

Tube Installation



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●-Recommended

○-Suitable

Tube Hole Gauges

Hole Size

- 0.375" to 2.000"
(9.5 to 51.0mm)

Elliott's Tube Hole Gauges make it easy to accurately measure tube IDs and tube sheet holes found in vessels such as heat exchangers, chillers, and surface condensers.

Simply insert the tube gauge in the tube or tube sheet hole and use the three point ball contact to obtain an accurate measurement. Elliott's Reversible Dial Plate offers metric on one side and inch/decimal on the other to suit your needs.

The standard measurement depth is 4" (101.6mm) or 8" (203.2mm) (see the table to the right) with additional extensions of 8" (203.2mm) available. See the Spares & Accessories section for more information on these extensions

Features & Benefits:

- 3 point contact much more accurate than common 2 point calipers.
- Can measure inside the tube where the actual rolling area will occur.
- More economical and rugged than electronic gauges.
- Easy to calibrate in field so accuracy is maintained.
- Large, reversible dial face for easily measuring in inches and metric.

How To Order:

1. Specify tube hole(s) to be measured. *See table on opposite page.*
2. Choose spares & accessories.

Each Tube Hole Gauge includes:

- Tube Hole Gauge
- Setting Ring
- Screwdriver
- Wrench
- Storage Box

Spares & Accessories: *See table on opposite page for part numbers.*

- Mandrel Extension: Will add 8" (203.2mm) to maximum reach. One Body Extension is required for each Mandrel Extension.
- Body Extension: Will add 8" (203.2mm) to maximum reach. One Mandrel Extension is required for each Body Extension.
- Mandrel
- Body
- Setting Ring



Tube OD	ID Range		Tube Hole Gauge	Reach	Setting Ring	Mandrel Extension	Body Extension
	Min	Max					
3/8" (9.5mm)	0.290" (7.4mm)	0.350" (8.9mm)	876200-375	4"	8252-3/8	876210-500	876211-375
1/2" (12.0mm)	0.350" (8.9mm)	0.450" (11.4mm)	876200-500	4"	8252-1/2	876210-500	876211-500
5/8" (15.9mm)	0.440" (11.0mm)	0.560" (14.2mm)	876200-625	4"	8252-5/8	876210-500	876211-625
3/4" (19.1mm)	0.550" (14.0mm)	0.715" (18.2mm)	876200-750	8"	8252-3/4	876210-500	876211-750
7/8" (22.2mm)	0.675" (17.1mm)	0.840" (21.3mm)	876200-875	8"	8252-7/8	876210-500	876211-750
1" (25.4mm)	0.800" (20.3mm)	0.965" (24.5mm)	876200-1000	8"	8252-1	876210-500	876211-750
1-1/4" (31.8mm)	0.950" (24.1mm)	1.170" (29.7mm)	876200-1250	8"	8252-1-1/4	876210-500	876211-750
1-3/8" (35.0mm)	1.085" (27.5mm)	1.295" (32.9mm)	876200-1375	8"	8252-1-3/8	876210-500	876211-750
1-1/2" (38.1mm)	1.240" (31.5mm)	1.450" (36.8mm)	876200-1500	8"	8252-1-1/2	876210-1500	876211-1500
1-3/4" (44.5mm)	1.440" (36.6mm)	1.650" (41.9mm)	876200-1750	8"	8252-1-3/4	876210-2000	876211-1750
1-7/8" (47.6mm)	1.630" (41.4mm)	1.840" (46.7mm)	876200-1875	8"	8252-1-7/8	876210-2000	876211-2000
2" (50.8mm)	1.700" (43.2mm)	1.910" (48.5mm)	876200-2000	8"	8252-2	876210-2000	876211-2000

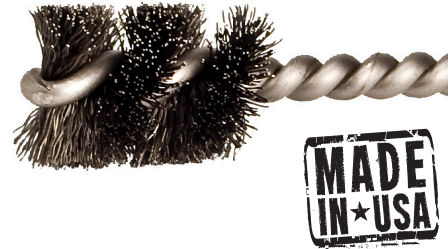
Tube Sheet Hole Brushes

Hole Size

- 0.250" to 1.250"
(6.4 to 31.8mm)

Elliott's Tube Sheet Hole Brushes clean and remove hard deposits from tube sheets and support plate holes in surface condensers and heat exchangers.

These brushes are constructed of stainless steel with a double twisted stem to provide for maximum life and durability.



Features & Benefits:

- Stainless steel bristles for cleaning hard deposits.
- Brush stems are high carbon steel with a double twist for extra life.

How To Order:

1. Specify tube sheet hole size(s) to be cleaned. *See table below.*
2. Determine quantity needed: Recommend quantity of 1 brush per every 150 tube sheet holes to be cleaned.

Size		Brush
Inch	mm	
1/4"	6.0	P5252-4
3/8"	9.5	P5252-6
1/2"	12.7	P5252-8
5/8"	15.9	P5252-10
3/4"	19.1	P5252-12
7/8"	22.2	P5252-14
1"	25.4	P5252-16
1-1/4"	31.8	P5252-20

Hole Size

- 0.625" to 3.000"
(15.9 to 76.2mm)

Elliott's GT Series Grooving Tools, also known as Serrating Tools, can be used manually to clean up existing grooves or can be used in milling or drilling equipment for OEM tube sheet thicknesses of 7/8" (22.2mm) through 2-1/8" (54.0mm).

The GT Series Grooving Tools feature a one-piece mandrel design to significantly improve performance and accuracy. Using standard GT Series cutter bits allow for repeatable, accurate cuts from tube sheet hole to tube sheet hole.



Features & Benefits:

- One piece mandrel for improved performance and accuracy.
- Uses standard cutter bits for easy replacement.
- Designed for manual or machine use.

How To Order:

1. Specify tube size(s) to be cut (see table below on the left).
2. Choose spares & accessories.

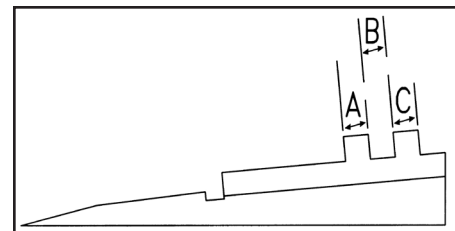
Each GT Series Grooving Tool includes:

- Standard 1/8" x 1/4" x 1/8" (3.0 x 6.4 x 3.0mm) Cutter Bit

Spares & Accessories:

- Cutter Bit: Available in ferrous and stainless steel in various cutter bit tooth configurations. *See table below for part numbers.*
- Mandrel *See table below for part numbers.*

Size		Grooving Tool	Mandrel	Morse Taper
Inch	mm			
5/8"	15.9	GT625	GT625-03	3
3/4"	19.1	GT750	GT750-03	
7/8"	22.2	GT875	GT875-03	
1"	25.4	GT1000	GT1000-03	
1-1/4"	31.8	GT1250	GT1250-03	4
1-1/2"	38.1	GT1500	GT1500-03	
1-3/4"	44.5	GT1750	GT1750-03	
2"	50.8	GT2000	GT2000-03	
2-1/2"	63.5	GT2500	GT2500-03	
3"	76.2	GT3000	GT3000-03	



Ferrous and Non-Ferrous Blade	A	B	C
GT100-31-3	1/8"	1/4"	1/8"
GT100-31-4	1/8"	3/8"	1/8"
Stainless Steel Blade	A	B	C
GT100-31-3S	1/8"	1/4"	1/8"
GT100-31-4S	1/8"	3/8"	1/8"

Tube Auger / End Prep Tool

Tube Size

- 3/4" to 3"
(19.1 to 76.2mm) ID
Other Sizes Available Upon Request

Elliott's EP443010 Tube Auger (End Prep Tool) is the best way to face, chamfer, profile, and trim tubes in fire-tube and watertube boilers.

The unique ratchet feed handle allows the operator to use the tool in tight spaces and provides accurate feed control of the cutter. The large gripping segments provide the tool a tight, positive position inside the tube and hold the tool firmly during the toughest cutting conditions. The 1-1/2" (38.1mm) feed travel of the unit allows plenty of cutting space without the need to reposition the unit. The powerful pneumatic motor makes for fast thick tube wall work. The slim profile design allows machining in 2" (50.0mm) tube and larger water wall applications with the optional 2" (50mm) cutter holder.

The cutter blades are made from high alloy tool steel and are then special coated to provide up to three times the life of other high speed blades. The unique spring bands are superior in the retention of the gripping segments over rubber O-Rings or spiral wound springs.

How To Order:

1. Select Tube Auger kit EP443010.
2. Choose spares & accessories.

The EP443010 Tube Auger Kit includes:

- End Prep Tool
- 3/4" to 1" (19.1 to 25.4mm) ID Mandrel Assembly
- 1" to 3" (25.4 to 76.2mm) ID Mandrel Kit
- Tool Box
- Set of Wrenches

Spares & Accessories:

- Contact Factory for other sizes.
- Cutter Blades: Recommend quantity of one set of blades for every 100 tube ends. Three cutter blades equals a set.
- 6070 Filter - Lubricator



Features & Benefits:

Versatile unit that will:

- Prepare the ends of water wall tubes prior to welding.
- Trim tube ends and preparing prior to expansion.
- Remove tube welds from tube sheet face.
- Remove beaded tube ends.
- Portable, pneumatically powered unit for easy and safe operator use.

Standard Blades Available:		
	Part Number	Profile
37-1/2° O.D. Bevel	EP163037	
90° Face / Weld Removal	EP163190	
37° I.D. Bevel	EP163137	
3/16" Radius Heat Exchanger Cutter / Weld Removal	EP163012	
1/4" Radius Boiler Plate Cutter / Weld Removal	EP163010	

*Blades come standard with special coating.
Tool has ratchet clamping and ratchet feed.*

Seat Width

- 0.187" to 0.656"
(4.8 to 16.7mm)

Elliott's 7099-1 Hand Hole Seat Grinder is air-powered, light, easy to handle, and precision-engineered to reface boiler header seats.

The Hand Hole Seat Grinder self-aligns for precision grinding every time, holding the grinding wheel securely in one plane. All movement of the grinder is confined precisely within the plane to ensure unvarying accuracy.

The model 7099-1 allows you to reach surfaces that hand methods can't get to and even reduces recurrent leakage around boiler plugs.

How To Order:

1. Choose the model 7099-1 Hand Hole Seat Grinder.
2. Choose spares and accessories based on the seat width.

The 7099-1 Hand Hole Seat Grinder includes:

- Hand hold grinding assembly with pneumatic motor
- Filter-Lubricator
- Shut-off valve
- Hose whip
- Inspection mirror
- Set of wrenches
- Set of 4 Guide rollers
- Carrying case

Spares & Accessories:

- Grinding Wheels: Recommend quantity of 1 for every 4 hand holes *See table below for part numbers.*
- Cup Brushes: Recommend quantity of 1 for every 4 hand holes *See table above for part numbers.*
- 702636 Extension Link: Used to extend reach beyond 11-1/2" (292.1mm).
- P7026-9 Wheel Dresser: Used for restoring the grinding surface of the grinding wheel.



Specifications:

- Accommodates seat widths between 0.187" to 0.656" (4.7mm to 16.7mm).
- RPM: 5,000 @ 90 PSI.
- Weight: 30 Lbs (13.6 kgs).
- Includes guide rollers.

RPM	PSI	Hose	Hose Size
Connection			
5,000	90	1/4 NPT	5/16" (7.92mm)

Features & Benefits:

- Saves lots of time as the boiler does not need to be brought up in order to check for leaks.
- Coarse grinding wheels available for quick removal of material. Fine grinding wheels available for smooth finish.

Seat Width		Guide Roller		Grinding Wheels		Cup Brush	Wheel & Brush Diameter	
inch	mm	No.	Part Number	Coarse	Fine		Inch	mm
0.187	4.75	10	702628-3	7026-21	7026-22	702630	2.00	50.80
0.218	5.54	11	702628-2					
0.250	6.35	11X	702628					
0.281	7.14	12	702628-1					
0.312	7.92	10	702628-3	7026-23	7026-24	702830-1	2.25	57.15
0.343	8.71	11	702628-2					
0.375	9.53	11X	702628					
0.406	10.31	12	702628-1					
0.437	11.10	10	702628-3	7026-25	7026-26	702830-2	2.50	63.50
0.468	11.89	11	702628-2					
0.500	12.70	11X	702628					
0.531	13.49	12	702628-1					
0.562	14.27	10	702628-3	7026-27	7026-28	702830-3	2.75	69.85
0.593	15.06	11	702628-2					
0.625	15.88	11X	702628					
0.656	16.66	12	702628-1					

Manhole Seat Grinder (Rental Only)

Manway Elliptical Dimensions

- 10" to 14" x 14" to 18"
(254.0 to 355.6mm) x (255.6 to 457.2mm)

Elliott's Rental Model RX709600P Manhole Seat Grinder is the answer to on-site resurfacing of boiler manway holes. Pitted gasket areas are easily resurfaced and put into first class condition in minutes!

Elliott offers two different grit of grinding wheels. The fine grit (60 grit) grinding wheel is the preferred wheel – in most cases this wheel will accommodate all resurfacing applications. Only in cases where pitting or warpage is extreme, the coarse grit (24 grit) grinding wheel is recommended. The coarse wheel should only be used to bring the seat back close to the finished tolerance. Final cut passes of the manway seat should be accomplished with the fine grit grinding wheel.

Features & Benefits:

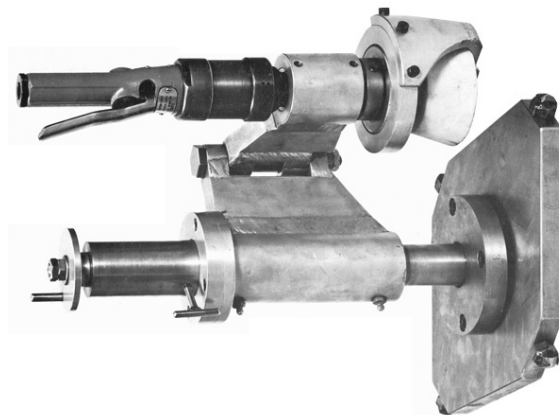
- Saves lots of time as the boiler does not need to be brought up in order to check for leaks.
- Pitted gasket areas are easily resurfaced and put into first class condition in minutes.
- Universal size fits many different applications.
- Coarse grinding wheels available for quick removal of material. Fine grinding wheels available for smooth finish.

How To Order:

1. Choose the rental model RX709600P Manhole Seat Grinder.
2. Choose spares and accessories below.

Spares & Accessories:

- Grinding wheels: Recommend quantity of 1 for every 4 manholes: Quantity may vary due to seat condition. *See table above for parts numbers.*
- 7096-28 Clamp Rest (Set of 4)
- 6070 Filter-Lubricator



Specifications:

- Accommodates manways having minimum elliptical of 10" x 14" (254.0 x 355.6mm) and maximum of 14" x 18" (355.6 x 457.2mm).
- RPM: 6,000 @ 90 PSI.
- Weight: 92 Lbs (13.6 kgs).

Grinding Wheel Grit	Part Number
Fine	7096-12
Coarse/Weld Removal	7096-12B

Tube Size

- 0.250" to 3.000"
(6.4 to 76.2mm) OD

Elliott's 430G Pneumatic Hammer is the recommended driving tool for Elliott's Beading Tools and Flaring Tools.

Beading Tools are made with different size radii for beading tubes in firetube boilers while Flaring Tools are used for flaring the inside of tube ends.

The 430G Pneumatic Hammer accepts Type No. 6 0.680" (17.3mm) diameter by 2-3/8" (60.3mm) long shanks.

Features & Benefits:

- Lightweight & compact design - easy to move in tight areas.
- Uses retainers on tools - improved operator safety.

How To Order:

1. Choose the 430G Pneumatic Hammer package.
2. Choose spares & accessories.

The 430G Pneumatic Hammer package includes:

- Hose Whip.
- Filter-Lubricator.
- Carrying Case.

Spares & Accessories:

- 6070 Filter-lubricator: Included with the 430G Pneumatic Hammer package.
- Flaring Tools: See below for part numbers.
- Beading Tools: See below for part numbers.

Elliott's Pneumatic Beading Tools, used with the 430G Pneumatic Hammer, are made with different size radii for beading tubes in firetube boilers.

The standard Type No. 1 shank is 0.680" (17.3mm) diameter by 2-3/8" (60.3mm) long.


Elliott's Flaring Tools, used with the 430G Pneumatic Hammer, are used for flaring the inside of tube ends.

The standard Type No. 6 shank is 0.680" (17.3mm) diameter by 2-3/8" (60.3mm) long with an oval collar.



Specifications:

- Piston Diameter & Stroke: 1-1/8" X 2" (28.6 X 50.8mm)
- Length (Overall): 14" (355.6mm)
- Blows per minute: 2,300
- Net Weight: 17 lbs. (7 Kg.)
- Air Requirement: 30 CFM @ 90 PSI
- Hose Diameter: 1/2" (12.7mm)

Pneumatic Beading Tools			
Radius For Pneumatic	For Tubes Bead Inches	B.W. Gauge	Beading Tool
75-456	9/64 (3.6mm)	13 and Lighter	
75-456S	3/16 4.8mm)	10, 11 and 12	
75-456A	7/32 (5.6mm)	8 and 9	

Flaring Tools		
Tube Size	Part No.	Flaring Tool
1/4" thru 3/8"	8498D	
7/16" thru 1"	8498	
1" thru 1-1/2"	8498A	
1-5/8" thru 2"	8498B	

Tube End Facers

Tube Size

- 0.375" to 1.500"
(9.5 to 38.1mm) OD

Elliott's ETF Series Tube End Facers are ideal for trimming heat exchanger, condenser, and chiller tubes to a specific tube projection after tube expansion.

Each Tube End Facer is equipped with an adjustable collar to allow tubes to be faced flush or to a specified length from the tube sheet. Each Tube End Facer also incorporates a 3/8" (9.5mm) male hex.

