2025

Fabrication & Maintenance Tools

Tube Tool Crib

Elliott Tool Technologies

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ELLIOTT TOOL TECHNOLOGIES

A History Of Innovation
1892 – Present

Why Choose Elliott Tool?

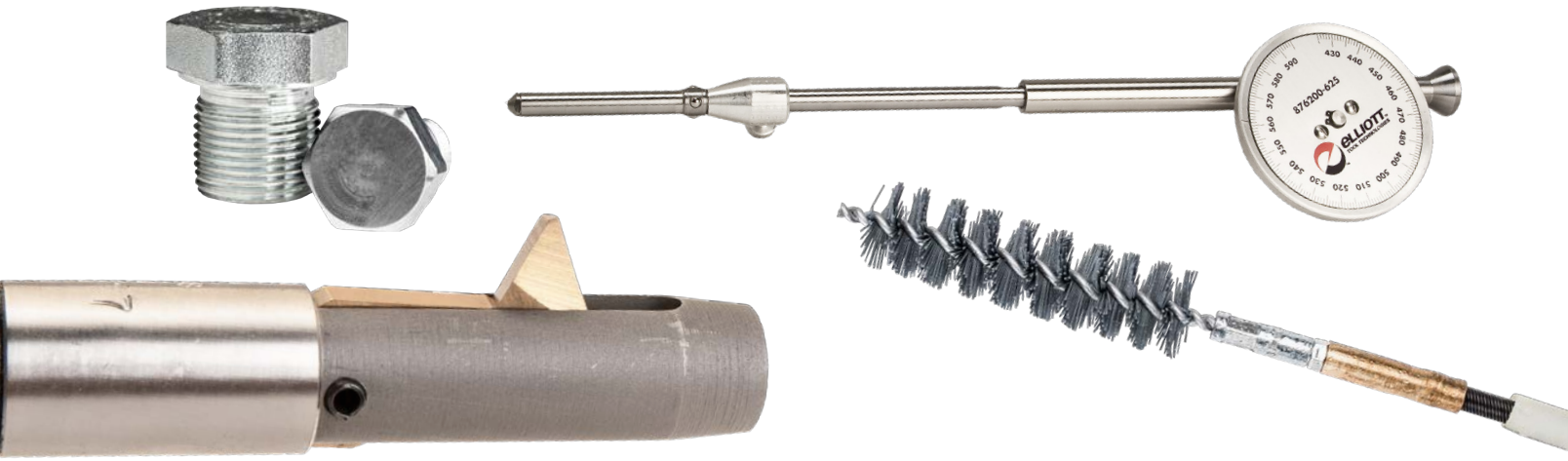
In September 1892, an inventor and manufacturer named Gustav Wiedeke began a small manufacturing business in a modest building at the rear of his Dayton, Ohio home. Today, over 100 years later, Wiedeke Dayton has become Elliott Tool Technologies Ltd. due to Mr. Wiedeke's efforts.

The Wiedeke business continued to operate as a family enterprise for the next 32 years. By this time, Wiedeke products had earned a worldwide reputation for excellence in the industries they served. Wiedeke tools were innovative enough to be covered by various patents and trademarks.

In 1916, William Elliott also recognized the need and opportunity in the industry for efficient tube cleaning equipment. Operating plants in both Ohio and Pennsylvania, the company went through several company name iterations (Lagonda Springfield and Elliott Springfield) and eventually became known as the Elliott Company. By the late 1960's, Elliott Company also enjoyed a worldwide reputation for its cleaning and turbo-machinery products. And in 1969, acquired the Gustav Wiedeke Company.

Today we are a private company known as Elliott Tool Technologies. Boasting self directed work teams, exceptional customer service, and a continued commitment to produce tube tools Gustav Wiedeke and William Swan Elliott would be proud of.

Elliott Tool Technologies is proud to represent more than 125 years of manufacturing, sales, and engineering experience.



1892

This is the oldest known photograph of the employees of the Gustav Wiedeke Company, Predecessor of the Elliott Company in Ohio. It was probably taken around 1906. Gustav Wiedeke, Jr., in vest, second from right.

2025

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ARTICLES

RESULTS REPORTS

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Elliott Has The Tube Tools You Need To Get The Job Done

The last thing you should have to worry about is the quality of your tools. You can count on Elliott to provide tools that are tougher than the job and are the best in the industry. Whether it's a tube cleaner, tester, plug, removal, or installation, Elliott's full line of products is sure to have the tube tool you're looking for.

Tube Tools
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CLEAN

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PLUG

REMOVE

SUPPORT

Helpful application guides, manuals, and other information that will help you get your job done more efficiently are offered for free. In addition we offer local support in more than 30 countries around the world.

To access information, visit our web site:
www.elliott-tool.com

MADE IN USA *Quality products manufactured in the USA.*

FOR RENT *Many of our products are available for rent. Please see page 230 for more information on Elliott's rental program.*


550
560
570
580
710
700
690
876200-750
ELLIOTT
TOOL TECHNOLOGIES

INSTALL

Alfa Laval ACE
Reduces Expansion Cycle Times by 50%

Featured: (From left to right) Nang Pau- Operator, Jason Black- Quality Inspector, Charles Rice- CU Team Manager, Randy Hall- Quality Manager, Gin Sing- Operator, Ryan Pitre- Manufacturing Engineer, Travis McCollough- Quality Inspector, Mark Gorgas- Factory Manager. (From bottom Left to right) John R. Scott- SU Team Manager, Dave Foster- Maintenance Team Leader

QUICK SUMMARY

The Challenge

- Current tube rolling system was primarily by feel and did not provide the expansion consistency they wanted.
- Too much time spent re-rolling to pass hydro.
- Stopping periodically to lubricate their expanders was time consuming.

The Solution

- Elliott's Hybrid Series Rapid Hawk with pneumatic motor and Direct Torque™ electronic torque control.
- Production trials to determine joint consistency, ease of operator use, and rolling times.

The Results

- Time savings of 50% per tube and a cost savings of ~$60,000 annually.
- Virtually zero tube leaks, reducing the number of man-hours attributed to re-rolling.
- Provided ± 2% variance from the target wall reduction.
- Significant time-savings from the through-the-cage auto-lubrication feature.
- Increased ergonomics reduced operator fatigue and strain.
- Increased tool life.

The Challenge

Alfa Laval ACE, located in Broken Arrow, OK, specializes in heat transfer, separation, and fluid handling technology. With a focus on producing quality air coolers for their customers, rolling consistency was of utmost importance. With their current tube rolling method relying heavily on operator feel to regulate the amount of wall reduction, the accuracy of wall reduction was lower than desired. This resulted in too much time spent re-rolling tubes.

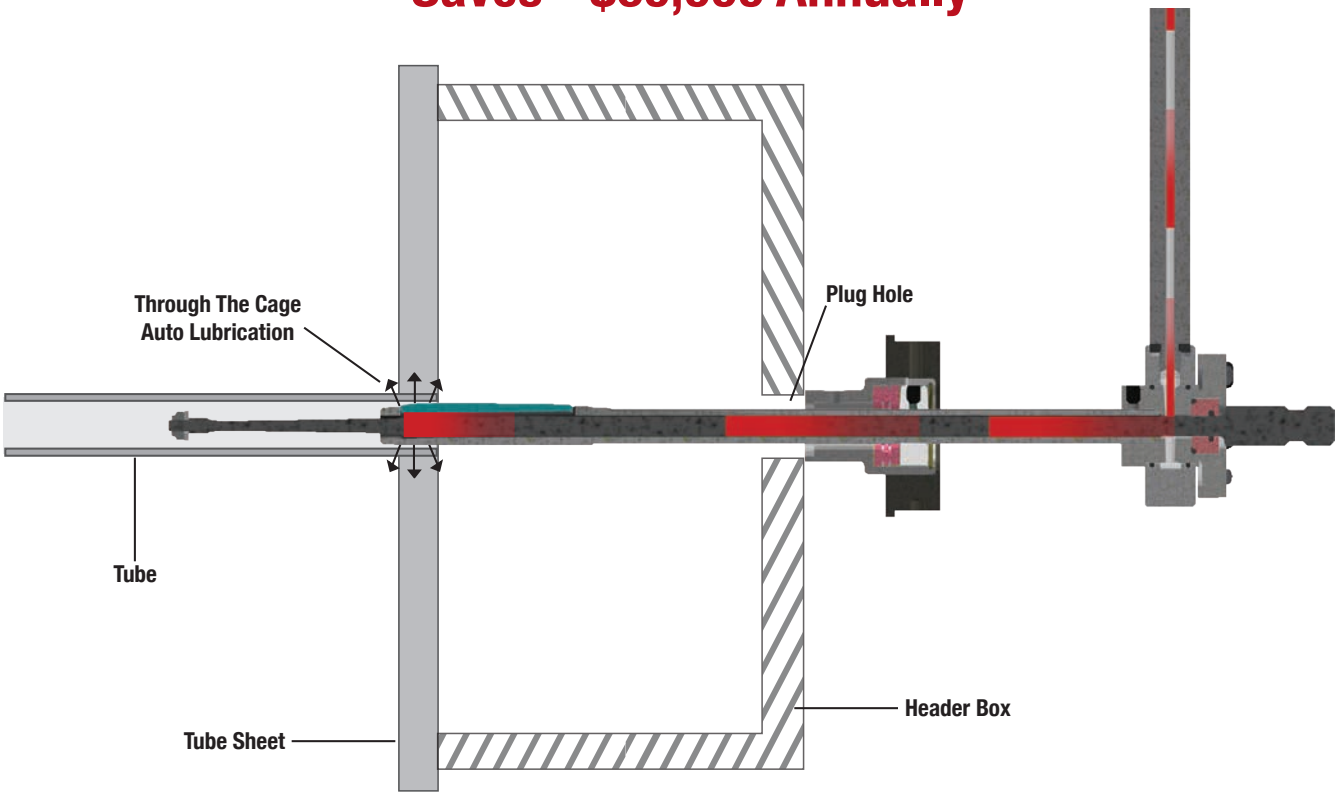
In addition to consistency, Alfa Laval was also looking for a method that would reduce the number of man-hours spent on a project. Due to their current tube rolling method, operators not only needed to regulate the amount of expansion taking place, they also had to stop periodically to re-lubricate the tooling. Operators would spend up to 1,350 hours annually lubricating tooling alone. Not to mention, this process was extremely messy and resulted in extra time spent cleaning up excess lubricant. Overall, this heavy reliance on operator care increased the amount of time and cost spent on a project.

The Solution

With roll consistency being of top priority, the Alfa Laval Team was eager to find an alternative tube rolling method. After numerous conversations with Elliott representatives, the Alfa Laval Team decided that the Hybrid Series Rapid Hawk could be the most comprehensive solution.

Elliott's Hybrid Series Rapid Hawk utilizes a pneumatic motor to provide fast cycle times for each expansion. While pneumatic motors are faster than electric, they tend to have challenges with consistency due to fluctuations in air volume or pressure. The Hybrid Series is able to help Alfa Laval achieve their goal of more consistency and less rework by utilizing Direct Torque™, an electronic torque control built into the Hybrid Series that can work with any motor regardless of its power source. Additionally, the Auto-Lubrication feature would greatly reduce the amount of downtime between tube expansions by providing lubricant through the cage directly to the rolls and mandrel during each expansion. Operators would also appreciate the Auto-Cycle feature, as it would reduce the amount of time and

Through The Cage Auto-Lubrication Saves ~$60,000 Annually



> *The Auto-Lube system has been huge, with a time savings of 50% per tube and a cost savings of ~$60,000 annually.*
>
> *-Ryan Pitre, Manufacturing Engineer, Alfa Laval*

manual force required to insert and retract the expander from the tubes.

After receiving the Hybrid Series Rapid Hawk, Alfa Laval conducted several trials to determine wall reduction consistency, ease of operator use, and overall rolling cycle time.

The Results

The Hybrid Series Rapid Hawk produced positive results almost immediately. With roll consistency showing a significant improvement, Alfa Laval was pleased with the accuracy of the system. “We aim for an 8% reduction and the Hybrid Series gets us to that range so well,” said Ryan Pitre, Manufacturing Engineer. “The quality and roll consistency is so much better. It takes into account all variables and executes precisely.” The Hybrid Series rolled tubes within 2% of their target wall reduction every time, whereas their previous tube rolling method had as much as 6% variation. This increase in consistency significantly reduced the number of man-hours attributed to re-rolling tubes, with virtually zero leaking joints at hydro testing.

The Hybrid Series was also able to reduce the tube-to-tube expansion cycle time and the overall cost to complete a project. “The Auto-Lube system has been huge, with a time savings of 50% per tube and a cost savings of ~$60,000 annually,” Ryan said. Not only did the auto-lubrication system save man hours from lubricating tooling, it also significantly reduced the time spent cleaning up excess lubricant.

The Direct Torque™ control not only increased accuracy, but it also benefitted operators. The guesswork that was necessary with their previous tube rolling system was eliminated, allowing them to complete their job faster. Additionally, the Auto-Cycle reduced the amount of time spent between expansions by starting, stopping, and reversing automatically. It also reduced the amount of manual force required to complete a job: “It [Auto-Cycle] makes it so easy to use. It draws itself into the tube and pushes itself out, so virtually no operator force is needed,” Ryan said.

With the significant increase in accuracy and consistency, the Rapid Hawk Hybrid Series was able to help operators increase productivity. Overall, the Alfa Laval Team was extremely pleased with both the performance of the system and the support gained from the Elliott team. “Support was the reason we went with the Elliott equipment,” Ryan explained, “The product is great and the people we worked with have been great.”

Tube Hole Gauge

Hole Size
- 0.375” to 2.000” OD
- (9.5 to 51.0mm) OD

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.

Tube Hole Gauge includes:
- Tube Hole Gauge
- Setting Ring
- Wrench
- Storage Box

Spares & Accessories:
- 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

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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		876211-500
5/8" (15.9mm)	0.440" (11.0mm)	0.560" (14.2mm)	876200-625	4"	8252-5/8		876211-625
3/4" (19.1mm)	0.550" (14.0mm)	0.715" (18.2mm)	876200-750	8"	8252-3/4		876211-750
7/8" (22.2mm)	0.675" (17.1mm)	0.840" (21.3mm)	876200-875	8"	8252-7/8		
1" (25.4mm)	0.800" (20.3mm)	0.965" (24.5mm)	876200-1000	8"	8252-1		
1-1/4" (31.8mm)	0.950" (24.1mm)	1.170" (29.7mm)	876200-1250	8"	8252-1-1/4		
1-3/8" (35.0mm)	1.085" (27.5mm)	1.295" (32.9mm)	876200-1375	8"	8252-1-3/8		
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		876211-2000
2" (50.8mm)	1.700" (43.2mm)	1.910" (48.5mm)	876200-2000	8"	8252-2		

Note: Extensions will add 8 inches of reach. Multiple extensions may be used to achieve a longer reach.

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Tube Sheet Hole Brushes

Hole Size

- 0.250” to 1.250” OD
- (6.4 to 31.8mm) OD

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 high carbon steel with a double twisted stem to provide for maximum life and durability.

Features & Benefits:

- High carbon steel bristles for cleaning hard deposits.
- Brush stems are high carbon steel with a double twist for extra life. Brush stems could also be stainless steel.

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

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Hole Size

- 0.375” to 3.000” OD
- (9.5 to 76.2mm) OD

Cutting Edge Design & Performance

Increase Mandrel Tool Life & Cutting Performance With Reusable Wear Pads

Elliott’s newly redesigned GT Series Grooving & Serrating Tools are engineered for optimal cutting performance and tool life. Now equipped with a reusable wear pad, the new mandrel design allows for metal chips to escape easily, reducing damage to the mandrel and tube sheet hole.

Grooving (Serrating) Tools can be used manually to clean up existing grooves or in milling and drilling equipment for OEM tube sheet thicknesses of 3/8” (9.5mm) through 2-1/8” (54.0mm).

GT Series Grooving Tool includes:

- Cutter Bit (GT-31-3 configuration)
- Mandrel
- Wear Pad*
  **Only for GT750 sizes & up*

Size		Grooving Tool	Mandrel	Wear Pad Set	Morse Taper
Inch	mm				
3/8	9.5	GT375*	GT375-03*	-	3
1/2	12.7	GT500*	GT500-03*		
5/8	15.9	GT625*	GT625-03*		
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	GT1250P	GT1250-03P	GT1250WP	
1-1/2	38.1	GT1500P	GT1500-03P	GT1500WP	4
1-3/4	44.5	GT1750P	GT1750-03P	GT1750WP	
2	50.8	GT2000P	GT2000-03P	GT2000WP	
2-1/2	63.5	GT2500P	GT2500-03P	GT2500WP	
3	76.2	GT3000P	GT3000-03P	GT3000WP	

**Sizes 1" and under do not require a wear pad.*

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Features & Benefits:

Improve Cutting Performance
Cutter bits are designed for extended tool life, allowing for repeatable, accurate cuts.

Extend Mandrel Tool Life
Mandrel wear pad reduces tool wear, eliminating the need to replace the mandrel.

Designed For Optimal Metal Chip Escape
New mandrel design allows for optimal chip escape, reducing damage to the mandrel and tube sheet hole.

Suitable For A Variety Of Applications
Designed for use in both manual and machining applications, the GT Series allows for customer flexibility.

Spares & Accessories:

- Cutter Bit: Available in different configurations for cutting ferrous and stainless steel materials.
- Mandrel
- Wear Pad Set

Dimensions for ABC listed below

Grooving Tool Blades			A	B	C
GT375	GT500	GT500			
GT375-31-1	GT500-31-1	GT100-31-1*	1/8”	1/8”	1/8”
GT375-31-3	GT500-31-3	GT100-31-3*	1/8”	1/4”	1/8”
GT375-31-4	GT500-31-4	GT100-31-4*	1/8”	3/8”	1/8”
-	GT500-31-6	GT100-31-6*	1/8”	1/2”	1/8”
-	GT500-31-7	GT100-31-7*	1/8”	5/8”	1/8”

Note: GT375-31 and GT500-31 blades work on ferrous and stainless steel materials.

** Add an “S” to the end when working on Stainless Steel tubes or tube sheets.*

Contact Elliott for more blade configurations.

Hand Hole Seat Grinder

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.

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.

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

RX7099-1 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
- Cup Brushes
- 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.

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					

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Tube Size
- 0.250” to 2.000”+ OD
- (6.4 to 50.8mm) 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.

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)

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.
- Beading Tools.

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.

Beading Tools			
Radius For Pneumatic	For Tubes Bead Inches	BWG	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	

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.

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	

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ETF Series
Tube End Facers

Tube Size
- 0.375” to1.500” OD
- (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.

Tube Facer Includes:
- Tube Facer
- Facer Pilots
- Hex Keys

Features & Benefits:
- Economical & easy blade replacement.
- Standard pilot set included.
- Adjustable stand-off - 1/4” to flush.

Spares & Accessories:
- Non-Ferrous Steel Facer Bits
- Stainless Steel Facer Bits
- Cutting Oil: ***See page 19 for part numbers.***
- Pilots

Tube OD		Std. Gauge Range	Tube ID		*Tube Facer	Tool Bits		Pilots
Inch	Metric		Inch	Metric		Non-Ferrous Steel	Stainless Steel	
3/8	9.53	16-23	0.245 - 0.319	6.22 - 8.10	ETF375	ETF376	ETF376SS	ETF375P(ga)
1/2	12.70	16-23	0.370 - 0.444	9.40 - 11.28	ETF500	ETF506	ETF506SS	ETF500P(ga)
5/8	15.88	14-23	0.459 - 0.569	11.66 - 14.45	ETF625	ETF626	ETF626SS	ETF625P(ga)
3/4	19.05	10-23	0.482 - 0.694	12.24 - 17.63	ETF750	ETF756	ETF756SS	ETF750P(ga)
7/8	22.22	10-23	0.607 - 0.791	15.42 - 20.09	ETF875	ETF876	ETF876SS	ETF875P(ga)
1	25.40	10-23	0.782 - 0.916	19.86 - 23.27	ETF1000	ETF1006	ETF1006SS	ETF1000P(ga)
1-1/8	28.58	10-23	0.907 - 1.041	23.04 - 26.44	ETF1125	ETF1126	ETF1126SS	ETF1125P(ga)
1-1/4	31.75	10-23	1.032 - 1.166	26.21 - 29.62	ETF1250	ETF1256	ETF1256SS	ETF1250P(ga)
1-3/8	34.93	10-23	1.157 - 1.291	29.39 - 32.79	ETF1375	ETF1376	ETF1376SS	ETF1375P(ga)
1-1/2	38.10	10-23	1.282 - 1.416	32.56 - 35.97	ETF1500	ETF1506	ETF1506SS	ETF1500P(ga)

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

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Model 447000

Model P5154

Electric Motors

Motor	RPM	Voltage	Hz	Amps
447000	Low Gear: 60-140 High Gear: 200-470	110	50/60	16
447000-220		220		8

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

Pneumatic Motors

Motor	RPM	Air Usage	Air Supply Hose
P5154	325	23 cfm @ 90PSI (6.2 bar)	1/4" NPTF - 5/16" (8mm) ID
P5476C	100		

1/2" Jacob's chuck.

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Tube Pilots/Guides

Tube Size

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

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

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.

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

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.

Spares & Accessories:

- Nylon brushes

63 series tube pilot includes:

- Aluminum tapered nose with a replaceable nylon brush attached.

Tube OD	Wall Gauge Range	Tube Pilot Part Number	Nylon Brush Part #
1/2” (12.7mm)	13-16	6308-1316	P5022-437
	17-22	6308-1722	P5022-500
5/8” (15.9mm)	10-12	6310-1012	P5022-472
	13-16	6310-1316	P5022-562
	17-22	6310-1722	P5022-625
3/4” (19.1mm)	10-12	6312-1012	P5022-602
	13-16	6312-1316	P5022-687
	17-22	6312-1722	P5022-750
7/8” (22.2mm)	10-12	6314-1012	P5022-730
	13-16	6314-1316	P5022-812
	17-22	6314-1722	P5022-875
1” (25.4mm)	10-12	6316-1012	P5022-812
	13-16	6316-1316	P5022-937
	17-22	6316-1722	P5022-1000
1-1/8” (28.6mm)	10-12	6318-1012	P5022-985
	13-16	6318-1316	P5022-1316
	17-22	6318-1722	P5022-1091
1-1/4” (31.8mm)	10-12	6320-1012	P5022-1125
	13-16	6320-1316	P5022-1188
	17-22	6320-1722	P5022-1269
1-1/2” (38.1mm)	10-12	6324-1012	P5022-1312
	13-16	6324-1316	P5022-1438
	17-22	6324-1722	P5022-1500

MADE IN USA

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.

Application	Water Soluble	Lubricant Series
Tube Rolling	Yes	Paste Series P8782
Tube Rolling	Yes	Liquid Series P8395
Roll Beading	No	Bead Coolant Series P8784
Tube Trimming, Facing & Cutting	No	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
Pneumatic Oil	16 oz	900082P
Bead Roll Grease (For use in 4480-20-26 Grease Gun)	14.5 oz	4480-20-30

MADE IN USA

900 Series
Flaring Boiler Expanders

Tube Size
- 0.620” to 1.500” OD
- (15.4 to 38.1mm) OD

Type
- Flaring Boiler Expander

Application
- Superheaters in watertube boilers or evaporator tubes

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 and flare projecting tube ends at 15 degrees from the tool center line.

The expanding rolls will roll tubes ¼” (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.

