

TAKE THE **TECO** APPROACH
TO TUBE EXPANDING

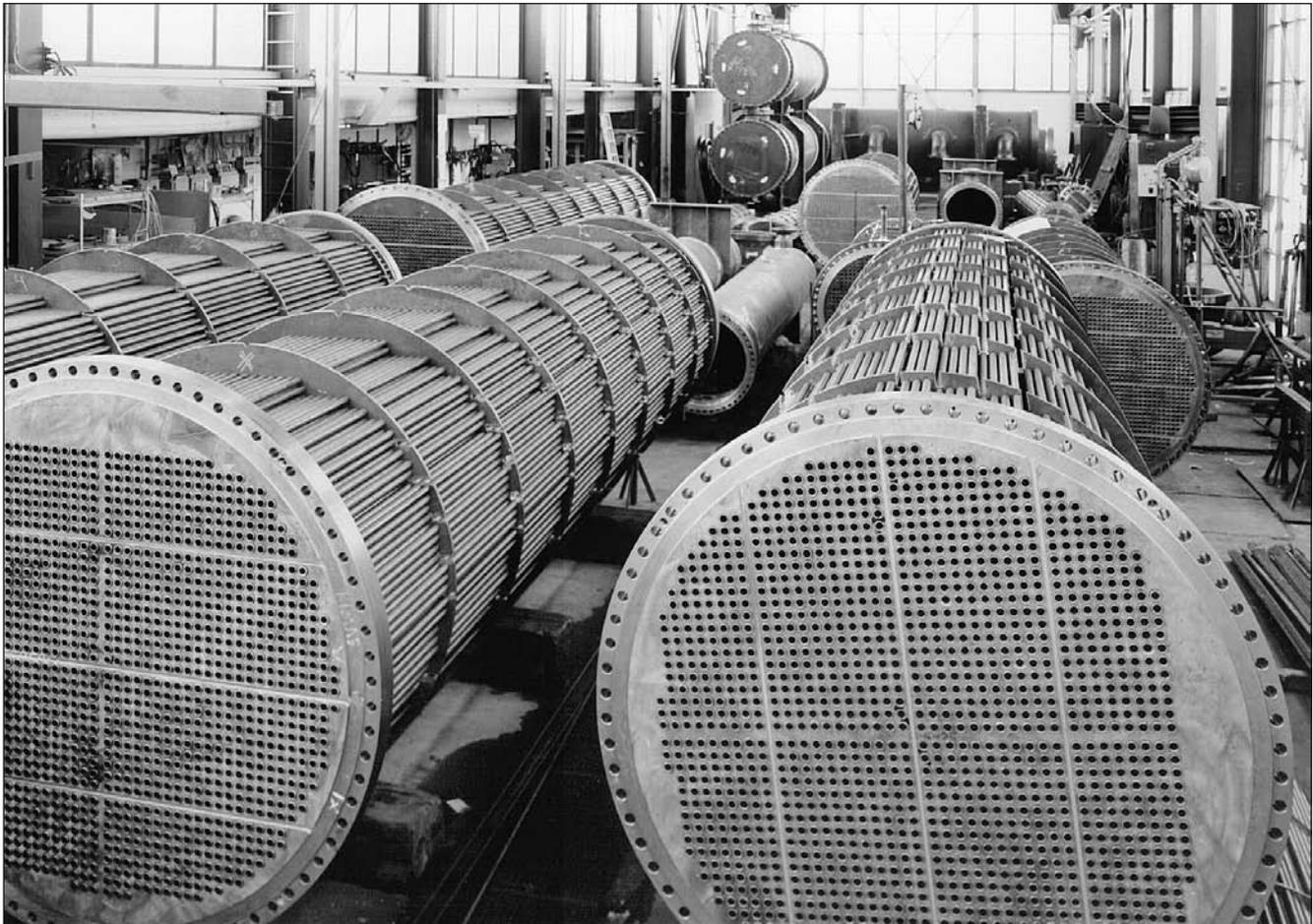
UTILIZE **TECO** SUPERIOR
TUBE INSTALLATION
AND REMOVAL TOOLS



CE
BOILERS
CONDENSERS
HEAT EXCHANGERS



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TECO TUBE EXPANDERS

for Condensers, Heat Exchangers and Boilers

TECO tube expanders are made from high quality alloy steels and are specially heat treated. The adjustable thrust collar incorporates a thrust bearing which eliminates frictional heating and possible tube end damage and makes these tools suitable for operation with electric or pneumatic power tools. The tube expanders in this catalogue cover the range of tubes from 1/4" O.D. - 20 Gauge to 4 1/2" O.D. - 2-18 Gauge.

SPECIAL TUBE EXPANDERS

Special Tube Expanders for any tube size and reach are manufactured to specification. TECO has manufactured for example a special tube expander with 3 1/4" O.D. and 12 feet reach for diesel engines. So do not hesitate to send your application for your specific need.

MANDREL EXTENSION AND UNIVERSAL JOINTS

These can be supplied as standard or special length with different square sizes. Mandrel extensions can be utilized in situations where there is not sufficient room available to use standard expanders with a drive unit, e.g. in water boxes of condensers etc.

STANDARD REVERSIBLE THRUST/ COLLAR

The models CH-800 and CH-1200 Tube Expanders are equipped with a reversible thrust collar. This is specially designed by TECO.

This offers the possibility of using the collar flush or recessed for the front tube sheet (please specify required recess depth). When reversed, the collar is now suitable for the rear tube sheet acting as a flow-collar allowing the tube to be drawn outwards. This eliminates the need to precisely cut the tube to length before expanding.

THRUST COLLARS

The following different models of thrust collar can be supplied:

- a) recessed thrust collar instead of standard collar (depth of recess to be specified).
- b) adjustable recess thrust collar to bring the tubes automatically to the right position in relation to the tube sheet; from a flush fitting on the tube sheet to as much as a 3/8" protrusion can be achieved.
- c) small diameter collars, for the expansion of the outside row of tubes into waterboxes for example.
- d) for thin gauge tube a special thrust collar can be supplied to prevent the tube from becoming trapped between the rolls and the collar as there is a possibility of thin tube being drawn up inside the collar whilst rolling.

CONSTRUCTION

TECO tube expanders are of the self feeding and parallel rolling type. The taper feed angle ensures a uniform expansion and tightness of the tube. The rolls have a radius at both ends to avoid a sharp ridge inside the tube.

TUBE SIZE INFORMATION

Tube O.D. refers to the measured outside diameter of a tube.

Tube I.D. refers to the measured inside diameter of a tube.

Tube Gauge is Birmingham wire gauge (B.W.G.) of the wall thickness of the tube.

STANDARD REVERSIBLE THRUST/COLLAR



COLLAR



THRUST RACE



THRUST RACE HOUSING



NUT WITH SETSCREW



TECO TUBE EXPANDERS

for Condensers, Heat Exchangers and Boilers

LUBRICATION, CARE AND MAINTENANCE OF TUBE EXPANDERS

The type of use demanded of tube expanders is severe and therefore these precision tools should be given a reasonable amount of care. For long, trouble-free and economical service the following is suggested:

1. Remove all rust, mill scale and other foreign matter from the inside and outside of the tube. Foreign matter on the inside of the tube will tend to become embedded into the tube wall and being abrasive may cause the rolls and mandrel of the tube expander to start breaking up. Mill scale or dirt left on the outer wall of the tube can cause damage to the tube seat and prevent the formation of a pressure-tight joint. Cleaning of the tube ends may be best accomplished by wire brushing or polishing. Remove any protective coating by washing with light oil or other solvents.

NB: DO NOT LEAVE A RESIDUE OF LIGHT OIL ON THE OUTSIDE OF THE TUBE AS THIS MAY ALSO PREVENT A PRESSURE-TIGHT JOINT.

2. Before using, the expander should be washed in any commercial solvent to remove protective coatings, dirt, grease and other foreign matter. Make sure that the rolls and mandrel are in good condition and working correctly.

3. Before using, expander should be properly lubricated with a pressure resistant lubricant. We recommend using **TECO 'Lube-A-Tube'**. This water soluble lubricant was developed for tube rolling and may be mixed with water to the desired consistency. For small diameter and light tube gauges immerse the expander in **TECO 'Lube-A-Tube'** or light oil such as SAE 10 or 20.

For large diameter and heavy gauge tubes, brush the expander with **TECO 'Lube-A-Tube'** or mixture of SAE 40 oil and graphite.

4. Expanders should be rotated at a speed proportionate to the tube size, gauge and length of tube seat. Tube materials must also be taken into consideration. The proper speed will provide a safe cold working of tube metal without crystallization or surface damage. Speed is also a major factor in expander life and if correctly set will prevent undue roller or mandrel breakdown. Ideal speed will keep to a minimum mandrel slip and the heat generated in mandrels and rolls when working.

5. After rolling each tube, clean and cool the expander in solvent or light oil and then properly lubricate the expander again. It is good practice to use two expanders so that one can be cooling whilst the clean expander is being used.

6. Inspect the rolls and the mandrel after rolling each tube. Replace any chipped rolls or mandrels immediately. A small chip in a roll can damage the entire expander, rolls or mandrel if not replaced at once. It can also damage the tube causing marks in the expanded area which may necessitate tube removal.

7. After the job has been completed, the expander should be cleaned thoroughly with a commercial solvent or a light oil and stored in a manner which will avoid possibility of parts rusting.

NB: DO NOT LEAVE A RESIDUE OF LIGHT OIL ON THE OUTSIDE OF THE TUBE AS THIS MAY ALSO PREVENT A PRESSURE-TIGHT JOINT.

SOME GUIDELINES FOR TUBE EXPANSION

Improperly rolled joints create additional expense to rectify. Under-rolling can be easily corrected merely by re-rolling, but over-rolling will require complete tube replacement. The optimum joint is one that develops a leak tight joint with adequate strength for the service intended with the minimum amount of cold working or reduction of the tube wall thickness.

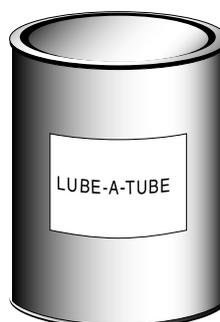
Experience indicates that joints of this type can be obtained with non-ferrous tubes in surface condensers by expanding to a wall reduction of 5% to 6%. This wall reduction is only achieved after metal to metal contact between the tube O.D. and the tube sheet hole. Steel tubes in heat exchangers may require wall reductions of 4% to 6%; soft copper and aluminium tubes in heat exchangers also require larger wall reductions in the area of 7% to 10%.

A typical example of the application of this method is indicated for 3/4" x 18 gauge (19.05 x 1.24 mm) tube in a condenser.

1.	Tube Sheet Hole	= 19.30 mm (.760")
	Tube O.D.	= -19.05 mm (.750")
	Clearance	0.25 mm (.010")
2.	Tube I.D.	= 16.56 mm (.652")
	Clearance	= + 0.25 mm (.010")
	I.D. Metal to Metal	16.81 mm (.662")
3.	6% of 1.24 mm x 2	= 0.14 mm (.006")
	Tube I.D. Metal to Metal	= +16.81 mm (.662")
	Expanded Tube I.D.	16.95 mm (.668")

LUBE-A-TUBE

TECO Lube-A-Tube is a water soluble lubricant especially compounded for use with tube expanders. When rolling large or small, ferrous or non-ferrous tubes, use **TECO Lube-A-Tube** for smoother rolling and longer expander life, for clean tube ends after rolling simply wash with water.



can of 5 kg (11.1 lbs).

STANDARD MODELS OF **TECO** TUBE EXPANDERS



CH-900

For Condensers And Heat Exchangers.

Model: CH-900 Tube range: 1/4" to 3/8" O.D.
(6.35 to 9.52 mm) O.D.

Expander with 3/4" (19.05 mm) long rolls suitable for tube sheet thicknesses from 1/8" to 3/4" (3.175 mm to 19.05 mm).

Expander with 1 1/4" (31.75 mm) long rolls suitable for tube sheet thicknesses from 1/2" to 1 1/4" (12.70 mm to 31.75 mm).

CH-1300

Model: CH-1300 Tube range: 3/8" (9.52 mm) O.D.

Expander with 3/4" (19.05 mm) long rolls suitable for tube sheet thicknesses from 1/4" to 3" (6.35 mm to 76.20 mm).

Expander with 1 1/4" (31.75 mm) long rolls suitable for tube sheet thicknesses from 3/4" to 3 1/2" (19.05 mm to 88.90 mm).

CH-800

Model: CH-800 Tube range: 1/2" to 1 3/4" O.D.
(12.70 to 44.45 mm) O.D.

Expander with 1 1/2" (38.10 mm) long rolls suitable for tube sheet thicknesses from 1/4" to 1 1/2" (6.35 mm to 38.10 mm).

Expander with 2 1/4" (57.15 mm) long rolls suitable for tube sheet thicknesses from 1" to 2 1/4" (25.40 mm to 57.15 mm).

Special 4 or 5 roll models available.

CH-1200

Model: CH-1200 Tube range: 1/2" to 1 3/4" O.D.
(12.70 to 44.45 mm) O.D.

Expander with 1 1/2" (38.10 mm) long rolls suitable for tube sheet thicknesses from 3/4" to 5 7/8" (19.05 mm to 149.09 mm).

Expander with 2 1/4" (57.15 mm) long rolls suitable for tube sheet thicknesses from 1 1/2" to 6 1/2" (38.10 mm to 165.10 mm).

Special 4 or 5 roll models available.

CH-1200

Model: CH-1200 Long reach with 1 1/2" or 2 1/4" rolls.
Tool reach standard 10"(B) or 12"(C) (254 mm or 305 mm).
Longer reaches available upon request.

Tube range: 1/2" to 1 3/4" (12.70 to 44.45 mm) O.D.

Special 4 or 5 roll models available.

CH-8012

Model: CH-8012 Tube range: 1 3/4" to 4 1/2" O.D.
(44.45 to 114.30 mm) O.D.

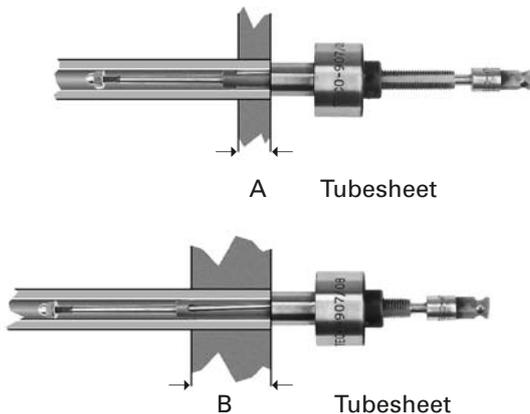
Expander with 2 1/4" (57.15 mm) long rolls suitable for tube sheet thicknesses from 1/2" to 4" (12.70 mm to 101.60 mm).

TECO TUBE EXPANDERS for Condensers and Heat Exchangers

Selection Guide:

Model : CH 900

Tube Size I.D. .155" - .320"
(3.95 - 8.13 mm)



	TUBE SHEET THICKNESS	
	A MINIMUM	B MAXIMUM
TUBE EXPANDER WITH 3/4" ROLL LENGTH	1/8" (3.175 mm)	5/8" (15.87 mm)
TUBE EXPANDER WITH 1 1/4" ROLL LENGTH	1/2" (12.70 mm)	1 9/64" (28.98 mm)

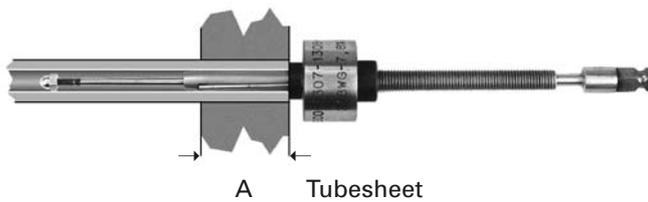
TUBE O.D. AND G.A.	MIN. I.D. TUBE TOOL ENTERS		MAX. TOOL EXPANSION		SIZE SQUARE ON MANDREL	EXPANDER WITH 3/4" (19 mm) ROLLS		EXPANDER WITH 1 1/4" (32 mm) ROLLS		MANDREL NO.
	Inch	mm	Inch	mm		EXPANDER NO.	ROLL SET NO.	EXPANDER NO.	ROLL SET NO.	
1/4"-19	.155	3.95	.190	4.83	1/4"	CH-921	TR-921			MT-40
1/4"-20	.175	4.44	.205	5.21		CH-923	TR-923			MT-40
1/4"-21	.180	4.57	.212	5.38		CH-924	TR-924			MT-40
1/4"-22	.190	4.83	.220	5.59		CH-925	TR-925			MT-41
1/4"-23	.195	4.95	.226	5.74		CH-926	TR-923			MT-41
1/4"-24	.201	5.10	.232	5.92		CH-927	TR-924			MT-41
1/4"-28	.219	5.55	.237	6.02	CH-928	TR-903			MT-928	
3/8"-14	.199	5.05	.232	5.88	1/4"	CH-914	TR-914			MT-35
3/8"-15	.230	5.84	.265	6.73		CH-915	TR-915			MT-36
3/8"-16	.242	6.15	.275	6.98		CH-916	TR-916			MT-36
3/8"-16	.242	6.15	.280	7.11				CH-916-L	TR-916-L	MT-36-L
3/8"-17	.255	6.48	.289	7.34		CH-918	TR-903			MT-37
3/8"-18	.272	6.85	.307	7.80		CH-901	TR-903	CH-902	TR-904	MT-30
3/8"-19	.286	7.26	.320	8.12		CH-903	TR-903	CH-904	TR-904	MT-31
3/8"-20	.300	7.62	.334	8.48		CH-905	TR-907	CH-906	TR-908	MT-32
3/8"-21	.306	7.77	.340	8.61		CH-907	TR-907	CH-908	TR-908	MT-33
3/8"-22	.314	7.98	.349	8.86		CH-909	TR-909	CH-910	TR-910	MT-34
3/8"-23	.320	8.13	.357	9.08		CH-911	TR-911	CH-912	TR-912	MT-34
3/8"-24	.320	8.13	.357	9.08		CH-911	TR-911	CH-912	TR-912	MT-34

TECO TUBE EXPANDERS for Condensers and Heat Exchangers

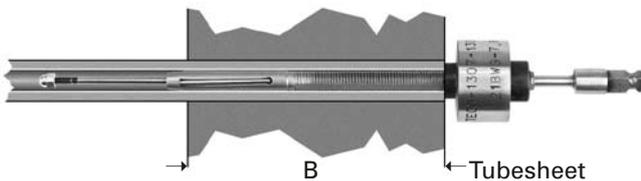
Selection Guide:

Model : CH 1300

Tube Size I.D. .230" - .323"
(5.9 - 8.2 mm)



A Tubesheet



B Tubesheet

	TUBE SHEET THICKNESS	
	A MINIMUM	B MAXIMUM
TUBE EXPANDER WITH 3/4" ROLL LENGTH	1/4" (6.35 mm)	2 7/8" (73.03 mm)
TUBE EXPANDER WITH 1 1/4" ROLL LENGTH	3/4" (19.05 mm)	3 11/32" (84.93 mm)

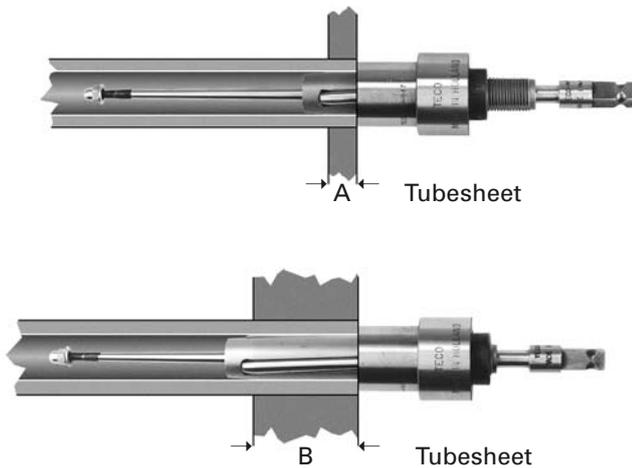
TUBE O.D. AND G.A.	MIN. I.D. TUBE TOOL ENTERS		MAX. TOOL EXPANSION		SIZE SQUARE ON MANDREL	EXPANDER WITH 3/4" (19 mm) ROLLS		EXPANDER WITH 1 1/4" (32 mm) ROLLS		MANDREL NO.
	Inch	mm	Inch	mm		EXPANDER NO.	ROLL SET NO.	EXPANDER NO.	ROLL SET NO.	
3/8"-15	.230	5.84	.265	6.73	1/4"	CH-1301	TR-903	CH-1316	TR-1316	MT-86
3/8"-18	.270	6.85	.307	7.80				CH-1302	TR-904	MT-80
3/8"-19	.286	7.26	.320	8.12				CH-1303	TR-903	TR-904
3/8"-20	.300	7.62	.334	8.48		CH-1305	TR-907	CH-1304	TR-904	MT-81
								CH-1306	TR-908	MT-82
3/8"-21	.306	7.77	.340	8.61		CH-1307	TR-907	CH-1308	TR-908	MT-83
3/8"-22	.314	7.98	.349	8.86		CH-1309	TR-909	CH-1310	TR-910	MT-84
3/8"-23	.320	8.13	.357	9.08		CH-1311	TR-911	CH-1312	TR-912	MT-84
3/8"-24	.320	8.13	.357	9.08		CH-1311	TR-911	CH-1312	TR-912	MT-84

TECO TUBE EXPANDERS for Condensers and Heat Exchangers

Selection Guide:

Model : CH 800

Tube Size I.D. .335" - 1.457"
(8.5 - 37.0 mm)



	TUBE SHEET THICKNESS	
	A MINIMUM	B MAXIMUM
TUBE EXPANDER WITH 1 1/2" ROLL LENGTH	1/4" (6.35 mm)	1 1/4" (31.75 mm)
TUBE EXPANDER WITH 2 1/4" ROLL LENGTH	1" (25.40 mm)	2" (50.80 mm)

TUBE O.D. AND G.A.	MIN. I.D. TUBE TOOL ENTERS		MAX. TOOL EXPANSION		SIZE SQUARE ON MANDREL	EXPANDER WITH 1 1/2" (38.1 mm) ROLLS		EXPANDER WITH 2 1/4" (57.1 mm) ROLLS		MANDREL NO.
	Inch	mm	Inch	mm		EXPANDER NO.	ROLL SET NO.	EXPANDER NO.	ROLL SET NO.	
1/2"-14	.324	8.23	.374	9.50	3/8"	CH-797	TR-797			MT-797
1/2"-15	.349	8.86	.398	10.11		CH-799	TR-1			MT-799
1/2"-16	.360	9.14	.410	10.41		CH-801	TR-1			MT-1
1/2"-17	.374	9.50	.424	10.77		CH-803	TR-2			MT-1
1/2"-18	.392	9.96	.447	11.35		CH-805	TR-3			MT-2
5/8"-12	.392	9.96	.447	11.35	3/8"	CH-805	TR-3			MT-2
5/8"-13	.425	10.79	.480	12.19		CH-807	TR-4			MT-3
5/8"-14	.449	11.40	.509	12.73		CH-809	TR-4	CH-810	TR-4-A	MT-4
5/8"-15	.471	11.96	.536	13.61		CH-811	TR-5	CH-812	TR-5-A	MT-5
5/8"-16	.485	12.32	.550	13.97		CH-813	TR-6	CH-814	TR-6-A	MT-5
5/8"-17	.499	12.67	.564	14.32	CH-815	TR-6	CH-816	TR-6-A	MT-6	
5/8"-18	.517	13.13	.572	14.53	CH-817	TR-7	CH-818	TR-7-A	MT-7	
3/4"-10	.471	11.96	.536	13.61	3/8"	CH-811	TR-5	CH-812	TR-5-A	MT-5
3/4"-11	.499	12.67	.564	14.32		CH-815	TR-6	CH-816	TR-6-A	MT-6
3/4"-12	.522	13.30	.582	15.20		CH-819-N	TR-7	CH-820-N	TR-7-A	MT-8
3/4"-13	.550	13.97	.615	15.62		CH-821	TR-8	CH-822	TR-8-A	MT-8
3/4"-14	.574	14.58	.639	16.23		CH-823	TR-9	CH-824	TR-9-A	MT-8
3/4"-15	.596	15.14	.661	16.79	CH-825	TR-10	CH-826	TR-10-A	MT-8	
3/4"-16	.605	15.37	.685	17.40	CH-827	TR-10	CH-828	TR-10-A	MT-9	
3/4"-17	.619	15.72	.699	17.75	CH-829	TR-11	CH-830	TR-11-A	MT-9	
3/4"-18	.619	15.72	.699	17.75	CH-829	TR-11	CH-830	TR-11-A	MT-9	

Note: Expander CH 800 is also available as four or five roll expander see page 10-11.



