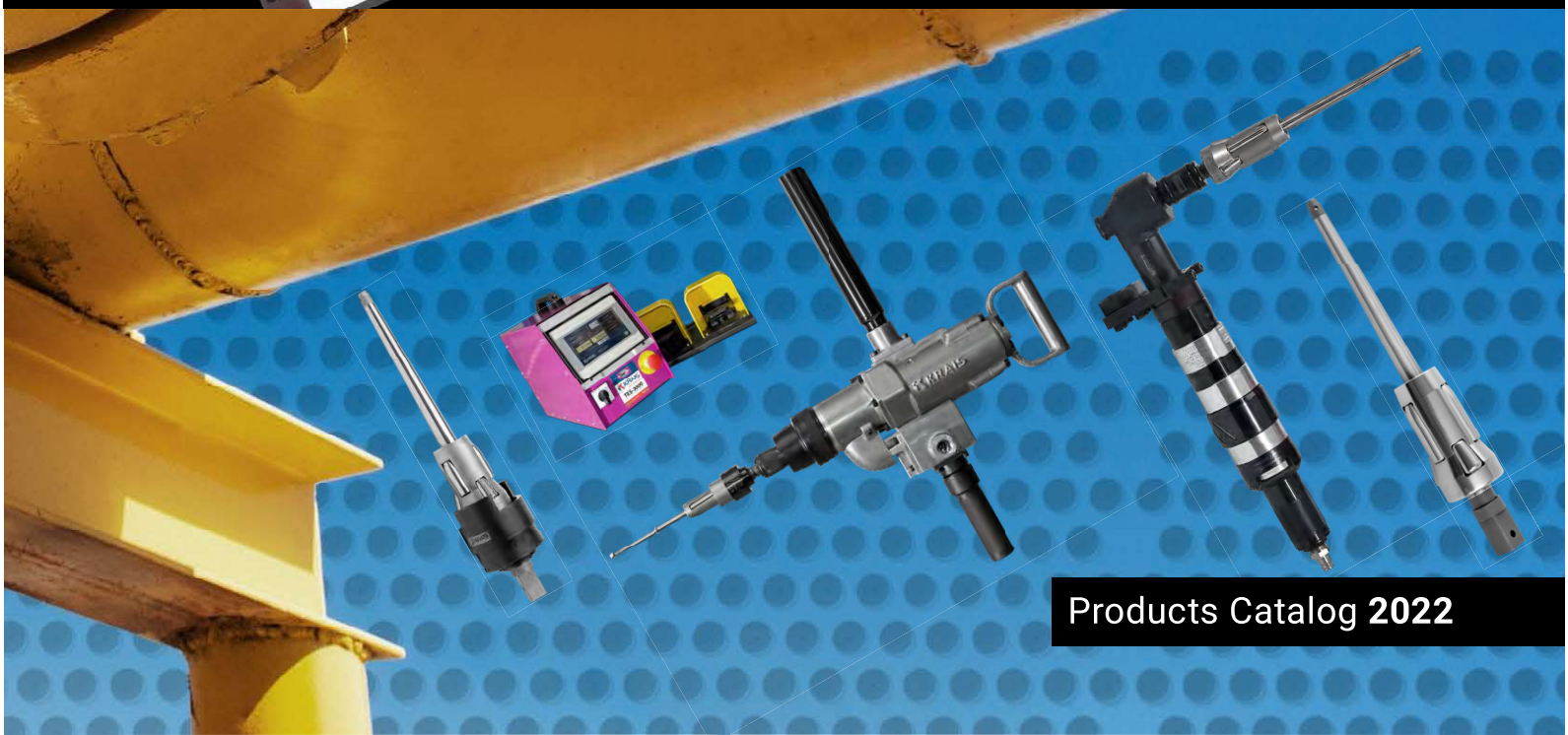
KRAIS
Tube & Pipe Tools

MADE IN POLAND

ISO 9001 Quality Management FM720649

Tube&Pipe
Professional Tools



Products Catalog **2022**

IMPORTANT!

Due to constant improvement of products presented in this catalog, the data and part numbers may change without further notice!
Most tools are available in custom-made versions. If your work requires a special solution - contact us, we will prepare a special tool.