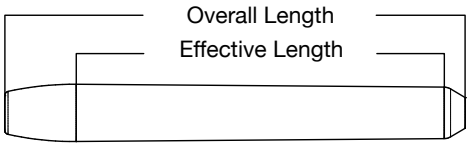
Features & Benefits:
- 3 flare rolls for faster, more uniform flaring. Works evenly to the tube minimizing stress.
- Expander is self-feeding. In one operation expands and flares at 15 degrees.
- Specifically made for use in superheaters in watertube boilers or evaporator tubes. Readily available for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

Mandrels 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:
- Drum Mandrel: 10 1/2” (266.7mm) to 17 1/2” (444.5mm) long.
- Header Mandrel: For reaching through a header or water leg.
- 700 Series Short Mandrel: 7 1/4” (184.2mm) long. May require up to 2 mandrels to obtain full expansion range of the expander.
- 500 Series Short Mandrel: 5 1/2” (139.7mm) long. May require up to 2 mandrels to obtain full expansion range of the expander.
- Roll Set.
- Tube Rolling Lubricant ***See page 19 for part numbers.***

MADE IN USA

Specifications / Tool Number for Sheet Thickness		Roll Dimensions	
Tube Sheet Thickness	xx	Overall Length	Eff. Length
1/2" - 7/8" (12.7 - 22.2mm)	15	1.000" (25.4mm)	.750" (19.1mm)
1" - 1-3/8" (25.4 - 35mm)	21	1.500" (38.1mm)	1.250" (31.8mm)
1-1/2" - 1-7/8" (38.1 - 47.6mm)	23	2.000" (50.8mm)	1.75" (44.5mm)
2" - 2-3/8" (50.8 - 60.3mm)	25	2.500" (63.5mm)	2.250" (57.2mm)



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

Outside Tube Diameter and BWG	Part Number	Expansion Range				Roll Set Number	Drum Mandrel	Header Mandrel	Short Mandrel Kits	
		Inch		Metric					Mandrel Length: 7.25" (184.15mm)	Mandrel Length: 5.50" (139.70mm)
		Min.	Max.	Min.	Max.					
5/8" X 16	9xx-03164	0.485	0.546	12.32	13.87	9xx-21	9003XD21	9003XH21	9003X721	9003X52-1
5/8" X 17	9xx-00102	0.5	0.562	12.7	14.27	9xx-22				
5/8" X 18	9xx-03364	0.515	0.578	13.08	14.68	9xx-23				
5/8" X 19	9xx-01732	0.531	0.593	13.49	15.06	9xx-23	9003XD22	9003XH22	9003X722	9003X52-2
5/8" X 20	9xx-03564	0.546	0.609	13.87	15.47	9xx-24				
3/4" X 14	9xx-00916	0.562	0.625	14.27	15.88	9xx-25				
3/4" X 15	9xx-01932	0.593	0.656	15.06	16.66	9xx-26	9003XD23	9003XH23	9003X72-1	9003X52-3
3/4" X 16	9xx-03964	0.609	0.687	15.47	17.45	9xx-27				
3/4" X 17	9xx-00508	0.625	0.703	15.88	17.86	9xx-27	9003XD24	9003XH24	9003X72-2	9003X52-4
3/4" X 18	9xx-04164	0.64	0.718	16.26	18.24	9xx-28				
3/4" X 19	9xx-02132	0.656	0.75	16.66	19.05	9xx-31	9003XD31	9003XH31	9003X73-1	9003X53-1
3/4" X 20	9xx-04364	0.671	0.765	17.04	19.43	9xx-32				
7/8" X 14	9xx-01116	0.687	0.781	17.45	19.84	9xx-33				
7/8" X 15	9xx-04564	0.703	0.796	17.86	20.22	9xx-34				
7/8" X 16	9xx-02332	0.718	0.812	18.24	20.62	9xx-34	9003XD32	9003XH32	9003X73-2	9003X53-2
7/8" X 17	9xx-04764	0.734	0.828	18.64	21.03	9xx-35				
7/8" X 18	9xx-00304	0.75	0.843	19.05	21.41	9xx-36				
7/8" X 19	9xx-04964	0.765	0.859	19.43	21.82	9xx-36	9003XD33	9003XH33	9003X73-3	9003X53-3
1" X 13	9xx-02532	0.781	0.875	19.84	22.23	9xx-37				
1" X 14-15	9xx-01316	0.812	0.921	20.62	23.39	9xx-38	9003XD34	9003XH34	9003X73-4	9003X53-4
1" X 16-17	9xx-02732	0.843	0.953	21.41	24.21	9xx-40				
1" X 18-19	9xx-00708	0.875	0.985	22.23	25.02	9xx-41	9003XD35	9003XH35	9003X73-5	9003X53-5
1-1/4" X 9	9xx-02932	0.906	1.015	23.01	25.78	9xx-42	9003XD36	9003XH36	9003X73-6	9003X53-6
1-1/4" X 10	9xx-01516	0.937	1.045	23.8	26.54	9xx-44				
1-1/4" X 11	9xx-03132	0.968	1.093	24.59	27.76	9xx-52	9003TD51	9003TH51	9003T751	9003T55-1
1-1/4" X 12	9xx-10000	1	1.125	25.4	28.58	9xx-53	9003TD52	9003TH52	9003T752	9003T55-2
1-1/4" X 13	9xx-10132	1.032	1.156	26.21	29.36	9xx-55				
1-1/4" X 14-15	9xx-10116	1.062	1.187	26.97	30.15	9xx-56	9003TD53	9003TH53	9003T753	9003T55-3
1-1/4" X 16-17	9xx-10332	1.093	1.234	27.76	31.34	9xx-57	9003TD54	9003TH54	9003T75-1	9003T55-4
1-1/4" X 18-19	9xx-10108	1.125	1.265	28.58	32.13	9xx-59				
1-1/2" X 9	9xx-10532	1.156	1.296	29.36	32.92	9xx-60	9003TD55	9003TH55	9003T75-2	9003T55-5
1-1/2" X 10	9xx-10316	1.187	1.32	30.15	33.53	9xx-61	9003TD56	9003TH56	9003T75-3	9003T55-6
1-1/2" X 11	9xx-10732	1.218	1.359	30.94	34.52	9xx-63				
1-1/2" X 12	9xx-10104	1.25	1.421	31.75	36.09	9xx-64	9003TD57	9003TH57	9003T75-4	9003T55-7
1-1/2" X 13	9xx-11764	1.265	1.437	32.13	36.5	9xx-65				
1-1/2" X 14	9xx-10932	1.281	1.453	32.54	36.91	9xx-65	9003TD58	9003TH58	9003T75-5	9003T55-8
1-1/2" X 15-16	9xx-10516	1.312	1.481	33.32	37.62	9xx-67				
1-1/2" X 17-18	9xx-11132	1.343	1.515	34.11	38.48	9xx-68	9003TD59	9003TH59	9003T75-6	9003T55-9

MADE IN USA

2 METHODS FOR EXPANDING X-ID BOILER TUBES

Generally, boilers require a larger footprint and higher energy usage to produce the required amount of heat transfer. In order to increase efficiency and lower operating costs, many boiler makers are switching to X-ID enhanced tubing. These enhancements improve efficiency by increasing the surface area of the tube and increasing the rate in which gases travel through the tube. While X-ID tubes are beneficial for the end user, they can be challenging to install. The enhanced material can reduce expander tool life and result in a poor mechanical joint or roll bead if not done correctly.

Straight Roll Method

The first method for installation uses a straight boiler expander and a roll beading expander. Once all the tubes are in the tube sheet and the proper projection for the roll bead is set, the operator would do a first pass with a straight roll expander. The goal is not to expand the tube, but to flatten out some of the enhancements. This process will take approximately 3-4 expander revolutions.

Once the tube surface is smoothed out, the single roll beading expander can be used. The operator should expand until the tube end forms a good bead that is touching the tube sheet face. Depending on the dimensions of the internal rifling, it can cause some material build-up during this process, with some of the material potentially wrapping around the bead roll of the expander. If this happens, the operator may need to clean out the tool between expansions.

While this method of expanding is easier for the operator and can be done quickly, it may have varying results. For example, it can be very difficult to get a perfectly smooth expansion area, as a lot of the material will migrate and build up in one location when flattening it out. Additionally, the quality of the bead may not be as optimal as when working with a prime tube. This is because the enhanced material can result in a sharp lip between the tube to bead transition. Depending on how severe it is, the ridge can result in more wear over time and potentially ruin the integrity of the bead.

Grind & Roll Bead Method

Another method for installing X-ID tubes requires a grinder and a single roll beading expander. When selecting a grinding disc, it's important to size it for the smallest tube ID which is the ID of the enhanced portion of the tube. This will ensure that you don't remove too much tube wall material. Using a grinding wheel and drill, the operator would come in perpendicular to the tube and perform a circular grinding motion to evenly remove the enhancements. It's important to grind as much of the enhancement off as you can without altering the wall size of the tube.

Once the tube has a smooth working area, about 2 – 3" inside the tube, the operator should use a single roll beading expander to finish the installation process. While this method requires a lot more prep time, the quality of the bead is significantly better and results in a smooth tube to bead transition. By removing the enhancement prior to expanding, it extends the life of the single roll beading expander and prevents the enhancement from showing in the bead. Additionally, this method eliminates material build up or internal ridges from the expansion process, reducing the risk of hot gasses and flames creating a failure point over time.

Overall, X-ID tubes are great for improving the operating efficiency of a boiler, however, it's important to understand how to properly install them before starting a job. Depending on your facility, one of the above methods may be better suited than the other. The first method is much easier for operators to perform and can be done much quicker. As a result, it may be better suited for jobs on a tighter turn around or teams with newer operators. While the second method takes more prep time, it only requires one rolling operation and can produce a better-quality bead. This may be better suited for faculties that are used to grinding and welding and have the ability to spend more time on the job.

1500 Series
Flaring Boiler Expanders

Tube Size
- 1.750” to 4.000” OD
- (44.5 to 101.6mm) OD

Type
- Flaring Boiler Expander

Application
- Firetube & Watertube Boilers

Elliott’s 1500 Series Flaring Boiler Expanders are self-feeding, specifically made for use in firetube and watertube boilers.

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

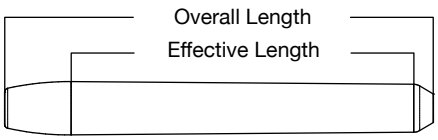
Features & Benefits:
- Most commonly used expander in installation of new boiler tubes due to its solid design and self-feeding rolling operation.
- High quality steel for the most demanding water tube boiler applications.
- Roll retainers hold the rolls in place when changing mandrels.

Mandrels 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:
- Drum Mandrel: 10-1/2” (266.7mm) to 17-1/2” (444.5mm) long.
- Header Mandrel: For reaching through a header or water leg.
- Short Mandrel: 6-1/4” (158.8mm) long. May require two or more mandrels to obtain full expansion range of the expander.
- Roll Set: Consists of two each expanding roll, flaring roll, overlapping roll, and one set of roll retainer pins.
- Tube Rolling Lubricant ***See page 19 for part numbers.***

MADE IN USA

Specifications / Tool Number for Sheet Thickness		Roll Dimensions*	
Tube Sheet Thickness	xx	Overall Length	Eff. Length
1/2" - 7/8" (12.7 - 22.2mm)	15	1.500" (38.1mm)	.875" (22.2mm)
1" - 1-3/8" (25.4 - 34.9mm)	21	2.000" (50.8mm)	1.375" (34.9mm)
1-1/2" - 1-7/8" (38.1 - 47.6mm)	23	2.500" (63.5mm)	1.875" (47.6mm)
2" - 2-3/8" (50.8 - 60.3mm)	25	3.000" (76.2mm)	2.375" (60.3mm)
2-1/2" - 2-7/8" (63.5 - 73.0mm)	27	3.500" (88.9mm)	2.875" (73.0mm)
3" - 3-3/8" (76.2 - 85.7mm)	29	4.000" (101.6mm)	3.375" (85.7mm)



xx signifies tube sheet thickness.

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

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

MADE IN USA

3400 Series
Flaring Boiler Expanders

Tube Size
- 1.500” to 4.000” OD
- (38.1 to 101.6mm) OD

Type
- Flaring Boiler Expander

Application
- Firetube & Watertube Boilers

Elliott’s 3400 Series Flaring Boiler Expanders are the recommended tube expanders for 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.

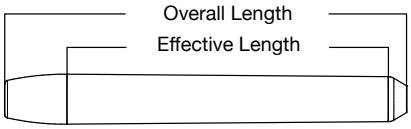
Features & Benefits:
- Prong style thrust collar - uniform flare lengths without risk of driving flare rolling into tube sheet.
- High quality steel for the most demanding boiler applications.

Mandrels 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:
- 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.
- Header Mandrel: For reaching through a header or water leg. 18" (457.2mm) to 25" (635.0mm) long.
- 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.
- Roll Set: Consists of (3) expanding rolls, (3) flaring rolls, and (6) roll retainer pins.
- Tube Rolling Lubricant ***See page 19 for part numbers.***

MADE IN USA

Specifications / Tool Number for Sheet Thickness		Roll Dimensions*	
Tube Sheet Thickness	xx	Overall Length	Eff. Length
1/2" - 7/8" (12.7 - 22.2mm)	15	1.500" (38.1mm)	.875" (22.2mm)
1" - 1-3/8" (25.4 - 34.9mm)	21	2.000" (50.8mm)	1.375" (34.9mm)



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

Outside Tube Diameter and BWG	Part Number	Expansion Range				Roll Set Number	Drum Mandrel	Header Mandrel	Short Mandrel Kits
		Inch		Metric					
		Min.	Max.	Min.	Max.				
1-1/2" X 12	34xx-10104	1.250"	1.421"	31.75	36.09	34xx-64	9003TD57	9003TH57	9003T75-4
1-1/2" X 13	34xx-11764	1.265"	1.437"	32.13	36.4	34xx-65			
1-1/2" X 14	34xx-10932	1.281"	1.453"	32.54	36.9	34xx-65	9003TD58	9003TH58	9003T75-5
1-1/2" X 15-16	34xx-10516	1.312"	1.484"	33.32	37.69	34xx-67			
1-1/2" X 17-18	34xx-11132	1.343"	1.515"	34.11	38.48	34xx-68	9003TD59	9003TH59	9003T75-6
1-3/4" X 9-10	34xx-10308	1.375"	1.560"	35.92	39.62	34xx-1	150003CD1PX	150003CH1PX	150003D-1
1-3/4" X 11-12	34xx-10716	1.437"	1.625"	36.64	41.27	34xx-2			
1-3/4" X 13-14	34xx-10102	1.500"	1.687"	38.1	42.85	34xx-3			
2" X 7-8	34xx-10916	1.562"	1.750"	39.67	44.45	34xx-4			
2" X 9-10	34xx-10508	1.625"	1.812"	41.28	46.02	34xx-5			
2" X 11-12	34xx-11116	1.687"	1.937"	42.85	49.2	34xx-5	150003CD3PX	150003CH3PX	150003D-2
2" X 13-14	34xx-10304	1.750"	2.000"	44.45	50.8	34xx-6			
2" X 15-18	34xx-11316	1.812"	2.062"	46.02	52.37	34xx-7			
2-1/4" X 9-10	34xx-10708	1.875"	2.125"	47.62	53.97	34xx-8			
2-1/4" X 11-12	34xx-11516	1.937"	2.187"	49.2	55.55	34xx-9			
2-1/4" X 13-18	34xx-20000	2.000"	2.250"	50.8	57.15	34xx-8	150003MD5PX	150003MH5PX	150003N-1
2-1/2" X 7-8	34xx-20116	2.062"	2.312"	52.87	58.72	34xx-9			
2-1/2" X 9-10	34xx-20108	2.125"	2.375"	53.97	60.32	34xx-10			
2-1/2" X 11-12	34xx-20316	2.187"	2.500"	55.55	63.5	34xx-12			
2-1/2" X 13-18	34xx-20104	2.250"	2.562	57.15	65.07	34xx-11	150003MD7PX	150003MH7PX	150003N-2
3" X 3	34xx-20516	2.312"	2.625"	58.72	66.67	34xx-12			
3" X 4	34xx-20308	2.375"	2.687"	60.32	68.25	34xx-13			
3" X 5-6	34xx-20716	2.437"	2.750"	61.9	69.85	34xx-14			
3" X 7	34xx-20102	2.500"	2.812"	63.5	71.42	34xx-15			
3" X 8-9	34xx-20916	2.562"	2.875"	65.07	73.02	34xx-16			
3" X 10-11	34xx-20508	2.625"	2.937"	66.67	74.6	34xx-17			
3" X 12-13	34xx-21116	2.687"	3.000"	68.25	76.2	34xx-16	150003MD8PX	150003MH8PX	150003N-3
3-1/4" X 7	34xx-20304	2.750"	3.062"	69.85	77.77	34xx-17			
3-1/4" X 8-9	34xx-21316	2.812"	3.125"	71.42	79.37	34xx-18			
3-1/4" X 10-11	34xx-20708	2.875"	3.187"	73.02	80.95	34xx-19			
3-1/4" X 12-13	34xx-21516	2.937"	3.250"	74.6	82.55	34xx-20			
3-1/2" X 7	34xx-30000	3.000"	3.375"	76.2	85.72	34xx-20	150003MD9PX	150003MH9PX	150003N-4
3-1/2" X 8-9	34xx-30116	3.062"	3.437"	77.77	87.3	34xx-21			
3-1/2" X 10-11	34xx-30108	3.125"	3.500"	79.37	88.9	34xx-22			
3-1/2" X 12-13	34xx-30316	3.187"	3.562"	80.95	90.47	34xx-23			
4" X 2	34xx-30104	3.250"	3.625"	82.55	92.07	34xx-24			
4" X 3	34xx-30516	3.312"	3.687"	84.12	93.65	34xx-25			
4" X 4	34xx-30308	3.375"	3.750"	85.72	95.25	34xx-24	150003MD10PX	150003MH10PX	150003N-5
4" X 5-6	34xx-30716	3.437"	3.812"	87.3	96.82	34xx-25			
4" X 7	34xx-30102	3.500"	3.875"	88.9	98.42	34xx-26			
4" X 8-9	34xx-30916	3.562"	3.937"	90.47	100.0	34xx-27			
4" X 10-11	34xx-30508	3.625"	4.000"	92.07	101.6	34xx-28			

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

MADE IN USA

3300 Series
Straight Boiler Expanders

Tube Size
- 1.500” to 4.000” OD
- (38.1 to 101.6mm) OD

Type
- Straight Boiler Expander

Application
- Firetube & Self-Contained Steam Boiler Units

Elliott’s 3300 Series Straight Boiler Expanders are the preferred tube expanders for firetube boilers and self-contained steam boiler units.

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.

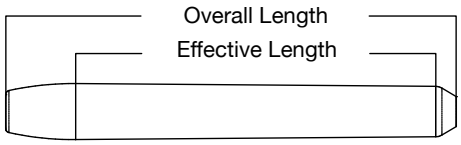
Features & Benefits:
- For performing a straight roll operation or re-rolling leaky joints.
- Ball bearing thrust collar prevents force feed of expander into tube.
- High quality steel for the most demanding boiler applications.

Mandrels 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:
- 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.
- Header Mandrel: For reaching through a header or water leg. 18” (457.2mm) to 25” (635.0mm) long.
- 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.
- Roll Set: Consists of (3) straight rolls and (6) roll retainer pins
- Tube Rolling Lubricant ***See page 19 for part numbers.***

MADE IN USA

Specifications / Tool Number for Sheet Thickness		Roll Dimensions	
Tube Sheet Thickness	xx	Overall Length	Eff. Length
1/2" - 7/8" (12.7 - 22.2mm)	15	1.500" (38.1mm)	0.875" (22.2mm)
1" - 1-3/8" (25.4 - 34.9mm)	21	2.000" (50.8mm)	1.375" (34.9mm)
1-1/2" - 1-7/8" (38.1 - 47.6mm)	23	2.500" (63.5mm)	1.875" (47.6mm)
2" - 2-3/8" (50.8 - 60.3mm)	25	3.000" (76.2mm)	2.375" (60.3mm)
2-1/2" - 2-7/8" (63.5 - 73.0mm)	27	3.500" (88.9mm)	2.875" (73.0mm)
3" - 3-3/8" (76.2 - 85.7mm)	29	4.000" (101.6mm)	3.375" (85.7mm)



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

Outside Tube Diameter and BWG	Part Number	Expansion Range				Roll Set Number	Drum Mandrel	Header Mandrel	Short Mandrel Kits
		Inch		Metric					
		Min.	Max.	Min.	Max.				
1-1/2" X 12	33xx-10104	1.250"	1.421"	31.75	36.09	33xx-64A	9003TD57	9003TH57	9003T75-4
1-1/2" X 13	33xx-11764	1.265"	1.437"	32.13	36.4	33xx-65A			
1-1/2" X 14	33xx-10932	1.281"	1.453"	32.54	36.9	33xx-65A	9003TD58	9003TH58	9003T75-5
1-1/2" X 15-16	33xx-10516	1.312"	1.484"	33.32	37.69	33xx-67A			
1-1/2" X 17-18	33xx-11132	1.343"	1.515"	34.11	38.48	33xx-68A	9003TD59	9003TH59	9003T75-6
1-3/4" X 9-10	33xx-10308	1.375"	1.560"	35.92	39.62	33xx-1A	150003CD1PX	150003CH1PX	150003D-1
1-3/4" X 11-12	33xx-10716	1.437"	1.625"	36.64	41.27	33xx-2A			
1-3/4" X 13-14	33xx-10102	1.500"	1.687"	38.1	42.85	33xx-3A			
2" X 7-8	33xx-10916	1.562"	1.750"	39.67	44.45	33xx-4A			
2" X 9-10	33xx-10508	1.625"	1.812"	41.28	46.02	33xx-5A			
2" X 11-12	33xx-11116	1.687"	1.937"	42.85	49.2	33xx-5A	150003CD3PX	150003CH3PX	150003D-2
2" X 13-14	33xx-10304	1.750"	2.000"	44.45	50.8	33xx-6A			
2" X 15-18	33xx-11316	1.812"	2.062"	46.02	52.37	33xx-7A			
2-1/4" X 9-10	33xx-10708	1.875"	2.125"	47.62	53.97	33xx-8A			
2-1/4" X 11-12	33xx-11516	1.937"	2.187"	49.2	55.55	33xx-9A			
2-1/4" X 13-18	33xx-20000	2.000"	2.250"	50.8	57.15	33xx-8A	150003MD5PX	150003MH5PX	150003N-1
2-1/2" X 7-8	33xx-20116	2.062"	2.312"	52.87	58.72	33xx-9A			
2-1/2" X 9-10	33xx-20108	2.125"	2.375"	53.97	60.32	33xx-10A			
2-1/2" X 11-12	33xx-20316	2.187"	2.500"	55.55	63.5	33xx-12A			
2-1/2" X 13-18	33xx-20104	2.250"	2.562	57.15	65.07	33xx-11A	150003MD7PX	150003MH7PX	150003N-2
3" X 3	33xx-20516	2.312"	2.625"	58.72	66.67	33xx-12A			
3" X 4	33xx-20308	2.375"	2.687"	60.32	68.25	33xx-13A			
3" X 5-6	33xx-20716	2.437"	2.750"	61.9	69.85	33xx-14A			
3" X 7	33xx-20102	2.500"	2.812"	63.5	71.42	33xx-15A			
3" X 8-9	33xx-20916	2.562"	2.875"	65.07	73.02	33xx-16A			
3" X 10-11	33xx-20508	2.625"	2.937"	66.67	74.6	33xx-17A			
3" X 12-13	33xx-21116	2.687"	3.000"	68.25	76.2	33xx-16A	150003MD8PX	150003MH8PX	150003N-3
3-1/4" X 7	33xx-20304	2.750"	3.062"	69.85	77.77	33xx-17A			
3-1/4" X 8-9	33xx-21316	2.812"	3.125"	71.42	79.37	33xx-18A			
3-1/4" X 10-11	33xx-20708	2.875"	3.187"	73.02	80.95	33xx-19A			
3-1/4" X 12-13	33xx-21516	2.937"	3.250"	74.6	82.55	33xx-20A			
3-1/2" X 7	33xx-30000	3.000"	3.375"	76.2	85.72	33xx-20A	150003MD9PX	150003MH9PX	150003N-4
3-1/2" X 8-9	33xx-30116	3.062"	3.437"	77.77	87.3	33xx-21A			
3-1/2" X 10-11	33xx-30108	3.125"	3.500"	79.37	88.9	33xx-22A			
3-1/2" X 12-13	33xx-30316	3.187"	3.562"	80.95	90.47	33xx-23A			
4" X 2	33xx-30104	3.250"	3.625"	82.55	92.07	33xx-24A			
4" X 3	33xx-30516	3.312"	3.687"	84.12	93.65	33xx-25A			
4" X 4	33xx-30308	3.375"	3.750"	85.72	95.25	33xx-24A	150003MD10PX	150003MH10PX	150003N-5
4" X 5-6	33xx-30716	3.437"	3.812"	87.3	96.82	33xx-25A			
4" X 7	33xx-30102	3.500"	3.875"	88.9	98.42	33xx-26A			
4" X 8-9	33xx-30916	3.562"	3.937"	90.47	100.0	33xx-27A			
4" X 10-11	33xx-30508	3.625"	4.000"	92.07	101.6	33xx-28A			

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

MADE IN USA

DRE Series
Deep Roll Boiler Expanders

Tube Size
- 1.750” to 4.000” OD
- (44.5 to 101.6mm) OD

Type
- Deep Roll Boiler Expander

Application
- Steam & Mud Drums in High Pressure Boilers

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.

Features & Benefits:
- Long expanding rolls allow for a quicker & easier 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.

Mandrels are sold separately.

Spares & Accessories:
- Header Mandrel
- Roll Set: Consists of (3) overlapping rolls and (6) roll retainer pins.
- Tube Rolling Lubricant ***See page 19 for part numbers.***

MADE IN USA

Outside Tube Diameter Inches and BWG	Part Number	Expansion Range Inch				Roll Set*	Header Mandrel
		Inch		Metric			
		Min.	Max.	Min.	Max.		
1-3/4" X 9-10	DRE10308	1.375"	1.560"	35.92	39.62	DRE3	150003CHL0
1-3/4" X 11-12	DRE10716	1.437"	1.625"	36.64	41.27	DRE4	
1-3/4" X 13-14	DRE10102	1.500"	1.687"	38.1	42.85	DRE5	
2" X 7-8	DRE10916	1.562"	1.750"	39.67	44.45	DRE6	
2" X 9-10	DRE10508	1.625"	1.812"	41.28	46.02	DRE5	150003CHL1
2" X 11-12	DRE11116	1.687"	1.937"	42.85	49.2	DRE7	
2" X 13-14	DRE10304	1.750"	2.000"	44.45	50.8	DRE8	
2" X 15-18	DRE11316	1.812"	2.062"	46.02	52.37	DRE9	
2-1/4" X 9-10	DRE10708	1.875"	2.125"	47.62	53.97	DRE10	
2-1/4" X 11-12	DRE11516	1.937"	2.187"	49.2	55.55	DRE11	
2-1/4" X 13-18	DRE20000	2.000"	2.250"	50.8	57.15	DRE8	150003MHL5
2-1/2" X 7-8	DRE20116	2.062"	2.312"	52.87	58.72	DRE9	
2-1/2" X 9-10	DRE20108	2.125"	2.375"	53.97	60.32	DRE10	
2-1/2" X 11-12	DRE20316	2.187"	2.500"	55.55	63.5	DRE12	
2-1/2" X 13-18	DRE20104	2.250"	2.562"	57.15	65.07	DRE11	150003MHL7
3" X 3	DRE20516	2.312"	2.625"	58.72	66.67	DRE12	
3" X 4	DRE20308	2.375"	2.687"	60.32	68.25	DRE13	
3" X 5-6	DRE20716	2.437"	2.750"	61.9	69.85	DRE14	
3" X 7	DRE20102	2.500"	2.812"	63.5	71.42	DRE15	
3" X 8-9	DRE20916	2.562"	2.875"	65.07	73.02	DRE16	
3" X 10-11	DRE20508	2.625"	2.937"	66.67	74.6	DRE17	
3" X 12-13	DRE21116	2.687"	3.000"	68.25	76.2	DRE16	150003MHL8
3-1/4" X 7	DRE20304	2.750"	3.062"	69.85	77.77	DRE17	
3-1/4" X 8-9	DRE21316	2.812"	3.125"	71.42	79.37	DRE18	
3-1/4" X 10-11	DRE20708	2.875"	3.187"	73.02	80.95	DRE19	
3-1/4" X 12-13	DRE21516	2.937"	3.250"	74.6	82.55	DRE20	
3-1/2" X 7	DRE30000	3.000"	3.375"	76.2	85.72	DRE20	150003MHL9
3-1/2" X 8-9	DRE30116	3.062"	3.437"	77.77	87.3	DRE21	
3-1/2" X 10-11	DRE30108	3.125"	3.500"	79.37	88.9	DRE22	
3-1/2" X 12-13	DRE30316	3.187"	3.562"	80.95	90.47	DRE23	
4" X 2	DRE30104	3.250"	3.625"	82.55	92.07	DRE24	
4" X 3	DRE30516	3.312"	3.687"	84.12	93.65	DRE25	
4" X 4	DRE30308	3.375"	3.750"	85.72	95.25	DRE24	150003MHL10
4" X 5-6	DRE30716	3.437"	3.812"	87.3	96.82	DRE25	
4" X 7	DRE30102	3.500"	3.875"	88.9	98.42	DRE26	
4" X 8-9	DRE30916	3.562"	3.937"	90.47	100.0	DRE27	
4" X 10-11	DRE30508	3.625"	4.000"	92.07	101.6	DRE28	

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

**Effective Roll Length: 2-5/8"*

MADE IN USA

40 Series
Straight Boiler Expanders

Tube Size
- 2.000” to 3.000” OD
- (50.8 to 76.2mm) OD

Type
- Straight Boiler Expander

Application
- Re-Rolling Leaky Tubes in Firetube Boilers By Hand

Elliott’s 40 Series Straight Boiler Expanders are recommended for re-rolling leaky tube joints in firetube boilers. Self-feeding, these expanders should primarily be used by hand.

The guard prong is 1/2” (12.7mm) long, allowing you to roll boiler tubes with a projection, while also controlling the mandrel feed to prevent over-rolling.