The Tube End Facers use high alloy facer bits with two cutting edges that are specially coated for increased life. Elliott offers two bit styles, Non-Ferrous / Steel and Stainless Steel, to achieve optimum cutting efficiency.

Elliott's electric and pneumatic motors are excellent drivers for Tube End Facers. See next page for more information.

How To Order:

1. Specify tube size(s) to be faced.
2. Choose spares and accessories.



Features & Benefits:

- Economical & easy blade replacement.
- Standard pilot set included.
- Adjustable stand-off - 1/4" to flush.

Spares & Accessories:

- Non-Ferrous Steel Facer Bits: Recommend quantity of 1 facer for every 100 tube ends. *See table below for part numbers.*
- Stainless Steel Facer Bits: Recommend quantity of 1 facer for every 100 tube ends. *See table below for part numbers.*
- Cutting Oil: *See page 13 for part numbers.*
- Pilots: *See table below for part numbers.*

Tube OD		Std. Gauge Range	Tube ID		*Tube Facer Number	Tool Bits		Pilots
Inch	Metric		Inch	Metric		Non-Ferrous Steel	Stainless Steel	
3/8	9.53	16-22	0.245 - 0.319	6.22 - 8.10	ETF375	ETF376	ETF376SS	ETF375P(ga)
1/2	12.70	16-22	0.370 - 0.444	9.40 - 11.28	ETF500	ETF506	ETF506SS	ETF500P(ga)
5/8	15.88	14-22	0.459 - 0.569	11.66 - 14.45	ETF625	ETF626	ETF626SS	ETF625P(ga)
3/4	19.05	10-22	0.482 - 0.694	12.24 - 17.63	ETF750	ETF756	ETF756SS	ETF750P(ga)
7/8	22.22	10-19	0.607 - 0.791	15.42 - 20.09	ETF875	ETF876	ETF876SS	ETF875P(ga)
1	25.40	10-19	0.782 - 0.916	19.86 - 23.27	ETF1000	ETF1006	ETF1006SS	ETF1000P(ga)
1-1/8	28.58	10-19	0.907 - 1.041	23.04 - 26.44	ETF1125	ETF1126	ETF1126SS	ETF1125P(ga)
1-1/4	31.75	10-19	1.032 - 1.166	26.21 - 29.62	ETF1250	ETF1256	ETF1256SS	ETF1250P(ga)
1-3/8	34.93	10-19	1.157 - 1.291	29.39 - 32.79	ETF1375	ETF1376	ETF1376SS	ETF1375P(ga)
1-1/2	38.10	10-19	1.282 - 1.416	32.56 - 35.97	ETF1500	ETF1506	ETF1506SS	ETF1500P(ga)

*Specify Non-Ferrous or Stainless Steel Tool Bit when ordering.

Electric Motors

Specifications:

***Model 447000**

110 Volt, 50/60Hz, 16 Amp
2 Speed Variable Speed Motor - 60-140 RPM
- 200-470 RPM

Weight:16Lbs. (7.26kg)

***Model 447000-220**

220 Volt, 50/60Hz, 8 Amp
2 Speed Variable Speed Motor - 60-140 RPM
- 200-470 RPM

Weight:16lbs. (7.26kg)

Motors Are supplied with 5/8" Jacob's chuck and 3/4" Square Female Socket Adapter.



Model 447000

Pneumatic Motors

Specifications:

Model P5154

23Cfm @ 90PSI (6.2bar)
1/4" NPTF - 5/16" (8mm) ID Air Supply Hose
325 RPM - Weight:5-1/2 lbs. (2.5kg)
1/2" Jacobs Chuck

Model P5476C

23Cfm @ 90PSI (6.2bar)
1/4" NPTF - 5/16" (8mm) ID Air Supply Hose
100 RPM - Weight: 5-1/2 lbs. (2.5kg)
1/2" Jacobs Chuck



Model P5154

Tube Pilots/Guides

Tube Size

- 0.500" to 1.500"
(12.7 to 38.1mm) OD

Elliott's 63 Series Tube Pilots, also known as Tube Guides, are used to pilot replacement tubes through tube sheets and tube support plates that are commonly found in heat exchangers and surface condensers.

The Tube Pilots consist of an aluminum tapered nose attached to a replaceable nylon brush. The nylon brush fits in the end of a tube, centering and holding the pilot firmly in place. Additionally, the brush cleans the tube where it will be rolled.

One Tube Pilot works for several gauges within a particular tube OD, saving you money and inventory space!

How To Order:

1. Specify tube size(s) to be piloted.
2. Choose spares and accessories.

Spares & Accessories:

- Nylon brushes *See table to the right for part numbers.*

Each 63 series tube pilot consists of:

- Aluminum tapered nose with a replaceable nylon brush attached.



Features & Benefits:

- Saves time and labor costs through faster guiding of replacement tubes through tube sheets & support plates.
- Nylon brush centers hold pilot in place, cleans the tube where it will be rolled.

Tube O.D.		Wall Gauge Range	Tube Pilot Part Number	Nylon Brush Part #
Inch	mm			
1/2	12.7	13-16	6308-1316	P5022-428
		17-22	6308-1722	P5022-510
5/8	15.9	10-12	6310-1012	P5022-472
		13-16	6310-1316	P5022-556
3/4	19.1	17-22	6310-1722	P5022-625
		10-12	6312-1012	P5022-602
7/8	22.2	13-16	6312-1316	P5022-686
		17-22	6312-1722	P5022-750
1	25.4	10-12	6314-1012	P5022-730
		13-16	6314-1316	P5022-815
1-1/8	28.6	17-22	6314-1722	P5022-882
		10-12	6316-1012	P5022-815
1-1/4	31.8	13-16	6316-1316	P5022-932
		17-22	6316-1722	P5022-1010
1-1/2	38.1	10-12	6318-1012	P5022-985
		13-16	6318-1316	P5022-1316
1-1/2	38.1	17-22	6318-1722	P5022-1091
		10-12	6320-1012	P5022-1125
1-1/2	38.1	13-16	6320-1316	P5022-1188
		17-22	6320-1722	P5022-1269
1-1/2	38.1	10-12	6324-1012	P5022-1312
		13-16	6324-1316	P5022-1438
1-1/2	38.1	17-22	6324-1722	P5022-1500

Elliott's Lubricants are engineered to provide the best lubrication in tube rolling and roll beading applications. They will provide time and tool savings compared to commonly available lubricants.

How To Order:

1. Determine Lubricant Series required by using the table below.
2. Choose container size (see table below for part numbers).



Application	Tube Material	Lubricant Series
Tube Rolling	Copper Alloy & Ferrous Tubes	Paste Series P8782
Tube Rolling	Stainless Steel, Titanium & Other Special Alloy Tubes	Liquid Series P8395
Roll Beading	Carbon Steel	Bead Coolant Series P8784
Tube Trimming, Facing & Cutting	All	Cutting Oil Series P8790

Lubricant Type	Size	Part Number
Paste	Quart	P8782
Paste	Gallon	P8782A
Paste	5 Gallon	P8782B
Liquid	Quart	P8395
Liquid	Gallon	P8395A
Liquid	5 Gallon	P8395B
Bead Coolant	Gallon	P8784A
Bead Coolant	5 Gallon	P8784B
Cutting Oil	4 oz	P8790A
Cutting Oil	Gallon	P8790B

900 Series Flaring Boiler Expanders

Tube Size

- 0.620" to 1.500"
(15.4 to 38.1mm) OD

Elliott's 900 Series Flaring Boiler Expanders are self-feeding, specifically made for use in superheaters in watertube boilers or evaporator tubes. In only one operation, these expanders roll tubes parallel and flare projecting tube ends at 15 degrees from the tool center line.

The expanding rolls will roll tubes $\frac{1}{4}$ " (6.4mm) beyond the tube sheet thickness. The three flare rolls provide faster, more uniform flaring than other flaring expander models. The generous roll radius eliminates sharp offset within the tube. Additionally, the mandrel nut enables the assembly of the expander, mandrel, and drive as one unit.

How To Order:

1. Specify tube size(s) to be expanded.
2. Choose spares and accessories.

Mandrels for the 900 Series Expanders are sold separately so users can choose from among a variety of mandrels best suited for their needs. Be sure to select a mandrel from the spares & accessories section below.

Spares & Accessories: See table on opposite page for part numbers.

- Drum Mandrel: 10 $\frac{1}{2}$ " (266.7mm) to 17 $\frac{1}{2}$ " (444.5mm) long. Recommend quantity of 1 per 250 tubes.
- Header Mandrel: For reaching through a header or water leg. Recommend quantity of 1 per 250 tubes.
- 700 Series Short Mandrel: 7 $\frac{1}{4}$ " (184.2mm) long. May require up to 2 mandrels to obtain full expansion range of the expander. Recommend quantity of 1 per 250 tubes.
- 500 Series Short Mandrel: 5 $\frac{1}{2}$ " (139.7mm) long. May require up to 2 mandrels to obtain full expansion range of the expander. Recommend quantity of 1 per 250 tubes.
- Roll Set: Recommend quantity of 1 set (3) per 250 tubes.
- Tube Rolling Lubricant See page 13 for part numbers.



Features & Benefits:

- 3 flare rolls for faster, more uniform flaring. Works evenly to the tube minimizing stress.
- Expander is self-feeding. In one operation expands and flares at 15 degrees.
- Specifically made for use in superheaters in watertube boilers or evaporator tubes. Readily available for evaporator tubes.

900 Series for Superheater and Marine-Type Boilers

Specifications / Tool Number for Sheet Thickness		Roll Dimensions	
Tube Sheet Thickness	xx	OAL	Eff. Length
1/2" - 7/8" (12 - 22mm)	15	1.000"	.750"
1" - 1-3/8" (25 - 35mm)	21	1.500"	1.250"
1-1/2" - 1-7/8" (38 - 47mm)	23	2.000"	1.75"
2" - 2-3/8" (50 - 60mm)	25	2.500"	2.250"

*xx signifies tube sheet thickness.
Enter two digits for desired roll length for expander and roll set part numbers.*

Specifications / Tube Size (Inches) and Birmingham Wire Gauge.												
TUBE SIZE		EXPANDER DATA										
Outside Tube Diameter Inches and BWG	Part Number	Expansion Range				Drum Mandrel	Header Mandrel	* Short Mandrel		Roll Set Number	Net Wt	
		Inch		Metric				9003	9003		Lbs.	Kg.
		Min.	Max.	Min.	Max.	9003	9003					
5/8" X 16	9xx-03164	0.485	0.546	12.32	13.87	XD21	XH21	X721	X521, X522, X523	9xx-21	1	0.45
5/8" X 17	9xx-00102	0.5	0.562	12.7	14.27	XD21	XH21	X721	X521, X522, X523	9xx-22	1	0.45
5/8" X 18	9xx-03364	0.515	0.578	13.08	14.68	XD21	XH21	X721	X521, X522, X523	9xx-23	1	0.45
5/8" X 19	9xx-01732	0.531	0.593	13.49	15.06	XD22	XH22	X722	X522, X523, X524	9xx-23	1	0.45
5/8" X 20	9xx-03564	0.546	0.609	13.87	15.47	XD22	XH22	X722	X522, X523, X524	9xx-24	1	0.45
3/4" X 14	9xx-00916	0.562	0.625	14.27	15.88	XD22	XH22	X722	X522, X523, X524	9xx-25	1	0.45
3/4" X 15	9xx-01932	0.593	0.656	15.06	16.66	XD23	XH23	X723, X724	X523, X524, X525, X526	9xx-26	1	0.45
3/4" X 16	9xx-03964	0.609	0.687	15.47	17.45	XD23	XH23	X723, X724	X523, X524, X525, X526	9xx-27	1	0.45
3/4" X 17	9xx-00508	0.625	0.703	15.88	17.86	XD24	XH24	X724, X725	X524, X525, X526, X527	9xx-27	1	0.45
3/4" X 18	9xx-04164	0.64	0.718	16.26	18.24	XD24	XH24	X724, X725	X524, X525, X526, X527	9xx-28	1	0.45
3/4" X 19	9xx-02132	0.656	0.75	16.66	19.05	XD31	XH31	X731, X732	X531, X533, X535	9xx-31	1	0.45
3/4" X 20	9xx-04364	0.671	0.765	17.04	19.43	XD31	XH31	X731, X732	X531, X533, X535	9xx-32	1	0.45
7/8" X 14	9xx-01116	0.687	0.781	17.45	19.84	XD31	XH31	X731, X732	X531, X533, X535	9xx-33	1	0.45
7/8" X 15	9xx-04564	0.703	0.796	17.86	20.22	XD31	XH31	X731, X732	X531, X533, X535	9xx-34	1	0.45
7/8" X 16	9xx-02332	0.718	0.812	18.24	20.62	XD32	XH32	X732, X733	X532, X534, X536	9xx-34	1	0.45
7/8" X 17	9xx-04764	0.734	0.828	18.64	21.03	XD32	XH32	X732, X733	X532, X534, X536	9xx-35	1.5	0.68
7/8" X 18	9xx-00304	0.75	0.843	19.05	21.41	XD32	XH32	X732, X733	X532, X534, X536	9xx-36	1.5	0.68
7/8" X 19	9xx-04964	0.765	0.859	19.43	21.82	XD33	XH33	X733, X734	X533, X535, X537	9xx-36	1.5	0.68
1" X 13	9xx-02532	0.781	0.875	19.84	22.23	XD33	XH33	X733, X734	X533, X535, X537	9xx-37	1.5	0.68
1" X 14-15	9xx-01316	0.812	0.921	20.62	23.39	XD34	XH34	X734, X736	X534, X536, X538, X539	9xx-38	1.5	0.68
1" X 16-17	9xx-02732	0.843	0.953	21.41	24.21	XD34	XH34	X734, X736	X534, X536, X538, X539	9xx-40	1.5	0.68
1" X 18-19	9xx-00708	0.875	0.985	22.23	25.02	XD35	XH35	X735, X737	X535, X537, X539, X540	9xx-41	1.5	0.68
1-1/4" X 9	9xx-02932	0.906	1.015	23.01	25.78	XD36	XH36	X736, X738	X536, X538, X540, X541	9xx-42	1.5	0.68
1-1/4" X 10	9xx-01516	0.937	1.045	23.8	26.54	XD36	XH36	X736, X738	X536, X538, X540, X541	9xx-44	1.5	0.68
1-1/4" X 11	9xx-03132	0.968	1.093	24.59	27.76	TD51	TH51	T751	T551, T554, T556	9xx-52	1.5	0.68
1-1/4" X 12	9xx-10000	1	1.125	25.4	28.58	TD52	TH52	T752	T552, T555, T557	9xx-53	1.5	0.68
1-1/4" X 13	9xx-10132	1.032	1.156	26.21	29.36	TD52	TH52	T752	T552, T555, T557	9xx-55	1.5	0.68
1-1/4" X 14-15	9xx-10116	1.062	1.187	26.97	30.15	TD53	TH53	T753	T553, T556, T558	9xx-56	1.5	0.68
1-1/4" X 16-17	9xx-10332	1.093	1.234	27.76	31.34	TD54	TH54	T754, T755	T554, T557, T560	9xx-57	1.5	0.68
1-1/4" X 18-19	9xx-10108	1.125	1.265	28.58	32.13	TD54	TH54	T754, T755	T554, T557, T560	9xx-59	1.5	0.68
1-1/2" X 9	9xx-10532	1.156	1.296	29.36	32.92	TD55	TH55	T755, T756	T555, T558, T561	9xx-60	2	0.91
1-1/2" X 10	9xx-10316	1.187	1.32	30.15	33.53	TD56	TH56	T756, T757	T556, T559, T562	9xx-61	2	0.91
1-1/2" X 11	9xx-10732	1.218	1.359	30.94	34.52	TD56	TH56	T756, T757	T556, T559, T562	9xx-63	2	0.91
1-1/2" X 12	9xx-10104	1.25	1.421	31.75	36.09	TD57	TH57	T757, T760	T557, T560, T563, T565	9xx-64	2	0.91
1-1/2" X 13	9xx-11764	1.265	1.437	32.13	36.5	TD57	TH57	T757, T760	T557, T560, T563, T565	9xx-65	2	0.91
1-1/2" X 14	9xx-10932	1.281	1.453	32.54	36.91	TD58	TH58	T758, T761	T558, T561, T564, T566	9xx-65	2	0.91
1-1/2" X 15-16	9xx-10516	1.312	1.481	33.32	37.62	TD58	TH58	T758, T761	T558, T561, T564, T566	9xx-67	2	0.91
1-1/2" X 17-18	9xx-11132	1.343	1.515	34.11	38.48	TD59	TH59	T759, T762	T559, T562, T565, T567	9xx-68	2	0.91

** Short Series Mandrel Lengths:
X700 Series are 7.25" (184.15mm) Long X500 Series are 5.50" (139.7mm) Long*

1500 Series Flaring Boiler Expanders

Tube Size

- 1.750" to 4.000"
(44.5 to 101.6mm) OD

Elliott's 1500 Series Flaring Boiler Expanders are self-feeding, specifically made for use in firetube and watertube boilers. In only one operation, these expanders roll tubes parallel and flare projecting tube ends at 20 degrees from the tool center line.

The 1500 Series Expanders are manufactured from high quality tool steels to assure for long life under the toughest of conditions.

How To Order:

1. Specify tube size(s) to be expanded.
2. Choose spares and accessories.



Features & Benefits:

- Most commonly used expander in installation of new boiler tubes due to its solid design and self-feeding parallel rolling operation.
- High quality steel for the most demanding water tube boiler applications.
- Roll retainers hold the rolls in place when changing mandrels.

Mandrels for the 1500 Series Expanders are sold separately so users can choose from among a variety of mandrels best suited for their needs. Be sure to select a mandrel from the Spares & Accessories section below.

Spares & Accessories: See table on opposite page for part numbers.