TUBE O.D. AND G.A.	MIN. I.D. TUBE TOOL ENTERS		MAX. TOOL EXPANSION		SIZE SQUARE ON MANDREL	EXPANDER WITH 1 1/2" (38.1 mm) ROLLS		EXPANDER WITH 2 1/4" (57.1 mm) ROLLS		MANDREL NO.
	Inch	mm	Inch	mm		EXPANDER NO.	ROLL SET NO.	EXPANDER NO.	ROLL SET NO.	
7/8"-10	.596	15.14	.661	16.79	3/8"	CH-825	TR-10	CH-826	TR-10-A	MT-8
7/8"-11	.619	15.72	.699	17.75		CH-829	TR-11	CH-830	TR-11-A	MT-9
7/8"-12	.642	16.31	.722	18.34		CH-831	TR-12	CH-832	TR-12-A	MT-9
7/8"-13	.670	17.02	.750	19.05		CH-833	TR-13	CH-834	TR-13-A	MT-10
7/8"-14	.685	17.40	.774	19.66		CH-835	TR-14	CH-836	TR-14-A	MT-11
7/8"-15	.712	18.08	.801	20.34		CH-837	TR-15	CH-838	TR-15-A	MT-11
7/8"-16	.726	18.44	.815	20.70		CH-839	TR-15	CH-840	TR-15-A	MT-12
7/8"-17	.740	18.80	.829	21.06		CH-843	TR-16	CH-844	TR-16-A	MT-12
7/8"-18	.740	18.80	.829	21.06		CH-843	TR-16	CH-844	TR-16-A	MT-12
1" - 8	.655	16.64	.735	18.67		3/8"	CH-841	TR-13	CH-842	TR-13-A
1" - 9	.685	17.40	.774	19.66	CH-835		TR-14	CH-836	TR-14-A	MT-11
1" - 10	.712	18.08	.801	20.34	CH-837		TR-15	CH-838	TR-15-A	MT-11
1" - 11	.740	18.80	.829	21.06	CH-843		TR-16	CH-844	TR-16-A	MT-12
1" - 12	.763	19.38	.852	21.64	CH-845		TR-17	CH-846	TR-17-A	MT-12
1" - 13	.791	20.09	.880	22.35	CH-847		TR-18	CH-848	TR-18-A	MT-12
1" - 14	.810	20.57	.909	23.09	CH-849		TR-18	CH-850	TR-18-A	MT-13
1" - 15	.837	21.26	.936	23.77	CH-851		TR-19	CH-852	TR-19-A	MT-13
1" - 16	.837	21.26	.936	23.77	CH-851		TR-19	CH-852	TR-19-A	MT-13
1" - 17	.865	21.97	.964	24.48	CH-855		TR-21	CH-856	TR-21-A	MT-13
1" - 18-20	.865	21.97	.964	24.48	CH-855	TR-21	CH-856	TR-21-A	MT-13	
1 1/8" - 8	.776	19.71	.875	22.22	3/8"	CH-853	TR-20	CH-854	TR-20-A	MT-13
1 1/8" - 9	.810	20.57	.909	23.09		CH-849	TR-18	CH-850	TR-18-A	MT-13
1 1/8" - 10	.837	21.26	.936	23.77		CH-851	TR-19	CH-852	TR-19-A	MT-13
1 1/8" - 11	.865	21.97	.964	24.48		CH-855	TR-21	CH-856	TR-21-A	MT-13
1 1/8" - 12	.883	22.43	.982	24.94		CH-857	TR-21	CH-858	TR-21-A	MT-14
1 1/8" - 13	.916	23.57	1.015	25.78	1/2"	CH-859	TR-22	CH-860	TR-22-A	MT-14
1 1/8" - 14	.835	23.75	1.044	26.52		CH-861	TR-23	CH-862	TR-23-A	MT-15
1 1/8" - 15	.962	24.43	1.071	27.20		CH-863	TR-24	CH-864	TR-24-A	MT-15
1 1/8" - 16	.962	24.43	1.071	27.20		CH-863	TR-24	CH-864	TR-24-A	MT-15
1 1/8" - 17	.990	25.15	1.099	27.91		CH-867	TR-26	CH-868	TR-26-A	MT-16
1 1/8" - 18	.990	25.15	1.099	27.91		CH-867	TR-26	CH-868	TR-26-A	MT-16
1 1/4" - 8	.901	22.88	1.010	25.60		1/2"	CH-865	TR-25	CH-866	TR-25-A
1 1/4" - 9	.935	23.75	1.044	26.52	CH-861		TR-23	CH-862	TR-23-A	MT-15
1 1/4" - 10	.962	24.43	1.071	27.20	CH-863		TR-24	CH-864	TR-24-A	MT-15
1 1/4" - 11	.990	25.15	1.099	27.91	CH-867		TR-26	CH-868	TR-26-A	MT-16
1 1/4" - 12	1.013	25.73	1.122	28.50	CH-869		TR-27	CH-870	TR-27-A	MT-16
1 1/4" - 13	1.041	26.44	1.150	29.21	CH-871		TR-28	CH-872	TR-28-A	MT-17
1 1/4" - 14	1.060	26.92	1.169	29.69	CH-873		TR-29	CH-874	TR-29-A	MT-17
1 1/4" - 15	1.087	27.61	1.196	30.38	CH-875		TR-30	CH-876	TR-30-A	MT-17
1 1/4" - 16	1.087	27.61	1.196	30.38	CH-875		TR-30	CH-876	TR-30-A	MT-17
1 3/8" - 8	1.026	26.06	1.135	28.83	1/2"		CH-877	TR-31	CH-878	TR-31-A
1 3/8" - 9	1.060	26.92	1.169	29.69		CH-873	TR-29	CH-874	TR-29-A	MT-17
1 3/8" - 10	1.087	27.61	1.196	30.38		CH-875	TR-30	CH-876	TR-30-A	MT-17
1 3/8" - 11	1.115	28.32	1.224	31.09		CH-879	TR-30	CH-880	TR-30-A	MT-18
1 3/8" - 12	1.133	28.78	1.242	31.55		CH-881	TR-32	CH-882	TR-32-A	MT-18
1 3/8" - 13	1.160	29.46	1.275	32.38		CH-883	TR-33	CH-884	TR-33-A	MT-19
1 3/8" - 14	1.179	29.95	1.294	32.87		CH-885	TR-34	CH-886	TR-34-A	MT-20
1 3/8" - 15	1.206	30.63	1.321	33.55		CH-887	TR-35	CH-888	TR-35-A	MT-20
1 3/8" - 16	1.206	30.63	1.321	33.55		CH-887	TR-35	CH-888	TR-35-A	MT-20
1 1/2" - 8	1.145	29.08	1.260	32.00		1/2"	CH-889	TR-34	CH-890	TR-34-A
1 1/2" - 9	1.179	29.95	1.294	32.87	CH-885		TR-34	CH-886	TR-34-A	MT-20
1 1/2" - 10	1.206	30.63	1.321	33.55	CH-887		TR-35	CH-888	TR-35-A	MT-20
1 1/2" - 11	1.235	31.37	1.350	34.29	CH-891		TR-36	CH-892	TR-36-A	MT-20
1 1/2" - 12	1.257	31.93	1.372	34.85	CH-893		TR-37	CH-894	TR-37-A	MT-20
1 1/2" - 13	1.285	32.64	1.400	35.56	CH-895		TR-37	CH-896	TR-37-A	MT-21
1 1/2" - 14	1.285	32.64	1.400	35.56	CH-895		TR-37	CH-896	TR-37-A	MT-21
1 1/2" - 15	1.331	33.81	1.446	36.73	CH-897		TR-38	CH-898	TR-38-A	MT-21
1 1/2" - 16	1.331	33.81	1.446	36.73	CH-897		TR-38	CH-898	TR-38-A	MT-21
1 3/4" - 8	1.406	35.70	1.531	38.90	1/2"		CH-899	TR-38	CH-899RL	TR-38-A

Note: Expander CH 800 is also available as four or five roll expander see page 10-11.

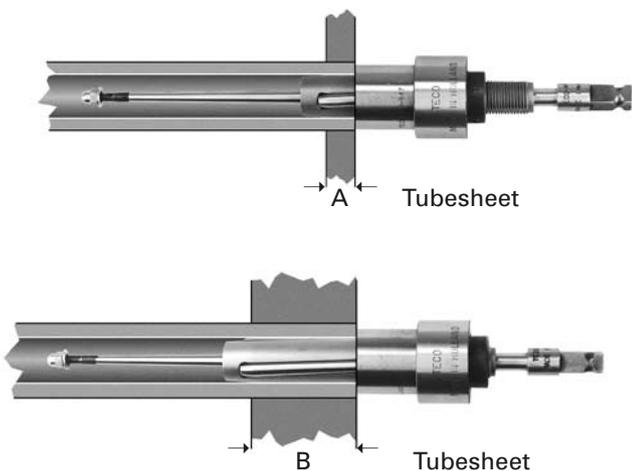
TECO TUBE EXPANDERS

for Condensers and Heat Exchangers

Selection Guide:

Model : CH 800
five roll type
expander

Tube Size I.D. .500" - 1.457"
(12.7 - 37.0 mm)



	TUBE SHEET THICKNESS	
	A MINIMUM	B MAXIMUM
TUBE EXPANDER WITH 1 1/2" ROLL LENGTH	1/4" (6.35 mm)	1 1/4" (31.75 mm)
TUBE EXPANDER WITH 2 1/4" ROLL LENGTH	1" (25.40 mm)	2" (50.80 mm)

TUBE O.D. AND G.A.	MIN. I.D. TUBE TOOL ENTERS		MAX. TOOL EXPANSION		SIZE SQUARE ON MANDREL	EXPANDER WITH 1 1/2" (38.1 mm) ROLLS		EXPANDER WITH 2 1/4" (57.1 mm) ROLLS		MANDREL NO.
	Inch	mm	Inch	mm		EXPANDER NO.	ROLL SET NO.	EXPANDER NO.	ROLL SET NO.	
5/8"-17-19	.499	12.67	.578	14.69	3/8"	CH-815-5	TR-4-5	CH-816-5	TR-4-A-5	MT-9
5/8"-20-22	.539	13.70	.601	15.27		CH-819-5	TR-4-5	CH-820-5	TR-4-A-5	MT-11
5/8"-23-24	.550	13.97	.627	15.93		CH-821-5	TR-5-5	CH-822-5	TR-5-A-5	MT-12
3/4"-13-14	.550	13.97	.627	15.93	1/2"	CH-821-5	TR-5-5	CH-822-5	TR-5-A-5	MT-12
3/4"-15-16	.596	15.14	.688	17.21		CH-827-5	TR-8-5	CH-828-5	TR-8-A-5	MT-12
3/4"-17-18	.619	15.72	.706	17.94		CH-829-5	TR-8-5	CH-830-5	TR-8-A-5	MT-13
3/4"-19-21	.642	16.31	.730	18.56		CH-831-5	TR-9-5	CH-832-5	TR-9-A-5	MT-13
3/4"-22-24	.670	17.02	.750	19.05	CH-833-5	TR-9-5	CH-834-5	TR-9-A-5	MT-14	

Note: For TECO four and five roll expanders we recommend a thin wall thrust collar, especially for 19-24 Gauge wall.



TUBE O.D. AND G.A.	MIN. I.D. TUBE TOOL ENTERS		MAX. TOOL EXPANSION		SIZE SQUARE ON MAN- DREL	EXPANDER WITH 1 1/2" (38.1 mm) ROLLS		EXPANDER WITH 2 1/4" (57.1 mm) ROLLS		MANDREL NO.
	Inch	mm	Inch	mm		EXPANDER NO.	ROLL SET NO.	EXPANDER NO.	ROLL SET NO.	
7/8"-13	.670	17.02	.750	19.05	1/2"	CH-833-5	TR-9-5	CH-834-5	TR-9-A-5	MT-14
7/8"-14	.685	17.40	.770	19.56		CH-835-5	TR-10-5	CH-836-5	TR-10-A-5	MT-14
7/8"-15-16	.712	18.08	.807	20.50		CH-837-5	TR-11-5	CH-838-5	TR-11-A-5	MT-16
7/8"-17-18	.740	18.80	.826	20.98		CH-843-5	TR-11-5	CH-844-5	TR-11-A-5	MT-17
7/8"-19-22	.763	19.38	.848	21.65		CH-845-5	TR-12-5	CH-846-5	TR-12-A-5	MT-17
7/8"-23-24	.791	20.09	.892	22.65		CH-847-5	TR-13-5	CH-848-5	TR-13-A-5	MT-18
1"-12	.763	19.38	.848	21.65		CH-845-5	TR-12-5	CH-846-5	TR-12-A-5	MT-17
1"-13	.791	20.09	.892	22.65		CH-847-5	TR-13-5	CH-848-5	TR-13-A-5	MT-18
1"-14	.810	20.57	.904	22.97		CH-849-5	TR-14-5	CH-850-5	TR-14-A-5	MT-18
1"-15-16	.837	21.26	.933	23.69	CH-851-5	TR-15-5	CH-852-5	TR-15-A-5	MT-18	
1"-17-20	.865	21.97	.971	24.67	CH-855-5	TR-15-5	CH-856-5	TR-15-A-5	MT-20	
1"-21-24	.883	22.43	.999	25.38	CH-857-5	TR-15-5	CH-858-5	TR-15-A-5	MT-21	
1 1/8"-11	.865	21.97	.971	24.67	1/2"	CH-855-5	TR-15-5	CH-856-5	TR-15-A-5	MT-20
1 1/8"-12	.883	22.43	.999	25.38		CH-857-5	TR-15-5	CH-858-5	TR-15-A-5	MT-21
1 1/8"-13-14	.916	23.57	1.013	25.74		CH-859-5	TR-16-5	CH-860-5	TR-16-A-5	MT-21
1 1/8"-15-16	.962	24.43	1.064	27.02		CH-863-5	TR-18-5	CH-864-5	TR-18-A-5	MT-21
1 1/8"-17-20	.990	25.15	1.091	27.72		CH-867-5	TR-19-5	CH-868-5	TR-19-A-5	MT-21
1 1/8"-21-24	1.013	25.73	1.118	28.40		CH-869-5	TR-21-5	CH-870-5	TR-21-A-5	MT-21
1 1/4"-10	.962	24.43	1.064	27.02		CH-863-5	TR-18-5	CH-864-5	TR-18-A-5	MT-21
1 1/4"-11	.990	25.15	1.091	27.72		CH-867-5	TR-19-5	CH-868-5	TR-19-A-5	MT-21
1 1/4"-12	1.013	25.73	1.118	28.40		CH-869-5	TR-21-5	CH-870-5	TR-21-A-5	MT-21
1 1/4"-15-16	1.087	27.61	1.204	30.58	CH-875-5	TR-21-5	CH-876-5	TR-21-A-5	MT-22	
1 1/4"-17-22	1.115	28.32	1.259	31.98	CH-879-5	TR-23-5	CH-880-5	TR-23-A-5	MT-22	
1 1/4"-23-25	1.133	28.78	1.285	32.64	CH-881-5	TR-24-5	CH-882-5	TR-24-A-5	MT-22	
1 3/8"-12	1.133	28.78	1.285	32.64	1/2"	CH-881-5	TR-24-5	CH-882-5	TR-24-A-5	MT-22
1 3/8"-14	1.179	29.95	1.294	32.88		CH-885-5	TR-23-5	CH-886-5	TR-23-A-5	MT-23
1 1/2"-12	1.257	31.93	1.375	34.92	1/2"	CH-893-5	TR-26-5	CH-894-5	TR-26-A-5	MT-24
1 1/2"-17-24	1.374	34.90	1.505	38.22		CH-899-5	TR-29-5	CH-899-RL-5	TR-29-A-5	MT-25

Also available as four roll expander, sizes as five roll expanders.

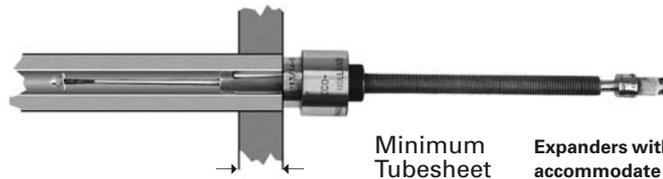
Note: For TECO four and five roll expanders we recommend a thin wall thrust collar, especially for 19-24 Gauge wall.

TECO TUBE EXPANDERS for Condensers and Heat Exchangers

Selection Guide:

Model : CH 1200

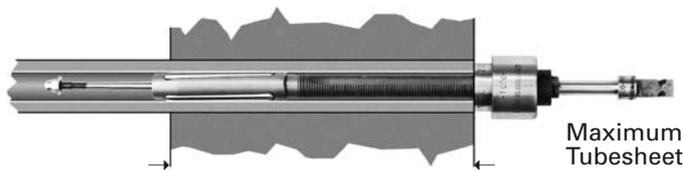
Tube Size I.D. .335" - 1.457"
(8.5 - 37.0 mm)



Minimum Tubesheet

Expanders with 1 1/2" (38.1mm) long rolls will accommodate tube sheet thickness as follows:

STANDARD REACH....	3/4" to 5 7/8"	(19.05 mm to 149.22 mm)
"B" REACH....	3/4" to 10"	(19.05 mm to 254.00 mm)
"C" REACH....	3/4" to 12"	(19.05 mm to 304.80 mm)



Maximum Tubesheet

Expanders with 2 1/4" (57.1mm) long rolls will accommodate tube sheet thickness as follows:

STANDARD REACH....	1 1/2" to 6 1/2"	(38.1 mm to 165.10 mm)
"B" REACH....	1 1/2" to 10 3/4"	(38.1 mm to 273.05 mm)
"C" REACH....	1 1/2" to 12 3/4"	(38.1 mm to 323.85 mm)

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

TUBE O.D. AND G.A.	MIN. I.D. TUBE TOOL ENTERS		MAX. TOOL EXPANSION		SIZE SQUARE ON MANDREL	EXPANDER WITH 1 1/2" (38.1 mm) ROLLS		EXPANDER WITH 2 1/4" (57.1 mm) ROLLS		MANDREL NO.	
	Inch	mm	Inch	mm		EXPANDER NO.	ROLL SET NO.	EXPANDER NO.	ROLL SET NO.		
1/2"-14	.324	8.23	.374	9.50	3/8"	CH-1197	TR-797			MT-1197	
1/2"-15	.349	8.86	.398	10.11		CH-1199	TR-1			MT-1199	
1/2"-16	.360	9.14	.410	10.41		CH-1201	TR-1			MT-51	
1/2"-17	.374	9.50	.424	10.77		CH-1203	TR-2			MT-51	
1/2"-18	.392	9.96	.447	11.35		CH-1205	TR-3			MT-52	
5/8"-12	.392	9.96	.447	11.35	3/8"	CH-1205	TR-3			MT-52	
5/8"-13	.425	10.79	.480	12.19		CH-1207	TR-4			MT-53	
5/8"-14	.449	11.40	.509	12.73		CH-1209	TR-4	CH-1210	TR-4-A	MT-54	
5/8"-15	.471	11.96	.536	13.61		CH-1211	TR-5	CH-1212	TR-5-A	MT-55	
5/8"-16	.485	12.32	.550	13.97		CH-1213	TR-6	CH-1214	TR-6-A	MT-55	
5/8"-17	.499	12.67	.564	14.32		CH-1215	TR-6	CH-1216	TR-6-A	MT-56	
5/8"-18	.517	13.13	.572	14.53		CH-1217	TR-7	CH-1218	TR-7-A	MT-57	
3/4"-10	.471	11.96	.536	13.61		3/8"	CH-1211	TR-5	CH-1212	TR-5-A	MT-55
3/4"-11	.499	12.67	.564	14.32			CH-1215	TR-6	CH-1216	TR-6-A	MT-56
3/4"-12	.522	13.30	.582	15.20			CH-1219-N	TR-7	CH-1220-N	TR-7-A	MT-58
3/4"-13	.550	13.97	.615	15.62	CH-1221		TR-8	CH-1222	TR-8-A	MT-58	
3/4"-14	.574	14.58	.639	16.23	CH-1223		TR-9	CH-1224	TR-9-A	MT-58	
3/4"-15	.596	15.14	.661	16.79	CH-1225		TR-10	CH-1226	TR-10-A	MT-58	
3/4"-16	.605	15.37	.685	17.40	CH-1227		TR-10	CH-1228	TR-10-A	MT-59	
3/4"-17	.619	15.72	.699	17.75	CH-1229		TR-11	CH-1230	TR-11-A	MT-59	
3/4"-18	.619	15.72	.699	17.75	CH-1229		TR-11	CH-1230	TR-11-A	MT-59	



TUBE O.D. AND G.A.	MIN. I.D. TUBE TOOL ENTERS		MAX. TOOL EXPANSION		SIZE SQUARE ON MANDREL	EXPANDER WITH 1 1/2" (38.1 mm) ROLLS		EXPANDER WITH 2 1/4" (57.1 mm) ROLLS		MANDREL NO.
	Inch	mm	Inch	mm		EXPANDER NO.	ROLL SET NO.	EXPANDER NO.	ROLL SET NO.	
7/8"-10	.596	15.14	.661	16.79	3/8"	CH-1225	TR-10	CH-1226	TR-10-A	MT-58
7/8"-11	.619	15.72	.699	17.75		CH-1229	TR-11	CH-1230	TR-11-A	MT-59
7/8"-12	.642	16.31	.722	18.34		CH-1231	TR-12	CH-1232	TR-12-A	MT-59
7/8"-13	.670	17.02	.750	19.05		CH-1233	TR-13	CH-1234	TR-13-A	MT-60
7/8"-14	.685	17.40	.774	19.66		CH-1235	TR-14	CH-1236	TR-14-A	MT-61
7/8"-15	.712	18.08	.801	20.34		CH-1237	TR-15	CH-1238	TR-15-A	MT-61
7/8"-16	.726	18.44	.815	20.70		CH-1239	TR-15	CH-1240	TR-15-A	MT-62
7/8"-17	.740	18.80	.829	21.06		CH-1243	TR-16	CH-1244	TR-16-A	MT-62
7/8"-18	.740	18.80	.829	21.06	CH-1243	TR-16	CH-1244	TR-16-A	MT-62	
1" - 8	.655	16.64	.735	18.67	3/8"	CH-1241	TR-13	CH-1242	TR-13-A	MT-59
1" - 9	.685	17.40	.774	19.66		CH-1235	TR-14	CH-1236	TR-14-A	MT-61
1" -10	.712	18.08	.801	20.34		CH-1237	TR-15	CH-1238	TR-15-A	MT-61
1" -11	.740	18.80	.829	21.06		CH-1243	TR-16	CH-1244	TR-16-A	MT-62
1" -12	.763	19.38	.852	21.64		CH-1245	TR-17	CH-1246	TR-17-A	MT-62
1" -13	.791	20.09	.880	22.35		CH-1247	TR-18	CH-1248	TR-18-A	MT-62
1" -14	.810	20.57	.909	23.09		CH-1249	TR-18	CH-1250	TR-18-A	MT-63
1" -15	.837	21.26	.936	23.77		CH-1251	TR-19	CH-1252	TR-19-A	MT-63
1" -16	.837	21.26	.936	23.77	CH-1251	TR-19	CH-1252	TR-19-A	MT-63	
1" -17	.865	21.97	.964	24.48	CH-1255	TR-21	CH-1256	TR-21-A	MT-63	
1" -18-20	.865	21.97	.964	24.48	CH-1255	TR-21	CH-1256	TR-21-A	MT-63	
1 1/8" - 8	.776	19.71	.875	22.22	3/8"	CH-1253	TR-20	CH-1254	TR-20-A	MT-63
1 1/8" - 9	.810	20.57	.909	23.09		CH-1249	TR-18	CH-1250	TR-18-A	MT-63
1 1/8" -10	.837	21.26	.936	23.77		CH-1251	TR-19	CH-1252	TR-19-A	MT-63
1 1/8" -11	.865	21.97	.964	24.48		CH-1255	TR-21	CH-1256	TR-21-A	MT-63
1 1/8" -12	.883	22.43	.982	24.94	1/2"	CH-1257	TR-21	CH-1258	TR-21-A	MT-64
1 1/8" -13	.916	23.57	1.015	25.78		CH-1259	TR-22	CH-1260	TR-22-A	MT-64
1 1/8" -14	.835	23.75	1.044	26.52		CH-1261	TR-23	CH-1262	TR-23-A	MT-65
1 1/8" -15	.962	24.43	1.071	27.20		CH-1263	TR-24	CH-1264	TR-24-A	MT-65
1 1/8" -16	.962	24.43	1.071	27.20		CH-1263	TR-24	CH-1264	TR-24-A	MT-65
1 1/8" -17	.990	25.15	1.099	27.91		CH-1267	TR-26	CH-1268	TR-26-A	MT-66
1 1/8" -18	.990	25.15	1.099	27.91		CH-1267	TR-26	CH-1268	TR-26-A	MT-66
1 1/4" - 8	.901	22.88	1.010	25.60		1/2"	CH-1265	TR-25	CH-1266	TR-25-A
1 1/4" - 9	.935	23.75	1.044	26.52	CH-1261		TR-23	CH-1262	TR-23-A	MT-65
1 1/4" -10	.962	24.43	1.071	27.20	CH-1263		TR-24	CH-1264	TR-24-A	MT-65
1 1/4" -11	.990	25.15	1.099	27.91	CH-1267		TR-26	CH-1268	TR-26-A	MT-66
1 1/4" -12	1.013	25.73	1.122	28.50	CH-1269		TR-27	CH-1270	TR-27-A	MT-66
1 1/4" -13	1.041	26.44	1.150	29.21	CH-1271		TR-28	CH-1272	TR-28-A	MT-67
1 1/4" -14	1.060	26.92	1.169	29.69	CH-1273		TR-29	CH-1274	TR-29-A	MT-67
1 1/4" -15	1.087	27.61	1.196	30.38	CH-1275		TR-30	CH-1276	TR-30-A	MT-67
1 1/4" -16	1.087	27.61	1.196	30.38	CH-1275	TR-30	CH-1276	TR-30-A	MT-67	
1 3/8" - 8	1.026	26.06	1.135	28.83	1/2"	CH-1277	TR-31	CH-1278	TR-31-A	MT-67
1 3/8" - 9	1.060	26.92	1.169	29.69		CH-1273	TR-29	CH-1274	TR-29-A	MT-67
1 3/8" -10	1.087	27.61	1.196	30.38		CH-1275	TR-30	CH-1276	TR-30-A	MT-67
1 3/8" -11	1.115	28.32	1.224	31.09		CH-1279	TR-30	CH-1280	TR-30-A	MT-68
1 3/8" -12	1.133	28.78	1.242	31.55		CH-1281	TR-32	CH-1282	TR-32-A	MT-68
1 3/8" -13	1.160	29.46	1.275	32.38		CH-1283	TR-33	CH-1284	TR-33-A	MT-69
1 3/8" -14	1.179	29.95	1.294	32.87		CH-1285	TR-34	CH-1286	TR-34-A	MT-70
1 3/8" -15	1.206	30.63	1.321	33.55		CH-1287	TR-35	CH-1288	TR-35-A	MT-70
1 3/8" -16	1.206	30.63	1.321	33.55	CH-1287	TR-35	CH-1288	TR-35-A	MT-70	
1 1/2" - 8	1.145	29.08	1.260	32.00	1/2"	CH-1289	TR-34	CH-1290	TR-34-A	MT-69
1 1/2" - 9	1.179	29.95	1.294	32.87		CH-1285	TR-34	CH-1286	TR-34-A	MT-70
1 1/2" -10	1.206	30.63	1.321	33.55		CH-1287	TR-35	CH-1288	TR-35-A	MT-70
1 1/2" -11	1.235	31.37	1.350	34.29		CH-1291	TR-36	CH-1292	TR-36-A	MT-70
1 1/2" -12	1.257	31.93	1.372	34.85		CH-1293	TR-37	CH-1294	TR-37-A	MT-70
1 1/2" -13	1.285	32.64	1.400	35.56		CH-1295	TR-37	CH-1296	TR-37-A	MT-71
1 1/2" -14	1.285	32.64	1.400	35.56		CH-1295	TR-37	CH-1296	TR-37-A	MT-71
1 1/2" -15	1.331	33.81	1.446	36.73		CH-1297	TR-38	CH-1298	TR-38-A	MT-71
1 1/2" -16	1.331	33.81	1.446	36.73	CH-1297	TR-38	CH-1298	TR-38-A	MT-71	
1 3/4" - 8	1.406	35.70	1.531	38.90	1/2"	CH-1299	TR-38	CH-1299RL	TR-38-A	MT-72

Note: Expander CH 1200 is also available as four or five roll expander see page 14-15.