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

Features & Benefits:
- Only for re-rolling leaky tube joints in firetube boilers.
- Tapered expansion aggressively seals leaky joints allowing for quick cycle time.
- Guard prong accommodates tube projections, allowing you to roll boiler tubes with projection while controlling the mandrel feed.
- An economical, durable tool.

Mandrels are sold separately.

Spares & Accessories:
- Drum Mandrel
- Roll Set
- Tube Rolling Lubricant ***See page 19 for part numbers.***

Outside Tube Diameter and BWG	Part Number	Expansion Range				Roll Set	Drum Mandrel	Mandrel Square
		Inch		Metric				
		Min.	Max.	Min.	Max.			
2” X 12-18	40-20000	1.718	2.000	43.64	50.80	4005-20	40C3P20000	3/4”
2-1/2” X 10-18	40-20102	2.156	2.500	54.76	63.50	4005-25	40C3P20102	3/4”
3” X 10-18	40-30000	2.625	3.000	66.68	76.20	4005-30	40M3P30000	1”

MADE IN USA

Unique Applications

Require Custom Solutions

Take on the Toughest Applications with Custom Engineered Solutions

With over 130 years of developmental experience, Elliott's in-house engineering team designs custom solutions for some of the industry's most unique applications.

Past Projects Include:

- **24' Condenser Expander**
- **U-Joint One-Revolution Cutter**
- **Baffle Expanders**
- **& Much More!**

Contact Us About Custom Solutions!
www.elliott-tool.com/contact-us

Keller & Associates Inc. Finds

The Best Bead In The Market

QUICK SUMMARY

The Challenge

- Provide the best quality work for their customers.
- Air hammer and beading tool were too labor intensive.
- Existing vendor's beading expander did not provide a smooth bead to tube sheet transition.
- Poor support from their existing vendor left them with little options.

The Solution

- Operators tested Elliott's 4480 Single Roll Beading Expander on a production job.

The Results

- Produced a smooth bead to tube sheet transition.
- Saved labor costs compared to manual beading.
- Extended tube life compared to a ridged bead transition.

The Challenge

As Operations Director of Keller & Associates Inc., a boiler contractor and repair shop in Lakeland, Florida, Ted Keller wants retube tools that will do the best job for his customers while minimizing time and costs on his end.

A roll beading expander that will roll, bead, and reroll the tube in one operation is an important tool for firetube boilers.

Keller & Associates' operators tried using an air hammer with beading tool but found that it was very time consuming since the three separate operations of rolling, beading, and re-rolling were required. Additionally, the air hammer was very hard on the body, making operators sore after just a few tubes.

Then they tried a single roll beading expander manufactured by a competitor of Elliott Tool. While the expander performed the three operations of roll, bead, and re-roll in only one function, thus saving time and labor costs, it did not produce a smooth bead to tube sheet transition. In fact, the bead had an evident lip (edge) on it.

A lip on the bead restricts the flame that is going through the firetube boiler tube which places stress on the tube. This stress decreases tube life which means that customers must get their firetube boilers retubed more often than they should need to.

Ted Keller actually called the single roll beading expander manufacturer to improve the quality of their bead since they want to do the best quality work for their firetube boiler customers. The manufacturer responded that they were working on the problem but Ted Keller never heard back!

The Solution

The Keller & Associates operators tried Elliott's Single Roll Beading Expander and immediately appreciated its key features:

- 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 Roll Beading Expanders.
- Only minimal component part changes to enable expansion of different tube gauges.
- Smooth bead to tube sheet transition to increase tube life.

Although Keller & Associates were extremely pleased with all of the above features, they were most impressed with the smooth bead to tube sheet transition that Elliott's Single Roll Beading Expander produced.

In fact, Keller & Associates employees, including Ted Keller, did a side by side beading test using the Elliott expander versus the other manufacturer's expander on the same firetube boiler. All agreed that Elliott's Single Roll Beading Expander clearly provided for a better bead than the other beading expander.

Ted Keller was impressed to see that Elliott's Single Roll Beading Expander solved the problem that he was experiencing with his current roll beading expanders so that he could provide the best quality to his customers.

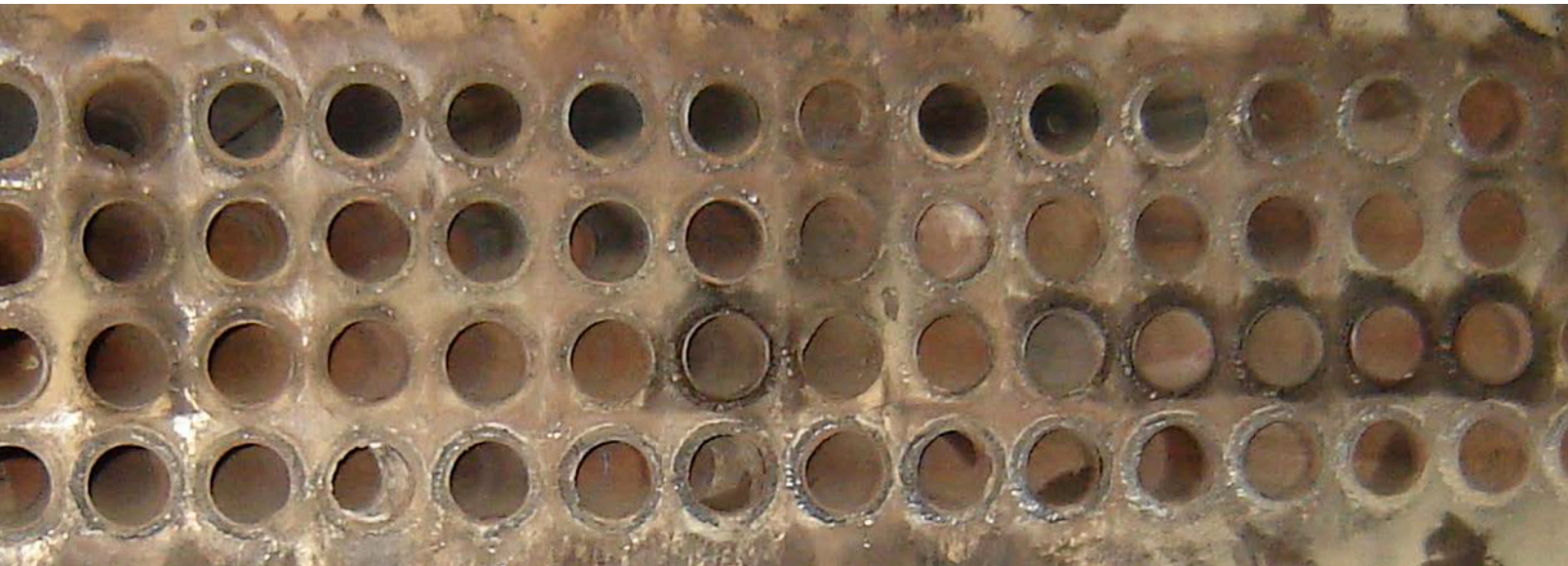
> *"I like the smooth bead to tube sheet transition because it eliminates stress on the tube to make it last longer. I have been asking another roll beading expander manufacturer to improve the quality of their bead and they said they're working on it."*
>
> **- Ted Keller, Operations Director**

The Results

Elliott's Single Roll Beading Expander saves Keller & Associates on labor costs as compared with the manual method of using an air hammer and beading tool which takes three operations instead of one.

The Elliott Single Roll Beading Expander also produces a smooth bead to tube sheet transition as compared with the other single roll beading expander manufacturer. The smooth bead allows firetube boiler tubes to last longer than those with ridged beads.

Keller & Associates knows that with the Elliott Single Roll Beading Expander, they are providing the best quality to their customers.



4480 Series
Single Roll Beading Expanders

Tube Size
- 1.500” to 3.000” OD
- (38.1 to 76.2mm) OD

Type
- Single Roll Beading Expander

Application
- Firetube Boilers

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.

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 other 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.

4480 Serie Package Includes:
- Roll Beading Expander
- Mandrel
- Grease Gun

Spares & Accessories:
- Mandrel
- Front Square Drive Mandrel: Recommended in applications where space is limited and tubes must be re-rolled from behind the boiler
- Expanding Roll Set: Includes 3 or 4 overlapping rolls (depending upon expander size) and 1 expanding roll
- Guide Roll
- Bead Roll
- Grease Gun ***(4480-20-26)*** / Grease ***(4480-20-30)***
- Bead Coolant ***See page 19 for part numbers.***
- Electric and Pneumatic Rolling Motors ***See page on page 62 and 72.***

> *“We have used Elliott’s single roll beading expander on two different retube projects so far and the finished look of the tube bead is machine quality. Our boilermakers said this was the best tool they have ever used. They will never pick up a pneumatic hammer and beading tool again!”*
>
> **-Burgess J. Holt, Owner**
> **NBW Inc**

MADE IN USA

FOR RENT

Single Roll Beading Expander											
OD	BWG	Tool Number	Expansion Range		Bead Roll	Guide Roll	Expanding Roll Set	Mandrel	Cage	Drive Square	Front Square Drive Mandrel
			Min.	Max.							
1-1/2" (38.1mm)	11	4480-1511	1.260" (32.00mm)	1.340" (34.04mm)	4480-15011-12	4480-15111	4480-1500	4480-1511-02	4480-1511BK	3/4"	N/A
	12	4480-1512	1.282" (32.56mm)	1.340" (34.04mm)		4480-15112					
	13	4480-1513	1.310" (33.27mm)	1.390" (35.31mm)	4480-15013-14	4480-15113		4480-1513-02	4480-1513BK		
	14	4480-1514	1.334" (33.88mm)	1.390" (35.31mm)		4480-15114					
2" (50.8mm)	10	4480-2010	1.732" (43.99mm)	1.875" (47.63mm)	4480-20010-011	4480-20110	4480-2000	4480-20-02	4480-20BK		4480-20-02FS
	11	4480-2011	1.760" (44.70mm)	1.875" (47.63mm)	4480-20010-011	4480-20111	4480-2000	4480-20-02			
	12	4480-2012	1.782" (45.26mm)	1.875" (47.63mm)	4480-20012-013	4480-20112	4480-2000	4480-20-02			
	13	4480-2013	1.810" (45.97mm)	1.875" (47.63mm)	4480-20012-013	4480-20113	4480-2000	4480-20-02			
2.5" (63.5mm)	10	4480-2510	2.232" (56.69mm)	2.375" (60.33mm)	4480-25010-011	4480-25110	4480-2500	4480-25-02	4480-25BK		4480-25-02FS
	11	4480-2511	2.260" (57.40mm)	2.375" (60.33mm)	4480-25010-011	4480-25111	4480-2500	4480-25-02			
	12	4480-2512	2.282" (57.96mm)	2.375" (60.33mm)	4480-25012-013	4480-25112	4480-2500	4480-25-02			
	13	4480-2513	2.310" (58.67mm)	2.375" (60.33mm)	4480-25012-013	4480-25113	4480-2500	4480-25-02			
3" (76.2mm)	10	4480-3010	2.732" (69.39mm)	2.900" (73.66mm)	4480-30010-011	4480-30110	4480-3000	4480-30-02	4480-30BK	1"	4480-30-02FS
	11	4480-3011	2.760" (70.10mm)	2.900" (73.66mm)	4480-30010-011	4480-30111	4480-3000	4480-30-02			
	12	4480-3012	2.782" (70.66mm)	2.900" (73.66mm)	4480-30012	4480-30112	4480-3000	4480-30-02			

Grease Gun

MADE IN USA

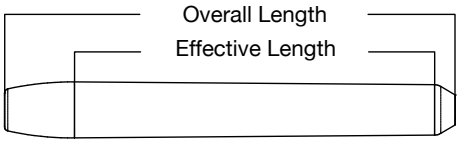
23 Series
Heat Exchanger & Condenser Expanders

Tube Size
- 0.250” – 0.375” OD
- 6.4 mm – 9.5 mm OD

Elliott’s 23 Series Condenser Expanders are ideal for expanding small tubes commonly found in oil coolers and other small heat exchangers.

The 23 Series Expanders are available in both standard and longer reaches to suit your application. The 23 Series works great with Elliott’s new ET720 Series Rolling Motors. With quality US manufacturing and proven tool life, the 23 Series consistently expands tubes in smaller vessels.

Spares & Accessories:
- Mandrel
- Roll Set
- Lubricant: ***See page 19 for part numbers.***
- ET Series Torque Controlled Pneumatic Rolling Motors: ***See page 66.***



Roll Part Number	Overall Roll Length	Effective Roll Length
231R01 - 231R17	0.750" (19.1mm)	0.606" (15.4mm)
232R09 - 232R17	1.250" (31.8mm)	1.106” (28.1mm)

3 Roll Expanders											
Tube Size				Expansion Range				Tube Sheet (Min/Max Reach) 1/4" - 3/4” (6.4 - 19.1mm) Overall Roll Length 3/4" (19.1mm)			Common Mandrel
OD	Wall Thickness			Inch		Metric		Expander Assembly		Roll Set (3 per set)	
	BWG	In	Metric	Min.	Max.	Min.	Max.	Flush	1/8" Recess		
1/4” (6.4mm)	18	0.049	1.24	0.149	0.173	3.78	4.39	23101	23101RA8	231R01-3	23M01
	19	0.042	1.07	0.161	0.185	4.09	4.71	23102	23102RA8	231R02-3	
	20	0.035	0.89	0.173	0.200	4.39	5.08	23103	23103RA8		23M03
	21	0.032	0.81	0.181	0.208	4.60	5.29	23104	23104RA8	231R04-3	
	22-23	0.028-0.025	0.71-0.64	0.188	0.219	4.78	5.56	23105	23105RA8		23M05
	24-25	0.022-0.020	0.56-0.51	0.198	0.229	5.03	5.82	23106	23106RA8	231R06-3	
	26-30	0.018-0.012	0.46-0.31	0.205	0.236	5.21	6.00	23107	23107RA8		23M07

Mandrel drive square size is 1/4”

MADE IN USA

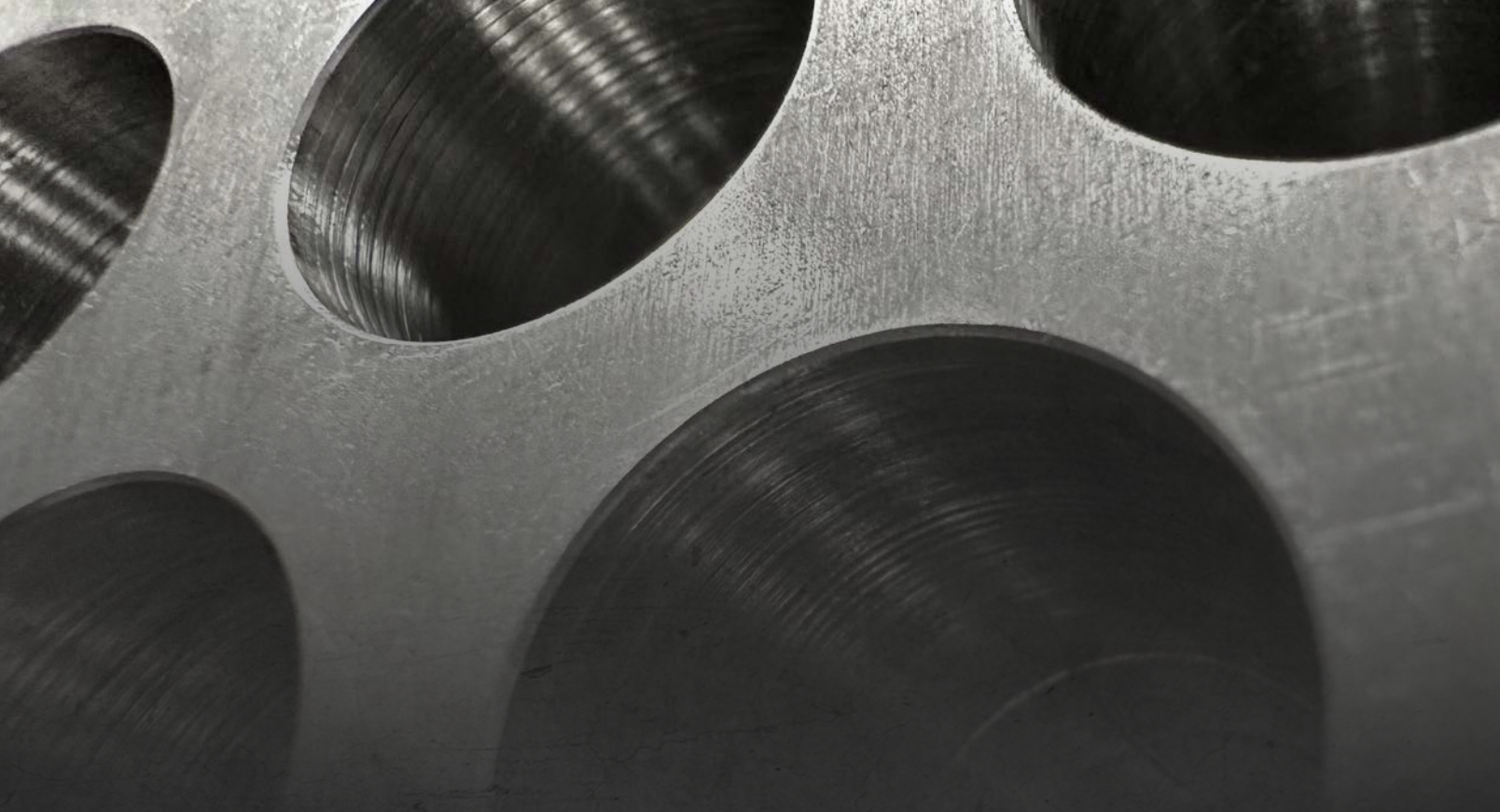
3 Roll Expanders														
Tube Size				Expansion Range				Tube Sheet (Min/Max Reach) 1/4"-1-1/4" (6.4 - 31.8mm) Overall Roll Length 3/4" (19.1mm)			Tube Sheet (Min/Max Reach) 3/4" - 1-1/4" (19.1 - 31.8mm) Overall Roll Length 1-1/4" (31.8mm)			Common Mandrel
OD	Wall Thickness			Inch		Metric		Expander Assembly		Roll Set (3 per set)	Expander Assembly		Roll Set (3 per set)	
	BWG	In	Metric	Min.	Max.	Min.	Max.	Flush	1/8" Recess		Flush	1/8" Recess		
3/8" (9.5mm)	14	0.083	2.11	0.203	0.235	5.16	5.96	23108	23108RA8	231R08-3	-	-	-	23M08
	15	0.072	1.83	0.226	0.261	5.74	6.64	23109	23109RA8	231R09-3	23209	23209RA8	232R09-3	23M09
	16	0.065	1.65	0.240	0.275	6.10	6.99	23110	23110RA8	231R10-3	23210	23210RA8	232R10-3	
	17	0.058	1.47	0.254	0.291	6.45	7.38	23111	23111RA8		23211	23211RA8		23M11
	18	0.049	1.24	0.269	0.306	6.83	7.77	23112	23112RA8	231R12-3	23212	23212RA8	232R12-3	
	19	0.042	1.07	0.283	0.325	7.19	8.27	23113	23113RA8	231R13-3	23213	23213RA8	232R13-3	23M13
	20	0.035	0.89	0.297	0.332	7.54	8.43	23114	23114RA8		23214	23214RA8		23M14
	21	0.032	0.81	0.303	0.338	7.70	8.60	23115	23115RA8	231R15-3	23215	23215RA8	232R15-3	
	22-23	0.028-0.025	0.71-0.64	0.309	0.351	7.85	8.92	23116	23116RA8	231R16-3	23216	23216RA8	232R16-3	23M16
	24-26	0.022-0.018	0.56-0.46	0.321	0.363	8.15	9.21	23117	23117RA8	231R17-3	23217	23217RA8	232R17-3	

Mandrel drive square size is 1/4"

3 Roll Expanders - 3" Reach														
Tube Size				Expansion Range				Tube Sheet (Min/Max Reach) 1/4"- 3" (6.4 - 76.2mm) Overall Roll Length 3/4" (19.1mm)			Tube Sheet (Min/Max Reach) 3/4" - 3" (19.1 - 76.2mm) Overall Roll Length 1-1/4" (31.8mm)			Common Mandrel
OD	Wall Thickness			Inch		Metric		Expander Assembly		Roll Set (3 per set)	Expander Assembly		Roll Set (3 per set)	
	BWG	In	Metric	Min.	Max.	Min.	Max.	Flush	1/8" Recess		Flush	1/8" Recess		
3/8" (9.5mm)	15	0.072	1.83	0.226	0.261	5.74	6.64	23109-3	23109RA8-3	231R09-3	23209-3	23209RA8-3	232R09-3	23M09-3
	16	0.065	1.65	0.240	0.275	6.10	6.99	23110-3	23110RA8-3	231R10-3	23210-3	23210RA8-3	232R10-3	
	17	0.058	1.47	0.254	0.291	6.45	7.38	23111-3	23111RA8-3		23211-3	23211RA8-3		23M11-3
	18	0.049	1.24	0.269	0.306	6.83	7.77	23112-3	23112RA8-3	231R12-3	23212-3	23212RA8-3	232R12-3	
	19	0.042	1.07	0.283	0.325	7.19	8.27	23113-3	23113RA8-3	231R13-3	23213-3	23213RA8-3	232R13-3	23M13-3
	20	0.035	0.89	0.297	0.332	7.54	8.43	23114-3	23114RA8-3		23214-3	23214RA8-3		23M14-3
	21	0.032	0.81	0.303	0.338	7.70	8.60	23115-3	23115RA8-3	231R15-3	23215-3	23215RA8-3	232R15-3	
	22-23	0.028-0.025	0.71-0.64	0.309	0.351	7.85	8.92	23116-3	23116RA8-3	231R16-3	23216-3	23216RA8-3	232R16-3	23M16-3
	24-26	0.022-0.018	0.56-0.46	0.321	0.363	8.15	9.21	23117-3	23117RA8-3	231R17-3	23217-3	23217RA8-3	232R17-3	

Mandrel drive square size is 1/4"

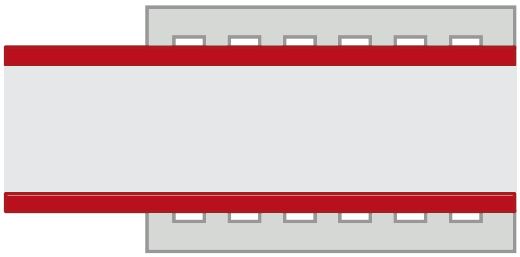
MADE IN USA



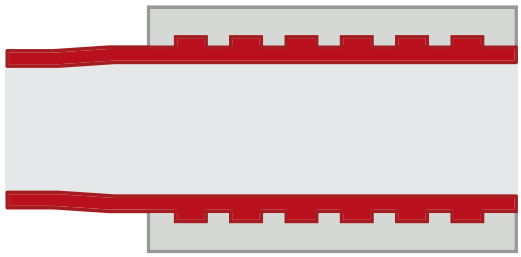
Tube Sheet Grooves

& How They Impact Expansion

Grooved tube sheets are the standard in most shell and tube heat exchanger applications. Providing both leak protection and improving the tube-to-tube sheet joints, grooves play an important role in prolonging the life of a tube and the efficiency of a vessel. However, in few applications where grooves are not required, there can be challenges during the tube expansion process. Learn the purpose of tube sheet grooves, industry specifications, and challenges that can occur in applications where grooves are not use.



tube not expanded



tube expanded into flanges

Leak Protection & Joint Strength

Tube Sheet grooves are serrations that are made in the tube sheet hole during manufacturing. Created using a CNC machine or a radial arm drill, these serrations are used to add additional leak path protection and improve tube to tube sheet joint strength. This is because the groove creates a path for the tube material to expand into, creating a tight mechanical joint. The use of grooves also allow operators to expand to a higher wall reduction percent, improving the effectiveness of the expansion in preventing leak paths from forming.

TEMA Specifications

Tubular Exchanger Manufacturers Association (TEMA) is a trade association made up of shell and tube heat exchanger manufacturers. The organization provides specifications for the fabrication of new shell and tube heat exchangers to ensure quality and consistency. When it comes to grooves, TEMA specifies that expanded joints for tubes 5/8" OD and larger shall be machined with 1 – 2 grooves depending on the tube sheet thickness. For tube sheets 1" and below, 1 groove is sufficient, while thicker tube sheets require 2 grooves.

In terms of groove placement, TEMA suggests that tube sheet grooves be 1/8" wide with a ¼" gap in-between. However, they leave the specific groove size and arrangement to the manufacturer's discretion, based on the vessel type and prior experience.

Exceptions to the Rule

While most shell and tube applications will have grooved tube sheets, there are some exceptions. First,

"any application with strength welded tube to tube sheet joints does not require the use of grooves."

This is because the strength weld is acting in a similar manner to prevent leaks and provide additional joint strength. Additionally, evaporators may not require tube sheet grooves depending on the type and the maximum allowable working pressure (MAWP). Since many evaporators have a very low working pressure, ~30-40 PSI, the benefits of grooves are not necessary. Instead, the vessel design may prioritize ease of maintenance and cost effectiveness instead.

Potential Challenges Expanding Un-Grooved Tube Sheets

One of the biggest challenges when expanding tubes without a grooved tube sheet is the potential for tube elongation. While this can occur in many different applications, it happens a lot quicker without grooves because the tube material has nowhere to go. Without a path for the material to expand into, the wall reduction that can be achieved in these applications is significantly lower than those with grooves. In general, customers can expect to see 3 – 4% of wall reduction depending on the type of tube and tube sheet material. Once that amount has been exceeded, any additional wall reduction will be a direct result of tube elongation. If the tubes grow too much, it can compromise the quality of the mechanical joint and cause damage to the tube or tube sheet hole.

In order to avoid excess elongation, operators are encouraged to start at a lower wall reduction and work their way up. This allows for additional room to re-roll the tube joints if they're under expanded at the time of hydro. Additionally, when

expanding tubes without grooved tube sheet holes, it's important to remember that measuring can be misleading. In most cases, it's highly encouraged to measure the tubes pre and post expansion. While this is still the case in these applications, it's important to keep in mind that the number may not indicate more wall reduction. At a certain point, as the percent wall reduction increases, any larger measurement in the tubes is likely a result of elongating rather than additional wall reduction.

A common method of identifying tube elongation is to visually look for growth. This can be done by monitoring the projection on the opposite side of the vessel, or by tracking the starting point of the tube. For example, some manufacturers will mark the OD of the tube where it meets the back side of the tube sheet. This allows operators to visually see if the tube starts to elongate, because the marked portion will move further and further away.

Overall, a majority of heat exchanger applications will have grooved tube sheet holes. This is because grooves improve leak protection and the tube-to-tube sheet joint. However, in some applications where grooves are not used, it's important to pay close attention to the wall reduction achieved. Overrolling can occur if wall reduction targets aren't adjusted to the application, as tube elongation is more likely. To avoid complications, be mindful of tube sheet grooves and the impact that they can have on the quality of the expansion.