- Drum Mandrel: 10-1/2" (266.7mm) to 17-1/2" (444.5mm) long. Recommend quantity of 1 per 250 tubes.
- Header Mandrel: For reaching through a header or water leg. Recommend quantity of 1 per 250 tubes.
- Short Mandrel: 6-1/4" (158.8mm) long. May require two or more mandrels to obtain full expansion range of the expander. Recommend quantity of 1 per 250 tubes.
- Roll Set: Consists of two each expanding roll, flaring roll, overlapping roll, and one set of roll retainer pins. Recommend quantity of 1 set (3) per 250 tubes.
- Tube Rolling Lubricant See page 13 for part numbers.

1500 Series

4 Roller for High and Low Pressure Steam Boilers

Specifications / Tool Number for Sheet Thickness		Roll Dimensions*	
Tube Sheet Thickness	xx	OAL	Eff. Length
1/2" - 7/8" (12 - 22mm)	15	1.500"	.875"
1" - 1-3/8" (25 - 35mm)	21	2.000"	1.375"
1-1/2" - 1-7/8" (38 - 47mm)	23	2.500"	1.875"
2" - 2-3/8" (50 - 60mm)	25	3.000"	2.375"
2-1/2" - 2-7/8" (63 - 73mm)	27	3.500"	2.875"
3" - 3-3/8" (76.2 - 85.7mm)	29	4.000"	3.375"
<i>xx signifies tube sheet thickness. Enter two digits for desired roll length for expander and roll set part numbers.</i>		<i>*Expanding Roll</i>	

Specifications / Tube Size (Inches) and Birmingham Wire Gauge.													
TUBE SIZE	EXPANDER DATA												
Outside Tube Diameter Inches and BWG	Part Number	Expansion Range				Enters Hand Hole Diameter		Drum Mandrel	Header Mandrel	* Short Mandrel	Roll Set	Net Wt	
		Inch		Metric		Inch	mm	150003	150003	150003	Number	Lbs.	Kg.
		Min.	Max.	Min.	Max.								
1-3/4" X 9-10	15xx-10308	1.375	1.560	35.92	39.62	1-3/4"	44.45	CD1PX	CH1PX	D, 1-2-3	15xx-1	4	1.74
1-3/4" X 11-12	15xx-10716	1.437	1.625	36.64	41.27	1-13/16"	46.02	CD1PX	CH1PX	D, 1-2-3	15xx-2	4	1.74
1-3/4" X 13-14	15xx-10102	1.500	1.687	38.1	42.85	1-7/8"	47.63	CD1PX	CH1PX	D, 1-2-3	15xx-3	4	1.74
2" X 7-8	15xx-10916	1.562	1.750	39.67	44.45	1-15/16"	49.20	CD1PX	CH1PX	D, 1-2-3	15xx-4	4	1.74
2" X 9-10	15xx-10508	1.625	1.812	41.28	46.02	2"	50.80	CD1PX	CH1PX	D, 1-2-3	15xx-5	4	1.74
2" X 11-12	15xx-11116	1.687	1.937	42.85	49.2	2-1/16"	52.37	CD3PX	CH3PX	D, 2-3-4	15xx-5	5	2.17
2" X 13-14	15xx-10304	1.750	2.000	44.45	50.8	2-1/8"	53.66	CD3PX	CH3PX	D, 2-3-4	15xx-6	5	2.17
2" X 15-18	15xx-11316	1.812	2.062	46.02	52.37	2-3/16"	55.55	CD3PX	CH3PX	D, 2-3-4	15xx-7	5	2.17
2-1/4" X 9-10	15xx-10708	1.875	2.125	47.62	53.97	2-1/4"	57.15	CD3PX	CH3PX	D, 2-3-4	15xx-8	5	2.17
2-1/4" X 11-12	15xx-11516	1.937	2.187	49.2	55.55	2-5/16"	58.74	CD3PX	CH3PX	D, 2-3-4	15xx-9	5	2.17
2-1/4" X 13-18	15xx-20000	2.000	2.250	50.8	57.15	2-3/8"	60.33	MD5PX	MH5PX	N, 4-5-6	15xx-8	7	3.04
2-1/2" X 7-8	15xx-20116	2.062	2.312	52.87	58.72	2-7/16"	61.90	MD5PX	MH5PX	N, 4-5-6	15xx-9	7	3.04
2-1/2" X 9-10	15xx-20108	2.125	2.375	53.97	60.32	2-1/2"	63.50	MD5PX	MH5PX	N, 4-5-6	15xx-10	7	3.04
2-1/2" X 11-12	15xx-20316	2.187	2.500	55.55	63.5	2-9/16"	65.10	MD5PX	MH5PX	N, 4-5-6	15xx-12	7	3.04
2-1/2" X 13-18	15xx-20104	2.250	2.562	57.15	65.07	2-5/8"	66.68	MD7PX	MH7PX	N, 5 to 8	15xx-11	7	3.04
3" X 3	15xx-20516	2.312	2.625	58.72	66.67	2-11/16"	68.25	MD7PX	MH7PX	N, 5 to 8	15xx-12	9	3.91
3" X 4	15xx-20308	2.375	2.687	60.32	68.25	2-3/4"	69.85	MD7PX	MH7PX	N, 5 to 8	15xx-13	9	3.91
3" X 5-6	15xx-20716	2.437	2.750	61.9	69.85	2-13/16"	71.42	MD7PX	MH7PX	N, 5 to 8	15xx-14	9	3.91
3" X 7	15xx-20102	2.500	2.812	63.5	71.42	2-7/8"	73.03	MD7PX	MH7PX	N, 5 to 8	15xx-15	9	3.91
3" X 8-9	15xx-20916	2.562	2.875	65.07	73.02	2-15/16"	74.60	MD7PX	MH7PX	N, 5 to 8	15xx-16	9	3.91
3" X 10-11	15xx-20508	2.625	2.937	66.67	74.6	3"	76.20	MD7PX	MH7PX	N, 5 to 8	15xx-17	12	5.22
3" X 12-13	15xx-21116	2.687	3.000	68.25	76.2	3-1/16"	77.77	MD8PX	MH8PX	N, 7 to 10	15xx-16	12	5.22
3-1/4" X 7	15xx-20304	2.750	3.062	69.85	77.77	3-1/8"	79.38	MD8PX	MH8PX	N, 7 to 10	15xx-17	12	5.22
3-1/4" X 8-9	15xx-21316	2.812	3.125	71.42	79.37	3-3/16"	80.95	MD8PX	MH8PX	N, 7 to 10	15xx-18	12	5.22
3-1/4" X 10-11	15xx-20708	2.875	3.187	73.02	80.95	3-1/4"	82.55	MD8PX	MH8PX	N, 7 to 10	15xx-19	12	5.22
3-1/4" X 12-13	15xx-21516	2.937	3.250	74.6	82.55	3-5/16"	84.12	MD8PX	MH8PX	N, 7 to 10	15xx-20	15	6.52
3-1/2" X 7	15xx-30000	3.000	3.375	76.2	85.72	3-3/8"	85.73	MD9PX	MH9PX	N, 8 to 12	15xx-20	15	6.52
3-1/2" X 8-9	15xx-30116	3.062	3.437	77.77	87.3	3-7/16"	87.30	MD9PX	MH9PX	N, 8 to 12	15xx-21	15	6.52
3-1/2" X 10-11	15xx-30108	3.125	3.500	79.37	88.9	3-1/2"	88.90	MD9PX	MH9PX	N, 8 to 12	15xx-22	15	6.52
3-1/2" X 12-13	15xx-30316	3.187	3.562	80.95	90.47	3-9/16"	90.47	MD9PX	MH9PX	N, 8 to 12	15xx-23	15	6.52
4" X 2	15xx-30104	3.250	3.625	82.55	92.07	3-5/8"	92.08	MD9PX	MH9PX	N, 8 to 12	15xx-24	18	7.83
4" X 3	15xx-30516	3.312	3.687	84.12	93.65	3 11/16"	93.65	MD9PX	MH9PX	N, 8 to 12	15xx-25	18	7.83
4" X 4	15xx-30308	3.375	3.750	85.72	95.25	3-3/4"	95.25	MD10PX	MH10PX	N, 10 to 14	15xx-24	18	7.83
4" X 5-6	15xx-30716	3.437	3.812	87.3	96.82	3-13/16"	96.82	MD10PX	MH10PX	N, 10 to 14	15xx-25	18	7.83
4" X 7	15xx-30102	3.500	3.875	88.9	98.42	3-7/8"	98.43	MD10PX	MH10PX	N, 10 to 14	15xx-26	18	7.83
4" X 8-9	15xx-30916	3.562	3.937	90.47	100.0	3-15/16"	100.00	MD10PX	MH10PX	N, 10 to 14	15xx-27	21	9.13
4" X 10-11	15xx-30508	3.625	4.000	92.07	101.6	4"	101.60	MD10PX	MH10PX	N, 10 to 14	15xx-28	21	9.13
4" X 12-13	15xx-31116	3.687	4.062	93.65	103.17	4-1/16"	103.17	MD11PX	MH11PX	N, 12 to 16	15xx-27	21	9.13

For sizes larger than shown, contact Customer Service for details.

3400 Series Flaring Boiler Expanders

Tube Size

- 1.500" to 4.000"
(38.1 to 101.6mm) OD

Elliott's 3400 Series Flaring Boiler Expanders are the recommended tube expanders for expanding and flaring tubes in watertube and firetube boilers.

The prong style collar allows for uniform flare lengths as well as torque controlled tube rolling to obtain uniform expanded joints.

The 3400 Series Expanders are manufactured from high quality tool steels to assure for long life under the toughest of conditions.



Features & Benefits:

- Prong style thrust collar - uniform flare lengths without risk of driving flare rolling into tube sheet.
- High quality steel for the most demanding boiler applications.

How To Order:

1. Specify tube size(s) to be expanded.
2. Choose spares and accessories.

Mandrels for the 3400 Series Expanders are sold separately so users can choose from among a variety of mandrels best suited for their needs. Be sure to select a mandrel from the Spares & Accessories section below.

Spares & Accessories: See table on opposite page for part numbers.

- Drum Mandrel: Most commonly used mandrel. Best used when tube sheet is readily accessible to operator. 9-5/8" (244.5mm) to 17" (431.8mm) long. Recommend quantity of 1 per 250 tubes.
- Header Mandrel: For reaching through a header or water leg. 18" (457.2mm) to 25" (635.0mm) long. Recommend quantity of 1 per 250 tubes.
- Short Mandrel: Used in place of Drum Mandrel when working in tight areas or where tube bends too quickly. May require two or more mandrels to obtain full expansion range of the expander. 6-1/4" (158.8mm) long. Recommend quantity of 1 per 250 tubes.
- Roll Set: Consists of (3) expanding rolls, (3) flaring rolls, and (6) roll retainer pins. Recommend quantity of 1 per 250 tubes.
- Tube Rolling Lubricant *See page 13 for part numbers.*

3400 Series 3 Roller Boiler Tube Expanders

Specifications / Tool Number for Sheet Thickness		Roll Dimensions*	
Tube Sheet Thickness	xx	OAL	Eff. Length
1/2" - 7/8" (12 - 22mm)	15	1.500"	.875"
1" - 1-3/8" (25 - 35mm)	21	2.000"	1.375"
<i>xx signifies tube sheet thickness. Enter two digits for desired roll length for expander and roll set part numbers.</i>		<i>*Expanding Roll</i>	

Specifications / Tube Size (Inches) and Birmingham Wire Gauge.												
TUBE SIZE	EXPANDER DATA											
	Outside Tube Diameter Inches and BWG	Part Number	Expansion Range				Drum Mandrel 9003	Header Mandrel 9003	*Short Mandrel 9003	Roll Set Number	Net Wt	
			Inch		Metric						Lbs.	Kg.
			Min.	Max.	Min.	Max.						
1-1/2" X 12	34xx-10104	1.250"	1.421"	31.75	36.09	TD57	TH57		34xx-64	2	0.91	
1-1/2" X 13	34xx-11764	1.265"	1.437"	32.13	36.4	TD57	TH57		34xx-65	2	0.91	
1-1/2" X 14	34xx-10932	1.281"	1.453"	32.54	36.9	TD58	TH58		34xx-66	2	0.91	
1-1/2" X 15-16	34xx-10516	1.312"	1.484"	33.32	37.69	TD58	TH58		34xx-67	2	0.91	
1-1/2" X 17-18	34xx-11132	1.343"	1.515"	34.11	38.48	TD59	TH59		34xx-68	2	0.91	
						150003	150003	150003				
1-3/4" X 9-10	34xx-10308	1.375"	1.560"	35.92	39.62	CD1PX	CH1PX	D, 1-2-3	34xx-1	4	1.74	
1-3/4" X 11-12	34xx-10716	1.437"	1.625"	36.64	41.27	CD1PX	CH1PX	D, 1-2-3	34xx-2	4	1.74	
1-3/4" X 13-14	34xx-10102	1.500"	1.687"	38.1	42.85	CD1PX	CH1PX	D, 1-2-3	34xx-3	4	1.74	
2" X 7-8	34xx-10916	1.562"	1.750"	39.67	44.45	CD1PX	CH1PX	D, 1-2-3	34xx-4	4	1.74	
2" X 9-10	34xx-10508	1.625"	1.812"	41.28	46.02	CD1PX	CH1PX	D, 1-2-3	34xx-5	4	1.74	
2" X 11-12	34xx-11116	1.687"	1.937"	42.85	49.2	CD3PX	CH3PX	D, 2-3-4	34xx-5	5	2.17	
2" X 13-14	34xx-10304	1.750"	2.000"	44.45	50.8	CD3PX	CH3PX	D, 2-3-4	34xx-6	5	2.17	
2" X 15-18	34xx-11316	1.812"	2.062"	46.02	52.37	CD3PX	CH3PX	D, 2-3-4	34xx-7	5	2.17	
2-1/4" X 9-10	34xx-10708	1.875"	2.125"	47.62	53.97	CD3PX	CH3PX	D, 2-3-4	34xx-8	5	2.17	
2-1/4" X 11-12	34xx-11516	1.937"	2.187"	49.2	55.55	CD3PX	CH3PX	D, 2-3-4	34xx-9	5	2.17	
2-1/4" X 13-18	34xx-20000	2.000"	2.250"	50.8	57.15	MD5PX	MH5PX	N, 4-5-6	34xx-8	7	3.04	
2-1/2" X 7-8	34xx-20116	2.062"	2.312"	52.87	58.72	MD5PX	MH5PX	N, 4-5-6	34xx-9	7	3.04	
2-1/2" X 9-10	34xx-20108	2.125"	2.375"	53.97	60.32	MD5PX	MH5PX	N, 4-5-6	34xx-10	7	3.04	
2-1/2" X 11-12	34xx-20316	2.187"	2.500"	55.55	63.5	MD5PX	MH5PX	N, 4-5-6	34xx-12	7	3.04	
2-1/2" X 13-18	34xx-20104	2.250"	2.562"	57.15	65.07	MD7PX	MH7PX	N, 5 to 8	34xx-11	7	3.04	
3" X 3	34xx-20516	2.312"	2.625"	58.72	66.67	MD7PX	MH7PX	N, 5 to 8	34xx-12	9	3.91	
3" X 4	34xx-20308	2.375"	2.687"	60.32	68.25	MD7PX	MH7PX	N, 5 to 8	34xx-13	9	3.91	
3" X 5-6	34xx-20716	2.437"	2.750"	61.9	69.85	MD7PX	MH7PX	N, 5 to 8	34xx-14	9	3.91	
3" X 7	34xx-20102	2.500"	2.812"	63.5	71.42	MD7PX	MH7PX	N, 5 to 8	34xx-15	9	3.91	
3" X 8-9	34xx-20916	2.562"	2.875"	65.07	73.02	MD7PX	MH7PX	N, 5 to 8	34xx-16	9	3.91	
3" X 10-11	34xx-20508	2.625"	2.937"	66.67	74.6	MD7PX	MH7PX	N, 5 to 8	34xx-17	12	5.2	
3" X 12-13	34xx-21116	2.687"	3.000"	68.25	76.2	MD8PX	MH8PX	N, 7 to 10	34xx-16	12	5.22	
3-1/4" X 7	34xx-20304	2.750"	3.062"	69.85	77.77	MD8PX	MH8PX	N, 7 to 10	34xx-17	12	5.22	
3-1/4" X 8-9	34xx-21316	2.812"	3.125"	71.42	79.37	MD8PX	MH8PX	N, 7 to 10	34xx-18	12	5.22	
3-1/4" X 10-11	34xx-20708	2.875"	3.187"	73.02	80.95	MD8PX	MH8PX	N, 7 to 10	34xx-19	12	5.22	
3-1/4" X 12-13	34xx-21516	2.937"	3.250"	74.6	82.55	MD8PX	MH8PX	N, 7 to 10	34xx-20	15	6.52	
3-1/2" X 7	34xx-30000	3.000"	3.375"	76.2	85.72	MD9PX	MH9PX	N, 8 to 12	34xx-20	15	6.52	
3-1/2" X 8-9	34xx-30116	3.062"	3.437"	77.77	87.3	MD9PX	MH9PX	N, 8 to 12	34xx-21	15	6.52	
3-1/2" X 10-11	34xx-30108	3.125"	3.500"	79.37	88.9	MD9PX	MH9PX	N, 8 to 12	34xx-22	15	6.52	
3-1/2" X 12-13	34xx-30316	3.187"	3.562"	80.95	90.47	MD9PX	MH9PX	N, 8 to 12	34xx-23	15	6.52	
4" X 2	34xx-30104	3.250"	3.625"	82.55	92.07	MD9PX	MH9PX	N, 8 to 12	34xx-24	18	7.83	
4" X 3	34xx-30516	3.312"	3.687"	84.12	93.65	MD9PX	MH9PX	N, 8 to 12	34xx-25	18	7.83	
4" X 4	34xx-30308	3.375"	3.750"	85.72	95.25	MD10PX	MH10PX	N, 10 to 14	34xx-24	18	7.83	
4" X 5-6	34xx-30716	3.437"	3.812"	87.3	96.82	MD10PX	MH10PX	N, 10 to 14	34xx-25	18	7.83	
4" X 7	34xx-30102	3.500"	3.875"	88.9	98.42	MD10PX	MH10PX	N, 10 to 14	34xx-26	18	7.83	
4" X 8-9	34xx-30916	3.562"	3.937"	90.47	100.0	MD10PX	MH10PX	N, 10 to 14	34xx-27	21	9.13	
4" X 10-11	34xx-30508	3.625"	4.000"	92.07	101.6	MD10PX	MH10PX	N, 10 to 14	34xx-28	21	9.13	

For sizes larger than shown, contact Customer Service for details.

