

TRITORC

ENDURING SOLUTIONS

Tube Tools

Tube Expansion Tools

Tube Installation Tools

Tube Removal Tools

Tube Cleaning Tools

Basic Principles of Tube Expanding

Tube Expanding is the art of reducing a tube wall by compressing the O.D. of the tube against a fixed container such as rolling tubes into tube sheets, drums, ferrules or flanges. To assure a proper tube joint, the tube wall must be reduced by a pre-determined percentage. The following chart can be used for determining the correct tube wall reduction.

This chart shows a typical 3/4" - 16 gauge tube. Before rolling this tube you should check the rolling dimensions as listed.

- A. First determine the tube hole size.
- B. Determine the tube outside diameter.
- C. Subtract the tube outside diameter from the tube hole dimension.
- D. With a Tube Gauge, determine the inside diameter of the tube before rolling.
- E. By adding the dimension found in "D" to the clearance between the tube O.D. and the tube hole, you will then know the tube's inside diameter at metal to metal contact.
- F. Roll the tube to what you feel is a good tube joint.
- G. By subtracting 'E' from the rolled diameter 'F' you determine the actual amount of expansion (tube wall reduction) on the inside diameter of your tube. This can be converted to a% of wall thickness ("B minus D") .130" into the amount of roll .009.

You can use the chart to your advantage by predetermining both the % of wall reduction required and the actual inside diameter of the tube which will result in actual wall reduction. Since the amount of wall reduction greatly determines the quality of the tube joint, you should arrive at the % required for your application prior to tube rolling.

By subtracting the tube inside diameter "D" from "B", you determine actual wall thickness. This example would therefore be .130". If you then take the 7% wall reduction times the wall thickness, you arrive at .0091". Adding .0091" ("G") to .627" ("E") we get "F" the inside diameter of the tube after rolling (.636").

Test Chart For Determining Proper Amount of Tube Expansion

Tube Test Number		1	2	3
A	Tube sheet hole size	.757		
B	Tube outside diameter	.750		
C	Clearance (A Minus B)	.007		
D	Tube inside diameter	.620		
E	Tube inside diameter when metal to metal contact is reached (D Plus C)	.627		
F	Tube inside diameter after rolling	.636		
G	Actual amount of roll on diameter (F Minus E)	.009		

Note:

- 1 Take all measurements in thousands / microns.
- 2 Take "A" in middle of area to be rolled.
- 3 Take "B", "D" and "F" in same position as No.2.
- 4 Take diameters in both horizontal and vertical directions as the tube may be out of the round shape. Determine mean diameter

This technique is an excellent way to set torque rolling devices. Once you have arrived at the rolled dimension for four or five tubes, you can roll them and very simply determine if more or less wall reduction is required. Knowing how to determine wall reduction is important; however it is equally important to know the characteristics of the materials being used. We should know the proper wall reduction which would apply to each metal. A simple rule of thumb, the harder the material, the lesser the wall reduction required to obtain a tube joint. For example, you can assign these as approximate percentages of wall reduction when rolling pressure vessels.



Copper & Cupro Nickel	8-10 %	These materials & percentages can be your guideline to rolling tubes of like materials.
Steel, Carbon Steel & Admiralty Brass	7-8 %	
Stainless Steel & Titanium	4-5 %	

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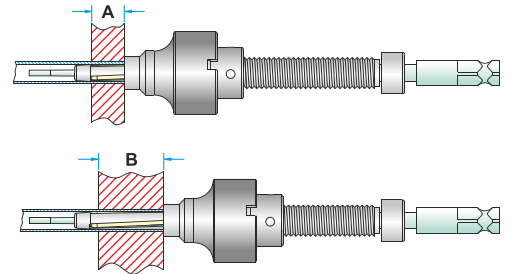


Tube Expander for Heat Exchanger and Condenser

'TN' Series



Roller Length	Adjustable Range	
	Min.	Max.
1" (25.4mm)	1/4" (6.35mm)	1" (25.4mm)



TUBE O.D. BWG	TUBE I.D.		MIN I.D. Tube Tool Enters		MAX Tool Expansion		EXPANDER With 1" (25.4 mm) long rolls		
	inch	mm	inch	mm	inch	mm	Expander Model	Roll Set Model	Mandrel Model
1/4 - 18	0.152	3.8	0.148	3.7	0.167	4.2	TA-25018	TR-20018	TM-21819
(6.35) - 19	0.166	4.2	0.160	4.0	0.180	4.5	TA-25019	TR-21920	TM-21819
- 20	0.180	4.5	0.175	4.4	0.196	4.9	TA-25020	TR-21920	TM-22021
- 21	0.186	4.7	0.180	4.5	0.202	5.1	TA-25021	TR-22124	TM-22021
- 22	0.194	4.9	0.190	4.8	0.213	5.4	TA-25022	TR-22124	TM-20022
- 23	0.200	5.0	0.195	4.9	0.216	5.5	TA-25023	TR-21920	TM-22324
- 24	0.206	5.2	0.201	5.1	0.224	5.7	TA-25024	TR-22124	TM-22324
- 28	0.222	5.6	0.217	5.4	0.243	6.1	TA-25028	TR-22830	TM-22830
- 29	0.224	5.7	0.217	5.4	0.243	6.1	TA-25028	TR-22830	TM-22830
- 30	0.226	5.7	0.217	5.4	0.243	6.1	TA-25028	TR-22830	TM-22830
3/8 - 14	0.209	5.3	0.204	5.1	0.230	5.8	TA-37514	TR-21920	TM-22830
(9.53) - 15	0.231	5.8	0.225	5.6	0.265	6.6	TA-37515	TR-31516	TM-22830
- 16	0.245	6.2	0.238	6.0	0.278	7.0	TA-37516	TR-31516	TM-31617
- 17	0.259	6.5	0.253	6.4	0.293	7.4	TA-37517	TR-31720	TM-31617
- 18	0.277	7.0	0.270	6.8	0.310	7.8	TA-37518	TR-31720	TM-30018
- 19	0.291	7.3	0.285	7.1	0.325	8.1	TA-37519	TR-31720	TM-30019
- 20	0.305	7.7	0.295	7.4	0.335	8.4	TA-37520	TR-31720	TM-32021
- 21	0.311	7.9	0.305	7.5	0.345	8.6	TA-37521	TR-32122	TM-32021
- 22	0.319	8.1	0.312	7.8	0.353	8.9	TA-37522	TR-32122	TM-32224
- 23	0.325	8.2	0.318	8.1	0.363	9.2	TA-37523	TR-32324	TM-32224
- 24	0.331	8.4	0.318	8.1	0.363	9.2	TA-37523	TR-32324	TM-32224

Tube Expander for Heat Exchanger and Condenser

T - 900 / 1300 Series

T900 Series	Adjustable Range	
	Roller Length	Max.
3/4" (19.05 mm)	1/4" (6.35 mm)	3/4" (19.05 mm)
1.1/4" (31.75 mm)	3/4" (19.05 mm)	1.1/4" (31.75 mm)



900 Series

T1300 Series	Adjustable Range	
	Roller Length	Max.
3/4" (19.05 mm)	3/4" (19.05 mm)	3" (76.20 mm)
1.1/4" (31.75 mm)	1.1/4" (31.75 mm)	3.1/2" (88.90 mm)



1300 Series

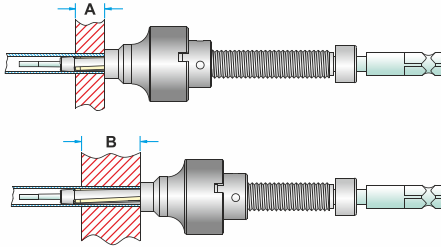
Tube O.D. BWG	Tube I.D.		Min I.D. Tube Tool Enters		Max Tool Expansion		900 Series Expander With				Mandrel Models	1300 Series Expander With				Mandrel Models
	inch	mm	inch	mm	inch	mm	3/4" (19.05 mm) rolls		1/4" (31.75 mm) rolls			1.3/4" (38 mm) rolls		1.1/4" (38 mm) rolls		
							Expander Model	Roll Set Model	Expander Model	Roll Set Model		Expander Model	Roll Set Model	Expander Model	Roll Set Model	
1/4" -18	0.152	3.8	0.151	3.8	0.173	4.4	T-921	TR-921			TM-39					
-19	0.166	4.2	0.165	4.1	0.185	4.7	T-922	TR-923			TM-39					
-20	0.180	4.5	0.175	4.4	0.200	5.1	T-923	TR-923			TM-40					
-21	0.186	4.7	0.180	4.5	0.207	5.2	T-924	TR-924			TM-40					
-22	0.194	4.9	0.190	4.8	0.216	5.5	T-925	TR-925			TM-41					
-23	0.200	5.0	0.195	4.9	0.222	5.6	T-926	TR-923			TM-41					
-24	0.206	5.2	0.201	5.1	0.230	5.8	T-927	TR-924			TM-41					
-28	0.222	5.6	0.222	5.6	0.238	6.0	T-928	TR-903			TM-928					
-29	0.224	5.7	0.222	5.6	0.238	6.0	T-928	TR-903			TM-928					
-30	0.226	5.7	0.222	5.6	0.238	6.0	T-928	TR-903			TM-928					
3/8" -14	0.209	5.3	0.201	5.1	0.232	5.8	T-927	TR-924			TM-41					
-15	0.231	5.8	0.230	5.8	0.265	6.7	T-915	TR-903			TM-42	T-1315	TR-1315	T-1316	TR-1316	TM-86
-16	0.245	6.2	0.240	6.1	0.275	6.9	T-916	TR-916			TM-36	T-1319	TR-1315	T-1319L	TR-916L	TM-86
-16	0.245	6.2	0.240	6.1	0.275	6.9			T-916L	TR-916L	TM-36L					
-17	0.259	6.5	0.255	6.4	0.289	7.3	T-918	TR-903	T-920	TR-904	TM-38	T-1317	TR-903	T-1318	TR-904	TM-88
-18	0.277	7.0	0.272	6.9	0.307	7.8	T-901	TR-903	T-902	TR-904	TM-30	T-1301	TR-903	T-1302	TR-904	TM-80
-19	0.291	7.3	0.286	7.2	0.320	8.1	T-903	TR-903	T-904	TR-904	TM-31	T-1303	TR-903	T-1304	TR-904	TM-81
-20	0.305	7.7	0.300	7.6	0.334	8.4	T-905	TR-907	T-906	TR-908	TM-32	T-1305	TR-907	T-1306	TR-908	TM-82
-21	0.311	7.9	0.306	7.7	0.340	8.6	T-907	TR-907	T-908	TR-908	TM-33	T-1307	TR-907	T-1308	TR-908	TM-83
-22	0.319	8.1	0.314	7.9	0.349	8.8	T-909	TR-909	T-910	TR-910	TM-34	T-1309	TR-909	T-1310	TR-910	TM-84
-23	0.325	8.2	0.320	8.1	0.357	9.0	T-911	TR-911	T-912	TR-912	TM-34	T-1311	TR-911	T-1312	TR-912	TM-84
-24	0.331	8.4	0.320	8.1	0.357	9.0	T-911	TR-911	T-912	TR-912	TM-34	T-1311	TR-911	T-1312	TR-912	TM-84

Tube Expander for Heat Exchanger and Condenser

T - 800 / 1200 Series - 3 Rollers



800 Series



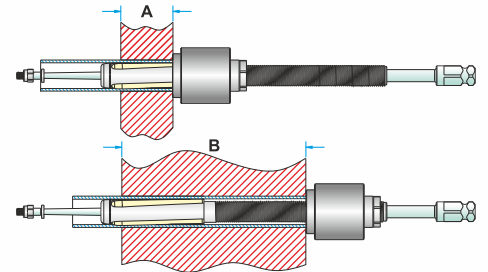
T800 Series	Adjustable Range	
	Roller Length	Min. Max.
1.1/2" (38.1 mm)	1/2" (12.7mm)	1.1/2" (38.1mm)
2.1/4" (57.1 mm)	1.1/4" (31.7mm)	2.1/4" (57.1mm)

Tube O.D. BWG	Tube I.D.		Min I.D. Tube Tool Enters		Max Tool Expansion		800 Series Expander With				Mandrel Models	1200 Series Expander With				Mandrel Models
							1 1/2" (38 mm) rolls		2 1/4" (57.1 mm) rolls			1 1/2" (38 mm) rolls		2 1/4" (57.1 mm) rolls		
							Expander Model	Roll Set Model	Expander Model	Roll Set Model		Expander Model	Roll Set Model	Expander Model	Roll Set Model	
1/2"-14	0.334	8.4	0.324	8.23	0.374	9.50	T-797	TR-797	-	-	TM-797	T-1197	TR-797	-	-	TM-1197
-15	0.356	9.0	0.349	8.84	0.398	10.11	T-799	TR-1	-	-	TM-799	T-1199	TR-1	-	-	TM-1199
-16	0.370	9.4	0.360	9.14	0.410	10.41	T-801	TR-1	-	-	TM-1	T-1201	TR-1	-	-	TM-51
-17	0.384	9.7	0.374	9.50	0.424	10.77	T-803	TR-2	-	-	TM-1	T-1203	TR-2	-	-	TM-51
-18	0.402	10.2	0.392	9.96	0.447	11.35	T-805	TR-3	-	-	TM-2	T-1205	TR-3	-	-	TM-52
-20	0.430	10.9	0.406	10.80	0.461	11.7	T-805S	TR-3	-	-	TM-3	T-1205S	TR-3	-	-	TM-53
5/8"-12	0.407	10.3	0.392	9.96	0.447	11.35	T-805	TR-3	-	-	TM-2	T-1205	TR-3	-	-	TM-52
-13	0.435	11.0	0.425	10.79	0.480	12.19	T-807	TR-4	-	-	TM-3	T-1207	TR-4	-	-	TM-53
-14	0.459	11.6	0.449	11.40	0.509	12.90	T-809	TR-4	T-810	TR-4-A	TM-4	T-1209	TR-4	T-1210	TR-4-A	TM-54
-15	0.481	12.2	0.471	11.96	0.536	13.61	T-811	TR-5	T-812	TR-5-A	TM-5	T-1211	TR-5	T-1212	TR-5-A	TM-55
-16	0.495	12.5	0.485	12.32	0.550	13.97	T-813	TR-6	T-814	TR-6-A	TM-5	T-1213	TR-6	T-1214	TR-6-A	TM-55
-17	0.509	12.9	0.499	12.67	0.564	14.32	T-815	TR-6	T-816	TR-6-A	TM-6	T-1215	TR-6	T-1216	TR-6-A	TM-56
-18	0.527	13.3	0.517	13.13	0.572	14.53	T-817	TR-7	T-818	TR-7-A	TM-7	T-1217	TR-7	T-1218	TR-7-A	TM-57
-19	0.541	13.7	0.522	13.26	0.582	14.7	T-819	TR-7	T-820	TR-7-A	TM-6	T-1219	TR-7	T-1220	TR-7-A	TM-56
-20	0.555	14.1	0.536	13.6	0.596	15.1	T-819S	TR-7	T-820S	TR-7-A	TM-8	T-1219S	TR-7	T-1220S	TR-7-A	TM-58
-21	0.561	14.2	0.536	13.6	0.596	15.1	T-819S	TR-7	T-820S	TR-7-A	TM-8	T-1219S	TR-7	T-1220S	TR-7-A	TM-58
-22	0.569	14.4	0.536	13.6	0.596	15.1	T-819S	TR-7	T-820S	TR-7-A	TM-8	T-1219S	TR-7	T-1220S	TR-7-A	TM-58
3/4"-10	0.482	12.2	0.471	11.96	0.536	13.61	T-811	TR-5	T-812	TR-5-A	TM-5	T-1211	TR-5	T-1212	TR-5-A	TM-55
-11	0.510	12.9	0.499	12.67	0.564	14.32	T-815	TR-6	T-816	TR-6-A	TM-6	T-1215	TR-6	T-1216	TR-6-A	TM-56
-12	0.532	13.5	0.522	13.26	0.582	14.70	T-819	TR-7	T-820	TR-7-A	TM-6	T-1219	TR-7	T-1220	TR-7-A	TM-56
-13	0.560	14.2	0.550	13.97	0.615	15.62	T-821	TR-8	T-822	TR-8-A	TM-8	T-1221	TR-8	T-1222	TR-8-A	TM-58
-14	0.584	14.8	0.574	14.58	0.639	16.23	T-823	TR-9	T-824	TR-9-A	TM-8	T-1223	TR-8	T-1224	TR-8-A	TM-58
-15	0.606	15.3	0.596	15.14	0.661	16.79	T-825	TR-10	T-826	TR-10-A	TM-8	T-1225	TR-8	T-1226	TR-8-A	TM-58
-16	0.620	15.7	0.605	15.37	0.685	17.40	T-827	TR-10	T-828	TR-10-A	TM-9	T-1227	TR-10	T-1228	TR-10-A	TM-59



1200 Series

T1200 Series	Adjustable Range		
	Roller Length	Reach	Min. Max.
1.1/2" (38.1mm)	Standard	1.1/2" (38.1mm)	6" (152.4 mm)
	A	1.1/2" (38.1mm)	8" (203.1 mm)
	B	1.1/2" (38.1mm)	10" (253.8 mm)
2.1/4" (57.1 mm)	Standard	2.1/4" (57.1mm)	6.3/4" (171.4 mm)
	A	2.1/4" (57.1mm)	8.3/4" (222.1 mm)
	B	2.1/4" (57.1mm)	10.3/4 (323.6 mm)



Longer reaches available upon request in 2 inch (50.8 mm) increments

Tube O.D. BWG	Tube I.D.		Min I.D. Tube Tool Enters		Max Tool Expansion		800 Series Expander With				Mandrel Models	1200 Series Expander With				Mandrel Models
							1 1/2" (38 mm) rolls		2 1/4" (57.1 mm) rolls			1 1/2" (38 mm) rolls		2 1/4" (57.1 mm) rolls		
							Expander Model	Roll Set Model	Expander Model	Roll Set Model		Expander Model	Roll Set Model	Expander Model	Roll Set Model	
3/4"-17	0.634	16.1	0.619	15.72	0.699	17.75	T-829	TR-11	T-830	TR-11-A	TM-9	T-1229	TR-11	T-1230	TR-11-A	TM-59
-18	0.652	16.5	0.619	15.72	0.699	17.75	T-829	TR-11	T-830	TR-11-A	TM-9	T-1229	TR-11	T-1230	TR-11-A	TM-59
-19	0.666	16.9	0.642	16.3	0.722	18.3	T-831	TR-12	T-832	TR-12-A	TM-9	T-1231	TR-12	T-1232	TR-12-A	TM-59
-20	0.680	17.2	0.642	16.3	0.722	18.3	T-831	TR-12	T-832	TR-12-A	TM-9	T-1231	TR-12	T-1232	TR-12-A	TM-59
-21	0.686	17.4	0.642	16.3	0.722	18.3	T-831	TR-12	T-832	TR-12-A	TM-9	T-1231	TR-12	T-1232	TR-12-A	TM-59
-22	0.694	17.6	0.642	16.3	0.722	18.3	T-831	TR-12	T-832	TR-12-A	TM-9	T-1231	TR-12	T-1232	TR-12-A	TM-59
7/8"-10	0.607	15.4	0.596	15.1	0.661	16.7	T-825	TR-10	T-826	TR-10-A	TM-8	T-1225	TR-10	T-1226	TR-10-A	TM-58
-11	0.635	16.1	0.619	15.7	0.699	17.7	T-829	TR-11	T-830	TR-11-A	TM-9	T-1229	TR-11	T-1230	TR-11-A	TM-59
-12	0.657	16.6	0.642	16.3	0.722	18.3	T-831	TR-12	T-832	TR-12-A	TM-9	T-1231	TR-12	T-1232	TR-12-A	TM-59
-13	0.685	17.4	0.670	17.0	0.750	19.0	T-833	TR-13	T-834	TR-13-A	TM-10	T-1233	TR-13	T-1234	TR-13-A	TM-60
-14	0.709	18.0	0.685	17.5	0.774	19.6	T-835	TR-14	T-836	TR-14-A	TM-11	T-1235	TR-14	T-1236	TR-14-A	TM-61
-15	0.731	18.5	0.712	18.0	0.801	20.3	T-837	TR-15	T-838	TR-15-A	TM-11	T-1237	TR-15	T-1238	TR-15-A	TM-61
-16	0.745	18.9	0.726	18.4	0.815	20.7	T-839	TR-15	T-840	TR-15-A	TM-12	T-1239	TR-15	T-1240	TR-15-A	TM-62
-17	0.759	19.2	0.740	18.8	0.829	21.0	T-843	TR-16	T-844	TR-16-A	TM-12	T-1243	TR-16	T-1244	TR-16-A	TM-62
-18	0.777	19.7	0.740	18.8	0.829	21.0	T-843	TR-16	T-844	TR-16-A	TM-12	T-1243	TR-16	T-1244	TR-16-A	TM-62
1"-8	0.670	17.0	0.655	16.6	0.735	18.6	T-841	TR-13	T-842	TR-13-A	TM-9	T-1241	TR-13	T-1242	TR-13-A	TM-59
-9	0.704	17.8	0.685	17.4	0.774	19.6	T-835	TR-14	T-836	TR-14-A	TM-11	T-1235	TR-14	T-1236	TR-14-A	TM-61
-10	0.732	18.5	0.712	18.0	0.801	20.3	T-837	TR-15	T-838	TR-15-A	TM-11	T-1237	TR-15	T-1238	TR-15-A	TM-61
-11	0.760	19.3	0.740	18.8	0.829	21.0	T-843	TR-16	T-844	TR-16-A	TM-12	T-1243	TR-16	T-1244	TR-16-A	TM-62
-12	0.782	19.8	0.763	19.3	0.852	21.6	T-845	TR-17	T-846	TR-17-A	TM-12	T-1245	TR-17	T-1246	TR-17-A	TM-62
-13	0.810	20.5	0.791	20.0	0.880	22.3	T-847	TR-18	T-848	TR-18-A	TM-12	T-1247	TR-18	T-1248	TR-18-A	TM-62
-14	0.834	21.1	0.810	20.5	0.909	23.0	T-849	TR-18	T-850	TR-18-A	TM-13	T-1249	TR-18	T-1250	TR-18-A	TM-63
-15	0.856	21.7	0.837	21.2	0.936	23.7	T-851	TR-19	T-852	TR-19-A	TM-13	T-1251	TR-19	T-1252	TR-19-A	TM-63
-16	0.870	22.1	0.837	21.2	0.936	23.7	T-851	TR-19	T-852	TR-19-A	TM-13	T-1251	TR-19	T-1252	TR-19-A	TM-63

Tube Expander for Heat Exchanger and Condenser

T - 800 / 1200 Series - 3 Rollers



800 Series

T800 Series	Adjustable Range	
	Roller Length	Min. Max.
1.1/2" (38.1mm)	1/2" (12.7mm)	1.1/2" (38.1mm)
2.1/4" (57.1mm)	1.1/4" (31.7mm)	2.1/4" (57.1 mm)

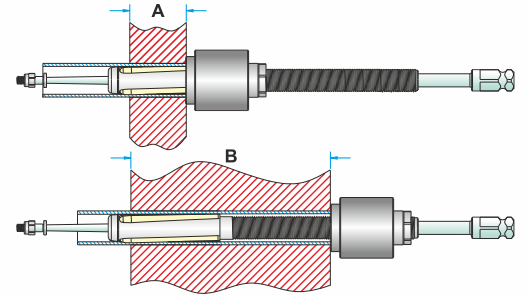
Tube O.D. BWG	Tube I.D.		Min I.D. Tube Tool Enters				Max Tool Expansion				800 Series Expander With				Mandrel Models	1200 Series Expander With				Mandrel Models
											1 1/2" (38 mm) rolls		2 1/4" (57.1 mm) rolls			1 1/2" (38 mm) rolls		2 1/4" (57.1 mm) rolls		
											Expander	Roll Set	Expander	Roll Set		Expander	Roll Set	Expander	Roll Set	
											Model	Model	Model	Model		Model	Model	Model	Model	
-17	0.884	22.4	0.865	21.9	0.964	24.4	T-855	TR-21	T-856	TR-21-A	TM-13	T-1255	TR-21	T-1256	TR-21-A	TM-63				
-18	0.902	22.9	0.865	21.9	0.964	24.4	T-855	TR-21	T-856	TR-21-A	TM-13	T-1255	TR-21	T-1256	TR-21-A	TM-63				
-19	0.916	23.2	0.865	21.9	0.964	24.4	T-855	TR-21	T-856	TR-21-A	TM-13	T-1255	TR-21	T-1256	TR-21-A	TM-63				
-20	0.930	23.6	0.865	21.9	0.964	24.4	T-855	TR-21	T-856	TR-21-A	TM-13	T-1255	TR-21	T-1256	TR-21-A	TM-63				
1.1/8"-8	0.795	20.1	0.776	19.7	0.875	22.2	T-853	TR-20	T-854	TR-20-A	TM-13	T-1253	TR-20	T-1254	TR-21-A	TM-63				
-9	0.829	21.0	0.810	20.5	0.909	23.0	T-849	TR-18	T-850	TR-18-A	TM-13	T-1249	TR-18	T-1250	TR-18-A	TM-63				
-10	0.857	21.7	0.837	21.2	0.936	23.7	T-851	TR-19	T-852	TR-19-A	TM-13	T-1251	TR-19	T-1252	TR-19-A	TM-63				
-11	0.885	22.4	0.865	21.9	0.964	24.4	T-855	TR-21	T-856	TR-21-A	TM-13	T-1255	TR-21	T-1256	TR-21-A	TM-63				
-12	0.907	23.0	0.883	22.4	0.982	24.9	T-857	TR-21	T-858	TR-21-A	TM-14	T-1257	TR-21	T-1258	TR-21-A	TM-64				
-13	0.935	23.7	0.916	23.2	1.015	25.7	T-859	TR-22	T-860	TR-22-A	TM-14	T-1259	TR-22	T-1260	TR-22-A	TM-64				
-14	0.959	24.3	0.935	23.7	1.044	26.5	T-861	TR-23	T-862	TR-23-A	TM-15	T-1261	TR-23	T-1262	TR-23-A	TM-65				
-15	0.981	24.9	0.962	24.4	1.071	27.2	T-863	TR-24	T-864	TR-24-A	TM-15	T-1263	TR-24	T-1264	TR-24-A	TM-65				
-16	0.995	25.2	0.962	24.4	1.071	27.2	T-863	TR-24	T-864	TR-24-A	TM-15	T-1263	TR-24	T-1264	TR-24-A	TM-65				
-17	1.009	25.6	0.990	25.1	1.099	27.9	T-867	TR-26	T-868	TR-26-A	TM-16	T-1267	TR-26	T-1268	TR-26-A	TM-66				
-18	1.027	26.0	0.990	25.1	1.099	27.9	T-867	TR-26	T-868	TR-26-A	TM-16	T-1267	TR-26	T-1268	TR-26-A	TM-66				
1.1/4"-8	0.920	23.3	0.901	22.8	1.010	25.6	T-865	TR-25	T-866	TR-25-A	TM-15	T-1265	TR-25	T-1266	TR-25-A	TM-65				
-9	0.954	24.2	0.935	23.7	1.044	26.5	T-861	TR-23	T-862	TR-23-A	TM-15	T-1261	TR-23	T-1262	TR-23-A	TM-65				
-10	0.982	24.9	0.962	24.4	1.071	27.2	T-863	TR-24	T-864	TR-24-A	TM-15	T-1263	TR-24	T-1264	TR-24-A	TM-65				
-11	1.010	25.6	0.990	25.1	1.099	27.9	T-867	TR-26	T-868	TR-26-A	TM-16	T-1267	TR-26	T-1268	TR-26-A	TM-66				
-12	1.032	26.2	1.013	25.7	1.122	28.5	T-869	TR-27	T-870	TR-27-A	TM-16	T-1269	TR-27	T-1270	TR-27-A	TM-66				
-13	1.060	26.9	1.041	26.4	1.150	29.2	T-871	TR-28	T-872	TR-28-A	TM-17	T-1271	TR-28	T-1272	TR-28-A	TM-67				
-14	1.084	27.5	1.060	26.9	1.169	29.6	T-873	TR-29	T-874	TR-29-A	TM-17	T-1273	TR-29	T-1274	TR-29-A	TM-67				
-15	1.106	28.0	1.087	27.6	1.196	30.3	T-875	TR-30	T-876	TR-30-A	TM-17	T-1275	TR-30	T-1276	TR-30-A	TM-67				
-16	1.120	28.4	1.087	27.6	1.196	30.3	T-875	TR-30	T-876	TR-30-A	TM-17	T-1275	TR-30	T-1276	TR-30-A	TM-67				



1200 Series

T1200 Series	Adjustable Range		
	Roller Length	Reach	Min. Max.
1.1/2" (38.1mm)	Standard	1.1/2" (38.1mm)	6" (152.4 mm)
	A	1.1/2" (38.1mm)	8" (203.1 mm)
	B	1.1/2" (38.1mm)	10" (253.8 mm)
2.1/4" (57.1 mm)	Standard	2.1/4" (57.1mm)	1.1/2" (38.1 mm)
	A	2.1/4" (57.1mm)	8.3/4" (222.1 mm)
	B	2.1/4" (57.1mm)	10.3/4 (323.6 mm)

Longer reaches available upon request in 2 inch (50.8 mm) increments



Tube O.D. BWG	Tube I.D.		Min I.D. Tube Tool Enters		Max Tool Expansion		800 Series Expander With				Mandrel Models	1200 Series Expander With				Mandrel Models	
							1 1/2" (38 mm) rolls		2 1/4" (57.1 mm) rolls			1 1/2" (38 mm) rolls		2 1/4" (57.1 mm) rolls			
							Expander Model	Roll Set Model	Expander Model	Roll Set Model		Expander Model	Roll Set Model	Expander Model	Roll Set Model		
1.1/4"-17	1.134	28.8	1.115	28.3	1.224	31.0	T-879	TR-30	T-880	TR-30-A	TM-18	T-1279	TR-30	T-1280	TR-30-A	TM-68	
	-18	1.152	29.2	1.115	28.3	1.224	31.0	T-879	TR-30	T-880	TR-30-A	TM-18	T-1279	TR-30	T-1280	TR-30-A	TM-68
1.3/8"-8	1.045	26.5	1.026	26.0	1.135	28.8	T-877	TR-31	T-878	TR-31-A	TM-17	T-1277	TR-30	T-1278	TR-31-A	TM-67	
	-9	1.079	27.4	1.060	26.9	1.169	29.6	T-873	TR-29	T-874	TR-29-A	TM-17	T-1273	TR-29	T-1274	TR-29-A	TM-67
	-10	1.107	28.1	1.087	27.6	1.196	30.3	T-875	TR-30	T-876	TR-30-A	TM-17	T-1275	TR-30	T-1276	TR-30-A	TM-67
	-11	1.135	28.8	1.115	28.3	1.224	31.0	T-879	TR-30	T-880	TR-30-A	TM-18	T-1279	TR-30	T-1280	TR-30-A	TM-68
	-12	1.157	29.3	1.133	28.7	1.242	31.5	T-881	TR-32	T-882	TR-32-A	TM-18	T-1281	TR-32	T-1282	TR-32-A	TM-68
	-13	1.185	30.1	1.160	29.4	1.275	32.3	T-883	TR-33	T-884	TR-33-A	TM-19	T-1283	TR-33	T-1284	TR-33-A	TM-69
	-14	1.209	30.7	1.179	29.9	1.294	32.8	T-885	TR-34	T-886	TR-34-A	TM-20	T-1285	TR-34	T-1286	TR-34-A	TM-70
	-15	1.231	31.2	1.206	30.6	1.321	33.5	T-887	TR-35	T-888	TR-35-A	TM-20	T-1287	TR-35	T-1288	TR-35-A	TM-70
1.1/2"-8	1.170	29.7	1.145	29.0	1.260	32.0	T-889	TR-34	T-890	TR-34-A	TM-19	T-1289	TR-34	T-1290	TR-34-A	TM-69	
	-9	1.204	30.5	1.177	29.9	1.294	32.8	T-885	TR-34	T-886	TR-34-A	TM-20	T-1285	TR-34	T-1286	TR-34-A	TM-70
	-10	1.232	31.2	1.206	30.6	1.321	33.5	T-887	TR-35	T-888	TR-35-A	TM-20	T-1287	TR-35	T-1288	TR-35-A	TM-70
	-11	1.260	32.0	1.235	31.3	1.350	34.2	T-891	TR-36	T-892	TR-36-A	TM-20	T-1291	TR-36	T-1292	TR-36-A	TM-70
	-12	1.282	32.5	1.257	31.9	1.372	34.8	T-893	TR-37	T-894	TR-37-A	TM-20	T-1293	TR-37	T-1294	TR-37-A	TM-70
	-13	1.310	33.2	1.285	32.6	1.400	35.5	T-895	TR-37	T-896	TR-37-A	TM-21	T-1295	TR-37	T-1296	TR-37-A	TM-71
	-14	1.334	33.8	1.285	32.6	1.400	35.5	T-895	TR-37	T-896	TR-37-A	TM-21	T-1295	TR-37	T-1296	TR-37-A	TM-71
	-15	1.356	34.4	1.331	33.8	1.446	36.7	T-897	TR-38	T-898	TR-38-A	TM-21	T-1297	TR-37	T-1298	TR-37-A	TM-71
	-16	1.370	34.8	1.331	33.8	1.446	36.7	T-897	TR-38	T-898	TR-38-A	TM-21	T-1297	TR-37	T-1298	TR-37-A	TM-71
	-17	1.384	35.1	1.331	33.8	1.472	37.3	T-899	TR-38	T-900	TR-38-A	TM-22	T-1299	TR-38	T-1300	TR-38-A	TM-72
-18	1.402	35.6	1.331	33.8	1.472	37.3	T-899	TR-38	T-900	TR-38-A	TM-22	T-1299	TR-38	T-1300	TR-38-A	TM-72	
-19	1.416	35.9	1.331	33.8	1.472	37.3	T-899	TR-38	T-900	TR-38-A	TM-22	T-1299	TR-38	T-1300	TR-38-A	TM-72	
-20	1.430	36.3	1.331	33.8	1.472	37.3	T-899	TR-38	T-900	TR-38-A	TM-22	T-1299	TR-38	T-1300	TR-38-A	TM-72	