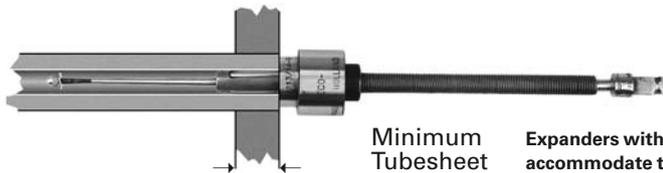
TECO TUBE EXPANDERS

for Condensers and Heat Exchangers

Selection Guide:

Model : CH 1200
five roll type
expander

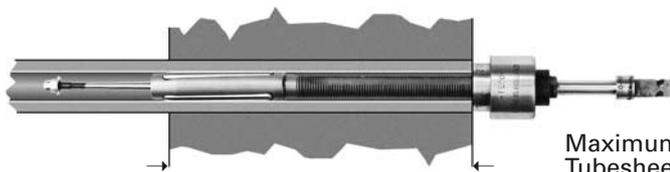
Tube Size I.D. .500" - 1.457"
(12.7 - 37.0 mm)



Minimum Tubesheet

Expanders with 1 1/2" (38.1mm) long rolls will accommodate tube sheet thickness as follows:

STANDARD REACH....	3/4" to 5 7/8"	(19.05 mm to 149.22 mm)
"B" REACH....	3/4" to 10"	(19.05 mm to 254.00 mm)
"C" REACH....	3/4" to 12"	(19.05 mm to 304.80 mm)



Maximum Tubesheet

Expanders with 2 1/4" (57.1mm) long rolls will accommodate tube sheet thickness as follows:

STANDARD REACH....	1 1/2" to 6 1/2"	(38.1 mm to 165.10 mm)
"B" REACH....	1 1/2" to 10 3/4"	(38.1 mm to 273.05 mm)
"C" REACH....	1 1/2" to 12 3/4"	(38.1 mm to 323.85 mm)

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

TUBE O.D. AND G.A.	MIN. I.D. TUBE TOOL ENTERS		MAX. TOOL EXPANSION		SIZE SQUARE ON MANDREL	EXPANDER WITH 1 1/2" (38.1 mm) ROLLS		EXPANDER WITH 2 1/4" (57.1 mm) ROLLS		MANDREL NO.
	Inch	mm	Inch	mm		EXPANDER NO.	ROLL SET NO.	EXPANDER NO.	ROLL SET NO.	
5/8"-17-19	.499	12.67	.578	14.69	3/8"	CH-1215-5	TR- 4-5	CH-1216-5	TR- 4-A-5	MT-59
5/8"-20-22	.539	13.70	.601	15.27		CH-1219-5	TR- 4-5	CH-1220-5	TR- 4-A-5	MT-61
5/8"-23-24	.550	13.97	.627	15.93		CH-1221-5	TR- 5-5	CH-1222-5	TR- 5-A-5	MT-62
3/4"-13-14	.550	13.97	.627	15.93	1/2"	CH-1221-5	TR- 5-5	CH-1222-5	TR- 5-A-5	MT-62
3/4"-15-16	.596	15.14	.688	17.21		CH-1227-5	TR- 8-5	CH-1228-5	TR- 8-A-5	MT-62
3/4"-17-18	.619	15.72	.706	17.94		CH-1229-5	TR- 8-5	CH-1230-5	TR- 8-A-5	MT-63
3/4"-19-21	.642	16.31	.730	18.56		CH-1231-5	TR- 9-5	CH-1232-5	TR- 9-A-5	MT-63
3/4"-22-24	.670	17.02	.750	19.05	CH-1233-5	TR- 9-5	CH-1234-5	TR- 9-A-5	MT-64	

Note: For TECO four and five roll expanders we recommend a thin wall thrust collar, especially for 19-24 Gauge wall.



TUBE O.D. AND G.A.	MIN. I.D. TUBE TOOL ENTERS		MAX. TOOL EXPANSION		SIZE SQUARE ON MAN- DREL	EXPANDER WITH 1 1/2" (38.1 mm) ROLLS		EXPANDER WITH 2 1/4" (57.1 mm) ROLLS		MANDREL NO.	
	Inch	mm	Inch	mm		EXPANDER NO.	ROLL SET NO.	EXPANDER NO.	ROLL SET NO.		
7/8"-13	.670	17.02	.750	19.05	1/2"	CH-1233-5	TR-9-5	CH-1234-5	TR-9-A-5	MT-64	
7/8"-14	.685	17.40	.770	19.56		CH-1235-5	TR-10-5	CH-1236-5	TR-10-A-5	MT-64	
7/8"-15-16	.712	18.08	.807	20.50		CH-1237-5	TR-11-5	CH-1238-5	TR-11-A-5	MT-66	
7/8"-17-18	.740	18.80	.826	20.98		CH-1243-5	TR-11-5	CH-1244-5	TR-11-A-5	MT-67	
7/8"-19-22	.763	19.38	.848	21.65		CH-1245-5	TR-12-5	CH-1246-5	TR-12-A-5	MT-67	
7/8"-23-24	.791	20.09	.892	22.65		CH-1247-5	TR-13-5	CH-1248-5	TR-13-A-5	MT-68	
1"-12	.763	19.38	.848	21.65		1/2"	CH-1245-5	TR-12-5	CH-1246-5	TR-12-A-5	MT-67
1"-13	.791	20.09	.892	22.65			CH-1247-5	TR-13-5	CH-1248-5	TR-13-A-5	MT-68
1"-14	.810	20.57	.904	22.97			CH-1249-5	TR-14-5	CH-1250-5	TR-14-A-5	MT-68
1"-15-16	.837	21.26	.933	23.69	CH-1251-5		TR-15-5	CH-1252-5	TR-15-A-5	MT-68	
1"-17-20	.865	21.97	.971	24.67	CH-1255-5		TR-15-5	CH-1256-5	TR-15-A-5	MT-70	
1"-21-24	.883	22.43	.999	25.38	CH-1257-5		TR-15-5	CH-1258-5	TR-15-A-5	MT-71	
1 1/8"-11	.865	21.97	.971	24.67	1/2"		CH-1255-5	TR-15-5	CH-1256-5	TR-15-A-5	MT-70
1 1/8"-12	.883	22.43	.999	25.38			CH-1257-5	TR-15-5	CH-1258-5	TR-15-A-5	MT-71
1 1/8"-13-14	.916	23.57	1.013	25.74			CH-1259-5	TR-16-5	CH-1260-5	TR-16-A-5	MT-71
1 1/8"-15-16	.962	24.43	1.064	27.02		CH-1263-5	TR-18-5	CH-1264-5	TR-18-A-5	MT-71	
1 1/8"-17-20	.990	25.15	1.091	27.72		CH-1267-5	TR-19-5	CH-1268-5	TR-19-A-5	MT-71	
1 1/8"-21-24	1.013	25.73	1.118	28.40		CH-1269-5	TR-21-5	CH-1270-5	TR-21-A-5	MT-71	
1 1/4"-10	.962	24.43	1.064	27.02		1/2"	CH-1263-5	TR-18-5	CH-1264-5	TR-18-A-5	MT-71
1 1/4"-11	.990	25.15	1.091	27.72			CH-1267-5	TR-19-5	CH-1268-5	TR-19-A-5	MT-71
1 1/4"-12	1.013	25.73	1.118	28.40			CH-1269-5	TR-21-5	CH-1270-5	TR-21-A-5	MT-71
1 1/4"-15-16	1.087	27.61	1.204	30.58	CH-1275-5		TR-21-5	CH-1276-5	TR-21-A-5	MT-72	
1 1/4"-17-22	1.115	28.32	1.259	31.98	CH-1279-5		TR-23-5	CH-1280-5	TR-23-A-5	MT-72	
1 1/4"-23-25	1.133	28.78	1.285	32.64	CH-1281-5		TR-24-5	CH-1282-5	TR-24-A-5	MT-72	
1 3/8"-12	1.133	28.78	1.285	32.64	1/2"		CH-1281-5	TR-24-5	CH-1282-5	TR-24-A-5	MT-72
1 3/8"-14	1.179	29.95	1.294	32.88			CH-1285-5	TR-23-5	CH-1286-5	TR-23-A-5	MT-73
1 1/2"-12	1.257	31.93	1.375	34.92	1/2"		CH-1293-5	TR-26-5	CH-1294-5	TR-26-A-5	MT-74
1 1/2"-17-24	1.374	34.90	1.505	38.22		CH-1299-5	TR-29-5	CH-1299-RL-5	TR-29-A-5	MT-75	

Also available as four roll expander, sizes as five roll expander.

Note: For TECO four and five roll expanders we recommend a thin wall thrust collar, especially for 19-24 Gauge wall.

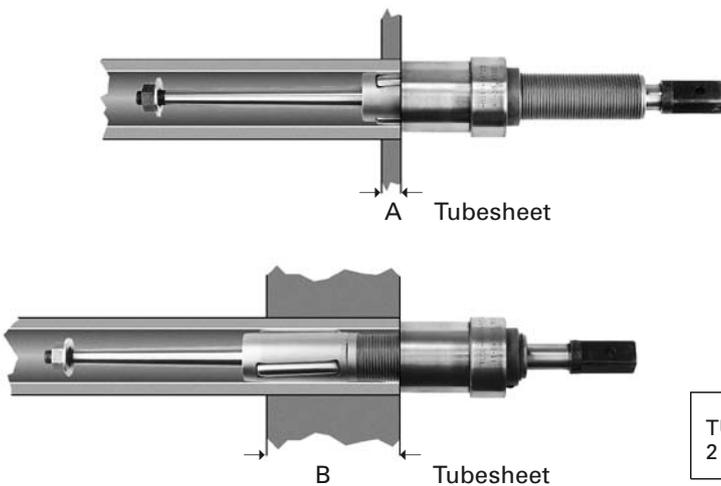
TECO TUBE EXPANDERS

for Condensers and Heat Exchangers

Selection Guide:

Model : CH 8012

Tube Size I.D. 1.358" - 4.000"
(34.5 - 101.6 mm)



	TUBE SHEET THICKNESS	
	A MINIMUM	B MAXIMUM
TUBE EXPANDER WITH 2 1/4" ROLL LENGTH	1/4" (6.35 mm)	3 3/4" (95.25 mm)

TUBE O.D. AND G.A.	MIN. I.D. TUBE TOOL ENTERS		MAX. TOOL EXPANSION		SIZE SQUARE ON MANDREL	EXPANDER WITH 2 1/4" (57.1 mm) ROLLS		MANDREL NO.
	Inch	mm	Inch	mm		EXPANDER NO.	ROLL SET NO.	
1 3/4" - 8	1.358	34.50	1.552	39.42	3/4"	CH-8012-1 3/4-8	TR-33-A	MT-90
1 3/4" - 9-10	1.420	36.10	1.617	41.08		CH-8012-1 3/4-10	TR-37-A	MT-90
1 3/4" - 11	1.452	36.90	1.637	41.58		CH-8012-1 3/4-11	TR-42	MT-90
1 3/4" - 12	1.480	37.60	1.659	42.14		CH-8012-1 3/4-12	TR-44	MT-90
1 3/4" - 13	1.507	38.30	1.687	42.84		CH-8012-1 3/4-13	TR-46	MT-90
1 3/4" - 14	1.532	38.90	1.711	43.46		CH-8012-1 3/4-14	TR-48	MT-90
2" - 6-7	1.563	39.70	1.791	45.51		3/4"	CH-8012-2-6-7	TR-48
2" - 8-10	1.625	41.30	1.859	47.23	CH-8012-2-8-10		TR-50	MT-91
2" - 11	1.662	42.00	1.888	47.95	CH-8012-2-11		TR-52	MT-91
2" - 12	1.685	42.80	1.910	48.51	CH-8012-2-12		TR-54	MT-91
2" - 13-16	1.724	43.80	1.949	49.51	CH-8012-2-13-16		TR-56	MT-91
2 1/4" - 5	1.788	45.40	2.019	51.28	3/4"		CH-8012-2 1/4- 5	TR-50
2 1/4" - 6- 7	1.839	46.70	2.069	52.56		CH-8012-2 1/4- 6- 7	TR-54	MT-92
2 1/4" - 8-10	1.882	47.80	2.109	53.56		CH-8012-2 1/4- 8-10	TR-56	MT-92
2 1/4" - 11	1.921	48.50	2.137	54.28		CH-8012-2 1/4- 11	TR-58	MT-92
2 1/4" - 12	1.933	49.10	2.159	54.84		CH-8012-2 1/4- 12	TR-60	MT-92
2 1/4" - 13-16	1.936	49.80	2.187	55.56		CH-8012-2 1/4- 13-16	TR-62	MT-92

Note: Expander CH 8012 is also available as four or five roll expander.



TUBE O.D. AND G.A.	MIN. I.D. TUBE TOOL ENTERS		MAX. TOOL EXPANSION		SIZE SQUARE ON MAN- DREL	EXPANDER WITH 2 1/4" (57.1 mm) ROLLS		MANDREL NO.
	Inch	mm	Inch	mm		EXPANDER NO.	ROLL SET NO.	
2 1/2"-5-7 2 1/2"-8-12 2 1/2"-13-16	2.043 2.134 2.232	51.90 54.20 56.70	2.348 2.409 2.437	59.64 61.20 61.90	1" 3/4"	CH-8012-2 1/2- 5- 7 CH-8012-2 1/2- 8-12 CH-8012-2 1/2-13-16	TR-62 TR-64 TR-64	MT-96 MT-93 MT-94
2 3/4"-5-7 2 3/4"-8-14	2.291 2.366	58.20 60.10	2.598 2.673	65.98 67.90	1"	CH-8012-2 3/4- 5- 7 CH-8012-2 3/4- 8-14	TR-64 TR-66	MT-96 MT-96
3"-3-4 3"-5 3"-6-7 3"-8-14	2.449 2.478 2.547 2.618	62.20 62.90 64.70 66.50	2.752 2.791 2.867 2.924	69.90 70.90 72.82 74.26	1"	CH-8012-3-3-4 CH-8012-3-5 CH-8012-3-6-7 CH-8012-3-8-14	TR-64 TR-64 TR-66 TR-67	MT-97-SP MT-98 MT-98 MT-96
3 1/4"-5-9 3 1/4"-7-14	2.744 2.871	69.70 72.90	3.045 3.174	77.35 80.63	1"	CH-8012-3 1/4- 5- 9 CH-8012-3 1/4- 7-14	TR-67 TR-68	MT-97 MT-97
3 1/2"-7-13 3 1/2"-8-14 3 1/2"-11-18	3.043 3.122 3.224	77.30 79.30 81.90	3.361 3.440 3.543	85.38 87.38 89.98	1"	CH-8012-3 1/2- 7-13 CH-8012-3 1/2- 8-14 CH-8012-3 1/2-11-18	TR-69 TR-69 TR-70	MT-98 MT-99 MT-99
4"-6-11 4"-10-16 4"-12-18	3.575 3.701 3.732	90.80 94.00 94.80	3.898 4.014 4.050	99.00 100.96 102.86	1"	CH-8012-4-6-11 CH-8012-4-10-16 CH-8012-4-12-18	TR-71 TR-72 TR-71	MT-99 MT-99 MT-100
4 1/4"-8-12	3.851	97.80	4.179	105.76	1"	CH-8012-4 1/4- 8-12	TR-72	MT-100
4 1/2"-2-3	3.851	97.80	4.179	105.76	1"	CH-8012-4 1/2- 2- 3	TR-72	MT-100

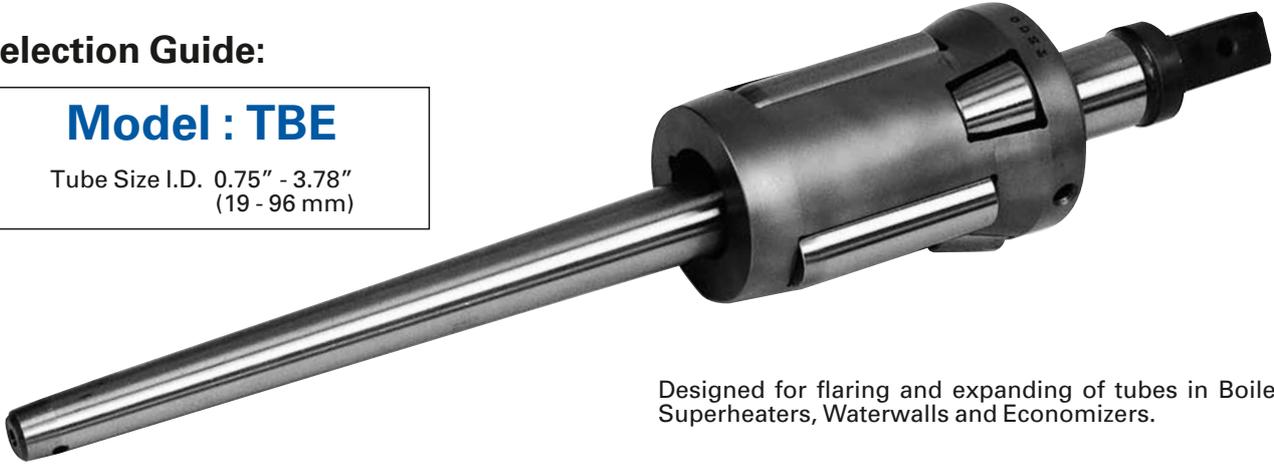
Note: Expander CH 8012 is also available as four or five roll expander.

TECO TBE SERIES BOILER TUBE EXPANDERS

Selection Guide:

Model : TBE

Tube Size I.D. 0.75" - 3.78"
(19 - 96 mm)



Designed for flaring and expanding of tubes in Boilers, Superheaters, Waterwalls and Economizers.

TOOL NO.	MIN. I.D. TUBE TOOL		MAX. TOOL EXPANSION		STD. ROLL LENGHT O.A.L.		ROLL EXPANSION & FLARE	MANDREL NO.	MANDREL O.A.L.		SHORT MANDREL SET (3 PCS)	SMS O.A.L.		SIZE SQUARE ON MANDREL
	mm	Inch	mm	Inch	mm	Inch			mm	Inch		mm	Inch	
TBE-19	19	0.75	22	0.87	42	1.65	TBR-12	TBM-19	195	7.68				1/2"
TBE-20	20	0.79	23	0.91	42	1.65	TBR-12	TBM-20	195	7.68				1/2"
TBE-22	22	0.87	25	0.98	42	1.65	TBR-12	TBM-22	195	7.68				1/2"
TBE-23	23	0.91	26	1.02	42	1.65	TBR-13	TBM-23	195	7.68				1/2"
TBE-24	24	0.94	27	1.06	42	1.65	TBR-13	TBM-24	195	7.68				1/2"
TBE-25	25	0.98	28	1.10	42	1.65	TBR-13	TBM-25	195	7.68				1/2"
TBE-27	27	1.06	30	1.18	42	1.65	TBR-15	TBM-27	200	7.87				1/2"
TBE-28	28	1.10	32	1.26	42	1.65	TBR-16	TBM-28	260	10.24	TBMS-28	175	6.89	3/4"
TBE-29	29	1.14	33	1.30	42	1.65	TBR-16	TBM-29	260	10.24	TBMS-29	175	6.89	3/4"
TBE-30	30	1.18	34	1.34	42	1.65	TBR-16	TBM-30	260	10.24	TBMS-30	175	6.89	3/4"
TBE-32	32	1.26	36	1.42	42	1.65	TBR-17	TBM-32	260	10.24	TBMS-32	175	6.89	3/4"
TBE-35	35	1.38	41	1.61	42	1.65	TBR-21	TBM-37	310	12.20	TBMS-37	188	7.40	3/4"
TBE-37	37	1.46	43	1.69	42	1.65	TBR-22	TBM-37	310	12.20	TBMS-37	188	7.40	3/4"
TBE-40	40	1.57	46	1.81	50	1.97	TBR-40	TBM-42	310	12.20	TBMS-42	205	8.07	3/4"
TBE-42	42	1.65	48	1.89	50	1.97	TBR-23	TBM-42	310	12.20	TBMS-42	205	8.07	3/4"
TBE-44	44	1.73	50	1.97	50	1.97	TBR-23	TBM-44	310	12.20	TBMS-44	205	8.07	3/4"
TBE-47	47	1.85	54	2.13	50	1.97	TBR-24	TBM-47	338	13.31	TBMS-47	218	8.58	3/4"
TBE-49	49	1.93	56	2.20	50	1.97	TBR-24	TBM-49	338	13.31	TBMS-49	218	8.58	3/4"
TBE-52	52	2.05	59	2.32	50	1.97	TBR-25	TBM-49	338	13.31	TBMS-49	218	8.58	3/4"
TBE-54	54	2.13	62	2.44	50	1.97	TBR-26	TBM-54	375	14.76	TBMS-54	230	9.06	3/4"
TBE-57	57	2.24	66	2.60	50	1.97	TBR-27	TBM-57	395	15.55	TBMS-57	235	9.25	3/4"
TBE-60	60	2.36	69	2.72	50	1.97	TBR-28	TBM-57	395	15.55	TBMS-57	235	9.25	3/4"
TBE-65	65	2.56	74	2.91	50	1.97	TBR-29	TBM-65	395	15.55	TBMS-65	235	9.25	3/4"
TBE-68	68	2.68	78	3.07	50	1.97	TBR-30	TBM-72	425	16.73	TBMS-72	255	10.04	1"
TBE-72	72	2.83	82	3.23	50	1.97	TBR-31	TBM-72	425	16.73	TBMS-72	255	10.04	1"
TBE-77	77	3.03	87	3.43	50	1.97	TBR-32	TBM-77	425	16.73	TBMS-77	255	10.04	1"
TBE-82	82	3.23	92	3.62	50	1.97	TBR-33	TBM-82	425	16.73	TBMS-82	255	10.04	1"
TBE-86	86	3.39	96	3.78	50	1.97	TBR-34	TBM-86	425	16.73	TBMS-86	255	10.04	1"
TBE-90	90	3.54	102	4.02	50	1.97	TBR-34	TBM-90	485	19.09	TBMS-90	275	10.83	1"
TBE-96	96	3.78	108	4.25	50	1.97	TBR-35	TBM-96	485	19.09	TBMS-96	275	10.83	1"

Extra roll length:

TBE-19 up to TBE-27, 30 mm (1.18") OR 50 mm (1.97").

TBE-28 up to TBE-37, 30 mm (1.18") OR 50 mm (1.97") OR 60 mm (2.36") OR 70 mm (2.76").

TBE-40 up to TBE-96, 40 mm (1.57") OR 60 mm (2.36") OR 70 mm (2.76") OR 80 mm (3.15") OR 90 mm (3.54") OR 100 mm (3.94").

Expanders from TBE-35 to TBE-96 have metal roll retainer.

Expanders from TBE-19 to TBE-32 have pin hole rather than metal roll retainer.

If you order expander TBE-54 with rolls of 50 mm you should specify TBE-5450, with 60 mm TBE-5460.

Short mandrel set with shorter length on request.

TECO TUBE EXPANDERS for Condensers and Heat Exchangers

Selection Guide:

Model : TTR 800

Tube Size I.D. .313" - 1.378"
(7.9 - 35 mm)



TECO TACK Rolling Tube Expander

Conical expander to expand the tube at the tube sheet face, before tube to tubesheet welding.

EXPANDER NO.	MIN. TOOL EXPANSION		MAX. EXPANSION		SIZE SQUARE ON MANDREL	ROLL SET NO.	MANDREL NO.
	Inch	mm	Inch	mm			
TTR-797	.313	7.9	.354	9.0	3/8 "	TR-797	MT-797
TTR-801	.349	8.9	.390	9.9	3/8 "	TR-1	MT-1
TTR-805	.381	9.7	.427	10.8	3/8 "	TR-3	MT-2
TTR-811	.433	11.0	.515	13.1	3/8 "	TR-5	MT-5
TTR-815	.461	11.7	.543	13.8	3/8 "	TR-6	MT-6
TTR-819	.480	12.2	.574	14.6	3/8 "	TR-7	MT-6
TTR-823	.535	13.6	.630	16.0	3/8 "	TR-9	MT-8
TTR-831	.602	15.3	.713	18.1	3/8 "	TR-12	MT-9
TTR-833	.633	16.1	.744	18.9	3/8 "	TR-13	MT-10
TTR-843	.701	17.8	.823	20.9	3/8 "	TR-16	MT-12
TTR-849	.771	19.6	.902	22.9	3/8 "	TR-18	MT-13
TTR-855	.826	21.0	.957	24.3	3/8 "	TR-21	MT-13
TTR-863	.925	23.5	1.063	27.0	1/2 "	TR-24	MT-15
TTR-871	1.004	25.5	1.142	29.0	1/2 "	TR-28	MT-17
TTR-881	1.094	27.8	1.236	31.4	1/2 "	TR-32	MT-18
TTR-885	1.142	29.0	1.284	32.6	1/2 "	TR-34	MT-20
TTR-895	1.248	31.7	1.390	35.3	1/2 "	TR-37	MT-21
TTR-899	1.378	35.0	1.524	38.7	1/2 "	TR-38	MT-22

Expansion range at the middle of roll length.