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

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

KRAIS TUBE & PIPE TOOLS

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TUBE ROLLING SETUP GUIDE

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

1. Pick 3 to 5 tubes in the unit to be rolled and complete the formula on the page A-1. It is important that the Measurements used in the set-up are actual, never use averaged dimensions.
2. After the worksheet is finished, start setting up the torque control motor by test rolling the first of the 5 tubes. The first test roll must be done with the airetrol or electric rolling motor set for low torque to avoid over rolling.
3. Measure the tube ID after rolling. If more expansion Is needed, increase the torque setting on the control and roll the second tube. Check the finished ID this step may have to be repeated on tube # 3. By this time, the torque setting should be correct.
4. Roll tubes 4 and 5 to double check the set-up. These tubes should measure as calculated within the allowable tolerance.
   Condenser tubes 10-17 BWG +/- 0.001”
   Condenser tubes 18-24 BWG+/- 0.0005”
   Boiler tubes 4-10 BWG +/- 0.002”
   Boiler tubes 12-16 BWG+/- 0.001”
5. The rolling control is now set and ready to roll the rest of: the tubes in the unit. The use of the torque control system will ensure the uniform tightness of all tubes.

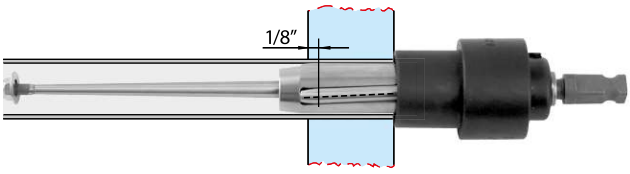
NOTE!
Re-roll all test tubes that were under size. To ensure the best tool life and the highest quality tube to tube sheet contact, periodic cleaning of the expander is necessary. Proper lubrication of the rolls, mandrel and thrust bearing is a must!

BOILER TUBE INSTALLATION CODE

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

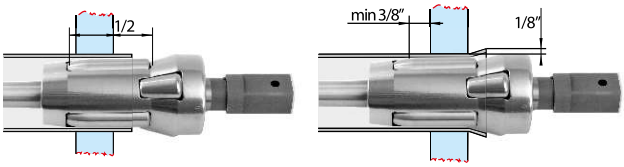
1. Tubes to protrude inside drum 1/4” minimum to 3/4” maximum.
2. Outside diameter of flare to be 1/8” larger than tube sheet hole.
3. Tube to be rolled past back of tube sheet 1/4” to 3/8”.

SETTING CONDENSER EXPANDER



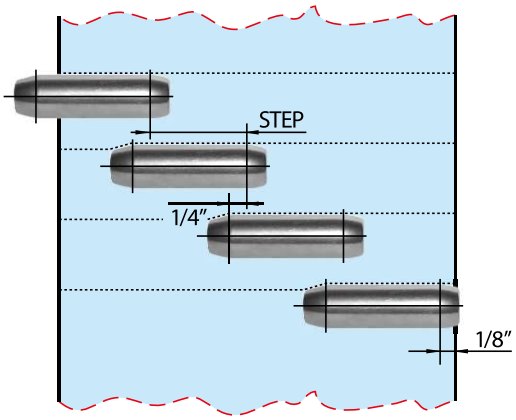
Locate high point of roll approx 1/8” inside back of tube sheet and thrust collar must be touching tube sheet.

SETTING BOILER EXPANDER



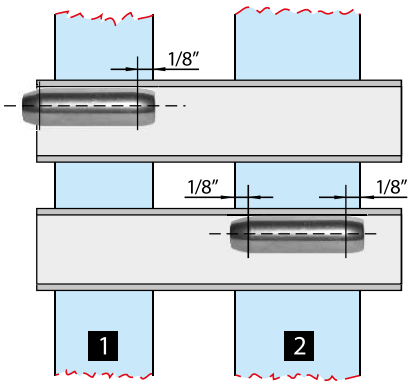
Short straight roll set approx half way into tube sheet. Tube rolled 3/8” back of tube sheet. Flared tube diameter 1/8” larger than tube sheet hole.