Tube Expander for Heat Exchanger and Condenser

T - 800 / 1200 Series - 5 Rollers (For Thin Wall Tubes)



800 Series

T800 Series	Adjustable Range	
	Roller Length	Min. Max.
1.1/2" (38.1mm)	1/2" (12.7mm)	1.1/2" (38.1mm)
2.1/4" (57.1mm)	1.1/4" (31.7mm)	2.1/4" (57.1 mm)

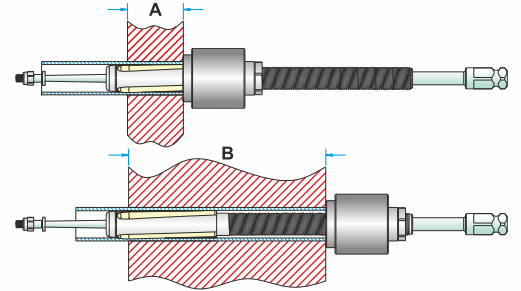
Tube O.D. BWG	Tube I.D.		Min I.D. Tube Tool Enters		Max Tool Expansion		800 Series Expander With				Mandrel Models	1200 Series Expander With				Mandrel Models	
							1 1/2" (38 mm) rolls		2 1/4" (57.1 mm) rolls			1 1/2" (38 mm) rolls		2 1/4" (57.1 mm) rolls			
							Expander	Roll Set	Expander	Roll Set		Expander	Roll Set	Expander	Roll Set		
							Model	Model	Model	Model		Model	Model	Model	Model		
5/8"-17	0.509	12.9	0.499	12.7	0.564	14.3	T-815-5	TR-4	T-816-5	TR-4A	TM-816	-	-	-	-	-	
	-18	0.527	13.4	0.517	13.1	0.576	14.6	T-817-5	TR-4	T-818-5	TR-4A	TM-9	-	-	-	-	-
	-19	0.541	13.7	0.522	13.3	0.582	14.8	T-819-5	TR-4	T-820-5	TR-4A	TM-820	-	-	-	-	-
	-20	0.555	14.1	0.536	13.6	0.596	15.1	T-819S-5	TR-4	T-820S-5	TR-4A	TM-820S	-	-	-	-	-
	-21	0.561	14.2	0.536	13.6	0.596	15.1	T-819S-5	TR-4	T-820S-5	TR-4A	TM-820S	-	-	-	-	-
	-22	0.569	14.5	0.536	13.6	0.596	15.1	T-819S-5	TR-4	T-820S-5	TR-4A	TM-820S	-	-	-	-	-
3/4"-13	0.56	14.2	0.55	14.0	0.615	15.6	T-821-5	TR-5	T-822-5	TR-5A	TM-822	-	-	-	-	-	
	-14	0.584	14.8	0.574	14.6	0.629	16.0	T-823-5	TR-6	T-824-5	TR-6A	TM-824	T-1223-5	TR-6	T-1224-5	TR-6-A	TM-1224
	-15	0.606	15.4	0.59	15.0	0.661	16.8	T-825-5	TR-7	T-826-5	TR-7A	TM-826	-	-	-	-	-
	-16	0.620	15.7	0.605	15.4	0.68	17.3	T-827-5	TR-7	T-828-5	TR-7A	TM-13	T-1227-5	TR-7	T1228-5	TR-7-A	TM-63
	-17-18	0.634	16.1	0.619	15.7	0.699	17.8	T-829-5	TR-7	T-830-5	TR-7A	TM-830	T-1229-5	TR-7	T1230-5	TR-7-A	TM-1230
	-19	0.666	16.9	0.642	16.3	0.729	18.5	T-831-5	TR-9	T-832-5	TR-9A	TM-13	T1231-5	TR-7	T1232-5	TR-7-A	TM-63
	-20	0.680	17.3	0.642	16.3	0.729	18.5	T-831-5	TR-9	T-832-5	TR-9A	TM-13	T1231-5	TR-7	T1232-5	TR-7-A	TM-63
	-21	0.686	17.4	0.642	16.3	0.729	18.5	T-831-5	TR-9	T-832-5	TR-9A	TM-13	T1231-5	TR-7	T1232-5	TR-7-A	TM-63
7/8"-13	0.685	17.4	0.670	17.0	0.747	19.0	T-833-5	TR-9	T-834-5	TR-9A	TM-14	-	-	-	-	-	
	-14	0.709	18.0	0.685	17.4	0.750	19.1	T-835-5	TR-10	T-836-5	TR-10A	TM-15	-	-	-	-	-
	-16	0.745	18.9	0.726	18.4	0.800	20.3	T-839-5	TR-11	T-840-5	TR-11A	TM-840	-	-	-	-	-
	-17-18	0.759	19.3	0.740	18.8	0.824	20.9	T-843-5	TR-11	T-844-5	TR-11A	TM-17	-	-	-	-	-
	-19	0.791	20.1	0.763	19.4	0.851	21.6	T-845-5	TR-11	T-846-5	TR-11A	TM-18	-	-	-	-	-
	-20	0.805	20.4	0.763	19.4	0.851	21.6	T-845-5	TR-11	T-846-5	TR-11A	TM-18	-	-	-	-	-
	-21	0.811	20.6	0.763	19.4	0.851	21.6	T-845-5	TR-11	T-846-5	TR-11A	TM-18	-	-	-	-	-
	-22	0.819	20.8	0.763	19.4	0.851	21.6	T-845-5	TR-11	T-846-5	TR-11A	TM-18	-	-	-	-	-



1200 Series

T1200 Series	Adjustable Range		
	Roller Length	Reach	Min. / Max.
1.1/2" (38.1mm)	Standard	1.1/2" (38.1mm)	6" (152.4 mm)
	A	1.1/2" (38.1mm)	8" (203.1 mm)
	B	1.1/2" (38.1mm)	10" (253.8 mm)
2.1/4" (57.1 mm)	Standard	2.1/4" (57.1mm)	1.1/2" (38.1 mm)
	A	2.1/4" (57.1mm)	8.3/4" (222.1 mm)
	B	2.1/4" (57.1mm)	10.3/4 (323.6 mm)

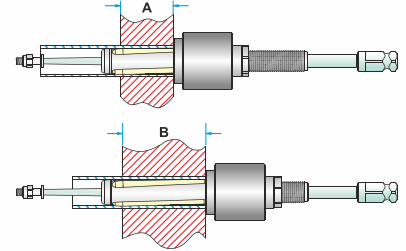
Longer reaches available upon request in 2 inch (50.8 mm) increments



Tube O.D. BWG	Tube I.D.		Min I.D. Tube Tool Enters		Max Tool Expansion		800 Series Expander With				Mandrel Models	1200 Series Expander With				Mandrel Models
							1 1/2" (38 mm) rolls		2 1/4" (57.1 mm) rolls			1 1/2" (38 mm) rolls		2 1/4" (57.1 mm) rolls		
							Expander	Roll Set	Expander	Roll Set		Expander	Roll Set	Expander	Roll Set	
							Model	Model	Model	Model		Model	Model	Model	Model	
1"-12	0.782	19.9	0.763	19.4	0.852	21.6	T-845-5	TR-11	T-846-5	TR-11A	TM-18	-	-	-	-	-
-13	0.810	20.6	0.791	20.1	0.880	22.4	T-847-5	TR-13	T-848-5	TR-13A	TM-18	-	-	-	-	-
-14	0.834	21.2	0.810	20.6	0.879	22.3	T-849-5	TR-12	T-850-5	TR-12A	TM-850	T-1249-5	TR-12	T-1250-5	TR-12A	TM-1250
-15-16	0.856	21.7	0.837	21.3	0.936	23.8	T-851-5	TR-13	T-852-5	TR-13A	TM-852	T-1251-5	TR-13	T-1252-5	TR-13A	TM-1252
-17	0.884	22.5	0.865	22.0	0.965	24.5	T-855-5	TR-13	T-856-5	TR-13A	TM-856	T-1255-5	TR-13	T-1256-5	TR-13A	TM-1256
-18	0.902	22.9	0.865	22.0	0.965	24.5	T-855-5	TR-13	T-856-5	TR-13A	TM-856	T-1255-5	TR-13	T-1256-5	TR-13A	TM-1256
-19	0.916	23.3	0.865	22.0	0.965	24.5	T-855-5	TR-13	T-856-5	TR-13A	TM-856	T-1255-5	TR-13	T-1256-5	TR-13A	TM-1256
-20	0.930	23.6	0.865	22.0	0.965	24.5	T-855-5	TR-13	T-856-5	TR-13A	TM-856	T-1255-5	TR-13	T-1256-5	TR-13A	TM-1256
1.1/8"-12	0.907	23.0	0.883	22.4	0.997	25.3	T-857-5	TR-15	T-858-5	TR-15A	TM-21	T-1257-5	TR-15	T-1258-5	TR-15A	TM-71
-13	0.935	23.7	0.916	23.3	1.000	25.4	T-859-5	TR-16	T-860-5	TR-16A	TM-860	-	-	-	-	-
-14	0.959	24.1	0.935	23.7	1.043	26.5	T-861-5	TR-17	T-862-5	TR-17A	TM-862	-	-	-	-	-
1.1/4"-15	1.106	28.1	1.087	27.6	1.196	30.4	T-875-5	TR-21	T-876-5	TR-21A	TM-876	-	-	-	-	-
-16	1.106	28.1	1.087	27.6	1.196	30.4	T-875-5	TR-21	T-876-5	TR-21A	TM-876	-	-	-	-	-
-17	1.134	28.8	1.115	28.3	1.231	31.3	T-879-5	TR-21	T-880-5	TR-21A	TM-880	-	-	-	-	-
-18	1.152	29.3	1.115	28.3	1.231	31.3	T-879-5	TR-21	T-880-5	TR-21A	TM-880	-	-	-	-	-
-20	1.18	29.6	1.115	28.3	1.231	31.3	T-879-5	TR-21	T-880-5	TR-21A	TM-880	-	-	-	-	-
-21	1.186	30.1	1.115	28.3	1.231	31.3	T-879-5	TR-21	T-880-5	TR-21A	TM-880	-	-	-	-	-
-22	1.194	30.3	1.115	28.3	1.231	31.3	T-879-5	TR-21	T-880-5	TR-21A	TM-880	-	-	-	-	-
1.3/8"-12	1.154	29.3	1.133	28.8	1.242	31.5	T-881-5	TR-21	T-882-5	TR-21A	TM-882	-	-	-	-	-
-14	1.209	30.7	1.179	29.9	1.296	32.9	T-885-5	TR-23	T-886-5	TR-23A	TM-882	-	-	-	-	-
1.12"-17	1.384	35.2	1.331	33.8	1.489	37.8	T-899-5	TR-29	T-900-5	TR-29A	TM-900	T-1299-5	TR-29	T-1300-5	TR-29A	TM-1299
-18	1.384	35.2	1.331	33.8	1.489	37.8	T-899-5	TR-29	T-900-5	TR-29A	TM-900	T-1299-5	TR-29	T-1300-5	TR-29A	TM-1299
-19-20	1.416	36.0	1.331	33.8	1.489	37.8	T-899-5	TR-29	T-900-5	TR-29A	TM-900	T-1299-5	TR-29	T-1300-5	TR-29A	TM-1299
-21-22	1.436	36.5	1.331	33.8	1.489	37.8	T-899-5	TR-29	T-900-5	TR-29A	TM-900	T-1299-5	TR-29	T-1300-5	TR-29A	TM-1299

Heat Exchanger and Boiler Tube Expander

'T-8012' Series



- More Durable Components
- Extended Service Life
- In Built Thrust Bearing
- Heavy Duty Application

Tube Expanders fitted with Roller Length		For Tube Sheet Adjustment Range	
		Minimum "A"	Maximum "B"
2.1/4" (57.15 mm)	STD Reach	1.1/2" (38.10 mm)	4" (101.40 mm)
	"6" Reach	1.1/2" (38.10 mm)	6" (152.40 mm)
	"8" Reach	1.1/2" (38.10 mm)	8" (203.20 mm)



Tube I.D. inch	Tube I.D.		Min. I.D.		Max Expansion		Expander with 2.1/4" (57.15 mm) long rollers		
	inch	mm	inch	mm	inch	mm	Model No.	Mandrel	Rollers Set.
1.3/4" (44.45)	8	1.420 36.1	1.368 34.7	1.550 39.3	T 8012-1.3/4-8	TM-90	TR-33-A		
	10	1.482 37.6	1.420 36.0	1.607 40.8	T 8012-1.3/4-8		TR-37-A		
	11	1.510 38.3	1.454 36.9	1.635 41.5	T 8012-1.3/4-11		TR-42		
	12	1.532 38.9	1.482 37.6	1.657 42.0	T 8012-1.3/4-12		TR-44		
	13	1.560 39.6	1.510 38.3	1.685 42.7	T 8012-1.3/4-13		TR-46		
	14	1.584 40.2	1.532 38.9	1.709 43.4	T 8012-1.3/4-14		TR-48		
2" (50.80)	8	1.670 42.4	1.595 40.5	1.795 45.6	T 8012-2-8	TM-91	TR-48		
	10	1.732 43.9	1.640 41.6	1.857 47.1	T 8012-2-10		TR-50		
	11	1.760 44.7	1.670 42.4	1.885 47.8	T 8012-2-11		TR-52		
	12	1.782 45.2	1.704 43.4	1.970 48.4	T 8012-2-12		TR-54		
	13	1.810 45.9	1.732 43.9	1.956 49.6	T 8012-2-13-18		TR-56		
	14	1.834 46.5	1.732 43.9	1.956 49.6	T 8012-2-13-18		TR-56		
	15	1.856 47.1	1.732 43.9	1.956 49.6	T 8012-2-13-18		TR-56		
	16	1.870 47.4	1.732 43.9	1.956 49.6	T 8012-2-13-18		TR-56		
	17	1.884 47.9	1.732 43.9	1.956 49.6	T 8012-2-13-18		TR-56		
18	1.902 48.3	1.732 43.9	1.956 49.6	T 8012-2-13-18	TR-56				
2.1/4" (57.15)	10	1.982 50.3	1.890 48.0	2.107 53.5	T 8012-2.1/4-10	TM-92	TR-56		
	11	2.010 51.0	1.920 48.7	2.137 54.2	T 8012-2.1/4-11		TR-58		
	12	2.032 51.6	1.954 49.6	2.157 54.7	T 8012-2.1/4-12		TR-60		
	13	2.060 52.3	1.982 50.3	2.185 55.4	T 8012-2.1/4-13-16		TR-62		
	14	2.084 52.9	1.982 50.3	2.185 55.4	T 8012-2.1/4-13-16		TR-62		
	15	2.106 53.4	1.982 50.3	2.185 55.4	T 8012-2.1/4-13-16		TR-62		
2.1/2" (63.50)	10	2.232 56.6	2.140 54.3	2.407 61.1	T 8012-2.1/2-10-12	TM-93	TR-64		
	11	2.260 57.4	2.140 54.3	2.407 61.1	T 8012-2.1/2-10-12		TR-64		
	12	2.282 57.9	2.140 54.3	2.407 61.1	T 8012-2.1/2-10-12		TR-64		
2.1/2" (63.50)	13	2.310 58.6	2.232 56.6	2.450 62.2	T 8012-2.1/2-13-18	TM-94	TR-64		
	14	2.334 59.2	2.232 56.6	2.450 62.2	T 8012-2.1/2-13-18		TR-64		
	15	2.356 59.8	2.232 56.6	2.450 62.2	T 8012-2.1/2-13-18		TR-64		
	16	2.370 60.1	2.232 56.6	2.450 62.2	T 8012-2.1/2-13-18		TR-64		
	17	2.384 60.6	2.232 56.6	2.450 62.2	T 8012-2.1/2-13-18		TR-64		
18	2.402 61.0	2.232 56.6	2.450 62.2	T 8012-2.1/2-13-18	TR-64				

T-8012 expanders can be supplied with 4 and 5 rollers

Tube O.D. inch	Thk bwg	Tube I.D.		Min I.D.		Max Expansion		Expander with 2.1/4" (57.15 mm) long rollers		
		inch	mm	inch	mm	inch	mm	Model No.	Mandrel	Rollers Set.
2.3/4 (69.85)	10	2.482	63.0	2.390	60.7	2.702	68.6	T8012-2.3/4-10-16	TM-95	TR-66
	11	2.510	63.7	2.390	60.7	2.702	68.6	T8012-2.3/4-10-16		TR-66
	12	2.532	64.3	2.390	60.7	2.702	68.6	T8012-2.3/4-10-16		TR-66
	13	2.560	65.0	2.390	60.7	2.702	68.6	T8012-2.3/4-10-16		TR-66
	14	2.584	65.6	2.390	60.7	2.702	68.6	T8012-2.3/4-10-16		TR-66
	15	2.606	66.1	2.390	60.7	2.702	68.6	T8012-2.3/4-10-16		TR-66
	16	2.620	66.6	2.390	60.7	2.702	68.6	T8012-2.3/4-10-16		TR-66
3" (76.20)	8	2.670	67.8	2.560	65.0	2.829	71.8	T8012-3-8-9	TM-96	TR-67
	9	2.701	68.6	2.560	65.0	2.829	71.8	T8012-3-8-9		TR-67
	10	2.732	69.3	2.640	67.0	2.952	74.9	T8012-3-10-18	TM-97	TR-67
	11	2.760	70.1	2.640	67.0	2.952	74.9	T8012-3-10-18		TR-67
	12	2.782	70.6	2.640	67.0	2.952	74.9	T8012-3-10-18		TR-67
	13	2.810	71.3	2.640	67.0	2.952	74.9	T8012-3-10-18		TR-67
	14	2.834	71.9	2.640	67.0	2.952	74.9	T8012-3-10-18		TR-67
	15	2.856	72.5	2.640	67.0	2.952	74.9	T8012-3-10-18		TR-67
	16	2.870	72.8	2.640	67.0	2.952	74.9	T8012-3-10-18		TR-67
	17	2.884	73.3	2.640	67.0	2.952	74.9	T8012-3-10-18		TR-67
18	2.902	73.7	2.640	67.0	2.952	74.9	T8012-3-10-18	TR-67		
3.1/2" (88.90)	13	3.311	84.1	3.190	81.0	3.464	88.0	T8012-3.1/2-13-18	TM-98	TR-70
	14	3.334	84.7	3.190	81.0	3.464	88.0	T8012-3.1/2-13-18		TR-70
	15	3.354	85.2	3.190	81.0	3.464	88.0	T8012-3.1/2-13-18		TR-70
	16	3.370	85.6	3.190	81.0	3.464	88.0	T8012-3.1/2-13-18		TR-70
	17	3.385	86.0	3.190	81.0	3.464	88.0	T8012-3.1/2-13-18		TR-70
	18	3.401	86.4	3.190	81.0	3.464	88.0	T8012-3.1/2-13-18		TR-70
4" (100.60)	3	3.480	88.4	3.425	87.0	3.780	96.0	T8012-3.1/2-3-4	TM-99	TR-71
	4	3.527	89.6	3.425	87.0	3.780	96.0	T8012-3.1/2-3-4		TR-71
	8	3.670	93.2	3.582	91.0	3.940	100.0	T8012-3.1/2-8-9		TR-71
	9	3.704	94.1	3.582	91.0	3.940	100.0	T8012-3.1/2-8-9		TR-71
	10	3.732	94.8	3.661	93.0	3.960	100.6	T8012-4-10-16		TR-72
	11	3.760	95.5	3.661	93.0	3.960	100.6	T8012-4-10-16		TR-72
	12	3.783	96.1	3.661	93.0	3.960	100.6	T8012-4-10-16		TR-72
	13	3.811	96.8	3.661	93.0	3.960	100.6	T8012-4-10-16		TR-72
	14	3.834	97.4	3.661	93.0	3.960	100.6	T8012-4-10-16		TR-72
	16	3.870	98.3	3.661	93.0	3.960	100.6	T8012-4-10-16		TR-72
4.1/2" (114.30)	3	3.980	101.1	3.940	100.0	4.291	109.0	T8012-4.1/2-3-4	TM-100	TR-73
	4	4.030	102.3	3.940	100.0	4.291	109.0	T8012-4.1/2-3-4		TR-73
	8	4.170	105.9	4.020	102.0	4.370	111.0	T8012-4.1/2-8-9		TR-74
	9	4.204	106.8	4.020	102.0	4.370	111.0	T8012-4.1/2-8-9		TR-74
	10	4.232	107.5	4.100	104.0	4.450	113.0	T8012-4.1/2-10-16		TR-74
	12	4.283	108.8	4.100	104.0	4.450	113.0	T8012-4.1/2-10-16		TR-74
	16	4.370	111.0	4.100	104.0	4.450	113.0	T8012-4.1/2-10-16		TR-74
5" (127.0)	3	4.480	113.8	4.410	112.0	4.763	121.0	T8012-5-3-4	TM-101	TR-76
	4	4.527	115.0	4.410	112.0	4.763	121.0	T8012-5-3-4		TR-76
	8	4.670	118.6	4.566	116.0	4.921	125.0	T8012-5-8-9		TR-77
	9	4.704	119.5	4.566	116.0	4.921	125.0	T8012-5-8-9		TR-77
	10	4.732	120.2	4.606	117.0	4.960	126.0	T8012-5-10-16		TR-78
	11	4.763	121.0	4.606	117.0	4.960	126.0	T8012-5-10-16		TR-78
	12	4.783	121.5	4.606	117.0	4.960	126.0	T8012-5-10-16		TR-78
	14	4.834	122.8	4.606	117.0	4.960	126.0	T8012-5-10-16		TR-78
	16	4.870	123.7	4.606	117.0	4.960	126.0	T8012-5-10-16		TR-78

Boiler Tube Expanders

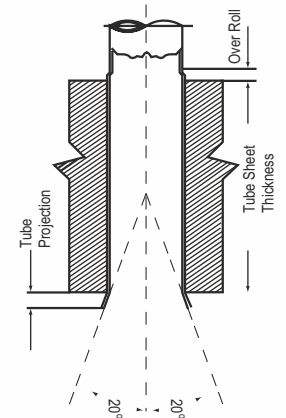
'T-114' Series (Flare) - 4 Plain Rollers & 2 Flare Rollers

- Multi purpose expander
- Popular choice for expanding & flaring
- Boiler Tubes
- Water Wall
- Economizer
- Riser & Air Heater Tubes

TUBE SIZE				Min I.D. Tool Enters		Max. Expansion of Tool		TUBE EXPANDER MODEL				
								Tube Sheet Thickness Range				
O.D. inch	THK bwg	O.D. inch	THK bwg	mm	inch	mm	inch	1/2" to 7/8"	3/4" to 1.1/8"	1.1/8" to 1.5/8"	1.5/8" to 2.1/8"	2.1/8" to 2.5/8"
				Tube Sheet Thickness Codes >				2	3	4	5	6
2	4-5	1.3/4	11-13	36.7	1.444	43.1	1.696	-	T14172	T14174	T14176	T14178
	6-7	1.3/4	14-16	38.3	1.507	44.6	1.755	-	T14182	T14184	T14186	T14188
	7-8			39.9	1.570	46.4	1.826	T14191	T14192	T14194	T14196	T14198
	9-10	2.1/4	13	41.5	1.633	48.0	1.889	T14201	T14202	T14204	T14206	T14208
	11-13	2.1/4	4-5	43.1	1.696	49.6	1.952	T14211	T14212	T14214	T14216	T14218
2 1/2	2	2.1/4	6-8	45.5	1.791	52.6	2.070	-	T14222	T14224	T14226	T14228
	3-4	2.1/4	9-11	47.1	1.856	54.2	2.133	-	T14232	T14234	T14236	T14238
	4-6	2.1/4	12-15	49.0	1.929	57.3	2.255	-	T14242	T14244	T14246	T14248
	7-10	2.3/4	2-3	51.9	2.043	60.5	2.381	-	T14252	T14254	T14256	T14258
	11-13	2.3/4	4-5	55.1	2.169	63.7	2.507	T14261	T14262	T14264	T14266	T14268
3	1-3	2.3/4	6-10	57.4	2.259	66.6	2.622	-	T14272	T14274	T14276	T14278
	4-6	2.3/4	11-15	60.6	2.385	70.0	2.755	-	T14282	T14284	T14286	T14288
	7-11	3.1/4	1-4	63.8	2.511	73.9	2.909	-	T14292	T14294	T14296	T14298
	10-12	3.1/4	4-7	66.9	2.635	77.3	3.043	T14301	T14302	T14304	T14306	T14308
3 1/2	1-4	3.1/4	7-11	70.1	2.759	80.1	3.153	-	T14312	T14314	T14316	T14318
	4-7	3.1/4	10-15	73.0	2.874	83.4	3.283	-	T14322	T14324	T14326	T14328
	7-11	3.3/4	2-3	76.2	3.000	86.8	3.417	-	T14332	T14334	T14336	T14338
	10-12	3.3/4	4-5	79.3	3.122	89.8	3.535	-	T14342	T14344	T14346	T14348
4	1-4	3.3/4	6-10	82.5	3.248	93.0	3.661	-	T14352	T14354	T14356	T14358
	4-7	3.3/4	11-15	85.7	3.374	96.0	3.779	-	T14362	T14364	T14366	T14368
	7-11	4.1/4	2-3	88.9	3.500	98.6	3.881	-	T14372	T14374	T14376	T14378
	8-12	4.1/4	3-5	90.5	3.562	102.3	4.027	-	T14382	T14384	T14386	T14388
4.1/2	1-4	4.1/4	6-9	95.2	3.748	104.7	4.122	-	T14392	T14394	T14396	T14398
	3-8	4.1/4	10-13	98.4	3.874	110.3	4.342	-	T14402	T14404	T14406	T14408
	6-12			101.6	4.000	113.5	4.468	-	T14412	T14414	T14416	T14418



SPARE ROLLER SET MODEL					SPARE MANDREL MODEL				
Tube Sheet Thickness Range					Drum Type	Header Type	Short Series	Short Series	SQ
1/2" to 7/8"	3/4" to 1.1/8"	1.1/8" to 1.5/8"	1.5/8" to 2.1/8"	2.1/8" to 2.5/8"					
2	3	4	5	6					
-	34872	34874	34878	34948	32269	32289	32308, 9, 10, 11	34876, 34948	3/4" <input checked="" type="checkbox"/>
-	34879	34881	34883	34949	32269	32289	32309, 10, 11	-	
34878	34879	34881	34883	34949	32270	32290	32309, 10, 11, 12	-	
34878	34879	34881	34883	34949	32271	32291	32311, 12, 13	32346	
34885	34886	34888	34890	34950	32270	32290	32310, 11, 12	32345	
-	34893	34895	34897	34951	32270	32290	32310, 11, 12, 13	-	
-	34893	34895	34897	34951	32271	32291	32311, 12, 13, 14	-	
-	34893	34895	34897	34951	32272	32292	32312, 13, 14, 15, 16	-	
-	34900	34902	34904	34952	32272	32292	32312, 13, 14, 15, 16	32347, 48, 49	
-	34900	34902	34904	34952	32273	32293	32315, 16, 17	33630, 31	
-	34907	34909	34911	34953	32273	32293	32315, 16, 17, 18, 19	-	
-	34907	34909	34911	34953	32274	32294	32317, 18, 19, 20, 21	-	
-	34914	34916	34918	34954	32274	32294	32318, 19, 20, 21, 22	33632, 33, 34, 35	
34913	34914	34916	34918	34954	32275	32295	32320, 21, 22	33634, 35	
-	34921	34923	34925	34955	32274	32294	32318, 19, 20, 21, 22	-	
-	34921	34923	34925	34955	32275	32275	32321, 22, 23, 24, 25	-	
-	34921	34923	34925	34955	32276	32296	32323, 24, 25, 26, 27	-	
-	34921	34923	34925	34955	32277	32297	32324, 25, 26, 27, 28	-	
-	34928	34930	34932	34956	32276	32296	32324, 25, 26, 27, 28	-	
-	34928	34930	34932	34956	32277	32297	32326, 27, 28, 29, 30	-	
-	34928	34930	34932	34956	32278	32298	32328, 29, 30, 31, 32	-	
-	34935	34937	34939	34957	32277	32297	32324, 25, 26, 27, 28	-	
-	34935	34937	34939	34957	32278	32298	32329, 30, 31, 32, 50	-	
-	34935	34937	34939	34957	32279	32299	32331, 32, 50, 37, 38	-	
-	34942	34944	34946	34958	32278	32298	32326, 27, 28, 29, 30	-	

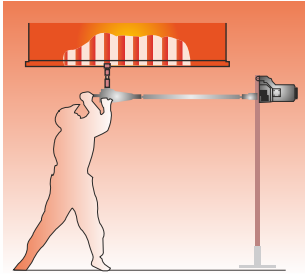


Boiler Tube Expanders

'TA' Series (Parallel) - 3 Plain Rollers

- Excellent expander for re-rolling and new construction
- Popular choice for small No. of tubes

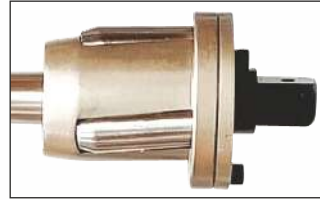
Tritorc offers solutions to overcome any installation problem



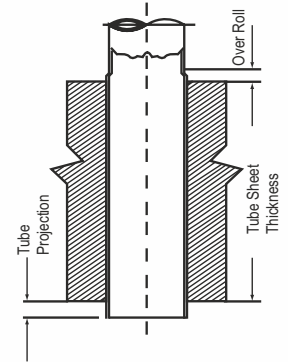
Tube expansion in vertical tubes

- Drive in conjunction with telescopic shaft coupled to a right angled gear drive makes tube installations easier.