Note: Expander TTR 800 is also available as four or five roll expander.

SPECIAL MODELS OF TUBE EXPANDERS



STEP EXPANDER Model: SL (patented)

Designed to avoid destructive axial stress in welded joints.

Among the many applications is expanding U-tubes in welded joints on thick tube plates, whereby the tubes are expanded after welding.

Automatic axial movement of the expander housing during expansion, ensures that tube elongation developed during this operation, is on the rear side of the tube plate.

The TECO SL Step Expander automatically smooths out the overlapping during expanding.

The range covered is for tubes from 3/8" to 1 11/32" (9 to 34 mm) I.D. and tube sheets thickness 2 9/16" to 27 1/2" (65 to 698.5 mm).

On request the expander can be supplied with Teflon bushings to prevent tube damage.



STEP BY STEP TUBE EXPANDER

This model expander is specially designed for thick tube sheets.

Automatic overlapping of the rolling in stages.

For tubes 3/8" to 1 3/8" (9.5 mm to 34.9 mm) I.D. and tube sheet thickness 2 1/2" to 27 1/2" (63.5 mm to 698.5 mm).



FIVE ROLL EXPANDER Model: CH 800 AND CH 1200

A special line of expanders to expand thin wall tubes, titanium, stainless steel and other high quality metals.

Available with special thrust collars, to eliminate the possibility of the tube being drawn up inside the thrust collar.

Reference pages 10-11 & 14-15.



TUBE EXPANDER Model: CC

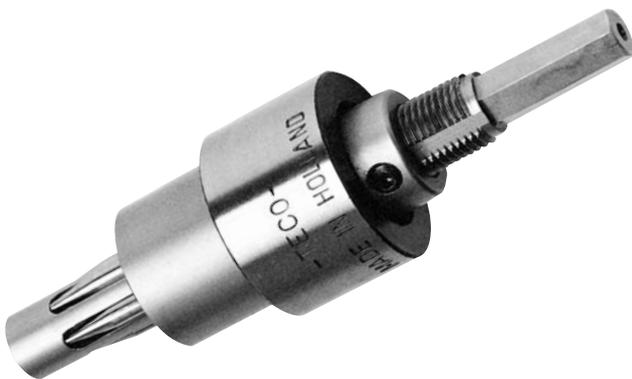
Ideal for expanding tubes in thin tube sheets.
For tubes from 1/2" to 4 1/2" (12.7 mm to 114.3 mm) O.D..
Available with adjustable collar.

SPECIAL MODELS OF TUBE EXPANDERS



TUBE EXPANDER Model: SR

Ideally suited for tube rolling with minimum travel of mandrel.
Expander mandrel is retained at rear to shorten mandrel length and to allow use near tube bends or I.D. fixed tubes.



TUBE EXPANDER Model: CL

Specially designed to enlarge the ends of non ferrous or thin steel tubes so that another tube of the same diameter can be inserted and welded or soldered.
All tube sizes covered.
Available with adjustable collar.

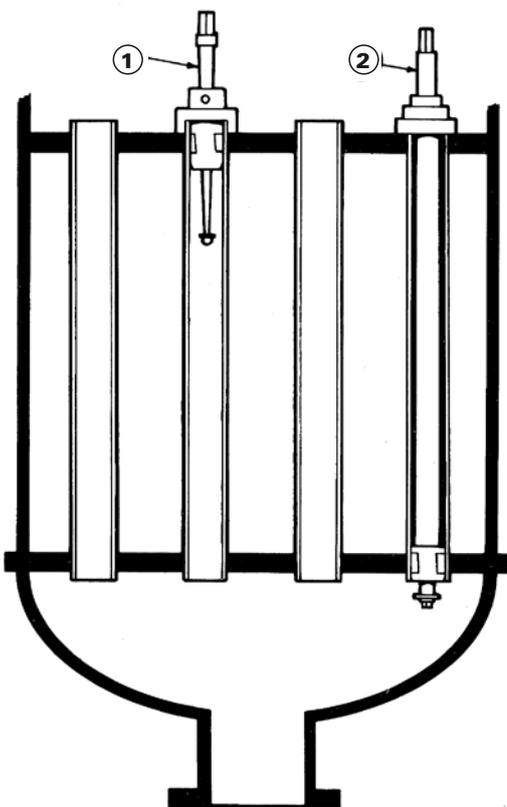


TUBE EXPANDER Model: Simplex

Designed for expanding core seals, according to DIN 443, in motor housings, cylinder heads and other cast parts.

SPECIAL MODELS OF TUBE EXPANDERS

SPECIAL EXPANDERS FOR SUGAR MILL EVAPORATORS



The diagram illustrates:

- ① a Short-Body parallel rolling type expander to locate and seal the tube in the upper tube plate and
- ② the Long-Body Sugar Refinery expander operated from tube sheet area.

AIR DRIVEN TORQUE CONTROLLED TUBE ROLLING MOTORS



P-1200



P-700

PNEUMATIC TORQUE CONTROLLED MOTORS

The machines are simple and easy to operate, featuring a simple clutch mechanism which is adjusted to disengage at a point set by the operator. The machines, except the P- types, are operated by a simple roll throttle. The machine range enables you to expand tubes from 1/2" up to 6" OD.



M19-1250



M25-700



M32-500



K45-220



K63-145



K76-100



K110-75

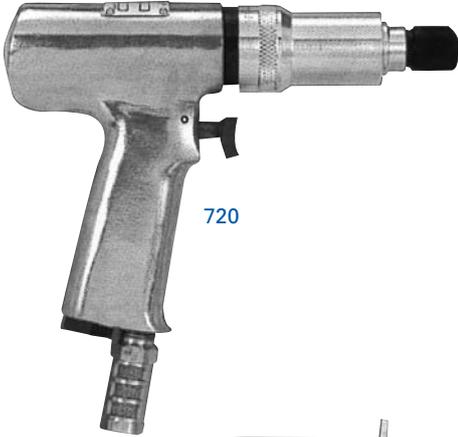


PBK-152

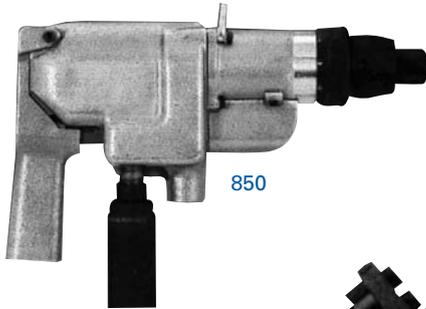
MODEL	SPEED Rpm	MIN. TORQUE Nm	MAX. TORQUE Nm	OVERALL LENGTH mm	WEIGHT Kg.	AIR CONSUMPTION Ltr./min.	TUBE CAPACITIES		CHUCK
							inch	mm	
P-1200	1200	0.3	4.0	220	1.5	600	1/2"	12.70	1/4" & 3/8"
P-700	700	0.5	8.5	225	1.6	600	5/8"	15.90	3/8"
M19-1250	1250	2.2	17.0	400	4.0	1600	3/4"	19.05	3/8"
M25-700	700	3.0	24.0	400	4.2	1600	1"	25.40	3/8" & 1/2"
M32-500	500	5.0	36.0	400	4.5	1600	1 1/4"	31.75	3/8" & 1/2"
K45-220	220	35.0	100.0	480	5.8	1600	1 3/4"	44.50	1/2" & 3/4"
K63-145	145	50.0	170.0	485	6.0	1600	2 1/2"	63.50	1/2" & 3/4"
K76-100	100	80.0	250.0	495	6.3	1600	3"	76.20	3/4" & 1"
K110-75	75	130.0	410.0	535	8.5	2000	4 1/2"	114.30	3/4" & 1"
PBK-152*	11	2000.0	2000.0	1150	26.0	1600	6"	152.40	1" & 1 1/4"

* Not torque controlled

ROLLING CONTROLS



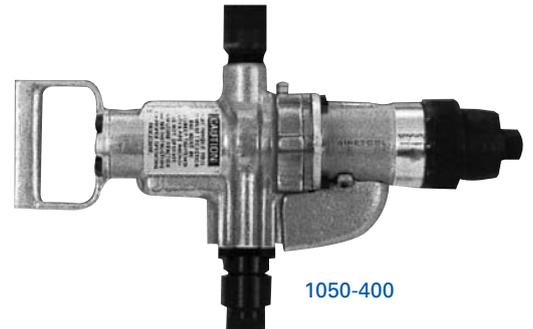
720



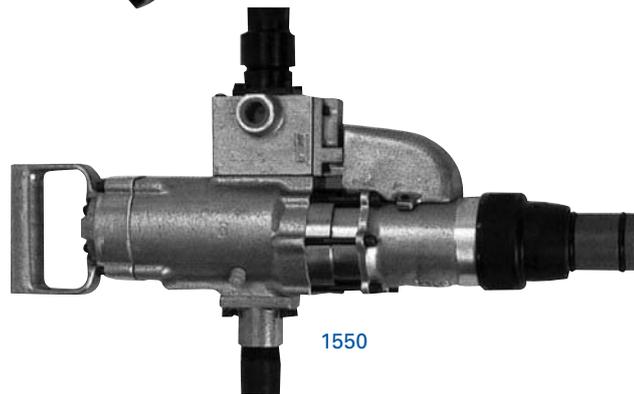
850



1753



1050-400



1550

AIR DRIVEN MOTORS TORQUE CONTROLLED ROLLING MOTORS

Control expansion by accurate measurement of torque. Automatically stops expansion accurately according to predetermined setting. Assures uniformly tight tube joints, prevents over- and under-expansion. This provides maximum holding strength for individual tubes. Strong, lightweight aluminium housing provides easier handling, less fatigue.

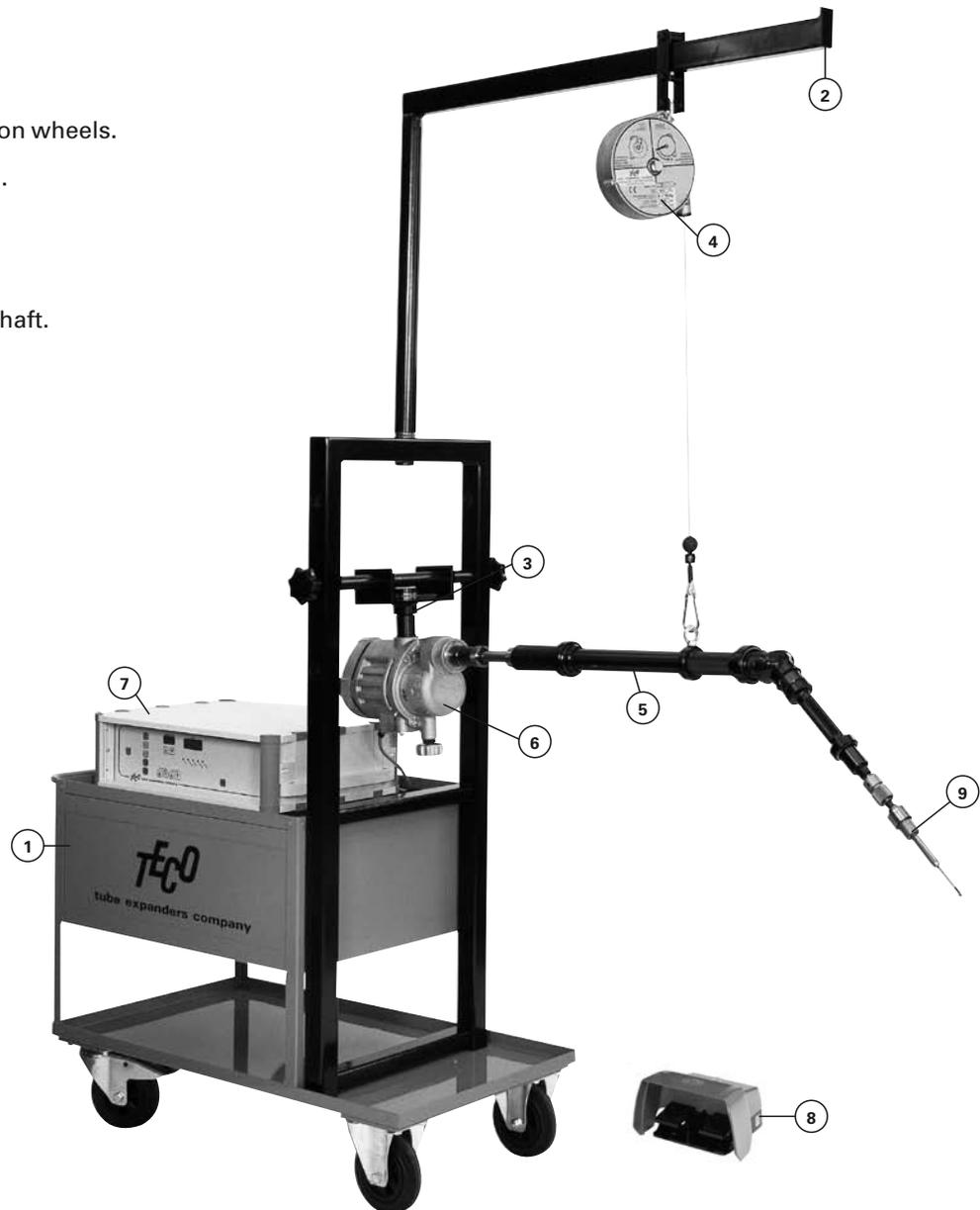
Rugged drive combines precision control, which measures torque output. All motors include a sensing cam designed and engineered specifically for tube expanding applications.

MODEL NO.	SPEED RPM	MINIMUM TORQUE Nm	MAXIMUM TORQUE Nm	OVERALL LENGHT mm	WEIGHT kg	SIDE TO CENTER mm	CENTER HOSE mm	AIR CONSUMPTION Ltr./min.	DRIVE SQUARE	TUBE CAPACITIES		CHUCKS INCL.	CHUCKS OPT.
										Inch	mm		
720-2500B	2500	0.23	2.29	198	1.09	20.6	7	480	1/4"	1/4"	6.3	1/4" QC	3/8" QC
720-1800B	1800	0.23	3.05	200	1.09	20.6	7	480	1/4"	3/8"	9.5	1/4" QC	3/8" QC
720-550B	550	0.23	8.47	219	1.23	20.6	7	480	3/8"	1/2"	12.7	3/8" QC	1/4" QC
850-1250A	1070	1.08	14.2	311	4.76	36.5	10	1344	3/8"	3/4"	19	3/8" QC	1/2" QC
850-600A	490	1.63	26	311	4.76	36.5	10	1344	3/8"	1"	25.4	3/8" QC	1/2" QC & 3/4"
1050-400	390	4.5	35.8	346	6.35	50	13	1900	1/2"	1 - 1/4"	31.7	3/8" QC	1/2" QC & 3/4"
1550-900	760	6.4	41.6	457	12.25	50	13	1960	1/2"	1 - 1/2"	38.1	3/8" QC	1/2" QC & 3/4"
1550-250	220	19.4	149	457	12.25	50	13	1960	3/4"	2 - 1/2"	63.5	3/4" & 1"	1/2" QC & 3/4"
1753-R-190	190	95	190	530	5.8	28	13	2000	5/8"	2 - 1/2"	63.5	3/4" & 1"	
1752-R-90	90	200	410	550	6.7	37	13	2000	3/4"	4"	101.5	3/4" & 1"	

TECO AUTO TUBE EXPANDING UNIT

INDEX

1. Transportable cabinet on wheels.
2. Overhead support arm.
3. Roll-A-Motor support.
4. Tool balancer.
5. Telescopic Universal Shaft.
6. Roll-A-Motor.
7. Control Unit.
8. Foot switch.
9. Expander.



FEATURES

- Easy to set up and use.
- Up-grades productivity.
- Improves quality.
- Complete repeatability of rolling torque.
- Semi or fully automatic operation.
- No motor weight or torque taken by the operator.
- Longer expander life.
- Four/five speed motors to cover most tube sizes.
- Low noise level.
- Telescopic spindle and foot switch operated.
- Hand held version available.

CONTROL UNIT FOR ROLL-A-MOTORS

FEATURES

- Latest computer technology.
- Ultimate reliability.
- Completely accurate.
- Easy to set-up.
- Semi or fully automatic operation.
- Robust construction.
- Single or three phase versions.

Based upon the latest technology in electronic control, the Teco roll-a-motor control units use the same processor as found in personal computers. Ultimate reliability combined with speed and accuracy to give completely repeatable torque control of the motor. This latest technology enables very easy initial set up of the equipment and eliminates the need to finely tune the motors. Set-up is therefore quick and easy with no special skills required by the operator. Securely housed in an aluminium casing this control unit is properly engineered to withstand the rigours of workshop and site environment alike.

ROLL-A-MOTOR CONTROL UNIT



SELECTION GUIDE: ROLL-A-MOTOR CONTROL UNIT

Model No.	Voltage	Suitable for ROLL-A-MOTOR
CU-04-A- 42-5	42 volt A.C. 50 - 60 Hz.	Model 400 / 875 / 1100 / 1200
CU-04-A- 110-5	110 volt A.C. 50 - 60 Hz.	Model 400 / 875 / 1100 / 1200
CU-04-A- 220-5	230 volt A.C. 50 - 60 Hz.	Model 400 / 875 / 1100 / 1200
CU-04-A- 342-5	42 volt 3 Ph. 50 - 60 Hz.	Model TC-4 / TC-4-1 / TC-5
CU-04-A-3220-5	220 volt 3 Ph. 50 - 60 Hz.	Model TC-4 / TC-4-1 / TC-5
CU-04-A-3380-5	400 volt 3 Ph. 50 - 60 Hz.	Model TC-4 / TC-4-1 / TC-5

CONTROL UNIT FOR ROLL-A-MOTORS

TECHNICAL SPECIFICATION

Voltage	: 110 or 230 : 1 phase : 50/60 Hz 220 or 400 : 3 phase : 50/60 Hz
Power output	: 2200 watts for 1 phase 3000 watts for 3 phase
Dimensions	: L 56 cm x W 36 cm x H 18 cm L 22" x W 14 11/64" x H 7 5/64"
Weight	: 15 kg
Optional	: Printer

Transformer to 42 volts

STANDARD FITTINGS

- Remote control (24 volts).
- Digital read-out for programming.
- Digital read-out for torque.
- Reverse time setting 0 to 60 seconds.
- Interval time setting 0 to 60 seconds.
- Automatic phase corrector for 3 phase models.
- Flat panel, easy clean push buttons.
- Carrying handle.
- RS 232 connector for interface with PC for read-out.

ROLL-A-MOTOR CONTROL UNIT WITH TRANSFORMER





ROLL-A-MOTORS SINGLE PHASE

The TECO 'Roll-A-Motor' is ruggedly designed for low and high torque capabilities. Smooth running, frequent forward and reverse operations together with a controlled output of the amount of expansion are highly desirable features and will create a more accurate joint in the finished product.

Selection Guide: ROLL-A-MOTORS SINGLE PHASE

MODEL NO.	TUBE CAPACITY O.D. MIN. - MAX.	LOADED SPEED RPM	VOLTAGE	POWER INPUT WATT	POWER OUTPUT WATT	SHANK
 400	STEEL 1/4" - 5/8" 6.35 - 15.87 mm NON-FERROUS 1/4" - 3/4" 6.35 - 19.05 mm	2 SPEED 430 1050	42 VOLT A.C. 110 VOLT A.C. 230 VOLT A.C. 50-60 HZ.	300	145	B-12
 875	STEEL 1/2" - 7/8" 12.7 - 22.22 mm NON-FERROUS 5/8" - 1" 15.87 - 25.4 mm	800 OR 1100	42 VOLT A.C. 110 VOLT A.C. 230 VOLT A.C. 50-60 HZ.	650	420	B-16
 1100	STEEL 1/2" - 2" 12.7 - 50.8 mm NON-FERROUS 3/4" - 2 1/2" 19.05 - 63.5 mm	4 SPEED 195 330 650 1035	42 VOLT A.C. 110 VOLT A.C. 230 VOLT A.C. 50-60 HZ.	1700	1000	MT-3
 1200	STEEL 3/4" - 2 1/2" 19.05 - 63.5 mm NON-FERROUS 3/4" - 3" 19.05 - 76.2 mm	4 SPEED 100 170 300 510	42 VOLT A.C. 110 VOLT A.C. 230 VOLT A.C. 50-60 HZ.	1700	1000	MT-3

ROLL-A-MOTORS SINGLE PHASE

	WEIGHT	SUPPLIED WITH QUICK CHANGE CHUCK
	3.3 lbs 1.5 kg	1/4" OR 3/8"
	8.1 lbs 3.7 kg	3/8" OR 1/2"
	18 lbs 8.3 kg	3/8" AND 1/2"
	18 lbs 8.3 kg	3/8" AND 1/2"



MODEL NO.	SHANK	EXTENSIBILITY	WEIGHT	ROLL-A-MOTOR SUPPORT
TUS-2	MT-2 M29X1.5	1005/1505 mm	25.3 lbs 11,5 kg	1000-TS
TUS-3	MT-3 M35X1.5	1005/1505 mm	25.3 lbs 11,5 kg	1200-TS

Note: Other quick change chuck available see page 32.



ROLL-A-MOTORS THREE PHASE

The TECO 'Roll-A-Motor' is ruggedly designed for low and high torque capabilities. Smooth running, frequent forward and reverse operations together with a controlled output of the amount of expansion are highly desirable features and will create a more accurate joint in the finished product.

Selection Guide: ROLL-A-MOTORS THREE PHASE

MODEL NO.	TUBE CAPACITY O.D. MIN. - MAX.	LOADED SPEED RPM	VOLTAGE	POWER INPUT WATT	POWER OUTPUT WATT	SHANK
 TC-4	STEEL 3/4" - 2" 19.05 - 50.8 mm NON-FERROUS 3/4" - 2 1/2" 19.05 - 63.5 mm	4 SPEED 120 195 360 680	42 VOLT 3 PH. 220 VOLT 3 PH. 400 VOLT 3 PH. 50-60 HZ.	1250	800	MT-3 M35X1.5
 TC-4/1	STEEL 3/4" - 2" 19.05 - 50.8 mm NON-FERROUS 5/8" - 2 1/2" 15.87 - 63.5 mm	5 SPEED 120 195 360 680 1450	42 VOLT 3 PH. 220 VOLT 3 PH. 400 VOLT 3 PH. 50-60 HZ.	1250	800	MT-3 M35X1.5
 TC-5	STEEL 1" - 3" 25.4 - 76.2 mm NON-FERROUS 1 1/4" - 4" 31.75 - 101.6 mm	5 SPEED 20 40 80 160 700	42 VOLT 3 PH. 220 VOLT 3 PH. 400 VOLT 3 PH. 50-60 HZ.	1500	900	MT-4 M50X2

ROLL-A-MOTORS THREE PHASE

	WEIGHT	SUPPLIED WITH QUICK CHANGE CHUCK
	29.5 lbs 13.5 kg	3/8" AND 1/2"
	29.5 lbs 13.5 kg	3/8" AND 1/2"
	46.0 lbs 20.9 kg	1/2" QUICK CHANGE CHUCK AND 3/4" FIXED CHUCK



ROLL-A-MOTOR SUPPORT



TELESCOPIC UNIVERSAL SHAFT

MODEL NO.	SHANK	EXTENSIBILITY	WEIGHT	ROLL-A-MOTOR SUPPORT
TUS-3	MT-3 M35X1.5	1005/1505 mm	25.3 lbs 11,5 kg	RMS-3
TUS-4	MT-4 M50X2	1005/1505 mm	25.3 lbs 11,5 kg	RMS-3

Note: Other quick change chuck available see page 32.



ROLL-A-MOTOR COUPLINGS

Selection Guide:

Motor Coupling with Quick Change Chuck



Model

MT-2 x 3/8" I.D. Sq.
MT-2 x 1/2" I.D. Sq.
MT-3 x 3/8" I.D. Sq.
MT-3 x 1/2" I.D. Sq.
MT-4 x 3/8" I.D. Sq.
MT-4 x 1/2" I.D. Sq.



Model

B12 x 1/4" I.D. Sq.
B12 x 3/8" I.D. Sq.
B16 x 3/8" I.D. Sq.
B16 x 1/2" I.D. Sq.

Motor Coupling Fixed Model



Model

MT-2 x 3/4" I.D. Sq.
MT-3 x 3/4" I.D. Sq.
MT-4 x 3/4" I.D. Sq.

MT-2 x 1" I.D. Sq.
MT-3 x 1" I.D. Sq.
MT-4 x 1" I.D. Sq.

Motor Coupling Fixed Model



3/4" I.D. Sq. x 3/4" I.D. Sq.
1" I.D. Sq. x 1" I.D. Sq.

ROLL-A-MOTOR UNIVERSAL JOINTS

Selection Guide:

Universal Joint with Quick Change Chuck



Model

3/8" O.D. Sq. x 3/8" I.D. sq.
MT-2 or MT-3 x 3/8" I.D. sq.
1/2" O.D. Sq. x 1/2" I.D. sq.
MT-2 or MT-3 x 1/2" I.D. sq.

Overall Length

4" Long
4" Long
4" Long
4" Long

Universal Joint Fixed Model

Model

3/4" O.D. Sq. x 3/4" I.D. Sq.
1" O.D. Sq. x 1" I.D. Sq.

Overall Length

8" or 12" Long
8" or 12" Long

Double Universal Joint with Quick Change Chuck

both sides with quick change chuck



3/8" I.D. Sq. x 3/8" I.D. Sq.
1/2" I.D. Sq. x 1/2" I.D. Sq.