24 Series
Heat Exchanger & Condenser Expanders

Tube Size
- 0.500” – 2.000” OD
- 12.7 mm – 50.8 mm OD

Proven Tool Life from the Inventor of the Tube Expander

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

24 Series Expanders are available in both standard and longer reaches. 4 and 5 roll expanders are also available for rolling thin wall stainless steel and titanium tubes.

24 Series Offerings:

Spares:
- Collars (page 45)
- Mandrels
- Roll Sets

Accessories:
- Lubricant (page 19)
- Rolling Motors and Torque Controls (page 62)

“Elliott’s 24 Series Tube Expanders have excellent tool life. They held consistent rolled ID numbers and are easy to adjust. I’m purchasing more immediately.”

-Jim Damon, Lean Manufacutring Engineer

Read Jim’s full story and more results reports at:
elliott-tool.com/24-series/results-reports

MADE IN USA

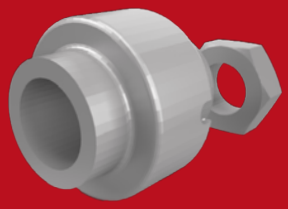
Elliott offers several types of collars for the 24 Series Condenser Expanders to accommodate all of your tube expansion job requirements.

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.	
Roll thin wall tubes flush with tube sheet.	Thin Wall Collar	Thin wall insert fits inside of the thin wall collar housing to prevent the thin wall tube from being drawn into the collar during expansion.	

Custom collars available upon request.

All New Jam Nut Style Collars

Elliott's standard collar will now feature a Jam Nut Style design. Optional collar kits are available for purchase during the transition.



MADE IN USA

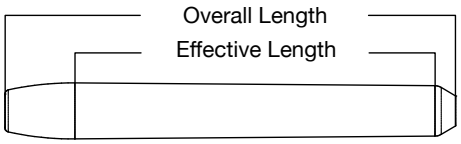
24 Series
3 Roll Expanders

Tube Size
- 0.500” – 2.000” OD
- 12.7 mm – 50.8 mm OD

3 Roll Expanders														
Tube Size				Expansion Range				Tube Sheet (Min/Max Reach) 0.500”-3.830” (12.7-97.3mm) Overall Roll Length 1-5/8” (41.3mm) **Overall Roll Length 1-1/2” (38.1mm)			Tube Sheet (Min/Max Reach) 1.250” - 4.200” (31.8-106.7mm) Overall Roll Length 2-3/8” (60.3mm) ***Overall Roll Length 2-1/4” (57.15mm)			Common Mandrel
OD	Wall Thickness			Inch		Metric		Expander Assembly		Roll Set (3 per set)	Expander Assembly		Roll Set (3 per set)	
	BWG	In	Metric	Min.	Max.	Min.	Max.	Flush	1/8" Recess		Flush	1/8" Recess		
1/2” (12.7mm)	13	0.095	2.41	0.305	0.340	7.7	8.6	24121	24121RB8	241R21-3**	24221	24221RB8	242R21-3***	24M21
	14	0.083	2.11	0.324	0.366	8.4	9.3	24122	24122RB8	241R22-3**	24222	24222RB8	242R22-3***	24M22
	15	0.072	1.83	0.346	0.386	8.8	9.7	24123	24123RA8		24223	24223RA8		24M23
	16-17	0.065-0.085	1.65-1.47	0.367	0.410	9.1	10.4	24124	24124RA8	241R24-3**	24224	24224RA8	242R24-3***	24M24
	18	0.049	1.24	0.392	0.447	10.0	11.3	24125	24125RA8	241R25-3**	24225	24225RA8	242R25-3***	24M25
	19-20	0.042-0.035	1.07-0.89	0.402	0.457	10.2	11.6	24126	24126RA8	241R26-3**	24226	24226RA8	242R26-3***	
	21-22	0.035-0.028	0.81-0.71	0.425	0.482	10.8	12.3	24127	24127RA8	241R27-3**	24227	24227RB8	242R27-3***	24M27
5/8” (15.9mm)	12	0.109	2.77	0.392	0.447	10.0	11.3	24125	24125RB8	241R25-3**	24225	24225RB8	242R25-3***	24M25
	13	0.095	2.41	0.425	0.482	10.8	12.3	24127	24127RB8	241R27-3**	24227	24227RB8	242R27-3***	24M27
	14	0.083	2.11	0.449	0.506	11.4	12.8	24128	24128RA8	241R28-3	24228	24228RA8	242R28-3	24M28
	15	0.072	1.83	0.471	0.524	12.0	13.3	24129	24129RA8	241R29-3	24229	24229RA8	242R29-3	24M29
	16	0.065	1.65	0.485	0.538	12.3	13.7	24129B	24129BRA8		24229B	24229BRA8		
	17	0.058	1.47	0.499	0.564	12.7	14.3	24130	24130RA8	241R30-3	24230	24230RA8	242R30-3	24M30
	18-19	0.049-0.042	1.24-1.07	0.517	0.584	13.1	14.8	24131	24131RA8	241R31-3	24231	24231RA8	242R31-3	24M31
	20-22	0.035-0.028	0.89-0.71	0.540	0.609	13.7	15.5	24132	24132RA8	241R32-3	24232	24232RA8	242R32-3	24M32
3/4” (19.1mm)	10	0.134	3.40	0.471	0.538	12.0	13.7	24129	24129RB8	241R29-3	24229	24229RB8	242R29-3	24M29
	11	0.120	3.05	0.499	0.564	12.7	14.3	24130	24130RB8	241R30-3	24230	24230RB8	242R30-3	24M30
	12	0.109	2.77	0.517	0.584	13.1	14.8	24131	24131RB8	241R31-3	24231	24231RB8	242R31-3	24M31
	13	0.095	2.41	0.540	0.609	13.7	15.5	24132	24132RB8	241R32-3	24232	24232RB8	242R32-3	24M32
	14	0.083	2.11	0.562	0.631	14.3	16.0	24133	24133RA8	241R33-3	24233	24233RA8	242R33-3	
	15-16	0.072-0.065	1.83-1.65	0.592	0.672	15.0	17.1	24134	24134RA8	241R34-3	24234	24234RA8	242R34-3	24M34
	17-18	0.058-0.049	1.47-1.24	0.620	0.697	15.7	17.7	24135	24135RA8	241R35-3	24235	24235RA8	242R35-3	24M35
	19-22	0.042-0.028	1.07-0.71	0.641	0.731	16.3	18.6	24136	24136RA8	241R36-3	24236	24236RA8	242R36-3	24M36
7/8” (22.2mm)	10	0.134	3.40	0.592	0.672	15.0	17.1	24134	24134RB8	241R34-3	24234	24234RB8	242R34-3	24M34
	11	0.120	3.05	0.620	0.697	15.7	17.7	24135	24135RB8	241R35-3	24235	24235RB8	242R35-3	24M35
	12	0.109	2.77	0.641	0.731	16.3	18.6	24136	24136RB8	241R36-3	24236	24236RB8	242R36-3	
	13	0.095	2.41	0.655	0.745	16.6	18.9	24138	24138RA8	241R38-3	24238	24238RA8	242R38-3	24M36
	14	0.083	2.11	0.675	0.765	17.1	19.4	24139	24139RA8	241R39-3	24239	24239RA8	242R39-3	
	15-16	0.072-0.065	1.83-1.65	0.715	0.800	18.2	20.3	24140	24140RA8		24240	24240RA8		24M40
	17-19	0.058-0.049	1.47-1.07	0.743	0.828	18.9	21.0	24141	24141RA8	241R41-3	24241	24241RA8	242R41-3	
	20-22	0.035-0.028	0.89-0.71	0.795	0.865	20.2	22.0	24142	24142RA8	241R42-3	24242	24242RA8	242R42-3	24M42
1” (25.4mm)	8	0.165	4.19	0.655	0.745	16.6	18.9	24138	24138RB8	241R38-3	24238	24238RB8	242R38-3	24M36
	9	0.148	3.76	0.675	0.765	17.1	19.4	24139	24139RB8	241R39-3	24239	24239RB8	242R39-3	
	10	0.134	3.40	0.715	0.800	18.2	20.3	24140	24140RB8		24240	24240RB8		24M40
	11	0.120	3.05	0.743	0.828	18.9	21.0	24141	24141RB8	241R41-3	24241	24241RB8	242R41-3	
	12-13	0.109-0.095	2.77-2.41	0.769	0.866	19.5	22.0	24143	24143RA8	241R42-3	24243	24243RA8	242R42-3	24M43
	14	0.083	2.11	0.799	0.896	20.3	22.7	24144	24144RA8	241R44-3	24244	24244RA8	242R44-3	
	15-16	0.072-0.065	1.83-1.65	0.841	0.922	21.4	23.4	24145	24145RA8		24245	24245RA8		24M45*
	17-19	0.058-0.042	1.47-1.07	0.872	0.968	22.1	24.6	24146	24146RA8	241R46-3	24246	24246RA8	242R46-3	24M46*
	20-22	0.035-0.028	0.89-0.71	0.894	0.990	22.7	25.2	24147	24147RA8	241R47-3	24247	24247RA8	242R47-3	

MADE IN USA

Mandrel drive square size is 3/8” **Mandrel drive square size is 1/2”* ***Mandrel drive square size is 3/4”*



Roll Part Number	Overall Roll Length	Effective Roll Length
241R21 - 241R27	1.500" (38.1mm)	1.187" (30.1mm)
241R28 - 241R42	1.625" (41.3mm)	1.301" (33.0mm)
241R43 - 241R69		1.239" (31.5mm)
242R21 - 242R27	2.250" (57.2mm)	1.937" (49.2mm)
242R28 - 242R42	2.365" (60.3mm)	2.051" (52.1mm)
242R43 - 242R69		1.989" (50.5mm)

3 Roll Expanders														
Tube Size				Expansion Range				Tube Sheet (Min/Max Reach) 0.500"-3.830" (12.7-97.3mm) Overall Roll Length 1-5/8" (41.3mm) **Overall Roll Length 1-1/2" (38.1mm)			Tube Sheet (Min/Max Reach) 1.250" - 4.200" (31.8-106.7mm) Overall Roll Length 2-3/8" (60.3mm) ***Overall Roll Length 2-1/4" (57.15mm)			Common Mandrel
OD	Wall Thickness			Inch		Metric		Expander Assembly		Roll Set (3 per set)	Expander Assembly		Roll Set (3 per set)	
	BWG	In	Metric	Min.	Max.	Min.	Max.	Flush	1/8" Recess		Flush	1/8" Recess		
1-1/8" (28.6mm)	8	0.165	4.19	0.769	0.866	19.5	22.0	24143	24143RB8	241R42-3	24243	24243RB8	242R42-3	24M43
	9	0.148	3.76	0.799	0.896	20.3	22.7	24144	24144RB8	241R44-3	24244	24244RB8	242R44-3	
	10	0.134	3.40	0.841	0.922	21.4	23.4	24145	24145RB8		24245	24245RB8		24M45*
	11-12	0.120-0.109	3.05-2.77	0.872	0.968	22.1	24.6	24146	24146RB8	241R46-3	24246	24246RB8	242R46-3	24M46*
	13	0.095	2.41	0.894	1.009	22.7	25.6	24149	24149RA8	241R47-3	24249	24249RA8	242R47-3	24M49*
	14-15	0.083-0.072	2.11-1.83	0.924	1.039	23.5	26.4	24150	24150RA8	241R50-3	24250	24250RA8	242R50-3	
	16-18	0.065-0.049	1.65-1.24	0.978	1.078	24.8	27.4	24151	24151RA8		24251	24251RA8		24M51*
	19-22	0.042-0.028	1.07-0.71	1.016	1.116	25.8	28.4	24152	24152RA8	241R52-3	24252	24252RA8	242R52-3	
1-1/4" (31.8mm)	8	0.165	4.19	0.894	1.009	22.7	25.6	24149	24149RB8	241R47-3	24249	24249RB8	242R47-3	24M49*
	9	0.148	3.76	0.924	1.039	23.5	26.4	24150	24150RB8	241R50-3	24250	24250RB8	242R50-3	
	10-11	0.134-0.120	3.40-3.05	0.962	1.083	24.4	27.5	24153	24153RA8	241R53-3	24253	24253RA8	242R53-3	24M53*
	12-13	0.109-0.095	2.77-2.41	1.012	1.128	25.7	28.7	24155	24155RA8	241R52-3	24255	24255RA8	242R52-3	24M55*
	14-17	0.083-0.058	2.11-1.47	1.066	1.195	27.1	30.3	24156	24156RA8	241R56-3	24256	24256RA8	242R56-3	24M56*
	18-22	0.049-0.028	1.24-0.71	1.112	1.240	28.2	31.5	24157	24157RA8	241R57-3	24257	24257RA8	242R57-3	
1-3/8" (34.9mm)	8	0.165	4.19	1.012	1.128	25.7	28.7	24155	24155RB8	241R52-3	24255	24255RB8	242R52-3	24M55*
	9-10	0.148-0.134	3.76-3.40	1.066	1.195	27.1	30.3	24156	24156RB8	241R56-3	24256	24256RB8	242R56-3	24M56*
	11	0.120	3.05	1.115	1.218	28.3	30.9	24158	24158RA8	241R58-3	24258	24258RA8	242R58-3	24M58*
	12-13	0.109-0.095	2.77-2.41	1.127	1.263	28.6	32.1	24159	24159RA8	241R57-3	24259	24259RA8	242R57-3	24M59*
	14-17	0.083-0.058	2.11-1.47	1.180	1.322	30.0	33.6	24160	24160RA8	241R60-3	24260	24260RA8	242R60-3	24M60*
	18-22	0.049-0.028	1.24-0.71	1.224	1.365	31.1	34.7	24161	24161RA8	241R61-3	24261	24261RA8	242R61-3	
1-1/2" (38.1mm)	8	0.165	4.19	1.127	1.263	28.6	32.1	24159	24159RB8	241R57-3	24259	24259RB8	242R57-3	24M59*
	9-10	0.148-0.134	3.76-3.40	1.180	1.322	30.0	33.6	24160	24160RB8	241R60-3	24260	24260RB8	242R60-3	24M60*
	11-12	0.120-0.109	3.05-2.77	1.224	1.365	31.1	34.7	24161	24161RB8	241R61-3	24261	24261RB8	242R61-3	
	13-14	0.095-0.083	2.41-2.11	1.285	1.415	32.6	35.9	24163	24163RA8		24263	24263RA8		24M63*
	15-17	0.072-0.058	1.83-1.47	1.325	1.455	33.7	36.9	24164	24164RA8	241R64-3	24264	24264RA8	242R64-3	
	18-22	0.049-0.028	1.24-0.71	1.361	1.490	34.6	37.9	24165	24165RA8	241R65-3	24265	24265RA8	242R65-3	
1-3/4" (44.5mm)	14-16	0.083-0.065	2.11-1.65	1.534	1.700	38.9	43.7	24166	24166RA8	241R66-3	24266	24266RA8		24M66**
2" (50.8mm)	13-16	0.095-0.065	2.41-1.65	1.750	1.952	44.0	49.6	24167	24167RA8	241R67-3	24267	24267RA8	242R67-3	24M67**
	17-22	0.058-0.028	1.47-0.71	1.848	1.990	46.9	50.5	24169	24169RA8		24269	24169RA8		24M69**

Mandrel drive square size is 3/8" **Mandrel drive square size is 1/2"* ***Mandrel drive square size is 3/4"*

MADE IN USA

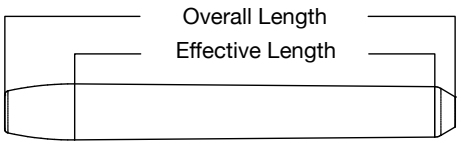
24 Series
3 Roll Expanders - 8” Reach

Tube Size
- 0.500” to 2.000” OD
- (12.7 to 50.8mm) OD

3 Roll Expanders														
Tube Size				Expansion Range				Tube Sheet (Min/Max Reach) 0.500”-7.830” (12.7-198.9mm) Overall Roll Length 1-5/8” (41.3mm) **Overall Roll Length 1-1/2” (38.1mm)			Tube Sheet (Min/Max Reach) 1.250” - 8.200” (31.8-208.3mm) Overall Roll Length 2-3/8” (60.3mm) ***Overall Roll Length 2-1/4” (57.15mm)			Common Mandrel
OD	Wall Thickness			Inch		Metric		Expander Assembly		Roll Set (3 per set)	Expander Assembly		Roll Set (3 per set)	
	BWG	In	Metric	Min.	Max.	Min.	Max.	Flush	1/8" Recess		Flush	1/8" Recess		
1/2” (12.7mm)	13	0.095	2.41	0.305	0.340	7.7	8.6	24121-8	24121RB8-8	241R21-3**	24221-8	24221RB8-8	242R21-3***	24M21-8
	14	0.083	2.11	0.324	0.366	8.4	9.3	24122-8	24122RB8-8	241R22-3**	24222-8	24222RB8-8	242R22-3***	24M22-8
	15	0.072	1.83	0.346	0.386	8.8	9.7	24123-8	24123RA8-8		24223-8	24223RA8-8		24M23-8
	16-17	0.065-0.085	1.65-1.47	0.367	0.410	9.1	10.4	24124-8	24124RA8-8	241R24-3**	24224-8	24224RA8-8	242R24-3***	24M24-8
	18	0.049	1.24	0.392	0.447	10.0	11.3	24125-8	24125RA8-8	241R25-3**	24225-8	24225RA8-8	242R25-3***	24M25-8
	19-20	0.042-0.035	1.07-0.89	0.402	0.457	10.2	11.6	24126-8	24126RA8-8	241R26-3**	24226-8	24226RA8-8	242R26-3***	
	21-22	0.035-0.028	0.81-0.71	0.425	0.482	10.8	12.3	24127-8	24127RA8-8	241R27-3**	24227-8	24227RA8-8	242R27-3***	24M27-8
5/8” (15.9mm)	12	0.109	2.77	0.392	0.447	10.0	11.3	24125-8	24125RB8-8	241R25-3**	24225-8	24225RB8-8	242R25-3***	24M25-8
	13	0.095	2.41	0.425	0.482	10.8	12.3	24127-8	24127RB8-8	241R27-3**	24227-8	24227RB8-8	242R27-3***	24M27-8
	14	0.083	2.11	0.449	0.506	11.4	12.8	24128-8	24128RA8-8	241R28-3	24228-8	24228RA8-8	242R28-3	24M28-8
	15	0.072	1.83	0.471	0.524	12.0	13.3	24129-8	24129RA8-8	241R29-3	24229-8	24229RA8-8	242R29-3	24M29-8
	16	0.065	1.65	0.485	0.538	12.3	13.7	24129B-8	24129BRA8-8		24229B-8	24229BRA8-8		
	17	0.058	1.47	0.499	0.564	12.7	14.3	24130-8	24130RA8-8	241R30-3	24230-8	24230RA8-8	242R30-3	24M30-8
	18-19	0.049-0.042	1.24-1.07	0.517	0.584	13.1	14.8	24131-8	24131RA8-8	241R31-3	24231-8	24231RA8-8	242R31-3	24M31-8
	20-22	0.035-0.028	0.89-0.71	0.540	0.609	13.7	15.5	24132-8	24132RA8-8	241R32-3	24232-8	24232RA8-8	242R32-3	24M32-8
3/4” (19.1mm)	10	0.134	3.40	0.471	0.538	12.0	13.7	24129-8	24129RB8-8	241R29-3	24229-8	24229RB8-8	242R29-3	24M29-8
	11	0.120	3.05	0.499	0.564	12.7	14.3	24130-8	24130RB8-8	241R30-3	24230-8	24230RB8-8	242R30-3	24M30-8
	12	0.109	2.77	0.517	0.584	13.1	14.8	24131-8	24131RB8-8	241R31-3	24231-8	24231RB8-8	242R31-3	24M31-8
	13	0.095	2.41	0.540	0.609	13.7	15.5	24132-8	24132RB8-8	241R32-3	24232-8	24232RB8-8	242R32-3	24M32-8
	14	0.083	2.11	0.562	0.631	14.3	16.0	24133-8	24133RA8-8	241R33-3	24233-8	24233RA8-8	242R33-3	
	15-16	0.072-0.065	1.83-1.65	0.592	0.672	15.0	17.1	24134-8	24134RA8-8	241R34-3	24234-8	24234RA8-8	242R34-3	24M34-8
	17-18	0.058-0.049	1.47-1.24	0.620	0.697	15.7	17.7	24135-8	24135RA8-8	241R35-3	24235-8	24235RA8-8	242R35-3	24M35-8
	19-22	0.042-0.028	1.07-0.71	0.641	0.731	16.3	18.6	24136-8	24136RA8-8	241R36-3	24236-8	24236RA8-8	242R36-3	24M36-8
7/8” (22.2mm)	10	0.134	3.40	0.592	0.672	15.0	17.1	24134-8	24134RB8-8	241R34-3	24234-8	24234RB8-8	242R34-3	24M34-8
	11	0.120	3.05	0.620	0.697	15.7	17.7	24135-8	24135RB8-8	241R35-3	24235-8	24235RB8-8	242R35-3	24M35-8
	12	0.109	2.77	0.641	0.731	16.3	18.6	24136-8	24136RB8-8	241R36-3	24236-8	24236RB8-8	242R36-3	
	13	0.095	2.41	0.655	0.745	16.6	18.9	24138-8	24138RA8-8	241R38-3	24238-8	24238RA8-8	242R38-3	24M36-8
	14	0.083	2.11	0.675	0.765	17.1	19.4	24139-8	24139RA8-8	241R39-3	24239-8	24239RA8-8	242R39-3	
	15-16	0.072-0.065	1.83-1.65	0.715	0.800	18.2	20.3	24140-8	24140RA8-8		24240-8	24240RA8-8		24M40-8
	17-19	0.058-0.049	1.47-1.07	0.743	0.828	18.9	21.0	24141-8	24141RA8-8	241R41-3	24241-8	24241RA8-8	242R41-3	
	20-22	0.035-0.028	0.89-0.71	0.795	0.865	20.2	22.0	24142-8	24142RA8-8	241R42-3	24242-8	24242RA8-8	242R42-3	24M42-8
1” (25.4mm)	8	0.165	4.19	0.655	0.745	16.6	18.9	24138-8	24138RB8-8	241R38-3	24238-8	24238RB8-8	242R38-3	24M36-8
	9	0.148	3.76	0.675	0.765	17.1	19.4	24139-8	24139RB8-8	241R39-3	24239-8	24239RB8-8	242R39-3	
	10	0.134	3.40	0.715	0.800	18.2	20.3	24140-8	24140RB8-8		24240-8	24240RB8-8		24M40-8
	11	0.120	3.05	0.743	0.828	18.9	21.0	24141-8	24141RB8-8	241R41-3	24241-8	24241RB8-8	242R41-3	
	12-13	0.109-0.095	2.77-2.41	0.769	0.866	19.5	22.0	24143-8	24143RA8-8	241R42-3	24243-8	24243RA8-8	242R42-3	24M43-8
	14	0.083	2.11	0.799	0.896	20.3	22.7	24144-8	24144RA8-8	241R44-3	24244-8	24244RA8-8	242R44-3	
	15-16	0.072-0.065	1.83-1.65	0.841	0.922	21.4	23.4	24145-8	24145RA8-8		24245-8	24245RA8-8		24M45-8*
	17-19	0.058-0.042	1.47-1.07	0.872	0.968	22.1	24.6	24146-8	24146RA8-8	241R46-3	24246-8	24246RA8-8	242R46-3	24M46-8*
	20-22	0.035-0.028	0.89-0.71	0.894	0.990	22.7	25.2	24147-8	24147RA8-8	241R47-3	24247-8	24247RA8-8	242R47-3	

MADE IN USA

*Mandrel drive square size is 3/8”. *Mandrel drive square size is 1/2”. **Mandrel drive square size is 3/4”.*



Roll Part Number	Overall Roll Length	Effective Roll Length
241R21 - 241R27	1.500" (38.1mm)	1.187" (30.1mm)
241R28 - 241R42	1.625" (41.3mm)	1.301" (33.0mm)
241R43 - 241R69		1.239” (31.5mm)
242R21 - 242R27	2.250" (57.2mm)	1.937" (49.2mm)
242R28 - 242R42	2.365” (60.3mm)	2.051” (52.1mm)
242R43 - 242R69		1.989” (50.5mm)