TUBE SIZE				Min I.D. Tool Enters	Max Expansion of Tool	TUBE EXPANDER MODEL						
						Tube Sheet Thickness Range						
O.D. inch	THK bwg	O.D. inch	THK bwg	mm	inch	mm	inch	1/2" to 7/8"	3/4" to 1.1/8"	1.1/8" to 1.5/8"	1.5/8" to 2.1/8"	2.1/8" to 2.5/8"
				Tube Sheet Thickness Codes >		2	3	4	5	6		
7/8	15	1	10	18.1	0.712	20.4	0.803	TA-31/2	TA-31/3			
	16	-	-	18.4	0.724	20.7	0.814	TA-32/2	TA-32/3			
	17	1	11	18.8	0.740	21.1	0.830	TA-33/2	TA-33/3			
	18	1	12	19.4	0.763	21.6	0.850	TA-34/2	TA-34/3			
	19 - 20	1.1/8	8	19.7	0.775	22.3	0.877	TA-35/2	TA-35/3			
1	13	-	-	20.1	0.791	22.4	0.881	TA-36/2	TA-36/3			
	14	1.1/8	9	20.6	0.811	23.1	0.909	TA-37/2	TA-37/3	TA-37/4		
	15 - 16	1.1/8	10	21.3	0.838	23.8	0.937	TA-38/2	TA-38/3	TA-38/4		
	17 - 18	1.1/8	11	22.0	0.866	24.5	0.964	TA-39/2	TA-39/3	TA-39/4		
	19 - 20	1.1/8	12	22.4	0.881	25.0	0.984	TA-40/2	TA-40/3	TA-40/4		
1.1/4	8	1.1/8	13	23.3	0.917	25.9	1.019	TA-41/2	TA-41/3	TA-41/4		
	9	1.1/8	14	23.8	0.937	26.5	1.043	TA-42/2	TA-42/3	TA-42/4		
	10	1.1/8	15- 16	24.4	0.960	27.2	1.070	TA-43/2	TA-43/3	TA-43/4		
	11			25.2	0.992	28.0	1.102	TA-44/2	TA-44/3	TA-44/4		
	12			25.7	1.011	28.5	1.122	TA-45/2	TA-45/3	TA-45/4		
	13	1.3/8	8	26.1	1.027	28.8	1.133	TA-46/2	TA-46/3	TA-46/4		
	14			26.4	1.039	29.2	1.149	TA-47/2	TA-47/3	TA-47/4		
	15	1.3/8	9	26.9	1.059	29.7	1.169	TA-48/2	TA-48/3	TA-48/4		
1.1/2	7	1.3/8	11	28.3	1.114	31.2	1.228	TA-50/2	TA-50/3	TA-50/4	TA-50/5	TA-50/6
	8	1.3/8	12	28.8	1.133	31.7	1.248	TA-51/2	TA-51/3	TA-51/4	TA-51/5	TA-51/6
	9	1.3/8	13 - 14	29.5	1.161	33.4	1.314	TA-52/2	TA-52/3	TA-52/4	TA-52/5	TA-52/6
	10	1.3/8	15 - 16	30.0	1.181	34.1	1.342	TA-53/2	TA-53/3	TA-53/4	TA-53/5	TA-53/6
	11 - 12			30.6	1.204	34.8	1.370	TA-54/2	TA-54/3	TA-54/4	TA-54/5	TA-54/6
	13	1.3/4	5	31.4	1.236	35.6	1.401	TA-55/2	TA-55/3	TA-55/4	TA-55/5	TA-55/6



SPARE ROLLER SET MODEL					SPARE MANDREL MODEL			
Tube Sheet Thickness Range					Drum Type	Header Type	Short Series	SQ
1/2" to 7/8"	3/4" to 1.1/8"	1.1/8" to 1.5/8"	1.5/8" to 2.1/8"	2.1/8" to 2.5/8"				
2	3	4	5	6				
152-RS	153-RS	-	-	-	TDM-11			3/8" <input checked="" type="checkbox"/>
152-RS	153-RS				TDM-12			
162-RS	163-RS							
202-RS	203-RS							
172-RS	173-RS				TDM-13			
182-RS	183-RS				TDM-12			
182-RS	183-RS	184-RS			TDM-13	THM-13	TSM-13	
192-RS	193-RS	194-RS						
212-RS	213-RS	214-RS						
212-RS	213-RS	214-RS			TDM-14	THM-14	TSM-14	
222-RS	223-RS	224-RS			TDM-15	THM-15	TSM-15	
232-RS	233-RS	234-RS						
242-RS	243-RS	244-RS						
262-RS	263-RS	264-RS						
272-RS	273-RS	274-RS						
312-RS	313-RS	314-RS			TDM-16	THM-16	TSM-16	
282-RS	283-RS	284-RS						
292-RS	293-RS	294-RS			TDM-17	THM-17	TSM-17	
302-RS	303-RS	304-RS	305-RS	306-RS				
302-RS	303-RS	304-RS	305-RS	306-RS				
322-RS	323-RS	324-RS	325-RS	326-RS	TDM-18	THM-18	TSM-18	
282-RS	283-RS	284-RS	285-RS	286-RS				
292-RS	293-RS	294-RS	295-RS	296-RS	TDM-20	THM-20	TSM-20	
302-RS	303-RS	304-RS	305-RS	306-RS				
332-RS	333-RS	334-RS	335-RS	336-RS				

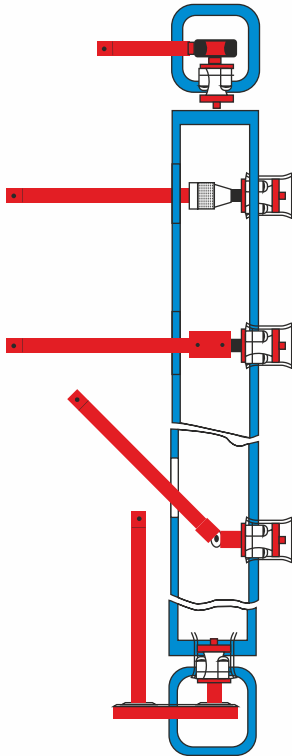


Boiler Tube Expanders

'TA' Series (Parallel) - 3 Plain Rollers

- Excellent expander for re-rolling and new construction
- Popular choice for small No. of tubes

Tritorc offers solutions to overcome any installation problem

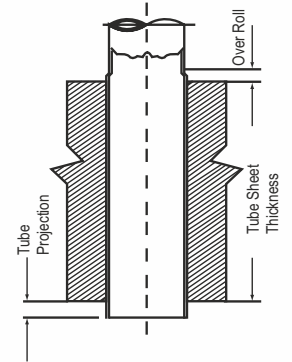


The various drive accessories developed are designed for optimum productivity and operator ease

TUBE SIZE				Min I.D. Tool Enters		Max Expansion of Tool		TUBE EXPANDER MODEL				
								Tube Sheet Thickness Range				
O.D inch	THK bwg	O.D. inch	THK bwg	mm	inch	mm	inch	1/2" to 7/8"	3/4" to 1.1/8"	1.1/8" to 1.5/8"	1.5/8" to 2.1/8"	2.1/8" to 2.5/8"
				Tube Sheet Thickness Codes >				2	3	4	5	6
1.1/2	14 - 5	1.3/4	6	32.6	1.283	36.8	1.448	TA-56/2	TA-56/3	TA-56/4	TA-56/5	TA-56/6
		1.3/4	7	33.4	1.314	38.1	1.500	TA-57/2	TA-57/3	TA-57/4	TA-57/5	TA-57/6
		1.3/4	8	34.2	1.346	38.7	1.523	TA-58/2	TA-58/3	TA-58/4	TA-58/5	TA-58/6
2	3	1.3/4	9 - 10	35.0	1.377	40.6	1.598	TA-59/2	TA-59/3	TA-59/4	TA-59/5	TA-59/6
	4	1.3/4	11 - 12	36.6	1.440	42.2	1.661	TA-60/2	TA-60/3	TA-60/4	TA-60/5	TA-60/6
	5 - 6	1.3/4	13 - 14	38.2	1.503	43.8	1.712	TA-61/2	TA-61/3	TA-61/4	TA-61/5	TA-61/6
	7 - 8	1.3/4	15 - 16	39.8	1.566	45.4	1.787	TA-62/2	TA-62/3	TA-62/4	TA-62/5	TA-62/6
	9 - 10	2.1/4	3	41.4	1.629	47.0	1.850	TA-63/2	TA-63/3	TA-63/4	TA-63/5	TA-63/6
	11 - 13	2.1/4	4	42.9	1.688	49.5	1.948	TA-64/2	TA-64/3	TA-64/4	TA-64/5	TA-64/6
	14 - 16	2.1/4	6 - 7	44.5	1.751	51.1	2.011	TA-65/2	TA-65/3	TA-65/4	TA-65/5	TA-65/6
2.1/2	17 - 18	2.1/4	8 - 9	46.1	1.814	52.7	2.074	TA-66/2	TA-66/3	TA-66/4	TA-66/5	TA-66/6
	3	2.1/4	10 - 11	47.7	1.877	54.3	2.137	TA-67/2	TA-67/3	TA-67/4	TA-67/5	TA-67/6
	4 - 5	2.1/4	12 - 13	49.3	1.940	55.9	2.200	TA-68/2	TA-68/3	TA-68/4	TA-68/5	TA-68/6
	6 - 7	2.1/4	14 - 16	50.8	2.000	57.8	2.275	TA-69/2	TA-69/3	TA-69/4	TA-69/5	TA-69/6
	8 - 9	2.3/4	3	52.4	2.062	59.4	2.338	TA-70/2	TA-70/3	TA-70/4	TA-70/5	TA-70/6
	10 - 11	2.3/4	4	54.0	2.125	61.0	2.401	TR-71/2	TA-71/3	TA-71/4	TA-71/5	TA-71/6
	12 - 14	2.3/4	5 - 6	55.6	2.188	64.0	2.519	TA-72/2	TA-72/3	TA-72/4	TA-72/5	TA-72/6
3	15 - 16	2.3/4	7 - 8	57.2	2.251	65.6	2.582	TA-73/2	TA-73/3	TA-73/4	TA-73/5	TA-73/6
	3	2.3/4	9 - 10	58.6	2.307	67.0	2.637	TA-74/2	TA-74/3	TA-74/4	TA-74/5	TA-74/6
	4	2.3/4	11 - 13	60.4	2.377	68.8	2.708	TA-75/2	TA-75/3	TA-75/4	TA-75/5	TA-75/6
	5 - 6	2.3/4	14 - 16	62.2	2.448	70.4	2.771	TA-76/2	TA-76/3	TA-76/4	TA-76/5	TA-76/6
	7 - 8			63.6	2.503	72.0	2.834	TA-77/2	TA-77/3	TA-77/4	TA-77/5	TA-77/6
	9 - 10	3.1/4	3	65.0	2.559	73.4	2.889	TA-78/2	TA-78/3	TA-78/4	TA-78/5	TA-78/6
	11 - 13	3.1/4	4	66.6	2.622	75.0	2.952	TA-79/2	TA-79/3	TA-79/4	TA-79/5	TA-79/6
14 - 16	3.1/4	5 - 6	68.3	2.688	76.9	3.027	TA-80/2	TA-80/3	TA-80/4	TA-80/5	TA-80/6	



SPARE ROLLER SET MODEL					SPARE MANDREL MODEL				
Tube Sheet Thickness Range					Drum Type	Header Type	Short Series	SQ	
1/2" to 7/8"	3/4" to 1.1/8"	1.1/8" to 1.5/8"	1.5/8" to 2.1/8"	2.1/8" to 2.5/8"					
2	3	4	5	6					
342-RS	343-RS	344-RS	345-RS	346-RS	TDM-21	THM-21	TSM-21	12"	
362-RS	363-RS	364-RS	365-RS	366-RS				12"	
372-RS	373-RS	374-RS	375-RS	376-RS					
332-RS	333-RS	334-RS	335-RS	336-RS	TDM-22	THM-22	TSM-22	3/4"	
372-RS	373-RS	374-RS	375-RS	376-RS					
382-RS	383-RS	384-RS	385-RS	386-RS					
392-RS	393-RS	394-RS	395-RS	396-RS					
402-RS	403-RS	404-RS	405-RS	406-RS					
402-RS	403-RS	404-RS	405-RS	406-RS	TDM-23	THM-23	TSM-23		
412-RS	413-RS	414-RS	415-RS	416-RS					
422-RS	423-RS	424-RS	425-RS	426-RS					
432-RS	433-RS	434-RS	435-RS	436-RS	TDM-24	THM-24	TSM-24		
442-RS	443-RS	444-RS	445-RS	446-RS					
432-RS	433-RS	434-RS	435-RS	436-RS					
442-RS	443-RS	444-RS	445-RS	446-RS					
452-RS	453-RS	454-RS	455-RS	456-RS	TDM-25	THM-25	TSM-25	1"	
472-RS	473-RS	474-RS	475-RS	476-RS					
462-RS	463-RS	464-RS	465-RS	466-RS					
472-RS	473-RS	474-RS	475-RS	476-RS	TDM-26	THM-26	TSM-26		
482-RS	483-RS	484-RS	485-RS	486-RS					
492-RS	493-RS	494-RS	495-RS	496-RS					
502-RS	503-RS	504-RS	505-RS	506-RS					
512-RS	513-RS	514-RS	515-RS	516-RS					
522-RS	523-RS	524-RS	525-RS	526-RS					
512-RS	513-RS	514-RS	515-RS	516-RS					

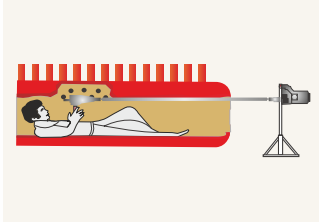


Boiler Tube Expanders

'TA' Series (Parallel) - 3 Plain Rollers

- Excellent expander for re-rolling and new construction
- Popular choice for small No. of tubes

Tritorc offers solutions to overcome any installation problem.

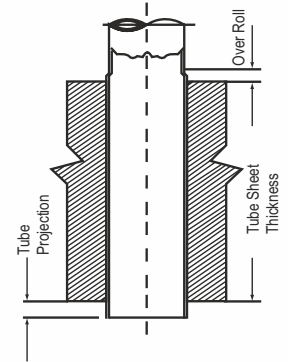


Typical example of solution oriented approach

TUBE SIZE				Min I.D. Tool Enters		Max Expansion of Tool		TUBE EXPANDER MODEL				
O.D inch	THK bwg	O.D. inch	THK bwg	mm	inch	mm	inch	Tube Sheet Thickness Range				
								1/2" to 7/8"	3/4" to 1.1/8"	1.1/8" to 1.5/8"	1.5/8" to 2.1/8"	2.1/8" to 2.5/8"
				Tube Sheet Thickness Codes >				2	3	4	5	6
3.1/2	2	3.1/4	7 - 8	69.9	2.751	78.5	3.090	TA-81/2	TA-81/3	TA-81/4	TA-81/5	TA-81/6
	3	3.1/4	9 - 10	71.5	2.814	80.1	3.153	TA-82/2	TA-82/3	TA-82/4	TA-82/5	TA-82/6
	4	3.1/4	11 - 13	73.1	2.877	81.7	3.216	TA-83/2	TA-83/3	TA-83/4	TA-83/5	TA-83/6
	5 - 6	3.1/4	14 - 16	74.6	2.937	84.2	3.314	TA-84/2	TA-84/3	TA-84/4	TA-84/5	TA-84/6
	7 - 8	3.3/4	2	76.2	3.000	85.5	3.366	TA-85/2	TA-85/3	TA-85/4	TA-85/5	TA-85/6
	9 - 11	3.3/4	3	77.8	3.062	87.4	3.440	TA-86/2	TA-86/3	TA-86/4	TA-86/5	TA-86/6
	12 - 16	3.3/4	4	79.4	3.125	89.0	3.503	TA-87/2	TA-87/3	TA-87/4	TA-87/5	TA-87/6
	3.3/4	5 - 6	81.0	3.188	90.6	3.566	TA-88/2	TA-88/3	TA-88/4	TA-88/5	TA-88/6	
4	2	3.3/4	7 - 8	82.6	3.251	92.2	3.629	TA-89/2	TA-89/3	TA-89/4	TA-89/5	TA-89/6
	3	3.3/4	9 - 10	84.2	3.314	93.8	3.692	TA-90/2	TA-90/3	TA-90/4	TA-90/5	TA-90/6
	4	3.3/4	11 - 13	85.8	3.377	96.2	3.787	TA-91/2	TA-91/3	TA-91/4	TA-91/5	TA-91/6
	5 - 6	3.3/4	14 - 16	87.4	3.440	97.8	3.850	TA-92/2	TA-92/3	TA-92/4	TA-92/5	TA-92/6
	7 - 8	4.1/4	2	89.0	3.503	99.4	3.913	TA-93/2	TA-93/3	TA-93/4	TA-93/5	TA-93/6
	9 - 11	4.1/4	3	90.4	3.559	100.8	3.968	TA-94/2	TA-94/3	TA-94/4	TA-94/5	TA-94/6
	12 - 16	4.1/4	4	92.0	3.622	102.4	4.031	TA-95/2	TA-95/3	TA-95/4	TA-96/5	TA-95/6
	4.1/4	5 - 6	93.4	3.677	103.8	4.086	TA-96/2	TA-96/3	TA-96/4	TA-96/5	TA-96/6	
4.1/2	2	4.1/4	7 - 8	95.0	3.740	105.4	4.149	TA-97/2	TA-97/3	TA-97/4	TA-97/5	TA-97/6
	3	4.1/4	9 - 11	96.6	3.803	107.0	4.212	TA-98/2	TA-98/3	TA-98/4	TA-98/5	TA-98/6
	4 - 5	4.1/4	11 - 13	98.2	3.866	108.6	4.275	TA-99/2	TA-99/3	TA-99/4	TA-99/5	TA-99/6
	6 - 7			101.2	3.984	110.0	4.330	TA-100/2	TA-100/3	TA-110/4	TA-100/5	TA-100/6
	8 - 9			102.8	4.047	111.6	4.393	TA-101/2	TA-101/3	TA-101/4	TA-101/5	TA-101/6
	10 - 12			104.4	4.110	113.2	4.456	TA-102/2	TA-102/3	TA-102/4	TA-102/5	TA-102/6



SPARE ROLLER SET MODEL					SPARE MANDREL MODEL			
Tube Sheet Thickness Range					Drum Type	Header Type	Short Series	SQ
1/2"	3/4"	1.1/8"	1.5/8"	2.1/8"				
to	to	to	to	to				
7/8"	1.1/8"	1.5/8"	2.1/8"	2.5/8"			5.1/8"	
2	3	4	5	6				
522-RS	523-RS	524-RS	525-RS	526-RS	TDM-26	THM-26	TSM-26	1" □
532-RS	533-RS	534-RS	535-RS	536-RS				
542-RS	543-RS	544-RS	545-RS	546-RS				
542-RS	543-RS	544-RS	545-RS	546-RS	TDM-27	THM-27	TSM-27	
552-RS	553-RS	554-RS	555-RS	556-RS				
562-RS	563-RS	564-RS	565-RS	566-RS				
572-RS	573-RS	574-RS	575-RS	576-RS				
582-RS	583-RS	584-RS	585-RS	586-RS				
592-RS	593-RS	594-RS	595-RS	596-RS	TDM-28	THM-28	TSM-28	
602-RS	603-RS	604-RS	605-RS	606-RS				
592-RS	593-RS	594-RS	595-RS	596-RS				
602-RS	603-RS	604-RS	605-RS	606-RS				
612-RS	613-RS	614-RS	615-RS	616-RS				
622-RS	623-RS	624-RS	625-RS	626-RS				
632-RS	633-RS	634-RS	635-RS	636-RS	TDM-29	THM-29	TSM-29	
622-RS	623-RS	624-RS	625-RS	626-RS				
632-RS	633-RS	634-RS	635-RS	636-RS	TDM-30	THM-30	TSM-30	
642-RS	643-RS	644-RS	645-RS	646-RS				
632-RS	633-RS	634-RS	635-RS	646-RS				
642-RS	643-RS	644-RS	645-RS	646-RS				
652-RS	653-RS	654-RS	655-RS	656-RS				
662-RS	663-RS	664-RS	665-RS	666-RS				

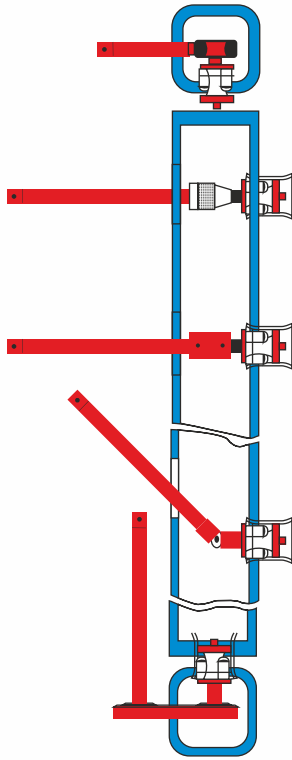


Boiler Tube Expanders

'TAF3' Series (Flare) - 3 Plain Rollers & 3 Flare Rollers

- Offset flare rolls eliminates ridges
- Rolls retained in cage when mandrel is removed

Tritorc offers solutions to overcome any installation problem

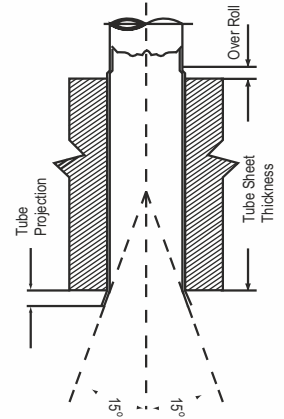


The various drive accessories developed are designed for optimum productivity and operator ease

TUBE SIZE				Min I.D. Tool Enters	Max Expansion of Tool	TUBE EXPANDER MODEL						
O.D inch	THK bwg	O.D. inch	THK bwg			Tube Sheet Thickness Range						
						1/2" to 7/8"	3/4" to 1.1/8"	1.1/8" to 1.5/8"	1.5/8" to 2.1/8"	2.1/8" to 2.5/8"		
				Tube Sheet Thickness Codes>		2	3	4	5	6		
7/8	15	1	10	18.1	0.712	20.4	0.803	TAF3-31/2	TAF3-31/3			
	16			18.4	0.724	20.7	0.814	TAF3-32/2	TAF3-32/3			
	17	1	11	18.8	0.740	21.1	0.830	TAF3-33/2	TAF3-33/3			
	18	1	12	19.4	0.763	21.6	0.850	TAF3-34/2	TAF3-34/3			
	19 - 20	1.1/8	8	19.7	0.775	22.3	0.877	TAF3-35/2	TAF3-35/3			
1	13			20.1	0.791	22.4	0.881	TAF3-36/2	TAF3-36/3			
	14	1.1/8	9	20.6	0.811	23.1	0.909	TAF3-37/2	TAF3-37/3	TAF3-37/4		
	15 - 16	1.1/8	10	21.3	0.838	23.8	0.937	TAF3-38/2	TAF3-38/3	TAF3-38/4		
	17 - 18	1.1/8	11	22.0	0.866	24.5	0.964	TAF3-39/2	TAF3-39/3	TAF3-39/4		
	19 - 20	1.1/8	12	22.4	0.881	25.0	0.984	TAF3-40/2	TAF3-40/3	TAF3-40/4		
1.1/4	8	1.1/8	13	23.3	0.917	25.9	1.019	TAF3-41/2	TAF3-41/3	TAF3-41/4		
	9	1.1/8	14	23.8	0.937	26.5	1.043	TAF3-42/2	TAF3-42/3	TAF3-42/4		
	10	1.1/8	15 - 16	24.4	0.960	27.2	1.070	TAF3-43/2	TAF3-43/3	TAF3-43/4		
	11			25.2	0.992	28.0	1.102	TAF3-44/2	TAF3-44/3	TAF3-44/4		
	12			25.7	1.011	28.5	1.122	TAF3-45/2	TAF3-45/3	TAF3-45/4		
	13	1.3/8	8	26.1	1.027	28.8	1.133	TAF3-46/2	TAF3-46/3	TAF3-46/4		
	14			26.4	1.039	29.2	1.149	TAF3-47/2	TAF3-47/3	TAF3-47/4		
	15	1.3/8	9	26.9	1.059	29.7	1.169	TAF3-48/2	TAF3-48/3	TAF3-48/4		
	16	1.3/8	10	27.6	1.086	30.4	1.196	TAF3-49/2	TAF3-49/3	TAF3-49/4	TAF3-49/5	TAF3-49/6
1.1/2	7	1.3/8	11	28.3	1.114	31.2	1.228	TAF3-50/2	TAF3-50/3	TAF3-50/4	TAF3-50/5	TAF3-50/6
	8	1.3/8	12	28.8	1.133	31.7	1.248	TAF3-51/2	TAF3-51/3	TAF3-51/4	TAF3-51/5	TAF3-51/6
	9	1.3/8	13 - 14	29.5	1.161	33.4	1.134	TAF3-52/2	TAF3-52/3	TAF3-52/4	TAF3-52/5	TAF3-52/6
	10	1.3/8	15 - 16	30.0	1.181	34.1	1.342	TAF3-53/2	TAF3-53/3	TAF3-53/4	TAF3-53/5	TAF3-53/6
	11 - 12			30.6	1.204	34.8	1.370	TAF3-54/2	TAF3-54/3	TAF3-54/4	TAF3-54/5	TAF3-54/6



SPARE ROLLER SET MODEL					SPARE MANDREL MODEL			
1/2" to 7/8"	3/4" to 1.1/8"	1.1/8" to 1.5/8"	1.5/8" to 2.1/8"	2.1/8" to 2.5/8"	Drum Type	Header Type	Short Series 5.1/8"	SQ
2	3	4	5	6				
152-F3	153-F3				TDM-11			3/8"
152-F3	153-F3				TDM-12			
162-F3	163-F3							
202-F3	203-F3							
172-F3	173-F3				TDM-13			
182-F3	183-F3				TDM-12			
182-F3	183-F3	184-F3			TDM-13	THM-13	TSM-13	3/8"
192-F3	193-F3	194-F3						
212-F3	213-F3	214-F3						
212-F3	213-F3	214-F3			TDM-14	THM-14	TSM-14	
222-F3	223-F3	224-F3						
232-F3	233-F3	234-F3			TDM-15	THM-15	TSM-15	
242-F3	243-F3	244-F3						
262-F3	263-F3	264-F3						
272-F3	273-F3	274-F3			TDM-16	THM-16	TSM-16	
312-F3	313-F3	314-F3						
282-F3	283-F3	284-F3			TDM-17	THM-17	TSM-17	1/2"
292-F3	293-F3	294-F3						
302-F3	303-F3	304-F3	305-F3	306-F3				
302-F3	303-F3	304-F3	305-F3	306-F3	TDM-18	THM-18	TSM-18	
322-F3	323-F3	324-F3	325-F3	326-F3				
282-F3	283-F3	284-F3	285-F3	286-F3	TDM-20	THM-20	TSM-20	
292-F3	293-F3	294-F3	295-F3	296-F3				
302-F3	303-F3	304-F3	305-F3	306-F3				



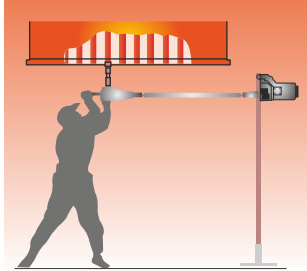
Can be supplied with
1 flare & 2 plane rollers

Boiler Tube Expanders

'TAF3' Series (Flare) - 3 Plain Rollers & 3 Flare Rollers

- Offset flare rolls eliminates ridges
- Rolls retained in cage when mandrel is removed

Tritorc offers solutions to overcome any installation problem

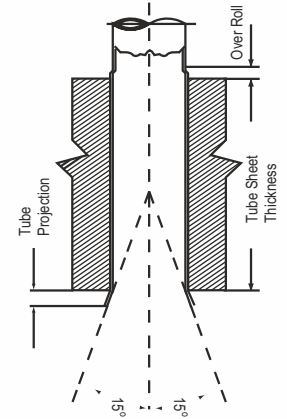


- Drive in conjunction with telescopic shaft coupled to a right angled gear drive makes tube installations easier.

TUBE SIZE				Min I.D. Tool Enters		Max Expansion of Tool		TUBE EXPANDER MODEL				
								Tube Sheet Thickness Range				
O.D. inch	THK bwg	O.D. inch	THK bwg	mm	inch	mm	inch	1/2" to 7/8"	3/4" to 1.1/8"	1.1/8" to 1.5/8"	1.5/8" to 2.1/8"	2.1/8" to 2.5/8"
				Tube Sheet Thickness Codes >				2	3	4	5	6
1.1/2	13	1.3/4	5	31.4	1.236	35.6	1.401	TAF3-55/2	TAF3-55/3	TAF3-55/4	TAF3-55/5	TAF3-55/6
	14 - 15	1.3/4	6	32.6	1.283	36.8	1.448	TAF3-56/2	TAF3-56/3	TAF3-56/4	TAF3-56/5	TAF3-56/6
		1.3/4	7	33.4	1.314	38.1	1.500	TAF3-57/2	TAF3-57/3	TAF3-57/4	TAF3-57/5	TAF3-57/6
		1.3/4	8	34.2	1.346	38.7	1.523	TAF3-58/2	TAF3-58/3	TAF3-58/4	TAF3-58/5	TAF3-58/6
2	3	1.3/4	9 - 10	35.0	1.377	40.6	1.598	TAF3-59/2	TAF3-59/3	TAF3-59/4	TAF3-59/5	TAF3-59/6
	4	1.3/4	11 - 12	36.6	1.440	42.2	1.661	TAF3-60/2	TAF3-60/3	TAF3-60/4	TAF3-60/5	TAF3-60/6
	5 - 6	1.3/4	13 - 14	38.2	1.503	43.8	1.712	TAF3-61/2	TAF3-61/3	TAF3-61/4	TAF3-61/5	TAF3-61/6
	7 - 8	1.3/4	15 - 16	39.8	1.566	45.4	1.787	TAF3-62/2	TAF3-62/3	TAF3-62/4	TAF3-62/5	TAF3-62/6
	9 - 10	2.1/4	3	41.4	1.629	47.0	1.850	TAF3-63/2	TAF3-63/3	TAF3-63/4	TAF3-63/5	TAF3-63/6
	11 - 13	2.1/4	4	42.9	1.688	49.5	1.948	TAF3-64/2	TAF3-64/3	TAF3-64/4	TAF3-64/5	TAF3-64/6
	14 - 16	2.1/4	6 - 7	44.5	1.751	51.1	2.011	TAF3-65/2	TAF3-65/3	TAF3-65/4	TAF3-65/5	TAF3-65/6
	17 - 18	2.1/4	8 - 9	46.1	1.814	52.7	2.074	TAF3-66/2	TAF3-66/3	TAF3-66/4	TAF3-66/5	TAF3-66/6
2.1/2	3	2.1/4	10 - 11	47.7	1.877	54.3	2.137	TAF3-67/2	TAF3-67/3	TAF3-67/4	TAF3-67/5	TAF3-67/6
	4 - 5	2.1/4	12 - 13	49.3	1.940	55.9	2.200	TAF3-68/2	TAF3-68/3	TAF3-68/4	TAF3-68/5	TAF3-68/6
	6 - 7	2.1/4	14 - 16	50.8	2.200	57.8	2.275	TAF3-69/2	TAF3-69/3	TAF3-69/4	TAF3-69/5	TAF3-69/6
	8 - 9	2.3/4	3	52.4	2.062	59.4	2.338	TAF3-70/2	TAF3-70/3	TAF3-70/4	TAF3-70/5	TAF3-70/6
	10 - 11	2.3/4	4	54.0	2.125	61.0	2.401	TAF3-71/2	TAF3-71/3	TAF3-71/4	TAF3-71/5	TAF3-71/6
	12 - 14	2.3/4	5 - 6	55.6	2.188	64.0	2.519	TAF3-72/2	TAF3-72/3	TAF3-72/4	TAF3-72/5	TAF3-72/6
	15 - 16	2.3/4	7 - 8	57.2	2.251	65.6	2.582	TAF3-73/2	TAF3-73/3	TAF3-73/4	TAF3-73/5	TAF3-73/6
3	3	2.3/4	9 - 10	58.6	2.307	67.0	2.637	TAF3-74/2	TAF3-74/3	TAF3-74/4	TAF3-74/5	TAF3-74/6
	4	2.3/4	11 - 13	60.4	2.377	68.8	2.708	TAF3-75/2	TAF3-75/3	TAF3-75/4	TAF3-75/5	TAF3-75/6
	5 - 6	2.3/4	14 - 16	62.2	2.448	70.4	2.771	TAF3-76/2	TAF3-76/3	TAF3-76/4	TAF3-76/5	TAF3-76/6
	7 - 8			63.6	2.503	72.0	2.834	TAF3-77/2	TAF3-77/3	TAF3-77/4	TAF3-77/5	TAF3-77/6
	9 - 10	3.1/4	3	65.0	2.559	73.4	2.889	TAF3-78/2	TAF3-78/3	TAF3-78/4	TAF3-78/5	TAF3-78/6



SPARE ROLLER SET MODEL					SPARE MANDREL MODEL			
Tube Sheet Thickness Range					Drum Type	Header Type	Short Series 5.1/8"	SQ
1/2" to 7/8"	3/4" to 1.1/8"	1.1/8" to 1.5/8"	1.5/8" to 2.1/8"	2.1/8" to 2.5/8"				
2	3	4	5	6				
332-F3	332-F3	334-F3	335-F3	336-F3	TDM-20	THM-20	TSM-20	
342-F3	343-F3	344-F3	345-F3	346-F3	TDM-21	THM-21	TSM-21	1/2"
362-F3	363-F3	364-F3	365-F3	366-F3				
372-F3	373-F3	374-F3	375-F3	376-F3				
332-F3	333-F3	334-F3	335-F3	336-F3	TDM-22	THM-22	TSM-22	
372-F3	373-F3	374-F3	375-F3	376-F3				
382-F3	383-F3	384-F3	385-F3	386-F3				
392-F3	393-F3	394-F3	395-F3	396-F3				
402-F3	403-F3	404-F3	405-F3	406-F3				
402-F3	403-F3	404-F3	405-F3	406-F3	TDM-23	THM-23	TSM-23	3/4"
412-F3	413-F3	414-F3	415-F3	416-F3				
422-F3	423-F3	424-F3	425-F3	426-F3				
432-F3	433-F3	434-F3	435-F3	436-F3				
442-F3	443-F3	444-F3	445-F3	446-F3	TDM-24	THM-24	TSM-24	
432-F3	433-F3	434-F3	435-F3	436-F3				
442-F3	443-F3	444-F3	445-F3	446-F3				
452-F3	453-F3	454-F3	455-F3	456-F3				
472-F3	473-F3	474-F3	475-F3	476-F3				
462-F3	463-F3	464-F3	465-F3	466-F3	TDM-25	THM-25	TSM-25	1"
472-F3	473-F3	474-F3	475-F3	476-F3				
482-F3	483-F3	484-F3	485-F3	486-F3				
492-F3	493-F3	494-F3	495-F3	496-F3				
502-F3	503-F3	504-F3	505-F3	506-F3				
512-F3	513-F3	514-F3	515-F3	516-F3				

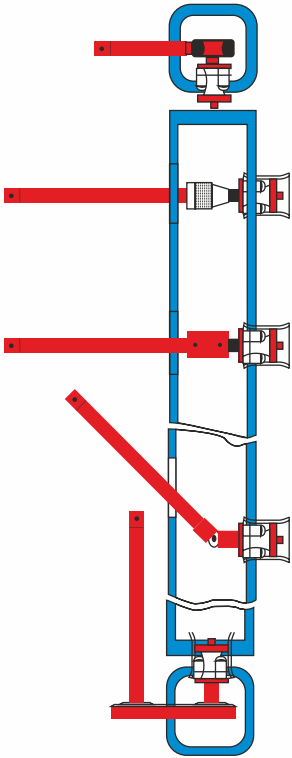


Boiler Tube Expanders

'TAF3' Series (Flare) - 3 Plain Rollers & 3 Flare Rollers

- Offset flare rolls eliminates ridges
- Rolls retained in cage when mandrel is removed

Tritorc offers solutions to overcome any installation problem

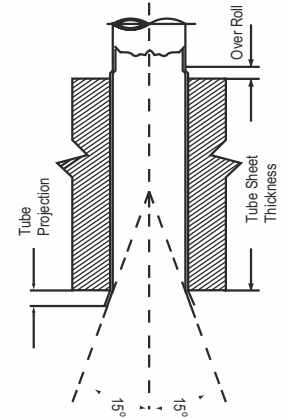


The various drive accessories developed are designed for optimum productivity and operator ease