Double Universal Joint (with fixed chuck)

3/4" Internal square x 3/4" Internal Square
1" Internal square x 1" Internal Square

Mandrel Extensions



Model

3/8" O.D. Sq. x 3/8" I.D. Sq.
Quick Change Chuck
1/2" O.D. Sq. x 1/2" I.D. Sq.
Quick Change Chuck

Overall Length

8" or 12" Long
8" or 12" Long

3/4" O.D. Sq. x 3/4"
Internal Square
1" O.D. Sq. x 1"
Internal Square

8" or 12" Long
8" or 12" Long



Model

3/8" O.D. Sq. x 3/8" O.D. Sq.
1/2" O.D. Sq. x 1/2" O.D. Sq.

Overall Length

8" or 12" Long
8" or 12" Long

TUBE TESTING GUN SET

INTRODUCTION

Find leaking heat exchangers tubes quickly and easy with the TP0631 Tube Testing Gun Set. It reveals even the smallest tube leak (pinholes). With the Tube Testing Gun Set, you can pneumatically test from 3 to 10 tubes per minute, all with significantly less operator fatigue and greater operator safety. The set comes complete with three rod and tube assemblies to test tubes from 7,2 to 32,5 mm ID.

OPERATION

Connect the Tube Testing Gun Set to plant air or an inert gas. Insert the Air Injection Gun in one end of the tube, the Plugging gun into the other and press the air control valve. Air expands the seals on both guns and pressurizes the tube. When the pressure in the tube stabilizes, release the air control valve. Any reduction of pressure will be indicated on the integral pressure gauge to reveal even the smallest tube leak. Press the relief control valve to release the pressure out of the tube and the seals on both guns release again.

FEATURES

- Interchangeable Seal and Washer Sets: allows testing of tubes from 7,2 to 32,5 mm ID.
- Compact and light weight: each gun weighs less than 1kg.
- Uses standard plant air (or gas) supplies from 2,7 to 8,5 bar.
- Standard seal material: neoprene (alternative materials on request).
- Seal holders and washers are made of Stainless Steel to prevent corrosion.
- No leakage after changing the Seal and Washer sets due to the unique sealing element of the seal holders.
- All thread connections are metric or BSP, through which debris and other impurities can be removed easily.

SEAL SETS

Neoprene seal, complete with washer sets for use with the Tube Testing Gun Set TP0631 (set for the 2 guns).



Partnumber	Tube ID. range	Appropriate seal holder
TPAN5107	7.2 – 8.5 mm	TP – 2031
TPAN5108	8.2 – 9.5 mm	TP – 2031
TPAN5109	9.5 – 10.5 mm	TP – 2031
TPAN5110	10.2 – 11.5 mm	TP – 2031
TPAN5111	11.2 – 12.5 mm	TP – 2031
TPAN5112	12.2 – 13.5 mm	TP – 2031
TPAN5212	12.2 – 13.5 mm	TP – 2081
TPAN5213	13.2 – 14.5 mm	TP – 2081
TPAN5214	14.2 – 15.5 mm	TP – 2081
TPAN5215	15.2 – 16.5 mm	TP – 2081
TPAN5216	16.2 – 17.5 mm	TP – 2081
TPAN5217	17.2 – 18.5 mm	TP – 2081
TPAN5218	18.2 – 19.5 mm	TP – 2081
TPAN5219	19.2 – 20.5 mm	TP – 2081
TPAN5220	20.2 – 21.5 mm	TP – 2081
TPAN5221	21.2 – 22.5 mm	TP – 2081
TPAN5222	22.2 – 23.5 mm	TP – 2081
TPAN5223	23.2 – 24.5 mm	TP – 2081
TPAN5224	24.2 – 25.5 mm	TP – 2081
TPAN5225	25.2 – 26.5 mm	TP – 2081
TPAN5226	26.2 – 27.5 mm	TP – 2081
TPAN5327	27.2 – 28.5 mm	TP – 2101
TPAN5328	28.2 – 29.5 mm	TP – 2101
TPAN5329	29.2 – 30.5 mm	TP – 2101
TPAN5330	30.2 – 31.5 mm	TP – 2101
TPAN5331	31.2 – 32.5 mm	TP – 2101

TECO SIDEWINDER TUBE WALL CONDITIONING MACHINE



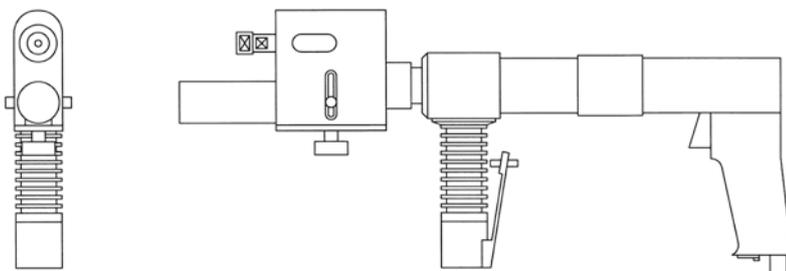
OUTSIDE DIAMETER CONDITIONING OF TUBES AND PIPES FROM 12.7 mm (1/2") THRU 88.9 mm (3 1/2")

The SIDEWINDER gives you maximum finish conditioning with minimum effort. Available with a wide range of abrasives, covering virtually every application.

The ergonomic design, including efficient noise and vibration damping, makes the SIDEWINDER easy on the operator in demanding applications.

For a completely new experience, in tube end finishing the SIDEWINDER offers the answer to heat exchanger, condenser, and boiler tubing. Expanding and Welding can be carried out with complete confidence.

When contamination removal is in focus, the SIDEWINDER provides a very competitive answer.



Drive motor speed : 36 Rpm
Conditioning motor speed : 20,000 Rpm

Average air consumption
350 l/min. at 6,2 bar air pressure

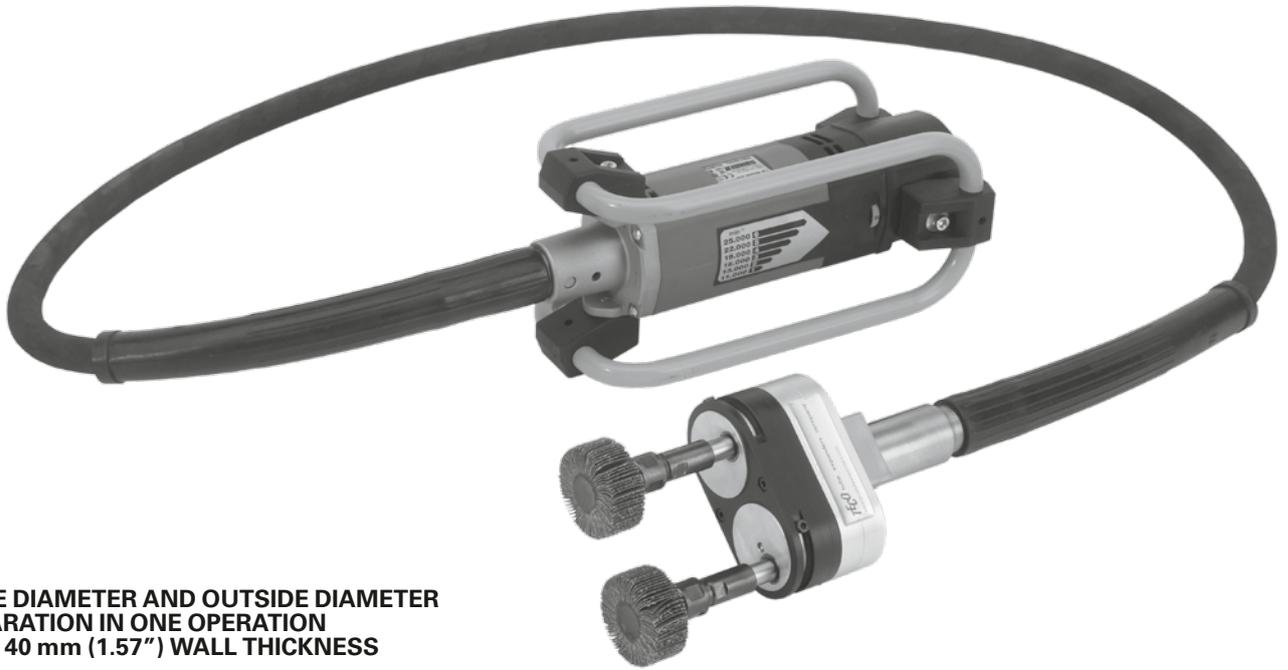
Outstanding power and ergonomics:

The SIDEWINDER provides you with extremely high power for external conditioning. The rubber auto balancer reduces vibrations to a minimum.

Rigid and powerful:

The rigid SIDEWINDER gives you the utmost power for rough tasks of external conditioning. The perfect balance of the tool enables you to guide it smoothly and easily into the tube bore.

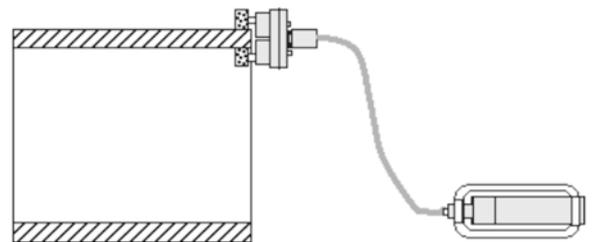
TECO RAPTOR PIPE WALL CONDITIONING MACHINE



**INSIDE DIAMETER AND OUTSIDE DIAMETER
PREPARATION IN ONE OPERATION
UP TO 40 mm (1.57") WALL THICKNESS**

The **RAPTOR PIPE WALL CONDITIONING MACHINE** is the fusion of both power and size. The RAPTOR's head is small and compact, for easy operator handling, complete supplied with the remote universal 1000 Watt integral variable speed motor. This combination brings a new concept to **Pipe Wall Conditioning**, either out on site or in the workshop.

The power is in the hands of the operator; the weight is on the floor.



Removes Rust, Coating, Pitting, Weld Slag, Burrs.

Can be used with Spiro Bands, Flap Wheels, Strip Wheels, and Wire Brushes.

The ergonomic design, including efficient noise and vibration damping, makes the RAPTOR easy on the operator in demanding applications. For a complete answer in Pipe end finishing the RAPTOR offers the final solution.

Rigid and powerful – The Raptor used in conjunction with the **HEX FRAME** gives you stability, easy setting and most importantly, correct wheel positioning throughout the 360° travel.

TUBE INSTALLATION TOOLS

Hole Gauge

The TECO hole gauge is a unique and simple instrument that quickly and accurately measures, with a three point contact, the inside diameter of tube and tube sheet holes. The reversible dial plate allows the user to measure in both inch/decimals and metric. Our standard adjustable depth is 4" (101.6 mm) or 8" (203 mm) dependent on the model. All gauges are furnished with setting ring and packed in a wooden carrying case.



Size		Minimum ID.		Maximum ID.		Toolnumber	Reach	
inch	mm	inch	mm	inch	mm		Inch	mm
1/2"	12.70	0.350"	8.90	0.450"	11.43	THG - 500	4"	101.6
5/8"	15.88	0.440"	11.18	0.560"	14.22	THG - 625	4"	101.6
3/4"	19.05	0.550"	13.97	0.715"	18.16	THG - 750	8"	203.2
7/8"	22.22	0.675"	17.15	0.840"	21.34	THG - 875	8"	203.2
1"	25.40	0.800"	20.32	0.965"	24.51	THG - 1000	8"	203.2
1 1/4"	31.75	0.950"	24.13	1.170"	29.72	THG - 1250	8"	203.2
1 3/8"	34.93	1.085"	27.56	1.295"	32.89	THG - 1375	8"	203.2
1 1/2"	38.10	1.240"	31.50	1.450"	36.83	THG - 1500	8"	203.2

Internal measuring gauge



- Mechanical internal measuring gauge for quick and accurate measuring of the inside diameter of tube and tube sheet holes.
- Available in metric and inch style.
- Scale interval 0.010 mm.

Toolnumber	Range (mm)	Arm length (mm)
TH - 210	10.0 - 30.0	85.0
TH - 220	20.0 - 40.0	85.0
TH - 230	30.0 - 50.0	85.0
TH - 240	40.0 - 60.0	85.0
TH - 250	50.0 - 70.0	85.0
TH - 260	60.0 - 80.0	85.0
TH - 270	70.0 - 90.0	85.0
TH - 280	80.0 - 100.0	85.0



- Ergonomically designed digital internal measuring gauge for quick and accurate measuring of the inside diameter of tube and tube sheet holes.
- The gauge provide a digital/analog display for better reading.
- Easy to convert from mm to inch.
- Scale interval 0.010 mm.

Toolnumber	Range (mm)	Arm length (mm)
TG - 210	10.0 - 30.0	85.0
TG - 220	20.0 - 40.0	85.0
TG - 230	30.0 - 50.0	85.0
TG - 240	40.0 - 60.0	85.0
TG - 250	50.0 - 70.0	85.0
TG - 260	60.0 - 80.0	85.0
TG - 270	70.0 - 90.0	85.0
TG - 280	80.0 - 100.0	85.0

TUBE INSTALLATION TOOLS

FLARING AND BELLING TOOL

Special tool for flaring tube ends.
Available for tubes from 1/2" to 1 1/2"
(12.7 mm to 38.1 mm) O.D.



Description	Model no. Prefix	Model size					Tube Gauge	Shank
		1/2"	5/8"	3/4"	7/8"	1"		
Flaring tool	TFT	500	625	750	875	1000	Specify Gauge	No. 01
Belling tool	TBT	500	625	750	875	1000	Specify Gauge	No. 01

Standard shank is no. 01, other shank types on request

Larger sizes on request

TUBE GUIDE

Ideal for piloting tubes through tube sheet baffles, and support plates.
Available for tubes from 3/8" to 2" (9.5 mm to 50.8 mm) O.D.



COMBINED TUBE-END MILL AND FACER

This tool is adjustable according to diameter and gauge of the tube. Used for simultaneous end milling and bevelling of I.D. and O.D. of tube.



In Aluminium, Steel and Stainless Steel with fitted replaceable nylon or Stainless Steel brush.

Tube O.D.		Gauge	Model no.
Inch	mm		
3/8"	9.5 mm	18-20	TTG- 0
1/2"	12.7 mm	16-18 19-20	TTG- 1 TTG- 2
5/8"	15.8 mm	12-13 14-16 17-20	TTG- 3 TTG- 4 TTG- 5
3/4"	19.05 mm	10-12 13-16 17-20	TTG- 6 TTG- 7 TTG- 8
7/8"	22.2 mm	10-12 13-16 17-20	TTG- 9 TTG-10 TTG-11
1"	25.4 mm	10-12 13-16 17-20	TTG-12 TTG-13 TTG-14

Model No.	Tube O.D.	Tube I.D.	Shank diameter
TMF-01	.237"-.473" 6.0-12.0 mm	.079"-.213" 2.0-5.4 mm	.492" 12.5 mm
TMF-02	.276"-.552" 7.0-14.0 mm	.102"-.307" 2.6-7.8 mm	.492" 12.5 mm
TMF-03	.355"-.788" 9.0-20.0 mm	.142"-.504" 3.6-12.8 mm	.630" 16 mm
TMF-04	.630"-1.063" 16.0-27.0 mm	.181"-.945" 4.6-24.0 mm	.630" 16 mm
TMF-05	.984"-1.732" 25.0-44.0 mm	.788"-1.535" 20.0-39.0 mm	MT-2
TMF-06	1.614"-2.363" 41.0-60.0 mm	1.417"-2.165" 36.0-55.0 mm	MT-2
TMF-07	2.244"-3.000" 57.0-76.0 mm	2.047"-2.795" 52.0-71.0 mm	MT-2
TMF-08	2.875"-3.625" 73.0-92.0 mm	2.677"-3.425" 68.0-87.0 mm	MT-2

Minimum order quantity 10 pcs.

Larger sizes on request

Larger sizes on request



TUBE INSTALLATION TOOLS

GROOVING TOOL

The grooving tool is a portable tool developed for cutting serrations in the tube holes of both ferrous and non-ferrous tube sheets.

It can be used as a hand tool or mounted in a radial drill for a more permanent and positive installation.

Works well in C N C controlled machines.

The tool is adjustable from 22 to 54 mm (7/8" to 2 1/8") from the face of the sheet to the back side of the inner groove.



Larger sizes on request.

Tube sheet hole	Tool number	Metric bit*	Inch bit*	Shank	Tube sheet hole	Tool number	Metric bit*	Inch bit*
		3x6x3 mm	1/8"x1/4"x1/8"				3x6x3 mm	1/8"x1/4"x1/8"
1/2"	TGS-500-1/2"	TGS - 206	ST-5003-S	MT-3	12.0 mm	TGS-1200-12 mm	TGS - 206	ST-5003-S
5/8"	TGS-625-5/8"	TGS - 306	ST-6203-S	MT-3	14.0 mm	TGS-1400-14 mm	TGS - 306	ST-6203-S
3/4"	TGS-750-3/4"	TGS - 406	ST-7503-S	MT-3	15.0 mm	TGS-1500-15 mm	TGS - 306	ST-6203-S
7/8"	TGS-875-7/8"	TGS - 406	ST-7503-S	MT-3	16.0 mm	TGS-1600-16 mm	TGS - 306	ST-6203-S
1"	TGS-1000-1"	TGS - 406	ST-7503-S	MT-3	18.0 mm	TGS-1800-18 mm	TGS - 406	ST-7503-S
1 1/8"	TGS-1125-1 1/8"	TGS - 406	ST-7503-S	MT-3	20.0 mm	TGS-2000-20 mm	TGS - 406	ST-7503-S
1 1/4"	TGS-1250-1 1/4"	TGS - 406	ST-7503-S	MT-3	22.0 mm	TGS-2200-22 mm	TGS - 406	ST-7503-S
1 1/2"	TGS-1500-1 1/2"	TGS - 406	ST-7503-S	MT-3	25.0 mm	TGS-2500-25 mm	TGS - 406	ST-7503-S

* Bits for other groove widths and/or spacing are on request.

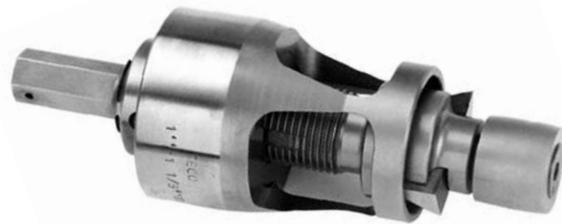
TUBE-END FACERS

For facing ends of tubes in heat exchangers and condensers.

It has one replaceable tool bit and a set of rotating pilot bushes. Fitted with an adjustable thrust collar the unit incorporates a depth gauge which accurately controls the amount of tube projection.

An important safety feature is the left-hand threaded adjustment of this part to prevent accidental self feeding of the cutter.

Available for tubes from 5/8" to 1 1/4" (15.8 mm to 31.75 mm) O.D.



Tube O.D. and Gauge	Model No.	Cutter Body	Cutter Bit Carbon Steel	Cutter Bit Non Ferrous S. Steel	Collar Housing	Thrust Nut	Bearing	Pilot Rolls (set)	Shank Hexagon
1/2" O.D.-12-20 G.A.	NTEF- 500	11710500	11720500	11730500	11760500	11770500	1201101	GR- 500-12-20	7/16" (11.1mm)
5/8" O.D.-11-19 G.A.	NTEF- 625	11710625	11720625	11730625	11760625	11770625	1201103	GR- 625-11-19	7/16" (11.1mm)
3/4" O.D.-10-19 G.A.	NTEF- 750	11710750	11720750	11730750	11760750	11770625	1201103	GR- 750-10-19	7/16" (11.1mm)
7/8" O.D.- 8-24 G.A.	NTEF- 875	11710750	11720750	11730750	11760750	11770625	1201103	GR- 875- 8-24	7/16" (11.1mm)
1" O.D.- 8-19 G.A.	NTEF-1000	11711000	11721000	11731000	11761000	11770750	1201104	GR-1000- 8-19	7/16" (11.1mm)
1 1/8" O.D.- 8-19 G.A.	NTEF-1125	11711000	11721000	11731000	11761000	11770750	1201104	GR-1125- 8-19	7/16" (11.1mm)
1 1/4" O.D.- 8-19 G.A.	NTEF-1250	11711250	11721250	11731250	11761250	11770750	1201104	GR-1250- 8-19	7/16" (11.1mm)

Larger sizes on request

TUBE REMOVAL TOOLS

TUBE DRIFT

For removing tube stubs from the tube sheets.



Available for tubes from 1/2" to 1 1/2" O.D. (12.7 mm to 38.1 mm) O.D.

Description	Model no. Prefix	Model size					Tube Gauge	Shank
		1/2"	5/8"	3/4"	7/8"	1"		
Tube drift	TTD	500	625	750	875	1000	Specify Gauge	No.01

Standard shank is no. 01, other shank types on request

Larger sizes on request

TUBE WALL REDUCING TOOL

For reducing the tube wall in condensers and heat exchangers to facilitate collapsing.



Available for tube 1/2" to 1 1/2" O.D. (12.7 mm to 38.1 mm) O.D.

Description	Model no. Prefix	Model size					Tube Gauge	Shank
		1/2"	5/8"	3/4"	7/8"	1"		
Tube wall reducing tool	TRT	500	625	750	875	1000	Specify Gauge	MT-2 or MT-3

Larger sizes on request

COLLAPSING TOOL

Designed for collapsing the tube in the tube sheet after the tube wall is reduced with the tube wall reducing tool.



Suitable for tubes from 1/2" to 1 1/2" O.D. (12.7 mm to 38.1 mm) O.D.

Description	Model no. Prefix	Model size					Shank
		1/2"	5/8"	3/4"	7/8"	1"	
Collapsing tool	TCT	500	625	750	875	1000	No.01

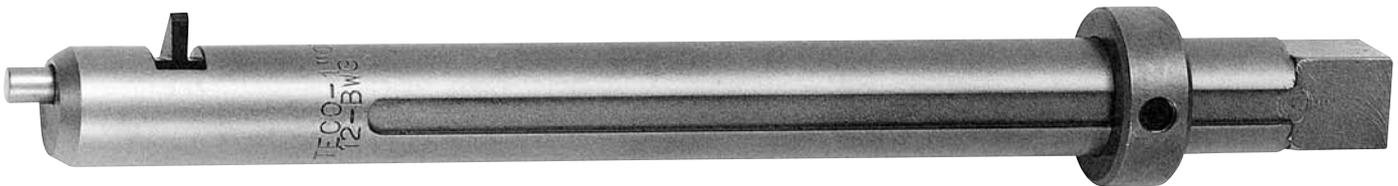
Standard shank is no. 01, other shank types on request

Larger sizes on request



TUBE REMOVAL TOOLS

ONE REVOLUTION TUBE CUTTER NEW MODEL



Suitable for cutting steel and non-ferrous tubes in condensers, heat exchangers and boilers.

Adjustable for tube sheet thickness from 2" to 6" (50.8 mm to 152.4 mm).

Available for tubes from 1/2" to 2 1/2" (12.7 to 63.3 mm) O.D..

The TECO one revolution tube cutter is designed for hand operation using a ratchet or hand wrench of proper size to fit the drive shank of the tool. The cutter bit operates

on an eccentric principle. With the cutter bit in the closed position insert the cutter into the tube to be cut. Apply wrench and turn in a clockwise direction. The tool bit will move out and pierce the tube wall. Continued turning and cut the tube off in one revolution. The cutter is then turned counterclockwise slightly to close in the bit allowing the cutter to be removed from the tube.

The TECO one revolution tube cutter can also be used to puncture the tube before plugging. This ensures that pressure cannot build up in the tube and cause the plug to become loose or blow out.

Tube O.D.	10 Gauge	11 Gauge	12 Gauge	13 Gauge	14 Gauge	15 Gauge	16 and 17 Gauge	18 and 19 Gauge	Cutter Bit
1/2" (12.70 mm)								TCOR- 500-18	CB- 625-7-12N
5/8" (15.88 mm)	TCOR- 625-10	TCOR- 625-11	TCOR- 625-12						CB- 625-7-12N
5/8" (15.88 mm)				TCOR- 625-13	TCOR- 625-14	TCOR- 625-15			CB- 625-13-15N
5/8" (15.88 mm)							TCOR- 625-16	TCOR- 625-18	CB- 750-7-11N
3/4" (19.05 mm)	TCOR- 750-10	TCOR- 750-11							CB- 750-7-11N
3/4" (19.05 mm)			TCOR- 750-12	TCOR- 750-13	TCOR- 750-14	TCOR- 750-15	TCOR- 750-16	TCOR- 750-18	CB- 750-12-19N
7/8" (22.22 mm)	TCOR- 875-10	TCOR- 875-11	TCOR- 875-12	TCOR- 875-13	TCOR- 875-14	TCOR- 875-15	TCOR- 875-16	TCOR- 875-18	CB-1000-7-11N
1" (25.40 mm)	TCOR-1000-10	TCOR-1000-11							CB-1000-7-11N
1" (25.40 mm)			TCOR-1000-12	TCOR-1000-13	TCOR-1000-14	TCOR-1000-15	TCOR-1000-16	TCOR-1000-18	CB-1000-12-19N
1 1/4" (31.75 mm)	TCOR-1250-10	TCOR-1250-11	TCOR-1250-12	TCOR-1250-13	TCOR-1250-14	TCOR-1250-15	TCOR-1250-16	TCOR-1250-18	CB-1000-12-19N
1 1/2" (38.10 mm)	TCOR-1500-10	TCOR-1500-11	TCOR-1500-12	TCOR-1500-13	TCOR-1500-14	TCOR-1500-15	TCOR-1500-16	TCOR-1500-18	CB-1500-10-19N
1 3/4" (44.45 mm)	TCOR-1750-10	TCOR-1750-11	TCOR-1750-12	TCOR-1750-13	TCOR-1750-14	TCOR-1750-15	TCOR-1750-16	TCOR-1750-18	CB-1500-10-19N
2" (50.80 mm)	TCOR-2000-10	TCOR-2000-11	TCOR-2000-12	TCOR-2000-13	TCOR-2000-14	TCOR-2000-15	TCOR-2000-16	TCOR-2000-18	CB-1500-10-19N
2 1/4" (57.15 mm)	TCOR-2250-10	TCOR-2250-11	TCOR-2250-12	TCOR-2250-13	TCOR-2250-14	TCOR-2250-15	TCOR-2250-16	TCOR-2250-18	CB-2250-10-19N
2 1/2" (63.50 mm)	TCOR-2500-10	TCOR-2500-11	TCOR-2500-12	TCOR-2500-13	TCOR-2500-14	TCOR-2500-15	TCOR-2500-16	TCOR-2500-18	CB-2250-10-19N

Other sizes and/or special reaches on request.