3 Roll Expanders

Tube Size				Expansion Range				Tube Sheet (Min/Max Reach) 0.500”-7.830” (12.7-198.9mm) Overall Roll Length 1-5/8” (41.3mm) **Overall Roll Length 1-1/2” (38.1mm)			Tube Sheet (Min/Max Reach) 1.250” - 8.200” (31.8-208.3mm) Overall Roll Length 2-3/8” (60.3mm) ***Overall Roll Length 2-1/4” (57.15mm)			Common Mandrel
OD	Wall Thickness			Inch		Metric		Expander Assembly		Roll Set (3 per set)	Expander Assembly		Roll Set (3 per set)	
	BWG	In	Metric	Min.	Max.	Min.	Max.	Flush	1/8" Recess		Flush	1/8" Recess		
1-1/8” (28.6mm)	8	0.165	4.19	0.769	0.866	19.5	22.0	24143-8	24143RB8-8	241R42-3	24243-8	24243RB8-8	242R42-3	24M43-8
	9	0.148	3.76	0.799	0.896	20.3	22.7	24144-8	24144RB8-8	241R44-3	24244-8	24244RB8-8	242R44-3	
	10	0.134	3.40	0.841	0.922	21.4	23.4	24145-8	24145RB8-8		24245-8	24245RB8-8		24M45-8*
	11-12	0.120-0.109	3.05-2.77	0.872	0.968	22.1	24.6	24146-8	24146RB8-8	241R46-3	24246-8	24246RB8-8	242R46-3	24M46-8*
	13	0.095	2.41	0.894	1.009	22.7	25.6	24149-8	24149RA8-8	241R47-3	24249-8	24249RA8-8	242R47-3	24M49-8*
	14-15	0.083-0.072	2.11-1.83	0.924	1.039	23.5	26.4	24150-8	24150RA8-8	241R50-3	24250-8	24250RA8-8	242R50-3	
	16-18	0.065-0.049	1.65-1.24	0.978	1.078	24.8	27.4	24151-8	24151RA8-8		24251-8	24251RA8-8		24M51-8*
	19-22	0.042-0.028	1.07-0.71	1.016	1.116	25.8	28.4	24152-8	24152RA8-8	241R52-3	24252-8	24252RA8-8	242R52-3	
1-1/4” (31.8mm)	8	0.165	4.19	0.894	1.009	22.7	25.6	24149-8	24149RB8-8	241R47-3	24249-8	24249RB8-8	242R47-3	24M49-8*
	9	0.148	3.76	0.924	1.039	23.5	26.4	24150-8	24150RB8-8	241R50-3	24250-8	24250RB8-8	242R50-3	
	10-11	0.134-0.120	3.40-3.05	0.962	1.083	24.4	27.5	24153-8	24153RA8-8	241R53-3	24253-8	24253RA8-8	242R53-3	24M53-8*
	12-13	0.109-0.095	2.77-2.41	1.012	1.128	25.7	28.7	24155-8	24155RA8-8	241R52-3	24255-8	24255RA8-8	242R52-3	24M55-8*
	14-17	0.083-0.058	2.11-1.47	1.066	1.195	27.1	30.3	24156-8	24156RA8-8	241R56-3	24256-8	24256RA8-8	242R56-3	24M56-8*
	18-22	0.049-0.028	1.24-0.71	1.112	1.240	28.2	31.5	24157-8	24157RA8-8	241R57-3	24257-8	24257RA8-8	242R57-3	
1-3/8” (34.9mm)	8	0.165	4.19	1.012	1.128	25.7	28.7	24155-8	24155RB8-8	241R52-3	24255-8	24255RB8-8	242R52-3	24M55-8*
	9-10	0.148-0.134	3.76-3.40	1.066	1.195	27.1	30.3	24156-8	24156RB8-8	241R56-3	24256-8	24256RB8-8	242R56-3	24M56-8*
	11	0.120	3.05	1.115	1.218	28.3	30.9	24158-8	24158RA8-8	241R58-3	24258-8	24258RA8-8	242R58-3	24M58-8*
	12-13	0.109-0.095	2.77-2.41	1.127	1.263	28.6	32.1	24159-8	24159RA8-8	241R57-3	24259-8	24259RA8-8	242R57-3	24M59-8*
	14-17	0.083-0.058	2.11-1.47	1.180	1.322	30.0	33.6	24160-8	24160RA8-8	241R60-3	24260-8	24260RA8-8	242R60-3	24M60-8*
	18-22	0.049-0.028	1.24-0.71	1.224	1.365	31.1	34.7	24161-8	24161RA8-8	241R61-3	24261-8	24261RA8-8	242R61-3	
1-1/2” (38.1mm)	8	0.165	4.19	1.127	1.263	28.6	32.1	24159-8	24159RB8-8	241R57-3	24259-8	24259RB8-8	242R57-3	24M59-8*
	9-10	0.148-0.134	3.76-3.40	1.180	1.322	30.0	33.6	24160-8	24160RB8-8	241R60-3	24260-8	24260RB8-8	242R60-3	24M60-8*
	11-12	0.120-0.109	3.05-2.77	1.224	1.365	31.1	34.7	24161-8	24161RB8-8	241R61-3	24261-8	24261RB8-8	242R61-3	
	13-14	0.095-0.083	2.41-2.11	1.285	1.415	32.6	35.9	24163-8	24163RA8-8		24263-8	24263RA8-8		
	15-17	0.072-0.058	1.83-1.47	1.325	1.455	33.7	36.9	24164-8	24164RA8-8	241R64-3	24264-8	24264RA8-8	242R64-3	24M63-8*
	18-22	0.049-0.028	1.24-0.71	1.361	1.490	34.6	37.9	24165-8	24165RA8-8	241R65-3	24265-8	24265RA8-8		
1-3/4” (44.5mm)	14-16	0.083-0.065	2.11-1.65	1.534	1.700	38.9	43.7	24166-8	24166RA8-8	241R66-3	24266-8	24266RA8-8	242R65-3	24M66-8**
2” (50.8mm)	13-16	0.095-0.065	2.41-1.65	1.750	1.952	44.0	49.6	24167-8	24167RA8-8	241R67-3	24267-8	24267RA8-8	242R67-3	24M67-8**
	17-22	0.058-0.028	1.47-0.71	1.848	1.990	46.9	50.5	24169-8	24169RA8-8		24269-8	24169RA8-8		24M69-8**

MADE IN USA

24 Series
3 Roll Expanders - 12” Reach

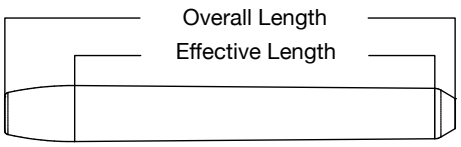
Tube Size
- 0.500” to 2.000” OD
- (12.7 to 50.8mm) OD

3 Roll Expanders														
Tube Size				Expansion Range				Tube Sheet (Min/Max Reach) 1.500”-11.830” (38.1-300.5mm) Overall Roll Length 1-5/8” (41.3mm) **Overall Roll Length 1-1/2” (38.1mm)			Tube Sheet (Min/Max Reach) 2.250” - 12.200” (57.2-309.9mm) Overall Roll Length 2-3/8” (60.3mm) ***Overall Roll Length 2-1/4” (57.15mm)			Common Mandrel
OD	Wall Thickness			Inch		Metric		Expander Assembly		Roll Set (3 per set)	Expander Assembly		Roll Set (3 per set)	
	BWG	In	Metric	Min.	Max.	Min.	Max.	Flush	1/8" Recess		Flush	1/8" Recess		
1/2” (12.7mm)	14	0.083	2.11	0.324	0.366	8.4	9.3	24122-12	24122RB8-12	241R22-3**	24222-12	24222RB8-12	242R22-3***	24M22-12
	15	0.072	1.83	0.346	0.386	8.8	9.7	24123-12	24123RA8-12		24223-12	24223RA8-12		24M23-12
	16-17	0.065-0.085	1.65-1.47	0.367	0.410	9.1	10.4	24124-12	24124RA8-12	241R24-3**	24224-12	24224RA8-12	242R24-3***	24M24-12
	18	0.049	1.24	0.392	0.447	10.0	11.3	24125-12	24125RA8-12	241R25-3**	24225-12	24225RA8-12	242R25-3***	24M25-12
	19-20	0.042-0.035	1.07-0.89	0.402	0.457	10.2	11.6	24126-12	24126RA8-12	241R26-3**	24226-12	24226RA8-12	242R26-3***	
	21-22	0.035-0.028	0.81-0.71	0.425	0.482	10.8	12.3	24127-12	24127RA8-12	241R27-3**	24227-12	24227RA8-12	242R27-3***	24M27-12
5/8” (15.9mm)	12	0.109	2.77	0.392	0.447	10.0	11.3	24125-12	24125RB8-12	241R25-3**	24225-12	24225RB8-12	242R25-3***	24M25-12
	13	0.095	2.41	0.425	0.482	10.8	12.3	24127-12	24127RB8-12	241R27-3**	24227-12	24227RB8-12	242R27-3***	24M27-12
	14	0.083	2.11	0.449	0.506	11.4	12.8	24128-12	24128RA8-12	241R28-3	24228-12	24228RA8-12	242R28-3	24M28-12
	15	0.072	1.83	0.471	0.524	12.0	13.3	24129-12	24129RA8-12	241R29-3	24229-12	24229RA8-12	242R29-3	24M29-12
	16	0.065	1.65	0.485	0.538	12.3	13.7	24129B-12	24129BRA8-12		24229B-12	24229BRA8-12		
	17	0.058	1.47	0.499	0.564	12.7	14.3	24130-12	24130RA8-12	241R30-3	24230-12	24230RA8-12	242R30-3	24M30-12
	18-19	0.049-0.042	1.24-1.07	0.517	0.584	13.1	14.8	24131-12	24131RA8-12	241R31-3	24231-12	24231RA8-12	242R31-3	24M31-12
	20-22	0.035-0.028	0.89-0.71	0.540	0.609	13.7	15.5	24132-12	24132RA8-12	241R32-3	24232-12	24232RA8-12	242R32-3	24M32-12
3/4” (19.1mm)	10	0.134	3.40	0.471	0.538	12.0	13.7	24129-12	24129RB8-12	241R29-3	24229-12	24229RB8-12	242R29-3	24M29-12
	11	0.120	3.05	0.499	0.564	12.7	14.3	24130-12	24130RB8-12	241R30-3	24230-12	24230RB8-12	242R30-3	24M30-12
	12	0.109	2.77	0.517	0.584	13.1	14.8	24131-12	24131RB8-12	241R31-3	24231-12	24231RB8-12	242R31-3	24M31-12
	13	0.095	2.41	0.540	0.609	13.7	15.5	24132-12	24132RB8-12	241R32-3	24232-12	24232RB8-12	242R32-3	24M32-12
	14	0.083	2.11	0.562	0.631	14.3	16.0	24133-12	24133RA8-12	241R33-3	24233-12	24233RA8-12	242R33-3	
	15-16	0.072-0.065	1.83-1.65	0.592	0.672	15.0	17.1	24134-12	24134RA8-12	241R34-3	24234-12	24234RA8-12	242R34-3	24M34-12
	17-18	0.058-0.049	1.47-1.24	0.620	0.697	15.7	17.7	24135-12	24135RA8-12	241R35-3	24235-12	24235RA8-12	242R35-3	24M35-12
	19-22	0.042-0.028	1.07-0.71	0.641	0.731	16.3	18.6	24136-12	24136RA8-12	241R36-3	24236-12	24236RA8-12	242R36-3	24M36-12
7/8” (22.2mm)	10	0.134	3.40	0.592	0.672	15.0	17.1	24134-12	24134RB8-12	241R34-3	24234-12	24234RB8-12	242R34-3	24M34-12
	11	0.120	3.05	0.620	0.697	15.7	17.7	24135-12	24135RB8-12	241R35-3	24235-12	24235RB8-12	242R35-3	24M35-12
	12	0.109	2.77	0.641	0.731	16.3	18.6	24136-12	24136RB8-12	241R36-3	24236-12	24236RB8-12	242R36-3	
	13	0.095	2.41	0.655	0.745	16.6	18.9	24138-12	24138RA8-12	241R38-3	24238-12	24238RA8-12	242R38-3	24M36-12
	14	0.083	2.11	0.675	0.765	17.1	19.4	24139-12	24139RA8-12	241R39-3	24239-12	24239RA8-12	242R39-3	
	15-16	0.072-0.065	1.83-1.65	0.715	0.800	18.2	20.3	24140-12	24140RA8-12		24240-12	24240RA8-12		24M40-12
	17-19	0.058-0.049	1.47-1.07	0.743	0.828	18.9	21.0	24141-12	24141RA8-12	241R41-3	24241-12	24241RA8-12	242R41-3	
	20-22	0.035-0.028	0.89-0.71	0.795	0.865	20.2	22.0	24142-12	24142RA8-12	241R42-3	24242-12	24242RA8-12	242R42-3	24M42-12
1” (25.4mm)	8	0.165	4.19	0.655	0.745	16.6	18.9	24138-12	24138RB8-12	241R38-3	24238-12	24238RB8-12	242R38-3	24M36-12
	9	0.148	3.76	0.675	0.765	17.1	19.4	24139-12	24139RB8-12	241R39-3	24239-12	24239RB8-12	242R39-3	
	10	0.134	3.40	0.715	0.800	18.2	20.3	24140-12	24140RB8-12		24240-12	24240RB8-12		24M40-12
	11	0.120	3.05	0.743	0.828	18.9	21.0	24141-12	24141RB8-12	241R41-3	24241-12	24241RB8-12	242R41-3	
	12-13	0.109-0.095	2.77-2.41	0.769	0.866	19.5	22.0	24143-12	24143RA8-12	241R42-3	24243-12	24243RA8-12	242R42-3	24M43-12
	14	0.083	2.11	0.799	0.896	20.3	22.7	24144-12	24144RA8-12	241R44-3	24244-12	24244RA8-12	242R44-3	
	15-16	0.072-0.065	1.83-1.65	0.841	0.922	21.4	23.4	24145-12	24145RA8-12		24245-12	24245RA8-12		24M45-12*
	17-19	0.058-0.042	1.47-1.07	0.872	0.968	22.1	24.6	24146-12	24146RA8-12	241R46-3	24246-12	24246RA8-12	242R46-3	24M46-12*
	20-22	0.035-0.028	0.89-0.71	0.894	0.990	22.7	25.2	24147-12	24147RA8-12	241R47-3	24247-12	24247RA8-12	242R47-3	

MADE IN USA

*Mandrel drive square size is 3/8”. *Mandrel drive square size is 1/2”. **Mandrel drive square size is 3/4”.*

Extended reaches available upon request.



Roll Part Number	Overall Roll Length	Effective Roll Length
241R21 - 241R27	1.500" (38.1mm)	1.187" (30.1mm)
241R28 - 241R42	1.625" (41.3mm)	1.301" (33.0mm)
241R43 - 241R69		1.239" (31.5mm)
242R21 - 242R27	2.250" (57.2mm)	1.937" (49.2mm)
242R28 - 242R42	2.365" (60.3mm)	2.051" (52.1mm)
242R43 - 242R69		1.989" (50.5mm)

3 Roll Expanders

Tube Size				Expansion Range				Tube Sheet (Min/Max Reach) 1.500”-11.830” (38.1-300.5mm) Overall Roll Length 1-5/8” (41.3mm) **Overall Roll Length 1-1/2” (38.1mm)			Tube Sheet (Min/Max Reach) 2.250” - 12.200” (57.2-309.9mm) Overall Roll Length 2-3/8” (60.3mm) ***Overall Roll Length 2-1/4” (57.15mm)			Common Mandrel
OD	Wall Thickness			Inch		Metric		Expander Assembly		Roll Set (3 per set)	Expander Assembly		Roll Set (3 per set)	
	BWG	In	Metric	Min.	Max.	Min.	Max.	Flush	1/8" Recess		Flush	1/8" Recess		
1-1/8” (28.6mm)	8	0.165	4.19	0.769	0.866	19.5	22.0	24143-12	24143RB8-12	241R42-3	24243-12	24243RB8-12	242R42-3	24M43-12
	9	0.148	3.76	0.799	0.896	20.3	22.7	24144-12	24144RB8-12	241R44-3	24244-12	24244RB8-12	242R44-3	
	10	0.134	3.40	0.841	0.922	21.4	23.4	24145-12	24145RB8-12		24245-12	24245RB8-12		24M45-12*
	11-12	0.120-0.109	3.05-2.77	0.872	0.968	22.1	24.6	24146-12	24146RB8-12	241R46-3	24246-12	24246RB8-12	242R46-3	24M46-12*
	13	0.095	2.41	0.894	1.009	22.7	25.6	24149-12	24149RA8-12	241R47-3	24249-12	24249RA8-12	242R47-3	24M49-12*
	14-15	0.083-0.072	2.11-1.83	0.924	1.039	23.5	26.4	24150-12	24150RA8-12	241R50-3	24250-12	24250RA8-12	242R50-3	
	16-18	0.065-0.049	1.65-1.24	0.978	1.078	24.8	27.4	24151-12	24151RA8-12		24251-12	24251RA8-12		24M51-12*
	19-22	0.042-0.028	1.07-0.71	1.016	1.116	25.8	28.4	24152-12	24152RA8-12	241R52-3	24252-12	24252RA8-12	242R52-3	
1-1/4” (31.8mm)	8	0.165	4.19	0.894	1.009	22.7	25.6	24149-12	24149RB8-12	241R47-3	24249-12	24249RB8-12	242R47-3	24M49-12*
	9	0.148	3.76	0.924	1.039	23.5	26.4	24150-12	24150RB8-12	241R50-3	24250-12	24250RB8-12	242R50-3	
	10-11	0.134-0.120	3.40-3.05	0.962	1.083	24.4	27.5	24153-12	24153RA8-12	241R53-3	24253-12	24253RA8-12	242R53-3	24M53-12*
	12-13	0.109-0.095	2.77-2.41	1.012	1.128	25.7	28.7	24155-12	24155RA8-12	241R52-3	24255-12	24255RA8-12	242R52-3	24M55-12*
	14-17	0.083-0.058	2.11-1.47	1.066	1.195	27.1	30.3	24156-12	24156RA8-12	241R56-3	24256-12	24256RA8-12	242R56-3	24M56-12*
	18-22	0.049-0.028	1.24-0.71	1.112	1.240	28.2	31.5	24157-12	24157RA8-12	241R57-3	24257-12	24257RA8-12	242R57-3	
1-3/8” (34.9mm)	8	0.165	4.19	1.012	1.128	25.7	28.7	24155-12	24155RB8-12	241R52-3	24255-12	24255RB8-12	242R52-3	24M55-12*
	9-10	0.148-0.134	3.76-3.40	1.066	1.195	27.1	30.3	24156-12	24156RB8-12	241R56-3	24256-12	24256RB8-12	242R56-3	24M56-12*
	11	0.120	3.05	1.115	1.218	28.3	30.9	24158-12	24158RA8-12	241R58-3	24258-12	24258RA8-12	242R58-3	24M58-12*
	12-13	0.109-0.095	2.77-2.41	1.127	1.263	28.6	32.1	24159-12	24159RA8-12	241R57-3	24259-12	24259RA8-12	242R57-3	24M59-12*
	14-17	0.083-0.058	2.11-1.47	1.180	1.322	30.0	33.6	24160-12	24160RA8-12	241R60-3	24260-12	24260RA8-12	242R60-3	24M60-12*
	18-22	0.049-0.028	1.24-0.71	1.224	1.365	31.1	34.7	24161-12	24161RA8-12	241R61-3	24261-12	24261RA8-12	242R61-3	
1-1/2” (38.1mm)	8	0.165	4.19	1.127	1.263	28.6	32.1	24159-12	24159RB8-12	241R57-3	24259-12	24259RB8-12	242R57-3	24M59-12*
	9-10	0.148-0.134	3.76-3.40	1.180	1.322	30.0	33.6	24160-12	24160RB8-12	241R60-3	24260-12	24260RB8-12	242R60-3	24M60-12*
	11-12	0.120-0.109	3.05-2.77	1.224	1.365	31.1	34.7	24161-12	24161RB8-12	241R61-3	24261-12	24261RB8-12	242R61-3	
	13-14	0.095-0.083	2.41-2.11	1.285	1.415	32.6	35.9	24163-12	24163RA8-12		24263-12	24263RA8-12		
	15-17	0.072-0.058	1.83-1.47	1.325	1.455	33.7	36.9	24164-12	24164RA8-12	241R64-3	24264-12	24264RA8-12	242R64-3	24M63-12*
	18-22	0.049-0.028	1.24-0.71	1.361	1.490	34.6	37.9	24165-12	24165RA8-12	241R65-3	24265-12	24265RA8-12		
1-3/4” (44.5mm)	14-16	0.083-0.065	2.11-1.65	1.534	1.700	38.9	43.7	24166-12	24166RA8-12	241R66-3	24266-12	24266RA8-12	242R65-3	24M66-12**
2” (50.8mm)	13-16	0.095-0.065	2.41-1.65	1.750	1.952	44.0	49.6	24167-12	24267RA8-12	241R67-3	24267-12	24267RA8-12	242R67-3	24M67-12**
	17-22	0.058-0.028	1.47-0.71	1.848	1.990	46.9	50.5	24169-12	24169RA8-12		24269-12	24169RA8-12		24M69-12**

MADE IN USA

24 Series
4 & 5 Roll Expanders

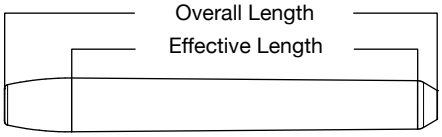
Tube Size
- 0.625” to 1.500” OD
- (15.9 to 38.1mm) OD

4 Roll Expanders												
Tube Size				Expansion Range				Tube Sheet (Min/Max Reach) 0.500”-3.830” (12.7-97.3mm) Overall Roll Length 1-5/8” (41.3mm)		Tube Sheet (Min/Max Reach) 1.250” - 4.200” (31.8-106.7mm) Overall Roll Length 2-3/8” (60.3mm)		Common Mandrel
OD	Wall Thickness			Inch		Metric		Expander Assembly Flush	Roll Set (4 per set)	Expander Assembly Flush	Roll Set (4 per set)	
	BWG	In	Metric	Min.	Max.	Min.	Max.					
5/8” (15.9mm)	18-19	0.049-0.042	1.24-1.07	0.512	0.583	13.0	14.8	24131-4	241R29-4	24231-4	242R29-4	24M31-4
	20-24	0.035-0.022	0.89-0.56	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 (Min/Max Reach) 0.500”-3.830” (12.7-97.3mm) Overall Roll Length 1-5/8” (41.3mm)			Tube Sheet (Min/Max Reach) 1.250” - 4.200” (31.8-106.7mm) Overall Roll Length 2-3/8” (60.3mm)			Common Mandrel
OD	Wall Thickness			Inch		Metric		Expander Assembly		Roll Set (5 per set)	Expander Assembly		Roll Set (5 per set)	
	BWG	In	Metric	Min.	Max.	Min.	Max.	Flush	1/8” Recess		Flush	1/8” Recess		
3/4” (19.1mm)	12	0.109	2.77	0.517	0.584	13.1	14.8	24131-5	24131RB8-5	241R28-5	24231-5	24231RB8-5	242R28-5	24M31-5
	13	0.095	2.41	0.540	0.609	13.7	15.5	24132-5	24132RB8-5	241R29-5	24232-5	24232RB8-5	242R29-5	24M32-5
	14	0.083	2.11	0.562	0.631	14.3	16.0	24133-5	24133RA8-5	241R30-5	24233-5	24233RA8-5	242R30-5	24M33-5
	15-17	0.072-0.058	1.83-1.47	0.592	0.672	15.0	17.1	24134-5	24134RA8-5	241R31-5	24234-5	24234RA8-5	242R31-5	24M34-5
	18-19	0.049-0.042	1.24-1.07	0.626	0.711	15.9	18.1	24136-5	24136RA8-5	241R33-5	24236-5	24236RA8-5	242R33-5	24M36-5
	20-24	0.035-0.022	0.89-0.56	0.655	0.740	16.6	18.8	24137-5	24137RA8-5	241R34-5	24237-5	24237RA8-5	242R34-5	24M37-5
7/8” (22.2mm)	18-19	0.049-0.042	1.24-1.07	0.749	0.831	19.0	21.1	24141-5	24141RB8-5	241R36-5	24241-5	24241RB8-5	242R36-5	24M41-5*
	20-24	0.035-0.022	0.89-0.56	0.783	0.865	19.9	22.0	24142-5	-	241R39-5	24242-5	-	242R39-5	24M41-5*
1” (25.4mm)	11	0.120	3.05	0.749	0.831	19.0	21.1	24141-5	24141RB8-5	241R36-5	24241-5	24241RB8-5	242R36-5	24M41-5*
	12-13	0.109-0.095	2.77-2.41	0.769	0.866	19.5	22.0	24143-5	24143RA8-5	241R39-5	24243-5	24243RA8-5	242R39-5	24M43-5*
	14	0.083	2.11	0.799	0.896	20.3	22.7	24144-5	24144RA8-5	241R41-5	24244-5	24244RA8-5	242R41-5	24M44-5*
	15-17	0.072-0.058	1.83-1.47	0.841	0.922	21.4	23.4	24145-5	24145RA8-5	241R41-5	24245-5	24245RA8-5	242R41-5	24M45-5*
	18-19	0.049-0.042	1.24-1.07	0.880	0.976	22.4	24.8	24146-5	24146RA8-5	241R42-5	24246-5	24246RA8-5	242R42-5	24M46-5*
	20-24	0.035-0.022	0.89-0.56	0.894	0.990	22.7	25.2	24147-5	24147RA8-5	241R43-5	24247-5	24247RA8-5	242R43-5	24M46-5*
1-1/8” (28.6mm)	18-24	0.049-0.022	1.24-0.56	0.997	1.116	25.3	28.4	24152-5	-	241R47-5	24252-5	-	242R47-5	24M52-5*
1-1/4” (31.8mm)	18-24	0.049-0.022	1.24-0.56	1.112	1.240	28.2	31.5	24157-5	-	241R52-5	24257-5	-	242R52-5	24M57-5*
1-3/8” (34.9mm)	18-24	0.049-0.022	1.24-0.56	1.237	1.365	31.4	34.7	24161-5	-	241R58-5	24261-5	-	242R58-5	24M61-5*
1-1/2” (38.1mm)	18-24	0.049-0.022	1.24-0.56	1.361	1.490	34.6	37.9	24165-5	24165RA8-5	241R60-5	24265-5	24265RA8-5	242R60-5	24M65-5*
2” (50.8mm)	17-22	0.058-0.028	1.47-0.71	1.840	1.990	46.7	50.5	24169-5	24169RA8-5	241R66-5	24269-5	24269RA8-5	242R66-5	24M69-5*

*Mandrel drive square size is 3/8”. *Mandrel drive square size is 1/2”.*

Roll Part Number	Overall Roll Length	Effective Roll Length
241R28 - 241R42	1.625" (41.3mm)	1.301" (33.0mm)
241R43 - 241R69		1.239" (31.5mm)
242R28 - 242R42	2.365” (60.3mm)	2.051” (52.1mm)
242R43 - 242R69		1.989” (50.5mm)



MADE IN USA

ET850 Series
Torque Controlled Pneumatic Rolling Motors

The quality you need. The compatibility you want.

The next generation of push pull motors.

Elliott's ET850 Motor is the next evolution of push-pull motors. Offering the same USA quality and performance you're used to, the compatibility you need, with additional features to improve the operator's experience.

A Motor You Can Count On

Roll Every Tube To Spec
Torque actuated cams measure torque to provide consistent expansions each time. Reference marks make it easy to roll to the same torque each time.

No Mess
Adjustable muffler port stays where you point it, keeping oil from getting on the operator.

Multi-Position Design
Multi-position muffler works as a handle and allows the operator to easily hold the motor in three different positions, left, right, and underneath.

Operator Friendly

Reduce Fatigue
An eye-bolt allows the operator to easily connect to a counterbalance, reducing fatigue.

Easy Setup
Includes quick disconnect air fitting to get the motor up and running quickly.

Spares Kit includes:

- Paddle Set
- Trip Spring
- Radial Ball Bearing
- O-Rings

Accessories:

- 1/2" Quick Change Chuck, 810-050-037
- 3/8" Quick Change Chuck, 810-037-037
- Spares Kit
- Filter-Lubricator, 6070

Roll Every Tube To Spec

Multi-Position Handle Design

Eye-Bolt Connects To A Counterbalance

Tube OD Range	Motor	Free Speed RPM	Torque Range	Weight	Air Usage	Air Supply Hose	Male Spindle Drive	Standard Quick Change Chuck	Spares Kit
5/8" - 3/4" (15.9 - 19.1mm)	ET850-1250	1,100	1.8 - 9.6 ft.lbs (2.5 - 13.0 Nm)	11lbs (5.0kg)	48 cfm (1274 l/min)	1/2" (12mm)	3/8" (9.5mm)	3/8" Fem Sq (optional 1/2" available)	ET850SK-1
3/4" - 1" (19.1 - 25.4mm)	ET850-600	500	2.6 - 16 ft.lbs (3.5 - 21.7 Nm)						ET850SK-2
1" - 1-1/4" (25.4 - 31.8mm)	ET850-400	400	5 - 26.5 ft lbs (6.8 - 35.9 Nm)					1/2" Fem Sq (optional 3/8" available)	

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

MADE IN USA

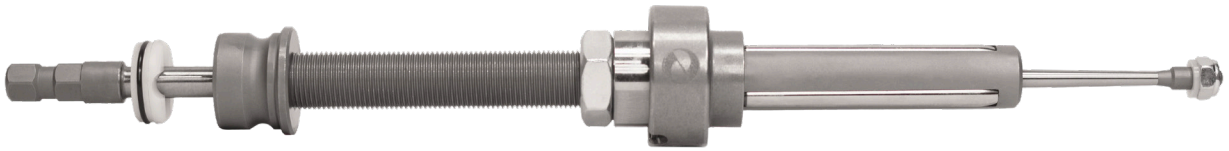
FOR RENT

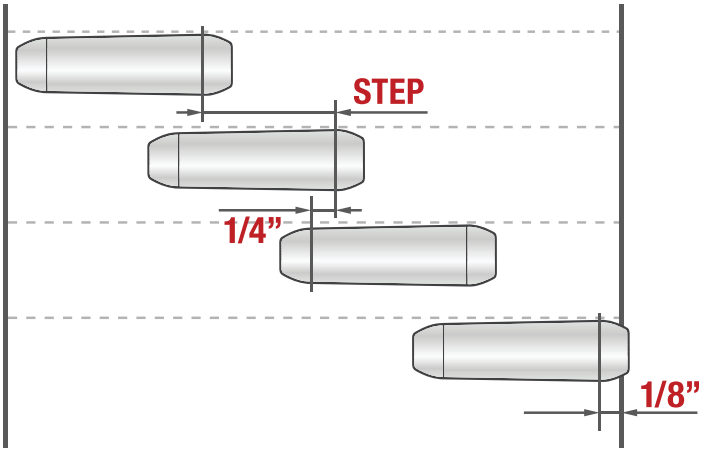
ULTRA HAWK™

3” & 4” Effective Roll Length Parallel Pin Expanders - COMING SOON

Tube Size

- 0.625” – 1.500” OD
- 15.9 mm – 38.1 mm OD





Features & Benefits:

Fewer Step Rolls
Up to 50% fewer step rolls per tube, leading to faster expansion times.