TUBE SIZE				Min I.D. Tool Enters		Max Expansion of Tool		TUBE EXPANDER MODEL				
								Tube Sheet Thickness Range				
O.D inch	THK bwg	O.D. inch	THK bwg	mm	inch	mm	inch	1/2" to 7/8"	3/4" to 1.1/8"	1.1/8" to 1.5/8"	1.5/8" to 2.1/8"	2.1/8" to 2.5/8"
				Tube Sheet Thickness Codes >				2	3	4	5	6
3	11 - 13	3.1/4	4	66.6	2.622	75.0	2.952	TAF3-79/2	TAF3-79/3	TAF3-79/4	TAF3-79/5	TAF3-79/6
	14 - 16	3.1/4	5 - 6	68.3	2.688	76.9	3.027	TAF3-80/2	TAF3-80/3	TAF3-80/4	TAF3-80/5	TAF3-80/6
	3.1/2	2 3.1/4	7 - 8	69.9	2.751	78.5	3.090	TAF3-81/2	TAF3-81/3	TAF3-81/4	TAF3-81/5	TAF3-81/6
	3	3.1/4	9 - 10	71.5	2.814	80.1	3.153	TAF3-82/2	TAF3-82/3	TAF3-82/4	TAF3-82/5	TAF3-82/6
	4	3.1/4	11 - 13	73.1	2.877	81.7	3.216	TAF3-83/2	TAF3-83/3	TAF3-83/4	TAF3-83/5	TAF3-83/6
	5 - 6	3.1/4	14 - 16	74.6	2.937	84.2	3.314	TAF3-84/2	TAF3-84/3	TAF3-84/4	TAF3-84/5	TAF3-84/6
	7 - 8	3.3/4	2	76.2	3.000	85.5	3.366	TAF3-85/2	TAF3-85/3	TAF3-85/4	TAF3-85/5	TAF3-85/6
	9 - 11	3.3/4	3	77.8	3.062	87.4	3.440	TAF3-86/2	TAF3-86/3	TAF3-86/4	TAF3-86/5	TAF3-86/6
	12 - 16	3.3/4	4	79.4	3.125	89.0	3.503	TAF3-87/2	TAF3-87/3	TAF3-87/4	TAF3-87/5	TAF3-87/6
		3.3/4	5 - 6	81.0	3.188	90.6	3.566	TAF3-88/2	TAF3-88/3	TAF3-88/4	TAF3-88/5	TAF3-88/6
4	2	3.3/4	7 - 8	82.6	3.251	92.2	3.629	TAF3-89/2	TAF3-89/3	TAF3-89/4	TAF3-89/5	TAF3-89/6
	3	3.3/4	9 - 10	84.2	3.314	93.8	3.692	TAF3-90/2	TAF3-90/3	TAF3-90/4	TAF3-90/5	TA-F390/6
	4	3.3/4	11 - 13	85.8	3.377	96.2	3.787	TAF3-91/2	TAF3-91/3	TAF3-91/4	TAF3-91/5	TAF3-91/6
	5 - 6	3.3/4	14 - 16	87.4	3.440	97.8	3.850	TAF3-92/2	TAF3-92/3	TAF3-92/4	TAF3-92/5	TAF3-92/6
	7 - 8	4.1/4	2	89.0	3.503	99.4	3.913	TAF3-93/2	TAF3-93/3	TAF3-93/4	TAF3-93/5	TAF3-93/6
	9 - 11	4.1/4	3	90.4	3.559	100.8	3.968	TAF3-94/2	TAF3-94/3	TAF3-94/4	TAF3-94/5	TAF3-94/6
	12 - 16	4.1/4	4	92.0	3.622	102.4	4.031	TAF3-95/2	TAF3-95/3	TAF3-95/4	TAF3-96/5	TAF3-95/6
4.1/2		4.1/4	5 - 6	93.4	3.677	103.8	4.086	TAF3-96/2	TAF3-96/3	TAF3-96/4	TAF3-96/5	TAF3-96/6
	2	4.1/4	7 - 8	95.0	3.740	105.4	4.149	TAF3-97/2	TAF3-97/3	TAF3-97/4	TAF3-97/5	TAF3-97/6
	3	4.1/4	9 - 11	96.6	3.803	107.0	4.212	TAF3-98/2	TAF3-98/3	TAF3-98/4	TAF3-98/5	TAF3-98/6
	4 - 5	4.1/4	11 - 13	98.2	3.866	108.6	4.275	TAF3-99/2	TAF3-99/3	TAF3-99/4	TAF3-99/5	TAF3-99/6
	6 - 7			101.2	3.984	110.0	4.330	TAF3-100/2	TAF3-100/3	TAF3-110/4	TAF3-100/5	TAF3-100/6
	8 - 9			102.8	4.047	111.6	4.393	TAF3-101/2	TAF3-101/3	TAF3-101/4	TAF3-101/5	TAF3101/6
			104.4	4.110	113.2	4.456	TAF3-102/2	TAF3-102/3	TAF3-102/4	TAF3-102/5	TAF3-102/6	



SPARE ROLLER SET MODEL					SPARE MANDREL MODEL			
Tube Sheet Thickness Range					Drum Type	Header Type	Short Series 5.1/8"	SQ
1/2" to 7/8"	3/4" to 1.1/8"	1.1/8" to 1.5/8"	1.5/8" to 2.1/8"	2.1/8" to 2.5/8"				
2	3	4	5	6				
522-F3	523-F3	524-F3	525-F3	526-F3	TDM-25	THM-25	TSM-25	
512-F3	513-F3	514-F3	515-F3	516-F3				
522-F3	523-F3	524-F3	525-F3	526-F3	TDM-26	THM-26	TSM-26	
532-F3	533-F3	534-F3	535-F3	536-F3				
542-F3	543-F3	544-F3	545-F3	546-F3				
542-F3	543-F3	544-F3	545-F3	546-F3	TDM-27	THM-27	TSM-27	
552-F3	553-F3	554-F3	555-F3	556-F3				
562-F3	563-F3	564-F3	565-F3	566-F3				
572-F3	573-F3	574-F3	575-F3	576-F3				
582-F3	583-F3	584-F3	585-F3	586-F3				
592-F3	593-F3	594-F3	595-F3	596-F3				
602-F3	603-F3	604-F3	605-F3	606-F3	TDM-28	THM-28	TSM-28	1"
592-F3	593-F3	594-F3	595-F3	596-F3				
602-F3	603-F3	604-F3	605-F3	606-F3				
612-F3	613-F3	614-F3	615-F3	616-F3				
622-F3	623-F3	624-F3	625-F3	626-F3	TDM-29	THM-29	TSM-29	
632-F3	633-F3	634-F3	635-F3	636-F3				
642-F3	643-F3	644-F3	645-F3	646-F3				
632-F3	633-F3	634-F3	635-F3	636-F3	TDM-30	THM-30	TSM-30	
642-F3	643-F3	644-F3	645-F3	646-F3				
652-F3	653-F3	654-F3	655-F3	656-F3				
662-F3	663-F3	664-F3	665-F3	666-F3				



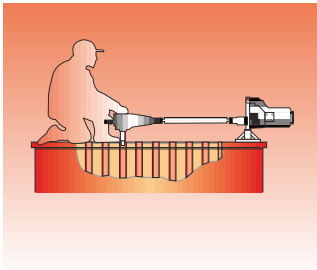
Boiler Tube Expander

'T - 1000' Series (Flare) - 3 Plain Rollers & 3 Flare Rollers

Most ideal for inaccessible areas

- Water boxes
- Small diameter drums

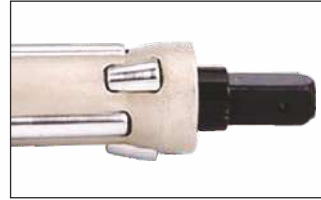
Tritorc believes in offering solutions to overcome any installation problem.



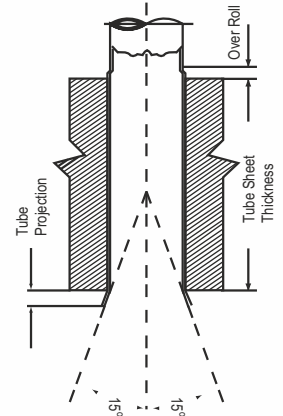
One of our drive systems helps overcome a problem caused by a difficult access...

- Reduces operator fatigue
- Ensures operator safety
- Increases productivity
- Maintains consistent accuracy

TUBE SIZE				Min I.D. Tool Enters		Max Expansion of Tool		TUBE EXPANDER MODEL				
O.D inch	THK bwg	O.D. inch	THK bwg					Tube Sheet Thickness Range				
				mm	inch	mm	inch	1/2" to 3/4"	7/8" to 1.1/4"	1.3/8" to 1.3/4"	1.7/8" to 2.1/4"	2.3/8" to 2.3/4"
Tube Sheet Thickness Codes >								3	5	7	9	11
1	13 - 14			19.7	0.775	23.4	0.921	T1079/3	T1079/5			
	15 - 16			20.7	0.814	24.4	0.961	T1083/3	T1083/5			
1.1/4	7			21.7	0.854	25.5	1.004	T1087/3	T1087/5			
	8 - 9			22.7	0.893	26.5	1.043	T1091/3	T1091/5			
	10			23.7	0.933	28.1	1.105	T1095/3	T1095/5			
	11-13			24.7	0.972	29.0	1.142	T1099/3	T1099/5			
	14 - 15			25.7	1.011	30.0	1.181	T1103/3	T1103/5			
1.1/2	16			27.8	1.094	33.0	1.299	T1111/3	T1111/5			
	10-12			30.7	1.280	35.0	1.378	T1118/3	T1118/5			
1.3/4	13-16			32.7	1.287	38.0	1.496	T1126/3	T1126/5			
	8-9	2	3	34.7	1.366	40.0	1.575	T1134/3	T1134/5	T1134/7	T1134/9	T1134/11
	10 - 12	2	4 - 5	36.7	1.444	42.5	1.673	T1142/3	T1142/5	T1142/7	T1142/9	T1142/11
2	13 - 16	2	6	38.7	1.523	44.5	1.752	T1150/3	T1150/5	T1150/7	T1150/9	T1150/11
	7 - 9	2.1/4	6	40.7	1.602	47.0	1.850	T1158/3	T1158/5	T1158/7	T1158/9	T1158/11
	10-12	2.1/4	4 - 5	42.7	1.681	49.0	1.929	T1166/3	T1166/5	T1166/7	T1166/9	T1166/11
	13-16	2.1/4	6	44.7	1.760	51.5	2.027	T1174/3	T1174/5	T1174/7	T1174/9	T1174/11
2.1/4	16	2.1/2	3	46.7	1.838	54.0	2.126	T1181/3	T1181/5	T1182/7	T1182/9	T1182/11
	10 - 13	2.1/2	4 - 5	48.7	1.917	56.0	2.205	T1189/3	T1189/5	T1189/7	T1189/9	T1189/11
	14 - 16	2.1/2	6	50.7	1.996	60.0	2.362	T1197/3	T1197/5	T1197/7	T1197/9	T1197/11
2.1/2	7-10			52.7	2.074	62.0	2.441	T1205/3	T1205/5	T1205/7	T1205/9	T1205/11
	11-13	3	2	54.7	2.135	64.0	2.520	T1213/3	T1213/5	T1213/7	T1213/9	T1213/11
	14-16			56.7	2.323	66.0	2.598	T1221/3	T1221/5	T1221/7	T1221/9	T1221/11



SPARE ROLLERS SET MODEL					SPARE MANDREL MODEL	
Tube Sheet Thickness Range					Drum Type	Short Series Mandrels
1/2" to 3/4"	7/8" to 1.1/4"	1.3/8" to 1.3/4"	1.7/8" to 2.1/4"	2.3/8" to 2.3/4"		
3	5	7	9	11		
0793-FS	0795-FS				TMP-83	
0833-FS	0835-FS					
0873-FS	0875-FS				TMP-91	
0953-FS	0955-FS					
0953-FS	0955-FS				TMP-99	1/2"
0993-FS	0995-FS					
1033-FS	1035-FS				TMP-118	
1113-FS	1115-FS					TMPS-1,2,3
1183-FS	1185-FS					TMPS-1,2,3
1263-FS	1265-FS				TMP-126	TMPS-2,3,4
1263-FS	1265-FS	1267-FS	1269-FS	12611-FS	TMP-134	TMPS-3,4,5
1423-FS	1425-FS	1427-FS	1429-FS	14211-FS	TMP-150	
1503-FS	1505-FS	1507-FS	1509-FS	15011-FS		
1583-FS	1585-FS	1587-FS	1589-FS	15811-FS	TMP-174	
1663-FS	1665-FS	1667-FS	1669-FS	16611-FS		
1743-FS	1745-FS	1747-FS	1749-FS	17411-FS	TMP-197	
1813-FS	1815-FS	1817-FS	1819-FS	18111-FS		
1743-FS	1745-FS	1747-FS	1749-FS	17411-FS	TMP-197	
2053-FS	2055-FS	2057-FS	2059-FS	20511-FS		
2053-FS	2055-FS	2057-FS	2059-FS	20511-FS	TMP-221	
2133-FS	2135-FS	2137-FS	2139-FS	21311-FS		
2213-FS	2215-FS	2217-FS	2219-FS	22111-FS		



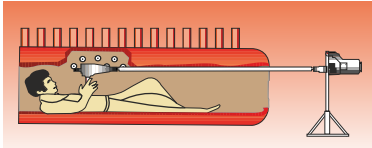
Boiler Tube Expander

'T - 1000' Series (Flare) - 3 Plain Rollers & 3 Flare Rollers

Most ideal for inaccessible areas

- Water boxes
- Small diameter drums

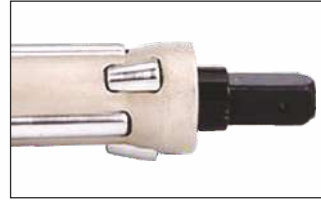
Tritorc offers solutions to overcome any installation problem.



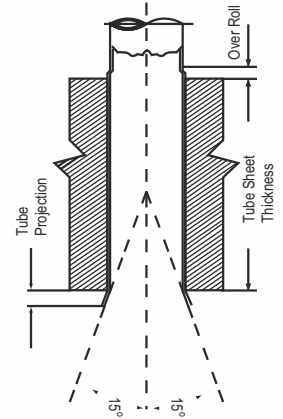
A typical example of an inaccessible area where Tritorc drive system ensures...

- Reduces operator fatigue
- Ensures operator safety
- Increases productivity
- Maintains consistent accuracy

TUBE SIZE				Min I.D. Tool Enters		Max Expansion of Tool		TUBE EXPANDER MODEL				
O.D. inch	THK bwg	O.D. inch	THK bwg					Tube Sheet Thickness Range				
				mm	inch	mm	inch	1/2" to 3/4"	7/8" to 1.1/4"	1.3/8" to 1.3/4"	1.7/8" to 2.1/4"	2.3/8" to 2.3/4"
Tube Sheet Thickness Codes >								3	5	7	9	11
2.3/4	7 - 9			58.7	2.311	68.0	2.677	T1229/3	T1229/5	T1229/7	T1229/9	T1229/11
	10 - 12			60.7	2.389	70.0	2.756	T1237/3	T1237/5	T1237/7	T1237/9	T1237/11
	13 - 16			62.7	2.468	72.0	2.835	T1244/3	T1244/5	T1244/7	T1244/9	T1244/11
3	7 - 8			64.7	2.547	74.0	2.913	T1252/3	T1252/5	T1252/7	T1252/9	T1252/11
	10 - 12			66.7	2.625	76.0	2.992	T1260/3	T1260/5	T1260/7	T1260/9	T1260/11
	13 - 14			68.7	2.704	78.0	3.071	T1268/3	T1268/5	T1268/7	T1268/9	T1268/11
	15 - 16			70.7	2.783	80.0	3.150	T1276/3	T1276/5	T1276/7	T1276/9	T1276/11
3.1/4	7 - 11			72.7	2.862	82.0	3.228	T1284/3	T1284/5	T1284/7	T1284/9	T1284/11
	12 - 14			74.7	2.940	84.0	3.307	T1292/3	T1292/5	T1292/7	T1292/9	T1292/11
	15 - 16	3.1/2	7 - 9	76.6	3.019	86.0	3.386	T1300/3	T1300/5	T1300/7	T1300/9	T1300/11
3.1/2	10 - 12			78.7	3.098	88.0	3.465	T1308/8	T1308/5	T1308/7	T1308/9	T1308/11
	13 - 15			80.7	3.177	92.0	3.622	T1315/3	T1315/5	T1315/7	T1315/9	T1315/11
	16	3.3/4	7 - 8	82.7	3.255	94.0	3.701	T1323/3	T1323/5	T1323/7	T1323/9	T1323/11
3.3/4	9 - 12			84.7	3.334	96.0	3.780	T1331/3	T1331/5	T1331/7	T1331/9	T1331/11
	13 - 16			86.7	3.413	98.0	3.858	T1339/3	T1339/5	T1339/7	T1339/9	T1339/11
4	7 - 8			88.7	3.492	100.0	3.937	T1347/3	T1347/5	T1347/7	T1347/9	T1347/11
	9 - 12			90.7	3.507	102.0	4.016	T1355/3	T1355/5	T1355/7	T1355/9	T1355/11
	13 - 15			92.7	3.649	104.0	4.094	T1363/3	T1363/5	T1363/7	T1363/9	T1363/11
	16	4.1/4	7 - 8	94.7	3.728	106.0	4.173	T1370/3	T1370/5	T1370/7	T1370/9	T1370/11
4.1/4	9 - 11			96.7	3.807	108.0	4.252	T1378/3	T1378/5	T1378/7	T1378/9	T1378/11
	12 - 16			98.7	3.885	110.0	4.331	T1386/3	T1386/5	T1386/7	T1386/9	T1386/11
	7 - 14			100.7	3.964	111.0	4.407	T1394/3	T1394/5	T1394/7	T1394/9	T1394/11



SPARE ROLLERS SET MODEL					SPARE MANDREL MODEL	
Tube Sheet Thickness Range					Drum Type	Short Series Mandrels
1/2" to 7/8"	7/8" to 1.1/4"	1.3/8" to 1.3/4"	1.7/8" to 2.1/4"	2.3/8" to 2.3/4"		
3	5	7	9	11		
2213-FS	2215-FS	2217-FS	2219-FS	22111-FS	TMP-244	TMPS-8,9,10,11,12,13
2373-FS	2375-FS	2377-FS	2379-FS	23711-FS		
2523-FS	2525-FS	2527-FS	2529-FS	25211-FS		
2523-FS	2525-FS	2527-FS	2529-FS	25211-FS	TMP-268	TMPS-10,11,12,13,14
2603-FS	2605-FS	2607-FS	2609-FS	26011-FS		
2683-FS	2685-FS	2687-FS	2689-FS	26811-FS		
2763-FS	2765-FS	2767-FS	2769-FS	27611-FS	TMP-300	TMPS-12,13,14,15,16
2843-FS	2845-FS	2847-FS	2849-FS	28411-FS		
2923-FS	2925-FS	2927-FS	2929-FS	29211-FS		
3153-FS	3155-FS	3157-FS	3159-FS	31511-FS	TMP-347	TMPS-15,16,17,18,19
2843-FS	2845-FS	2847-FS	2849-FS	28411-FS		TMPS-14,15,16,17,18,19
3153-FS	3155-FS	3157-FS	3159-FS	31511-FS		
3233-FS	3235-FS	3237-FS	3239-FS	32311-FS	TMP-394	
3313-FS	3315-FS	3317-FS	3319-FS	33111-FS		
3553-FS	3555-FS	3557-FS	3559-FS	35511-FS		
3633-FS	3635-FS	3637-FS	3639-FS	36311-FS	TMP-394	TMPS-17,18,19,20,21
3553-FS	3555-FS	3557-FS	3559-FS	35511-FS		
3633-FS	3635-FS	3637-FS	3639-FS	36311-FS		
3703-FS	3705-FS	3707-FS	3709-FS	37011-FS		
3783-FS	3785-FS	3787-FS	3789-FS	37811-FS		
3863-FS	3865-FS	3867-FS	3869-FS	38611-FS		
3943-FS	3945-FS	3947-FS	3949-FS	39411-FS		

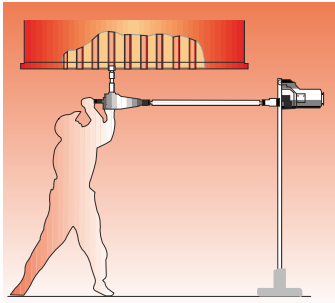


Boiler Tube Expander

'T - 3000' Series (Flare) - 3 Plain Rollers

- More durable components
- Extended service life
- In built thrust bearing
- Heavy duty application

Tritorc offers solutions to overcome any installation problem

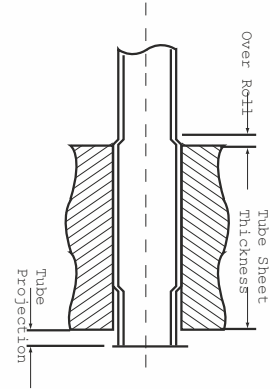


Our drive systems are designed to overcome any challenge posed by installation areas at any site

TUBE SIZE				Min I.D. Tool Enters		Max Expansion of Tool		TUBE EXPANDER MODEL	
O.D inch	THK bwg	O.D. inch	THK bwg	mm	inch	mm	inch	Tube Sheet Thickness Range	
								1/2" to 4.3/8"	3/4" to 5.3/8"
Tube Sheet Thickness Codes >								7	11
1.1/4	16			28.1	1.105	33.0	1.299	T3111/7	
1.1/2	10 - 12			31.0	1.221	35.0	1.378	T3118/7	
	13 - 16			33.0	1.300	38.0	1.496	T3126/7	
1.3/4	8 - 9	2	3	35.0	1.379	40.0	1.575	T3134/7	T3134/11
	10 - 12	2	4 - 5	37.0	1.457	42.5	1.673	T3142/7	T3142/11
	13 - 16	2	6	39.0	1.536	44.5	1.752	T3150/7	T3150/11
2	7 - 9	2.1/4	3	41.0	1.615	47.0	1.850	T3158/7	T3158/11
	10 - 12	2.1/4	4 - 5	43.0	1.694	49.0	1.929	T3166/7	T3166/11
	13 - 16	2.1/4	6	45.0	1.772	51.5	2.027	T3174/7	T3174/11
	16	2.1/2	3	47.0	1.851	54.0	2.126	T3181/7	T3181/11
2.1/4	10 - 13	2.1/2	4 - 5	49.0	1.930	56.0	2.205	T3189/7	T3189/11
	14 - 16	2.1/2	6	51.0	2.009	60.0	2.362	T3197/7	T3197/11
2.1/2	7 - 10			53.0	2.087	62.0	2.441	T3205/7	T3205/11
	11 - 13	3	2	55.0	2.116	64.0	2.520	T3213/7	T3213/11
	14 - 16			57.0	2.245	66.0	2.598	T3221/7	T3221/11
2.3/4	7 - 9			59.0	2.323	68.0	2.677	T3229/7	T3229/11
	10 - 12			61.0	2.402	70.0	2.756	T3237/7	T3237/11
	13 - 16			63.0	2.481	72.0	2.835	T3244/7	T3244/11



SPARE ROLLERS SET MODEL			SPARE MANDREL MODEL	
Tube Sheet Thickness Range				
1/2" to 4.3/8"	1.1/2" to 5.3/8"	Drum Type	Short Series Mandrel	
7	11	< Tube Sheet Thickness Codes		
1117-RS		TM-118	TMS-1,2,3	3/4"
1187-RS				
1267-RS			TMS-2,3,4	
1267-RS	12611-RS	TM-150	TMS-3,4,5	
1427-RS	14211-RS		TMS-3,4,5,6	
1507-RS	15011-RS			
1587-RS	15811-RS	TM-175	TMS-4,5,6,7,8	
1667-RS	16611-RS			
1747-RS	17411-RS			
1817-RS	18111-RS	TM-197	TMS-7,8,9,10,11,12	
1747-RS	17411-RS			
2057-RS	20511-RS		TMS-6,7,8,9,10,11,12	
2057-RS	20511-RS	TM-221	TMS-7,8,9,10,11,12	1"
2137-RS	21311-RS			
2217-RS	22111-RS			
2217-RS	22111-RS	TM-244	TMS-8,9,10,11,12,13	
2377-RS	23711-RS			
2527-RS	25211-RS			



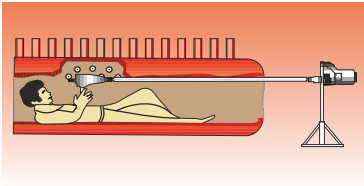
Note: 3000 B Series Expander can be supplied with 3" Shorter Mandrel for easy accessibility to limited access area.

Boiler Tube Expander

'T - 3000' Series (Flare) - 3 Plain Rollers

- More durable components
- Extended service life
- In built thrust bearing
- Heavy duty application

Tritorc offers solutions to overcome any installation problem

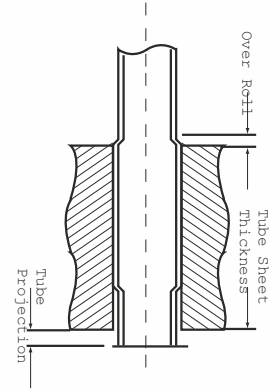


Typical example of solution oriented approach

TUBE SIZE				Min I.D. Tool Enters		Max Expansion of Tool		TUBE EXPANDER MODEL	
O.D. inch	THK bwg.	O.D. inch	THK bwg.					Tube Sheet Thickness Range	
				mm	inch	mm	inch	1/2" to 4.3/8"	3/4" to 5.3/8"
Tube Sheet Thickness Codes >								7	11
3	7 - 8			65.0	2.560	74.0	2.913	T3252/7	T3252/11
	10 - 12			67.0	2.638	76.0	2.992	T3260/7	T3260/11
	13 - 14			69.0	2.717	78.0	3.071	T3268/7	T3268/11
	15 - 16			71.0	2.796	80.0	3.150	T3276/7	T3276/11
3.1/4	7 - 11			73.0	2.874	82.0	3.228	T3284/7	T3284/11
	12 - 14			75.0	2.953	84.0	3.307	T3292/7	T3292/11
	15 - 16	3.1/2	7 - 9	77.0	3.032	86.0	3.386	T3300/7	T3300/11
3.1/2	10 - 12			79.0	3.111	88.0	3.465	T3308/7	T3308/11
	13 - 15			81.0	3.190	92.0	3.622	T3315/7	T3315/11
	16	3.3/4	7 - 8	83.0	3.218	94.0	3.701	T3323/7	T3323/11
3.3/4	9 - 12			85.0	3.347	96.0	3.780	T3331/7	T3331/11
	13 - 16			87.0	3.426	98.0	3.858	T3339/7	T3339/11
4	7 - 8			89.0	3.505	100.0	3.937	T3347/7	T3347/11
	9 - 12			91.0	3.583	102.0	4.016	T3355/7	T3355/11
	13 - 15			93.0	3.662	104.0	4.094	T3363/7	T3363/11
	16	4.1/4	7 - 8	95.0	3.741	106.0	4.173	T3370/7	T3370/11
4.1/4	9 - 11			97.0	3.820	108.0	4.252	T3378/7	T3378/11
	12 - 16			99.0	3.898	110.0	4.331	T3386/7	T3386/11
	7 - 14			101.0	3.997	111.0	4.407	T3394/7	T3394/11



SPARE ROLLERS SET MODEL			SPARE MANDREL MODEL	
Tube Sheet Thickness Range				
1/2" to 4.3/8	1.1/2" to 5.3/8	Drum Type	Short Series Mandrel	
7	11	< Tube Sheet Thickness Codes		
2527-RS	25211-RS	TM-268	TMS-10, 11, 12, 13, 14	
2607-RS	26011-RS			
2687-RS	26811-RS			
2767-RS	27611-RS	TM-300	TMS-12, 13, 14, 15, 16	
2847-RS	28411-RS			
2927-RS	29211-RS			
3157-RS	31511-RS			
2847-RS	28411-RS	TM-347	TMS-15, 16, 17, 18, 19	
3157-RS	31511-RS		TMS-14, 15, 16, 17, 18, 19	
3237-RS	32311-RS			
3317-RS	33111-RS			
3557-RS	35511-RS	TM-394	TMS-17, 18, 19, 20, 21	
3637-RS	36311-RS			
3557-RS	35511-RS			
3637-RS	36311-RS			
3707-RS	37011-RS			
3787-RS	37811-RS			
3867-RS	38611-RS			
3947-RS	39411-RS			



Note: 3000 Series Expander can also be supplied with 3" shorter mandrel for easy accessibility to limited access areas and is no menclatured as 3000B Series.

Sugar Industry Application

'TSB & TCSB' Series

- More durable components
- Extended service life
- In built thrust bearing
- Heavy duty application
- Hard rolling of tubes



'TSB' Tube Expander

TUBE SIZE		Min I.D. Tool Enters		Max Expansion of Tool		TUBE EXPANDER MODEL			Spare Roller Model	Spare Mandrel Model	
						Plate Thickness mm (inch)					
O.D. inch	THK bwg	mm	inch	mm	inch	31.75 (1.25)	38.1 (1.5)	50.8 (2.0)	Model	Model	
		Tube Sheet Thickness Codes>				A	B	C			
1.1/2	11 - 12	29.0	1.141	31.9	1.256	TSB-00A	TSB-00B	TSB-00C	TSBR-1A, 1B, 1C	TSBM-1	1/2" <input checked="" type="checkbox"/>
	13 - 14	32.5	1.279	36.0	1.417	TSB-0A	TSB-0B	TSB-0C	TSBR-2A, 2B, 2C	TSBM-2	
	15 - 16	33.5	1.319	37.2	1.465	TSB-1A	TSB-1B	TSB-1C	TSBR-3A, 3B, 3C		
1.3/4	9 - 10	35.2	1.386	39.1	1.539	TSB-2A	TSB-2B	TSB-2C	TSBR-3A, 3B, 3C	TSBM-3	3/4" <input checked="" type="checkbox"/>
	11 - 12	36.5	1.437	40.5	1.594	TSB-3A	TSB-3B	TSB-3C	TSBR-4A, 4B, 4C		
	13 - 14	38.1	1.500	42.7	1.681	TSB-4A	TSB-4B	TSB-4C	TSBR-5A, 5B, 5C		
	15 - 16	39.1	1.539	44.2	1.740	TSB-5A	TSB-5B	TSB-5C	TSBR-4A, 4B, 4C	TSBM-4	
2	7 - 8	41.3	1.626	46.7	1.838	TSB-6A	TSB-6B	TSB-6C	TSBR-5A, 5B, 5C		3/4" <input checked="" type="checkbox"/>
	9 - 10	42.8	1.685	48.3	1.901	TSB-7A	TSB-7B	TSB-7C	TSBR-6A, 6B, 6C		
	11 - 13	44.4	1.748	49.7	1.957	TSB-8A	TSB-8B	TSB-8C	TSBR-6A, 6B, 6C	TSBM-5	
	14 - 16	46.0	1.811	52.3	2.055	TSB-9A	TSB-9B	TSB-9C	TSBR-7A, 7B, 7C		
2.1/4	9 - 10	47.6	1.874	53.8	2.118	TSB-10A	TSB-10B	TSB-10C	TSBR-8A, 8B, 8C		3/4" <input checked="" type="checkbox"/>
	11 - 13	49.2	1.937	55.4	2.181	TSB-11A	TSB-11B	TSB-11C	TSBR-9A, 9B, 9C		
	14 - 16	50.7	1.996	57.8	2.275	TSB-12A	TSB-12B	TSB-12C	TSBR-8A, 8B, 8C	TSBM-6	
2.1/2	9 - 10	54.9	2.161	61.0	2.401	TSB-13A	TSB-13B	TSB-13C	TSBR-10A,10B,10C		

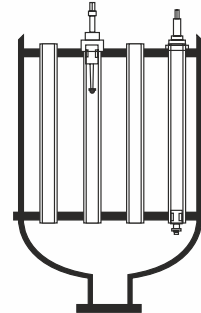
Tube Expander 'TCSB' Series

TCSB Series Tube Expanders are used to expand tube at bottom plate of sugar evaporator. They are supplied with adjustable reach of 300mm from minimum to maximum of tube given below:



'TCSB' Tube Expander

Reach	Min (mm)	Max (mm)
Std Reach	700	1000
A	1000	1500
B	1500	2000
C	2000	2500
D	2500	3000



TUBE SIZE		Min I.D. Tool Enters		Max Expansion of Tool		TUBE EXPANDER MODEL			Spare Roller Model	Spare Mandrel Model
						Plate Thickness mm (inch)				
O.D inch	THK bwg	mm	inch	mm	inch	31.75 (1.25)	38.1 (1.5)	50.8 (2.0)	Model	Model
		Tube Sheet Thickness Codes>				A	B	C		
2.1/2	14 - 16	57.1	2.248	65.6	2.582	TSB-14A	TSB-14B	TSB-14C	TSBR-11A, 11B, 11C	TSBM-7
2.3/4	10 - 14	60.3	2.374	68.8	2.708	TSB-15A	TSB-15B	TSB-15C	TSBR-12A, 12B, 12C	
3	7 - 9	63.5	2.500	72.0	2.835	TSB-16A	TSB-16B	TSB-16C	TSBR-13A, 13B, 13C	TSBM-7
	10 - 14	66.5	2.618	75.0	2.953	TSB-17A	TSB-17B	TSB-17C	TSBR-14A, 14B, 14C	
3.1/4	7 - 8	69.8	2.748	78.5	3.090	TSB-18A	TSB-18B	TSB-18C	TSBR-14A, 14B, 14C	TSBM-8
3.1/2	4 - 5	73.0	2.874	81.7	3.216	TSB-19A	TSB-19B	TSB-19C	TSBR-15A, 15B, 15C	
	6 - 8	76.1	2.996	85.8	3.378	TSB-20A	TSB-20B	TSB-20C	TSBR-16A, 16B, 16C	TSBM-9
3.3/4	4 - 5	79.3	3.122	89.0	3.504	TSB-21A	TSB-21B	TSB-21C	TSBR-17A, 17B, 17C	
	6 - 8	82.5	3.248	92.2	3.629	TSB-22A	TSB-22B	TSB-22C	TSBR-18A, 18B, 18C	
4	3 - 4	85.7	3.374	96.2	3.787	TSB-23A	TSB-23B	TSB-23C	TSBR-18A, 18B, 18C	TSBM-10
	10 - 16	90.3	3.555	100.8	3.968	TSB-24A	TSB-24B	TSB-24C	TSBR-19A, 19B, 19C	
4.1/4	6 - 8	94.6	3.736	105.2	4.141	TSB-25A	TSB-25B	TSB-25C	TSBR-20A, 20B, 20C	TSBM-11
4.1/2	4 - 7	89.7	3.531	110.9	4.366	TSB-26A	TSB-26B	TSB-26C	TSBR-21A, 21B, 21C	
	8 - 10	104.3	4.106	113.1	4.452	TSB-27A	TSB-27B	TSB-27C	TSBR-21A, 21B, 21C	TSBM-12

Combination Beading Tube Expander 'TCB' Series



This is a dual operation tool that simultaneously beads and expands in one operation...