STEP ROLLING (THICK TUBE SHEET)



To determine length of steps, divide the estimated number of steps into the length of area to be rolled. This length must be at least 1/4” shorter than the effective length of the “2R” roll.
NOTE! 1-1/2” long rolls have maximum effective length of 1”; 2-1/4” long rolls have maximum effective length of 1-3/4”

DOUBLE TUBE SHEET APPLICATION



Primary tube sheet would be rolled with a 800 type expander with roll located per example.
Note! Effective length of roll to be specified based on secondary tube sheet thickness.
Secondary tube sheet would be rolled with a 1200 type expander with „2R” type rolls as per example.
Note! When rolling a secondary tube sheet always use „2R” type rolls.
Position expander so that the roll straddles the tube sheet with the high points approx 1/8” inside front and sack of the tube sheet.

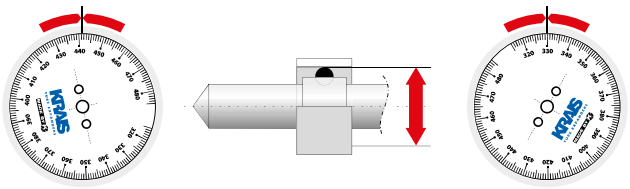
Tube Hole Gauge

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

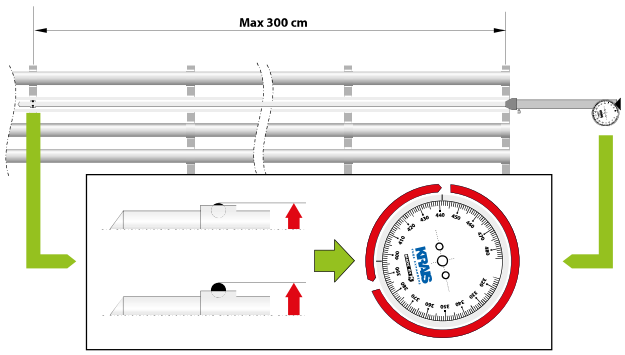
SIZE*		ID RANGE				TOOL NUMBER	REACH		SETTING RING	MANDREL EXTENSION	BODY EXTENSION
		MIN		MAX							
[INCH]	[MM]	[INCH]	[MM]	[INCH]	[MM]		[INCH]	[MM]			
3/8	9,53	0,290	0,350	7,37	8,89	K200-95	4	101,6	SR-3/8	K200-95-ME	K200-95-BE
1/2	12,70	0,350	0,450	8,89	11,43	K200-127	4	101,6	SR-1/2	K200-127-ME	K200-127-BE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

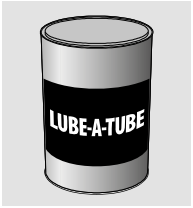
FREE GAUGE ADJUSTMENT



LONG VERSION (UP TO 3M)



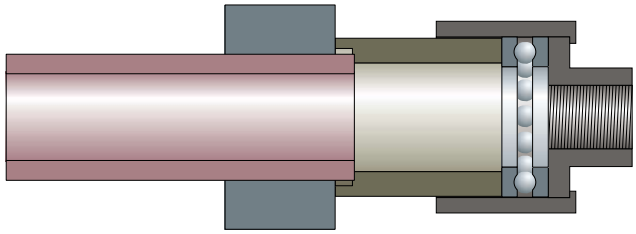
LUBE-A-TUBE for better rolling



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.

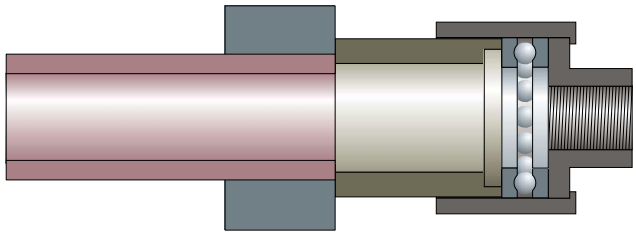
- Lube-A-Tube is easy to apply. Stays in the tube during whole rolling operation - it will not leak.
- Lube-A-Tube does not carbonize under the heat and pressure found during the tube rolling operation.
- Lube-A-Tube keeps the expanding tool cool what gives a long tool life.
- Lube-A-Tube is effective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