Up To 2X The Speed
Increase cycle times with parallel pin expansion and get up to twice the speed of tapered rolling.

Decreased Downtime
Larger effective roll lengths minimize the number of necessary setups, saving time and reducing labor costs.

Increased Productivity
Fewer setups and increased system accuracy reduce job times, increasing shop productivity.

Roll Every Tube To Spec
The Ultra Hawk measures torque and controls system functions, allowing you to roll the target wall reduction each time, eliminating costly re-rolling expansion times.

MADE IN USA

Roto-Jet
Rotary Tube Cleaning Systems

Tube Size
- 0.250” to 3.000” ID
- 6.35 to 76.2mm ID

Tube Section
- Straight
- Curved

Type
- Soft, gummy or organic

Thickness
- Light
- Medium

Flush
- Wet
- Dry

Elliott Tool Roto-Jet Cleaning Systems are an effective solution to increasing chiller, condenser, and other heat exchanger efficiency.

Elliott Tool offers a variety of Roto-Jet Tube Cleaners to suit your specific application needs:

Roto-Jet I Series
Electric heavy duty models 0620AR (110V) and 0820AR (220V) are ideal for mechanical contractors that perform tube cleaning on a regular basis. Equipped with a 1 HP motor, these cleaners are powerful yet simple to use due to their reversing capability.

Pneumatic Roto-Jet
Model 0420 is a pneumatic tube cleaner with a powerful 4 HP motor to clean tubes where electricity is not readily available. The 0420 is perfect for tube cleaning performed in power utility plants and paper, steel, and sugar mills.

All of the Roto-Jet Tube Cleaning Systems use flexible shafts and cleaning tools to flush deposits free from the tubes, enabling you to increase heat transfer efficiencies while reducing your heat transfer costs.


Roto-Jet I

Roto-Jet II


Pneumatic Roto-Jet

Features & Benefits:
- Heavy duty shaft for cleaning heavy deposits.
- Flexible shaft with water flush for removal of deposits in curved tubes.
- Storage compartment for foot pedal, controls, & supplies.
- Lightweight and sized for confined work spaces.
- Uses standard flex shafts for easy maintenance.
- Ground fault isolation for increased operator safety.
- Roto-Jet II (220V) is CE mark certified.

Part #	Voltage	Reversible	RPM	Dimensions		Weight		Tube ID	
				Inch	mm	lbs.	Kg.	Inch	mm
0620AR	110	Yes	850	17 X 15 X 10.5	432 X 381 X 267	63	29	0.250-3.000	6.35-76.2
0820AR	220	Yes	850	17 X 15 X 10.5	432 X 381 X 267	63	29	0.250-3.000	6.35-76.2
0650R	110	Yes	0-1800	11 X 20 X 9	280 X 508 X 229	35	16	0.250-1.000	6.35-25.4
0750R	220	Yes	0-1800	11 X 20 X 9	280 X 508 X 229	35	16	0.250-1.000	6.35-25.4

Part #	Air Requirement	Reversible	RPM	Dimensions		Weight		Tube ID	
				Inch	mm	lbs.	Kg.	Inch	mm
0420	138 CFM @100 PSI	No	0-2500	21.5 X 10.25 X 10.5	546 X 261 X 267	48	22	0.250-3.000	6.35-76.2

MADE IN USA

FOR RENT

Pipe Rattling Equipment
Oil Field Pipeyard Cleaning Motors & Heads

Tube Size
- 2.375” to 20.000” OD
- 60.3mm to 508.0mm OD

Tube Section
- Straight

Type
- Hard powder
- Rock solid

Thickness
- Medium
- Heavy

Flush
- Dry

These product kits have been specially designed for the oil field. They are recommended for the most common sizes used in the oil field today.

Rattling equipment for oil field tubular products are ideal for 2.375” to 20.000” OD (60.3mm to 508.0mm). Additional sizes and configurations are available upon request.

Features & Benefits:
- Powerful motors for fast cleaning.
- Engineered design that is easy to maintain.
- Armored hose design for rigidity and torque absorption.

Rattling Equipment Kit Includes:
- Air Motor
- Motor Sleeve (where applicable)
- Wrench
- Cutter Head
- Head Coupling
- 2 Sets of replacement cutters
- 2 Sets of replacement cutter pins

Spares & Accessories:
- Operating Hose: Highly recommended for proper operation and long life.
- 6055 Lubricator: Highly recommended for proper operation and long life.
- Foot Valve
- Replacement Cutters, Cutter Pins, & Arms
- Motor Paddles & Rotors

Rattling Equipment Kits			Rattling Equipment Accessories	
Outside Diameter Pipe or Casing		Part Number	Operating Hose	Foot Valve
2.375"	60.3mm	20308K	85HD075-XX	720700B
2.875"	73.0mm	20708K		
3.500"	88.9mm	30102K	85HD100-XX	
4.500"	114.3mm	40102K*		
5.000” - 5.500”	127.0 - 139.7mm	50000K		
7.000"	177.8mm	70000K*		
7.625"	193.7mm	70508K*		
8.625"	219.1mm	80508K*		
9.625"	244.5mm	90508K*		
10.750"	273.1mm	100304K*		
11.750"	298.5mm	110304K*	85HD125-XX	-
13.375"	339.7mm	130308K*		
20.000"	508.0mm	200000K*		

**Kit also includes Motor Sleeve.*
Replace “XX” with “25” or “50” to indicate 25’ or 50’ length.
Couplings or adapters may be required.

MADE IN USA

ET Series
Oil Field Pipeyard Cleaning Motors & Heads

Pipe Size
- 3/4” to 5-7/8” OD
- 19.05mm to 149.23mm OD

Tube Section
- Straight

Type
- Hard powder
- Rock solid

Thickness
- Medium
- Heavy

Flush
- Dry

The ET Series cleaning motors and heads are designed and tested using advanced engineering practices to confidently withstand tough cleaning applications and provide long tool life. The powerful motor combined with the cleaning head provide superior cleaning performance for oil field pipes and tubular products.

The ET Series offers a wide selection of cutters and cleaning heads for 7/8” to 4-3/4” (22.225 to 120.65mm) tubes ranging from single head cutters to spring loaded swing arm. Additional sizes and configurations are available upon request.

Features & Benefits:
- The most advanced engineering and manufacturing principles for powerful performance and superior cleaning.
- Thoroughly tested, wear-resistant design for the longest tool life in the industry.
- Gearless design for easy maintenance.

Spares & Accessories:
- Replacement Cutters, Cutter Pins, & Arms
- Motor Paddles & Rotors
- Operating Hose*
- Air Valve *(see page 144)**
- Foot Valve *(see page 144)**
- 6055 Lubricator*
- 6070 Filter/Lubricator*

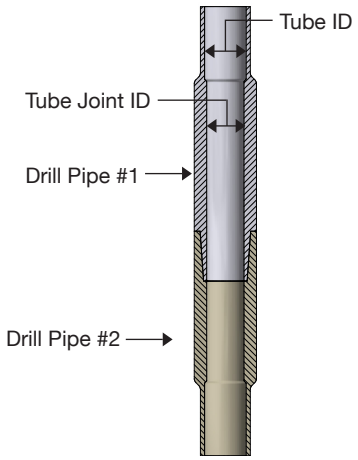
** Used in hand cleaning operations*

MADE IN USA

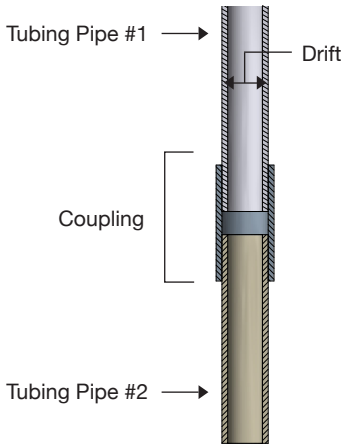
Tube Internal Diameter (ID)
Is a result of the OD and the wall thickness.

Drift Diameter
Is the diameter of a 42” long mandrel that passes through the tubing joint. It is a foremost parameter as it gives the maximum OD of any equipment to run through the tubing string and accounts for roundness of a pipe.

Drill Pipe



Tubing Pipe



Single Pin Head

ETTC Head

ETP Head

Tubing Pipe Recommendation Chart

Size	Weight	Drift	Connection	Head	Motor	Operating Hose
3/4"	1.50#	.648"	3/4"CS	D6701840	D67000-18	85HS012-XX
1"	2.25#	.848"	1"CS	ET2940	ET29A	85HS025-XX
1-1/4"	3.02#	1.184"	1-1/4"CS	ET12240	ET31	85HS037-XX
1-1/2"	3.64#	1.406"	1-1/2"CS	ETTC14	ET3150	85HD050-XX
2-1/16"	3.25#	1.657"	2-1/16"CS	ETTC11	ET3162	85HD075-XX
2-1/16"	3.25#	1.657"	2-1/16"GST	ETTC11	ET3162	85HD075-XX
2-3/8"	4.70#	1.901"	2-3/8"CS	ETTC16PY	ET3200	85HD075-XX
2-3/8"	4.70#	1.901"	2-3/8"EUE8rd	ETTC16PY	ET3200	85HD075-XX
2-3/8"	5.95#	1.773"	2-3/8"PH6	ETTC17PY	ET3178	85HD075-XX
2-7/8"	6.50#	2.347"	2-7/8"CS	ETP9PY*	ET3250*	85HD100-XX
2-7/8"	6.50#	2.347"	2-7/8"EUE8rd	ETP9PY*	ET3250*	85HD100-XX
2-7/8"	7.90#	2.229"	2-7/8"PH6	ETP15PY	ET3225	85HD075-XX
3-1/2"	9.30#	2.867"	3-1/2"CS	ETP6APY	ET3275	85HD100-XX
3-1/2"	10.30#	2.797	3-1/2"CS	ETP6APY	ET3275	85HD100-XX
3-1/2"	9.30#	2.867	3-1/2"EUE8rd	ETP6APY	ET3275	85HD100-XX
3-1/2"	12.95#	2.625"	3-1/2"PH6	ETP7SPY	ET3275	85HD100-XX
4-1/2"	12.75#	3.833"	4-1/2"CS	ETP3SPY	ET3350	85HD100-XX
4-1/2"	12.60#	3.833"	4-1/2"LT&C	ETP3SPY	ET3350	85HD100-XX
4-1/2"	12.75#	3.833"	4-1/2"EUE8rd	ETP3SPY	ET3350	85HD100-XX
4-1/2"	15.50#	3.701"	4-1/2"PH6	ETP3SPY	ET3350	85HD100-XX
4-1/2"	19.20#	3.515"	4-1/2"PH6	ETP4SPY	ET3350	85HD100-XX

** Alternative Head & Motor: ETP15PY and ET3225*
Replace “XX” with “25” or “50” to indicate 25’ or 50’ length.
Couplings or adapters may be required.

MADE IN USA

Spring Head

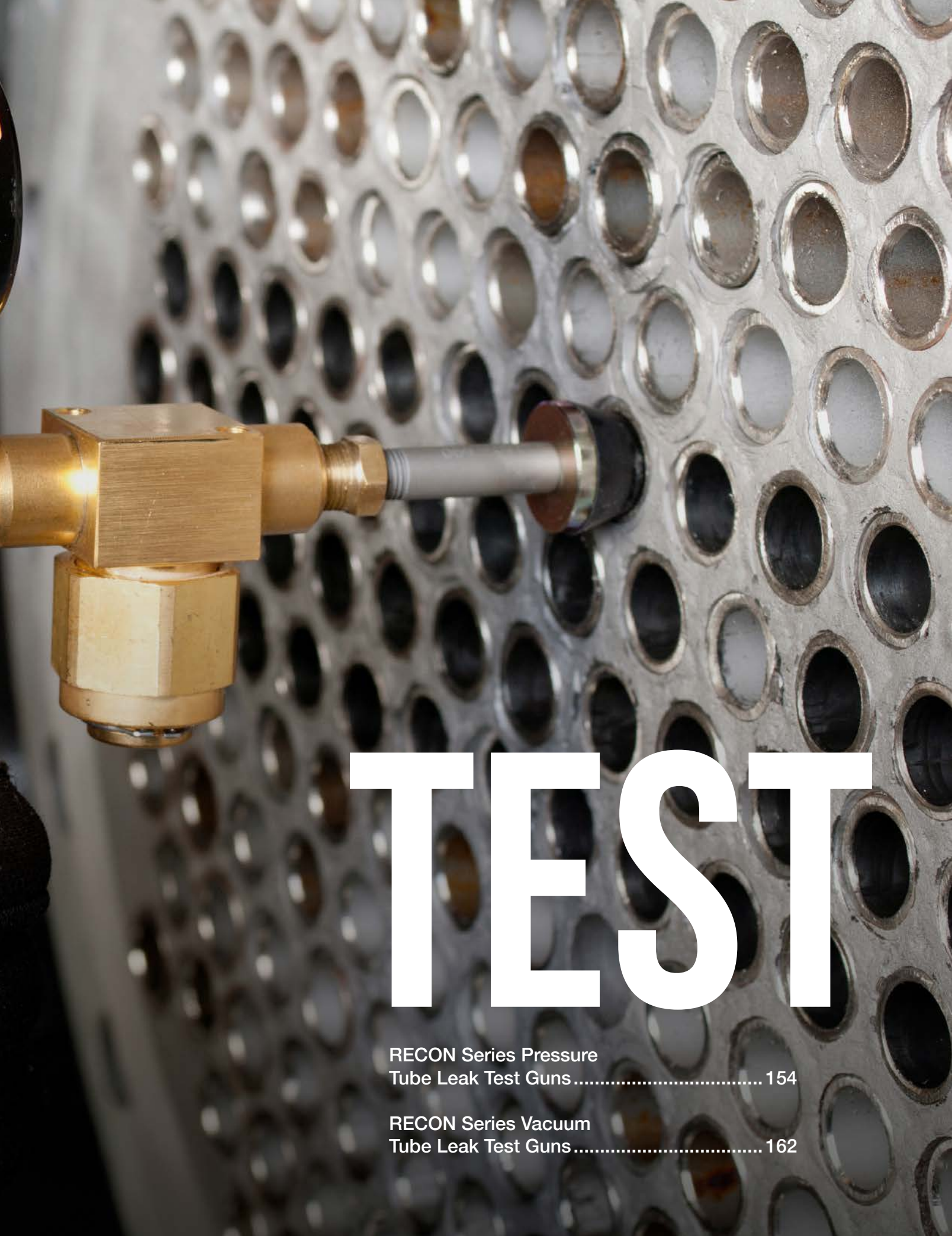
Swing Head

Drill Pipe Recommendation Chart								
Size	Weight	Tube Joint ID	Tube ID	Connection	Spring Head	Swing Arm Head	Motor	Operating Hose
2-3/8"	6.65#	1.750"	1.815"	2-3/8"IF/NC26	-	ET1840	ET3178	85HD075-XX
2-7/8"	10.40#	1.500"	2.151"	2-7/8" HTPAC	ETSRA1470	ET1470	ET3150	85HD050-XX
2-7/8"	10.40#	1.500"	2.151"	NC26 2-3/8 IFSH	ETSRA1470	ET1470	ET3150	85HD050-XX
2-7/8"	10.40#	1.750"	2.151"	HT-26	ETSRA1470	ET1470	ET3150	85HD050-XX
2-7/8"	10.40#	1.975"	2.151"	2-3/8HTSLH90	ETTC13PY*		ET3200	85HD075-XX
2-7/8"	10.40#	2.000"	2.151"	2-7/8"IF NC31	ETTC13PY*		ET3200	85HD075-XX
2-7/8"	10.40#	2.125"	2.151"	2-7/8"IF NC31	ETTC13PY*		ET3200	85HD075-XX
2-7/8"	10.40#	2.156"	2.151"	2-7/8"AOH	ETTC13PY*		ET3200	85HD075-XX
3-1/2"	13.30#	2.563"	2.602"	XT-38	ETSL3370A	ET3370A	ET3250	85HD100-XX
3-1/2"	13.30#	2.563"	2.764"	3-1/2"IF NC38	ETSL3370A	ET3370A	ET3250	85HD100-XX
3-1/2"	13.30#	2.563"	2.764"	3-1/2"HT-38	ETSL3370A	ET3370A	ET3250	85HD100-XX
3-1/2"	13.30#	2.563"	2.764"	3-1/2"XT-38	ETSL3370A	ET3370A	ET3250	85HD100-XX
3-1/2"	13.30#	2.688"	2.764"	3-1/2"IF NC38	ETSL3370A	ET3370A	ET3250	85HD100-XX
3-1/2"	15.50#	2.563"	2.602"	3-1/2"IF NC38	ETSL3370A	ET3370A	ET3250	85HD100-XX
3-1/2"	15.50#	2.563"	2.602"	NC-38	ETSL3370A	ET3370A	ET3250	85HD100-XX
4"	14.00#	2.688"	3.340"	XT-39	ETSL3270ALA	ET3270ALA	ET3250	85HD100-XX
4"	14.00#	2.688"	3.340"	4" FH NC40`	ETSL3270ALA	ET3270ALA	ET3250	85HD100-XX
4"	14.00#	2.688"	3.340"	HT-40	ETSL3270ALA	ET3270ALA	ET3250	85HD100-XX
4"	14.00#	2.688"	3.340"	XT-M 38	ETSL3270ALA	ET3270ALA	ET3250	85HD100-XX
4"	14.00#	2.813"	3.340"	XT-39	ETSL3270ALA	ET3270ALA	ET3250	85HD100-XX
4"	15.70#	2.688"	3.340"	XT-39	ETSL3270ALA	ET3270ALA	ET3250	85HD100-XX
4-1/2"	16.60#	3.000"	3.826"	4-1/2"XH NC46	ETSL970LA	ET970LA	ET3275	85HD100-XX
4-1/2"	20.00#	3.000"	3.640"	4-1/2"XH NC46	ETSL970LA	ET970LA	ET3275	85HD100-XX
5"	19.50#	3.250"	4.276"	4-1/2"IF NC50	ETSL770SA	ET770SA	ET3275	85HD100-XX
5"	19.50#	3.750"	4.276"	XT-50	ETSL770SA	ET770SA	ET3275	85HD100-XX
5"	25.60#	3.250"	4.000"	4-1/2"IF NC50	ETSL770SA	ET770SA	ET3275	85HD100-XX
5-1/2"	21.90#	3.500"	4.778"	5-1/2" FH	ETSL770SA	ET770SA	ET3275	85HD100-XX
5-1/2"	24.70#	3.000"	4.670"	5-1/2" FH	ETSL770SA	ET770SA	ET3275	85HD100-XX
5-7/8"	23.40#	4.250"	5.153"	XT-57	ETSL770SA	ET770SA	ET3275	85HD100-XX
5-7/8"	26.30#	4.250"	5.045"	XT-57	ETSL770SA	ET770SA	ET3275	85HD100-XX
5-7/8"	28.70#	4.250"	4.875"	CTM57	ETSL770SA	ET770SA	ET3275	85HD100-XX

** Will be supplied with a barrel style cleaning head*
Replace "XX" with "25" or "50" to indicate 25' or 50' length.
Couplings or adapters may be required.

MADE IN USA


ELLIOTT
TOOL TECHNOLOGIES



TEST

RECON Series Tube Leak Test Guns
RECON 1250 & 2500 - Pressure

Tube Size
- 0.500” to 2.500” OD
- 12.7mm to 63.5mm OD

Intelligently designed and battle tested for impossible missions.

Take on the mission of quickly and easily finding tube leaks. Utilize the RECON Series tube leak test guns and test every tube quickly and efficiently with the most ergonomic test gun on the market.

From the lightweight cast aluminum body to the ergonomically modeled pistol grip, each feature offers an engineered and rugged solution for finding leaking tubes.

The RECON 1250 and 2500 are simple to operate. Connect the air supply, insert the seals into both sides of the tube ends and pressurize the tubes. Then monitor the gauges for drops in air pressure, which indicate a tube leak.

RECON 1250

RECON 1250 Kit (TTP1250) includes:
Tube Leak Test Gun Set
- 3 Support Tube Assemblies (TTPST1, TTPST2, TTPST3)
- Pressure Regulator
- Tool Case

RECON 2500 Kit (TTP2500) includes:
Tube Leak Test Gun Set
- 2 Support Tube Assemblies (TTPST4)
- Washers to support up to 2.5” seal sets.
- Tool Case

Spares & Accessories:
- Seal & Washer Sets: Seals are compatible with Elliott's 5373 Series Test Gun. ***See table on page 156.***
- Seal Kits: Includes all of the seal sets to cover the entire range of the gun. Available for both the RECON 1250 and 2500 Test Guns. ***See table below.***
- Support Tubes & Support Tube Extensions: Make finding leaks easier on channel head and water box applications. Support tubes are compatible with Elliott's 5373 Series Test Gun. ***See table on page 156.***

Tube OD Range	Tube Leak Test Gun Kit*	Seal Kit
1/2” x 12 BWG - 1-1/4” x 15 BWG (12.7mm x 2.77 Wall - 34.9mm x 1.83 Wall)	TTP1250	TTP1250SK
1-1/4” x 16 BWG - 2-1/2” x 24 BWG (31.75mm x 1.65 Wall - 63.5mm x 0.56 Wall)	TTP2500	TTP2500SK

**Seal Sets are ordered separately.*

MADE IN USA

FOR RENT

RECON Series Tube Leak Test Guns

RECON 1250 & 2500 - Pressure

Easy to hold and use with superior grip ergonomics.

Steel gauge body to protect the gauge.

Use in tight workspaces because of its thin profile.

Safe & Ergonomic

Superior Grip
Easy to hold and use with superior grip ergonomics, utilizing a non-slip, wrinkle-coat finish on the handle.

Works Great In Small Spaces
Easy to use in tight work spaces because of its thin profile.

Built-In Safety Features
Ensure safety with a bleed off valve to release pressure and a moving piston positioned away from the operator.

Operator Friendly
Reduce operator fatigue and increase efficiency with the lightweight aluminum body.

Increased Productivity

Easy To Use
Simply connect the air supply, insert the seals into both sides of the tube ends, pull the trigger to pressurize the tube, and monitor.

Increase Accuracy
Increase accuracy using the dual gauge design to read pressure from both tube ends.

Long Tool Life
Durable cast aluminum body that protects the working components and a steel gauge body to protect the gauge.

Specifications:

RECON 1250 & 2500 Air Requirements:

- Minimum - 40 PSI (2.7 bar)
- Maximum - 125 PSI (8.5 bar)

RECON 2500

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RECON 1250 & 2500 Seal Sets							
Tube OD	BWG						
	8-9	10-11	12-13	14-15	16-17	18-19	20-24
1/2" (12.7mm)	-	-	TTPS250	TTPS300	TTPS340	TTPS370	TTPS400
5/8" (15.9mm)	TTPS270	TTPS340	TTPS370	TTPS440	TTPS470	TTPS500	TTPS530
3/4" (19.1mm)	TTPS400	TTPS440	TTPS500	TTPS530	TTPS590	TTPS620	TTPS650
7/8" (22.2mm)	TTPS530	TTPS590	TTPS620	TTPS690	TTPS720	TTPS750	TTPS780
1" (25.4mm)	TTPS650	TTPS690	TTPS750	TTPS800	TTPS840	TTPS870	TTPS900
1-1/8" (28.6mm)	TTPS780	TTPS840	TTPS870	TTPS940	TTPS970	TTPS1000	TTPS1030
1-1/4" (31.75mm)	TTPS900	TTPS940	TTPS1000	TTPS1070	TTPS1090	TTPS1120	TTPS1150
1-3/8" (34.9mm)	TTPS1050	TTPS1090	TTPS1120	TTPS1190	TTPS1230	TTPS1250	TTPS1280
1-1/2" (38.1mm)	TTPS1150	TTPS1190	TTPS1250	TTPS1310	TTPS1340	TTPS1370	TTPS1400
1-5/8" (41.3mm)	TTPS1280	TTPS1340	TTPS1370	TTPS1440	TTPS1470	TTPS1500	TTPS1530
1-3/4" (44.5mm)	TTPS1400	TTPS1470	TTPS1500	TTPS1550	TTPS1590	TTPS1620	TTPS1650
2" (50.8mm)	TTPS1650	TTPS1700	TTPS1750	TTPS1800	TTPS1840	TTPS1840	TTPS1900
2-1/4" (34.9mm)	TTPS1900	TTPS1950	TTPS2000	TTPS2050	TTPS2090	TTPS2120	TTPS2150
2-1/2" (63.5mm)	TTPS2150	TTPS2200	TTPS2250	TTPS2290	TTPS2340	TTPS2370	TTPS2400

Seal sets contain two seals and four washers. Seal sets TTPS250 through TTPS440 contain 4 seals and 4 washers. Standard seal material is neoprene. Seals are backwards-compatible.

Replacement Support Tube Sets & Optional Extensions					
Seal Set Size	4" (Std.) (101.6mm) Part #	12" (305mm) Part #	24" (610mm) Part #	36" (914mm) Part #	48" (1,219mm) Part #
TTPS250 - TTPS440	TTPST1	TTPST1-12	TTPST1-24	TTPST1-36	TTPST1-48
TTPS470 - TTPS800	TTPST2	TTPST2-12	TTPST2-24	TTPST2-36	TTPST2-48
TTPS840 - TTPS1190	TTPST3	TTPST3-12	TTPST3-24	TTPST3-36	TTPST3-48
TTPS1230 - TTPS1590	TTPST4	TTPST4-12	TTPST4-24	TTPST4-36	TTPST4-48
TTPS1620 - TTPS2000	TTPST5	TTPST5-12	TTPST5-24	TTPST5-36	TTPST5-48
TTPS2050 - TTPS2400	TTPST6	-	-	-	-

For larger seal and washer sizes, contact factory. Support Tubes are backwards-compatible. Extensions for TTPST6 available upon request.