- No initial flaring is required
- Reduced manhour and operator fatigue
- Smooth bead finish
- Less parts, thus low maintenance
- Two bead rollers for self centering of tool

TUBE SIZE		TUBE	EXPANDER	MANDREL	EXPANDER	BEADING
inch	mm	Gauge	Model	No.	Rolls Set	Rolls.
2	50.8	10-14	TCB-508	TBM-508	TRR-508	TBR-508
2.1/2	63.5	10-14	TCB-635	TBM-635	TRR-635	TBR-635
3	76.2	10-14	TCB-762	TBM-762	TRR-762	TBR-762

Hydraulic Tube Expansion System

Hydrive

- Low noise level easy on operator's ears
- Best suited for boiler tube expansion inside drums
- Accurate torque control by pressure setting on power pack
- Safe in operation, 24 v control voltage
- Can expand from 3/4" to 4" O.D. in conjunction with 3 drives



Powerpack

SPECIFICATION	Hydraulic Pump Models	
	THP-3	THP-5
Oil Tank Capacity (Litres)	30	45
Hydraulic Oil	SAE VG 68	SAE VG 68
Maximum Working Pressure (bar)	100	100
Net Weight (kgs)	80	100
Overall Dimensions (mm)	610*270*985	820*320*985
Electric Motor	3 hp. Single phase	5 hp. 3 phase
Voltage	230v / 110v	415v
Standard Hose Size (Length)	1/2" (10 mtrs.)	1/2" (10 mtrs.)

Standard scope of supply includes 2 hoses of 1/2" 10 mts long each

Hydraulic Expansion Drive

Tube O.D. Steel	Drive Model	No Load Speed with THP -3/5/10	Weight kg
19-38	THD-4	350/480/400	9.7
38-76	THD-5	62/84/70	11.0
50-102	THD-6	40/62/54	11.5



TDTC Series - Electric Tube Expansion System

- Fully Solid State Design
- Connected Drive is automatically recognised & indicated by means of LED indicator on the Torque
- Controller panel for Wattage based Torque Controller
- Accurately Calibrated Digital Torque Setting
- Slow start has been provided to all the drives for safety
- Trip, Reverse & Pause time are adjustable
- Manual Reverse provided in case of emergency
- Trigger (Hand) & foot mods are available
- LED on the panel board indicates the forward, reverse or trip condition of drive
- MCB has been provided for Safety



Electric Drives use with Torque Controller For Expansion

High Torque to Weight Ratio



PED-0



PED-2



PED-3

Supply Voltage Single Phase 50/60 Hz	Drive Model	Speed I / II	No Load R.P.M.	Expansion Range				Drive Weight Kgs.
				Steel Tube O.D.		Copper Tube O.D.		
				inch	mm	inch	mm	
230 V	PED - 0	I	2200	1/4" - 3/8"	6 - 10	1/4" - 1/2"	6 - 12	2.0
		II	1000	3/8" - 5/8"	10 - 16	3/8" - 3/4"	13 - 20	
	PED - 1	I	1900	5/16" - 3/8"	8 - 13	5/16" - 1/2"	8 - 13	2.5
		II	480	5/8" - 1.3/4"	16 - 45	5/8" - 2"	16 - 50	
	PED - 2	I	1080	5/8" - 1.1/4"	16 - 32	5/8" - 1.1/2"	16 - 38	7.5
		II	130	1" - 3"	25 - 76	1" - 4"	25 - 102	
PED - 3	I	430	1" - 2"	25 - 50	1" - 3"	25 - 76	8.5	
	II							
110 V	PED - 0	I	2200	1/4" - 3/8"	6 - 10	1/4" - 1/2"	6 - 12	2.0
		II	1000	3/8" - 5/8"	10 - 16	3/8" - 3/4"	13 - 20	
	PED - 1	I	1900	5/16" - 3/8"	8 - 13	5/16" - 1/2"	8 - 13	2.5
		II	480	5/8" - 1.3/4"	16 - 45	5/8" - 2"	16 - 50	
	PED - 2	I	1080	5/8" - 1.1/4"	16 - 32	5/8" - 1.1/2"	16 - 38	7.5
		II	130	1" - 3"	25 - 76	1" - 4"	25 - 102	
PED - 3	I	430	1" - 2"	25 - 50	1" - 3"	25 - 76	8.5	
	II							

Pneumatic Tube Rolling Drives



For Heat Exchangers



For Boilers

Model No.	Tube Capacity (inch)	Max Torque Nm	Weight (kg)
T720 - 550	1/2	8.47	1.20
T850 - 1250	3/4	12.20	4.80
T850 - 600	1	21.81	4.80
T850 - 400	1.1/4	36.00	4.80

Model No.	Tube Capacity (inch)	Max Torque Nm	Weight (kg)
T72 - RT - 190	2.5	190	5.80
T72 - RT - 90	4	410	6.70

Ergonomic Tool Holding System

Reliable and proven ergonomic design, work holding system suitable for every application of tube installation and tube removal.

Tool holding system operates on air pressure of 6 bar. This system is very portable and can be used to hold most of the tools and drives required for tube expansion, facing and tube removing operations.

Model No.	Vertical Movement	Horizontal Movement	Lift Capacity	Allowable Torque
TAS - 35	3 Feet (915 mm)	5 Feet (1524 mm)	35 Kgs.	170NM
TAS - 55	5 Feet (1524 mm)	5 Feet (1524 mm)	35 kgs.	170NM



Grooving Tools - 'TST' Series



Tools Bits

- High Production Tool
- One Tool for one size only
- One piece mandrel construction give you more accuracy



1/8" x 3/8" x 1/8"



1/8" x 1/4" x 1/8"

Tube O.D.		Tool Model No.	Spare Tool Bit	
50/60 Hz Inch	mm		1/8" X 3/8" X 1/8" Spacing	1/8" X 1/4" X 1/8" Spacing
3/8"	9.52	TST-375	TST-371	TST-371-S
1/2"	12.70	TST-875	TST-501	TST-501-S
5/8"	15.87	TST-500	TST-621	TST-621-S
3/4"	19.05	TST-750	TST-751	TST-751-S
7/8"	22.22	TST-625	TST-751	TST-751-S
1"	25.40	TST-1000	TST-751	TST-751-S
1.1/4"	31.75	TST-1250	TST-751	TST-751-S
1.1/2"	38.10	TST-1500	TST-751	TST-751-S
2"	50.80	TST-2000	TST-751	TST-751-S
2.1/2"	63.50	TST-2500	TST-751	TST-751-S

'TW' Series



- By changing the pilot nose & cutter covers full range of diameters
- Length & Depth of cut is adjustable
- Cutters are easy to change & resharpenable



Tools Bit



Tool Bits Holder With Tool Bit



Circular Form Cutter

Tube O.D.		Tool Model No.	Pilot Nose Model No.	Circular Form Cutter Model No.	Tool Bit Holder Model No.	Spare Tool Bit Model No.
Inch	mm					
3/8" - 1.1/4"	9 - 32	1TW - 2MT	1TW - PN	1TW - CF	1TW - TBH	1TW - TB
5/8" - 1.3/4"	16 - 45	3TW - 3MT	3TW - PN	3TW - CF	3TW - TBH	3TW - TB
3/4" - 1.7/8"	19 - 48	4TW - 4MT	4TW - PN	4TW - CF	4TW - TBH	4TW - TB
1.1/2" - 4"2"	38 - 102	6TW - 5MT	6TW - PN	6TW - CF	6TW - TBH	6TW - TB

Tube Sheet Hole Reamer



3/8" - 1.1/4" O.D.

- High Speed Steel
- Best for Condenser, Heat-Exchanger Tube Sheet Reaming

Tube O.D.		Reamer Sizes as per "TEMA" Speci.		Model No.	Flute Length		Over All Length		Morse Taper
Inch	mm	Inch	mm		Inch	mm	Inch	mm	
3/8"	9.53	0.380	9.65	TR - 095/66	2.60	66.00	5.70	146.00	1
				TR - 095/101	3.97	101.00	7.12	181.00	
				TM - 095/152	5.98	152.00	9.13	232.00	
1/2"	12.70	0.505	12.83	TM - 127/76	2.99	76.00	6.14	156.00	1
				TM - 127/101	3.97	101.00	7.12	181.00	
				TM - 127/152	5.98	152.00	9.13	232.00	
5/8"	15.87	0.631	16.03	TM - 158/87	3.42	87.00	7.36	187.00	2
				TM - 158/152	5.98	152.00	9.92	252.00	
				TM - 158/203	7.99	203.00	11.93	303.00	
**	16.00	0.636	16.16	TM - 160/87	3.42	87.00	7.36	187.00	2
				TM - 160/152	5.98	152.00	9.92	252.00	
				TM - 160/203	7.99	203.00	11.93	303.00	
3/4"	19.05	0.758	19.25	TM - 190/100	3.90	100.00	7.87	200.00	2
				TM - 190/152	5.98	152.00	9.92	252.00	
				TM - 190/203	7.99	203.00	11.93	303.00	
**	20.00	0.795	20.20	TM - 200/100	3.90	100.00	7.87	200.00	2
				TM - 200/152	5.98	152.00	9.92	252.00	
				TM - 200/203	7.99	203.00	11.93	303.00	
**	22.00	0.875	22.22	TM - 220/107	4.21	107.00	8.15	207.00	2
				TM - 220/152	5.98	152.00	9.92	252.00	
				TM - 220/203	7.99	203.00	11.93	303.00	
7/8"	22.22	0.883	22.42	TM - 222/107	4.21	107.00	8.15	207.00	2
				TM - 222/152	5.98	152.00	9.92	252.00	
				TM - 222/203	7.99	203.00	11.93	303.00	
**	25.00	0.994	25.25	TM - 250/115	4.53	115.00	9.53	242.00	3
				TM - 250/203	7.99	203.00	12.99	330.00	
				TM - 250/254	10.00	254.00	15.00	381.00	
1"	25.40	1.010	25.65	TM - 254/115	4.53	115.00	9.53	242.00	3
				TM - 254/203	7.99	203.00	12.99	330.00	
				TM - 254/254	10.00	254.00	15.00	381.00	
1.1/8"	28.57	1.136	28.86	TM - 285/124	4.88	124.00	9.88	251.00	3
				TM - 285/203	7.99	203.00	12.99	330.00	
				TM - 285/254	10.00	254.00	15.00	381.00	
1.1/4"	31.75	1.262	32.07	TM - 317/133	5.23	133.00	11.53	293.00	4
				TM - 317/203	7.99	203.00	14.29	363.00	
				TM - 317/254	10.00	254.00	16.30	414.00	

Please Enquire for larger diameter & long flute length.

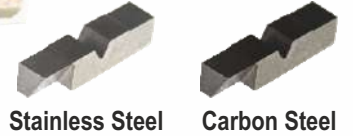
Tube End Facer

- Well suited for quick facing of projecting ends of Condenser, heat-Exchangers Tubes
- Tool supply with set of pilots to suit different I.D. with same O.D.



3/8" - 2.1/2" O.D.

Tools Bits



Tube O.D.		Gauge	Model No.	Spare Tool Bit	
50/60 Hz Inch	mm			For Non Ferrous & Carbon Steel Tubes	For Stainless Steel Tubes
3/8"	9.52	16-22	TTF - 375	TTFB - 375	TTFB - 375 - SS
1/2"	12.70	15-20	TTF - 500	TTFB - 500	TTFB - 500 - SS
5/8"	15.87	14-18	TTF - 625	TTFB - 625	TTFB - 625 - SS
3/4"	19.05	10-18	TTF - 750	TTFB - 750	TTFB - 750 - SS
7/8"	22.22	13-18	TTF - 875	TTFB - 875	TTFB - 875 - SS
1"	25.40	11-18	TTF - 1000	TTFB - 1000	TTFB - 1000 - SS
1.1/8"	28.57	11-18	TTF - 1125	TTFB - 1125	TTFB - 1125 - SS
1.1/4"	31.75	11-18	TTF - 1250	TTFB - 1250	TTFB - 1250 - SS
1.3/8"	34.92	11-18	TTF - 1375	TTFB - 1375	TTFB - 1375 - SS
1.1/2"	38.10	11-18	TTF - 1500	TTFB - 1500	TTFB - 1500 - SS
1.5/8"	41.27	11-18	TTF - 1625	TTFB - 1625	TTFB - 1625 - SS
1.3/4"	44.45	11-18	TTF - 1750	TTFB - 1750	TTFB - 1750 - SS
1.7/8"	47.62	11-18	TTF - 1875	TTFB - 1875	TTFB - 1875 - SS
2"	50.80	11-18	TTF - 2000	TTFB - 2000	TTFB - 2000 - SS
2.1/4"	57.15	11-18	TTF - 2250	TTFB - 2250	TTFB - 2250 - SS
2.1/2"	63.50	11-18	TTF - 2500	TTFB - 2500	TTFB - 2500 - SS

Weld Removal Tool



1.1/2" - 4" O.D.

- Tool suitable for weld removal, Facing, Chamfering (Internal & External) of Condenser, Heat-Exchanger Tubes
- This tool can be supplied with MT Shank suitable for drills

Tube O.D.		Assy Model No.	Spare Tool Bits Model No.
Inch	mm		
1.1/2"		TFC - 1500	TFC - 1500 - TB
1.5/8"	41.27	TFC - 1625	TFC - 1625 - TB
1.3/4"	44.45	TFC - 1750	TFC - 1750 - TB
1.7/8"	47.62	TFC - 1875	TFC - 1875 - TB
2"	50.80	TFC - 2000	TFC - 2000 - TB
2.1/4"	57.15	TFC - 2250	TFC - 2250 - TB
2.1/2"	63.50	TFC - 2500	TFC - 2500 - TB
2.3/4"	69.85	TFC - 2750	TFC - 2750 - TB
3	76.20	TFC - 3000	TFC - 3000 - TB
3.1/4"	82.55	TFC - 3250	TFC - 3250 - TB
3.1/2"	88.90	TFC - 3500	TFC - 3500 - TB
3.3/4"	95.25	TFC - 3750	TFC - 3750 - TB
4	101.60	TFC - 4000	TFC - 4000 - TB

Tube Guide

To Guide the tube through the tube sheet & baffles plates while insertion of tube

Tube O.D.		Guage	Model No.
Inch	mm		
1/2"	12.70	16-18	TTG - 1
		19-20	TTG - 2
		21-23	TTG - 2.5
5/8"	15.87	12-13	TTG - 3
		14-16	TTG - 4
		17-20	TTG - 5
		22-24	TTG - 5.5
3/4"	19.05	10-12	TTG - 6
		13-16	TTG - 7
		17-20	TTG - 8
		22-24	TTG - 8.5
7/8"	22.22	10-12	TTG - 9
		13-16	TTG - 10
		17-20	TTG - 11
		21-22	TTG - 11.5
1"	25.40	8-9	TTG - 11.5
		10-12	TTG - 12
		13-16	TTG - 13
		17-20	TTG - 14
		21-23	TTG - 14.5



1/2" - 3" O.D.

Tube O.D.		Guage	Model No.
Inch	mm		
1.1/4"	31.75	10-13	TTG - 15
		14-20	TTG - 16
1.3/8"	34.92	8-9	TTG - 17
		10-13	TTG - 18
		14-20	TTG - 19
1.1/2"	38.10	8-9	TTG - 20
		10-13	TTG - 21
		14-20	TTG - 22
2"	50.80	8-10	TTG - 23
		11-13	TTG - 24
		14-16	TTG - 25
2.1/2"	63.50	10-13	TTG - 26
		14-16	TTG - 27

Flaring Tool



To Flare the tube with pneumatic chipping

Tube O.D.		Guage	Model No.
Inch	mm		
1/2"	12.70	16-22	TFT - 1
5/8"	15.87	14-15	TFT - 2
		16-22	TFT - 3
3/4"	19.05	14-15	TFT - 4
		16-22	TFT - 5
7/8"	22.22	14-15	TFT - 6
		16-22	TFT - 7
1"	25.40	12-15	TFT - 8
		16-22	TFT - 9
1.1/8"	28.57	12-15	TFT - 10
		16-22	TFT - 11
1.1/4"	31.75	8-14	TFT - 12
		15-22	TFT - 13
1.3/8"	34.92	8-14	TFT - 14
		15-22	TFT - 15
1.1/2"	38.10	8-14	TFT - 16
		15-22	TFT - 17

Tube Sheet Hole Brush



To clean the tube sheet bore before tube insertion

Tube O.D.		Model No.
Inch	mm	
1/2"	12.70	TSB - 1/2
5/8"	15.87	TSB - 5/8
3/4"	19.05	TSB - 3/4
7/8"	22.22	TSB - 7/8
1"	25.40	TSB - 1
1.1/4"	31.75	TSB - 1.1/4
1.1/2"	38.10	TSB - 1.1/2
1.3/4"	44.45	TSB - 1.3/4
2"	50.80	TSB - 2
2.1/4"	57.15	TSB - 2.1/4
2.1/2"	63.50	TSB - 2.1/2
2.3/4"	69.85	TSB - 2.3/4
3"	76.20	TSB - 3

Tube Leak Detector

This Vacuum Tube Leak Detector VLD-3000 simple & accurate method of testing leakages in the tubes of Boiler, Condenser, Heat -Exchanger, Chiller, Cooler, etc.

It is a compact tool for checking the tubes for leakage before insertion in tube plate. It works on principle of vacuum in which tool vacuums the air from tube & create vacuum to a desired reading on gauge.

Steady reading on gauge indicates NO LEAK.

If the reading on the gauge drops it indicates a LEAK in the tube.

- Only one tool necessary for testing multiple tube sizes
- Simple Design, Light Weight, Quick tube testing.
- Cover wide range of tubes with one unit [(tube sizes: 1/4" (6.3 mm) to 3" (76.2 mm)]
- Interchangeable Seals for I.D. 10.35 mm to 30.65 mm
- Required Air Supply: Standard 6 to 10 Bar
- Silent while Testing

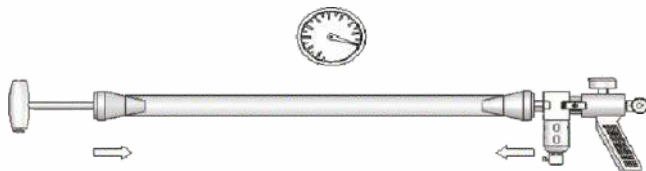


1/4" - 3" O.D.

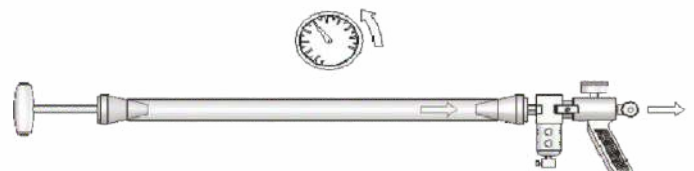
Tube Seals Available:

Part No.	Tube O.D. Size
T - 760	1/4" (6.3mm) - 3/4" (19.5mm)
T - 1250	5/8" (15.9mm) - 1.1/4" (31.7mm)
T - 2000	1.1/8" (28.6mm) - 2" (50.8mm)
T - 3000	1.7/8" (47.6mm) - 3" (76.2mm)

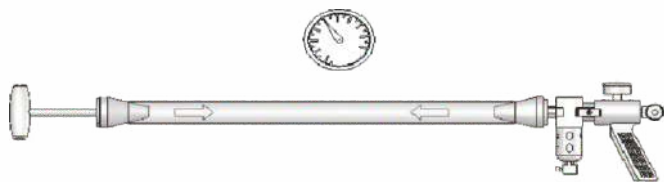
Operating Instructions



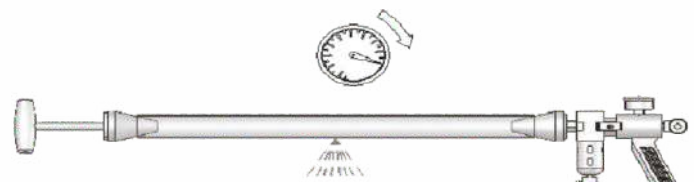
- 1) Connect air supply to the gun Plug both ends of the tube to be tested with Plugging 'T' handle one end & vacuum gun at other end.



- 2) Operate slide valve & initiate vacuum generation in the tubes.



- 3) Shut off the slide value when vacuum gauge reaches to the desire pressure. Hold for a few seconds & if gauge shows steady pressure there is no leak.

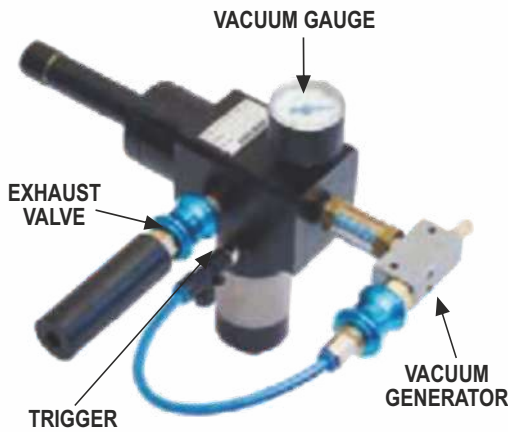


- 4) If gauge is not showing the steady pressure it means the tube has a leak.

Specifications:

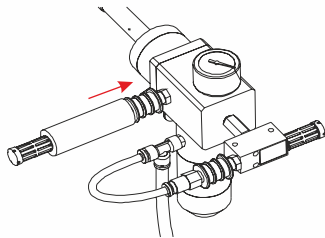
- Requires 90 psi (6.0 bar) compressed air
- Air consumption: 26 CFM (720 l/min).

Tube To Tube Sheet Joint Testing Kit

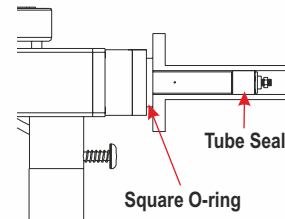


- Simple, Quick and Reliable tube joint testing.
- Interchangeable seal sets: Allows testing of tubes from 7.75 mm to 30.63 mm
- Easy to replace accessories. Joint Testing Gun weighs less than 1.5 kg.
- Air supply : Uses standard plant air supplies from 70 psi to 100 psi (4.7 to 6.8 bar).
- Silent during use. Ergonomic design makes testing effortless.
- Each Kit is packed in a compact and handy case.

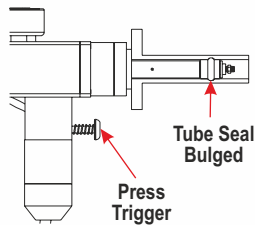
Sequence of Operation



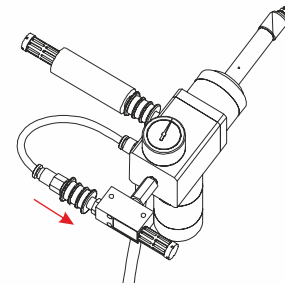
A) Close exhaust valve by sliding to extreme right



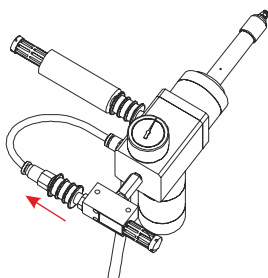
B) Insert manifold till square o-ring firmly sits on the tube



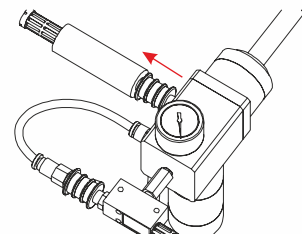
C)



D) Slide vacuum valve to right to start generating vacuum. The gauge will indicate the vacuum level.

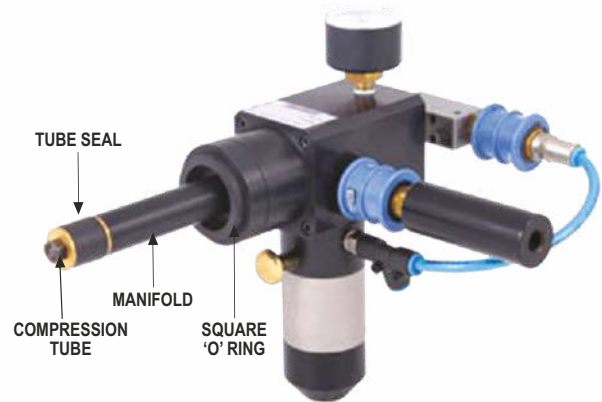


E) Close vacuum slide valve by shifting to left. This will stop vacuum generation. Observe vacuum gauge. Vacuum level falls if the joint is leaking.



F) After testing the joint release the tube seal by sliding the exhaust to the left. The Joint Testing Kit can be withdrawn after the tube seal collapses.

Tube To Tube Sheet Joint Testing Kit Specifications



Tube Size		Tube ID Range		Tube Seal Part No.	Tube Seal Diameter		Manifold with Square O ring	Compression Tube Part No.	Square O ring
O.D.	bwg	mm	inch		mm	inch			
5/8"	9	8.37	.330	TTK-300N	7.5	.295	TTM-15-125-5/8	TTK-15-125	TTK-16-5/8
	10-13	9.07 - 11.05	.357 - .435	TTK-370N	9	.354			
	14-15	11.67 - 12.23	.459 - .481	TTK-450N	11.6	.457			
	16-17	12.57 - 12.93	.459 - .509	TTK-470N	12.2	.480	TTM-15-312-5/8	TTK-15-312	
	18-19	13.39 - 13.75	.527 - .541	TTK-490N	13.3	.523			
20-24	14.11 - 14.77	.555 - .581	TTK-530N	13.8	.543				
3/4"	9	11.55	.455	TTK-430N	10.8	.425	TTM-15-312-3/4-1	TTK-15-312	TTK-16-3/4
	10 - 11	12.25 - 12.95	.482 - .510	TTK-450N	11.6	.457	TTM-15-125-3/4	TTK-15-125	
	12 - 13	13.53-14.23	.532 - .560	TTK-490N	13.3	.523	TTM-15-312-3/4-2	TTK-15-312	
	14 - 15	14.85 - 15.41	.584 - .606	TTK-530N	13.8	.543			
	16 - 17	15.75 - 16.11	.620 - .634	TTK-570N	15.4	.606			
	18 - 24	16.57 - 17.95	.652 - .706	TTK-610N	16.5	.649			
7/8"	8-9	13.84 - 14.72	.544 - .579	TTK-530N	13.8	.543	TTM-15-312-7/8-1	TTK-15-312	TTK-16-7/8
	10-11	15.42 - 16.12	.607 - .635	TTK-570N	15.4	.606			
	12-13	16.7 - 17.4	.657 - .685	TTK-610N	16.5	.649			
	14-17	18.02 - 19.28	.709 - .759	TTK-690N	18	.708	TTM-15-312-7/8-2		
	18-19	19.74 - 20.1	.777 - .791	TTK-740N	19.7	.775			
20-24	20.46 - 21.12	.805 - .831	TTK-790N	20.1	.791				
1"	8-9	17.02 - 17.9	.670 - .704	TTK-610N	16.5	.649	TTM-15-312-1	TTK-15-312	TTK-16-1
	10-11	18.6 - 19.3	.732 - .760	TTK-690N	18	.708			
	12-13	19.88 - 20.58	.782 - .810	TTK-740N	19.7	.775			
	14-15	21.2 - 21.76	.834 - .856	TTK-790N	20.1	.791	TTM-15-405-1	TTK-15-405	
	16-17	22.1 - 22.46	.870 - .884	TTK-840N	21.7	.854			
	18-19	22.92 - 23.28	.902 - .916	TTK-870N	22.9	.901			
20-24	23.64 - 24.3	.930 - .956	TTK-890N	23.3	.917				
1.1/8"	8-9	20.19 - 21.07	.795 - .829	TTK-790N	20.1	.791	TTM-15-312-1.1/8	TTK-15-312	TTK-16-1.1/8
	10-11	21.77 - 22.47	.857 - .884	TTK-840N	21.7	.854	TTM-15-405-1.1/8	TTK-15-405	
	12-13	23.05 - 23.75	.907 - .935	TTK-870N	22.9	.901			
	14-15	24.37 - 24.93	.959 - .981	TTK-890N	23.3	.917			
	16-17	25.27 - 25.63	.994 - 1.009	TTK-980N	25.2	.992			
	18-19	26.09 - 26.45	1.027 - 1.041	TTK-990N	26.0	1.024			
20-24	26.81 - 27.47	1.055 - 1.081	TTK-1040N	26.8	1.055				
1.1/4"	8-11	23.37 - 25.65	.920 - 1.01	TTK-890N	23.3	.917	TTM-15-405-1.1/4	TTK-15-405	TTK-16-1.1/4
	12-13	26.23 - 26.93	1.032 - 1.060	TTK-990N	26.0	1.024			
	14-17	27.55 - 28.81	1.084 - 1.134	TTK-1090N	27.5	1.082			
	18-24	29.27 - 30.65	1.152 - 1.206	TTK-1100N	29.2	1.149			

Tube / Pipe Beveling Machines

Specially designed to suit the most critical applications with restricted access. These Tools are rigid, however they are compact and light weight to facilitate portability and ease of use.

A range of 6 models cover Tube size from 20 mm to 457 mm. O.D. Face Tool head can be mounted either on Electric or Pneumatic Tool as per the requirement. Ideal for on-site pipe Facing, Beveling and Weld preparation.

Applications:

- Suitable for jobs in restricted access areas
- Useful in shutdown environments on Condensers and Heat Exchangers
- Used for maintenance and new Boiler manufacturing
- Designed to bevel, face and prepare weld edges for heavy wall thickness tubes

Features:

- Light weight and portable design
- Quick interchangeability of locking jaws to suit wide range of diameters
- Modular and ergonomic design to be suitable in tough working conditions
- Suitable for wide range of tube IDs

TFM-2042

Drive	Pneumatic	Electric
Locking Range (mm)	20 - 42	20 - 42
Ideal Speed (RPM)	400	250
Torque (Nm)	27.5	45.0
Feeding Stroke (mm)	23	23
Pneumatic Power (HP)	0.60	--
Air Consumption (cfm)	16	--
Air Pressure (psi)	90	--
Electric Power (watts)	--	650
Weight (kg)	5.5	5.5





TFM - 2876

Drive	Pneumatic	Electric
Locking Range (mm)	28 -76	28 - 76
Ideal Speed (RPM)	110	140
Torque (Nm)	84	138
Feeding Stroke (mm)	40	40
Pneumatic Power (HP)	0.83	--
Air Consumption (cfm)	42	--
Air Pressure (psi)	90	--
Electric Power (watts)	--	595
Weight (kg.)	5.5	11.0

TFM - 51203

Drive	Pneumatic	Electric
Locking Range (mm)	51 - 203	51 - 203
Ideal Speed (RPM)	40	40
Torque (Nm)	220	240
Feeding Stroke (mm)	40	40
Pneumatic Power (HP)	1.3	--
Air Consumption (cfm)	40	--
Air Pressure (psi)	90	--
Electric Power (watts)	--	1800
Weight (kg.)	26.5	30.0



TFM - 39105

Drive	Pneumatic	Electric
Locking Range (mm)	39 -104	39 - 104
Ideal Speed (RPM)	60	60
Torque (Nm)	220	240
Feeding Stroke (mm)	40	40
Pneumatic Power (HP)	1.3	--
Air Consumption (cfm)	40	--
Air Pressure (psi)	90	--
Electric Power (watts)	--	1800
Weight (kg.)	21.0	23.0

TFM - 99306

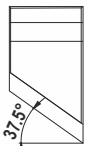
Drive	Pneumatic	Electric
Locking Range (mm)	100-306	100-306
Ideal Speed (RPM)	35	31
Torque (Nm)	180	230
Feeding Stroke (mm)	50	50
Pneumatic Power (HP)	1.9	--
Air Consumption (cfm)	60	--
Air Pressure (psi)	90	--
Electric Power (watts)	--	1400
Weight (kg.)	43.0	44.0



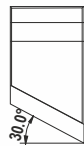
TFM 102457

Drive	Pneumatic	Electric
Locking Range (mm)	102 - 457	102 - 457
Ideal Speed (RPM)	13	15
Torque (Nm)	1266	1182
Feeding Stroke (mm)	60	60
Pneumatic Power (HP)	2.6	--
Air Consumption (cfm)	85	--
Air Pressure (psi)	90	--
Electric Power (watts)	--	2000
Weight (kg)	--	90

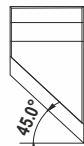
TOOL SET



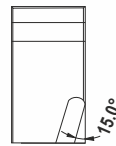
FT-1
(Ext. Beveling)



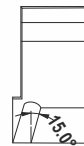
FT-2
(Ext. Beveling)



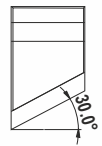
FT-3
(Ext. Beveling)



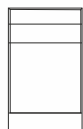
FT-4
(Int. Beveling)



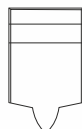
FT-5
(Int. Beveling)



FT-6
(Int. Beveling)



FT-8
(Facing)



FT-9
(Weld Removal)



FT-10
(‘J’ Grooving)

Continuous Tube Pulling Systems

Contipull

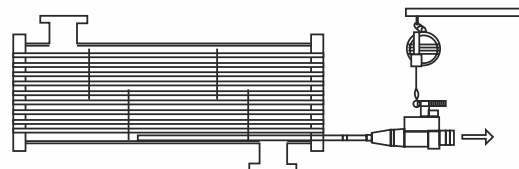
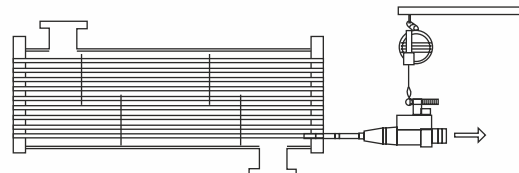
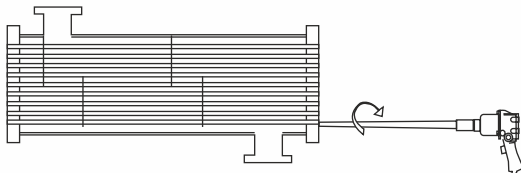
Hydraulic Tube Pulling Systems

- Light Weight Design allows higher mobility
- Small foot print suitable for confined areas
- Higher Productivity
- Low Maintenance
- Near silent operation reduces operator fatigue

Power pack (Continuous tube pulling)			
	TTP-50	TTP-75	TPP-50
Oil tank capacity (lts)	90	100	60
Oil	ISO 68	ISO 68	ISO 68
Weight (kg/lbs)	230 (506)	255 (561)	230 (506)
Drive	Electric	Electric	Pneumatic
Voltage	415v +/- 10%	415v +/- 10%	N. A.
Power in kw	3.7	5.5	4.9
Air consumption (cfm)	N.A	N.A	150
Air Pressure (psig)	N. A.	N. A.	90 psi
Control Voltage (v)	24	24	24



Tube Pulling Guns (Continuous)			
	TPG - 15	TPG - 30	TPG - 45
Pulling capacity (T @350 bar)	15	30	45
Min to Max tube O.D.	3/8" - 1"	3/8" - 1.1/2"	1" - 3"
Stub pulling capacity	- 1.1/2" O.D.	- 3" O.D.	- 4" O.D.
Pull stroke (mm)	150	150	150
Weight (kg/lbs)	25	50	61



Tool Balancer:

To suspend pulling gun

Model	Capacity	Wt. (kg)
E - 30	22 - 30	KG 9.5
E - 60	50 - 60 KG	12.6
E - 70	60 - 70	KG 13.2



Sockets:

To drive mandrels with impact wrench

Model No.	A	B
TS - 1	3/4"	3/8"
TS - 2	3/4"	1/2"
TS - 3	3/4"	5/8"
TS - 4	3/4"	3/4"
TS - 5	3/4"	1"
TS - 6	1"	3/4"
TS - 7	1"	1"



Impact Wrench:

To drive mandrels

Model	A	B	Tube Dia
IMT - 1	3/4"	3/8"	upto 2"
IMT - 2	1"	1/2"	upto 3"



'Pine Jenny' Style Tube Pulling Accessories

'Pine Jenny' Tube Spears



3/8" - 1" Tube Spear

Model Number	Tube OD inch	BWG
T-0916	3/8	16-17
T-0918	3/8	18-19
T-0920	3/8	20-21
T-0922	3/8	22-24
T-1212	5/8	12-13
T-1214	5/8	14-15
T-1216	5/8	16-17
T-1218	5/8	18-19
T-1220	5/8	20-21
T-1911	3/4	11-13
T-1914	3/4	14-15
T-1916	3/4	16-17
T-1918	3/4	18-19
T-1920	3/4	20-21
T-2212	7/8	12-13
T-2214	7/8	14-15
T-2216	7/8	16-17
T-2218	7/8	18-19
T-2220	7/8	20-21



1.1/4" - 3" Tube Spear

Model Number	Tube OD inch	BWG
T-2509	1	9
T-2510	1	10-11
T-2512	1	12-13
T-2514	1	14-15
T-2516	1	16-17
T-2518	1	18-19
T-2520	1	20-21
T-3112	1-1/4	12-13
T-3114	1-1/4	14-15
T-3116	1-1/4	16-17
T-3318	1-1/4	18-19
T-3120	1-1/4	20-21
T-3814	1-1/2	14-16
T-3817	1-1/2	17-20
T-4414	1-3/4	14-18
T-5014	2	14-18
T-5714	2-1/2	14-18
T-7610	3	10-14

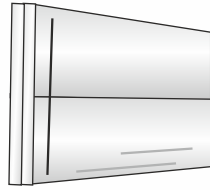
Note: For other sizes of 'Pine Jenny' Spears. Please enquire.