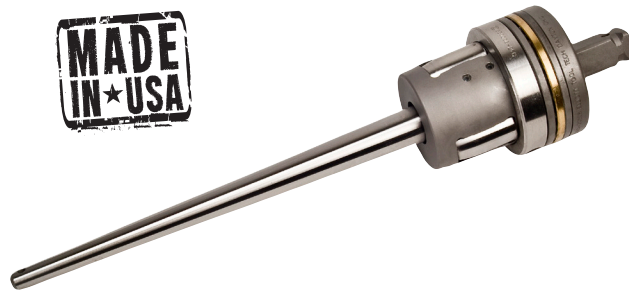
3300 Series Straight Boiler Expanders

Tube Size

- 1.500" to 4.000"
(38.1 to 101.6mm) OD

Elliott's 3300 Series Straight Boiler Expanders are the preferred tube expanders for expanding tubes in firetube boilers or in self-contained steam boiler units. They are recommended for any requirement for parallel expansion of tubes in tube sheets.

The standard expanders are provided with thrust collars for rolling tubes flush to the tube sheet. Prong style collars are also available for tube ends extending beyond the tube sheet face.



How To Order:

1. Specify tube size(s) to be expanded.
2. Choose spares and accessories

Features & Benefits:

- For performing a straight roll operation or re-rolling leaky joints.
- Ball bearing thrust collar prevents force feed of expander into tube.
- High quality steel for the most demanding boiler applications.

Mandrels for the 3300 Series Expanders are sold separately so users can choose from among a variety of mandrels best suited for their needs. Be sure to select a mandrel from the Spares & Accessories section below.

Spares & Accessories: See table on opposite page for part numbers.

- Drum Mandrel: Most commonly used mandrel. Best used when tube sheet is readily accessible to operator. 9-5/8" (244.5mm) to 17" (431.8mm) long. Recommend quantity of 1 per 250 tubes.
- Header Mandrel: For reaching through a header or water leg. 18" (457.2mm) to 25" (635.0mm) long. Recommend quantity of 1 per 250 tubes.
- Short Mandrel: Used in place of Drum Mandrel when working in tight areas or where tube bends too quickly. May require two or more mandrels to obtain full expansion range of the expander. 6-1/4" (158.8mm) long. Recommend quantity of 1 per 250 tubes.
- Roll Set: Consists of (3) straight rolls and (6) roll retainer pins. Recommend quantity of 1 per 250 tubes.
- Tube Rolling Lubricant *See page 13 for part numbers.*

3300 Series 3 Roller Boiler Tube Expanders

Specifications / Tool Number for Sheet Thickness		Roll Dimensions	
Tube Sheet Thickness	xx	OAL	Eff. Length
1/2" - 7/8" (12 - 22mm)	15	1.500"	.875"
1" - 1-3/8" (25 - 35mm)	21	2.000"	1.375"
1-1/2" - 1-7/8" (38 - 47mm)	23	2.500"	1.875"
2" - 2-3/8" (50 - 60mm)	25	3.000"	2.375"
2-1/2" - 2-7/8" (63 - 73mm)	27	3.500"	2.875"
3" - 3-3/8" (76.2 - 85.7mm)	29	4.000"	3.375"

xx signifies tube sheet thickness. Enter two digits for desired roll length for expander and roll set part numbers.

Specifications / Tube Size (Inches) and Birmingham Wire Gauge.											
TUBE SIZE	Part Number	EXPANDER DATA									
		Expansion Range				Drum Mandrel	Header Mandrel	* Short Mandrel	Roll Set Number	Net Wt	
		Inch		Metric						Lbs.	Kg.
Outside Tube Diameter Inches and BWG		Min.	Max.	Min.	Max.	9003	9003	9003			
1-1/2" X 12	*33xx-10104	1.250"	1.421"	31.75	36.09	TD57	TH57		33xx-64A	2	0.91
1-1/2" X 13	*33xx-11764	1.265"	1.437"	32.13	36.4	TD57	TH57		33xx-65A	2	0.91
1-1/2" X 14	*33xx-10932	1.281"	1.453"	32.54	36.9	TD58	TH58		33xx-65A	2	0.91
1-1/2" X 15-16	*33xx-10516	1.312"	1.484"	33.32	37.69	TD58	TH58		33xx-67A	2	0.91
1-1/2" X 17-18	*33xx-11132	1.343"	1.515"	34.11	38.48	TD59	TH59		33xx-68A	2	0.91
						150003	150003	150003			
1-3/4" X 9-10	33xx-10308	1.375"	1.560"	35.92	39.62	CD1PX	CH1PX	D, 1-2-3	33xx-1A	4	1.74
1-3/4" X 11-12	33xx-10716	1.437"	1.625"	36.64	41.27	CD1PX	CH1PX	D, 1-2-3	33xx-2A	4	1.74
1-3/4" X 13-14	33xx-10102	1.500"	1.687"	38.1	42.85	CD1PX	CH1PX	D, 1-2-3	33xx-3A	4	1.74
2" X 7-8	33xx-10916	1.562"	1.750"	39.67	44.45	CD1PX	CH1PX	D, 1-2-3	33xx-4A	4	1.74
2" X 9-10	33xx-10508	1.625"	1.812"	41.28	46.02	CD1PX	CH1PX	D, 1-2-3	33xx-5A	4	1.74
2" X 11-12	33xx-11116	1.687"	1.937"	42.85	49.2	CD3PX	CH3PX	D, 2-3-4	33xx-5A	5	2.17
2" X 13-14	33xx-10304	1.750"	2.000"	44.45	50.8	CD3PX	CH3PX	D, 2-3-4	33xx-6A	5	2.17
2" X 15-18	33xx-11316	1.812"	2.062"	46.02	52.37	CD3PX	CH3PX	D, 2-3-4	33xx-7A	5	2.17
2-1/4" X 9-10	33xx-10708	1.875"	2.125"	47.62	53.97	CD3PX	CH3PX	D, 2-3-4	33xx-8A	5	2.17
2-1/4" X 11-12	33xx-11516	1.937"	2.187"	49.2	55.55	CD3PX	CH3PX	D, 2-3-4	33xx-9A	5	2.17
2-1/4" X 13-18	33xx-20000	2.000"	2.250"	50.8	57.15	MD5PX	MH5PX	N, 4-5-6	33xx-8A	7	3.04
2-1/2" X 7-8	33xx-20116	2.062"	2.312"	52.87	58.72	MD5PX	MH5PX	N, 4-5-6	33xx-9A	7	3.04
2-1/2" X 9-10	33xx-20108	2.125"	2.375"	53.97	60.32	MD5PX	MH5PX	N, 4-5-6	33xx-10A	7	3.04
2-1/2" X 11-12	33xx-20316	2.187"	2.500"	55.55	63.5	MD5PX	MH5PX	N, 4-5-6	33xx-12A	7	3.04
2-1/2" X 13-18	33xx-20104	2.250"	2.562"	57.15	65.07	MD7PX	MH7PX	N, 5 to 8	33xx-11A	7	3.04
3" X 3	33xx-20516	2.312"	2.625"	58.72	66.67	MD7PX	MH7PX	N, 5 to 8	33xx-12A	9	3.91
3" X 4	33xx-20308	2.375"	2.687"	60.32	68.25	MD7PX	MH7PX	N, 5 to 8	33xx-13A	9	3.91
3" X 5-6	33xx-20716	2.437"	2.750"	61.9	69.85	MD7PX	MH7PX	N, 5 to 8	33xx-14A	9	3.91
3" X 7	33xx-20102	2.500"	2.812"	63.5	71.42	MD7PX	MH7PX	N, 5 to 8	33xx-15A	9	3.91
3" X 8-9	33xx-20916	2.562"	2.875"	65.07	73.02	MD7PX	MH7PX	N, 5 to 8	33xx-16A	9	3.91
3" X 10-11	33xx-20508	2.625"	2.937"	66.67	74.6	MD7PX	MH7PX	N, 5 to 8	33xx-17A	12	5.22
3" X 12-13	33xx-21116	2.687"	3.000"	68.25	76.2	MD8PX	MH8PX	N, 7 to 10	33xx-16A	12	5.22
3-1/4" X 7	33xx-20304	2.750"	3.062"	69.85	77.77	MD8PX	MH8PX	N, 7 to 10	33xx-17A	12	5.22
3-1/4" X 8-9	33xx-21316	2.812"	3.125"	71.42	79.37	MD8PX	MH8PX	N, 7 to 10	33xx-18A	12	5.22
3-1/4" X 10-11	33xx-20708	2.875"	3.187"	73.02	80.95	MD8PX	MH8PX	N, 7 to 10	33xx-19A	12	5.22
3-1/4" X 12-13	33xx-21516	2.937"	3.250"	74.6	82.55	MD8PX	MH8PX	N, 7 to 10	33xx-20A	15	6.52
3-1/2" X 7	33xx-30000	3.000"	3.375"	76.2	85.72	MD9PX	MH9PX	N, 8 to 12	33xx-20A	15	6.52
3-1/2" X 8-9	33xx-30116	3.062"	3.437"	77.77	87.3	MD9PX	MH9X	N, 8 to 12	33xx-21A	15	6.52
3-1/2" X 10-11	33xx-30108	3.125"	3.500"	79.37	88.9	MD9PX	MH9PX	N, 8 to 12	33xx-22A	15	6.52
3-1/2" X 12-13	33xx-30316	3.187"	3.562"	80.95	90.47	MD9PX	MH9PX	N, 8 to 12	33xx-23A	15	6.52
4" X 2	33xx-30104	3.250"	3.625"	82.55	92.07	MD9PX	MH9PX	N, 8 to 12	33xx-24A	18	7.83
4" X 3	33xx-30516	3.312"	3.687"	84.12	93.65	MD9PX	MH9PX	N, 8 to 12	33xx-25A	18	7.83
4" X 4	33xx-30308	3.375"	3.750"	85.72	95.25	MD10PX	MH10PX	N, 10 to 14	33xx-24A	18	7.83
4" X 5-6	33xx-30716	3.437"	3.812"	87.3	96.82	MD10PX	MH10PX	N, 10 to 14	33xx-25A	18	7.83
4" X 7	33xx-30102	3.500"	3.875"	88.9	98.42	MD10PX	MH10PX	N, 10 to 14	33xx-26A	18	7.83
4" X 8-9	33xx-30916	3.562"	3.937"	90.47	100.0	MD10PX	MH10PX	N, 10 to 14	33xx-27A	21	9.13
4" X 10-11	33xx-30508	3.625"	4.000"	92.07	101.6	MD10PX	MH10PX	N, 10 to 14	33xx-28A	21	9.13

**Not available in 2-1/2" (63mm) tube sheet thickness. For sizes larger than shown, contact Customer Service for details.*

DRE Series Deep Roll Boiler Expanders

Tube Size

- 1.750" to 4.000"
(44.5 to 101.6mm) OD

Elliott's DRE Series Deep Roll Boiler Expanders are used for deep and hard rolling of steam and mud drums found in high pressure boilers.

The DRE Series Expanders are furnished with a minimum reach of 3-1/2" (88.9mm) to maximum reach of 10-1/2" (266.7mm).

The DRE and 1500 Series Boiler Expanders make a great combination for boiler tube erection and boiler tube replacement.



How To Order:

1. Specify tube size(s) to be expanded.
2. Choose spares and accessories.

Features & Benefits:

- Easy set-up for step-rolling operation.
- Long expanding rolls allow for quicker step-rolling operation.
- For use in heavy drum thicknesses for rolling tubes. With a reach up to 10-1/2" it ensures that any required reach or depth is easily performed with this tool.
- High quality steel for the most demanding water tube boiler applications.

Header Mandrels for the DRE Series Expanders are sold separately.

Spares & Accessories: See table on opposite page for part numbers.

- Header Mandrel: Recommend quantity of 1 per 250 tubes.
- Roll Set: Consists of (3) overlapping rolls and (6) roll retainer pins. Recommend quantity of 1 per 250 tubes.
- Tube Rolling Lubricant See page 13 for part numbers.

DRE Series 3 Roller Deep Rolling Boiler Tube Expanders

Specifications / Tube Size (Inches) and Birmingham Wire Gauge.										
TUBE SIZE		EXPANDER DATA								
Outside Tube Diameter Inches and BWG		Part Number DRE	Expansion Range				Header Mandrel 150003	Roll Set DRE	Net Wt	
O.D. & Ga.	O.D. & Ga.		Inch		Metric				Lbs.	Kg.
			Min.	Max.	Min.	Max.				
1-3/4" X 9-10	2" X 3	10308	1.375"	1.560"	35.92	39.62	CHL0	3	7	3.04
1-3/4" X 11-12	2" X 4-5	10716	1.437"	1.625"	36.64	41.27	CHL0	4	7	3.04
1-3/4" X 13-14	2" X 6	10102	1.500"	1.687"	38.1	42.85	CHL0	5	7	3.04
2" X 7-8	2-1/4" X 2	10916	1.562"	1.750"	39.67	44.45	CHL0	6	10	4.35
2" X 9-10	2-1/4" X 3	10508	1.625"	1.812"	41.28	46.02	CHL1	5	10	4.35
2" X 11-12	2-1/4" X 4-5	11116	1.687"	1.937"	42.85	49.2	CHL1	7	10	4.35
2" X 13-14	2-1/4" X 6	10304	1.750"	2.000"	44.45	50.8	CHL1	8	10	4.35
2" X 15-18	2-1/2" X 2	11316	1.812"	2.062"	46.02	52.37	CHL1	9	10	4.35
2-1/4" X 9-10	2-1/2" X 4-5	10708	1.875"	2.125"	47.62	53.97	CHL1	10	10	4.35
2-1/4" X 11-12	2-1/2" X 6	11516	1.937"	2.187"	49.2	55.55	CHL1	11	10	4.35
2-1/4" X 13-18		20000	2.000"	2.250"	50.8	57.15	MHL5	8	15	6.52
2-1/2" X 7-8		20116	2.062"	2.312"	52.87	58.72	MHL5	9	15	6.52
2-1/2" X 9-10		20108	2.125"	2.375"	53.97	60.32	MHL5	10	15	6.52
2-1/2" X 11-12	3" X 2	20316	2.187"	2.500"	55.55	63.5	MHL5	11	15	6.52
2-1/2" X 13-18		20104	2.250"	2.562"	57.15	65.07	MHL7	12	15	6.52
3" X 3		20516	2.312"	2.625"	58.72	66.67	MHL7	12	25	10.87
3" X 4		20308	2.375"	2.687"	60.32	68.25	MHL7	13	25	10.87
3" X 5-6		20716	2.437"	2.750"	61.9	69.85	MHL7	14	25	10.87
3" X 7		20102	2.500"	2.812"	63.5	71.42	MHL7	15	25	10.87
3" X 8-9	3-1/4" X 3	20916	2.562"	2.875"	65.07	73.02	MHL7	16	25	10.87
3" X 10-11	3-1/4" X 4	20508	2.625"	2.937"	66.67	74.6	MHL7	17	25	10.87
3" X 12-13	3-1/4" X 5-6	21116	2.687"	3.000"	68.25	76.2	MHL8	16	30	13.04
3-1/4" X 7		20304	2.750"	3.062"	69.85	77.77	MHL8	17	30	13.04
3-1/4" X 8-9	3-1/2" X 3	21316	2.812"	3.125"	71.42	79.37	MHL8	18	30	13.04
3-1/4" X 10-11	3-1/2" X 4	20708	2.875"	3.187"	73.02	80.95	MHL8	19	30	13.04
3-1/4" X 12-13	3-1/2" X 5-6	21516	2.937"	3.250"	74.6	82.55	MHL8	20	30	13.04
3-1/2" X 7		30000	3.000"	3.375"	76.2	85.72	MHL9	20	35	15.22
3-1/2" X 8-9		30116	3.062"	3.437"	77.77	87.3	MHL9	21	35	15.22
3-1/2" X 10-11		30108	3.125"	3.500"	79.37	88.9	MHL9	22	35	15.22
3-1/2" X 12-13		30316	3.187"	3.562"	80.95	90.47	MHL9	23	35	15.22
4" X 2		30104	3.250"	3.625"	82.55	92.07	MHL9	24	35	15.22
4" X 3		30516	3.312"	3.687"	84.12	93.65	MHL9	25	35	15.22
4" X 4		30308	3.375"	3.750"	85.72	95.25	MHL10	24	40	17.39
4" X 5-6		30716	3.437"	3.812"	87.3	96.82	MHL10	25	40	17.39
4" X 7		30102	3.500"	3.875"	88.9	98.42	MHL10	26	40	17.39
4" X 8-9	4-1/4" X 3	30916	3.562"	3.937"	90.47	100.0	MHL10	27	40	17.39
4" X 10-11	4-1/4" X 4	30508	3.625"	4.000"	92.07	101.6	MHL10	28	40	17.39

*Note: One spare mandrel and roll set is recommended for each expander.
For sizes larger than shown, contact Customer Service for details.*

40 Series Straight Boiler Expanders

Tube Size

- 2.000" to 3.000"
(50.8 to 76.2mm) OD

Elliott's 40 Series Straight Boiler Expanders are recommended for re-rolling leaky tube joints in firetube boilers. Self-feeding, these expanders can be used by hand or powered by a rolling motor for fast tube rolling.

The guard prong is 1/2" (12.7mm) long that bears against the tube sheet and straddles the projected tube end.

The bronze bearing between the expander's frame and guard reduces friction and allows for torque controlled tube rolling.