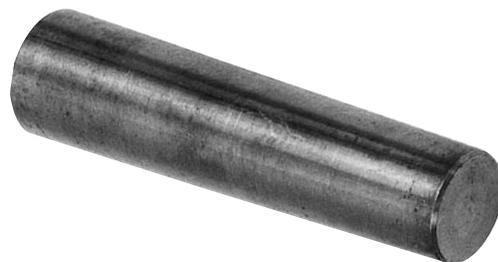
TWO PIECE TUBE PLUGS



For sealing off leaky condenser and heat exchanger tubes without damaging tube sheets. Tapered pin is driven into ring, which is tapered on the inside and is parallel to tube on the outside. This gives even expansion to the ring and a long contact to the seal.

Available in a variety of metals. Specify Tube O.D. and Gauge.

TAPERED TUBE PLUGS



Ideal for sealing leaky tubes in condensers or heat exchangers. Just drive a plug into each end of leaky tube.

Available in a variety of metals. Specify Tube O.D. and Gauge.



TUBE PLUGS

INTRODUCTION

TECO produces a range of "TECO PLUG" tube plugs, which are used in heat exchangers to maintain a safe and leak-tight seal under the most severe conditions. The TECO Plugs are used in leaking tubes or as a preventive seal. The TECO plugs are characterized by the simple, quick and especially safe installation, and also the extreme durable character of this system.

ORDERING INFORMATION

When ordering the TECO plugs, please provide the following information:

1. Tube OD and wall thickness and/or measured tube ID.
2. Thickness of tube sheet, diameter and pitch of the tubes.
3. Tube and tube sheet material.
4. Maximum pressure and temperature.
5. Type of tube-to-tube sheet joint (rolled and/or welded etc).
6. Is there a water head/divider plate, and if yes, also all the dimensions.
7. Condition of tubes and age of heat exchanger.

TECO PLUG®

INSTALLATION EQUIPMENT

The installation equipment hydraulically installs TECO plugs in seconds. The package is compact and easy to use.

The total package includes:

- Specially designed TECO hydraulic ram.
- Air activated hydraulic pump.
- High pressure hose (3m).
- Pressure gauge.
- Storage box.

STANDARD MATERIALS

The plugs are available in the following materials:

- Carbon Steel – C
- Brass – B
- Stainless steel 316L – S
- Monel – M

For alternative materials, such as Titanium you can contact TECO.

Always ensure that you use a compatible plug for each type of tube to prevent thermal and/or chemical reactions occurring.

Replace the letter X by the code of the requested material (as mentioned above)

TECO Plug kit	Tube ID. (mm)	Complete pull rod & plug Positioner diameter	Complete pull rod extension
IPK – 100 – X	10.0 – 10.5	IPST – 100 –110 Diameter 10 mm	IPSTV-100-125-300
IPK – 105 – X	10.5 – 11.0		
IPK – 110 – X	11.0 – 11.5		
IPK – 115 – X	11.5 – 12.0		
IPK – 120 – X	12.0 – 12.5	IPST – 115 –125 Diameter 11.5 mm	IPSTV-100-125-300
IPK – 125 – X	12.5 – 13.0		
IPK – 130 – X	13.0 – 13.5		
IPK – 135 – X	13.5 – 14.0	IPST – 130-145 Diameter 13 mm	IPSTV-130-165-300
IPK – 140 – X	14.0 – 14.5		
IPK – 145 – X	14.5 – 15.0		
IPK – 150 – X	15.0 – 15.5		
IPK – 155 – X	15.5 – 16.0	IPST – 150-165 Diameter 15 mm	IPSTV-130-165-300
IPK – 160 – X	16.0 – 16.5		
IPK – 165 – X	16.5 – 17.0		
IPK – 170 – X	17.0 – 17.5	IPST – 170-190 Diameter 17 mm	IPSTV-170-300-300
IPK – 175 – X	17.5 – 18.0		
IPK – 180 – X	18.0 – 18.5		
IPK – 185 – X	18.5 – 19.0		
IPK – 190 – X	19.0 – 19.5		
IPK – 195 – X	19.5 – 20.0		
IPK – 200 – X	20.0 – 20.5	IPST – 195-215 Diameter 19.5 mm	IPSTV-170-300-300
IPK – 205 – X	20.5 – 21.0		
IPK – 210 – X	21.0 – 21.5		
IPK – 215 – X	21.5 – 22.0		
IPK – 220 – X	22.0 – 22.5	IPST – 220-240 Diameter 22 mm	IPSTV-170-300-300
IPK – 225 – X	22.5 – 23.0		
IPK – 230 – X	23.0 – 23.5		
IPK – 235 – X	23.5 – 24.0		
IPK – 240 – X	24.0 – 24.5		
IPK – 245 – X	24.5 – 25.0		
IPK – 250 – X	25.0 – 25.5	IPST – 245-265 Diameter 24.5 mm	IPSTV-170-300-300
IPK – 255 – X	25.5 – 26.0		
IPK – 260 – X	26.0 – 26.5		
IPK – 265 – X	26.5 – 27.0		
IPK – 270 – X	27.0 – 27.5	IPST – 270-290 Diameter 27 mm	IPSTV-170-300-300
IPK – 275 – X	27.5 – 28.0		
IPK – 280 – X	28.0 – 28.5		
IPK – 285 – X	28.5 – 29.0		
IPK – 290 – X	29.0 – 29.5		

A kit consists of : 10 pcs. plugs, 1 pcs. tube cleaning brush and 1 pcs. caliper





TUBE REMOVAL TOOLS

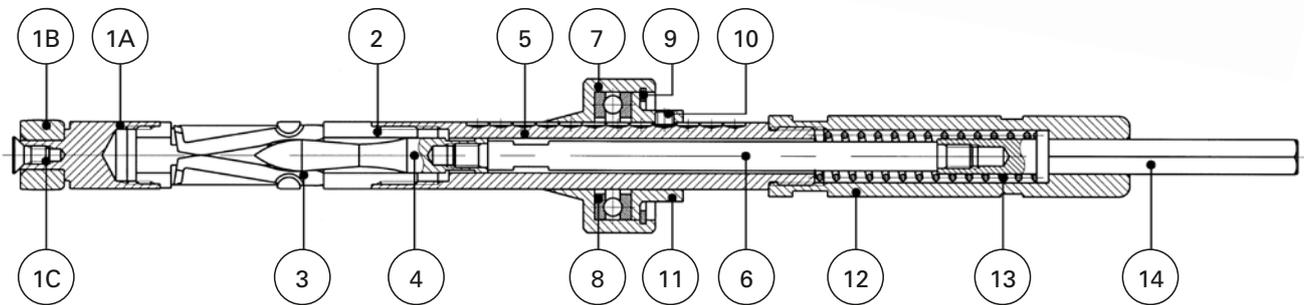
TECO PTC INTERNAL TUBE CUTTERS

Are available for tube sizes 5/8" – 1 1/8" OD (16 – 28 mm). Other sizes and/or special body tip for larger walls are optional. Standard adjustable reach of 4 7/16" (110 mm) with optional longer reaches available.

"A" Reach = 7 7/16" (188 mm),
 "C" Reach = 10 15/16" (277 mm).

Two piece body and mandrel construction allow for quick and easy tool bit replacement. Optimum tube cutting performance and tooling life are obtained when employed by the TECO Cutter Feed Assist. Cutter Bits are now standard with Tin coating, increasing the cutter bit life. TECO PTC tube cutters are sold with a complete set of pilots.

Not shown: *Trimming attachment*, to be used in conjunction with the push type cutter, to cut the tube protrusion in front of the tube sheet.



PART LIST TUBE CUTTER TYPE PTC

		5/8" OD (16mm) 16-21 GA.	3/4"OD (19 mm) 14-22 GA.	7/8"OD (22 mm) 16-22 GA.	1"OD (25 mm) 12-22 GA.	1 1/8"OD (28 mm) 12-22 GA.
NO.	Part Name	Part No.	Part No.	Part No.	Part No.	Part No.
	Complete PTC Cutter	PTC-625 17000625	PTC-750 17000750	PTC-875 17000875	PTC-1000 17001000	PTC-1125 17001125
1.A	Pilot Body	17100625	17100750	17100875	17101000	17101125
1.B	Pilot	11490616	11490714	11490816	11491012	11491112
		11490617	11490715	11490817	11491013	11491113
		11490618	11490716	11490818	11491014	11491114
		11490619	11490717	11490819	11491015	11491115
		11490620	11490718	11490820	11491016	11491116
		11490621	11490719	11490822	11491017	11491117
			11490720		11491018	11491118
			11490721		11491019	11491119
					11491020	11491120
					11491022	11491122
2.	Body Tip	17200625	17200750	17200875	17201000	17201125
3.*	Tool Bit set	PTC-43-10°	PTC-3-10°	PTC-53-10°	PTC-33-10°	PTC-33-10°
3.*	Tool Bit set	PTC-43-15°	PTC-3-15°	PTC-53-15°	PTC-33-15°	PTC-33-15°
4.	Mandrel Tip	17400625	17400750	17400875	17400875	17401125
5.	Body Extension	17500625	17500750	17500875	17501000	17501125
6.	Mandrel Extension	17600625	17600625	17600875	17600875	17600875
7.	Thrust Body	17700625	17700750	17700875	17701000	17701125
8.	Bearing	1201102	1201102	1201104	1201104	1201105
9.	Thrust Spring	J-28-V.	J-28-V	J-35 V	J-35-V	J-42-V
10.	Set Screw	M5x5	M5x5	M5x5	M5x5	M5x5
11.	Thrust Nut	17110625	17110750	17110875	17111000	17111125
12.	Spring Housing	17120625	17120625	17120625	17120625	17120625
13.	Spring	PTC-625-13	PTC-625-13	PTC-625-13	PTC-625-13	PTC-625-13
14.	Driver	17140625	17140625	17140625	17140625	17140625
15.	Trim Thrust Body	17150625	17150750	17150875	17151000	17151125
16.	Trim Collar	17160625	17160750	17160875	17161000	17161125
17.	Trim Attachment	17170625	17170750	17170875	17171000	17171125

* Choice of cutter bits depends on tube material and wall thickness of the tube. Lifetime of the cutter bits can be increased by using a proper cutting lubricant.

AIR-DRIVEN CUTTER FEED ASSIST



Model number	Free speed	Governed speed	Weight	Air inlet
CF-150-400	600 rpm	150 – 550 rpm	4.8 kg.	1/4" NPT
CF-400-1200	1250 rpm	400 – 1200 rpm	4.8 kg.	1/4" NPT

Minimum hose size : 1/4" (6 mm)

Increase your productivity with the TECO air-driven Cutter Feed Assist. The Cutter Feed Assist is designed to aid the TECO PTC Push Type Tube Cutters for OD tube sizes of 5/8" through 1" (15.9 - 25.4 mm). Powered by an air-driven variable speed drill.

FEATURES

- Constant pressure on tube cutting surface increases tool bit life, more time cutting tubes, less time changing bits.
- Independent cutter bit feed trigger for operator safety.
- Positive feed stop controls tube cutting depth.
- Easy operation reduces operator fatigue, increasing productivity.
- RPM speed control dial on powerful Drills accommodate various tube sizes and materials for optimum tube cutting speed, increasing your productivity.
- Saving you valuable time and money.
- Simple tube cutter size change over for easy set up.
- Compact design allows the Cutter Feed Assist easier access to confined areas.

RECOMMENDED CUTTING SPEEDS FOR TUBE CUTTER, TUBE-END FACERS AND WELD REMOVAL TOOLS

Tube Material	Tube O.D.									
	1/4"	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1 1/4"	1 1/2"	2"
Aluminium (153 mtr / min)	7500 Rpm	5000 Rpm	3800 Rpm	3000 Rpm	2500 Rpm	2200 Rpm	1900 Rpm	1500 Rpm	1275 Rpm	950 Rpm
Brass (92 mtr / min)	4600 Rpm	3050 Rpm	2300 Rpm	1825 Rpm	1525 Rpm	1300 Rpm	1150 Rpm	925 Rpm	750 Rpm	575 Rpm
Copper (76 mtr / min)	3825 Rpm	2550 Rpm	1900 Rpm	1525 Rpm	1275 Rpm	1100 Rpm	950 Rpm	750 Rpm	625 Rpm	500 Rpm
Carbon steel (43 mtr / min)	2150 Rpm	1425 Rpm	1075 Rpm	850 Rpm	700 Rpm	625 Rpm	525 Rpm	425 Rpm	350 Rpm	275 Rpm
Stainless steel (29 mtr / min)	1000 Rpm	660 Rpm	500 Rpm	400 Rpm	330 Rpm	285 Rpm	250 Rpm	200 Rpm	165 Rpm	125 Rpm
Titanium (9.5 mtr / min)	450 Rpm	300 Rpm	230 Rpm	185 Rpm	155 Rpm	130 Rpm	115 Rpm	95 Rpm	75 Rpm	60 Rpm
Inconel (6 mtr / min)	305 Rpm	205 Rpm	155 Rpm	125 Rpm	100 Rpm	90 Rpm	75 Rpm	60 Rpm	50 Rpm	40 Rpm

The recommended cutting speeds above are based on published speeds and feeds. A slower speed may be necessary depending on tube material analysis and hardness. Proper lubricant must be used.

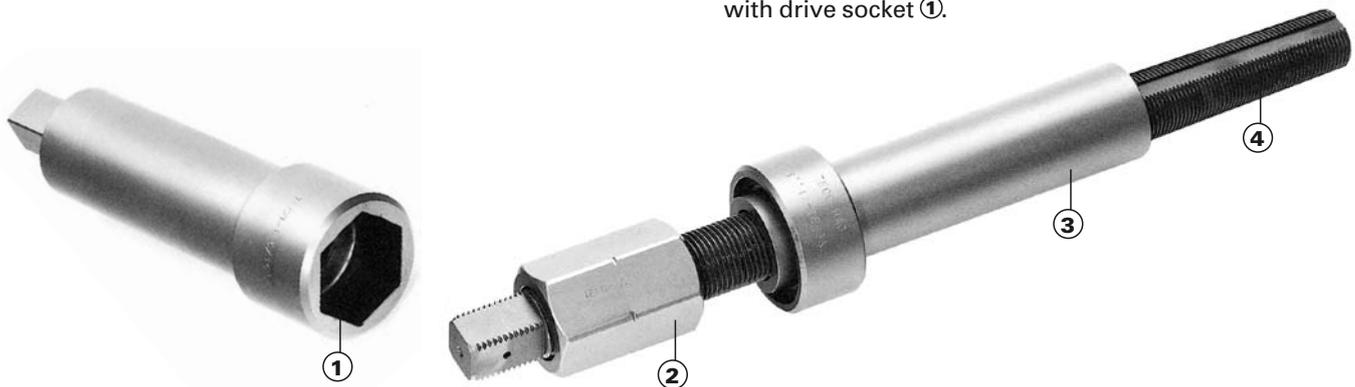
TUBE REMOVAL TOOLS

MANUAL TUBE PULLER

This newly designed tool is used for extracting tubes from the tube sheet holes without damaging the tube sheet holes.
Available for tubes from 1/2" to 1 1/2" (12.7 mm to 38.1 mm) O.D.

FEATURES

- Easy to use.
- No external power necessary.
- Can be used with an impact wrench in combination with drive socket ①.



Tube Size O.D. and GA	Model no.	Spear ④ no.	Diameter small end	Diameter large end	Square on spear	Collar ③ no.	Nut ② Hex 1 5/16"	Socket ① Hex 1 5/16" Square 5/8"
1/2"-14-20	MTP-1/2"-14-20	MTPS-1	.315" 8 mm	.472" 12 mm	5/8"	MPC-1/2"	MPN	MPS
5/8"-11-14	MTP-5/8"-11-14	MTPS-2	.354" 9 mm	.512" 13 mm	5/8"	MPC-5/8"	MPN	MPS
5/8"-14-20	MTP-5/8"-14-20	MTPS-3	.453" 11,5 mm	.610" 15,5 mm	5/8"	MPC-5/8"	MPN	MPS
3/4"-10-13	MTP-3/4"-10-13	MTPS-3	.453" 11,5 mm	.610" 15,5 mm	5/8"	MPC-3/4"	MPN	MPS
3/4"-14-20	MTP-3/4"-14-20	MTPS-4	.571" 14,5 mm	.728" 18,5 mm	5/8"	MPC-3/4"	MPN	MPS
7/8"-14-19	MTP-7/8"-14-19	MTPS-5	.689" 17,5 mm	.846" 21,5 mm	5/8"	MPC-7/8"	MPN	MPS
1"-9-13	MTP-1"-9-13	MTPS-5	.689" 17,5 mm	.846" 21,5 mm	5/8"	MPC-1"	MPN	MPS
1"-14-20	MTP-1"-14-20	MTPS-6	.823" 20,9 mm	.980" 24,9 mm	5/8"	MPC-1"	MPN	MPS
1"-17-24	MTP-1"-17-24	MTPS-7	.866" 22 mm	1.024" 26 mm	5/8"	MPC-1"	MPN	MPS
1 1/8"-11-15	MTP-1 1/8"-11-15	MTPS-7	.866" 22 mm	1.024" 26 mm	5/8"	MPC-1 1/8"	MPN	MPS
1 1/8"-15-23	MTP-1 1/8"-15-23	MTPS-8	.965" 24,5 mm	1.122" 28,5 mm	5/8"	MPC-1 1/8"	MPN	MPS
1 1/4"-10-13	MTP-1 1/4"-10-13	MTPS-8	.965" 24,5 mm	1.122" 28,5 mm	5/8"	MPC-1 1/4"	MPN	MPS
1 1/4"-14-19	MTP-1 1/4"-14-19	MTPS-9	1.063" 27 mm	1.220" 31 mm	5/8"	MPC-1 1/4"	MPN	MPS
1 1/2"-12-17	MTP-1 1/2"-12-17	MTPS-10	1.268" 32,2 mm	1.425" 36,2 mm	5/8"	MPC-1 1/2"	MPN	MPS

TECO TUBE PULLING SYSTEMS

UNIVERSAL HYDRAULIC PUMPS



Model no.: **TZE-5420-SPR**

- Electro Hydraulic Pump:
2.2 kW 220 Volt - 3 Ph -50/60 Hz.
2.2 kW 400 Volt - 3 Ph -50/60 Hz.
- Two-Stage pump flow capacity:
11.27 Ltr./min. at 0-50 bar.
1.64 Ltr./min. at 50-700 bar.
- Oil tank capacity: 20 litre.
- Electric Solenoid 4/3-way valve: 24 Volt A.C.
- Remote control: Hand, Foot switch is optional.
- Frame size: L 75 cm x W 64 cm x H 78 cm,
L 30" x W 26" x H 31",
provided with ball bearing type swivel wheels
and brakes.
- Glycerine filled pressure gauge scale 0-700 bar.
- Complete with set of hydraulic hoses, 6 metres
(20 feet) long, with High-Flow quick couplings.
- Weight complete: 85 kg.

Other models and power supplies are available on request.

Model no.: **TZA-4420-SPR**

- Air-Driven Hydraulic Pump 2.2 kW Air-motor.
- Air consumption: 2400 Ltr./min.
- Air pressure: 6 bar (84 Psi).
- Two-Stage pump flow capacity:
11.1 Ltr./min. at 0-50 bar.
1.31 Ltr./min. at 50-700 bar.
- Oil tank capacity: 20 litre.
- Pneumatic operated 4/3-way valve.
- Remote control: Foot switch.
- Frame size: L 75 cm x W 64 cm x H 78 cm,
L 30" x W 26" x H 31",
provided with ball bearing type swivel wheels
and brakes.
- Glycerine filled pressure gauge scale 0-700 bar.
- Complete with set of hydraulic hoses, 6 metres
(20 feet) long, with High-Flow quick couplings.
- Weight complete: 70 kg.

TECO TUBE PULLING SYSTEMS

HYDRAULIC RAM FOR GRIPPER TYPE TUBE PULLER



Model no. : **RD-96-155-SP-7**

Lightweight Hydraulic Double Acting Ram.

Capacity : 7 ton pulling power at 700 bar.
 Stroke : 155 mm (6")
 Cylinder O.D. : 65 mm (2 1/2")
 Length : 600 mm (23 1/2")
 Weight : 9 kg (20 lbs)

Model no. : **BRD-166-155-SP-11**

Lightweight Hydraulic Double Acting Ram.

Capacity : 11 ton pulling power at 700 bar.
 Stroke : 155 mm (6")
 Cylinder O.D. : 80 mm (3 1/8")
 Length : 630 mm (25")
 Weight : 13 kg (28 lbs)



COLLAR TUBING ⑤	
Tube Size	Model No
5/8" O.D.	CTTP-625
3/4" O.D.	CTTP-750
7/8" O.D.	CTTP-875
1" O.D.	CTTP-1000
1 1/8" O.D.	CTTP-1125
1 1/4" O.D.	CTTP-1250

COLLAR HOUSING ⑥	
Ram Model no.	Model No
RD-96-155-SP-7	CHTP-96
BRD-166-155-SP-11	CHTP-166

ADAPTER GRIPPER ⑦	
Ram Model no.	Model No
RD-96 & BRD-166	ACTP-7/16"-20
RD-96 & BRD-166	ACTP-1/2"-20
RD-96 & BRD-166	ACTP-5/8"-20

HYDRAULIC OPERATED GRIPPER TYPE TUBE PULLER FOR CONDENSER TUBES

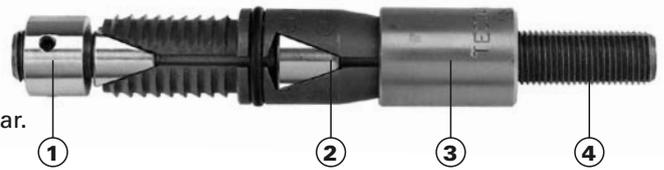


VERY FAST - EASY TO USE - LIGHT TOOL (Patented)

When re-tubing condenser and other similar types of unit containing non-ferrous tubes this specially developed Hydraulic Gripper Tube Puller removes tubes or tube stubs without damaging the tube sheet holes. This unit can pull up to 4 to 6 tubes per minute. The hydraulic ram has a single cycle stroke of 6 inch and a pulling power of 7 or 11 tons. The hydraulic pump operates at a pressure of 700 Bar and has High-Flow quick couplings.

THE HYDRAULIC GRIPPER TUBE PULLER CONSISTS OF

- Gripper tube puller unit (Patented) containing:
 1. Stop nut.
 2. Replaceable Gripper shells.
 3. Bushing.
 4. Puller mandrel.
- Hydraulic Ram either: 7 or 11 tons pulling power with collar.
- Hydraulic Pump (electric or pneumatic) see page 45.
- Hand or Foot-switch, pump will only run when switch is operated.
- Connection hose with High-Flow quick couplings.



