1,138	28,9	**TP-7-****
1-1/4	31,7	11-14	0,926	23,53	1,138	28,10	**TP-7-****
		15-22	1,015	25,78	1,263	32,08	**TP-8-****
1-3/8	34,9	11-14	1,015	25,79	1,263	32,09	**TP-8-****
		15-22	1,176	29,87	1,388	35,87	**TP-9-****
1-1/2	38,1	11-14	1,176	29,88	1,388	35,88	**TP-9-****
		15-22	1,301	32,66	1,513	38,93	**TP-10-****

** Specify material: AL for Aluminium; S for Steel; S for Stainless Steel; B for Brass; M for Monel

TWO PIECE TUBE PLUGS



Ideal for sealing leaky tubes in condenser and heat exchangers. It is recommended to use our ORTC - one revolution tube cutter to puncture the tube to ensure that pressure can not build up in the tube and cause the plug loosen or blow out.

TUBE OD		TUBE GAUGE	TUBE ID		BRASS		CARBON STEEL		STAINLESS STEEL	
[INCH]	[MM]	BWG	[INCH]	[MM]	RING	PIN	RING	PIN	RING	PIN
5/8	15,88	13	0,44	11,18	T8TP445BR	TP3BP	T8TP445CS	TP3CSP	T8TP445SS	TP3SSP
		14	0,46	11,68	T8TP469BR	TP3BP	T8TP469CS	TP3CSP	T8TP469SS	TP3SSP
		15	0,48	12,19	T8TP491BR	TP3BP	T8TP491CS	TP3CSP	T8TP491SS	TP3SSP
		16	0,5	12,70	T8TP505BR	TP4BP	T8TP505CS	TP4CSP	T8TP505SS	TP4SSP
		17	0,51	12,95	T8TP519BR	TP4BP	T8TP519CS	TP4CSP	T8TP519SS	TP4SSP
		18	0,53	13,46	T8TP537BR	TP4BP	T8TP537CS	TP4CSP	T8TP537SS	TP4SSP
		19	0,54	13,72	T8TP551BR	TP4BP	T8TP551CS	TP4CSP	T8TP551SS	TP4SSP
		20	0,56	14,22	T8TP571BR	TP4BP	T8TP571CS	TP4CSP	T8TP571SS	TP4SSP
		21	0,56	14,22	T8TP571BR	TP4BP	T8TP571CS	TP4CSP	T8TP571SS	TP4SSP
		22	0,57	14,48	T8TP571BR	TP4BP	T8TP571CS	TP4CSP	T8TP571SS	TP4SSP
3/4	19,05	12	0,53	13,46	T8TP537BR	TP4BP	T8TP537CS	TP4CSP	T8TP537SS	TP4SSP
		13	0,56	14,22	T8TP571BR	TP4BP	T8TP571CS	TP4CSP	T8TP571SS	TP4SSP
		14	0,58	14,73	T8TP594BR	TP5BP	T8TP594CS	TP5CSP	T8TP594SS	TP5SSP
		15	0,61	15,49	T8TP616BR	TP5BP	T8TP616CS	TP5CSP	T8TP616SS	TP5SSP
		16	0,62	15,75	T8TP630BR	TP5BP	T8TP630CS	TP5CSP	T8TP630SS	TP5SSP
		17	0,63	16,00	T8TP644BR	TP5BP	T8TP644CS	TP5CSP	T8TP644SS	TP5SSP
		18	0,65	16,51	T8TP662BR	TP5BP	T8TP662CS	TP5CSP	T8TP662SS	TP5SSP
		19	0,67	17,02	T8TP676BR	TP5BP	T8TP676CS	TP5CSP	T8TP676SS	TP5SSP
		20	0,68	17,27	T8TP696BR	TP6BP	T8TP696CS	TP6CSP	T8TP696SS	TP6SSP
		21	0,69	17,53	T8TP696BR	TP6BP	T8TP696CS	TP6CSP	T8TP696SS	TP6SSP
		22	0,69	17,53	T8TP696BR	TP6BP	T8TP696CS	TP6CSP	T8TP696SS	TP6SSP
7/8	22,2	12	0,66	16,76	T8TP662BR	TP6BP	T8TP662CS	TP6CSP	T8TP662SS	TP6SSP
		13	0,69	17,53	T8TP696BR	TP6BP	T8TP696CS	TP6CSP	T8TP696SS	TP6SSP
		14	0,71	18,03	T8TP719BR	TP6BP	T8TP719CS	TP6CSP	T8TP719SS	TP6SSP
		15	0,73	18,54	T8TP741BR	TP6BP	T8TP741CS	TP6CSP	T8TP741SS	TP6SSP
		16	0,75	19,05	T8TP755BR	TP6BP	T8TP755CS	TP6CSP	T8TP755SS	TP6SSP
		17	0,76	19,30	T8TP769BR	TP6BP	T8TP769CS	TP6CSP	T8TP769SS	TP6SSP
		18	0,78	19,81	T8TP787BR	TP7BP	T8TP787CS	TP7CSP	T8TP787SS	TP7SSP
		19	0,79	20,07	T8TP801BR	TP7BP	T8TP801CS	TP7CSP	T8TP801SS	TP7SSP
		20	0,81	20,57	T8TP821BR	TP7BP	T8TP821CS	TP7CSP	T8TP821SS	TP7SSP
		21	0,81	20,57	T8TP821BR	TP7BP	T8TP821CS	TP7CSP	T8TP821SS	TP7SSP
		22	0,82	20,83	T8TP821BR	TP7BP	T8TP821CS	TP7CSP	T8TP821SS	TP7SSP
1	25,4	12	0,78	19,81	T8TP787BR	TP7BP	T8TP787CS	TP7CSP	T8TP787SS	TP7SSP
		13	0,81	20,57	T8TP821BR	TP7BP	T8TP844CS	TP7CSP	T8TP844SS	TP7SSP
		14	0,83	21,08	T8TP844BR	TP7BP	T8TP844CS	TP7CSP	T8TP844SS	TP7SSP
		15	0,86	21,84	T8TP866BR	TP7BP	T8TP866CS	TP7CSP	T8TP866SS	TP7SSP
		16	0,87	22,10	T8TP880BR	TP8BP	T8TP880CS	TP8CSP	T8TP880SS	TP8SSP
		17	0,88	22,35	T8TP894BR	TP8BP	T8TP894CS	TP8CSP	T8TP894SS	TP8SSP
		18	0,9	22,86	T8TP912BR	TP8BP	T8TP912CS	TP8CSP	T8TP912SS	TP8SSP
		19	0,92	23,37	T8TP926BR	TP8BP	T8TP926CS	TP8CSP	T8TP926SS	TP8SSP
		20	0,93	23,62	T8TP946BR	TP8BP	T8TP946CS	TP8CSP	T8TP946SS	TP8SSP
		21	0,94	23,88	T8TP946BR	TP8BP	T8TP946CS	TP8CSP	T8TP946SS	TP8SSP
		22	0,94	23,88	T8TP946BR	TP8BP	T8TP946CS	TP8CSP	T8TP946SS	TP8SSP