How To Order:

1. Specify tube size(s) to be expanded.
2. Choose spares and accessories.



Features & Benefits:

- Only for re-rolling leaky tube joints in firetube boilers.
- Tapered expansion aggressively seals leaky joints allowing for quick cycle time.
- An economical, durable tool.

Drum Mandrels for the 40 Series Expanders are sold separately.

Spares & Accessories: See table below for part numbers.

- Drum Mandrel: Recommend quantity of 1 per 250 tubes.
- Roll Set: Recommend quantity of one set (three) per 250 tubes.
- Tube Rolling Lubricant See page 13 for part numbers.

TUBE SIZE Outside Tube Diameter Inches and BWG	EXPANDER DATA									
	Part Number	Expansion Range				Drum Mandrel	Mandrel Square	Roll Set	Net Wt	
		Inch		Metric					Lbs.	Kg.
		Min.	Max.	Min.	Max.					
2" X 12-18	40-20000	1.718	2.000	43.64	50.80	40C3P20000	3/4"	4005-20	6	2.72
2-1/2" X 10-18	40-20102	2.156	2.500	54.76	63.50	40C3P20102	3/4"	4005-25	8	3.63
3" X 10-18	40-30000	2.625	3.000	66.68	76.20	40M3P30000	1"	4005-30	12	5.45

4480 Series Single Roll Beading Expanders

Tube Size

- 2.000" to 3.000"
(50.8 to 76.2mm) OD

Elliott's 4480 Series Single Roll Beading Expanders expand the tube into the tube sheet while forming a bead at the end of the tube required in firetube boiler applications.

The 4480 Series combines three operations (rolling, beading, re-rolling) into one, saving significant time and money. Additionally, the single beading roll design enables standard motors to provide enough torque to successfully bead the tube.

How To Order:

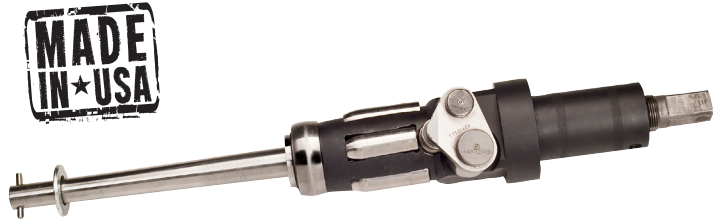
1. Specify tube size(s) to be expanded.
2. Choose spares and accessories.

Each 4480 Series Single Roll Beading Expander includes:

- Single Roll Beading Expander
- Mandrel
- Grease Gun

Spares & Accessories: See table below for part numbers.

- Mandrel: Recommend quantity of 1 per 800 tubes.
- Front Square Drive Mandrel: Recommended in applications where space is limited and tubes must be re-rolled from behind the boiler. Recommend quantity of 1 per 800
- Expanding Roll Set: Includes 3 or 4 overlapping rolls (dependent on expander size) and 1 expanding roll. Recommend quantity of 1 set per 250 tubes.
- Guide Roll: Recommend quantity of 1 per 250 tubes.
- Bead Roll: Recommend quantity of 1 per 250 tubes.
- Grease Gun / Grease
- Bead Coolant *See page 13 for part numbers.*
- Electric and Pneumatic Rolling Motors *See table on page 36 for part numbers.*



Features & Benefits:

- Rolling and beading in one operation together with fast feeding boosts productivity.
- Easy on body compared to air hammer and beading tool.
- Eliminates the high torque requirement of others' double Single Roll Beading expanders.
- Smooth bead to tube sheet transition: increases tube life.
- Only minimal component part changes to enable expansion of different tube gauges.

Single Roll Beading Expander							
Tool Number	Size Ga	Bead Roll No.	Guide Roll No.	Expanding Roll Set No.	Mandrel No.	Drive Square Size	Front Square Drive Mandrel
4480-2010	2"-10	4480-20010-011	4480-20110	4480-2000	4480-20-02	3/4"	4480-20-02FS
4480-2011	2"-11	4480-20010-011	4480-20111	4480-2000	4480-20-02		
4480-2012	2"-12	4480-20012-013	4480-20112	4480-2000	4480-20-02		
4480-2013	2"-13	4480-20012-013	4480-20113	4480-2000	4480-20-02		4480-25-02FS
4480-2510	2.5"-10	4480-25010-011	4480-25110	4480-2500	4480-25-02		
4480-2511	2.5"-11	4480-25010-011	4480-25111	4480-2500	4480-25-02		
4480-2512	2.5"-12	4480-25012-013	4480-25112	4480-2500	4480-25-02		
4480-2513	2.5"-13	4480-25012-013	4480-25113	4480-2500	4480-25-02	1"	
4480-3010	3"-10	4480-30010-011	4480-30110	4480-3000	4480-30-02		4480-30-02FS
4480-3011	3"-11	4480-30010-011	4480-30111	4480-3000	4480-30-02		
4480-3012	3"-12	4480-30012	4480-30112	4480-3000	4480-30-02		

24 Series Condenser Expanders

Tube Size

- 0.250" to 1.500"
(6.4 to 38.1mm) OD

Elliott's 24 Series Condenser Expanders are ideal for expanding tubes in chillers, heat exchangers, feedwater heaters, fin fan coolers, and surface condensers.

The 24 Series Expanders are available in both standard and longer reaches. Additionally, Elliott offers 4 and 5 roll expanders for rolling thin wall stainless steel tubes and titanium tubes. For more information, contact Customer Service.

How To Order:

1. Specify tube size(s) to be expanded.
2. Choose spares and accessories.

Spares & Accessories: See table on for part numbers.

- Mandrel: Recommend quantity of 1 per 500 tubes.
- Roll Set: Recommend quantity of 1 set per 500 tubes.
- Tube Rolling Lubricant. See page 13 for part numbers.
- Rolling Motors and Torque Controls: Available in electric and pneumatic models. See page 36 for part numbers.

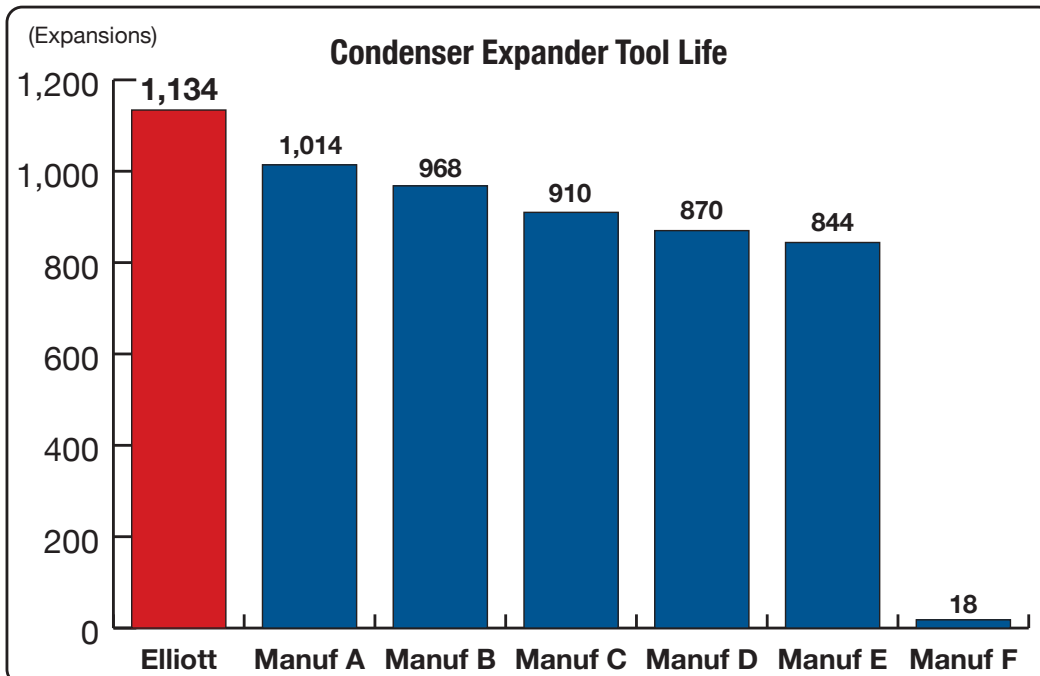


Features & Benefits:

- Proven tool life from the inventor of the tube expander.
- Tool life increased 7% - 31% over the leading competitor.
 - Results vary according to tube size, material, variation between tools, etc.
- Smaller collar diameter: works in tight spaces.
- Reduced expander weight: higher operator satisfaction.

The standard long reach offering for the 24 Series condenser expanders is 8" and 12" maximum reach. The short roll expanders have a minimum reach of 1-1/2", and the long roll expanders have a minimum reach of 2-1/4".

We offer long reach expanders over 12", and encourage purchasing these in 6" reach increments (18", 24", 30", etc.). These expanders will have a standard reach adjustment of 6" unless specified otherwise. For example, a 24" reach expander will have a reach adjustment of 18"-24".



Test results were achieved under aggressive test conditions on the same tube size and material for each manufacturer. The tool life of your 24 Series expander may vary depending on your application.

24 Series Condenser Expanders

3 Roll Expanders											
Tube Size				Expansion Range				Tube Sheet 3/16"-3/4" (4.8-19.1mm) Roll Length 3/4" (19.1mm)		Common Mandrel	Mandrel Drive Square
Inch		Metric		Inch		Metric		Expander Assembly	Roll Set (3 per set)		
O.D.	BWG	O.D.	Wall	Min.	Max.	Min.	Max.				
1/4	18	6.4	1.2	0.147	0.175	3.7	4.4	24101	241R01-3	24M01	1/4"
1/4	19	6.4	1.1	0.159	0.186	4.0	4.7	24102	241R02-3		
1/4	20	6.4	0.9	0.176	0.203	4.5	5.2	24103			
1/4	21	6.4	0.8	0.182	0.209	4.6	5.3	24104	241R04-3		
1/4	22-23	6.4	.7-.6	0.191	0.218	4.9	5.5	24105			
1/4	24-25	6.4	.6-.5	0.203	0.230	5.2	5.8	24106	241R06-3		
1/4	26-30	6.4	.5-.3	0.211	0.238	5.4	6.1	24107			

3 Roll Expanders													
Tube Size				Expansion Range				Tube Sheet 1/4"-1" (6.4-25.4mm) Roll Length 1" (25.4mm)		Tube Sheet 3/4" - 1-1/2" (19.1-38.1mm) Roll Length 1-1/2" (38.1mm)		Common Mandrel	Mandrel Drive Square
Inch		Metric		Inch		Metric		Expander Assembly	Roll Set (3 per set)	Expander Assembly	Roll Set (3 per set)		
O.D.	BWG	O.D.	Wall	Min.	Max.	Min.	Max.						
3/8	14	9.5	2.2	0.204	0.240	5.2	6.1	24108	241R08-3	-	-	24M08	1/4"
3/8	15	9.5	1.8	0.226	0.261	5.7	6.6	24109	241R09-3	-	-	24M09	
3/8	16	9.5	1.7	0.238	0.273	6.0	6.9	24110	241R10-3	-	-	24M11	
3/8	17	9.5	1.5	0.252	0.288	6.4	7.3	24111		-	-		
3/8	18	9.5	1.2	0.271	0.306	6.9	7.8	24112	241R12-3	24212	242R12-3	24M12	
3/8	19	9.5	1.1	0.281	0.316	7.1	8.0	24113	241R13-3	24213	242R13-3		
3/8	20	9.5	0.9	0.299	0.334	7.6	8.5	24114		24214		24M14	
3/8	21	9.5	0.8	0.305	0.340	7.7	8.6	24115	241R15-3	24215	242R15-3	24M16	
3/8	22-24	9.5	.7-.6	0.314	0.349	8.0	8.9	24116		24216			
3/8	25-26	9.5	.5-.5	0.330	0.366	8.4	9.3	24117	241R17-3	24217	242R17-3		
1/2	13	12.7	2.5	0.305	0.340	7.7	8.6	24115	241R15-3	24215	242R15-3	24M14	
1/2	14	12.7	2.2	0.330	0.366	8.4	9.3	24117	241R17-3	24217	242R17-3	24M16	
1/2	15	12.7	1.8	0.346	0.381	8.8	9.7	24118	241R18-3	24218	242R18-3		

24 Series Condenser Expanders

3 Roll Expanders													
TUBE SIZE				Expansion Range				Tube Sheet 1/2"-4" (12.7-101.6mm) Roll Length 1-5/8" (41.3mm) **Roll Length 1-1/2" (38.1mm)		Tube Sheet 1-1/4" - 4-3/8" (31.8-111.1mm) Roll Length 2-3/8" (60.3mm)		Common Mandrel	Mandrel Drive Square
Inch		Metric		Inch		Metric		Expander	Roll Set	Expander	Roll Set		
O.D.	BWG	O.D.	Wall	Min.	Max.	Min.	Max.	Assembly	(3 per set)	Assembly	(3 per set)		
1/2	16-17	12.7	1.7-1.5	0.367	0.410	9.1	10.4	24124	241R24-3**	-	-	24M24	3/8"
	18	12.7	1.2	0.392	0.447	10.0	11.3	24125	241R25-3**	-	-	24M25	
	19-20	12.7	1.1-.9	0.402	0.457	10.2	11.6	24126	241R26-3**	-	-	24M27	
	21-22	12.7	.8-.7	0.425	0.482	10.8	12.3	24127	241R27-3**	-	-	24M25	
5/8	12	15.9	2.8	0.392	0.447	10.0	11.3	24125	241R25-3**	-	-	24M25	
	13	15.9	2.5	0.425	0.482	10.8	12.3	24127	241R27-3**	-	-	24M27	
	14	15.9	2.2	0.449	0.506	11.4	12.8	24128	241R28-3	24228	242R28-3	24M28	
	15-16	15.9	1.8-1.7	0.471	0.538	12.0	13.7	24129	241R29-3	24229	242R29-3	24M29	
	17	15.9	1.5	0.499	0.564	12.7	14.3	24130	241R30-3	24230	242R30-3	24M30	
	18-19	15.9	1.2-1.1	0.517	0.584	13.1	14.8	24131	241R31-3	24231	242R31-3	24M31	
	20-22	15.9	.9-.7	0.540	0.609	13.7	15.5	24132	241R32-3	24232	242R32-3	24M32	
3/4	10	19.1	3.4	0.471	0.538	12.0	13.7	24129	241R29-3	24229	242R29-3	24M29	
	11	19.1	3.1	0.499	0.564	12.7	14.3	24130	241R30-3	24230	242R30-3	24M30	
	12	19.1	2.8	0.517	0.584	13.1	14.8	24131	241R31-3	24231	242R31-3	24M31	
	13	19.1	2.5	0.540	0.609	13.7	15.5	24132	241R32-3	24232	242R32-3	24M32	
	14	19.1	2.2	0.562	0.631	14.3	16.0	24133	241R33-3	24233	242R33-3	24M34	
	15-16	19.1	1.8-1.7	0.592	0.672	15.0	17.1	24134	241R34-3	24234	242R34-3	24M35	
	17-18	19.1	1.5-1.2	0.620	0.697	15.7	17.7	24135	241R35-3	24235	242R35-3	24M36	
7/8	10	22.2	3.4	0.592	0.672	15.0	17.1	24134	241R34-3	24234	242R34-3	24M34	
	11	22.2	3.1	0.620	0.697	15.7	17.7	24135	241R35-3	24235	242R35-3	24M35	
	12	22.2	2.8	0.641	0.731	16.3	18.6	24136	241R36-3	24236	242R36-3	24M36	
	13	22.2	2.5	0.655	0.745	16.6	18.9	24138	241R38-3	24238	242R38-3		
	14	22.2	2.2	0.675	0.765	17.1	19.4	24139	241R39-3	24239	242R39-3	24M40	
	15-16	22.2	1.8-1.7	0.715	0.800	18.2	20.3	24140		24240			
	17-19	22.2	1.5-1.1	0.743	0.828	18.9	21.0	24141	241R41-3	24241	242R41-3	24M42	
	20-22	22.2	.9-.7	0.795	0.865	20.2	22.0	24142	241R42-3	24242	242R42-3		
1	8	25.4	4.2	0.655	0.745	16.6	18.9	24138	241R38-3	24238	242R38-3	24M36	
	9	25.4	3.8	0.675	0.765	17.1	19.4	24139	241R39-3	24239	242R39-3	24M40	
	10	25.4	3.4	0.715	0.800	18.2	20.3	24140		24240			
	11	25.4	3.1	0.743	0.828	18.9	21.0	24141	241R41-3	24241	242R41-3	24M43	
	12-13	25.4	2.8-2.5	0.769	0.866	19.5	22.0	24143	241R42-3	24243	242R42-3	24M45	
	14	25.4	2.2	0.799	0.896	20.3	22.7	24144	241R44-3	24244	242R44-3	24M46	
	15-16	25.4	1.8-1.7	0.841	0.922	21.4	23.4	24145		24245			
	17-19	25.4	1.5-1.1	0.872	0.968	22.1	24.6	24146	241R46-3	24246	242R46-3	24M43	
20-22	25.4	.9-.7	0.894	0.990	22.7	25.2	24147	241R47-3	24247	242R47-3			
1 1/8	8	28.6	4.2	0.769	0.866	19.5	22.0	24143	241R42-3	24243	242R42-3	24M43	
	9	28.6	3.8	0.799	0.896	20.3	22.7	24144	241R44-3	24244	242R44-3	24M45	
	10	28.6	3.4	0.841	0.922	21.4	23.4	24145		24245			
	11-12	28.6	3.1-2.8	0.872	0.968	22.1	24.6	24146	241R46-3	24246	242R46-3	24M49	
	13	28.6	2.5	0.894	1.009	22.7	25.6	24149	241R47-3	24249	242R47-3	24M51	
	14-15	28.6	2.2-1.8	0.924	1.039	23.5	26.4	24150	241R50-3	24250	242R50-3		
	16-18	28.6	1.7-1.2	0.978	1.078	24.8	27.4	24151		24251			
19-22	28.6	1.1-.7	1.016	1.116	25.8	28.4	24152	241R52-3	24252	242R52-3			