Tube Size	Model No.	Grippers set ②	Puller Mandrel ④	Stop-Nut ①	Bushing ③
5/8" O.D.-15 Gauge 16 mm O.D. to 12.22 mm I.D.	CTP – 12 mm	GCTP – 12 mm	MCTP – 12 mm	SCTP-11/32"-24	BCTP-7/16"20
5/8" O.D.-16-17 Gauge 16 mm O.D. to 12.57-12.92 mm I.D.	CTP – 12.5 mm	GCTP – 12.5 mm	MCTP – 12.5 mm	SCTP-11/32"-24	BCTP-7/16"20
5/8" O.D.-18-19 Gauge 16 mm O.D. to 13.38-13.74 mm I.D.	CTP – 13 mm	GCTP – 13 mm	MCTP – 13 mm	SCTP-3/8"-24	BCTP-7/16"20
5/8" O.D.-20-22 Gauge 16 mm O.D. to 14.10-14.45 mm I.D.	CTP – 14 mm	GCTP – 14 mm	MCTP – 14 mm	SCTP-3/8"-24	BCTP-7/16"20
3/4" O.D.-15-16 Gauge 19.05 mm O.D. to 15.39-15.75 mm I.D.	CTP – 15 mm	GCTP – 15 mm	MCTP – 15 mm	SCTP-7/16"-20	BCTP-7/16"20
3/4" O.D.-17-19 Gauge 19.05 mm O.D. to 16.10-16.90 mm I.D.	CTP – 16 mm	GCTP – 16 mm	MCTP – 16 mm	SCTP-7/16"-20	BCTP-7/16"20
3/4" O.D.-20-22 Gauge 19.05 mm O.D. to 17.27-17.63 mm I.D.	CTP – 17 mm	GCTP – 17 mm	MCTP – 17 mm	SCTP-7/16"-20	BCTP-7/16"20
7/8" O.D.-14-16 Gauge 22.20 mm O.D. to 18.00-18.92 mm I.D.	CTP – 18 mm	GCTP – 18 mm	MCTP – 18 mm	SCTP-7/16"-20	BCTP-7/16"20
7/8" O.D.-17-18 Gauge 22.20 mm O.D. to 19.28-19.74 mm I.D.	CTP – 19 mm	GCTP – 19 mm	MCTP – 19 mm	SCTP-1/2"-20	BCTP-1/2"-20
7/8 O.D.-19-22 Gauge 22.20 mm O.D. to 20.10-20.80 mm I.D.	CTP – 20 mm	GCTP – 20 mm	MCTP – 20 mm	SCTP-1/2"-20	BCTP-1/2"-20
1" O.D.-14-15 Gauge 25.40 mm O.D. to 21.18-21.74 mm I.D.	CTP – 21 mm	GCTP – 21 mm	MCTP – 21 mm	SCTP-1/2"-20	BCTP-1/2"-20
1" O.D.-16-18 Gauge 25.40 mm O.D. to 22.10-22.91 mm I.D.	CTP – 22 mm	GCTP – 22 mm	MCTP – 22 mm	SCTP-1/2"-20	BCTP-1/2"-20
1" O.D.-19-22 Gauge 25.40 mm O.D. to 23.30-23.97 mm I.D.	CTP – 23 mm	GCTP – 23 mm	MCTP – 23 mm	SCTP-1/2"-20	BCTP-1/2"-20
1 1/8" O.D.-14-15 Gauge 28.50 mm O.D. to 24.35-24.91 mm I.D.	CTP – 24 mm	GCTP – 24 mm	MCTP – 24 mm	SCTP-1/2"-20	BCTP-1/2"-20
1 1/8" O.D.-16-17 Gauge 28.50 mm O.D. to 25.20-25.63 mm I.D.	CTP – 25 mm	GCTP – 25 mm	MCTP – 25 mm	SCTP-1/2"-20	BCTP-1/2"-20
1 1/8" O.D.-18-19 Gauge 28.50 mm O.D. to 26.09-26.44 mm I.D.	CTP – 26 mm	GCTP – 26 mm	MCTP – 26 mm	SCTP-5/8"-18	BCTP-5/8"-18
1 1/4" O.D.-14 Gauge 31.75 mm O.D. to 27.53 mm I.D.	CTP – 27 mm	GCTP – 27 mm	MCTP – 27 mm	SCTP-5/8"-18	BCTP-5/8"-18
1 1/4" O.D.-15-17 Gauge 31.75 mm O.D. to 28.09-28.80 mm I.D.	CTP – 28 mm	GCTP – 28 mm	MCTP – 28 mm	SCTP-5/8"-18	BCTP-5/8"-18
1 1/4" O.D.-18-20 Gauge 31.75 mm O.D. to 29.26-29.97 mm I.D.	CTP – 29 mm	GCTP – 29 mm	MCTP – 29 mm	SCTP-5/8"-18	BCTP-5/8"-18
1 1/4" O.D.-21-22 Gauge 31.75 mm O.D. to 30.12-30.33 mm I.D.	CTP – 30 mm	GCTP – 30 mm	MCTP – 30 mm	SCTP-5/8"-18	BCTP-5/8"-18
1 3/8" O.D.-15 - 16 Gauge 34.93 mm O.D. to 31.27-31.63 mm I.D.	CTP – 31 mm	GCTP – 31 mm	MCTP – 31 mm	SCTP-5/8"-18	BCTP-5/8"-18
1 3/8" O.D.-17 - 19 Gauge 34.93 mm O.D. to 32.0 - 32.8 mm I.D.	CTP – 32 mm	GCTP – 32 mm	MCTP – 32 mm	SCTP-5/8"-18	BCTP-5/8"-18
1 3/8" O.D.-20 - 22 Gauge 34.93 mm O.D. to 33.15-33.51 mm I.D.	CTP – 33 mm	GCTP – 33 mm	MCTP – 33 mm	SCTP-5/8"-18	BCTP-5/8"-18
1 1/2" O.D.-15 - 16 Gauge 38.1 mm O.D. to 34.44-34.80 mm I.D.	CTP – 34 mm	GCTP – 34 mm	MCTP – 34 mm	SCTP-5/8"-18	BCTP-5/8"-18
1 1/2" O.D.-17 - 19 Gauge 38.1 mm O.D. to 35.15-35.97 mm I.D.	CTP – 35 mm	GCTP – 35 mm	MCTP – 35 mm	SCTP-5/8"-18	BCTP-5/8"-18

TECO TUBE PULLING SYSTEMS

HYDRAULIC RAM FOR SPEAR TYPE TUBE PULLER



Model no. : **RRH-306-155-SP-30**

Lightweight Hydraulic Double Acting Ram.

Capacity : 30 ton pulling power at 700 bar.
Stroke : 155 mm (6")
Cylinder O.D. : 120 mm (4 3/8")
Length : 440 mm (17 3/8")
Weight : 25 kg (55 lbs)

ADAPTER



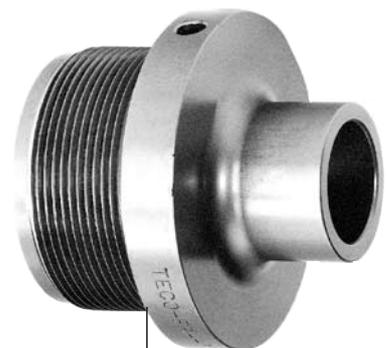
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JAW



3

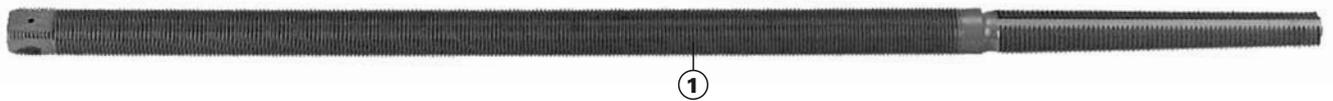
COLLAR



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HYDRAULIC OPERATED SPEAR TYPE TUBE PULLER FOR CONDENSER TUBES

The hydraulic spear model tube puller is used to remove tubes from heat exchangers before re-tubing without damaging the tube sheet holes. The spear is screwed into the relevant tube by means of an impact wrench or slow running nutrunner motor. The hydraulic cylinder with collar and quick action chuck is placed over the puller mandrel. The jaws are then closed around the thread on the puller mandrel by manual operation. The tube is now ready to be removed by actuating the hydraulic ram.



SPEAR TYPE TUBE PULLER

Tube Size O.D. and GA	Model ① Spear no.	Collar ④ no.	Diameter small end	Diameter large end	Square	Thread on rear end of spear	Jaw ③ no.	Adapter ②
1/2"-12-15BWG	HTP-1	HPC-1/2"	.276" 7 mm	.407" 10.3 mm	5/8"	M19x2	M19x2	3/4" x 5/8" or 1" x 5/8"
1/2"-15-22BWG & 5/8"-10-13BWG	HTP-2	HPC-1/2"	.354" 9 mm	.485" 12.3 mm	5/8"	M19x2	M19x2	
5/8"-13-18BWG & 3/4"-9-12BWG	HTP-3	HPC-5/8"	.453" 11.5 mm	.584" 14.8 mm	5/8"	M19x2	M19x2	
5/8"-18-24BWG & 3/4"-12-15BWG	HTP-4	HPC-5/8"	.531" 13.5 mm	.663" 16.8 mm	5/8"	M19x2	M19x2	
3/4"-15-19 BWG, 7/8"-11-13BWG & 1"-7-8BWG	HTP-5	HPC-3/4"	.571" 15.5 mm	.741" 18.8 mm	5/8"	M19x2	M19x2	
7/8"-13-17BWG & 1"-8-11BWG	HTP-6	HPC-7/8"	.689" 17.5 mm	.820" 20.8 mm	3/4"	M25x2	M25x2	3/4" x 3/4" or 1" x 3/4"
1"-11-14BWG & 1 1/8"-7-9BWG	HTP-7	HPC-1"	.748" 19 mm	.879" 22.3 mm	3/4"	M25x2	M25x2	
1"-14-20BWG & 1 1/8"-9-12BWG	HTP-8	HPC-1"	.846" 21.5 mm	.978" 24.8 mm	3/4"	M25x2	M25x2	
1 1/8"-12-15 BWG	HTP-9	HPC-1 1/8"	.905" 23 mm	1.037" 26.3 mm	3/4"	M25x2	M25x2	
1 1/8"-15-24 BWG & 1 1/4"-8-10BWG	HTP-10	HPC-1 1/8"	1.004" 25.5 mm	1.135" 28.8 mm	3/4"	M25x2	M25x2	1" x 3/4"
1 1/4"-14-18 BWG	HTP-11	HPC-1 1/4"	1.083" 27.5 mm	1.214" 30.8 mm	3/4"	M25x2	M25x2	
1 1/4"-18-24 BWG & 1 1/2"-8-10 BWG	HTP-12	HPC-1 1/4"	1.161" 29.5 mm	1.293" 32.8 mm	1"	M30x2	M30x2	
1 1/2"-10-13 BWG	HTP-13	HPC-1 1/2"	1.240" 31.5 mm	1.371" 31.8 mm	1"	M30x2	M30x2	1" x 1" or 1 1/2" x 1"
1 1/2"-13-17 BWG	HTP-14	HPC-1 1/2"	1.319" 33.5 mm	1.450" 36.8 mm	1"	M30x2	M30x2	

TUBE REMOVAL TOOLS

SPINNER

TECO has developed an automatic tube spinner capable of running at high speed, tubes out of a heat exchanger, even if the tubes are corroded and dirty. The electric-hydraulic power unit (pneumatic also available) drives two hydraulic motors for extracting tubes up to 1 $\frac{1}{2}$ " outside diameter.

FEATURES

- Fully self contained hydraulic system with adjustable speed flow control.
- Suspended via a spring balancer for weightless operation.
- Reacts against the tube sheet or the rear of a pulling cylinder.
- Used in conjunction with your existing puller.
- Use simultaneously during pulling operations for maximum productivity.
- Requires only 150 mm tube protrusion to capture the tube.
- Uses Interchangeable pulling collars and roller sets.

Power unit:

Electric motor 400 volt, 3 phase, 7.5 kw (10 Hp) or Pneumatic motor with air consumption 3500 Ltr./min. at 6 bar Weight : 230 kg.

Complete supplied with :

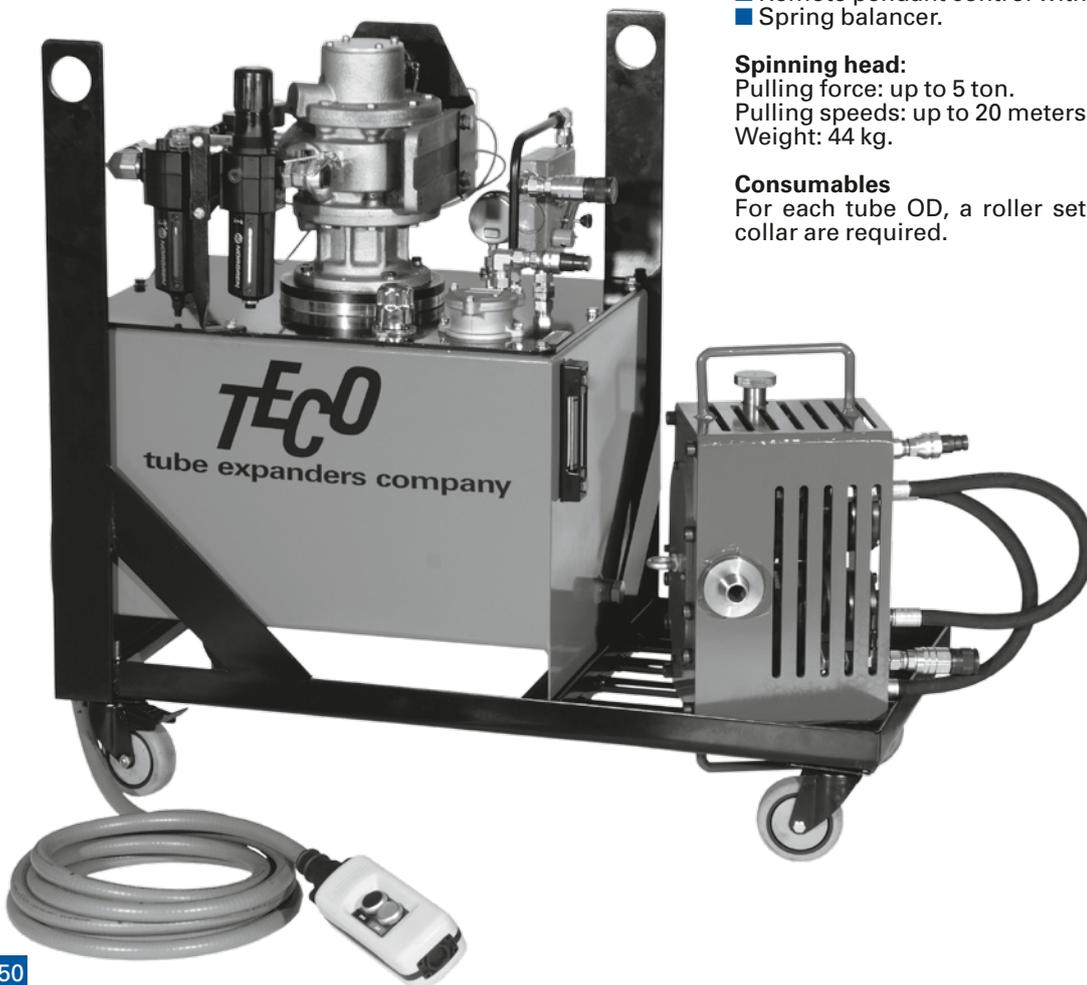
- Hydraulic hose set complete with flat faced couplings, 6 m in length.
- Remote pendant control with 6 m of cable.
- Spring balancer.

Spinning head:

Pulling force: up to 5 ton.
 Pulling speeds: up to 20 meters per minute.
 Weight: 44 kg.

Consumables

For each tube OD, a roller set (2 per set) and a pulling collar are required.



TECO HYDRAULIC PIPE VICE

The air driven foot operated hydraulic pipe vice is used to remove the tube puller spear from the tube after the tube extraction process.



Model no. : **THPV-10-65**

Complete with power pack, hose, and replaceable jaws.

Tube size capacity : 10-65 mm O.D.
3/8" - 2 1/2" O.D.

Clamping power : 10 Ton

Air consumption : 340 Ltr./min.
12 cfm

Air pressure range: 2.7 – 8.3 bar
39 – 125 psi

AUTOMATIC & CONTINUOUS TUBE PULLING

TECO has introduced the most efficient range of continuous tube pullers. This semi or fully automatic TUBE PULLER will run tubes out of heat exchangers and condensers without the need to cut the tube prior to pulling.



FEATURES

- Continuous pull capacity up to 3" O.D.
- Easy to set up and use.
- High power and high speed automatic cycling.
- Proven mandrel and pulling jaw system.
- Electric or pneumatic versions available.
- 'Slow-start' to minimise the risk of tube breakage.
- Standard electric, hydraulic and pneumatic components.
- 24 volt operator controls for added safety.
- Interchangeable pulling guns.

15 Ton Gun

For light duty, high speed work on tubes of diameter 3/8" to 1" O.D. e.g. condenser work.
Free pulling speed : 4.5 m/min. (15 ft/min.)

30 Ton Gun

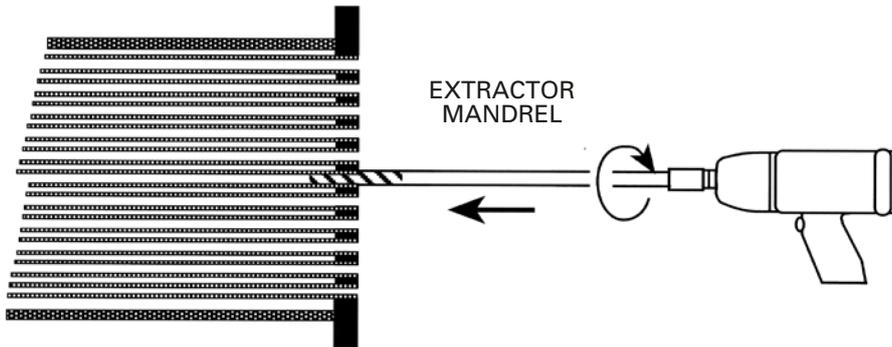
For all tube sizes from 3/8" to 1 1/2" O.D. continuously through the gun and to 3" O.D. stub pulling.
Free pulling speed : 3 m/min. (10 ft/min.)

45 Ton Gun

For all tube sizes up to 3" O.D. continuously through the gun and stub pulling applications on boilers and steam drums.

AUTOMATIC & CONTINUOUS TUBE PULLING

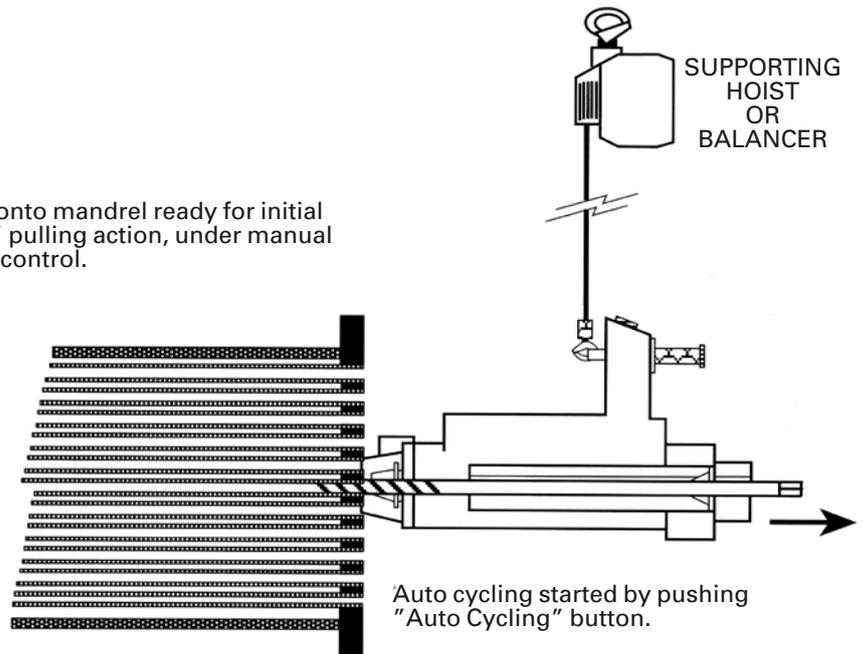
Secure Extractor Mandrel using impact wrench



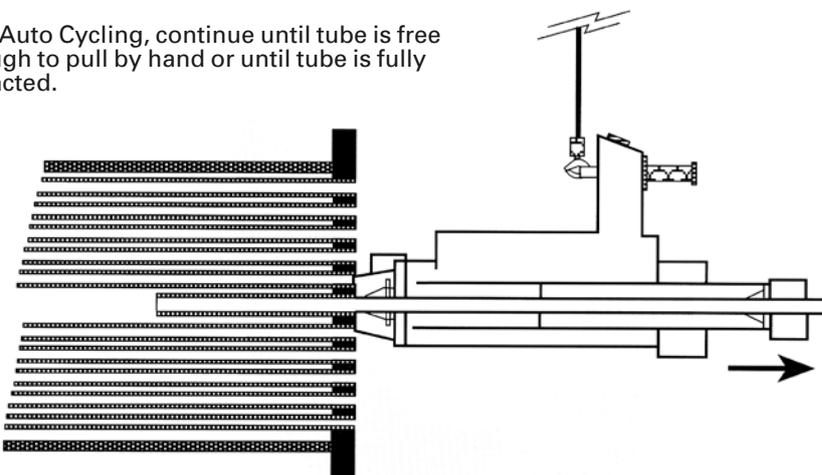
AS SIMPLE AS A B C

- No need for tube cutting, thinning or collapsing.
- Pulls both front and back expansion in one simple action.

Gun loaded onto mandrel ready for initial "Slow Start" pulling action, under manual push button control.



Gun Auto Cycling, continue until tube is free enough to pull by hand or until tube is fully extracted.



TUBE-END BEVELLING MACHINES FOR 12.5 TO 876 MM (1/2" TO 34 1/2") I.D. TUBES

The Portable Pneumatic and Electric Machines are used for a variety of applications - the removal of weld, the preparation of tube ends prior to welding and for facing operations.

Bevelling machines are also used on light or heavy wall pipes to simultaneously bevel inside and outside and for facing cuts.

These machines have the semi-automatic capability for repetitive operations.

Interchangeable shaft sets are available for bevelling **elbows and u-bends**.

One standard shaft covers a wide range of jaws sets for I.D. range of machine.



Model : MINI (Pneumatic or Electric operated)

Specially designed - No kick-back action.

Suitable for bevelling ferrous and non-ferrous tubes from 19.05 to 42 mm (3/4" to 1 5/8" I.D.).

Optional from 12.5 mm (1/2").

Model : MINI-AUTOMATIC (Pneumatic operated only)

Specially designed for facing end of tubes in heat exchangers and condensers.

This machine operates fully automatically.

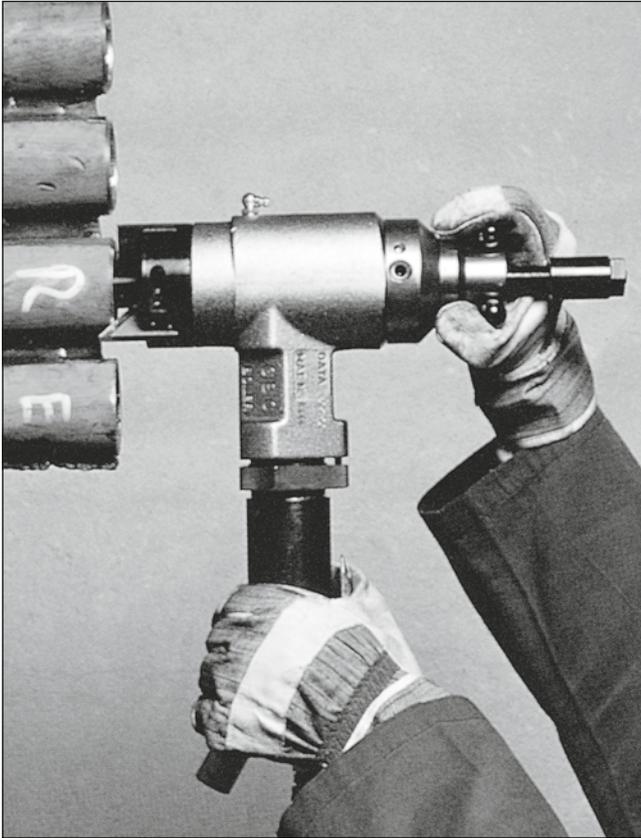
Specially designed - No kick-back action.

Suitable for bevelling ferrous and non-ferrous tubes from 19.05 to 42 mm (3/4" to 1 5/8" I.D.).

Optional from 12.5 mm (1/2").



TUBE-END BEVELLING MACHINES FOR 12.5 TO 876 MM (1/2" TO 34 1/2") I.D. TUBES



Model : BOILER (Pneumatic or Electric operated)

Specially designed - No kick-back action.

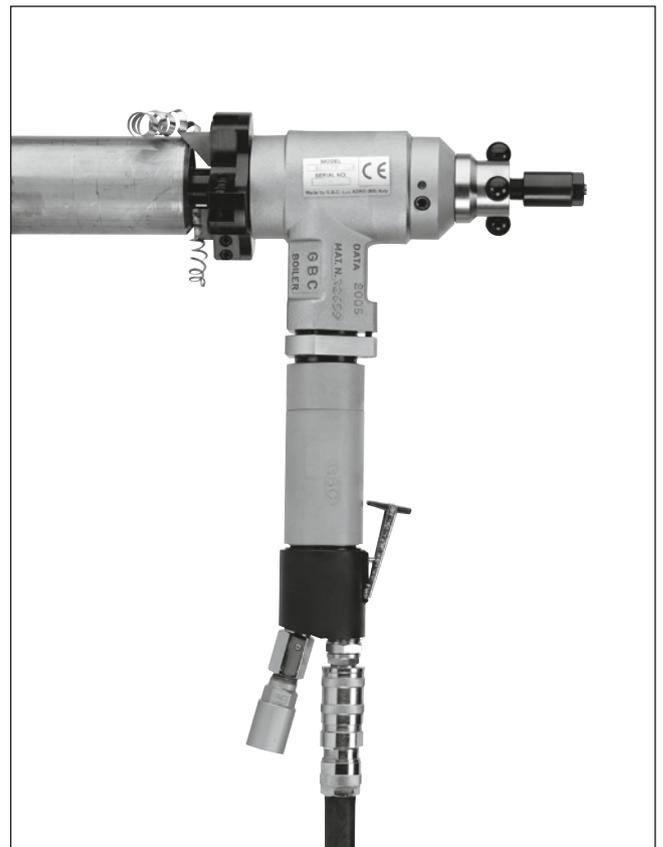
Suitable for bevelling ferrous and non-ferrous tubes from 28 to 76 mm (1 1/8" to 3" I.D.).

Optional from 19.05 mm (3/4").

Model : BOILER 1" – 4" (Pneumatic or Electric operated)

Specially designed - No kick-back action.

Suitable for bevelling ferrous and non-ferrous tubes from 22 to 111 mm (7/8" to 4 1/4" I.D.).



TUBE-END BEVELLING MACHINES FOR 12.5 TO 876 MM (1/2" TO 34 1/2") I.D. TUBES

Model : SUPERBOILER T4 & T5 (Pneumatic or Electric operated)

Specially designed—No kick-back action.

Suitable for bevelling ferrous and non-ferrous tubes from 39 to 203 mm (1 1/2" to 8" I.D.).



Model : SUPERMAXI 12 (Pneumatic or Electric operated)

Specially designed - No kick-back action.

Suitable for bevelling ferrous and non-ferrous tubes from 100 to 306 mm (4" to 12" I.D.).



TECO HYDRAULIC SYSTEM FOR TACK EXPANDING

GENERAL DESCRIPTION

The new TECO hydraulic manual expanding system is an easy to operate tool specifically designed for enlarging tube ends to produce the slight contact required between the tube O.D. and the tube sheet hole.

PRIOR TO WELDING THE JOINTS.

It can also be used to calibrate tube ends.

It is also used to fix the tube into the tube sheet hole before normal expansion by means of a conventional expander.

ADVANTAGE

- Centering of the tube in the tube sheet hole.
- Minimum stress on the material.
- No stressing of the tube surface.
- Total circumference expanded in the required area.
- Easily changed to another tube size.
- Simple operation and adjustment.