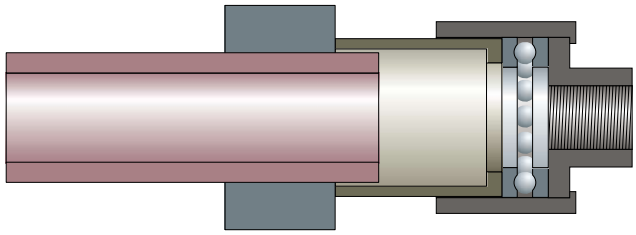
Typical thrust collars



STC

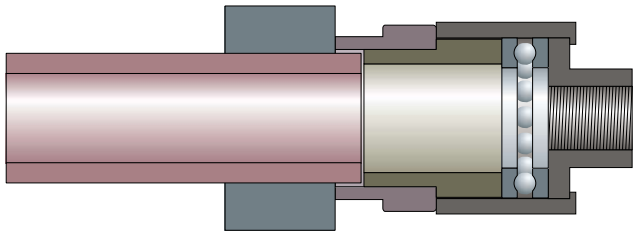
Fixed recessed thrust collar 1/8“. One flip type thrust collar for 1200&800 series tube expanders.





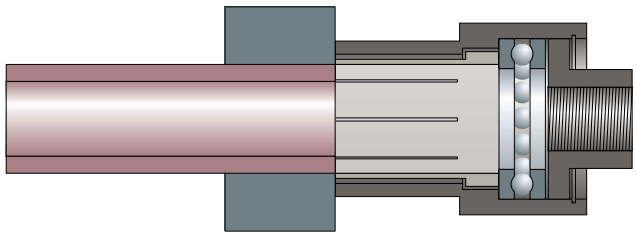
FRTC

Full recessed thrust collar.



ARTC

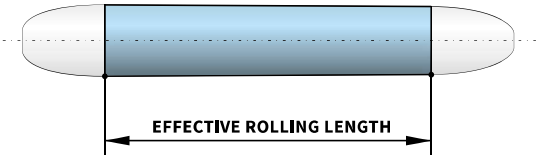
Adjustable recess thrust collar 0,025 – 0,5“.