24 Series Condenser Expanders

3 Roll Expanders													
TUBE SIZE				Expansion Range				Tube Sheet 1/2"-4" (12.7-101.6mm) Roll Length 1-5/8" (41.3mm) **Roll Length 1-1/2" (38.1mm)		Tube Sheet 1-1/4" - 4-3/8" (31.8-111.1mm) Roll Length 2-3/8" (60.3mm)		Common Mandrel	Mandrel Drive Square
Inch		Metric		Inch		Metric		Expander	Roll Set	Expander	Roll Set		
O.D.	BWG	O.D.	Wall	Min.	Max.	Min.	Max.	Assembly	(3 per set)	Assembly	(3 per set)		
1 1/4	8	31.8	4.2	0.894	1.009	22.7	25.6	24149	241R47-3	24249	242R47-3	24M49	1/2"
	9	31.8	3.8	0.924	1.039	23.5	26.4	24150	241R50-3	24250	242R50-3		
	10-11	31.8	3.4-3.1	0.962	1.083	24.4	27.5	24153	241R53-3	24253	242R53-3		
	12-13	31.8	2.8-2.5	1.012	1.128	25.7	28.7	24155	241R52-3	24255	242R52-3		
	14-17	31.8	2.2-1.5	1.066	1.195	27.1	30.3	24156	241R56-3	24256	242R56-3		
18-22	31.8	1.2-.7	1.112	1.240	28.2	31.5	24157	241R57-3	24257	242R57-3	24M56		
1 3/8	8	34.9	4.2	1.012	1.128	25.7	28.7	24155	241R52-3	24255	242R52-3	24M55	3/4"
	9-10	34.9	3.8-3.4	1.066	1.195	27.1	30.3	24156	241R56-3	24256	242R56-3		
	11	34.9	3.1	1.115	1.218	28.3	30.9	24158	241R58-3	24258	242R58-3		
	12-13	34.9	2.8-2.5	1.127	1.263	28.6	32.1	24159	241R57-3	24259	242R57-3		
	14-17	34.9	2.2-1.5	1.180	1.322	30.0	33.6	24160	241R60-3	24260	242R60-3		
18-22	34.9	1.2-.7	1.224	1.365	31.1	34.7	24161	241R61-3	24261	242R61-3	24M60		
1 1/2	8	38.1	4.2	1.127	1.263	28.6	32.1	24159	241R57-3	24259	242R57-3	24M59	1/2"
	9-10	38.1	3.8-3.4	1.180	1.322	30.0	33.6	24160	241R60-3	24260	242R60-3		
	11-12	38.1	3.1-2.8	1.224	1.365	31.1	34.7	24161	241R61-3	24261	242R61-3		
	13-14	38.1	2.5-2.2	1.285	1.415	32.6	35.9	24163		24263			
	15-17	38.1	1.8-1.5	1.325	1.455	33.7	36.9	24164	241R64-3	24264	242R64-3	24M63	
18-22	38.1	1.2-.7	1.361	1.490	34.6	37.9	24165	241R65-3	24265	242R65-3	24M66		
1 3/4	14-16	44.5	2.1	1.534	1.700	38.9	43.7	24166	241R66-3	-	-	24M66	
2	13-16	50.8	2.4-1.7	1.750	1.952	44.0	49.6	24167	241R67-3	-	-	24M67	

4 Roll Expanders													
TUBE SIZE				Expansion Range				Tube Sheet 1/2"-4" (12.7-101.6mm) Roll Length 1-5/8" (41.3mm)		Tube Sheet 1-1/4" - 4-3/8" (31.8-111.1mm) Roll Length 2-3/8" (60.3mm)		Common Mandrel	Mandrel Drive Square
Inch		Metric		Inch		Metric		Expander	Roll Set	Expander	Roll Set		
O.D.	BWG	O.D.	Wall	Min.	Max.	Min.	Max.	Assembly	(4 per set)	Assembly	(4 per set)		
5/8	18-19	15.9	1.2-1.1	0.512	0.583	13.0	14.8	24131-4	241R29-4	24231-4	242R29-4	24M31-4	3/8"
	20-24	15.9	.9-.6	0.538	0.609	13.7	15.5	24132-4	241R31-4	24232-4	242R31-4	24M31-4	

5 Roll Expanders													
TUBE SIZE				Expansion Range				Tube Sheet 1/2"-4" (12.7-101.6mm) Roll Length 1-5/8" (41.3mm)		Tube Sheet 1-1/4" - 4-3/8" (31.8-111.1mm) Roll Length 2-3/8" (60.3mm)		Common Mandrel	Mandrel Drive Square
Inch		Metric		Inch		Metric		Expander	Roll Set	Expander	Roll Set		
O.D.	BWG	O.D.	Wall	Min.	Max.	Min.	Max.	Assembly	(5 per set)	Assembly	(5 per set)		
3/4	18-19	19.1	1.2-1.1	0.626	0.711	15.9	18.1	24136-5	241R33-5	24236-5	242R33-5	24M36-5	3/8"
	20-24	19.1	.9-.6	0.655	0.740	16.6	18.8	24137-5	241R34-5	24237-5	242R34-5	24M37-5	
7/8	18-19	22.2	1.2-1.1	0.749	0.831	19.0	21.1	24141-5	241R36-5	24241-5	242R36-5	24M41-5	1/2"
	20-24	22.2	.9-.6	0.783	0.865	19.9	22.0	24142-5	241R39-5	24242-5	242R39-5	24M41-5	
1	18-19	25.4	1.2-1.1	0.880	0.976	22.4	24.8	24146-5	241R42-5	24246-5	242R42-5	24M46-5	3/4"
	20-24	25.4	.9-.6	0.894	0.990	22.7	25.2	24147-5	241R43-5	24247-5	242R43-5	24M46-5	
1 1/8	18-24	28.6	1.2-.6	0.997	1.116	25.3	28.4	24152-5	241R47-5	24252-5	242R47-5	24M52-5	
1 1/4	18-24	31.8	1.2-.6	1.112	1.240	28.2	31.5	24157-5	241R52-5	24257-5	242R52-5	24M57-5	
1 3/8	18-24	34.9	1.2-.6	1.237	1.365	31.4	34.7	24161-5	241R58-5	24261-5	242R58-5	24M61-5	
1 1/2	18-24	38.1	1.2-.6	1.361	1.490	34.6	37.9	24165-5	241R60-5	24265-5	242R60-5	24M65-5	

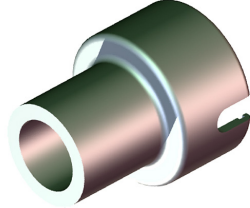
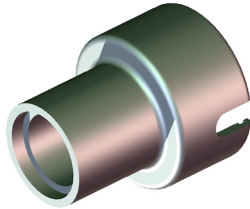
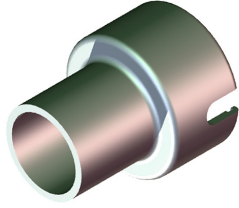
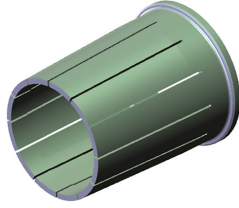
*Nylon Pilots are also available

24 Series Condenser Expanders Accessories

Collars

Elliott offers several types of collars for the 24 Series Condenser Expanders to accommodate all of your tube expansion job requirements.



Application	Collar Type	Other Information	
Roll tubes flush with tube sheet.	Flush Collar	This is the standard collar furnished with the 24 Series.	
Roll tubes that extend a uniform distance beyond tube sheet.	Recessed Collar	Elliott will recess collars to your requirements in depth increments of 1/64" each.	
Roll tubes that extend at irregular distance beyond tube sheet.	Telescoping Collar	The end of the collar butts against the sheet thus maintaining a constant depth roll in the sheet without thrusting against end of tube.	
Rolls thin wall tubes flush with tube sheet.	Thin Wall Collar	Thin wall insert fits inside of the telescoping collar to prevent the thin wall tube from being drawn into the collar during expansion.	

Custom collars available upon request.

How To Order:

1. Determine collar type required by using the table above.
2. Contact Customer Service with your tube size(s) and tube projection(s) to determine the collar part number you will need.

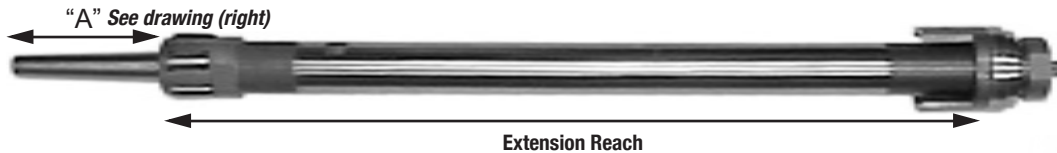
6621 Series Sugar Mill Vacuum Pan Expanders

Tube Size

- 3.000" to 4.000"
(76.2 to 101.6mm) OD

Elliott's 6621 Series Sugar Mill Vacuum Pan Expanders are ideal for the fabrication and re-tube of sugar mill vacuum pans. They are operated from the top and eliminate the cumbersome and dangerous task of expanding the bottom tube sheet from underneath the pan. The 6621 Series Expanders also remove the need to purchase several short mandrels required for bottom tube sheet expansions.

6621 Long Reach Expander Assembly For Rolling Bottom Sheet From Top Sheet.



6621 Short Expander Assembly For Rolling Top Sheet.



Tube Size	Expander Assembly	30"-42" Reach	42-54" Reach	54-66" Reach
4" x 13-16	6621-60-xx	-36	-48	-60
3 1/2" x 14-16	6621-53-xx	-36	-48	-60
3" x 14-16	6621-44-xx	-36	-48	-60

xx= Expander Reach

Tube Sheet Thickness OD BWG	Range (min.-max.)	Expander Assembly	Roll Set (5 per set)	Spare Mandrel	Drive Shank	"A" Distance
4" x 13-18	3.750 - 4.000	6621-60	662105-60-5	662103-60	3/4" Sq.	6.10"
3-1/2" x 14-16	3.250 - 3.500	6621-53	662105-53-5	662103-53	3/4" Sq.	6.10"
3" x 14-16	2.750 - 3.000	6621-44	662105-44-5	662103-44	1" Sq.	6.10"

How To Order:

1. Specify tube size(s) to be expanded.
2. Choose spares and accessories.

Features & Benefits:

- Easy assembly and disassembly.
- Range for reach adjustment of up to 12" (304.8mm).
- Pin and washer mandrel retention.
- Through-hole for vertical suspension (fits standard "D" rings).
- Double radius rolls to avoid sharp edges on rolled area.
- Better labor relations: less operator fatigue, safer than rolling from bottom.
- Less time resulting in significant labor cost savings.

Each 6621 Series Sugar Mill Vacuum Pan Expander includes:

- Expander Assembly
- Mandrel Extension
- Square Socket
- Cage Extension
- Mandrel Guide
- 3 Set Screws

Spares & Accessories:

- Extension Set: Includes 1 Cage Extension, 1 Mandrel Extension, 1 Mandrel Guide, 1 Square Socket, and 3 Set Screws.
- Roll Set: Recommend quantity of one set (5) per 250 tubes.
- Mandrel: Recommend quantity of 1 per 250 tubes.

3321 Series Sugar Mill Vacuum Pan Expanders

Tube Size

- 3.000" to 4.000"
(76.2 to 101.6mm) OD



Elliott's 3321 Series Sugar Mill Vacuum Pan Expanders are the ideal expanders for re-rolling tubes in vacuum pans.

The 3321 Series Expanders can be used with short series mandrels for rolling in confined spaces.



Features & Benefits:

- For performing a straight roll operation or re-rolling leaky joints.
- Ball bearing thrust collar prevents force feed of expander into tube.
- High quality steel for the most demanding applications.

How To Order:

1. Specify tube size(s) to be expanded.
2. Choose spares and accessories.

Mandrels for the Elliott 3321 Series Expanders are sold separately so users can choose from among a variety of mandrel best suited for their needs. Be sure to select a mandrel from the Spares & Recommended Accessories section below.

Spares & Accessories: See table below for part numbers.

- Short Series Mandrel: Are 6-1/4" (158.8mm) OAL with 1" (25.4mm) square drive. Both mandrels are required for the selected wall gauge. Recommend quantity of 3 each size per 250 tubes.
- Roll Set: Recommend quantity of one set (3) per 250 tubes.

3321 STRAIGHT EXPANDERS for Re-Rolling Tubes on Vacuum Pans						
Tube Size OD BWG	Range (min.-max.)	Expander Assembly	**Roll Set	Drum Mandrel*	Short Mandrel	Approx. Weight
4" x 13-18	3.625 – 4.000	3321-30508	3321-28A	150003MD10PX	10 to 14	21 lbs
3-1/2" x 14-18	3.187 – 3.562	3321-30316	3321-23A	150003MD9PX	8 to 12	19 lbs
3" x 14-18	2.687 – 3.000	3321-21116	3321-16A	150003MD8PX	7 to 10	18 lbs

* Mandrels must be purchased separately.
** Roll Set includes 3 rolls and 6 roll retainer pins.

SELECTION GUIDE FOR SHORT SERIES MANDRELS Used for Rolling Confined Space in Vacuum Pans. Use with 3321 Expander Listed Above.						
Expander Assembly	Tube OD	14ga (.083")	15ga (.072")	16ga (.065")	17ga (.058")	18ga (.049")
3321-30508	4" OD	12, 13	13, 14	13, 14	13, 14	14
3321-30316	3-1/2" OD	10, 11	10, 11	10, 11	10, 11	11, 12
3321-21116	3" OD	9, 10	9, 10	9, 10	9, 10	10

N Series Short Mandrels shown are 6-1/4" long and are supplied 1" Square.
Part Number for Short Mandrels is 150003Nx

Collet Style Support Sheet Expanders

Tube Size

- 0.750" to 1.000"
(19.1 to 25.4mm) OD

Elliott's Collet Style Support Sheet Expanders are used with a handheld short stroke hydraulic ram and light weight, low-pressure hydraulic pump to support sheet expand finned or prime surface tubes commonly found in chillers. Suitable only for soft materials such as copper. Not suitable for all chiller applications, i.e. Duplex chillers which require rolled joints in a center tube sheet.

Elliott offers two packages for 3/4" (19.1mm) and 1" (25.4mm) tubes. Both packages come complete with (3) 4 ft. (1.2M) extensions.

Features & Benefits:

- Expands copper tubes in support sheets in seconds!
- Modular design allows for easy transport and storage.

How To Order:

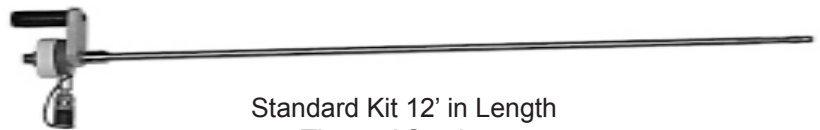
1. Specify tube size(s) to be expanded.
2. Choose spares and accessories.



Short Stroke Hydraulic Ram
M5766-00
5 lbs.



The new M5767-00 (110V) and M5767-220 (220V) light weight, low pressure hydraulic pumps make this system quick and easy to use.

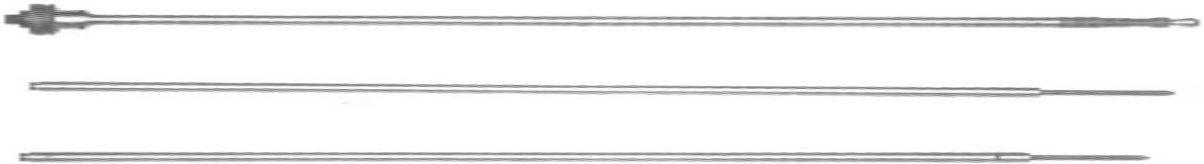


Standard Kit 12' in Length
Three 4' Sections

Collet Type (B9765A00) 3/4" OD & (B10180-00) 1" OD

3/4" Range: .530" - .687"

1" Range: .815" - .982"



B9765PKG and B10180PKG:

Each Collet Style Support Sheet Expander Package includes:

- Collet Style Support Sheet Expander
- 3 - 4 ft. (1.2M) Collet Extensions
- M5767-00 110V or M5767-220 220V Hydraulic Pump
- 3 - 4 ft. (1.2M) Draw Bar Extensions.
- Short Stroke Hydraulic Ram

Spares & Accessories:

- Draw Bar: Recommend quantity of 1 per 250 tubes.
- Draw Bar Extension: Each Draw Bar Extension will add 4 ft. (1.2M) to expander length.
- Collet Extension: Each Collet Extension will add 4 ft. (1.2M) to expander length.