VACUUM LEAK TESTER KVLD-3000

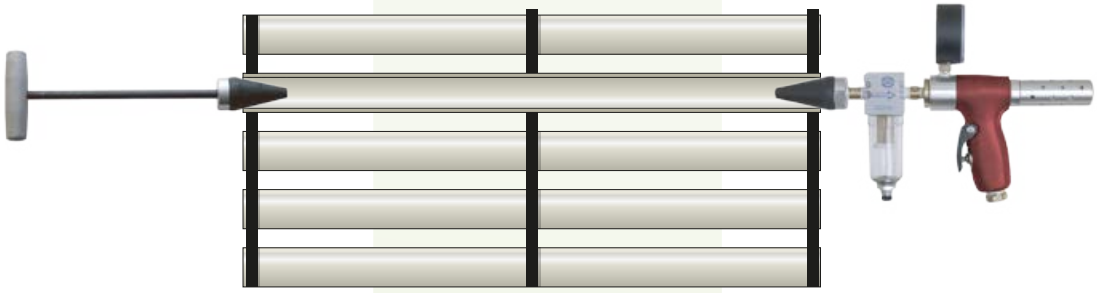
The vacuum leak tester KVLD-3000 is a simple, precise method of testing tubes in boilers, condensers, an d heat exchangers. It is the fastest, most accurate means of locating leaky tubes for plugging or replacement.

FEATURES

- 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.

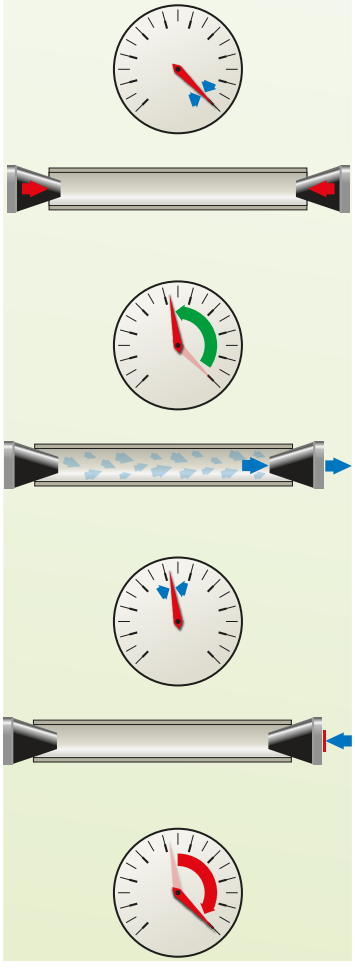
SPECIFICATIONS

- 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.

TESTING PUMPS

All testing pumps are delivered „ready for use" and equiped with:

- Tank (Except PEM 30)
- Pressure gauge
- Drain valve
- Flexibe 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 PUMPS

LE-PTP ELECTRIC PUMPS

PTP1201 PNEUMATIC PUMPS

MODEL	DRIVEN	SERVICE PRESSURE		DIAMETER	STROKE	VOLUME PER STROKE		TANK CAPACITY		WEIGHT	
		BAR	PSI	MM	MM	CM^3	IN^3	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

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	.010	,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
12.7	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											
15.9	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							
	Mom.	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							
19.1	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			
22.2	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			
25.4	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
28.6	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
31.8	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
34.9	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
38.1	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
	Mom.	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	10,930	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	XX-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	277,62	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

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)

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

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

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