THE UNIT CONSISTS OF

Electro hydraulic pump trolley mounted:

- Power : 400/220 Volt - 3 Ph - 50/60 Hz.
- Two-Stage pump flow capacity :
10.6 Ltr./min. at 0-60 bar.
2.0 Ltr./min. at 60-350 bar.
- Oil tank capacity : 7.5 litre.
- Electrical Solenoid 4/3-way valve : 24 Volt A.C.
- Remote control : hand switch.
- Frame size : L 69 cm x W 18 cm x H 68 cm
L 27" x W 7" x H 27",
provided with ball bearing type swivel wheels and brakes.
- Glycerine filled pressure gauge scale 0-400 bar.
- Complete with set of hydraulic hoses, 20 feet (6 metres) long, with High-Flow quick couplings.
- Weight complete : 49 kg (107 lbs).



Light weight hydraulic double-acting cylinder:

- Capacity : 80 KN.
- Stroke : 50 mm (2")
- Weight : 9.5 kg (21 lbs).
- Tools : - adjustable housing for expansion range.
- suspension ring.
- locking ring.
- slotted ring with index.
- handle with switch.
- quick change couplings.

Expanding tools available:

- Minimum 8 mm (5/16") I.D.
- Maximum 100 mm (4") I.D.

TECO HYDRO EXPANSION UNIT

The TECO Hydro Expansion Unit has been developed for speedy simple tube expanding in the construction of heat exchangers, condensers, steam generators, cooling apparatus, etc.

Tubes are expanded by precisely controlled hydraulic pressure.

The primary pressure is obtained by using oil and the secondary pressure by water. It is the water that creates the pressure for the tube expansion. This equipment can easily expand large wall thickness tubes without occurrence of flaking.

FEATURES

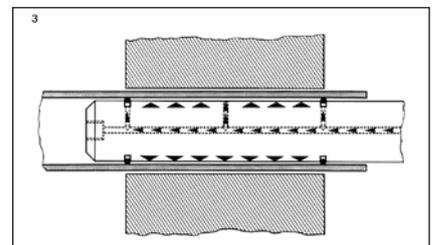
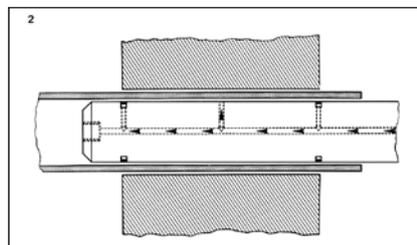
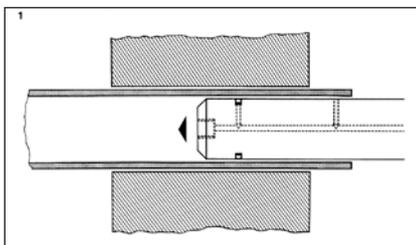
- Expands in one action tubes with a large wall thickness.
- Expands tubes over a long length.
- Eliminates the need for step tube expanding.
- No work hardening of the tube as this is not a rolling type expansion.
- Eliminates distortion of the tube sheet, as there is no extension of the tube during expansion.
- Does not therefore stress welded tube ends.
- Increased holding strength between tube and tube sheet.
- Tighter tubes in ring grooved tube sheets.
- Smooth contour change between expanded and non-expanded part of the tube.
- Eliminates the need to clean down after expanding.
- No rotary reaction of the tube to hold.
- Reduced operator fatigue.



Hydro Expansion Mandrel introduced.

Water introduced and de-aerated.

Seals expanded.



TECO HYDRO EXPANSION UNIT

PRINCIPLES OF OPERATION

The TECO Hydro Expansion is the direct application of high internal hydraulic pressure within a tube in order to form a tight joint between the tube and tube sheet. This pressure or expansive force is accurately set, measured, repeated and controlled. The pressure level can be calculated or determined empirically.

Pressure from the control unit is intensified to the desired high pressure. It is transmitted through a 6 metre (20 feet), small bore, flexible high pressure tube to a light-weight hand held gun. The mandrel, which latches into the gun, directs the pressure to the inside diameter of the tube and is held within an accurately prescribed pressure zone. Pressure is contained within the expanding tube by a special elastic seal. Pressure is applied over the full length of the joint in one step. Stress, crevice corrosion, and metallurgical changes are minimized.

A smooth transition from expanded to unexpanded areas, along with no change in tube material properties, reduces strain hardening, tube fatigue and stress induced corrosion cracking. Tube wall thickness and tube length change minimally. Before contact is made with the tube sheet a small reduction in tube wall thickness and length occurs because a constant volume of tube material is expanded to a larger diameter. However, no change occurs during the high pressure expanding, eliminating the shear strain and loss of seal between tube and tube sheet that is a characteristic of roller expanding.

TECO Hydro Expansion cycle is automatic and initiated by the operator pedal on the footswitch. The tube is filled with clean water at a low pressure. It is then intensified to the higher pressure and held for the time required to allow the tube to expand into a stable condition. This dwell time is essential for the stability of exotic materials. Finally the pressure is released and the water drained back into the reservoir. All this takes is just a few seconds so the cycle time is fast.

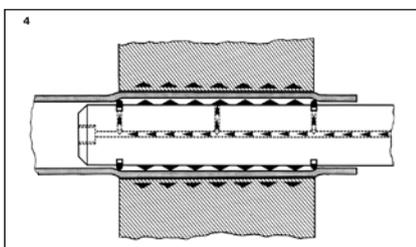
Actual pressure of the water causing expansion is read on a digital indicator and can be printed out if required.

TECHNICAL SPECIFICATION

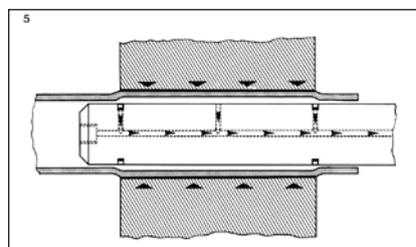
Model	: TECO Hydro Expansion Unit.
Power	: 400 volt 3 Phase 50/60 Hz., 16 Amp.
Maximum Low pressure	: 200 Bar
Maximum High pressure	: 4000 Bar
Oil tank capacity	: 40 Litre
Water tank capacity	: 25 Litre
Flex tube to the handgun	: 6 metres (18 feet), maximum pressure 6000 Bar
Dimensions Control Unit	: L 160 cm x W 77 cm x H 137 cm L 63" x W 30" x H 54"
Weight	: 640 kg (1411 lbs).
Dimensions Hand Gun	: L 17 cm x W 21 cm x H 12 cm L 7" x W 9" x H 5"
Weight	: 4 kg (9 lbs).



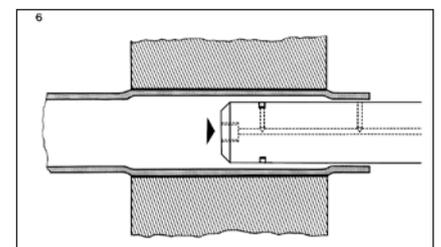
Tube is expanded to touch tube sheet hole.



Further elastic deformation of the tube sheet hole.



Pressure is released, elastic deformation will contract and a uniform seal on the tube is established.





TABLES AND FORMULAS

BIRMINGHAM WIRE GAUGE TABLE INCHES

TUBE SIZES														
B.W.G. Wall Thickness	00	0	1	2	3	4	5	6	7	8	9	10	11	
	0.380	0.340	0.300	0.284	0.259	0.238	0.220	0.203	0.180	0.165	0.148	0.134	0.120	
INSIDE DIAMETER (INCH)														
OUTSIDE DIAMETER	1/4"													
	3/8"									0.045	0.079	0.107	0.135	
	1/2"					0.024	0.060	0.094	0.140	0.170	0.204	0.232	0.260	
	5/8"			0.025	0.057	0.107	0.149	0.185	0.219	0.265	0.295	0.329	0.357	0.385
	3/4"		0.070	0.150	0.182	0.232	0.274	0.310	0.344	0.390	0.420	0.454	0.482	0.510
	7/8"	0.115	0.195	0.275	0.307	0.357	0.399	0.435	0.469	0.515	0.545	0.579	0.607	0.635
	1"	0.240	0.320	0.400	0.432	0.482	0.524	0.560	0.594	0.640	0.670	0.704	0.732	0.760
	1-1/4"	0.490	0.570	0.650	0.682	0.732	0.774	0.810	0.844	0.890	0.920	0.954	0.982	1.010
	1-1/2"	0.740	0.820	0.900	0.932	0.982	1.024	1.060	1.094	1.140	1.170	1.204	1.232	1.260
	1-3/4"	0.990	1.070	1.150	1.182	1.232	1.274	1.310	1.344	1.390	1.420	1.454	1.482	1.510
	2"	1.240	1.320	1.400	1.432	1.482	1.524	1.560	1.594	1.640	1.670	1.704	1.732	1.760
	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
	2-1/2"	1.740	1.820	1.900	1.932	1.982	2.024	2.060	2.094	2.140	2.170	2.204	2.232	2.260
	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
	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
	3-1/4"	2.490	2.570	2.650	2.682	2.732	2.774	2.810	2.844	2.890	2.920	2.954	2.982	3.010
	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
	3-3/4"	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
	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
	4-1/4"	3.490	3.570	3.650	3.682	3.732	3.774	3.810	3.844	3.890	3.920	3.954	3.982	4.010
4-1/2"	3.740	3.820	3.900	3.932	3.982	4.024	4.060	4.094	4.140	4.170	4.204	4.232	4.260	

BIRMINGHAM WIRE GAUGE TABLE INCHES

TUBE SIZES														
B.W.G. Wall Thickness	12	13	14	15	16	17	18	19	20	21	22	23	24	
	0.109	0.095	0.083	0.072	0.065	0.058	0.049	0.042	0.035	0.032	0.028	0.025	0.022	
INSIDE DIAMETER (INCH)														
OUTSIDE DIAMETER	1/4"	0.032	0.060	0.084	0.106	0.120	0.134	0.152	0.166	0.180	0.186	0.194	0.200	0.206
	3/8"	0.157	0.185	0.209	0.231	0.245	0.259	0.277	0.291	0.305	0.311	0.319	0.325	0.331
	1/2"	0.282	0.310	0.334	0.356	0.370	0.384	0.402	0.416	0.430	0.436	0.444	0.450	0.456
	5/8"	0.407	0.435	0.459	0.481	0.495	0.509	0.527	0.541	0.555	0.561	0.569	0.575	0.581
	3/4"	0.532	0.560	0.584	0.606	0.620	0.634	0.652	0.666	0.680	0.686	0.694	0.700	0.706
	7/8"	0.657	0.685	0.709	0.731	0.745	0.759	0.777	0.791	0.805	0.811	0.819	0.825	0.831
	1"	0.782	0.810	0.834	0.856	0.870	0.884	0.902	0.916	0.930	0.936	0.944	0.950	0.956
	1-1/4"	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"	1.282	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"	1.532	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"	1.782	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"	2.032	2.060	2.084	2.106	2.120	2.134	2.152						
	2-1/2"	2.282	2.310	2.334	2.356	2.370	2.384	2.402						
	2-3/4"	2.532	2.560	2.584	2.606	2.620	2.634	2.652						
	3"	2.782	2.810	2.834	2.856	2.870	2.884	2.902						
	3-1/4"	3.032	3.060	3.084	3.106	3.120	3.134	3.152						
	3-1/2"	3.282	3.310	3.334	3.356	3.370	3.384	3.402						
	3-3/4"	3.532	3.560	3.584	3.606	3.620	3.634	3.652						
	4"	3.782	3.810	3.834	3.856	3.870	3.884	3.902						
	4-1/4"	4.032	4.060	4.084	4.106	4.120	4.134	4.152						
4-1/2"	4.282	4.310	4.334	4.356	4.370	4.384	4.402							



TABLES AND FORMULAS

BIRMINGHAM WIRE GAUGE TABLE METRIC

TUBE SIZES														
B.W.G Wall Thickness	00	0	1	2	3	4	5	6	7	8	9	10	11	
	9.652	8.636	7.620	7.214	6.579	6.045	5.588	5.156	4.572	4.191	3.759	3.404	3.048	
INSIDE DIAMETER (METRIC)														
OUTSIDE DIAMETER	1/4" 6.350 mm													
	3/8" 9.525 mm									1.143	2.007	2.717	3.429	
	1/2" 12.700 mm						0.610	1.524	2.388	3.556	4.318	5.182	5.892	6.604
	5/8" 15.875 mm			0.635	1.447	2.717	3.785	4.699	5.563	6.731	7.493	8.357	9.067	9.779
	3/4" 19.050 mm		1.778	3.810	4.622	5.892	6.960	7.874	8.738	9.906	10.668	11.532	12.242	12.954
	7/8" 22.225 mm	2.921	4.953	6.985	7.797	9.067	10.135	11.049	11.913	13.081	13.843	14.707	15.417	16.129
	1" 25.400 mm	6.096	8.128	10.160	10.972	12.242	13.310	14.224	15.088	16.256	17.018	17.882	18.592	19.304
	1-1/4" 31.750 mm	12.446	14.478	16.510	17.322	18.592	19.660	20.574	21.438	22.606	23.368	24.232	24.942	25.654
	1-1/2" 38.100 mm	18.796	20.828	22.860	23.672	24.942	26.010	26.924	27.788	28.956	29.718	30.582	31.292	32.004
	1-3/4" 44.450 mm	25.146	27.178	29.210	30.022	31.292	32.360	33.274	34.138	35.306	36.068	36.932	37.642	38.354
	2" 50.800 mm	31.496	33.528	35.560	36.372	37.642	38.710	39.624	40.488	41.656	42.418	43.282	43.992	44.704
	2-1/4" 57.150 mm	37.846	39.878	41.910	42.722	43.992	45.060	45.974	46.838	48.006	48.768	49.632	50.342	51.054
	2-1/2" 63.500 mm	44.196	46.228	48.260	49.072	50.342	51.410	52.324	53.188	54.356	55.118	55.982	56.692	57.404
	2-3/4" 69.850 mm	50.546	52.578	54.610	55.422	56.692	57.760	58.674	59.538	60.706	61.468	62.332	63.042	63.754
	3" 76.200 mm	56.896	58.928	60.960	61.772	63.042	64.110	65.024	65.888	67.056	67.818	68.682	69.392	70.104
	3-1/4" 82.550 mm	63.246	65.278	67.310	68.122	69.392	70.460	71.374	72.238	73.406	74.168	75.032	75.742	76.454
	3-1/2" 88.900 mm	69.596	71.628	73.660	74.472	75.742	76.810	77.724	78.588	79.756	80.518	81.382	82.092	82.804
	3-3/4" 95.250 mm	75.946	77.978	80.010	80.822	82.092	83.160	84.074	84.938	86.106	86.868	87.732	88.442	89.154
	4" 101.600 mm	82.296	84.328	86.360	87.172	88.442	89.510	90.424	91.288	92.456	93.218	94.082	94.792	95.504
	4-1/4" 107.950 mm	88.646	90.678	92.710	93.522	94.792	95.860	96.774	97.638	98.806	99.568	100.432	101.142	101.854
	4-1/2" 114.300 mm	94.996	97.028	99.060	99.872	101.142	102.210	103.124	103.988	105.156	105.918	106.782	107.492	108.204

BIRMINGHAM WIRE GAUGE TABLE METRIC

TUBE SIZES														
B.W.G Wall Thickness	12	13	14	15	16	17	18	19	20	21	22	23	24	
	2.769	2.413	2.108	1.829	1.651	1.473	1.245	1.067	0.889	0.813	0.711	0.635	0.559	
INSIDE DIAMETER (METRIC)														
OUTSIDE DIAMETER	1/4" 6.350 mm	0.812	1.524	2.134	2.692	3.048	3.404	3.860	4.216	4.572	4.724	4.928	5.080	5.232
	3/8" 9.525 mm	3.987	4.699	5.309	5.867	6.223	6.579	7.035	7.391	7.747	7.899	8.103	8.255	8.407
	1/2" 12.700 mm	7.162	7.874	8.484	9.042	9.398	9.754	10.210	10.566	10.922	11.074	11.278	11.430	11.582
	5/8" 15.875 mm	10.337	11.049	11.659	12.217	12.573	12.929	13.385	13.741	14.097	14.249	14.453	14.605	14.757
	3/4" 19.050 mm	13.512	14.224	14.834	15.392	15.748	16.104	16.560	16.916	17.272	17.424	17.628	17.780	17.932
	7/8" 22.225 mm	16.687	17.399	18.009	18.567	18.923	19.279	19.735	20.091	20.447	20.599	20.803	20.955	21.107
	1" 25.400 mm	19.862	20.574	21.184	21.742	22.098	22.454	22.910	23.266	23.622	23.774	23.978	24.130	24.282
	1-1/4" 31.750 mm	26.212	26.924	27.534	28.092	28.448	28.804	29.260	29.616	29.972	30.124	30.328	30.480	30.632
	1-1/2" 38.100 mm	32.562	33.274	33.884	34.442	34.798	35.154	35.610	35.966	36.322	36.474	36.678	36.830	36.982
	1-3/4" 44.450 mm	38.912	39.624	40.234	40.792	41.148	41.504	41.960	42.316	42.672	42.824	43.028	43.180	43.332
	2" 50.800 mm	45.262	45.974	46.584	47.142	47.498	47.854	48.310	48.666	49.022	49.174	49.378	49.530	49.682
	2-1/4" 57.150 mm	51.612	52.324	52.934	53.492	53.848	54.204	54.660						
	2-1/2" 63.500 mm	57.962	58.674	59.284	59.842	60.198	60.554	61.010						
	2-3/4" 69.850 mm	64.312	65.024	65.634	66.192	66.548	66.904	67.360						
	3" 76.200 mm	70.662	71.374	71.984	72.542	72.898	73.254	73.710						
	3-1/4" 82.550 mm	77.012	77.724	78.334	78.892	79.248	79.604	80.060						
	3-1/2" 88.900 mm	83.362	84.074	84.684	85.242	85.598	85.954	86.410						
	3-3/4" 95.250 mm	89.712	90.424	91.034	91.592	91.948	92.304	92.760						
	4" 101.600 mm	96.062	96.774	97.384	97.942	98.298	98.654	99.110						
	4-1/4" 107.950 mm	102.412	103.124	103.734	104.292	104.648	105.004	105.460						
	4-1/2" 114.300 mm	108.762	109.474	110.084	110.642	110.998	111.354	111.810						



TABLES AND FORMULAS

INCH TO METRIC TABLE CONVERSION

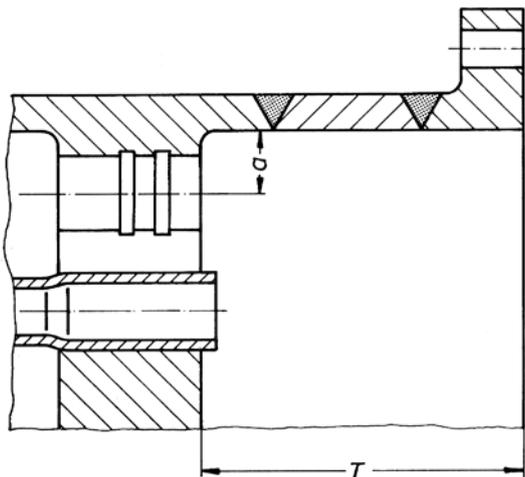
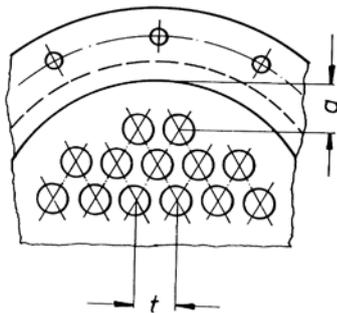
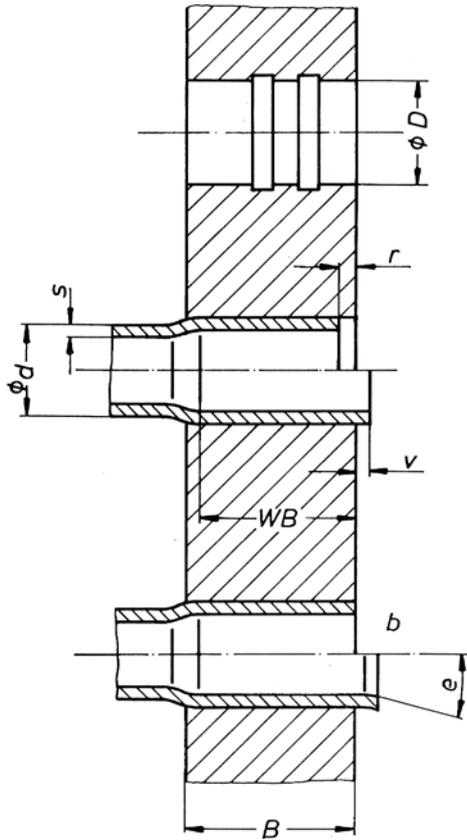
Fractional Inch	Decimal Inch	Millimetre	Fractional Inch	Decimal Inch	Millimetre	Fractional Inch	Decimal Inch	Millimetre
1/64	.0156	0.3969	23/64	.3594	9.1281	45/64	.7031	17.8594
1/32	.0312	0.7937	3/8	.375	9.525	23/32	.7187	18.2562
3/64	.0469	1.1906	25/64	.3906	9.9219	47/64	.7344	18.6531
1/16	.0625	1.5875	13/32	.4062	10.3187	3/4	.75	19.05
5/64	.0781	1.9843	27/64	.4219	10.7156	49/64	.7656	19.4469
3/32	.0937	2.3812	7/16	.4375	11.1125	25/32	.7812	19.8437
7/64	.1094	2.7781	29/64	.4531	11.5094	51/64	.7969	20.2406
1/8	.125	3.175	15/32	.4687	11.9062	13/16	.8125	20.6375
9/64	.1406	3.5719	31/64	.4844	12.3031	53/64	.8281	21.0344
5/32	.1562	3.9687	1/2	.5	12.7	27/32	.8437	21.4312
11/64	.1719	4.3656	33/64	.5156	13.0969	55/64	.8594	21.8281
3/16	.1875	4.7625	17/32	.5312	13.4937	7/8	.875	22.225
13/64	.2031	5.1594	35/64	.5469	13.8906	57/64	.8906	22.6219
7/32	.2187	5.5562	9/16	.5625	14.2875	29/32	.9062	23.0187
15/64	.2344	5.9531	37/64	.5781	14.6844	59/64	.9219	23.4156
1/4	.25	6.35	19/32	.5937	15.0812	15/16	.9375	23.8125
17/64	.2656	6.7469	39/64	.6094	15.4781	61/64	.9531	24.2094
9/32	.2818	7.1437	5/8	.625	15.875	31/32	.9687	24.6062
19/64	.2969	7.5406	41/64	.6406	16.2719	63/64	.9844	25.0031
5/16	.3125	7.9375	21/32	.6562	16.6687	1	1	25.4
21/64	.3281	8.3344	43/64	.6719	17.0656	2	2	50.8
11/32	.3437	8.7312	11/16	.6875	17.4625	3	3	76.2

U.S TO METRIC CONVERSION FORMULAS

METRIC TO U.S CONVERSION FORMULAS

To convert	Multiply By	To convert	Multiply By
Linear Measure		Linear Measure	
Inch (in) to Millimetre (mm)	25.400	Millimetre (mm) to Inch (in)	0.039
Inch (in) to Centimetre (cm)	2.540	Centimetre (cm) to Inch (in)	0.394
Foot (ft) to Metre (m)	0.305	Metre (m) to Foot (ft)	3.281
Square Measures		Square Measures	
Sq. Inch (sq. in) to Sq. Centimetre (cm ²)	6.452	Sq. Centimetre (cm ²) to Sq. Inch (sq. in)	0.155
Sq. Foot (sq. ft) to Sq. Metre (m ²)	0.093	Sq. Metre (m ²) to Sq. Foot (sq. ft)	10.760
Measures of Volume		Measures of Volume	
Cu. Inch (cu. in) to Cu. Centimetre (cm ³)	16.390	Cu. Centimetre (cm ³) to Cu. Inch (cu. in)	0.061
Cu. Foot (cu. ft) to Cu. Metre (m ³)	0.028	Cu. Metre (m ³) to Cu. Foot (cu. ft)	35.310
U.S. Gallon (g) to Litre (Ltr.)	3.785	Litre (l) to U.S. Gallon (g)	0.264
Imperial Gallon (imp. gal) to Litre (Ltr.)	4.546	Litre (l) to Imperial Gallon (imp. gal)	0.219
Weight		Weight	
Pound (lb) to Kilogram (kg)	0.454	Kilogram (kg) to Pound (lb)	2.205
Pressure		Pressure	
PSI to BAR	0.069	BAR to PSI	14.504
Power		Power	
Horse Power (HP) to Kilowatt (kW)	0.746	Kilowatt (kW) to Horse Power (HP)	1.341
To Convert	Subtract then Multiply By	To Convert	Multiply By then Add
Temperature		Temperature	
Fahrenheit (°F) to Celsius (°C)	32 5/9	Celsius (°C) to Fahrenheit (°F)	9/5 32

INFORMATION SHEET



Tube o.d.	d ±	mm
Tube wall thicken.	s ±	mm
Tube material		
<hr/>		
Dia. of tube sheet hole	D ±	mm
Tube sheet thickness	B ±	mm
Tube sheet material		
<hr/>		
Length of rolling	WB ±	mm
Tube protrusion	v	mm
Tube recessing	r	mm
Degree of angle when belling	e	
Minimum distance between two holes	t	mm
No. of tubes	
<hr/>		
Straight tubes	Yes / No	
U-tubes	Yes / No	
Welded joint	Yes / No	
Welded and expanded joint	Yes / No	
Required expansion of tube (one wall)	%	
<hr/>		
Pressure	
Temperature	
<hr/>		
For difficult expansions	T	mm
	a	mm
<hr/>		
For recessing head, pilot ring and tool holder:		
<hr/>		
Bore	D ±	mm
Distance bore-groove	mm
Groove	mm
Distance between grooves	mm



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