Tube Expander Accessories

Drives

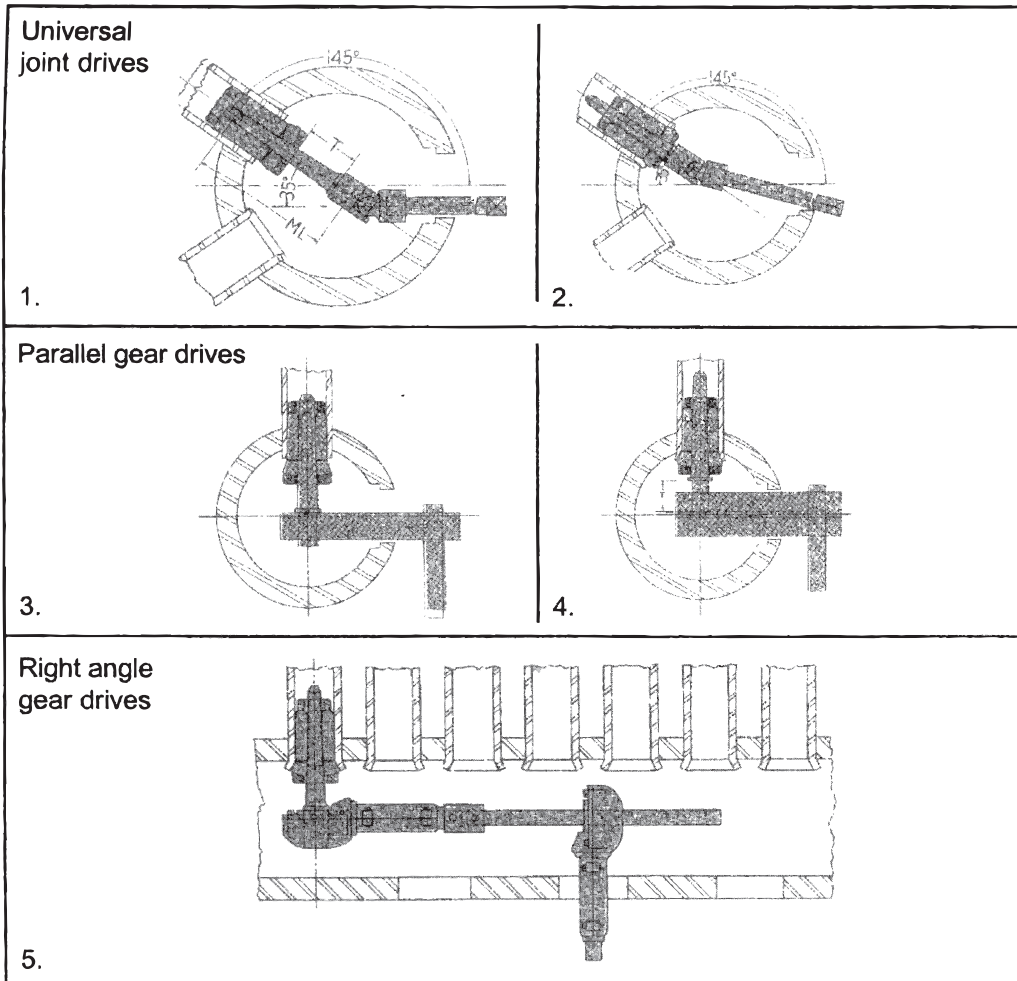
Universal joint drives are used to operate short mandrels in tube expander when rolling and flaring tubes through hand hole at angles up to 35° from center line. View 1 shows position of mandrel and universal joint drive at beginning of operation. View 2 shows position of mandrel and drive after mandrel has traveled maximum distance into tube expander.

Parallel gear drive is used to roll tubes at right angle through hand hole. View 3 shows starting position. View 4 shows amount of travel (T). May also be used parallel inside of header and operated through nearest hand hole with second gear drive.

Right angle gear drive View 5 is preferred for rolling tubes at any angle to hand hole when used parallel inside of header. Drive shaft and coupling connects two right angle gear drives enabling operator to drive the tube expander from outside of header. Single right angle gear drive with long drive shaft is often used for rolling tubes inside headers having end opening. Two sizes available.

Universal joints are heat treated for long service. Have set screws which will fit in countersunk holes in short mandrels and drive handles. Provide an effective operating range at angles up to 35°.

These combined drive and joint assemblies are easy to operate . . . save time, labor and are especially convenient when the size of the header permits operating the tube expanders from outside the header by reaching through hand holes.



Universal Drive Handles A



Drive shafts and sockets are used as a connection between two right angle gear drives.

Parallel Gear Drives D



Used parallel inside of header or through hand hole - Distance center to center of end gears - 6" in four gear units - Nos. GDT-6, GDC-6, GDM-6.

NOTE: 4" long drive shaft furnished with each complete unit.

Number 290 Reversible Ratchet Wrench E



Universal Joints F



Universal Joint Drives G



Series 1149 and 202

Right Angle Worm Gear Drive H



	Part Number	Female Square Socket	Male Square Drive	Female Square Socket	Overall Length	Width Across Face	Maximum Height	Net Weight Pounds
A	73UHX12		3/8"		12"			2
	73UHX20		3/8"		20"			5
	73UHT12		1/2"		12"			3
	73UHT20		1/2"		20"			6
	73UHC12		3/4"		12"			4
	73UHC20		3/4"		20"			7
	73UHM12		1"		12"			5
	73UHM20		1"		20"			8
B	73DST4		1/2"		4"			1
	73DST8		1/2"		8"			2
	73DST12		1/2"		12"			3
	73DST24		1/2"		24"			6
	73DSC4		3/4"		4"			2
	73DSC8		3/4"		8"			3
	73DSC12		3/4"		12"			4
	73DSC24		3/4"		24"			8
	73DSM4		1"		4"			3
	73DSM8		1"		8"			4
	73DSM12		1"		12"			5
	73DSM24		1"		24"			10
C	71SOX	3/8"		3/8"		1-3/4"		
	71SOXT	3/8"		1/2"		1-7/8"		
	71SOCX	3/8"		3/4"		1-7/8"		
	71SOT	1/2"		1/2"		1-3/4"		
	71SOCT	1/2"		3/4"		1-7/8"		
	71SOMT	1/2"		1"		1-7/8"		1
	71SOBT	5/8"		1/2"		1-3/8"		
	71SOCB	5/8"		3/4"		2"		
	71SOMB	5/8"		1"		2"		
	71SOC	3/4"		3/4"		2"		
	71SOMC	3/4"		1"		2"		
	71SOM	1"		1"		2"		
D	76GDC6	3/4"			9"	2-3/4"	1-1/2"	8
	76GDM6	1"						
E	74-290R2X	3/8"			10"	2-1/16"	1-1/16"	3
	74-290R2T	1/2"						
	74-290R4C	3/4"			18"	2-13/16"	1-5/16"	8
	74-290R4M	1"						
	74-290R6C	3/4"			24"	3-13/16"	1-7/16"	14
	74-290R6M	1"						
F	72UJX2	3/8"	3/8"		3"			1/2
	72UJT1	1/2"		1/2"	3"			1/2
	72UJT2	1/2"	1/2"					
	72UJC3	3/4"		3/4"	4"			1
	72UJC4	3/4"	3/4"					
	72UJM7	1"		1"	4-1/2"			1
	72UJM8	1"	1"					
G	72-1149XX	3/8"	3/8"		10"			2
	72-1149TT	1/2"	1/2"					
	72-1149CC	3/4"	3/4"		10"			3
	72-1149MM	1"	1"					
	72-202JMM	1"	1"		23"			5
H	76-910XX	3/8"	3/8"		10"	3-1/8"	1-3/8"	
	76-910TT	1/2"	1/2"		10"	3-5/32"	1-3/8"	
	76-910CC	3/4"	3/4"		11-1/8"	3-15/16"	1-7/8"	
	76-910MM	1"	1"		12-1/4"	4-7/16"	1-7/8"	
	76-910TC	3/4"	1/2"		10"	3-5/32"	1-3/8"	

99 Series Electric Rolling Motors

Tube Size

- 0.250" to 3.000"
(6.4 to 76.2mm) OD



99062 Series
1/4" - 5/8" OD



99150 Series
1/2" - 1-1/2" OD



99300 Series
1" - 3" OD

Always on, always precise. Electricity offers better consistency when rolling tubes and is more readily available than air. However, in the past, pneumatic rolling motors have offered higher RPMs and torque. Elliott is redefining the electric rolling motor with the 99 Series. Now, faster RPMs and comparable torque to pneumatic offerings are possible.

The dual speed option offers a new level of flexibility when rolling across various applications. The low speed setting offers increased torque for demanding applications while the high speed setting allows for greater speed and productivity.

To complement the 99 Series Electric Rolling Motors, Elliott offers the best electric torque controller in the market, the ELC110220. Job set-up is 2 to 3 times faster and allows you to roll to the target ID each time so that costly re-rolls are eliminated.

Spares & Accessories:

- ELC110220 Electric Torque Controller: *See opposite page for more information.*
- Motor Adapter Cord: *See opposite page for more information.*

Features & Benefits:

- More consistent and convenient than pneumatic rolling motors.
- High RPMs for faster job completion.
- Dual speed: High gear for greater speed and productivity, low gear for high torque applications.
- Lightweight, balanced ergonomics for decreased operator fatigue.
- Ready for immediate use with the best electric torque controller in the market, Elliott's ELC110220.

How To Order:

1. Specify tube size(s) to be expanded.
2. Choose necessary voltage.
3. Choose spares and accessories.

Tube OD Range*		Volts	Part Numbers	Motor Type	Hz	Amps (Max.)	Free Speed RPM	Maximum Torque	Approx. Weight	Spindle Drive	Included Square Chuck	Included Tool Box	Carbon Brush Replacement Sets
Inch	mm												
1/4 - 5/8	6.4 - 15.9	110	99062-110-7P	Auto-Reverse	50-60	4.3	3,000	15 in.-lbs. @ 1,900 RPM	2.7 / 1.2	3/8 Male Sq.	1/4 & 3/8 Fem. Quick Change	153G	44-191627-8
		220	99062-220-7P	Auto-Reverse	50-60	2							
1/2 - 1-1/2	12.7 - 38.1	110	99150-110-7P	Auto-Reverse	50-60	10	760 (Low Gear)	12 ft.-lbs. @ 290 RPM	8.5 / 3.9	1/2 Male Sq.	3/8 & 1/2 Fem. Quick Change	153G	40-80700013-2
							1,250 (High Gear)	8 ft.-lbs. @ 690 RPM					
		220	99150-220-7P	Auto-Reverse	50-60	5	760 (Low Gear)	12 ft.-lbs. @ 290 RPM					
							1,250 (High Gear)	8 ft.-lbs. @ 690 RPM					
1 - 3	25.4 - 76.2	110	99300-110	Manual Reverse	50-60	16	75 (Low Gear)	102 ft.-lbs. @ 72 RPM	17 / 7.7	3/4 Male Sq.	3/4 & 1 Fem. Socket	153K	40-80700021-2
							250 (High Gear)	30 ft.-lbs. @ 244 RPM					
		220	99300-220	Manual Reverse	50-60	8	75 (Low Gear)	102 ft.-lbs. @ 72 RPM					
							250 (High Gear)	30 ft.-lbs. @ 244 RPM					

Notes:
*Tube size range may vary due to tube wall thickness, wall reduction, material, tube sheet thickness, lubrication, operating condition, and/or operator technique.
Please contact Customer Service if your application falls at the low or high end of the tube OD range listed to ensure the motor will work for your application.

ELC110220 Electric Torque Controller

Elliott is pleased to introduce its ELC110220 Electric Torque Controller – the first torque control with an Embedded Logic Controller that senses and is compatible with both 110V and 220V and automatic and manual reverse rolling motors.

Set-up is easy and two to three times faster, even for inexperienced operators. You can choose one of three modes: automatic, assisted, or manual to suit your individual rolling needs.

Whereas other competitors require two or more torque controls to accommodate different rolling motors or voltages, the ELC110220 can be used with auto or manual reverse motors, 110V or 220V. No more worrying about which controller or motor to bring to the job site because the ELC110220 is all you need!

Additionally, the torque controller is CE Mark and UR & RoHS complaint for operator safety.

How To Order:

1. Choose spares and accessories.

Each ELC110220 Electric Torque Controller includes:

- Electric Controller Unit.
- 3 Controller Power Cords (110V North American (Nema 5-15), 110V United Kingdom, 220V Continental Europe (Schuko)).

Spares & Accessories: See the table below for part numbers.

- Replacement Controller Power Cords.
- Motor Adapter Cord: Detachable adapter cords to adapt an existing electric motor(s) to the ELC110220 controller's 7-pin connection. Each adapter cord will measure approximately 1 ft. [0.3M] long. Auto-reversing motors must be of Elliott Tool manufacture. Motor Adapter Cords are available in the following: 110V North American (Nema 5-15) - Manual Reversing, 110V North American (5-Pin Amphenol) - Auto Reversing, 220V Continental Europe (Schuko) - Manual Reversing, 220V Continental Europe (5-Pin Amphenol) - Auto Reversing, 110V United Kingdom - Manual Reversing. Contact Customer Service for other manufacturers' auto-reversing models.
- Electric Rolling Motors: For use with the ELC110220.



Specifications:

- Amperage: 20 Amps
- Hertz: 50 / 60 Hz
- Voltage: 100V to 240V
- Tolerance: +/- 40 milliamps.
- Temperatures: 0°F to 120°F. (-18°C to 49°C)
- Dimensions: 8" x 6.5" x 6.75". (20.3 cm x 16.5 cm x 17.1 cm)
- Weight: 3.6 pounds (1.6 kg)
- Supported Languages: English, Spanish

Features & Benefits:

- Job set-up 2 to 3 times faster.
- Three set-up modes to suit your needs.
- A single controller lowers your investment.

Tube Size	110V		220V	
	Auto Reverse	Manual Reverse	Auto Reverse	Manual Reverse
1/4 – 5/8"	99062-110-7P		99062-220-7P	
1/2" – 1-1/2"	99150-110-7P		99150-220-7P	
1 – 3"		99300-110		99300-220

Item	Part Number
Electric Torque Controller	ELC110220
Adapter Cord (220V Manual Cont. Eur.)	ELCACEU
Adapter Cord (220V Auto Cont. Eur.)	ELCACEUR
Adapter Cord (110V Manual NA)	ELCACNA
Adapter Cord (7 Pin M to 5 Pin F)	ELCACNAR
Adapter Cord (110V UK)	ELCACUK110
Adapter Cord (7 Pin to 220V Cont. Eur. Non-Reverse)	ELCAC7PEU
Adapter Cord (7 Pin to 110V NA Non-Reverse)	ELCAC7PNA
Adapter Cord (5 Pin M to 7 Pin F)	ELCAC5P7P
Power Cord (Continental Europe)	ELCPCEU
Power Cord (North American)	ELCPCNA
Power Cord (United Kingdom)	ELCPCUK110

Torque Controlled Pneumatic Rolling Motors

Midi/Maxi Series Pneumatic Rolling Motors

Tube Size

- 0.375" to 2.000"
(9.5 to 50.8mm)

Elliott offers the Midi/Maxi™ Series for tube sizes 0.375" (9.5mm) to 2.000" (50.8mm) to suit your tube expansion needs.

The Midi/Maxi Series Pneumatic Rolling Motors are actually back by popular demand! Numerous customers requested that the Midi/Maxi Series be brought back, claiming they were the best motors on the market. These motors are manufactured with quality materials to provide motor robustness and durability for years. The Midi/Maxi Series Pneumatic Rolling Motors will last for years to come – they are so durable that they can survive for as long as thirty years or more.

The Midi/Maxi Series Pneumatic Rolling Motor Package includes:

- Torque Controlled Pneumatic Rolling Motor
- 16 oz. Can Lube Oil
- 7-1/2' Air Hose Whip
- Carrying Box
- Exhaust Hose Assembly
- Filter-Lubricator
- Hose Adapter
- Muffler Unit
- On/Off Valve. (For 9011C and 9015)
- Quick Change Chuck(s)

Features & Benefits:

- Designed for maximum durability with heavy duty planetary gearing, roller and ball gearing construction, and Heli-Coil inserts.
- Customer proven that motors can survive for thirty years or longer.
- Exhaust hose, motor speed, and compact design provide increased operator satisfaction.
- High torque consistency reduces costs associated with rework.

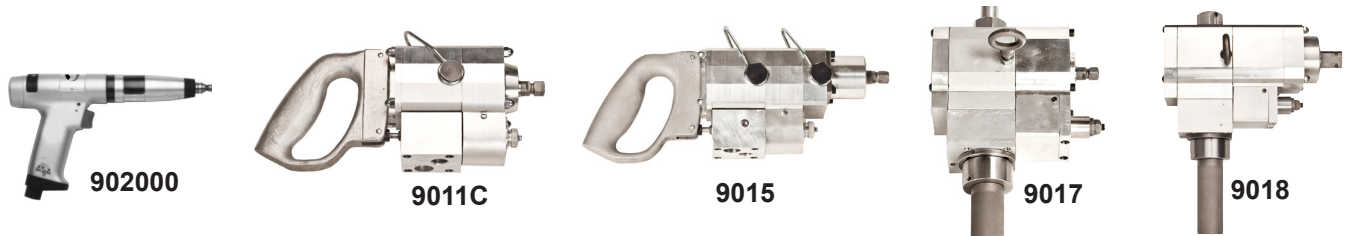
How To Order:

1. Specify tube size(s) to be expanded.
2. Choose spares and accessories.

See the Midi/Maxi in action!

Visit www.elliott-tool.com/midimaxi

Pneumatic Torque Control Rolling Motors for Condensers and Heat Exchangers



	902000	**9011C Midi-Torq	**9015 Maxi-Torq	9017 Super Maxi-Torq	9018 Super HD Maxi
Tube O.D. Range*	1/4" (6mm)	3/8" – 3/4" (9.5-19mm)	5/8" – 1" (15.9-25.4mm)	1" – 1-1/2" (25.4-38.1mm)	1-1/2" – 2" (38.1-50.8mm)
Free Speed RPM	2,000	1,800	900	850	175
Torque Range	4 - 17 in lbs (.5 - 2.1 Nm)	15 - 85 in lbs (1.7 - 9.6 Nm)	30 - 160 in lbs (3.4 - 18.1 Nm)	12 - 33 ft lbs (16.3 - 44.7 Nm)	30 - 150 ft lbs (40.7 - 203.4 Nm)
Weight	lbs	1.8	8	10	21
	kg	0.82	3.6	4.5	9.5
Air Usage	13 cfm (368 l/min)	45 cfm (1274 l/min)	45 cfm (1274 l/min)	75 cfm (2124 l/min)	75 cfm (2124 l/min)
Air Supply Hose	3/8 (9mm)	1/2 (12mm)	1/2 (12mm)	3/4 (19mm)	3/4 (19mm)
Male Spindle Drive	3/8" Sq. Male	1/2"	1/2"	1/2"	3/4"
Standard Quick Change Chuck	1/4" Fem. Sq.	3/8" Fem. Sq.	3/8" Fem. Sq. (1/2" included)	1/2" Fem. Sq. (3/4" included)	3/4" Fem. Sq. (1" included)

*Tube size range may vary due to tube wall thickness, material, tube sheet thickness, lubrication, operation condition, and/or operator technique.