Consumables

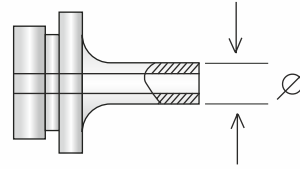


MANDREL - TPM

TUBE		MANDREL				JAW			COLLAR	
DIA	BWG	d		TPM	SQ ∇	TPJ 15	TPJ 30	TPJ 45	TPC 15/30	TPC 45
		mm	inch							
3/8"	17 - 19	6.5 - 7.5	0.260 - 0.295	7	5/16"	1	1		11	
	20 - 24	7.5 - 8.5	0.295 - 0.0335	8						
1/2"	14 - 16	8.5 - 9.5	0.335 - 0.375	9	3/8"	2	2		14	
	17 - 18	9.5 - 10.5	0.375 - 0.415	10						
	19 - 21	10.5 - 11.5	0.415 - 0.455	11						
	24	11.5 - 12.5	0.455 - 0.495	12						
5/8"	16 - 17	12.5 - 13.5	0.495 - 0.535	13A	1/2"	3	3		18	
	19 - 21	13.5 - 14.5	0.535 - 0.570	14A						
	23 - 24	14.5 - 15.5	0.570 - 0.610	15A						
3/4"	11	12.5 - 13.5	0.495 - 0.535	13	5/8"	4	4		21	
	12 - 13	13.5 - 14.5	0.535 - 0.570	14						
	14 - 15	14.5 - 15.5	0.570 - 0.610	15						
	16 - 17	15.5 - 16.5	0.610 - 0.650	16						
	18. 20	16.5 - 17.5	0.650 - 0.690	17						
	21 - 24	17.5 - 18.5	0.690 - 0.730	18						
7/8"	14	17.5 - 18.5	0.690 - 0.730	18S	5/8"	4/A	4/A		25	
	16 - 17	18.5 - 19.5	0.730 - 0.770	19S						
	18 - 19	19.5 - 20.5	0.770 - 0.810	20S						
1"	10 - 11	18.5 - 19.5	0.730 - 0.770	19	3/4"	5	5	5	28	28
	12	19.5 - 20.5	0.770 - 0.810	20						
	13 - 14	20.5 - 21.5	0.810 - 0.845	21						
	15 - 16	21.5 - 22.5	0.845 - 0.885	22						
	18	22.5 - 23.5	0.885 - 0.925	23						
	19 - 20	23.5 - 24.5	0.925 - 0.965	24						
3/4" Gas	13	21.5 - 22.5	0.845 - 0.885	22G			6	6	31	31
	14 - 15	22.5 - 23.5	0.885 - 0.925	23G						
	16 - 17	23.5 - 24.5	0.925 - 0.965	24G						
	19 - 21	24.5 - 25.5	0.996 - 1.005	25G						
1.1/4"	10	24.5 - 25.5	0.996 - 1.005	25	1"		7	7	34	
	11 - 12	25.5 - 26.5	1.005 - 1.045	26						
	13	26.5 - 27.5	1.045 - 1.085	27						
	14 - 15	27.5 - 28.5	1.085 - 1.125	28						
	16 - 18	28.5 - 29.5	1.125 - 1.165	29						
	19 - 22	29.5 - 30.5	1.165 - 1.200	30						
	23 - 24	30.5 - 31.5	1.200 - 1.240	31						
1.1/2"	10 - 11	31.5 - 32.5	1.240 - 1.280	32	1"	9	9	9	41	
	12 - 13	32.5 - 33.5	1.280 - 1.320	33						
	14	33.5 - 34.5	1.320 - 1.360	34						



JAW - TPJ



COLLAR - TPC

TUBE		MANDREL				JAW			COLLAR	
DIA	BWG	mm	inch	TPM	SQ ∇	TPJ 15	TPJ 30	TPJ 45	TPC 15/30	TPC 45
	15 - 17	34.5 - 35.5	1.360 - 1.400	35						
	18 - 20	35.5 - 36.5	1.400 - 1.440	36						
	21 - 24	36.5 - 37.5	1.440 - 1.475	37						
1.1/4" Gas	12	36.5 - 37.5	1.440 - 1.475	37G	10	10		44		44
	13 - 14	37.5 - 38.5	1.475 - 1.515	38G						
	15 - 16	38.5 - 39.5	1.515 - 1.555	39G						
	17 - 19	39.5 - 40.5	1.555 - 1.595	40G						
	20 - 24	40.5 - 41.5	1.595 - 1.635	41G						
1.3/4"	10 - 11	37.5 - 38.5	1.475 - 1.515	38/44	1"			11		48
	12	38.5 - 39.5	1.515 - 1.555	39/44						
	13 - 14	39.5 - 40.5	1.555 - 1.595	40/44						
	15 - 16	40.5 - 41.5	1.595 - 1.635	41/44						
	18 - 19	41.5 - 42.5	1.635 - 1.675	42/44						
1.1/2" Gas	10 - 11	37.5 - 38.5	1.475 - 1.515	38/44						
	12	38.5 - 39.5	1.515 - 1.555	39/44						
	13 - 14	39.5 - 40.5	1.555 - 1.595	40/44						
	15 - 16	40.5 - 41.5	1.595 - 1.635	41/44						
2"	11 - 12	42.5 - 43.5	1.675 - 1.715	43G	1"			13		54
	13 - 14	43.5 - 44.5	1.830 - 1.870	44G						
	15 - 17	44.5 - 45.5	1.870 - 1.910	45G						
	18 - 19	45.5 - 46.5	1.910 - 1.950	46G						
	10	43.5 - 44.5	1.830 - 1.870	44/51						
2.1/4"	10 - 12	44.5 - 45.5	1.870 - 1.910	45/51	1.1/2"			14		60
	11	50.5 - 51.5	1.990 - 2.030	51/57						
	12 - 13	51.5 - 52.5	2.030 - 2.070	52/57						
2" Gas	7	50.5 - 51.5	1.990 - 2.030	51G	1.1/2"			15		63
	8	51.5 - 52.5	2.030 - 2.070	52G						
	9	52.5 - 53.5	2.070 - 2.106	53G						
2.1/2"	7	53.5 - 54.5	2.106 - 2.145	54/63	1.1/2"			16		66
	8	54.5 - 55.5	2.145 - 2.185	55/63						
	9	55.5 - 56.5	2.185 - 2.225	56/63						
	10	56.5 - 57.5	2.225 - 2.265	57/63						
3"	7	66.5 - 67.5	2.580 - 2.620	67/76	1.1/2"			17		66
	8	67.5 - 68.5	2.620 - 2.660	68/76						
	9 - 10	68.5 - 69.5	2.660 - 2.695	69/76						
	11	69.5 - 70.5	2.695 - 2.735	70/76						

Master Tugger Hydraulic Tube Puller STPP 300 (Electric) Pump



Specifications

Model	Volts / Phase	Power hp	Oil Tank Capacity ltrs.	Net Wt. kgs.	Dimension mm	Hyd.Hoses Size x Length inch x mtrs.
TSTPP - 300	230 / 1	3	10	68	510 x 370 x 680	1/4" x 5 Twin Jack Hose
TSPPP - 300 (Pneumatic)	-	-	10	65	510 x 370 x 680	1/4" x 5 Twin Jack Hose

Note: Max. Working Pressure 700 Bar
ALL Powerpacks supplied with 5 mtr. long hydraulic hoses.

Hydraulic Tube Pulling Guns



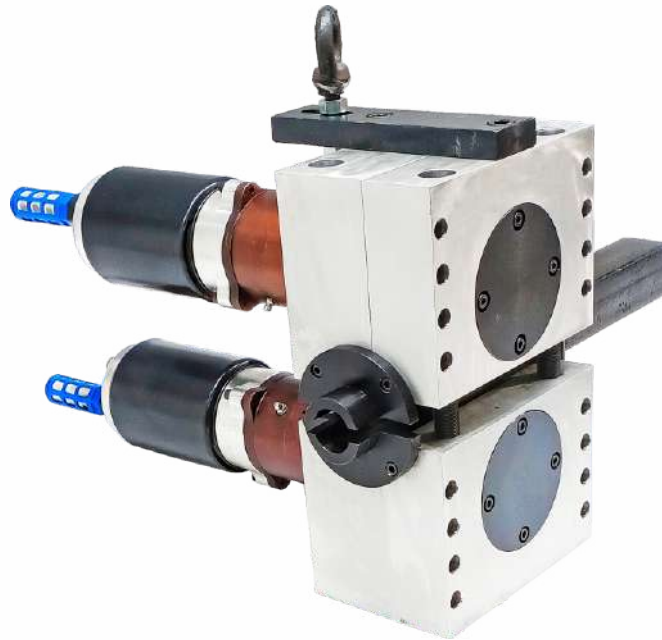
Specifications

Gun Model	Pulling Capacity tons	Max. Tube O.D. Thru Gun inch	Stub Pulling Capacity inch	Weight		Free Pulling Speed (meter/min) with TTPP - 300
				kgs.	lbs.	
TSHPG - 15	15	1	1.1/2	18	40	3.3
TSHPG - 30	30	1.1/2	3	25	55	2
TSHPG - 45	45	3	4	51	112	1.3

Tube Spinner

Pneumatic Tube Spinner

Pneumatic tube spinner is designed to remove and flatten nonferrous tubes from 5/8" to 1 1/4" OD. Can also be used to extract ferrous tubes from 5/8" to 1 1/2" OD using special shaped rolls sized to fit each tube.



Features

- Pulling rolls are made from tool steel and hardened for extended life.
- High quality, strength construction body is made from aircraft grade aluminum.
- Fully sealed bearings guarantee thousands of hours trouble free operation!

Specification:

- Pulling Speed : up to 30m per minute
- Standard Configuration : 1" nonferrous tubes
- Air Consumption : 2 x 2800 l/min - 2 x 95 cfm
- Air Pressure : 6.2 bar - 90 psi
- Motor Power : 2 x 3.5 Hp
- Weight : 50 kg
- Size : 140 x 200 x 350 mm

Tube Removal Tubes

Tube Wall Reducer



Features:

- This tool is used to reduce the wall thickness of heavy gauge tube
- This tool is suited for 5" tube sheet

Tube O.D. inch	Model Number	MT Shank #
3/8	TWR-375	1
1/2	TWR-500	2
5/8	TWR-625	2
3/4	TWR-750	2
7/8	TWR-875	2
1	TWR-1000	3
1.1/4	TWR-1250	3
1.1/2	TWR-1500	3
1.3/4	TWR-1750	3
2	TWR-2000	3
2.1/2	TWR-2500	4
2.3/4	TWR-2750	4
3	TWR-3000	4
3.1/4	TWR-3250	4
3.1/2	TWR-3500	4
4	TWR-4000	4

While Ordering specify the gauge with O.D. of tube.

Long reach also available as per the requirement.

Tube Drift & Knockout Tool



Features:

- This tool is used with chipping hammer to knockout the tube stubs & tubes from the tube sheet
- Available in 01, 06 & 15 Shank

Tube O.D. inch	Model Number
3/8	TKT-375
1/2	TKT-500
5/8	TKT-625
3/4	TKT-750
7/8	TKT-875
1	TKT-1000
1.1/4	TKT-1250
1.1/2	TKT-1500
1.3/4	TKT-1750
2	TKT-2000
2.1/2	TKT-2500
2.3/4	TKT-2750
3	TKT-3000
3.1/4	TKT-3250
3.1/2	TKT-3500
4	TKT-4000

While Ordering specify the gauge with O.D. of tube & Shank required.

Standard Reach is 6" Long reach also available on request.

Collapsing Tool



Features:

- This tool is used with chipping hammer to collapsed the tube stubs tubes & drive out from the tube sheet
- Available in 01, 06 Shank

Tube O.D. inch	Model Number
3/8	TCT-375
1/2	TCT-500
5/8	TCT-625
3/4	TCT-750
7/8	TCT-875
1	TCT-1000
1.1/4	TCT-1250
1.1/2	TCT-1500
1.3/4	TCT-1750
2	TCT-2000
2.1/2	TCT-2500

While Ordering specify the shank with O.D. of tube

Standard Reach is 6" Long reach also available on request

Chipping Hammer with safety retainer for use with Tube Drifts / Collapsing Tools



MODEL TCH-1 - Specification

Blows/min	Bore	Stroke	Weight
1600	1.1/8" (28.5mm)	3.1/4" (82.5mm)	16lbs (7.0kg)

Push Type Internal Tube Cutter - TATP Series



- Push type Internal Tube Cutter cuts Ferrous or Non-Ferrous tubes of the Condensers, Heat-Exchangers
- This internal tube cutter can be operated with a Electrical or Pneumatic drill machine

To operate this tool:

- 01) Insert the tool in the tube which is to be cut.
- 02) Adjust the thrust collar as per the cutting length required then gradually press the Electric or Pneumatic drive which is attached to the tool.
- 03) The cutting bit cuts the tube within few seconds

Tube O.D.	Tube Gauge (BWG)	Tube Cutter Model No. (Std. Reach)	Spare Cutting Bit Model No.
5/8"	14 - 22	TATP-625	TATP-625-SB
3/4"	14 - 22	TATP-750	TATP-750-SB
7/8"	14 - 22	TATP-875	TATP-875-SB
1"	12 - 22	TATP-1000	TATP-1000-SB
1.1/4"	12 - 22	TATP-1250	TATP-1250-SB
1.1/2"	12 - 22	TATP-1500	TATP-1500-SB

- Standard adjustment reach is 4". The tools are available in the increments of 2" upto 10"
- Every tool comes with the complete set of Pilots to cover the entire range of tube thickness for that particular tube O.D.
- The cutting bit can be replaced easily

Internal Tube Cutter - TB68 Series

- TB-68 Tube Cutters are ideal for cutting thick walled boiler tubes of 2" O.D. and higher
- The Internal Tube Cutter TB-68 is driven using the square in a clockwise direction using either an electric, pneumatic or hydraulic driving machine
- TB-68 type tube cutters are available in standard reach of 4" (100 mm). Additional reaches in increments of 4" are available up to 16" (400 mm)



Size	Tool Model Number	Spare Bit Model Number	Tube I.D. Range		Max. Tube O.D.		Body Diameter		Drive Square Male
			mm	inch	mm	inch	mm	inch	
095	0680951	1680951	10 - 12	.394 - .472	15	.591	9.5	374	1/2"
105	0681051		11 - 13	.433 - .512	18	.709	10.5	413	
115	0681151	1681151	12 - 14	.472 - .551	19	.748	11.5	453	
125	0681251	1681251	13 - 15	.519 - .591	20	.787	12.5	492	
135	0681351		14 - 17	.551 - .669	23	.906	13.5	531	
155	0681551		16 - 19	.630 - .748	25	.984	15.5	610	
175	0681751	1681751	18 - 21	.709 - .827	27	1.063	17.5	689	
195	0681951	1681951	20 - 25	.787 - .984	34	1.339	19.5	768	
245	0682451	1682451	25 - 30	.984 - 1.181	38	1.496	24.5	965	
290	0682901	1682901	30 - 35	1.181 - 1.378	43	1.693	29	1.142	
330	0683301		35 - 40	1.378 - 1.575	48	1.890	33	1.299	
380	0683801		40 - 50	1.575 - 1.969	58	2.126	38	1.496	
480	0684801	1684801	50 - 60	1.969 - 2.362	68	2.677	48	1.890	3/4"
530	0685301		55 - 65	2.165 - 2.559	73	2.874	53	2.087	
630	0686301		65 - 75	2.559 - 2.953	83	3.268	63	2.480	
730	0687301	1687301	75 - 85	2.953 - 3.346	93	3.661	73	2.874	
830	0688301		85 - 95	3.346 - 3.740	103	4.055	83	3.268	
930	0689301		95 - 105	3.740 - 4.134	113	4.449	93	3.661	

Note: Refer to operation manual for detailed features and parts list.

One Turn Cutter

- The tool cuts the Non-Ferrous & Thin Walled Ferrous Tube in one turn alone
- This is a hand operated tool which is used with a ratchet handle
- The cutting bit of this tool is eccentrically positioned due to which while entering in the tube, the tool bit remains in a closed position but as the tool rotates in clockwise direction using a ratchet handle, it comes out & contacts with the I.D. of the tube. As rotating is continued It pierces the tube wall & shears the tube along the circumference
- This tool is fitted with an adjustable collar to achieve the required cutting length.

Tools Bit



Tube O.D.		Gauge	Tube I.D. Range (mm)	Tool Model No.	Spare Tool Bit Model No.
Inch	mm				
5/8"	15.87	14	11.40 - 11.90	TOTC - 625 - 14	TOTC - 625 - TB
		15 - 16	12.00 - 12.90	TOTC - 625 - 16	
		17 - 18	12.70 - 13.50	TOTC - 625 - 18	
		19 - 20	13.50 - 14.21	TOTC - 625 - 20	
		22	14.00 - 14.70	TOTC - 625 - 22	
3/4"	19.05	14 - 15	14.70 - 15.50	TOTC - 750 - 14	TOTC - 750 - TB
		16	15.20 - 16.00	TOTC - 750 - 16	
		17 - 18	15.90 - 16.50	TOTC - 750 - 18	
		19 - 20	16.70 - 17.50	TOTC - 750 - 20	
7/8"	22.22	14 - 15	17.80 - 18.50	TOTC - 875 - 14	TOTC - 875 - TB
		16 - 17	18.80 - 19.50	TOTC - 875 - 16	
		18	19.30 - 20.00	TOTC - 875 - 18	
		19 - 20	19.80 - 20.60	TOTC - 875 - 20	
1"	25.4	14	20.80 - 21.60	TOTC - 1000 - 14	TOTC - 1000 - TB
		15	21.30 - 22.10	TOTC - 1000 - 15	
		16 - 17	22.10 - 22.60	TOTC - 1000 - 16	
		18 - 20	22.60 - 23.90	TOTC - 1000 - 18	
		22	23.90 - 24.60	TOTC - 1000 - 20	
1.1/4"	31.75	12	25.90 - 26.70	TOTC - 1250 - 12	TOTC - 1250 - TB
		13 - 14	26.70 - 27.40	TOTC - 1250 - 14	
		15 - 16	27.90 - 28.70	TOTC - 1250 - 16	
		17 - 19	28.70 - 29.60	TOTC - 1250 - 18	
1.1/2"	38.10	12 - 13	32.5 - 33.30	TOTC - 1500 - 12	TOTC - 1500 - TB
		14 - 15	33.80 - 34.50	TOTC - 1250 - 14	
		16 - 17	34.50 - 35.30	TOTC - 1250 - 16	
		18 - 19	35.30 - 36.10	TOTC - 1250 - 18	
2"	50.80	12 - 13	45.00 - 46.00	TOTC - 2000 - 12	TOTC - 2000 - TB
		14 - 15	46.20 - 47.20	TOTC - 2000 - 14	
		16 - 17	47.20 - 48.20	TOTC - 2000 - 16	
		18 - 19	48.00 - 49.00	TOTC - 2000 - 18	
2.1/2"	63.50	12 - 13	57.60 - 58.60	TOTC - 2500 - 12	TOTC - 2500 - TB
		14 - 15	58.90 - 60.00	TOTC - 2500 - 14	
		16 - 17	60.00 - 61.00	TOTC - 2500 - 16	
		18 - 19	60.70 - 61.70	TOTC - 2500 - 18	

Standard adjustment reach is 6". The tools are available in the increments of 2" upto 12".

Manual Tube Puller

- No power required: Manual Insertion of tool & easy removal of tube with a hand wrench
- Easy to use: Hex at the Spear allows tightening without dismantling the tool



Tube Size							Tube Puller Model Number	Spare Spear Model Number
O.D.		BWG	Wall Thickness		I.D.			
mm	inch		mm	inch	mm	inch		
6.35	1/4	18	1.24	.049	0.38	.152	TMTP-25-18	TMPS-25-18
9.52	3/8	16	1.65	.065	6.22	.245	TMTP-38-16	TMPS-38-16
9.52	3/8	18	1.24	.049	7.04	.277	TMTP-38-18	TMPS-38-18
9.52	3/8	20	0.88	.035	7.75	.305	TMTP-38-20	TMPS-38-20
12.70	1/2	14	2.11	.083	8.48	.334	TMTP-50-14	TMPS-50-14
12.70	1/2	16	1.65	.065	9.40	.370	TMTP-50-16	TMPS-50-16
12.70	1/2	18	1.24	.049	10.21	.402	TMTP-50-18	TMPS-50-18
12.70	1/2	20	0.88	.035	10.92	.430	TMTP-50-20	TMPS-50-20
15.88	5/8	14	2.10	.083	11.66	.459	TMTP-63-14	TMPS-63-14
15.88	5/8	16	1.65	.065	12.57	.495	TMTP-63-16	TMPS-63-16
15.88	5/8	18	1.24	.049	13.39	.527	TMTP-63-18	TMPS-63-18
15.88	5/8	20	0.88	.035	14.10	.555	TMTP-63-20	TMPS-63-20
19.05	3/4	14	2.10	.083	14.86	.585	TMTP-75-14	TMPS-75-14
19.05	3/4	16	1.65	.065	15.75	.620	TMTP-75-16	TMPS-75-16
19.05	3/4	18	1.24	.049	16.56	.652	TMTP-75-18	TMPS-75-18
19.05	3/4	20	0.88	.035	17.27	.680	TMTP-75-20	TMPS-75-20
22.22	7/8	14	2.10	.083	18.01	.709	TMTP-87-14	TMPS-87-14
22.22	7/8	16	1.65	.065	18.92	.745	TMTP-87-16	TMPS-87-16
22.22	7/8	18	1.24	.049	19.74	.777	TMTP-87-18	TMPS-87-18
22.22	7/8	20	0.88	.035	20.45	.805	TMTP-87-20	TMPS-87-20
25.40	1	14	2.10	.083	21.18	.834	TMTP-100-14	TMPS-100-14
25.40	1	16	1.65	.065	22.10	.870	TMTP-100-16	TMPS-100-16
25.40	1	18	1.24	.049	22.91	.902	TMTP-100-18	TMPS-100-18
25.40	1	20	0.88	.035	23.62	.930	TMTP-100-20	TMPS-100-20

Note: For larger / other sizes, please enquiry.

Tube Plugs



One Piece



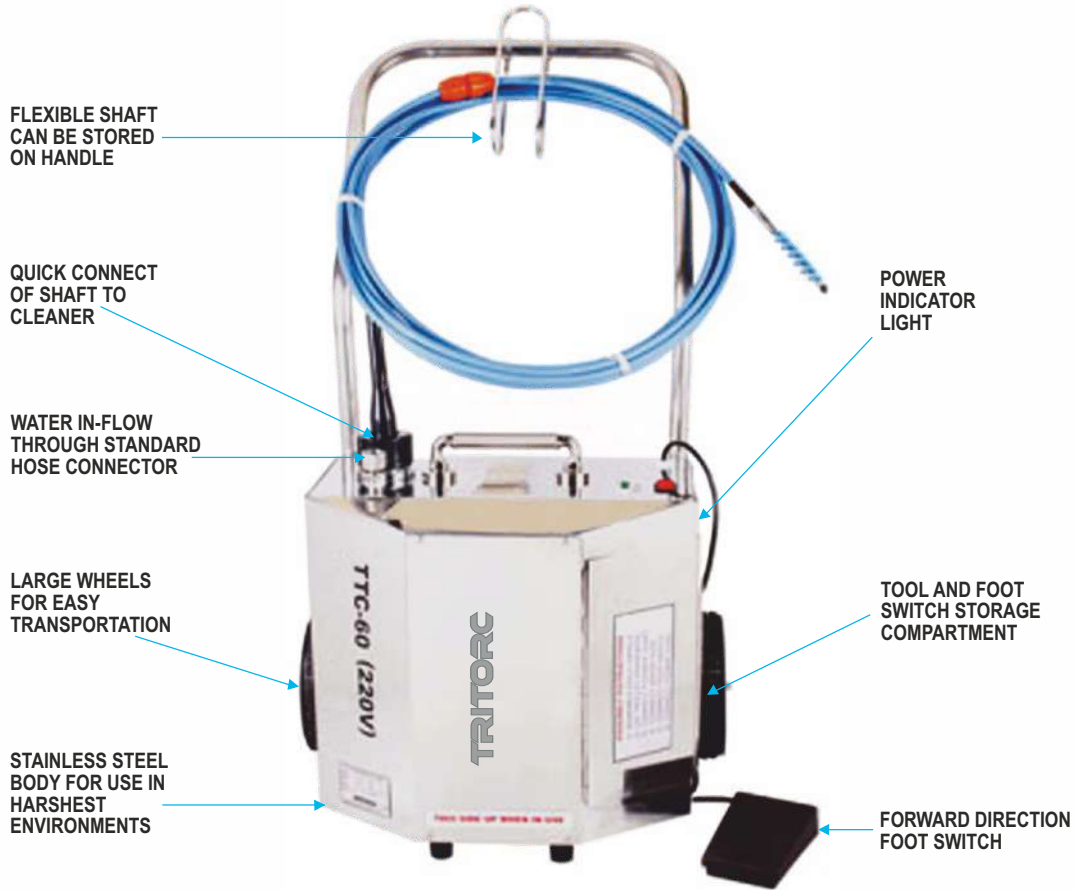
Two Piece

- Tube plugs are designed for sealing off leaky or damaged tubes in heat exchangers, condensers, broilers etc. It ensures a uniform joint without damaging the tube sheet.

Tube O.D.		One Piece Tube Plug Model No.	Two Piece Tube Plug Model No.
mm	inch		
9.53	3/8	TLG-375-1	-
12.70	1/2	TLG-500-1	TLG-500-2
15.87	5/8	TLG-625-1	TLG-625-2
19.05	3/4	TLG-750-1	TLG-750-2
22.22	7/8	TLG-875-1	TLG-875-2
25.40	1	TLG-1000-1	TLG-1000-2
31.75	1.1/4	TLG-1250-1	TLG-1250-2
38.10	1.1/2	TLG-1500-1	TLG-1500-2

Note: Tube plugs are available in a variety of materials like carbon steel, brass, stainless steel, fibre etc. Specify material needed when ordering.

Electric Tube Cleaners



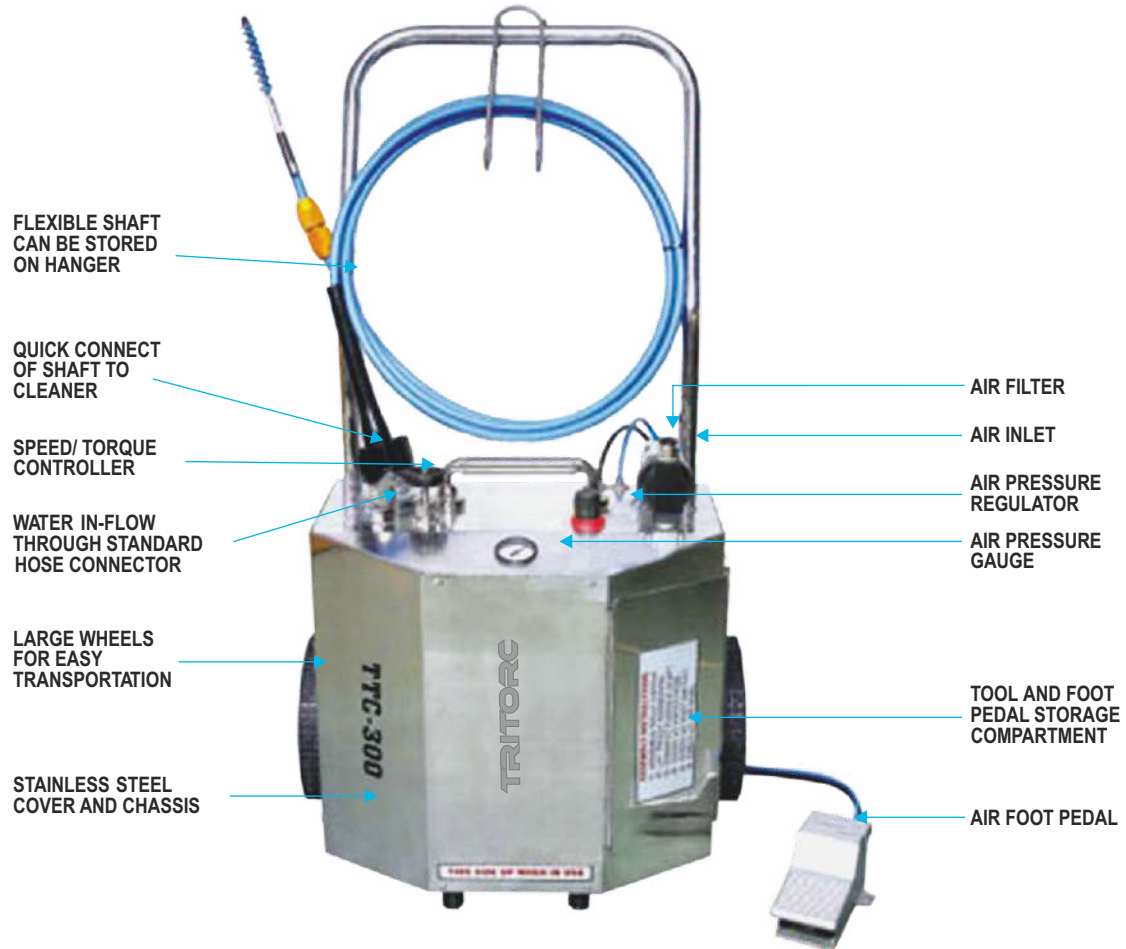
- Water flows through the shaft and helps flush out deposits from the tube
- Forward direction foot switch enables operator to concentrate on cleaning operation without worrying about the cleaner unit. Water consumption can be regulated as needed
- Flexible shaft can be easily disconnected.
- Stainless steel body offers corrosion resistant
- Easy interchangeability of various shafts and accessories for maximum versatility
- Large wheels for easy transportation

Electric Tube Cleaners are environment friendly, compact and easily maneuverable units used to clean straight and curved tubes in heat exchangers, condensers, boilers and other tubular apparatus. They work by attaching a cleaning tool (to be determined on type of deposit to be cleaned) to a flexible shaft. The Electric Tube Cleaner provides rotary motion to the flexible shaft which rotates the cleaning tool inside the tube. If needed water passes through the flexible shaft to aid in flushing out of the deposits. All Electric Tube Cleaners are supplied with forward direction foot switch. Dual direction foot switches are available or request.