Powerful Grip for Faster Tube Pulling

A Faster Way To Remove Tube Stubs

Elliott's Super Collet Tube Puller is designed to quickly pull tube stubs from tube sheets without damaging the tube sheet hole. The puller is powered by an electric or pneumatic hydraulic pump and provides up to 25 tons of pulling capacity.

For more information, see page 202 or visit:
www.elliott-tool.com/super-collet-tube-puller

2 Common Types of Tube Failure

Identifying Fouling and Corrosion In Heat Exchangers

Heat exchangers are essential for many industries, but their performance can be significantly impacted by fouling and corrosion. These can lead to reduced efficiency, increased maintenance costs, and potential safety hazards. Understanding the mechanisms, impacts, and prevention strategies for fouling and corrosion is crucial for ensuring the optimal operation of heat exchangers.

1. Fouling and Scaling

One of the most common, and least severe, types of tube failure is fouling and scaling. Fouling describes the build-up of unwanted deposits in the tube. This can include mineral deposits, biological growth, and organic matter like oil or grease.

Types of Fouling

Scaling is a specific type of fouling caused by the precipitation of inorganic salts, primarily calcium, from hard water. As the water temperature increases, salts become less soluble and form hard, crust-like deposits on the heat transfer surfaces.

Another type of fouling is biofouling, which is common in marine applications. This is the accumulation of microorganisms like bacteria, algae, arthropods, or mollusks.

Impacts of Fouling and Scaling

Fouling and scaling can decrease heat transfer efficiency, increase maintenance costs and risk of corrosion, and reduce the lifespan of the exchanger.

- Reduced heat transfer efficiency: The deposits act as an insulating layer, reducing the transfer of heat.
- Increased pressure drop: Deposit build-up

  can narrow the internal diameter of the tube, restricting the amount of fluid that can pass through the tube. This will result in an increase in pumping power to maintain pressure.
- Increased risk of corrosion: Fouling creates localized areas of high concentration of corrosive substances, accelerating corrosion.
- Reduced lifespan: Combined effects of reduced efficiency, increased pressure drop, and corrosion can lead to premature failure of the exchanger.

Testing Methods

Various methods can be used to test for fouling, including visual inspection and pressure drop analysis. A pressure analysis evaluates the pressure difference between the inlet and outlet of the heat exchanger. A high pressure drop indicates fouling or scaling obstructions, while a low-pressure drop can indicate an internal leak where the system is running below capacity.

In marine applications, water sampling can also be used to identify biofouling. This will determine how much microbial contamination is present.

2. Corrosion and Erosion

Corrosion and erosion are two severe methods of failure that can degrade the performance and lifespan of a heat exchanger.

Types of Corrosion

Corrosion is the deterioration of a material due to a chemical reaction with its environment. In a heat exchanger, this. is typically a result of a reaction between the tube material and the fluid running through the exchanger causing a reaction.

Galvanic corrosion occurs when two dissimilar metals are in contact with each other, generally due to tube plugging with a dissimilar material or an improper matching of component materials.

Pitting or crevice corrosion occur as a result of small pits or gaps in the metal surface, allowing fluids can accumulate and cause a localized reaction.

Types of Erosion

Erosion is the gradual wearing away of material due to the mechanical action of fluid. While different from corrosion, the impact of erosion on the heat exchanger is quite similar.

The most common cause of erosion is high-velocity fluid flow, which can erode the metal surface, especially in areas of high turbulence like bends, inlets, and outlets.

Impacts of Corrosion and Erosion

When corrosion and erosion occur together, the effects are often more severe. Erosion can remove protective oxide layers, exposing the underlying metal to further corrosion.

- Reduced heat transfer efficiency: corroded materials can form a layer on the heat transfer surface, increasing thermal resistance and reducing the heat transfer rate.
- Increased pressure drop: reduced flow area of the tubes or channels leads to an increased pressure drop, requiring higher pumping power.
- Structural damage: Corrosion can lead to significant metal loss, weaking the structural integrity of the heat exchanger. Additionally, corrosion can cause stress corrosion cracking, leading to sudden and catastrophic failures.
- Tube Leaks: Thinning tube walls can lead to leaks and potential for fluid mixing.
- Safety Risks: Fluid leaks can lead to the release of hazardous materials, and in some cases lead to fires or explosions.

Testing Methods

Ultrasonic testing and eddy current are the most common methods to reveal wall loss. Ultrasonic testing is a non-destructive testing method that uses high-frequency sound waves to detect defects. Similarly, eddy current testing uses an electromagnetic current passed through a coil to detect changes in the magnetic field.

Overall, fouling and corrosion are challenges that can affect the performance and longevity of heat exchangers. By understanding the underlying causes and implementing appropriate preventive measures, it is possible to mitigate these issues early on. Regular inspection and testing are essential for early detection and timely intervention to prevent catastrophic failures. By prioritizing these strategies, industries can optimize their heat exchanger systems and minimize downtime and operational costs.

RECON Series Tube Leak Test Guns
RECON 1500 - Vacuum

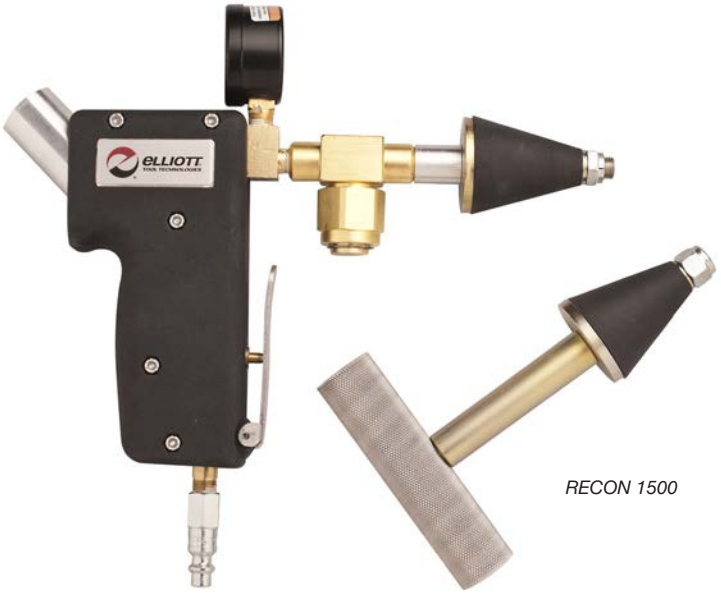
Tube Size
- 0.280” to 2.456” ID
- 7.1mm to 62.4mm ID

Intelligently designed and battle tested for impossible missions.

Take on the mission of quickly and easily finding tube leaks. Utilize the RECON Series tube leak test guns and test every tube quickly and efficiently with the most ergonomic test gun on the market.

From the lightweight cast aluminum body to the ergonomically modeled pistol grip, each feature offers an engineered and rugged solution for finding leaking tubes.

Operating the RECON 1500 Tube Leak Test Gun is simple. With the air supply connected, plug one tube end with the test gun and the other end with the T-Handle Plugging Tool. Press the lever trigger and the Venturi System quickly and efficiently evacuates the tube. Then monitor the gauge for loss of vacuum, which indicates a tube leak.



RECON 1500

Tube ID Range	Tube Leak Test Gun Kit	Seal & Washer Set Part Number
0.280”-0.690” (7.1-17.5mm)	TTV1500	TTVS1
0.640”-1.450” (16.2-36.8mm)		TTVS2
1.490”-2.456” (37.8-62.4mm)		TTVS3

Support Tube Extensions				
Tube ID Range	12” (305mm) Part #	24” (610mm) Part #	36” (914mm) Part #	48” (1,219mm) Part #
0.280”-0.690” (7.1-17.5mm)	TTVST1-12	TTVST1-24	TTVST1-36	TTVST1-48
0.640”-1.450” (16.2-36.8mm)	TTVST2-12	TTVST2-24	TTVST2-36	TTVST2-48
1.490”-2.456” (37.8-62.4mm)	TTVST3-12	TTVST3-24	TTVST3-36	TTVST3-48

RECON 1500 Kit includes:
- Tube Leak Test Gun
- T-Handle Plugging Tool
- 2 Seal & Washer Sets (TTVS1, TTVS2)
- Tool Case

Spares & Accessories:
- Seal & Washer Sets: TTVST3 and TTVS3 are available to accommodate larger tube sizes. TTVST3 includes a seal and washer set for the Support Tube and T-Handle Plugging Tool. ***See table to the left.***
- Support Tube Extensions: Make finding leaks easier on channel head and water box applications. Available in lengths of 12”, 24”, 36” and 48”. Support Tubes are compatible with Elliott's 5556 Series Test Gun. ***See table to the left.***
- Filter Element (TTV1500FE)

MADE IN USA

FOR RENT

RECON Series Tube Leak Test Guns
RECON 1500 - Vacuum

Easy to hold and use with superior grip ergonomics.

Field replaceable Venturi System

Use in tight workspaces because of its thin profile.

Safe & Ergonomic

Superior Grip
Easy to hold and use with superior grip ergonomics, utilizing a non-slip, wrinkle-coat finish on the handle.

Works Great In Small Spaces
Easy to use in tight work spaces because of its thin profile.

Operator Friendly
Reduce operator fatigue and increase efficiency with the lightweight aluminum body.

Increased Productivity

Easy To Use
Simply insert the seals into both ends of the tube, pull the trigger to evacuate the air, and monitor.

Works With A Variety Of Sizes
Tapered seal design allows the operator to test a large range of tube IDs without changing seals, washers, or support tube assemblies.

Easy Maintenance
Avoid replacing the entire test gun in the case of damage, with the field replaceable Venturi System. It's quick and easy to replace the filter element that protects the gun from harmful debris.

Long Tool Life
Durable cast aluminum body that protects the working components and a steel gauge body to protect the gauge.

Specifications:
RECON 1500 Air Requirements:
- Minimum - 40 PSI (2.7 bar)
- Maximum - 130 PSI (8.9 bar)

MADE IN USA

FOR RENT

PLUG

One-Piece Tube Plugs

Tube Size
- 0.375” to 3.000” OD
- 9.5mm to 76.2mm OD

Maximum Pressure
- 150 PSI

Elliott’s One-Piece Tube Plugs cover a wide tube OD range, making them ideal for sealing leaky tubes in both heat exchangers and boilers.

It is good practice to install a plug that is the same as or a compatible material to the tube to be plugged. The tube plugs are available in an array of materials to suit your needs: brass, carbon steel, 304 stainless steel, 316 stainless steel, 416 stainless steel, aluminum, and Monel (other materials are available upon request). Elliott recommends puncturing the leaky tube with a One-Revolution Tube Cutter. This will ensure the tube is properly vented prior to plugging.

Features & Benefits:
- Quick method to plug leaky tubes - less labor cost.
- Easy to weld to tube sheet - peace of mind.
- Plug covers multiple tube sizes - less inventory cost.
- Material certifications included for traceability and safety compliance.

Spares & Accessories:
- One Revolution Tube Cutter: Utilize to puncture the tube to ensure the tube is properly vented so pressure cannot build up in the tube and cause the plugs to loosen. See page 190.

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Part Number Material Prefixes							
Brass	Carbon Steel	SA-105 Carbon Steel	Stainless Steel			Aluminum	Monel
			316	304	416		
7180*	7181*	7179*	7182*	7183*	7184*	7185*	7186*

Note: Additional sizes and materials are available upon request.

Tube OD		BWG	Suggested Tube ID Range	Plug OD Ranges	Plug 10 Pack*
Inch	mm				
3/8”	9.5	13-22	0.185” - 0.319” (4.7 - 8.1mm)	0.178" - 0.375" (4.5 - 9.5mm)	XXXX-209-10
1/2”	12.7	11-12			
1/2”	12.7	13-22	0.310” - 0.444” (7.9 - 11.3mm)	0.303" - 0.500" (7.7 - 12.7mm)	XXXX-334-10
5/8”	15.9	11-12			
5/8”	15.9	13-22	0.435” - 0.569” (11.0 - 14.5mm)	0.428" - 0.625" (10.9 - 15.9mm)	XXXX-459-10
3/4”	19.1	11-12			
3/4”	19.1	13-22	0.560” - 0.694” (14.2 - 17.6mm)	0.553" - 0.750" (14.0 - 19.1mm)	XXXX-584-10
7/8”	22.2	11-12			
7/8”	22.2	13-22	0.685” - 0.819” (17.4 - 20.8mm)	0.678" - 0.875" (17.2 - 22.2mm)	XXXX-709-10
1”	25.4	11-12			
1”	25.4	13-22	0.810” - 0.944” (20.6 - 24.0mm)	0.803" - 1.000" (20.4 - 25.4mm)	XXXX-834-10
1-1/8”	28.6	11-12			
1-1/8”	28.6	13-22	0.935” - 1.069” (23.7 - 27.2mm)	0.928" - 1.125" (23.6 - 28.6mm)	XXXX-959-10
1-1/4”	31.8	11-12			
1-1/4”	31.8	13-22	1.060” - 1.194” (26.9 - 30.3mm)	1.053" - 1.250" (26.7 - 31.8mm)	XXXX-1084-10
1-3/8”	34.9	11-12			
1-3/8”	34.9	13-22	1.185” - 1.319” (30.1 - 33.5mm)	1.178" - 1.375" (29.9 - 34.9mm)	XXXX-1209-10
1-1/2”	38.1	11-12			
1-1/2”	38.1	13-22	1.310” - 1.444” (33.3 - 36.7mm)	1.303" - 1.500" (33.1 - 38.1mm)	XXXX-1334-10
1-3/4”	44.5	11-12	1.510” - 1.532” (38.4 - 38.9mm)	1.428" - 1.625" (36.3 - 41.3mm)	XXXX-1459-10
1-3/4”	44.5	13-22	1.560” - 1.694” (39.6 - 43.0mm)	1.553" - 1.750" (39.4 - 44.5mm)	XXXX-1584-10
2”	50.8	11-12	1.760” - 1.782” (44.7 - 45.3mm)	1.678" - 1.875" (42.6 - 47.6mm)	XXXX-1709-10
2”	50.8	13-22	1.810” - 1.944” (46.0 - 49.4mm)	1.803" - 2.000" (45.8 - 50.8mm)	XXXX-1834-10
2-1/4”	57.2	11-12	2.010” - 2.032” (51.1 - 51.6mm)	1.928" - 2.125" (49.0 - 54.0mm)	XXXX-1959-10
2-1/4”	57.2	13-22	2.060” - 2.194” (52.3 - 55.7mm)	2.053" - 2.250" (52.1 - 57.2mm)	XXXX-2084-10
2-1/2”	63.5	11-12	2.260” - 2.282” (57.4 - 57.9mm)	2.178" - 2.375" (55.3 - 60.3mm)	XXXX-2209-10
2-1/2”	63.5	13-22	2.310” - 2.444” (58.7 - 62.1mm)	2.303" - 2.500" (58.5 - 63.5mm)	XXXX-2334-10
2-3/4”	69.9	11-12	2.510” - 2.532” (63.8 - 64.3mm)	2.428" - 2.625" (61.7 - 66.7mm)	XXXX-2459-10
2-3/4”	69.9	13-22	2.560” - 2.694” (65.0 - 68.4mm)	2.553" - 2.750" (64.8 - 69.9mm)	XXXX-2584-10
3”	76.2	11-12	2.760” - 2.782” (70.1 - 70.7mm)	2.678" - 2.875" (68.0 - 73.0mm)	XXXX-2709-10
3”	76.2	13-22	2.810” - 2.944” (71.4 - 74.8mm)	2.803" - 3.000" (71.2 - 76.2mm)	XXXX-2834-10

** Plugs are only available in 10 packs.*
XXXX signifies material designation. Replace with the appropriate material found above (ie. 7180-584-10)

MADE IN USA

WHAT'S THE DEAL WITH SA-105?

Understanding Material Selection For Tube Plug Welding

Welding has become fairly common practice in pressure vessel fabrication and maintenance. From tube ends to plugs, welding can provide additional strength or sealing coverage if done correctly. When it comes to tube plugging, many customers are facing questions about plug materials and special requirements to ensure vessel specifications are met. In this article we will discuss the changes to the ASME code, material types and nomenclature, and impacts to the welding process.

Selecting The Right Material

When plugging a tube, it's best practice to use the same or a compatible material to the tube to prevent corrosion. Using a dissimilar metal will cause the tube and plug to corrode, resulting in a leak and plug failure. Generally, in most cases it's easy to match the tube material to the plug without any special material designations. However, there are a few materials that can have several grades or uses depending on the application.

Nomenclature

Different grades of Carbon Steel have become more popular, due to specifications set by ASME and other standards for welding.

One method to identify materials is based on the organization that specifies it. The American Society for Testing and Materials (ASTM) and the American Society for Mechanical Engineers (ASME) often work together to produce material specifications for the pressure vessel industry. As a result, their spec'd materials will often start with ASTM or ASME followed by the material, or an "S" prefix will be added in front of the material number.

The ASTM Grading System will also assign a letter prefix to a metal based on the category. For example, 'A' typically refers to ferrous materials (contains iron), where 'B' refers to nonferrous materials (does not contain iron). Combined with the organization prefix, materials may read ASTM A105 or simply SA-105.

Tubing Material vs. Bar Stock

When matching plugs or tooling to a tube spec, it can be difficult to know which designation to look for. Materials that are specified by ASME or ASTM often refer to the tube material itself. Depending on the grade, the material used to manufacture tubes may not be available in a solid round bar for manufacturing. This means that materials may not match on name alone but should be matched based on the chemical composition of the material.

"SA-105 Carbon Steel is often specified due to its ability to withstand high temperatures and pressures without degrading."

For example, SA-105 specifies a seamless forged carbon steel pipe that can be used in pressure systems

at variable temperatures. However, SA-105 does not have a solid round bar counterpart instead it points to a different "A" hot-rolled carbon steel with a specific chemical composition matching that of SA-105.

Chemical Properties For Welding

While many materials can be used for welding operations, the preferred type of metal can vary depending upon the welding method and application.

In the case of tube plug welding, SA-105 Carbon Steel is often specified due to its ability to withstand high temperatures and pressures. Since SA-105 tubing is forged, it is much stronger than regular carbon steel and can withstand higher temperatures without degrading. Additionally, it's lower carbon content makes it an easier material to weld compared to other carbon steels.

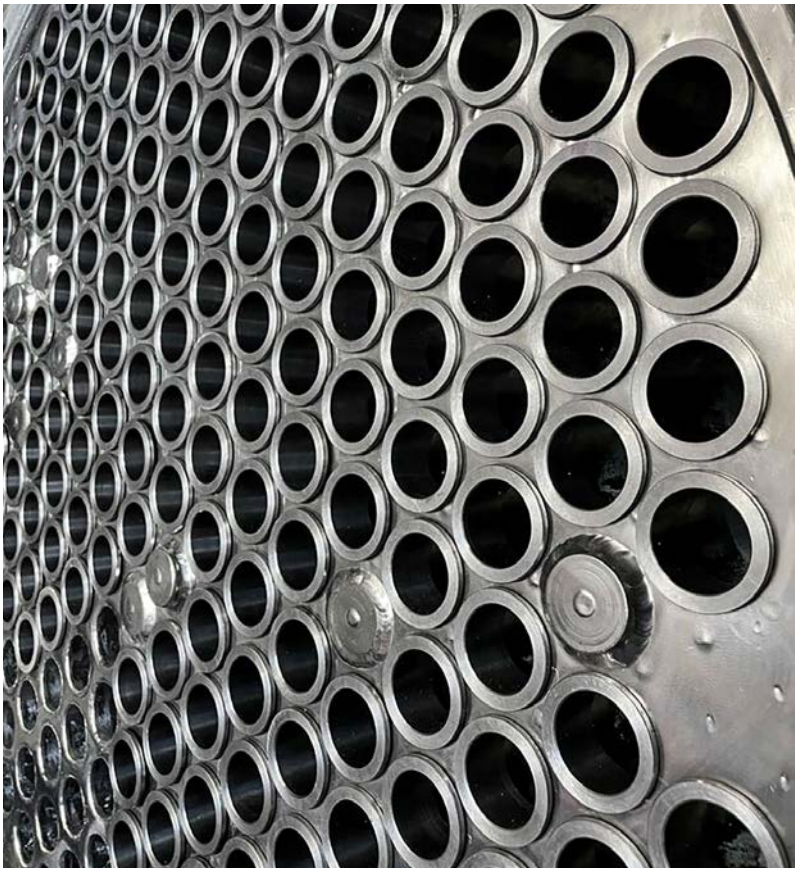
Plug Installation

Once it's determined that a vessel needs to be plugged, the end user or manufacturer will specify the type of plug that should be used, the material, as well as other process requirements. Depending on the vessel and the amount of tube degradation, welding may be specified.

Welding Requirements

While there are several benefits to welding One-Piece plugs, if not done correctly it could cause damage to the tube sheet or tube sheet holes. As a result, it is critical that a reputable contractor or on-site welder is used to complete the job and avoid costly repairs in the future.

Welding will increase the chance of the plug holding at higher pressures and ensures that the plug has the best seal. Where a traditionally installed one-piece plug can only hold up to 150 PSI, welding will allow it to withstand up to 1,000 PSI. Additionally, if the tube is more corroded, welding will make sure there is a tight seal and prevent leaks or dislodging.
Prior to welding, many end users require that



all plugs have appropriate material certification. For SA-105 plugs, heat lot numbers may also be required. This documentation verifies that the right type of plug is being used and allows for traceability should there be an issue.

Tube Plugging Process

Before installing one-piece plugs, all tubes should be trimmed flush to the tube sheet. Hammering a plug into a projection can cause the tube end to crack and a poor seal. The plug needs to make full contact with the tube sheet to create a good mechanical seal.

In addition to trimming tubes, it is best practice to clean and vent the tubes that will be plugged. This will get rid of any remaining debris and avoid any future build-up of pressure in the tube. Depending on the industry, venting may not be allowed so it's best to confirm with the manufacturer.

Once the tubes have been prepped, you can start plug installation. The design of the one-piece plug makes them easy to install. The tapered pin is installed by simply tapping the end of the plug into the tube with a hammer or mallet until metal-to-metal contact is made and then advancing it an additional 1/8". Driving the plug all the way into the tube can cause stress on the joint and has the potential of causing damage to the ligament. If this occurs it can cause adjacent tubes to leak. Generally, operators say you'll hear a ringing sound or a ping to let you know that the plug set.

Overall, welding one-piece plugs can be a viable option for many different applications. Whether the tube is corroded, or the user wants the extra seal protection, when done correctly welding can be a great solution. However, it's important to understand what materials and documentation are required to ensure vessel specifications are met. For example, ASME often specifies that SA-105 Carbon Steel be used in welding applications due to its strength under pressure and high temperatures. Additionally, material certifications and heat lot numbers will provide optimal traceability in the event of a failure.

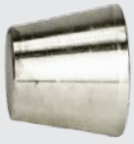
Tube Plug Installation Process

1. Trim Tube Ends

2. Clean Tube Ends

3. Vent Tube

4. Hammer In One-Piece Plug



Two-Piece Tube Plugs

Tube Size
- 0.375” to 1.250” OD
- 9.5mm to 31.8mm OD

Maximum Pressure
- 150 PSI

Elliott’s Two-Piece Tube Plugs offer more sealing compared to One-Piece Plugs. The tapered pin is driven into the ring, which is tapered on the inside and is parallel to the tube on the outside. This gives even expansion to the ring and a long contact to the seal.

It is good practice to install rings and pins that are the same as or a compatible material to the tube to be plugged. The tube plugs are available in an array of materials to suit your needs: brass, carbon steel, 316 stainless steel, 416 stainless steel, and aluminum (other materials are available upon request). Elliott recommends puncturing the leaky tube with a One-Revolution Tube Cutter. This will ensure the tube is properly vented prior to plugging.

Features & Benefits:
- Better method to plug leaky tubes - less labor cost.
- Larger sealing surface - less chance for repeat leaking.
- Does not damage the tube sheet - no tube sheet repair cost.

Spares & Accessories:
- One Revolution Tube Cutter: Utilize to puncture the tube to ensure the tube is properly vented so pressure cannot build up in the tube and cause the plugs to loosen. See page 190.

MADE IN USA

Two-Piece Plug											
Tube OD	BWG	Brass- 10 Pack*		Carbon Steel- 10 Pack*		316 Stainless Steel- 10 Pack*		416 Stainless Steel- 10 Pack*		Aluminum - 10 Pack*	
		Ring	Pin	Ring	Pin	Ring	Pin	Ring	Pin	Ring	Pin
3/8" (9.5mm)	20	853002-308-10	853103-312-10	853102-308-10	853003-312-10	861802-308-10	861803-312-10	852902-308-10	852903-312-10	861902-308-10	861903-312-10
	21	853002-315-10		853102-315-10		861802-315-10		852902-315-10		861902-315-10	
	22	853002-322-10		853102-322-10		861802-322-10		852902-322-10		861902-322-10	
	23										
	24	853002-333-10		853102-333-10		861802-333-10		852902-333-10		861902-333-10	
1/2" (12.7mm)	15	853002-363-10		853102-363-10		861802-363-10		852902-363-10		861902-363-10	
	16	853002-377-10	853103-375-10	853102-377-10	853003-375-10	861802-377-10	861803-375-10	852902-377-10	852903-375-10	861902-377-10	861903-375-10
	17	853002-390-10		853102-390-10		861802-390-10		852902-390-10		861902-390-10	
	18	853002-407-10		853102-407-10		861802-407-10		852902-407-10		861902-407-10	
	19	853002-418-10		853102-418-10		861802-418-10		852902-418-10		861902-418-10	
	20	853002-435-10		853102-435-10		861802-435-10		852902-435-10		861902-435-10	
	21	853002-440-10	853103-437-10	853102-440-10	853003-437-10	861802-440-10	861803-437-10	852902-440-10	852903-437-10	861902-440-10	861903-437-10
	22	853002-445-10		853102-445-10		861802-445-10		852902-445-10		861902-445-10	
	23	853002-455-10		853102-455-10		861802-455-10		852902-455-10		861902-455-10	
5/8" (15.9mm)	11	853002-397-10	853103-375-10	853102-397-10	853003-375-10	861802-397-10	861803-375-10	852902-397-10	852903-375-10	861902-397-10	861903-375-10
	12	853002-418-10		853102-418-10		861802-418-10		852902-418-10		861902-418-10	
	13	853002-445-10	853103-437-10	853102-445-10	853003-437-10	861802-445-10	861803-437-10	852902-445-10	852903-437-10	861902-445-10	861903-437-10
	14	853002-467-10		853102-467-10		861802-467-10		852902-467-10		861902-467-10	
	15	853002-488-10		853102-488-10		861802-488-10		852902-488-10		861902-488-10	
	16	853002-502-10	853103-500-10	853102-502-10	853003-500-10	861802-502-10	861803-500-10	852902-502-10	852903-500-10	861902-502-10	861903-500-10
	17	853002-515-10		853102-515-10		861802-515-10		852902-515-10		861902-515-10	
	18	853002-532-10		853102-532-10		861802-532-10		852902-532-10		861902-532-10	
	19	853002-545-10		853102-545-10		861802-545-10		852902-545-10		861902-545-10	
	20	853002-559-10		853102-559-10		861802-559-10		852902-559-10		861902-559-10	
	21	853002-564-10		853102-564-10		861802-564-10		852902-564-10		861902-564-10	
	22	853002-570-10		853102-570-10		861802-570-10		852902-570-10		861902-570-10	
3/4" (19.1mm)	9	853002-467-10	853103-437-10	853102-467-10	853003-437-10	861802-467-10	861803-437-10	852902-467-10	852903-437-10	861902-467-10	861903-437-10
	10	853002-495-10		853102-495-10		861802-495-10		852902-495-10		861902-495-10	
	11	853002-522-10	853103-500-10	853102-522-10	853003-500-10	861802-522-10	861803-500-10	852902-522-10	852903-500-10	861902-522-10	861903-500-10
	12	853002-545-10		853102-545-10		861802-545-10		852902-545-10		861902-545-10	
	13	853002-570-10		853102-570-10		861802-570-10		852902-570-10		861902-570-10	

** Plugs are only available in 10 packs.*

Note: Additional sizes and materials are available upon request. A minimum order quantity may be applicable for these special sizes and materials. Contact Customer Service for details.