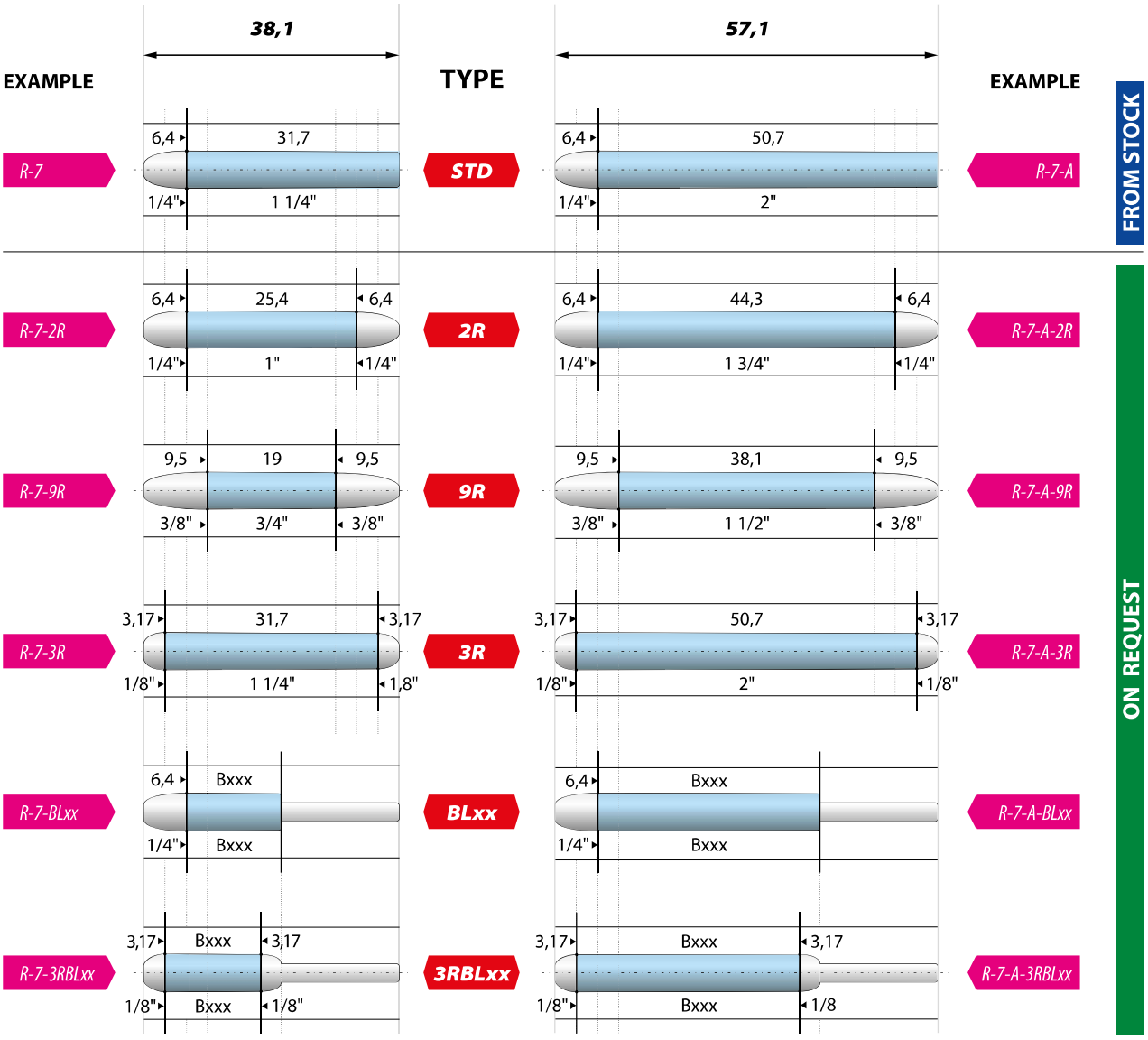


TWTC

Thin wall thrust collar.

Rolls for condenser expanders





900 Series Condenser Tube Expanders

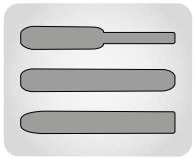
BASIC INFO

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"	1/4" to 1-1/4"

OPTIONAL SPARES AND ACCESSORIES



ROLLS ON REQUEST

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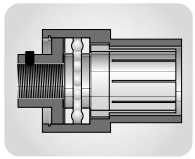

THRUST COLLARS

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ROLLING MOTORS

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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" 6.3 TO 19 MM		3/4 TO 1-1/4" 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

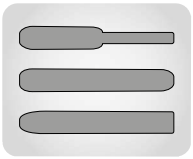
BASIC INFO

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"	3/4" to 3-1/2"

OPTIONAL SPARES AND ACCESSORIES



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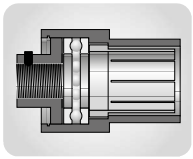

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TUBE OD		TUBE GAUGE			TUBE ID		EXPANSION RANGE				TUBE SHEET THICKNESS				MANDREL	MANDREL SQUARE		PNEUMATIC MOTOR	ELECTRIC MOTOR
							[INCH]		[MM]		3/4" TO 3"		1-1/4" TO 3-1/2"						
											19,0 TO 76,0 MM		31,7 TO 88,9 MM						
[INCH]	[MM]	[BWG]	[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

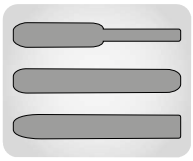
BASIC INFO

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.

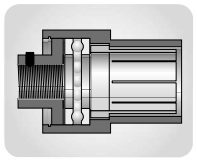
WORKING RANGE

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" to 1-1/2"	1/2" to 2-1/4"

OPTIONAL SPARES AND ACCESSORIES



ROLLS ON REQUEST
→ PAGE 10



THRUST COLLARS
→ PAGE 9

ROLLING MOTORS
→ CHAPTER PAGE 40

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]		
3/8	9,5	22-24	0,027	0,71	0,314	8,00	0,307	0,358	7,80	9,10	**795**	**795**	-	-	**795**	3/8	9,5		
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	1,179	1,294	29,95	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

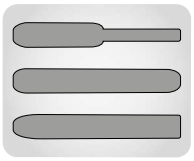
BASIC INFO

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” to 1-1/2”	1/2” to 2-1/4”

OPTIONAL SPARES AND ACCESSORIES



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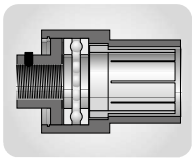

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TUBE OD		TUBE GAUGE			TUBE ID		EXPANSION RANGE				TUBE SHEET THICKNESS				MANDREL	MANDREL SQUARE		PNEUMATIC MOTOR *	ELECTRIC MOTOR *
							[INCH]		[MM]		1/2" TO 1-1/2"		1-1/4" TO 2-1/4"						
											12,7 TO 38,1 MM		31,7 TO 57,1MM						
[INCH]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