**Optional Side Handle 901187 to fit 9011C & 9015 Rolling Motors.

Torque Controlled Pneumatic Rolling Motors

Right Angle Torque Control Series Motors

Tube Size

- 2.000" to 4.000"
(50.8 to 101.6mm)

Elliott offers the Right Angle Torque Control Series for tube sizes 2.000" (50.8mm) to 4.000" (101.6mm) to suit your tube expansion needs.

The Right Angle Torque Control Series are ideal for boiler tube expansion because they are so powerful. Additionally, these motors are great for rolling tubes in hard to reach, tight areas.



Features & Benefits:

- Powerful for boiler tube expansion.
- Great for hard to reach or tight areas.

The Right Angle Torque Control Package includes:

- Pneumatic Motor
- Torque Reaction Bar (For 445L1753-190 and 445L1752-90).
- Socket

Protect and maintain your tool's performance with the Elliott Tool 6070 Filter/Lubricator!

Spares & Accessories: See table on page 41 for part numbers.

- 6070 Filter-Lubricator
- Roll Lever Side Handle
- Morse Taper Adapters
- Sockets
- Chucks



6070 Filter/Lubricator
(Purchased Separately)

Tube O.D. Range*		Part Numbers	Torque Range		Free Speed RPM	Weight		Air Supply Hose	Air Usage (CFM @ 90 PSI)	Spindle Drive Size	Std. Drive Socket
Inch	mm		Ft lbs	Nm		lbs	kg				
2 - 3	50-75	**445L1753-190	70-140	95-190	190	13	5.8	3/4"	70	5/8" Male Sq.	3/4" Fem.
2 - 3	50-75	445R1753-190	70-140	95-190	190	13	5.8	3/4"	70	5/8" Male Sq.	3/4" Fem.
2 - 4	50-100	445R1752-90	150-305	200-410	90	14.75	6.7	3/4"	70	3/4" Male Sq.	1" Fem.
2 - 4	50-100	**445L1752-90	150-305	200-410	90	14.75	6.7	3/4"	70	3/4" Male Sq.	1" Fem.

*May vary due to tube wall, material and tube sheet thickness.

**Motor is supplied with lever style throttle.

Stall Torque Pneumatic Rolling Motors

Tube Size

- 0.750" to 4.000"
(19.1 to 101.6mm)

Elliott's Stall Torque Pneumatic Rolling Motors are the most powerful motor available for rolling tubes in extreme applications. The motors are recommended for use in heavy wall, thick drum applications in watertube boilers. 950 ft. lbs. of stall torque will expand any boiler tube with a wall thickness heavier than 8 BWG.

Features & Benefits:

- Ideal for expanding tubes with heavy wall thicknesses.

How To Order:

1. Specify tube size(s) to be expanded.
2. Choose spares and accessories.

Spares & Accessories: See table below for part numbers.

- 6070 Filter-Lubricator.
- Morse Taper Adapters.
- Sockets.
- Chucks.



440LA



445SA & 445RA



6070 Filter/Lubricator
(Purchased Separately)

Tube O.D. Range*		Part Numbers	Stall Torque		Free Speed RPM	Weight		Air Supply Hose	Air Usage (CFM @ 90 PSI)	Spindle Drive Size	Std. Drive Socket
Inch	mm		ft lbs	Nm		lbs	kg				
3/4 - 1-1/2	19-38	440LA	56	75	350	15	6.8	3/4"	55	2MT Socket Fem. Sq.	3/4" Fem.
2 - 4	50-100	445SA	275	365	150	45	20.4	1"	100	4MT Socket Fem. Sq.	3/4" Fem.
4 - 6	100-150	445RA	950	1260	70	70	31.8	1"	160	5MT Socket Fem. Sq.	1" Fem.

*May vary due to tube material, tube sheet thickness or tube wall thickness.

Electric and Pneumatic Rolling Motor Accessories Connectors

Elliott offers many sizes and varieties of connectors that will allow you to quickly and easily attach your rolling motor and expander.

These connectors include Quick Change Chucks, Drive Sockets, and Morse Taper Adapters.

Female Square
(Quick Release)



Female Square
(Pin On)

Female Square
(Quick Release)



Male Square

Female Square
(Quick Release)



Male Morse
Taper

Female Square
(Quick Release)



Female Square
(Quick Release)

Quick Change Chucks

Part Number	Expander End Female Sq.	Motor Drive Sq. or M.T.
Female Square Both Ends		
810-025-037	1/4"	3/8"
810-037-037	3/8"	3/8"
810-037-050	3/8"	1/2"
810-050-050	1/2"	1/2"
810-050-075	1/2"	3/4"
810-075-050	3/4"	1/2"
810-075-075	3/4"	3/4"
810-075-100	3/4"	1"
810-100-075	1"	3/4"
810-100-100	1"	1"

Female Square to Male Square

820-075-075	3/4"	3/4"
820-075-100	3/4"	1"
820-100-075	1"	3/4"
820-100-100	1"	1"

Female Square to Male Morse Taper

830-00-2-037	3/8"	#2 MT
830-00-2-050	1/2"	#2 MT
830-00-2-075	3/4"	#2 MT
830-00-3-037	3/8"	#3 MT
830-00-3-050	1/2"	#3 MT
830-00-3-075	3/4"	#3 MT
830-00-3-100	1"	#3 MT
830-00-4-075	3/4"	#4 MT
830-00-4-100	1"	#4 MT
830-00-5-075	3/4"	#5 MT
830-00-5-100	1"	#5 MT

Female Square Both Ends (Ball Retention Both Ends)

858400-1/4	1/4"	1/2"
858400-3/8	3/8"	1/2"
858400-1/2	1/2"	1/2"
858400-3/4	3/4"	1/2"
858400-1	1"	1/2"
902200-3/4	3/4"	1"
902200-1	1"	1"

Drive Sockets			
Female to Female Square (Set Screw Both Ends)			
Part Number	Size	OAL	FIG
71SOX	3/8" x 3/8"	1-3/4"	1
71SOXT	3/8" x 1/2"	1-7/8"	1
71SOCX	3/8" x 3/4"	1-7/8"	1
71SOT	1/2" x 1/2"	1-3/4"	1
71SOCT	1/2" x 3/4"	1-7/8"	1
71SOMT	1/2" x 1"	1-7/8"	1
71SOBT	5/8" x 1/2"	1-5/8"	2
71SOCB	5/8" x 3/4"	2"	2
71SOMB	5/8" x 1"	2"	2
71SOC	3/4" x 3/4"	2"	2
71SOMC	3/4" x 1"	2"	2
71SOM	1" x 1"	2"	2



Fig. 1



Fig. 2

Male Square



Male Morse
Taper

Morse Taper Adapters

Male Morse Taper to Male Square

Part Number	Male Morse Taper	Male Square
830-12-2-037		3/8"
830-12-2-050	#2 MT	1/2"
830-12-2-075		3/4"
830-12-3-050		1/2"
830-12-3-075	#3 MT	3/4"
830-12-3-100		1"
830-12-4-075	#4MT	3/4"
830-12-4-100		1"
830-12-5-075	#5MT	3/4"
830-12-5-100		1"

Conversion Tables

Chart to Determine Inside Diameter of Tubes*

B.W.G.	Wall Thickness		Outside Diameter Tubes																				
			1/4"	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1 1/4"	1 1/2"	1 3/4"	2"	2 1/4"	2 1/2"	2 3/4"	3"	3 1/4"	3 1/2"	3 3/4"	4"	4 1/4"	4 1/2"
			6.35	9.52	12.70	15.87	19.05	22.22	25.40	31.75	38.10	44.45	50.80	57.15	63.50	69.85	76.20	82.55	88.90	95.25	101.60	107.95	114.30
00	inch	0.380						0.115	0.240	0.490	0.740	0.990	1.240	1.490	1.740	1.990	2.240	2.490	2.740	2.990	3.240	3.490	3.740
	mm	9.65						2.92	6.10	12.45	18.80	25.15	31.50	37.85	44.20	50.55	56.90	63.25	69.60	75.95	82.30	88.65	95.00
0	inch	0.340					0.070	0.195	0.320	0.570	0.820	1.070	1.320	1.570	1.820	2.070	2.320	2.570	2.820	3.070	3.320	3.570	3.820
	mm	8.64					1.78	4.95	8.13	14.48	20.83	27.18	33.53	39.88	46.23	52.58	58.93	65.28	71.63	77.98	84.33	90.68	97.03
1	inch	0.300				0.025	0.150	0.275	0.400	0.650	0.900	1.150	1.400	1.650	1.900	2.150	2.400	2.650	2.900	3.150	3.400	3.650	3.900
	mm	7.62				0.64	3.81	6.99	10.16	16.51	22.86	29.21	35.56	41.91	48.26	54.61	60.96	67.31	73.66	80.01	86.36	92.71	99.06
2	inch	0.284					0.057	0.182	0.307	0.432	0.682	0.932	1.182	1.432	1.682	1.932	2.182	2.432	2.682	2.932	3.182	3.432	3.682
	mm	7.21					1.45	4.62	7.80	10.97	17.32	23.67	30.02	36.37	42.72	49.07	55.42	61.77	68.12	74.47	80.82	87.17	93.52
3	inch	0.259					0.107	0.232	0.357	0.482	0.732	0.982	1.232	1.482	1.732	1.982	2.232	2.482	2.732	2.982	3.232	3.482	3.732
	mm	6.58					2.72	5.89	9.07	12.24	18.59	24.94	31.29	37.64	43.99	50.34	56.69	63.04	69.39	75.74	82.09	88.44	94.79
4	inch	0.238				0.024	0.149	0.274	0.399	0.524	0.774	1.024	1.274	1.524	1.774	2.024	2.274	2.524	2.774	3.024	3.274	3.524	3.774
	mm	6.05				0.61	3.78	6.96	10.13	13.31	19.66	26.01	32.36	38.71	45.06	51.41	57.76	64.11	70.46	76.81	83.16	89.51	95.86
5	inch	0.220					0.060	0.185	0.310	0.435	0.560	0.810	1.060	1.310	1.560	1.810	2.060	2.310	2.560	2.810	3.060	3.310	3.560
	mm	5.59					1.52	4.70	7.87	11.05	14.22	20.57	26.92	33.27	39.62	45.97	52.32	58.67	65.02	71.37	77.72	84.07	90.42
6	inch	0.203					0.094	0.219	0.344	0.469	0.594	0.844	1.094	1.344	1.594	1.844	2.094	2.344	2.594	2.844	3.094	3.344	3.594
	mm	5.16					2.39	5.56	8.74	11.91	15.09	21.44	27.79	34.14	40.49	46.84	53.19	59.54	65.89	72.24	78.59	84.94	91.29
7	inch	0.180					0.140	0.265	0.390	0.515	0.640	0.890	1.140	1.390	1.640	1.890	2.140	2.390	2.640	2.890	3.140	3.390	3.640
	mm	4.57					3.56	6.73	9.91	13.08	16.26	22.61	28.96	35.31	41.66	48.01	54.36	60.71	67.06	73.41	79.76	86.11	92.46
8	inch	0.165				0.045	0.170	0.295	0.420	0.545	0.670	0.920	1.170	1.420	1.670	1.920	2.170	2.420	2.670	2.920	3.170	3.420	3.670
	mm	4.19				1.14	4.32	7.49	10.67	13.84	17.02	23.37	29.72	36.07	42.42	48.77	55.12	61.47	67.82	74.17	80.52	86.87	93.22
9	inch	0.148					0.079	0.204	0.329	0.454	0.579	0.704	0.954	1.204	1.454	1.704	1.954	2.204	2.454	2.704	2.954	3.204	3.454
	mm	3.76					2.01	5.18	8.36	11.53	14.71	17.88	24.23	30.58	36.93	43.28	49.63	55.98	62.33	68.68	75.03	81.38	87.73
10	inch	0.134					0.107	0.232	0.357	0.482	0.607	0.732	0.982	1.232	1.482	1.732	1.982	2.232	2.482	2.732	2.982	3.232	3.482
	mm	3.40					2.72	5.89	9.07	12.24	15.42	18.59	24.94	31.29	37.64	43.99	50.34	56.69	63.04	69.39	75.74	82.09	88.44
11	inch	0.120					0.135	0.260	0.385	0.510	0.635	0.760	1.010	1.260	1.510	1.760	2.010	2.260	2.510	2.760	3.010	3.260	3.510
	mm	3.05					3.43	6.60	9.78	12.95	16.13	19.30	25.65	32.00	38.35	44.70	51.05	57.40	63.75	70.10	76.45	82.80	89.15
12	inch	0.109	0.032	0.157	0.282	0.407	0.532	0.657	0.782	1.032	1.282	1.532	1.782	2.032	2.282	2.532	2.782	3.032	3.282	3.532	3.782	4.032	4.282
	mm	2.77	0.81	3.99	7.16	10.34	13.51	16.69	19.86	26.21	32.56	38.91	45.26	51.61	57.96	64.31	70.66	77.01	83.36	89.71	96.06	102.41	108.76
13	inch	0.095	0.060	0.185	0.310	0.435	0.560	0.685	0.810	1.060	1.310	1.560	1.810	2.060	2.310	2.560	2.810	3.060	3.310	3.560	3.810	4.060	4.310
	mm	2.41	1.52	4.70	7.87	11.05	14.22	17.40	20.57	26.92	33.27	39.62	45.97	52.32	58.67	65.02	71.37	77.72	84.07	90.42	96.77	103.12	109.47
14	inch	0.083	0.084	0.209	0.334	0.459	0.584	0.709	0.834	1.084	1.334	1.584	1.834	2.084	2.334	2.584	2.834	3.084	3.334	3.584	3.834	4.084	4.334
	mm	2.11	2.13	5.31	8.48	11.66	14.83	18.01	21.18	27.53	33.88	40.23	46.58	52.93	59.28	65.63	71.98	78.33	84.68	91.03	97.38	103.73	110.08
15	inch	0.072	0.106	0.231	0.356	0.481	0.606	0.731	0.856	1.106	1.356	1.606	1.856	2.106	2.356	2.606	2.856	3.106	3.356	3.606	3.856	4.106	4.356
	mm	1.83	2.69	5.87	9.04	12.22	15.39	18.57	21.74	28.09	34.44	40.79	47.14	53.49	59.84	66.19	72.54	78.89	85.24	91.59	97.94	104.29	110.64
16	inch	0.065	0.120	0.245	0.370	0.495	0.620	0.745	0.870	1.120	1.370	1.620	1.870	2.120	2.370	2.620	2.870	3.120	3.370	3.620	3.870	4.120	4.370
	mm	1.65	3.05	6.22	9.40	12.57	15.75	18.92	22.10	28.45	34.80	41.15	47.50	53.85	60.20	66.55	72.90	79.25	85.60	91.95	98.30	104.65	111.00
17	inch	0.058	0.134	0.259	0.384	0.509	0.634	0.759	0.884	1.134	1.384	1.634	1.884	2.134	2.384	2.634	2.884	3.134	3.384	3.634	3.884	4.134	4.384
	mm	1.47	3.40	6.58	9.75	12.93	16.10	19.28	22.45	28.80	35.15	41.50	47.85	54.20	60.55	66.90	73.25	79.60	85.95	92.30	98.65	105.00	111.35
18	inch	0.049	0.152	0.277	0.402	0.527	0.652	0.777	0.902	1.152	1.402	1.652	1.902	2.152	2.402	2.652	2.902	3.152	3.402	3.652	3.902	4.152	4.402
	mm	1.24	3.86	7.04	10.21	13.39	16.56	19.74	22.91	29.26	35.61	41.96	48.31	54.66	61.01	67.36	73.71	80.06	86.41	92.76	99.11	105.46	111.81
19	inch	0.042	0.166	0.291	0.416	0.541	0.666	0.791	0.916	1.166	1.416	1.666	1.916										
	mm	1.07	4.22	7.39	10.57	13.74	16.92	20.09	23.27	29.62	35.97	42.32	48.67										
20	inch	0.035	0.180	0.305	0.430	0.555	0.680	0.805	0.930	1.180	1.430	1.680	1.930										
	mm	0.89	4.57	7.75	10.92	14.10	17.27	20.45	23.62	29.97	36.32	42.67	49.02										
21	inch	0.032	0.186	0.311	0.436	0.561	0.686	0.811	0.936	1.186	1.436	1.686	1.936										
	mm	0.81	4.72	7.90	11.07	14.25	17.42	20.60	23.77	30.12	36.47	42.82	49.17										
22	inch	0.028	0.194	0.319	0.444	0.569	0.694	0.819	0.944	1.194	1.444	1.694	1.944										
	mm	0.71	4.93	8.10	11.28	14.45	17.63	20.80	23.98	30.33	36.68	43.03	49.38										
23	inch	0.025	0.200	0.325	0.450	0.575	0.700	0.825	0.950	1.200	1.450	1.700	1.950										
	mm	0.64	5.08	8.26	11.43	14.61	17.78	20.96	24.13	30.48	36.83	43.18	49.53										
24	inch	0.022	0.206	0.331	0.456	0.581	0.706	0.831	0.956	1.206	1.456	1.706	1.956										
	mm	0.56	5.23	8.41	11.58	14.76	17.93	21.11	24.28	30.63	36.98	43.33	49.68										

*Above table does not allow for tube mill tolerance.

Table to Determine Pipe Size and Schedule Number

Nominal Pipe Size (in.)	O.D. (in.)	Schedule Number for Pipe Sizes Wall Thickness / Inside Diameter (Inches)							
		40	ID	80	ID	120	ID	160	ID
1/8	.405	.068	.269	.095	.215				
1/4	.540	.088	.364	.119	.302				
3/8	.675	.091	.493	.126	.423				
1/2	.840	.109	.622	.147	.546		.187		.466



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Elliott Tool offers a complete line of precision tube tools to meet your needs. Contact us or your local support.

Elliott Tool Technologies, Ltd.
1760 Tuttle Avenue
Dayton, Ohio 45403-3428
Phone: +1 937 253 6133 • +1 800 332 0447
Fax: +1 937 253 9189
www.elliott-tool.com

Locally Supported By:

www.elliott-tool.com/support