Tube I.D.		Tube Cleaner Model No.	Motor Power		Motor Speed RPM	Weight		Dimension		
mm	inch		HP	kW		lbs.	Kg.	High	Wide	Deep
6.4-25.4	1/4-1	TTC-40	1/2	0.40	890	62	28	38" (975mm)	21" (535mm)	18" (457mm)
6.4-25.4	1/4-1	TTC-60	3/4	0.60	890	66	30	38" (975mm)	21" (535mm)	18" (457mm)
25.4 & UP	1 & UP	TTC-75	1	0.75	1780	70	32	38" (975mm)	21" (535mm)	18" (457mm)
25.4 & UP	1 & UP	TTC-150	2	1.50	1780	84	38	40" (1015mm)	22" (560mm)	19" (482mm)

All units available in your choice of: 110V 60Hz, 110V 50Hz - 9 Amps., 220V 60Hz, 220V 50Hz - 4.5 Amps.
Please Specify when ordering.

Pneumatic Tube Cleaners



- Shock Resistant - Excellent for applications where using electric equipment is hazardous
- Corrosion Resistant - Stainless steel cover and chassis for long life
- Versatile - Interchangeability of different size flexible shafts and cleaning tools
- Speed/Torque control - Shaft rotation can be set at optimum speed for each application
- No tooling required for quick disconnect of flexible shaft
- Large Wheels allow easy Maneuverability
- Time Saving - Simultaneous water flush to remove deposits from tubes
- Cleanliness - Foot pedal for operator convenience to activate shaft rotation and water flow to reduced water consumption and cleaner working area

Tritorc Model TATC-300 Extra Heavy Duty Pneumatic Tube Cleaning Machine includes air filter, regulator, lubricator, adjustable speed/torque control, mobile dolly, tool storage box and air foot pedal. The TATC-300 uses a cleaning tool mounted to the tip of a flexible shaft, which is available in different lengths and diameters to fit the size of the tube to be cleaned. For wet applications as the shaft rotates inside its watertight nylon casing, the unit feeds water through the casing to the cleaning tool. A foot pedal controls shaft rotation and water flow. While the operator feeds the rotating shaft assembly through the tube, the water flushes out deposits as they are loosened.

Tube I.D.		Tube Cleaner Model No.	Motor Power		Motor Speed RPM	Weight		Dimension		
mm	inch		HP	kW		lbs.	Kg.	High	Wide	Deep
6.4 & UP	1/4 & UP	TATC-300	4	3.00	300-3000	64	29	38" (975mm)	22" (560mm)	16" (406mm)

Electric Tube Cleaners Systems

MODEL TTCS-40 Chiller Tube Cleaning System

MODEL TTCS-40 Chiller Tube Cleaning System is the most common package used for cleaning 5/8" I.D. tubes of Trane, Blue Star, Thermax, Carrier, York, and other units.

CONTENTS

- TTC - 40 Tube Cleaner - 1 no.
- TFS - 500-79 Flexible Shafts - 2 nos.
- Nylon Brushes (specify size) - 25 nos.
- TTBT-1, 2, 3 or 4 Buffing tools (specify size) - 2 nos.
- Replacement blades for Buffing Tools - 8 nos.
- Repair kit for flexible shaft TFS-500 consisting of 4 drive end couplings, 4 tool end couplings, 1 shaft tool with hammer, 1 flexible shaft lubricator and 2 bottles of lubricant



TTC-40 - Tube Cleaner



Flexible Shaft



Nylon Brush



Buffing Tool



Replacement Blades



Shaft Repair Tool



Repair Kit

MODEL TTCS-60 Chiller Tube Cleaning System

MODEL TTCS-60 Chiller Tube Cleaning System is similar to the TTCS-40 Tube Cleaning System, but uses a more powerful 3/4 HP motor for tougher deposits. A dual direction foot switch is provided for cleaning internally grooved tubes.

CONTENTS

- TTC - 60 Tube Cleaner - 1 no.
- TFS - 500-140 Flexible Shafts - 2 nos.
- Nylon Brushes (specify size) - 25 nos.
- Repair kit for flexible shaft TFS-500 consisting of 4 drive end couplings, 4 tool end couplings, 1 shaft repair tool with hammer, 1 flexible shaft lubricator and 2 bottles of lubricant.



TTC-60 - Tube Cleaner



Flexible Shaft



Nylon Brush

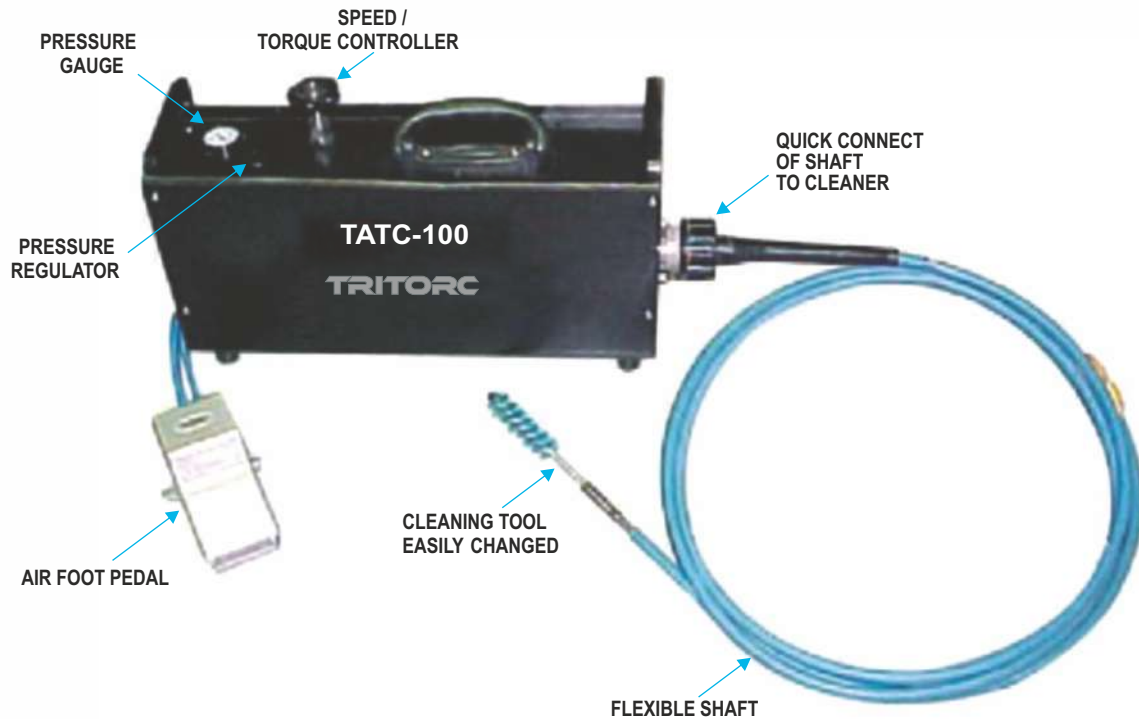


Shaft Repair Tool



Repair Kit

Portable Pneumatic Tube Cleaners



- Shock Resistant - Excellent for applications where use of electric equipment is hazardous
- Versatile - Interchangeability of different size flexible shafts and cleaning tools
- Speed/Torque control - Shaft rotation speed can be set at optimum for each application
- No Tooling - Quick disconnection of flexible shaft
- Time Saving - Simultaneous water flush to remove deposits from tubes
- Cleanliness - Foot switch for operator's convenience to activate both shaft rotation and water flow to reduce water consumption and making working area clean
- Compact - Light weight easy to operate inside drum

Model-TATC-100 Portable Pneumatic Tube Cleaning Machine includes FRL unit, adjustable speed/torque control, and air foot pedal. The TATC-100 uses a cleaning tool mounted on the tip of a flexible shaft, which is available in different lengths and diameters to fit the size of the tube to be cleaned. For wet applications, as the shaft rotates inside its watertight nylon casing, the unit feeds water through the casing to the cleaning tool.

A foot switch controls shaft rotation and water flow. While the operator feeds the rotating shaft assembly through the tube, the waterflow softens the deposits before cleaning and flushes them out during cleaning.

Tube I.D.		Tube Cleaner Model No.	Motor Power		Motor Speed RPM	Air Supply		Weight		Dimension		
mm	inch		HP	kW		Min	Max	lbs.	Kg.	High	Wide	Deep
6.4 & UP	1/4 & UP	TATC-100	1.7	1.1	300-3000	60psi@15cfm	100psi@70cfm	26	12	10.3/8" (655mm)	6" (152mm)	19" (483mm)

'Porta' Portable Electric Tube Cleaners

Features:

- Compact and portable for use in multiple locations
- Easy connect and disconnect of various shafts and cleaning tools
- Foot Switch enables operator to concentrate on cleaning operation
- Water moving through shaft flushes out deposits already dislodged by cleaning tools



The 'PORTA' is built for users to whom a small size and easy transportation mean that they can clean more tubes faster. It is used to clean 1/4" - 1" I.D. tubes in chillers, condensers, evaporators and heat exchangers. The flexible shaft rotates at 1760 rpm as water feeds through the nylon casing to the cleaning tool. As the tool removes the deposits, the water flow flushes them out. A solenoid valve ensures that water flows only when the machine is running. Water consumption can be regulated as needed.

Tube I.D.		Tube Cleaner Model No.	Motor Power		Motor Speed RPM	Weight		Dimension		
mm	inch		HP	kW		lbs.	Kg.	High	Wide	Deep
6.4 - 25.4	1/4-1	PORTA	1/2	0.40	1760	36	16	10" (254mm)	11" (279mm)	18" (457mm)

All units available in your choice of: 110V 60Hz, 110V 50Hz - 9 Amps., 220V 60Hz, 220V 50Hz - 4.5 Amps.
Please Specify when ordering.

'TTCS-Porta' Portable Electric Tube Cleaners System

MODEL TTCS-PORTA

Chiller Tube Cleaning System

MODEL TTCS-PORTA Chiller Tube Cleaning System is the most common system for cleaning chillers for users to whom size and portability is paramount.

CONTENTS

- 'PORTA' Portable Tube Cleaner - 1 no.
- TTFS - 500-140 Flexible Shafts - 2 nos.
- Nylon Brush (specify size) - 25 nos.
- Repair kit for flexible shaft TTFS-500 consisting of 4 drive end couplings, 4 tool end couplings, 1 shaft repair tool with hammer, 1 flexible shaft lubricator and 2 bottles of lubricant.

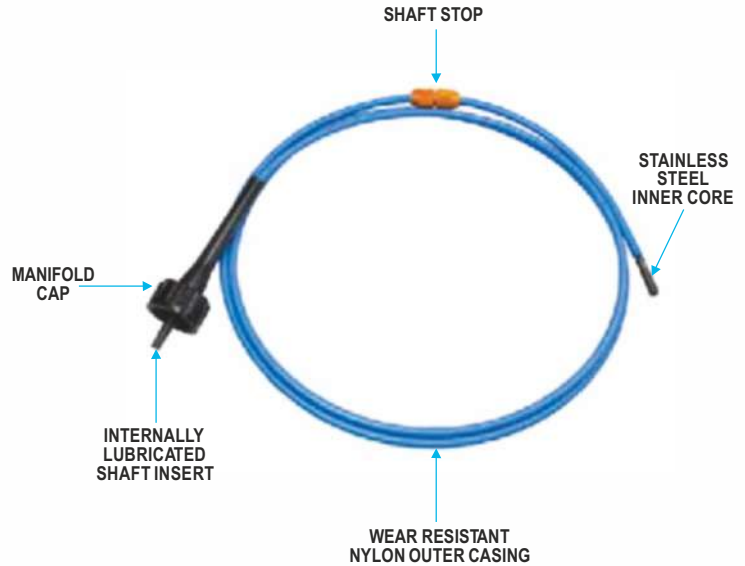


Flexible Shafts

For TTC-40, TTC-60

Flexible Shafts with Stainless Steel Inner Core

Shafts have color coded shaft stops for easy identification. Stainless Steel inner cores ensure our shafts have longest life, flexibility and resistance to corrosion. Since the inner core of the Shafts are the heart of the system and take most of the train, stainless steel inner cores cause our shafts to last longer than the competition.



Tube I.D. Range		Flexible Shaft Model No.	Flexible Shaft Length		Shaft Core O.D.		Shaft Casing O.D.		Tool End Thread
mm	inch		feet	mtrs	mm	inch	mm	inch	
6.4-9.5	1/4-3/8	TFS-250-40	13	4.0	3.2	1/8	6.4	1/4	8 - 32 F
		TFS-250-79	26	7.9					
11.1-12.7	7/16-1/2	TFS-375-40	13	4.0	6.4	1/4	9.5	3/4	1/4 - 28 F
		TFS-375-55	18	5.5					
		TFS-375-79	26	7.9					
		TFS-375-110	36	11.0					
		TFS-375-140	46	14.0					
14.3-25.4	9/16-1	TFS-500-40	13	4.0	7.9	5/16	12.7	1/2	1/4 - 28 F
		TFS-500-55	18	5.5					
		TFS-500-79	26	7.9					
		TFS-500-110	36	11.0					
		TFS-500-140	46	14.0					
		TFS-500-184	61	18.4					
TFS-500-232	76	23.2							

Flexible Shafts for Internally Grooved Tubes

Tube I.D. Range		Flexible Shaft Model No.	Flexible Shaft Length		Shaft Core O.D.		Shaft Casing O.D.		Tool End Thread
mm	inch		feet	mtrs	mm	inch	mm	inch	
17.5-25.4	1 1/16-1	TFS-560-40	13	4.0	9.5	3/8	14.3	9/16	1/4 - 28
		TFS-560-55	18	5.5					
		TFS-560-79	26	7.9					
		TFS-560-110	36	11.0					
		TFS-560-140	46	14.0					
		TFS-560-186	61	18.6					
		TFS-560-232	75	23.2					

When ordering flexible shafts and accessories, each item should be ordered for specific tube/pipe size or size range.

To order Flexible Shaft(s), determine tube I.D.(s) and length of the longest tube(s). Order Flexible Shaft(s) to correspond with tube I.D.(s) and lengths. Please ask us for special or longer lengths.

Brushes

Nylon Brushes Used for removing soft scales in ferrous (carbon steel, stainless steel) and non-ferrous tubes (Copper, Brass, Plastic, etc.) and for final 'finishing' of tubes.



Nylon Brush

STAINLESS STEEL BRUSHES Used for removing soft and light scale deposits in ferrous tubes (carbon steel, stainless steel, etc.).



Stainless Steel Brush

BRASS BRUSHES Used for removing soft and light scale deposits in straight, non-ferrous tubes. (Copper, brass, nickel and their alloyed tubes).



Brass Brush

Brush O.D.		Nylon Brush	Stainless Steel	Brass Brush	Threading	Coupling
mm	inch					
6.4	1/4	TN - 250	SS - 250	TB - 250	8 - 32F	P-1 (8 - 32M x 8 - 32M)
7.9	5/16	TN - 312	SS - 312	TB - 312	8 - 32F	P-1 (8 - 32M x 8 - 32M)
9.5	3/8	TN - 375	SS - 375	TB - 375	12 - 24F	P-2 (8 - 32M x 12 - 24M)
11.1	7/16	TN - 437	SS - 437	TB - 437	1/4 - 28M	-
12.7	1/2	TN - 500	SS - 500	TB - 500	1/4 - 28M	-
14.3	9/16	TN - 562	SS - 562	TB - 562	1/4 - 28M	-
15.9	5/8	TN - 625	SS - 625	TB - 625	1/4 - 28M	-
17.5	11/16	TN - 687	SS - 687	TB - 687	1/4 - 28M	-
19.1	3/4	TN - 750	SS - 750	TB - 750	1/4 - 28M	-
20.6	13/16	TN - 812	SS - 812	TB - 812	1/4 - 28M	-
22.2	7/8	TN - 875	SS - 875	TB - 875	1/4 - 28M	-
23.8	15/16	TN - 937	SS - 937	TB - 937	1/4 - 28M	-
25.4	1	TN - 1000	SS - 1000	TB - 1000	1/4 - 28M	-

Brushes should be ordered so that brush O.D. is marginally less than tube I.D., for it to easily enter tube with deposit.

Drill Tip Double Diameter Brushes

These brushes are used to clean internally grooved tubes. The drill tip of brushes cleans through hard scale before the brush cleaning action takes over. The large diameter of this brush cleans into the grooves of the tubes and the small diameter into the lands of the tube's rifling.

Tube I.D.		Drill Tip Nylon Brush	Drill Tip Brass Brush
mm	inch		
15.9	5/8	TDTBN-625	TDTBB-625



Drill Tip Double Diameter Nylon Brush



Drill Tip Double Diameter Brass Brush

Color Coded Shoot Thru Scrubbers



Features:

- Scrubbers are shot through the tubes with a gun using compressed air and water
- Scraping disks will not damage inside of tubes
- Scrubbers float for easy retrieval and are reusable

In most cases Hard Tube Scrubbers are recommended for removing light to medium deposits in condensers. They work by being 'Shot Thru' the tubes with a high pressure air gun.

Tube I.D.		Scrubber O.D. (inch)	Model	Color	Type
mm	inch				
12.57-13.74	0.495-0.541	0.560	TSC-560-S	Gold	Soft
13.39-14.10	0.527-0.555	0.560	TSC-560	Gold	Hard
14.50-15.75	0.570-0.620	0.630	TSC-630-S	Brown	Soft
15.00-16.00	0.590-0.630	0.630	TSC-630	Brown	Hard
15.75-17.15	0.620-0.675	0.695	TSC-695-S	Orange	Soft
16.56-17.63	0.652-0.694	0.695	TSC-695	Orange	Hard
16.76-18.54	0.660-0.730	0.750	TSC-750-S	Violet	Soft
18.03-19.05	0.710-0.750	0.750	TSC-750	Violet	Hard
18.54-20.32	0.730-0.800	0.825	TSC-825-S	White	Soft
19.74-20.80	0.777-0.819	0.825	TSC-825	White	Hard
19.81-21.60	0.780-0.850	0.870	TSC-870-S	Lime	Soft
20.96-22.10	0.825-0.870	0.870	TSC-870	Lime	Hard
22.10-24.00	0.870-0.944	0.960	TSC-960-S	Blue	Soft
22.50-24.13	0.886-0.950	0.960	TSC-960-M	Blue	Medium
22.91-24.28	0.902-0.956	0.960	TSC-960	Blue	Hard
25.40-27.56	1.000-1.085	1.100	TSC-1100-S	Black	Soft
26.09-28.09	1.027-1.106	1.100	TSC-1100	Black	Hard

Order tube scrubbers by model and color

Buffing Tools For Larger Radius

Buffing Tools are used for final polishing or removal of light and soft deposits from ferrous and non-ferrous tubes that have been previously cleaned. Used in straight or very large radius tubes in a clockwise direction only.



Buffing Tool



Buffing Tool with Drill Tip



Replacement Blades

Tube I.D.		Buffing Tool	With Drill Tip	Replacement Blades	Adjusting Tool
mm	inch				
7.9-9.5	5/16-3/8	TBT-1	TBT-1-T	TBB-1	TBT-AT
9.5-12.7	3/8-1/2	TBT-2	TBT-2-T	TBB-1	TBT-AT
12.7-14.3	1/2-9/16	TBT-3	TBT-3-T	TBB-2	-
15.9-25.4	5/8-1	TBT-4	TBT-4-T	TBB-3	-

Carbide Drill

Carbide Drills are used for cleaning tubes choked solidly with hard deposits.

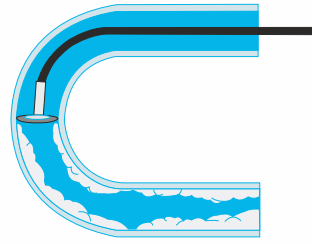


Carbide Drill

Tube I.D.		Carbide Drill
mm	inch	
6.4	1/4	TCB-250
9.5	3/8	TCB-375
11.1	7/16	TCB-430
12.7	1/2	TCB-500
14.3	9/16	TCB-560
15.9	5/8	TCB-625
17.5	11/16	TCB-680

Cleaning Accessories

U-Shape Tube Bundle Tools: These tools are used to clean tubes that have sharp bends in them. They consist of a brush or cobalt tip mounted on a piece of flexible shaft so the tool can navigate the bend.



Cup Brush Tools - Brass or Stainless Steel

Tube I.D.		Cup Brush Tools
mm	inch	
12.7-19.1	1/2-3/4	TCBT-500B
12.7-19.1	1/2-3/4	TCBT-500SS



CUP BRUSH TOOL

Wheel Brush Tools - Brass or Stainless Steel

Tube I.D.		Wheel Brush Tools
mm	inch	
20.6-25.4	13/16-1	TWBT-813B
20.6-25.4	13/16-1	TWBT-813SS



Wheel Brush Tool

Cobalt Tip Tools

Tube I.D.		Cobalt Tip Tools
mm	inch	
12.7	1/2	TCTT-500
15.9	5/8	TCTT-625



Cobalt Tip Tool

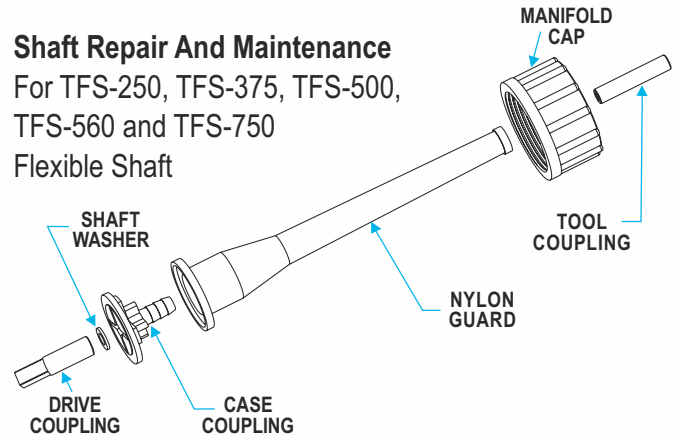
For sizes not listed above please contact us.

Shaft Replacement Couplings

Flexible Shaft Model	PFS-250	PFS-375	PFS-500	PFS-560	PFS-750
Tool Coupling	TCC-250	TC-375	TC-500	TC-560	TC-750
Case Coupling	TCC-250	TCC-375	TCC-500	TCC-560	TCC-750
Manifold Cap	TMC-1	TMC-1	TMC-1	TMC-1	TMC-1
Shaft Washer	3/16X3/4	5/16X3/4	7/16/3/4	9/16X7/8	11/16X1
Drive Coupling	TDC-250	TDC-375	TDC-500	TDC-560	TDC-750
Nylon Guard	TNG-250	TNG-375	TNG-500	TNG560	TNG-750

Shaft Repair And Maintenance

For TFS-250, TFS-375, TFS-500, TFS-560 and TFS-750 Flexible Shaft



Shaft Repair Tools

Allows users to quickly and safely attach couplings onto the shaft ensuring maximum useful life for the shaft.

SHT-1: Shaft Repair Tool with Hammer.

SHP-1: Replacement Hammer.



Shaft Repair Tool

Flexible Shaft Lubricator is used to lubricate flexible shafts for maximum useful life. They are also used to lubricate shafts prior to storage. The lubricator is filled with a water soluble lubricant that enters and lubricates the shaft when air supply is provided to the lubricator. The residue lubricant washes out with water when the shaft is used again.

TFSL-1: Flexible Shaft Lubricator.

TLUBE: Lubricant for flexible shaft lubricator, 8 ounces (0.25 litres).



Flexible Shaft Lubricator & Lubricant

Shafts & Brushes

For TTC-75, TTC-150

Flexible Shafts (Wet application - Nylon casing) for tubes 1" (25.4mm) I.D. and UP

Tube I.D. Range		Flexible Shaft Model No.	Flexible Shaft Length		Shaft Core O.D.		Shaft Casing O.D.		Tool End Thread
mm	inch		feet	mtrs	mm	inch	mm	inch	
25.4	1	TFS-750-49	16	4.9	12.7	1/2	19.1	3/4	1/2 - 12F
		TFS-750-79	26	7.9					
		TFS-750-110	36	11.0					
		TFS-750-155	51	15.5					



Flexible Shaft



Flexible Shaft

To order flexible shaft(s), determine tube I.D.(s) and length of longest tubes. Order flexible shaft(s) to correspond with tube I.D.(s) & lengths. (Consult factory for longer shafts if required.)

Flexible Shafts (Dry application - Steel casing) for tubes 1" (25.4mm) I.D. and UP

Tube I.D. Range		Flexible Shaft Model No.	Flexible Shaft Length		Shaft Core O.D.		Shaft Casing O.D.		Tool End Thread
mm	inch		feet	mtrs	mm	inch	mm	inch	
25.4	1	TFS-875-49	16	4.9	12.7	1/2	22.2	7/8	1/2 - 12F
		TFS-875-79	26	7.9					
		TFS-875-110	36	11.0					
		TFS-875-155	51	15.5					

Flexible Shafts (Dry application - Stainless Steel casing) for tubes 1" (25.4mm) I.D. and UP

Tube I.D. Range		Flexible Shaft Model No.	Flexible Shaft Length		Shaft Core O.D.		Shaft Casing O.D.		Tool End Thread
mm	inch		feet	mtrs	mm	inch	mm	inch	
25.4	1	TFS-875-49-SS	16	4.9	12.7	1/2	22.2	7/8	1/2 - 12F
		TFS-875-79-SS	26	7.9					
		TFS-875-110-SS	36	11.0					
		TFS-875-155-SS	51	15.5					

Brushes

Nylon Brushes:

Recommended for removing soft scales in straight, non-ferrous tubes. (Copper, Brass Plastic, etc.) and Ferrous (Stainless Steel, Saron Steel) & for final 'finishing' of tubes.



Nylon Brush



Stainless Steel Brush



Brass Brush

Brass Brushes:

Recommended for removing soft and light scale deposits in straight, non-ferrous tubes.

Stainless Steel Brushes:

Recommended for removing soft & light scale deposits in straight, ferrous tubes. (carbon steel, stainless steel, etc.).

Brush O.D.		Nylon Brush	Brass Brush	Stainless Steel
mm	inch			
31.7	1.1/4	TN - 1250	TB - 1250	TSS - 1250
38.1	1.1/2	TN - 1500	TB - 1500	TSS - 1500
44.5	1.3/4	TN - 1750	TB - 1750	TSS - 1750
51.0	2	TN - 2000	TB - 2000	TSS - 2000
57.1	2.1/4	TN - 2250	TB - 2250	TSS - 2250
63.5	2.1/2	TN - 2500	TB - 2500	TSS - 2500
70.0	2.3/4	TN - 2750	TB - 2750	TSS - 2750
76.2	3	TN - 3000	TB - 3000	TSS - 3000
82.6	3.1/4	TN - 3250	TB - 3250	TSS - 3250
89.0	3.1/2	TN - 3500	TB - 3500	TSS - 3500
95.2	3.3/4	TN - 3750	TB - 3750	TSS - 3750
101.6	4	TN - 4000	TB - 4000	TSS - 4000

Order brush so that brush O.D. is marginally smaller than tube I.D.

Brushes & Accessories

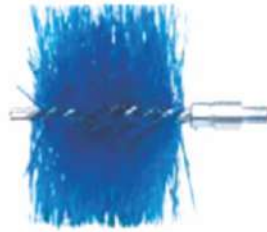
Carbon Steel Brushes

Recommended for removing soft and light scale deposits in straight, ferrous tubes.



Plastic Brushes

Recommended for removing soft deposits in straight, ferrous and non-ferrous tubes and for final 'finishing' up of cleaning in hoses, tubes and pipes.



Brush O.D.		Carbon Steel	Plastic Brush
mm	inch		
127.0	5	TCS - 5000	T - 5000
152.4	6	TCS - 6000	T - 6000
178.0	7	TCS - 7000	T - 7000
203.2	8	TCS - 8000	T - 8000
228.6	9	TCS - 9000	T - 9000
254.0	10	TCS - 10000	T - 10000
279.4	11	TCS - 11000	T - 11000
305.0	12	TCS - 12000	T - 12000
330.2	13	TCS - 13000	T - 13000
355.6	14	TCS - 14000	T - 14000

Note: Brushes over 1" O.D. require # TCB-C coupling to connect to TFS-750, TFS-875 and TFS-875-SS

Order brush so that brush O.D. is marginally smaller than tube I.D.

Drill Tip Double Diameter Brushes: These brushes are used to clean internally grooved tubes. The drill tip of brushes cleans through hard scale before the brush cleaning action takes over. The large diameter of this brush, cleans into the grooves of the tubes and the small diameter into the lands of the tube's rifling.



Drill Tip Nylon Brush



Drill Tip Brass Brush

Tube I.D.		Drill Tip Nylon Brush	Drill Tip Brass Brush
mm	inch		
25.4	1	TDTBN-1000	TDTBB-1000
31.7	1.1/4	TDTBN-1250	TDTBB-1250

Circular Brush Tools For Straight Tubes

These tools consist of 4 stainless steel circular brushes that are mounted on a shaft and connected to a Universal Joint. These tools are used to clean soft to medium scales. Replacement circular brushes can be ordered when wear starts.



Circular Brush (for Straight Tubes)

Straight Tube I.D.		Circular Brush Tool Model	Brush O.D.		Spare Brush Model (4 needed)	Spare Universal Joint Model
mm	inch		mm	inch		
28.6-33.3	1.1/8-1.5/16	TCBTS - 1125	25.4	1	TCBSB - 1125	TUCT - 1063
35.0-39.7	1.3/8-1.9/16	TCBTS - 1375	31.7	1.1/4	TCBSB - 1375	TUCT - 1063
41.3-47.1	1.5/8-1.13/16	TCBTS - 1625	38.1	1.1/2	TCBSB - 1625	TUCT - 1063
47.6-52.6	1.7/8-2.1/16	TCBTS - 1875	44.5	1.3/4	TCBSB - 1875	TUCT - 1250
54.0-58.7	2.1/8-2.5/16	TCBTS - 2125	51.0	2	TCBSB - 2125	TUCT - 1250
60.3-65-1	2.3/8-2.9/16	TCBTS - 2375	57.1	2.1/4	TCBSB - 2375	TUCT - 1250
66.7-71.6	2.5/8-2.13/16	TCBTS - 2625	63.5	2.1/2	TCBSB - 2625	TUCT - 1250
73.0-77.8	2.7/8-3.1/16	TCBTS - 2875	70.0	2.3/4	TCBSB - 2875	TUCT - 1250
79.4-84.2	3.1/8-3.5/16	TCBTS - 3125	76.2	3	TCBSB - 3125	TUCT - 1250

Note: For larger sizes, please enquire.

Cleaning Accessories

Circular Brush Tools For Curved Tubes: These tools consist of 2 stainless steel circular brushes that are mounted onto a Double Universal Joint for maximum flexibility. These tools are used to clean soft to medium scales.



Circular Brush (for Curved Tubes)

Curved Tube I.D.		Circular Brush Tool Model	Brush O.D.		Spare Brush Model (2 needed)	Spare Universal Joint Model
mm	inch		mm	inch		
31.7-35.6	1.1/4-1.7/16	TCBTC - 1125	25.4	1	TCBSB - 1125	TUCT - 1500
38.1-42.9	1.1/2-1.11/16	TCBTC - 1500	31.7	1.1/4	TCBSB - 1375	TUCT - 1500
44.5-49.2	1.3/4-1.15/16	TCBTC - 1750	38.1	1.1/2	TCBSB - 1625	TUCT - 1500
51.0-55.6	2-2.3/16	TCBTC - 2000	44.5	1.3/4	TCBSB - 1875	TUCT - 1250
57.1-61.9	2.1/4-2.7/16	TCBTC - 2250	51.0	2	TCBSB - 2125	TUCT - 1250
63.5-68.3	2.1/2-2.11/16	TCBTC - 2500	57.1	2.1/4	TCBSB - 2375	TUCT - 1250
70.0-74.6	2.3/4-2.15/16	TCBTC - 2750	63.5	2.1/2	TCBSB - 2625	TUCT - 1250
76.2-81.0	3-3.3/16	TCBTC - 3000	70.0	2.3/4	TCBSB - 2875	TUCT - 1250
82.6-90.6	3.1/4-3.9/16	TCBTC - 3250	76.2	3	TCBSB - 3125	TUCT - 1250

Note: For larger sizes, please enquire. Replacement circular brushes can be ordered when starts.

Buffing Tools for Tubes/Pipes 1"-3" (25.4-76.2mm) I.D.

Buffing Tool are used for final polishing or removal of light and soft deposits from ferrous and non-ferrous tubes that have been previously cleaned.

Used in straight or very large radius tubes in a clockwise direction only.

TBT-7 Buffing Tools for tubes 1"-3" (25.4-76.2mm) I.D.

TBT-7-T Buffing Tools for tubes 1"-3" (25.4-76.2mm) with drill tip.

TBB-5 Replacement Blades for TBT-7.



Buffing Tool



Buffing Tool with Drill Tip



Replacement Blades

Carbide Drill

Carbide Drills are used for cleaning tubes choked solidly with hard deposits.

Tube I.D.		Carbide Drill
mm	inch	
19.1	3/4	TCB - 750
22.2	7/8	TCB - 875
25.4	1	TCB - 1000



Carbide Drill

Cleaning Accessories

Combination Cone-Carbide Drill

Tool: These combination tools use the extreme hardness of a carbide drill coupled with the cleaning properties of cone cleaning cutters to drill through and simultaneously clean tubes that are choked with very hard deposits.



**Combination
Cone-carbide Drill Tool**

Tube I.D.		Combination Cone-Carbide Drill Tool Model
mm	inch	
23.8-27.0	15/16-1.1/16	TCCD - 938
27.0-30.2	1.1/16-1.3/16	TCCD - 1063
30.2-36.5	1.3/16-1.7/16	TCCD - 1188
36.5-42.9	1.7/16-1.11/16	TCCD - 1438
42.9-49.2	1.11/16-1.15/16	TCCD - 1687

Cylinder Cutter Tool: These tools are used typically in boilers and other larger tubes that have a light to medium deposit. These tools uses ergonomic cutting wheels that ensure the same tooth of the cutter wheel does not touch the same spot when cleaning. This prevents grooves being formed in the tube scale. The cutters extend outwards when the tool is rotated and perform cleaning action.