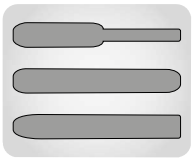
BASIC INFO

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" to 1-1/2"	

OPTIONAL SPARES AND ACCESSORIES



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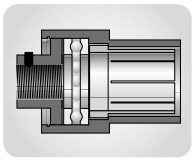

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TUBE SHEET THICKNESS

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" 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]		
3/8	9,5	22-24	0,027	0,71	0,314	8,00	0,307	0,358	7,80	9,10	**1195**	**795**	-	-	**M-1195**	3/8	9,5		
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

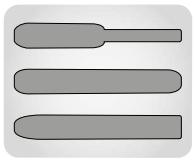
BASIC INFO

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" to 1-1/2"	

OPTIONAL SPARES AND ACCESSORIES



ROLLS ON REQUEST
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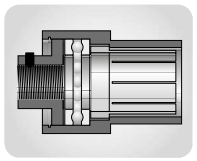

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TUBE SHEET THICKNESS

ROLLS	REACH	TUBE SHEET THICKNESS [INCH]	TUBE SHEET THICKNESS [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"		2-1/4" TO 6-3/4"						
[INCH]	[MM]	[BWG]	[INCH]	[MM]	[INCH]	[MM]	MIN	MAX	MIN	MAX	38,1 TO 152,4 MM TOOL NO.	ROLL NO.	57,1 TO 171,4 MM 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" 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]		
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**	**1258-5**	**R-15-A-5**	**M-71-3/8**	3/8	9,5		
		22	0,028	0,71	0,944	23,98	0,883	0,982	22,43	24,94	**1257-5**	**R-15-5**	**1258-5**	**R-15-A-5**	**M-71-3/8**	3/8	9,5		
1-1/8	28,5	12	0,109	2,77	0,907	23,04	0,883	0,982	22,43	24,94	**1257-5**	**R-15-5**	**1258-5**	**R-15-A-5**	**M-71-3/8**	3/8	9,5	K60-400	TES3000 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

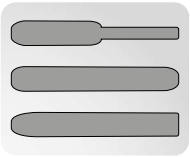
BASIC INFO

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	15,8 - 25,4 MM	38,1 - 57,1 MM
0,532 - 0,884"	5/8" to 1"	1-½" to 2-¼"

OPTIONAL SPARES AND ACCESSORIES



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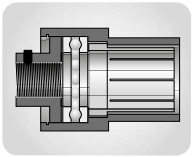

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TUBE ID		ROLL LENGTH 1-1/2" (38,1 MM)		ROLL LENGTH 2-1/4" (57,1 MM)		EXPANSION RANGE [INCH]		EXPANSION RANGE [MM]		FLARE ROLL	MANDREL	RECCOMENDED DRIVE*	
[INCH]	[MM]	TOOL NO.	ROLL NO.	TOOL NO.	ROLL NO.	MIN	MAX	MIN	MAX			ELECTRIC	PNEUMATIC
0,532	13,51	**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

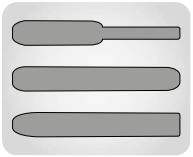
BASIC INFO

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"	1-3/4" to 3"	1-1/2" to 2-1/4"

OPTIONAL SPARES AND ACCESSORIES



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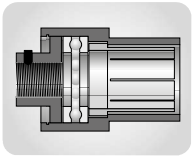

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TUBE OD		TUBE GAUGE			TUBE ID		EXPANSION RANGE [INCH]		EXPANSION RANGE [MM]		TOOL NO.	ROLL NO.	MANDREL	MANDREL	PNEUMATIC MOTOR *	ELECTRIC MOTOR *
[INCH]	[MM]	[BWG]	[INCH]	[MM]	[INCH]	[MM]	MIN	MAX	MIN	MAX				[INCH]		
1-3/4	44,4	8	0,165	4,19	1,42	36,07	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				TOOL NO.	ROLL NO.	MANDREL	MANDREL	PNEUMATIC MOTOR *	ELECTRIC MOTOR *
							[INCH]		[MM]							
[INCH]	[MM]	[BWG]	[INCH]	[MM]	[INCH]	[MM]	MIN	MAX	MIN	MAX				[INCH]		
2-3/4	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.*