**Cylinder
Cutter Tool**

Tube I.D.		Cylinder Cutter Tool Model	Spare Cylinder Cutter Model
mm	inch		
36.5-47.6	1.7/16-1.7/8	TCCD - 1438	TCYC - 1438
46.0-73.0	1.13/16-2.7/8	TCCD - 1813	TCYC - 1438
55.5-81.0	2.3/16-3.3/16	TCCD - 2188	TCYC - 2188
79.4-98.4	3.1/8-3.7/8	TCCD - 3125	TCYC - 2188

Wing Tools-Stiff Arm Cutter:

These tools use long stiff arms with cone cutters on their ends, that spread out when rotated. These tools are used to clean light to medium deposits in large diameter tubes and pipes.



**Wing Tools-Stiff
Arm Cutter**

Tube I.D.		Wing Tool-Stiff Arm Cutter Model	Spare Cone Cutter Model
mm	inch		
42.9-101.6	1.11/16-4	TWTS - 1688	TSCT - 937
100.0-165.1	3.15/16-6.1/2	TWTS - 3938	TSCT - 937

Wing Tools-Flexible Arm Cutter: These tools are similar in operation to the Stiff Arm Winged Tools, but the Cone Cutters are attached onto flexible arms. These tools are used in typically very large vertical pipes and are used in cleaning pipes from top to bottom.



Wing Tools-Flexible Arm Cutter

Tube I.D.		Wing Tool - Flexible Arm Cutter Model	Spare Cone Cutter Model
mm	inch		
100.0-309.0	3.15/16-12	TWTF - 3938	TSCT-937

Wing Tools-flexible Arm-carbide Ball Tip: These tools are similar in operation to the Flexible Arm Cutter Wing Tools except these use carbide balls for removing light scale in large diameter tubes and pipes.



Wing Tools-Flexible Arm-carbide Ball Tip

Tube I.D.		Wing Tool - Flexible Arm Carbide Ball Tip Model	Number of Balls Used
mm	inch		
23.8-52.4	15/16-2.1/16	TWTC-938	4
49.2-103.2	1.15/16-4.1/16	TWTC-1938	6
100.0-204.8	3.15/16-8.1/16	TWTC-3938	6

Wing Tools-flexible Nylon Rod: These tools are fitted with abrasive nylon rods that spread out when rotated. These tools are used to clean light deposits in thin tubes and pipes of exotic materials where damage to tubes is to be avoided.



Wing Tools-Flexible Nylon Rod

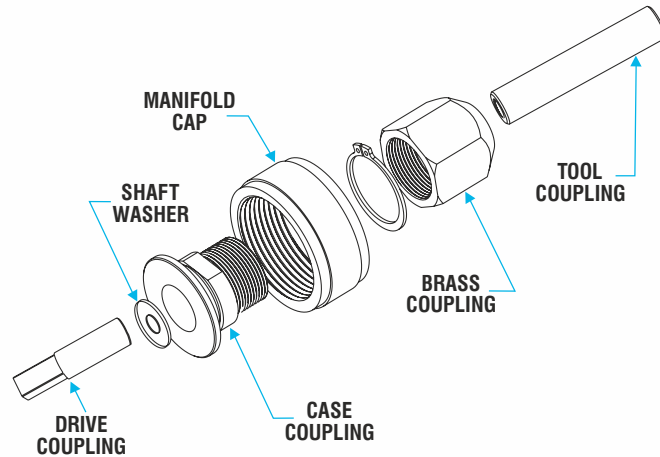
Tube I.D.		Wing Tool - Flexible Nylon Rod Model
mm	inch	
49.2-431.8	1.15/16-17	TWTN-1938

Shaft Repair

Flexible Shafts Repair / Maintenance: For TFS-750, TFS-875 and TFS-875-SS Flexible Shafts

Shaft Repair Couplings: The life of flexible shafts can be extended by proper use and maintenance. If a flexible shaft should break at either end it can be easily repaired by cutting off the end portion and using a shaft repair tool to attach a coupling onto the cut shaft.

Flexible Shaft Model	PFS-875/ PFS-875-SS
Tool Coupling	TTC-750
Case Coupling	TCC-875
Manifold Cap	TMC-2
Shaft Washer	9/16x7/8
Drive Coupling	TDC-750
Brass Coupling	TBC-875



Shaft Repair Tool For Flexible Shaft Repair: Allows users to quickly and safely attach couplings onto the shaft ensuring maximum useful life for the shaft.

TSHT-1 Shaft Repair Tool with Hammer
TSHP-1 Replacement Hammer



Shaft Repair Tool With Hammer

Flexible Shaft Lubricator is used to lubricate flexible shafts for maximum useful life. They are also used to lubricate shafts prior to storage. The lubricator is filled with a water soluble lubricant that enters and lubricates the shaft when air supply is provided to the lubricator. The residue lubricant washes out with water when the shaft is used again.

TFSL-1 Flexible Shaft Lubricator
TLUBE Lubricant for flexible shaft lubricator, 8 ounces (0.25 litres)



Flexible Shaft Lubricator & Lubricant

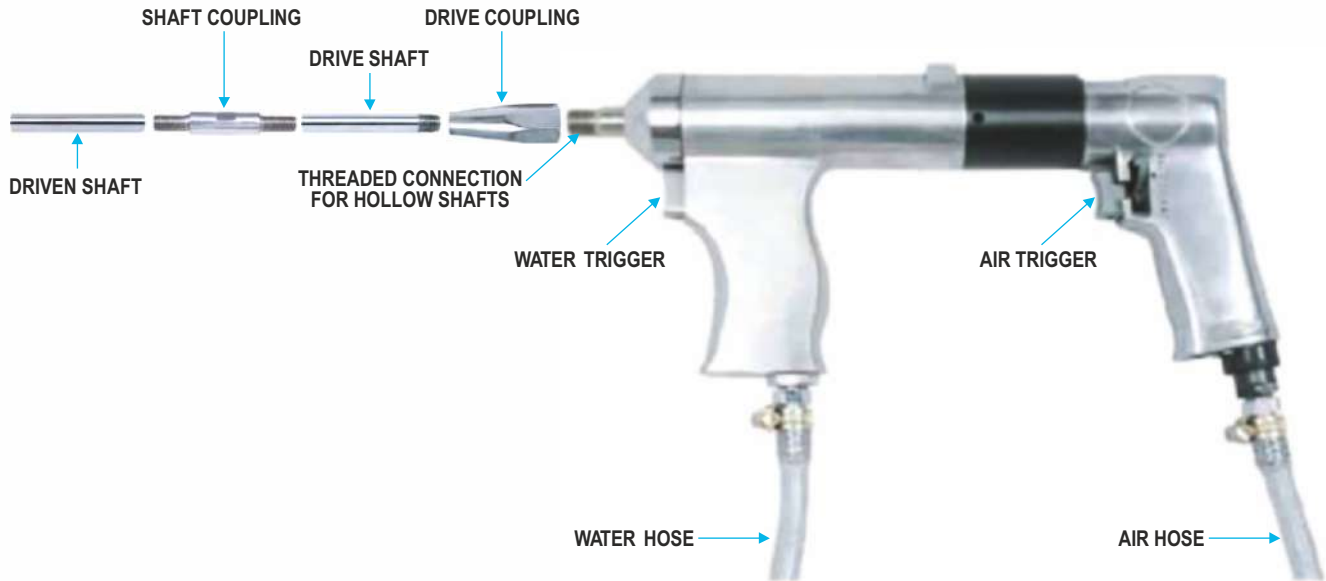
Flexible Shaft Repair Kits: Flexible shaft repair kits include 4 drive end repair couplings, 4 tool end repair couplings, 1 shaft repair tool with punch, 1 flexible shaft lubricator, 2 bottles [8 ounce (0.25 litre) each] of lubricant for flexible shaft lubricator.

REP-750-KIT Repair kit for TFS-750, TFS-875 and TFS-875-SS Flexible shafts



Repair Kit

Portable Pneumatic Tube Cleaners



Operation: The portable pneumatic tube cleaners use hollow shafting of different diameters as per tube I.D. to be cleaned which can be coupled together to form lengths according to the length of the tube to be cleaned.

Water flows through the hollow tube and washes out deposits that are dislodged by the cleaning tools attached to the driven shafts. Typical cleaning tools used are carbide drills for severely clogged tubes, brushes for light deposits and buffing tools for final polishing of tubes. The water flow is independently controlled allowing the user to determine how much water is needed in the application.

Model TC-10 is typically used on oil coolers, small heat exchangers and condensers.

Model TCP-315 is typically used on larger diameter tubes of process vessels, heat exchangers and condensers.

Tube I.D.'s suite for		Model No.	Max Motor Power		Free Speed RPM	Air Supply		Water Supply		Weight	
mm	inch		HP	kW		Min	Max	Min	Max	lbs.	kg.
4.8-25.4	3/16-1	TC - 10	0.6	0.45	700	60psi@16cfm	90psi@16cfm	30psi	100psi	5.72	2.6
22.2-51.0	7/8-2	TCP - 315	1	0.746	1000	90psi@20cfm	90psi@40cfm	30psi	100psi	6.60	3.0

Note: The tube cleaners above are supplied with a heavy duty plastic carrying case with separate provision to house upto 8, 4ft. (1.2m) long hollow shafts, 15ft. (4.6m) air hose, 15ft. (4.6m) water hose.

Portable Pneumatic Tube Cleaner Accessories

Hollow Drive Shaft - 4ft. (1.2m) long aircraft quality steel shafts to connect to drive.
Model TDS-300 to TDS-500 & Model TDS-562 to TDS-750



Hollow Drive Shaft - 4ft. (1.2m) long aircraft quality steel shafts to connect to driven shafts. Order quantities based on length of tube to be cleaned.
Model TDN-300 to TDN-500 & Model TDN-562 to TDN-750



Drive Coupling - To Couple hollow drive shaft to drive.
Model TDC-300 to TDC-500 & Model TDC-562 to TDC-750



Shaft Coupling - To Couple 2 hollow shaft together.
Model TSC-300 to TSC-500 & Model TSC-562 to TSD-750



Starter Drill - To make pilot holes in deposits of completely clogged tubes.
Model TSD-312 to TSD-500 & Model TSD-562 to TSD-750



Tube I.D.'s suited for		Drive Model No.	Hollow Drive Shaft Model No.	Hollow Driven Shaft Model No.	Hollow Coupling Model No.	Shaft Coupling Model No.	Starter Drill Model No.
mm	inch						
4.8-6.4	3/16-1/4	TC-10	TDS-300	TDN-300	TDC-300	TSC-300	-
9.5	3/8		TDS-312	TDN-312	TDC-312	TSC-312	TSD-312
11.1	7/16		TDS-375	TDN-375	TDC-375	TSC-375	TSD-375
12.7-14.3	1/2-9/16		TDS-473	TDN-437	TDC-437	TSC-437	TSD-437
15.9-17.5	5/8-11/16		TDS-500	TDN-500	TDC-500	TSC-500	TSD-500
19.1-20.6	3/4-13/16		TDS-562	TDN-562	TDC-562	TSC-562	TSD-562
22.2-25.4	7/8-1	TCP-312	TDS-625	TDN-625	TDC-625	TSC-625	TSD-625
27.0-51.0	1.1/16-2		TDS-750	TDN-750	TDC-750	TSC-750	TSD-750

Cleaning Tools For Use with Portable Pneumatic Tube Cleaners



Nylon Brushes



Brass Brushes



Stainless Brushes



Buffing Tools



Carbide Drills

Portable Pneumatic Tube Cleaning Kits

Build your own kit by adding price of Drive (C-10 or CP-315), Hollow Drive Shafts, Hollow Driven Shafts, Shaft Couplings, Drive Coupling based on length of tube to be cleaned and cleaning tools (Brushes, Carbide Drills, Buffing Tools).

We will supply all the above in a handy box at no extra charge! The box will accommodate a maximum of 1 Drive + 4 Hollow Shafts + 5 Couplings + 18 Cleaning Tools (Brushes, Carbide Drills, Buffing Tools).

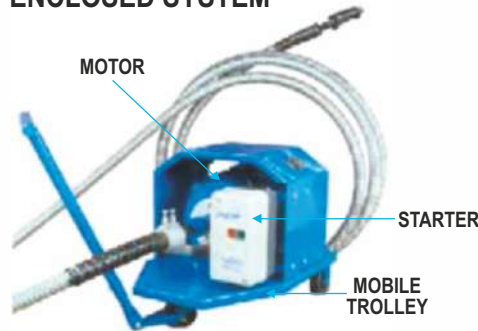
Sugar Mill Tube Cleaners

Flexible Shaft Machine (Electrically Driven)

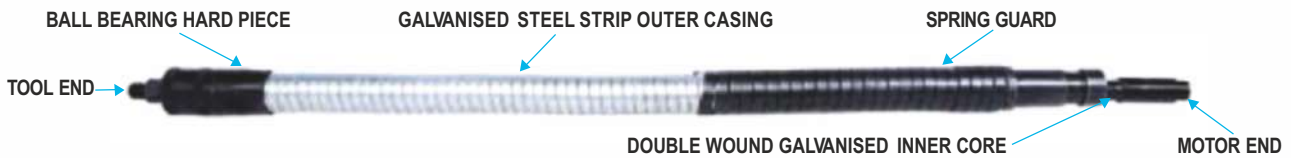
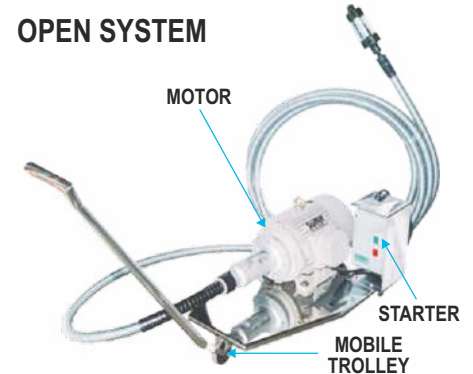
Flexible Shaft Machine is a self-contained portable unit, mounted on a 3-wheel trolley, fitted with a carrying handle. It incorporates a directly coupled, totally enclosed squirrel cage, 2800 rpm. continuously rated electric motor. Selecting the H.P. of the motor depends upon length and size of flexible shaft and nature of scaling. It is controlled by a push button starter which is provided with three thermal adjustable overload relays. Each machine is fully wired, carefully tested and is fitted with a 10-foot length of PVC Cable to main supply. Longer cable can be supplied upon request. Please consult us if your electric supply is different from listed below. Motors for alternate supplies are also available.

Model No.	Motor H. P.	Speed (RPM)	Electric Supply
TTC - 30	3.0	2800	440V
TTC - 50	5.0		3 PHASE
TTC - 75	7.5		50 Hz

ENCLOSED SYSTEM



OPEN SYSTEM



Flexible Shaft (drives): The Flexible Shaft transmits constant torque / power from the motor unit to the tool head or brush within the tube.

Inner Core is double wound in opposing layers made out of high tensile-spring steel wires and passed through stress relieving process, made to absolute-vibration free performance and continuous duty.

Outer Casing is flexible, made out of galvanized steel strip and provided with special steel anti-friction lining for the entire length.

Connections: Suitable motor connection at one end and detachable ball bearing hand piece (tool holder) with threaded spindle for tool head or brush at other end.

The size of the flexible shaft is based on internal diameter (I.D.) of the tube. The length of flexible shaft required is the addition of the length of the longest tube plus the distance between the mouth of the tube and the position of the power unit. The power unit should be located so that the flexible shaft be kept as straight as possible.

Inner Core mm (inch)		12 - 13 (½")	15 - 16 (5/8")	19 - 20 (¾")
Outer Casing mm (inch)		25 - 26 (1")	31 - 32 (1.1/4")	34 - 35 (1.3/8")
Length				
mtr.	feet	Model No.	Model No.	Model No.
7.5	25.0	TIFS-105-25	TIFS-106-25	TIFS-107-25
9.0	30.0	TIFS-105-30	TIFS-106-30	TIFS-107-30
10.0	33.0	TIFS-105-33	TIFS-106-33	TIFS-107-33
12.0	40.0	TIFS-105-40	TIFS-106-40	TIFS-107-40
15.0	50.0	TIFS-105-50	TIFS-106-50	TIFS-107-50
18.0	60.0	TIFS-105-60	TIFS-106-60	TIFS-107-60
20.0	65.0	TIFS-105-65	TIFS-106-65	TIFS-107-65
Spare Inner Core - Per mtr.		TIC-105	TIC-106	TIC-107
Spare Outer Casing - Per mtr.		TOC-105	TOC-106	TOC-107
Spare Hand Piece		THP-105	THP-106	THP-107

Sugar Mill Wire Brushes

For Sugarmill Juice Heaters, Evaporators, Boilers



“TTH” for Soot Removal from Smoke Tubes, General Cleaning



“TDS” for Removing Light Scale & Burnishing All Types of Tubes



“TWBA” Heavy Duty Brushes



“TEXP” Expanding Brush for Thin Scale, Soot or Soft Deposits.



“TMB” For General Purpose Polishing And Deburring



“TCB” Spare Brush Wheels for “MB” Brushes



“TRS” Heavy Duty Brushes For Heavy Scale Removal



“TEXS” Expanding Scrapers for Thin Scale, Soot or Soft Deposits

Size		‘TTH’ Turk Head Brush Model No.	‘TDS’ Double Spiral Brush Model No.	‘TWBA’ Brush Model No.	‘TEXP’ Expanding Brush Model No.	‘TMB’ Multi Purpose Brush Model No.	‘TCB’ Circular Wheel Brush Model No.	‘TRS’ Cup Shape Brush Model No.	‘TEXS’ Expanding Scrapers Model No.
mm	inch								
31.7	1.1/4	TTH-10	TDS-10	TWBA-10	TEXP-10	TMB-10	TCB-10	-	TEXS-10
35.0	1.3/8	TTH-11	TDS-11	TWBA-11	TEXP-11	TMB-11	TCB-11	-	TEXS-11
38.1	1.1/2	TTH-12	TDS-12	TWBA-12	TEXP-12	TMB-12	TCB-12	-	TEXS-12
41.3	1.5/8	TTH-13	TDS-13	TWBA-13	TEXP-13	TMB-13	TCB-13	-	TEXS-13
44.5	1.3/4	TTH-14	TDS-14	TWBA-14	TEXP-14	TMB-14	TCB-14	-	TEXS-14
47.6	1.7/8	TTH-15	TDS-15	TWBA-15	TEXP-15	TMB-15	TCB-15	-	TEXS-15
50.8	2	TTH-16	TDS-16	TWBA-16	TEXP-16	TMB-16	TCB-16	TRS-16	TEXS-16
54.0	2.1/8	TTH-17	TDS-17	TWBA-17	TEXP-17	TMB-17	TCB-17	TRS-17	TEXS-17
57.1	2.1/4	TTH-18	TDS-18	TWBA-18	TEXP-18	TMB-18	TCB-18	TRS-18	TEXS-18
60.3	2.3/8	TTH-19	TDS-19	TWBA-19	TEXP-19	TMB-19	TCB-19	TRS-19	TEXS-19
63.5	2.1/2	TTH-20	TDS-20	TWBA-20	TEXP-20	TMB-20	TCB-20	TRS-20	TEXS-20
66.7	2.5/8	TTH-21	TDS-21	TWBA-21	TEXP-21	TMB-21	TCB-21	TRS-21	TEXS-21
70.0	2.3/4	TTH-22	TDS-22	TWBA-22	TEXP-22	TMB-22	TCB-22	TRS-22	TEXS-22
73.0	2.7/8	TTH-23	TDS-23	TWBA-23	TEXP-23	TMB-23	TCB-23	TRS-23	TEXS-23
76.2	3	TTH-24	TDS-24	TWBA-24	TEXP-24	TMB-24	TCB-24	TRS-24	TEXS-24
79.4	3.1/8	TTH-25	TDS-25	TWBA-25	TEXP-25	TMB-25	TCB-25	TRS-25	TEXS-25
82.5	3.1/4	TTH-26	TDS-26	TWBA-26	TEXP-26	TMB-26	TCB-26	TRS-26	TEXS-26
85.7	3.3/8	TTH-27	TDS-27	TWBA-27	TEXP-27	TMB-27	TCB-27	TRS-27	TEXS-27
88.9	3.1/2	TTH-28	TDS-28	TWBA-28	TEXP-28	TMB-28	TCB-29	TRS-28	TEXS-28
92.1	3.5/8	TTH-29	TDS-29	TWBA-29	TEXP-29	TMB-29	TCB-29	TRS-29	TEXS-29
95.2	3.3/4	TTH-30	TDS-30	TWBA-30	TEXP-30	TMB-30	TCB-30	TRS-30	TEXS-30
98.4	3.7/8	TTH-31	TDS-31	TWBA-31	TEXP-31	TMB-31	TCB-31	TRS-31	TEXS-31
101.6	4	TTH-32	TDS-32	TWBA-32	TEXP-32	TMB-32	TCB-32	TRS-32	TEXS-32

Sugar Mill Cutter Heads



**SINGLE LAYER
'H' TOOL**



**TWO LAYER
'H' TOOL**



**THREE LAYER
'H' TOOL**



**CLOSE 'HZ' TOOL
(HZ-10 TO HZ-11)**



**OPEN 'HZ' TOOL
(HZ-11A TO HZ-16)**

'TH' TYPE CUTTER HEADS

for Tubes / Pipes 1.1/4" - 4" (31.7mm - 101.6mm) I.D.

These Cutter Heads are designed for cleaning straight and curved tubes as found in Boilers, Air Heaters, Economizers, etc. Cutter Heads are provided with 3 cutter wheels, one each of straight teeth, teeth cut right hand, teeth cut left hand, for quicker cleaning and prevention of scale grooving.

Model No.	Tube I.D.		Cutter Wheels Set (3)	Spare Spindle
	mm	inch	Model No.	Model No.
TH-10	31.7	1.1/4	THSRL-1	THA-1
TH-11	35.0	1.3/8	THSRL-1	THA-1
TH-12	38.1	1.1/2	THSRL-1	THA-1
TH-13	41.3	1.5/8	THSRL-2	THA-2
TH-14	44.5	1.3/4	THSRL-2	THA-2
TH-15	47.6	1.7.8	THSRL-2	THA-2
TH-16	51.0	2	THSRL-2	THA-2
TH-17	54.0	2.1/8	THSRL-2	THA-2
TH-18	57.1	2.1/4	THSRL-3	THA-3
TH-20	63.5	2.1/2	THSRL-3	THA-3
TH-22	70.0	2.3/4	THSRL-4	THA-3
TH-24	76.2	3	THSRL-4	THA-3
TH-26	82.5	3.1/4	THSRL-5	THA-3
TH-28	88.9	3.1/2	THSRL-5	THA-3
TH-30	95.2	3.3/4	THSRL-6	THA-4
TH-32	101.6	4	THSRL-6	THA-4

'THZ' TYPE CUTTER HEADS

for Tubes / Pipes 1.1/4" - 2" (31.7mm - 51.0mm) I.D.

These spring loaded, self expanding Cutter Heads are designed for rapid removal of hard and obstinate scale formations in straight tubes as found in Evaporators, Juice Heaters, etc. It consists of 3 bevel, 4 straight cutter wheels, 4 left cutter wheels and 4 right cutter wheels, fitted on 3 bridge type arms.

Model No.	Tube I.D.		Cutter Wheels Set (15)	Spare Arms
	mm	inch	Model No.	Model No.
THZ-10	31.7	1.1/4	THZSRL-1	THZA-1
THZ-10A	33.3	1.5/16	THZSRL-1	THZA-1
THZ-11	35.0	1.3/8	THZSRL-1	THZA-1
THZ-11A	36.5	1.7/16	THZSRL-1	THZA-2
THZ-12	38.1	1.1/2	THZSRL-1	THZA-2
THZ-12A	39.7	1.9/16	THZSRL-1	THZA-2
THZ-13	41.3	1.5/8	THZSRL-1	THZA-2
THZ-13A	42.9	1.11/16	THZSRL-1	THZA-2
THZ-14	44.5	1.3/4	THZSRL-2	THZA-3
THZ-14A	46.0	1.13/16	THZSRL-2	THZA-3
THZ-15	47.6	1.7/8	THZSRL-2	THZA-3
THZ-15A	49.2	1.15/16	THZSRL-2	THZA-3
THZ-16	51.0	2	THZSRL-2	THZA-3

'TTWA' Type Cutter Heads

for Tubes / Pipes 1.1/2" - 4" (38.1 mm - 101.6 mm) I.D.

These Cutter Heads produce excellent results in curved or straight tubes. Pivoted arms of Cutter Heads swing out by centrifugal force so that the cutters contact every part of the tube wall.



Model No.	Tube I.D.		Cone Cutter Set (3)	Spare Arms	Universal Joint
	mm	inch	Model No.	Model No.	Model No.
TWA-12	38.1	1.1/2	TWAL-1	TWAA-1	TWAUJ-1
TWA-14	44.5	1.3/4	TWAL-1	TWAA-1	TWAUJ-1
TWA-16	51.0	2	TWAL-1	TWAA-1	TWAUJ-1
TWA-18	57.1	2.1/4	TWAL-2	TWAA-1	TWAUJ-2
TWA-20	63.5	2.1/2	TWAL-2	TWAA-1	TWAUJ-2
TWA-22	70.0	2.3/4	TWAL-2	TWAA-1	TWAUJ-2
TWA-24	76.2	3	TWAL-3	TWAA-2	TWAUJ-2
TWA-28	88.9	3.1/2	TWAL-3	TWAA-2	TWAUJ-2
TWA-32	101.6	4	TWAL-4	TWAA-2	TWAUJ-2

'TTSA' Type Cutter Heads

for Tubes / Pipes 2" - 4" (51.0 mm - 101.6 mm) I.D.

These Cutter Heads have 3 to 5 freely pivoted arms, activated centrifugally, which swing out to give access to any part of tube wall.



Model No.	Tube I.D.		Cone & Flat Cutter Set (9)	Arms	Universal Joint
	mm	inch	Model No.	Model No.	Model No.
TSA-16	51.0	2	TSAFC-1	TSAA-1	TSAUJ-1
TSA-18	57.1	2.1/4	TSAFC-2	TSAA-2	TSAUJ-2
TSA-20	63.5	2.1/4	TSAFC-2	TSAA-2	TSAUJ-2
TSA-22	70.0	2.3/4	TSAFC-3	TSAA-2	TSAUJ-2
TSA-24	76.2	3	TSAFC-3	TSAA-2	TSAUJ-2
TSA-28	88.9	3.1/2	TSAFC-4	TSAA-2	TSAUJ-2
TSA-32	101.6	4	TSAFC-5	TSAA-3	TSAUJ-2

Special Tables

Recommended Expansion of Tubes for Optimum Joint Strength in Heat Exchanger and Condensers

Tube O.D.		Gauge	Tube Expansion		Tube O.D.		Gauge	Tube Expansion		Tube O.D.		Gauge	Tube Expansion	
mm	inch		mm	inch	mm	inch		mm	inch	mm	inch		mm	inch
12.7	1/2	14	.15	.006	15.8	5/8	20	.10	.004	25.4	1	10	.22	.009
12.7	1/2	15	.15	.006	15.8	5/8	21	.10	.004	25.4	1	11	.22	.009
12.7	1/2	16	.15	.006	19.0	3/4	10	.20	.008	25.4	1	12	.22	.009
12.7	1/2	17	.12	.005	19.0	3/4	11	.20	.008	25.4	1	13	.20	.008
12.7	1/2	18	.12	.005	19.0	3/4	12	.20	.008	25.4	1	14	.20	.008
12.7	1/2	19	.10	.004	19.0	3/4	13	.20	.008	25.4	1	15	.17	.007
12.7	1/2	20	.10	.004	19.0	3/4	14	.20	.008	25.4	1	16	.15	.006
12.7	1/2	21	.10	.004	19.0	3/4	15	.17	.007	25.4	1	17	.12	.005
15.8	5/8	12	.15	.006	19.0	3/4	16	.15	.006	25.4	1	18	.12	.005
15.8	5/8	13	.15	.006	19.0	3/4	17	.12	.005	31.7	1.1/4	8	.25	.010
15.8	5/8	14	.15	.006	19.0	3/4	18	.12	.005	31.7	1.1/4	10	.25	.010
15.8	5/8	15	.15	.006	19.0	3/4	19	.12	.005	31.7	1.1/4	12	.22	.009
15.8	5/8	16	.15	.006	19.0	3/4	20	.12	.005	31.7	1.1/4	14	.20	.008
15.8	5/8	17	.12	.005	19.0	3/4	21	.10	.004	31.7	1.1/4	16	.17	.007
15.8	5/8	18	.12	.005	25.4	1	8	.22	.009	31.7	1.1/4	18	.15	.006
15.8	5/8	19	.10	.004	25.4	1	9	.22	.009					

Additional Sizes : 1/4 in. (6.3 mm) O.D. tube - expand all gauges .003 in (.07 mm) after contact with tube sheet tube.
3/8 in. (9.5 mm) O.D. tube - expand all gauges .004 in. (.10 mm) after contact with tube sheet hole.

EXAMPLE : 3/4 in. (19.0 mm) O.D. x 14 Gauge Tubes:

Recommended Expansion008 in. (.20 mm)
 Tube Sheet Hole760 in. (19.3 mm)
Therefore, expand as follows:
 Tube I.D. before expanding584 in. (14.8 mm)
 Recommended Expansion0.008 in. (.20 mm)
 Clearance between Tube &
 Tube Sheet hole010 in. (.25 mm)
 Finish I.D.602 in. (15.2 mm)

The above recommendation is based on our experience. However, because of the great variety of materials, tubes, and tube sheets used, some conditions will require experimental rolling to be certain that the rolled joints will be satisfactory.

Tube Sizes - Birmingham Wire Gauges

Tube O.D. inch	Birmingham Wire Gauge (Gauge - Inches)																									
	00-380	0-340	1-300	2-284	3-259	4-238	5-220	6-203	7-180	8-165	9-148	10-134	11-120	12-109	13-095	14-083	15-072	16-065	17-058	18-049	19-042	20-035	21-032	22-028	23-025	24-022
1/4																				.152	.166	.180	.186	.194	.200	.206
3/8															.209	.231	.245	.259	.277	.291	.305	.311	.319	.325	.331	
1/2														.310	.334	.356	.370	.384	.402	.416	.430	.436	.444	.450	.456	
5/8													.407	.435	.459	.481	.495	.509	.527	.541	.555	.561	.569	.575	.581	
3/4											.482	.510	.532	.560	.584	.606	.620	.634	.652	.666	.680	.686	.694	.700	.706	
7/8										.607	.635	.657	.685	.709	.731	.745	.759	.777	.791	.805	.811	.819	.825	.831		
1								.670	.704	.732	.760	.782	.810	.834	.856	.870	.884	.902	.916	.930	.936	.944	.950	.956		
1.1/4								.920	.954	.982	1.010	1.032	1.060	1.084	1.106	1.120	1.134	1.152	1.166	1.180	1.186	1.194	1.200	1.206		
1.1/2								1.170	1.204	1.232	1.260	1.282	1.310	1.334	1.356	1.370	1.384	1.402	1.416	1.430	1.436	1.444	1.450	1.456		
1.3/4						1.310	1.344	1.390	1.420	1.454	1.482	1.510	1.532	1.560	1.584	1.606	1.620	1.634	1.652	1.666	1.680	1.686	1.694	1.700	1.706	
2					1.524	1.560	1.594	1.640	1.670	1.704	1.732	1.760	1.782	1.810	1.834	1.856	1.870	1.884	1.902	1.916	1.930	1.936	1.944	1.950	1.956	
2.1/4	1.490	1.570	1.650	1.682	1.732	1.774	1.810	1.844	1.890	1.920	1.954	1.982	2.010	2.032	2.060	2.084	2.106	2.210	2.134	2.151						
2.1/2	1.740	1.820	1.900	1.932	1.982	2.024	2.050	2.094	2.140	2.170	2.204	2.232	2.260	2.282	2.310	2.334	2.356	2.370	2.384	2.402						
2.3/4	1.990	2.070	2.150	2.182	2.232	2.274	2.310	2.344	2.390	2.420	2.454	2.482	2.510	2.532	2.560	2.584	2.606	2.620	2.634	2.652						
3	2.240	2.320	2.400	2.432	2.482	2.524	2.560	2.594	2.640	2.670	2.704	2.732	2.760	2.782	2.810	2.834	2.856	2.870	2.884	2.902						
3.1/4	2.490	2.570	2.650	2.682	2.732	2.774	2.810	2.844	2.890	2.920	2.854	2.982	3.010	3.032	3.060	3.084	3.106	3.120	3.134	3.151						
3.1/2	2.740	2.820	2.900	2.932	2.982	3.024	3.060	3.094	3.140	3.170	3.204	3.232	3.260	3.282	3.310	3.334	3.356	3.370	3.384	3.401						
3.3/4	2.990	3.070	3.150	3.182	3.232	3.274	3.310	3.344	3.390	3.420	3.454	3.482	3.510	3.532	3.560	3.584	3.606	3.620	3.634	3.652						
4	3.240	3.320	3.400	3.432	3.482	3.524	3.560	3.594	3.640	3.670	3.704	3.732	3.760	3.782	3.810	3.834	3.856	3.870	3.884	3.902						

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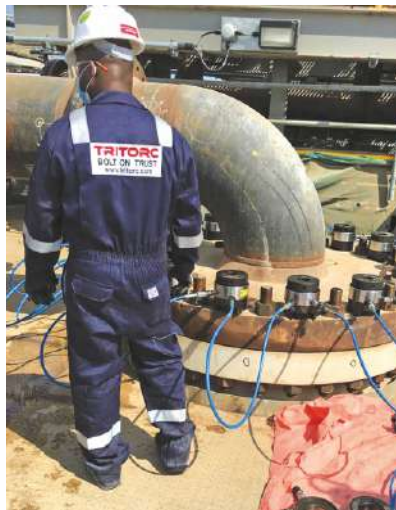
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