MADE IN USA

Two-Piece Tube Plugs

Two-Piece Plug- 10 Pack Part #											
Tube OD	BWG	Brass- 10 Pack*		Carbon Steel- 10 Pack*		316 Stainless Steel- 10 Pack*		416 Stainless Steel- 10 Pack*		Aluminum- 10 Pack*	
		Ring	Pin	Ring	Pin	Ring	Pin	Ring	Pin	Ring	Pin
3/4" (19.1mm)	14	853002-590-10	853103-500-10	853102-590-10	853003-500-10	861802-590-10	861803-500-10	852902-590-10	852903-500-10	861902-590-10	861903-500-10
	15	853002-613-10	853103-1-10	853102-613-10	853003-1-10	861802-613-10	861803-1-10	852902-613-10	852903-1-10	861902-613-10	861903-1-10
	16	853002-631-10		853102-631-10		861802-631-10		852902-631-10		861902-631-10	
	17	853002-640-10		853102-640-10		861802-640-10		852902-640-10		861902-640-10	
	18	853002-657-10		853102-657-10		861802-657-10		852902-657-10		861902-657-10	
	19	853002-670-10		853102-670-10		861802-670-10		852902-670-10		861902-670-10	
	20	853002-685-10		853102-685-10		861802-685-10		852902-685-10		861902-685-10	
	21	853002-690-10	853103-1A-10	853102-690-10	853003-1A-10	861802-690-10	861803-1A-10	852902-690-10	852903-1A-10	861902-690-10	861903-1A-10
	22	853002-695-10		853102-695-10		861802-695-10		852902-695-10		861902-695-10	
7/8" (22.2mm)	9	853002-590-10	853103-500-10	853102-590-10	853003-500-10	861802-590-10	861803-500-10	852902-590-10	852903-500-10	861902-590-10	861903-500-10
	10	853002-620-10	853103-1-10	853102-620-10	853003-1-10	861802-620-10	861803-1-10	852902-620-10	852903-1-10	861902-620-10	861903-1-10
	11	853002-647-10		853102-647-10		861802-647-10		852902-647-10		861902-647-10	
	12	853002-670-10		853102-670-10		861802-670-10		852902-670-10		861902-670-10	
	13	853002-695-10	853103-1A-10	853102-695-10	853003-1A-10	861802-695-10	861803-1A-10	852902-695-10	852903-1A-10	861902-695-10	861903-1A-10
	14	853002-719-10		853102-719-10		861802-719-10		852902-719-10		861902-719-10	
	15	853002-738-10		853102-738-10		861802-738-10		852902-738-10		861902-738-10	
	16	853002-752-10		853102-752-10		861802-752-10		852902-752-10		861902-752-10	
	17	853002-765-10		853102-765-10		861802-765-10		852902-765-10		861902-765-10	
	18	853002-782-10	853103-2-10	853102-782-10	853003-2-10	861802-782-10	861803-2-10	852902-782-10	852903-2-10	861902-782-10	861903-2-10
	19	853002-793-10		853102-793-10		861802-793-10		852902-793-10		861902-793-10	
	20	853002-809-10		853102-809-10		861802-809-10		852902-809-10		861902-809-10	
	21										
	22	853002-820-10		853102-820-10		861802-820-10		852902-820-10		861902-820-10	
1" (25.4mm)	8	853002-687-10	853103-1A-10	853102-687-10	853003-1A-10	861802-687-10	861803-1A-10	852902-687-10	852903-1A-10	861902-687-10	861903-1A-10
	9	853002-719-10		853102-719-10		861802-719-10		852902-719-10		861902-719-10	
	10	853002-745-10		853102-745-10		861802-745-10		852902-745-10		861902-745-10	
	11	853002-772-10		853102-772-10		861802-772-10		852902-772-10		861902-772-10	
	12	853002-793-10	853103-2-10	853102-793-10	853003-2-10	861802-793-10	861803-2-10	852902-793-10	852903-2-10	861902-793-10	861903-2-10
	13	853002-820-10		853102-820-10		861802-820-10		852902-820-10		861902-820-10	
	14	853002-845-10		853102-845-10		861802-845-10		852902-845-10		861902-845-10	

** Plugs are only available in 10 packs.*

Note: Additional sizes and materials are available upon request. A minimum order quantity may be applicable for these special sizes and materials. Contact Customer Service for details.

MADE IN USA

Two-Piece Plug- 10 Pack Part #											
Tube OD	BWG	Brass- 10 Pack*		Carbon Steel- 10 Pack*		316 Stainless Steel- 10 Pack*		416 Stainless Steel- 10 Pack*		Aluminum - 10 Pack*	
		Ring	Pin	Ring	Pin	Ring	Pin	Ring	Pin	Ring	Pin
1" (25.4mm)	15	853002-863-10	853103-2-10	853102-863-10	853003-2-10	861802-863-10	861803-2-10	852902-863-10	852903-2-10	861902-863-10	861903-2-10
	16	853002-877-10	853103-2A-10	853102-877-10	853003-2A-10	861802-877-10	861803-2A-10	852902-877-10	852903-2A-10	861902-877-10	861903-2A-10
	17	853002-890-10		853102-890-10		861802-890-10		852902-890-10		861902-890-10	
	18	853002-907-10		853102-907-10		861802-907-10		852902-907-10		861902-907-10	
	19	853002-918-10		853102-918-10		861802-918-10		852902-918-10		861902-918-10	
	20	853002-934-10		853102-934-10		861802-934-10		852902-934-10		861902-934-10	
	21	853002-937-10		853102-937-10		861802-937-10		852902-937-10		861902-937-10	
	22	853002-945-10		853102-945-10		861802-945-10		852902-945-10		861902-945-10	
1-1/8" (28.6mm)	8	853002-812-10	853103-2-10	853102-812-10	853003-2-10	861802-812-10	861803-2-10	852902-812-10	852903-2-10	861902-812-10	861903-2-10
	9	853002-845-10		853102-845-10		861802-845-10		852902-845-10		861902-845-10	
	10	853002-870-10		853102-870-10		861802-870-10		852902-870-10		861902-870-10	
	11	853002-897-10	853103-2A-10	853102-897-10	853003-2A-10	861802-897-10	861803-2A-10	852902-897-10	852903-2A-10	861902-897-10	861903-2A-10
	12	853002-918-10		853102-918-10		861802-918-10		852902-918-10		861902-918-10	
	13	853002-945-10		853102-945-10		861802-945-10		852902-945-10		861902-945-10	
	14	853002-969-10	853103-3-10	853102-969-10	853003-3-10	861802-969-10	861803-3-10	852902-969-10	852903-3-10	861902-969-10	861903-3-10
	15	853002-988-10		853102-988-10		861802-988-10		852902-988-10		861902-988-10	
	16	853002-1002-10		853102-1002-10		861802-1002-10		852902-1002-10		861902-1002-10	
	17	853002-1015-10		853102-1015-10		861802-1015-10		852902-1015-10		861902-1015-10	
	18	853002-1032-10		853102-1032-10		861802-1032-10		852902-1032-10		861902-1032-10	
1-1/4" (31.8mm)	8	853002-937-10	853103-2A-10	853102-937-10	853003-2A-10	861802-937-10	861803-2A-10	852902-937-10	852903-2A-10	861902-937-10	861903-2A-10
	9	853002-969-10	853103-3-10	853102-969-10	853003-3-10	861802-969-10	861803-3-10	852902-969-10	852903-3-10	861902-969-10	861903-3-10
	10	853002-995-10		853102-995-10		861802-995-10		852902-995-10		861902-995-10	
	11	853002-1022-10		853102-1022-10		861802-1022-10		852902-1022-10		861902-1022-10	
	12	853002-1043-10		853102-1043-10		861802-1043-10		852902-1043-10		861902-1043-10	
	13	853002-1070-10	853103-3A-10	853102-1070-10	853003-3A-10	861802-1070-10	861803-3A-10	852902-1070-10	852903-3A-10	861902-1070-10	861903-3A-10
	14	853002-1092-10		853102-1092-10		861802-1092-10		852902-1092-10		861902-1092-10	
	15	853002-1113-10		853102-1113-10		861802-1113-10		852902-1113-10		861902-1113-10	
	16	853002-1127-10		853102-1127-10		861802-1127-10		852902-1127-10		861902-1127-10	
	17	853002-1140-10		853102-1140-10		861802-1140-10		852902-1140-10		861902-1140-10	
	18	853002-1157-10		853102-1157-10		861802-1157-10		852902-1157-10		861902-1157-10	

** Plugs are only available in 10 packs.*

Note: Additional sizes and materials are available upon request. A minimum order quantity may be applicable for these special sizes and materials. Contact Customer Service for details.

MADE IN USA

Mechanical Tube Plugs

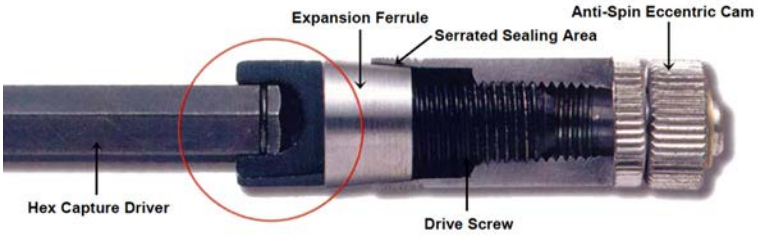
Tube Size
- 0.410” to 1.000” ID
- 10.4mm to 25.4mm ID

Maximum Pressure
- 1,000 or 6,500 PSI

Elliott’s mechanical plugs create a positive mechanical contact seal up to 1,000 PSI (68.95 bar) or 6,500 PSI (448.2 bar), making them ideal for medium and high pressure applications such as feedwater heaters and other high pressure heat exchangers over 200 PSI (13.8 bar) and is compliant with ASME PCC-2-2015. As the most secure method to plug leaky tubes, they can also be used in low pressure applications for peace of mind.

Elliott’s mechanical plugs have been used by customers for more than 30 years. Our proven design makes them the most secure method to plug leaky tubes. Setup of the mechanical plug is quick and easy because the plug is installed without a hydraulic ram. With only a plug and hand torque wrench, the operator is ready to plug tubes. Simply insert the plug into the tube and expand with a standard 3/8” drive torque wrench. The plug will expand approximately 0.030” (0.76mm) to provide a positive mechanical contact seal. The one piece design allows operators to easily plug tubes in tight spaces like hemispherical heads, baffle plates, and dividers.

It is good practice to install tube plugs that are the same as or a compatible material to the tube and tube sheet. The tube plugs are available in an array of materials to suit your needs: brass, carbon steel, stainless steel, titanium, Monel, and copper nickel. Elliott recommends puncturing the leaky tube with a One-Revolution Tube Cutter. This will ensure the tube is properly vented prior to plugging.



Patented Hex Drive Capture System
New hex drivers have a spring loaded tang that captures the plug onto the end of the drive preventing it from falling off into the heat exchanger tube.

Features & Benefits:

Peace Of Mind
Most secure method to plug leaky tubes. No welding required.

Expands In Tube
Can be installed into hard to reach areas and at any depth of the tube sheet, avoiding severely corroded areas on the tube sheet face.

Low Investment
No expensive capital equipment required.

Protects The Tube Sheet
Wide sealing zone ensures a positive seal with a gradual and symmetrical torque expansion – Eliminates thermal and mechanical shock to the tube sheet.

MADE IN USA

Quality Assurance:

Tested to meet or exceed all of the following industry standards:

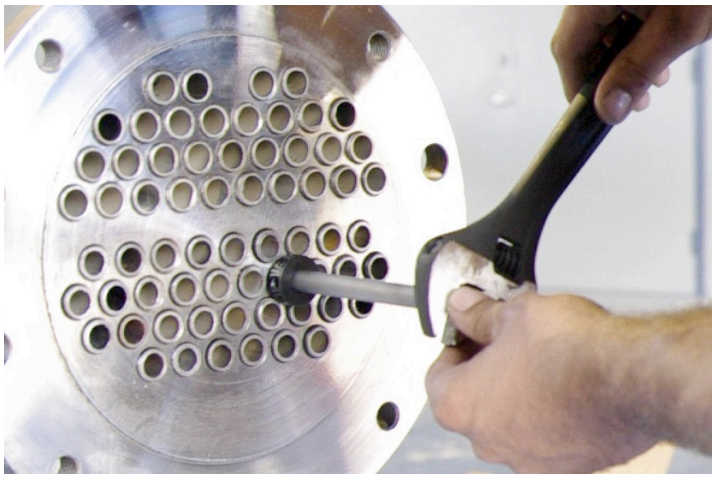
Industry Standards
ASME B31.3
ASME Section VII Division 1
CSA B51
CSA Z662
TEMA
CAN/CSA 285.0 6.1.6 Cat H
ASME PCC-2-2015
ISO-9001: 2008 Standards for: • ASME Section VII • API 660 • Alberta (ABSA) • Ontario (TSSA)
Visit our website to read the comprehensive testing report, www.elliott-tool.com/mechanical-tube-plugs/

Spares & Accessories:

- Tube Prep Brushes, see page 178
- Brush Extensions, see page 181
- Mechanical Plug Removal Kit, see page 181
- Torque Wrench, 8830TW: Use to install the high pressure tube plug into the tube.
- One Revolution Tube Cutter: Utilize to puncture the tube to ensure the tube is properly vented so pressure cannot build up in the tube and cause the plugs to loosen. See page 190.

Specifications:

- Pressure: 1,000 PSI (68.95 bar) or 6,500 PSI (448.2 bar).
- Temperature: Up to 1,750ºF (954.4ºC).
- Standard Reach: 5” for 1/4” and 5/16” drive, 6-1/2” for 3/8” drive.



Install & Remove Elliott’s Mechanical Plugs Quickly & Easily. Visit Our Website To Learn More!

www.elliott-tool.com/mechanical-tube-plugs

MADE IN USA

Mechanical Tube Plugs
Medium Pressure - Up To 1,000 PSI

The below size recommendations assume a 5% wall reduction and 0.010" (0.254mm) clearance between the tube and tube sheet hole.

Tube Size		Measured Tube ID Range (Up to 1,000 PSI)		Plug OD		Prep Brush	Plug Part # (10 Packs)					
OD	BWG	Inch	mm	Inch	mm		Brass	Carbon Steel	316 Stainless Steel	Titanium	Monel	90/10 Cu-Ni
1/2" (12.7mm)	19	0.410 - 0.445	10.41 - 11.30	0.405	10.29	MPB-410	8830-410-10	8831-410-10	8832-410-10	8833-410-10	8834-410-10	8835-410-10
	20-22	0.430 - 0.465	10.92 - 11.81	0.425	10.80	MPB-430	8830-430-10	8831-430-10	8832-430-10	8833-430-10	8834-430-10	8835-430-10
	24	0.450 - 0.485	11.43 - 12.32	0.445	11.30	MPB-450	8830-450-10	8831-450-10	8832-450-10	8833-450-10	8834-450-10	8835-450-10
5/8" (15.9mm)	13	0.430 - 0.465	10.92 - 11.81	0.425	10.80	MPB-430	8830-430-10	8831-430-10	8832-430-10	8833-430-10	8834-430-10	8835-430-10
	14	0.450 - 0.485	11.43 - 12.32	0.445	11.30	MPB-450	8830-450-10	8831-450-10	8832-450-10	8833-450-10	8834-450-10	8835-450-10
	15	0.470 - 0.505	11.94 - 12.83	0.465	11.81	MPB-470	8830-470-10	8831-470-10	8832-470-10	8833-470-10	8834-470-10	8835-470-10
	16	0.490 - 0.525	12.45 - 13.34	0.485	12.32	MPB-490	8830-490-10	8831-490-10	8832-490-10	8833-490-10	8834-490-10	8835-490-10
	17	0.500 - 0.535	12.70 - 13.59	0.495	12.57	MPB-510	8830-500-10	8831-500-10	8832-500-10	8833-500-10	8834-500-10	8835-500-10
	18	0.510 - 0.545	12.95 - 13.84	0.505	12.83		8830-510-10	8831-510-10	8832-510-10	8833-510-10	8834-510-10	8835-510-10
	19	0.530 - 0.565	13.46 - 14.35	0.525	13.34	MPB-530	8830-530-10	8831-530-10	8832-530-10	8833-530-10	8834-530-10	8835-530-10
	20-21	0.550 - 0.585	13.97 - 14.86	0.545	13.84	MPB-550	8830-550-10	8831-550-10	8832-550-10	8833-550-10	8834-550-10	8835-550-10
	22-24	0.570 - 0.605	14.48 - 15.37	0.565	14.35	MPB-570	8830-570-10	8831-570-10	8832-570-10	8833-570-10	8834-570-10	8835-570-10
3/4" (19.1mm)	10	0.480 - 0.515	12.19 - 13.08	0.475	12.07	MPB-490	8830-480-10	8831-480-10	8832-480-10	8833-480-10	8834-480-10	8835-480-10
	11	0.510 - 0.545	12.95 - 13.84	0.505	12.83	MPB-510	8830-510-10	8831-510-10	8832-510-10	8833-510-10	8834-510-10	8835-510-10
	12	0.530 - 0.565	13.46 - 14.35	0.525	13.34	MPB-530	8830-530-10	8831-530-10	8832-530-10	8833-530-10	8834-530-10	8835-530-10
	13	0.550 - 0.585	13.97 - 14.86	0.545	13.84	MPB-550	8830-550-10	8831-550-10	8832-550-10	8833-550-10	8834-550-10	8835-550-10
	14	0.580 - 0.615	14.73 - 15.62	0.575	14.61	MPB-590	8830-580-10	8831-580-10	8832-580-10	8833-580-10	8834-580-10	8835-580-10
	15	0.600 - 0.635	15.24 - 16.13	0.595	15.11	MPB-610	8830-600-10	8831-600-10	8832-600-10	8833-600-10	8834-600-10	8835-600-10
	16	0.610 - 0.645	15.49 - 16.38	0.605	15.37		8830-610-10	8831-610-10	8832-610-10	8833-610-10	8834-610-10	8835-610-10
	17	0.630 - 0.665	16.00 - 16.89	0.625	15.88	MPB-630	8830-630-10	8831-630-10	8832-630-10	8833-630-10	8834-630-10	8835-630-10
	18-19	0.650 - 0.685	16.51 - 17.40	0.645	16.38	MPB-650	8830-650-10	8831-650-10	8832-650-10	8833-650-10	8834-650-10	8835-650-10
	20	0.670 - 0.705	17.02 - 17.91	0.665	16.89	MPB-670	8830-670-10	8831-670-10	8832-670-10	8833-670-10	8834-670-10	8835-670-10
	21	0.680 - 0.715	17.27 - 18.16	0.675	17.15	MPB-690	8830-680-10	8831-680-10	8832-680-10	8833-680-10	8834-680-10	8835-680-10
	22-24	0.690 - 0.725	15.53 - 18.42	0.685	17.40		8830-690-10	8831-690-10	8832-690-10	8833-690-10	8834-690-10	8835-690-10
7/8" (22.2mm)	10	0.600 - 0.635	15.24 - 16.13	0.595	15.11	MPB-610	8830-600-10	8831-600-10	8832-600-10	8833-600-10	8834-600-10	8835-600-10
	11	0.630 - 0.665	16.00 - 16.89	0.625	15.88	MPB-630	8830-630-10	8831-630-10	8832-630-10	8833-630-10	8834-630-10	8835-630-10
	12	0.650 - 0.685	16.51 - 17.40	0.645	16.38	MPB-650	8830-650-10	8831-650-10	8832-650-10	8833-650-10	8834-650-10	8835-650-10

Plugs are only available in 10 packs.
Additional sizes and materials available upon request.

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The below size recommendations assume a 5% wall reduction and 0.010" (0.254mm) clearance between the tube and tube sheet hole.

Tube Size		Measured Tube ID Range (Up to 1,000 PSI)		Plug OD		Prep Brush	Plug Part # (10 Packs)					
OD	BWG	Inch	mm	Inch	mm		Brass	Carbon Steel	316 Stainless Steel	Titanium	Monel	90/10 Cu-Ni
7/8" (22.2mm)	13	0.680 - 0.715	17.27 - 18.16	0.675	17.15	MPB-690	8830-680-10	8831-680-10	8832-680-10	8833-680-10	8834-680-10	8835-680-10
	14	0.700 - 0.735	17.78 - 18.67	0.695	17.65	MPB-710	8830-700-10	8831-700-10	8832-700-10	8833-700-10	8834-700-10	8835-700-10
	15-16	0.730 - 0.765	18.54 - 19.43	0.725	18.42	MPB-730	8830-730-10	8831-730-10	8832-730-10	8833-730-10	8834-730-10	8835-730-10
	17	0.750 - 0.785	19.05 - 19.94	0.745	18.92	MPB-750	8830-750-10	8831-750-10	8832-750-10	8833-750-10	8834-750-10	8835-750-10
	18	0.770 - 0.805	19.56 - 20.45	0.765	19.43	MPB-770	8830-770-10	8831-770-10	8832-770-10	8833-770-10	8834-770-10	8835-770-10
	19	0.780 - 0.815	19.81 - 20.70	0.775	19.69	MPB-780	8830-780-10	8831-780-10	8832-780-10	8833-780-10	8834-780-10	8835-780-10
	20-21	0.800 - 0.835	20.32 - 21.21	0.795	20.19	MPB-800	8830-800-10	8831-800-10	8832-800-10	8833-800-10	8834-800-10	8835-800-10
	22	0.810 - 0.845	20.57 - 21.46	0.805	20.45	MPB-820	8830-810-10	8831-810-10	8832-810-10	8833-810-10	8834-810-10	8835-810-10
	24	0.820 - 0.855	20.83 - 21.72	0.815	20.70		8830-820-10	8831-820-10	8832-820-10	8833-820-10	8834-820-10	8835-820-10
1" (25.4mm)	10	0.730 - 0.765	18.54 - 19.43	0.725	18.42	MPB-730	8830-730-10	8831-730-10	8832-730-10	8833-730-10	8834-730-10	8835-730-10
	11	0.760 - 0.795	19.30 - 20.19	0.755	19.18	MPB-770	8830-760-10	8831-760-10	8832-760-10	8833-760-10	8834-760-10	8835-760-10
	12	0.780 - 0.815	19.81 - 20.70	0.775	19.69	MPB-780	8830-780-10	8831-780-10	8832-780-10	8833-780-10	8834-780-10	8835-780-10
	13	0.800 - 0.835	20.32 - 21.21	0.795	20.19	MPB-800	8830-800-10	8831-800-10	8832-800-10	8833-800-10	8834-800-10	8835-800-10
	14	0.830 - 0.865	21.08 - 21.97	0.825	20.96	MPB-840	8830-830-10	8831-830-10	8832-830-10	8833-830-10	8834-830-10	8835-830-10
	15	0.850 - 0.885	21.59 - 22.48	0.845	21.46	MPB-860	8830-850-10	8831-850-10	8832-850-10	8833-850-10	8834-850-10	8835-850-10
	16	0.860 - 0.895	21.84 - 22.73	0.855	21.72		8830-860-10	8831-860-10	8832-860-10	8833-860-10	8834-860-10	8835-860-10
	17	0.880 - 0.915	22.35 - 23.24	0.875	22.23	MPB-880	8830-880-10	8831-880-10	8832-880-10	8833-880-10	8834-880-10	8835-880-10
	18	0.900 - 0.935	22.86 - 23.75	0.895	22.73	MPB-900	8830-900-10	8831-900-10	8832-900-10	8833-900-10	8834-900-10	8835-900-10
	19	0.910 - 0.945	23.11 - 24.00	0.905	22.99	MPB-920	8830-910-10	8831-910-10	8832-910-10	8833-910-10	8834-910-10	8835-910-10
	20-21	0.920 - 0.955	23.37 - 24.26	0.915	23.24		8830-920-10	8831-920-10	8832-920-10	8833-920-10	8834-920-10	8835-920-10
	22-24	0.940 - 0.975	23.88 - 24.77	0.935	23.75	MPB-940	8830-940-10	8831-940-10	8832-940-10	8833-940-10	8834-940-10	8835-940-10
1-1/4" (31.8mm)	8	0.915 - 0.950	23.24 - 24.13	0.910	23.11	MPB-920	8830-915-10	8831-915-10	8832-915-10	8833-915-10	8834-915-10	8835-915-10
	10	0.980 - 1.015	24.89 - 25.78	0.975	24.78	MPB-980	8830-980-10	8831-980-10	8832-980-10	8833-980-10	8834-980-10	8835-980-10

Plugs are only available in 10 packs.
Additional sizes and materials available upon request.

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Mechanical Tube Plugs
High Pressure - Up to 6,500 PSI

Measured Tube ID Range (Up to 6,500 PSI)		Plug OD		Prep Brush	Plug Part # (10 Packs)*					
Inch	mm	Inch	mm		Brass	Carbon Steel	316 Stainless Steel	Titanium	Monel	90/10 Cu-Ni
0.410-0.429	10.41-10.92	0.405	10.29	MPB-410	8830-410-10	8831-410-10	8832-410-10	8833-410-10	8834-410-10	8835-410-10
0.430-0.449	10.92-11.43	0.425	10.80	MPB-430	8830-430-10	8831-430-10	8832-430-10	8833-430-10	8834-430-10	8835-430-10
0.450-0.469	11.43-11.94	0.445	11.30	MPB-450	8830-450-10	8831-450-10	8832-450-10	8833-450-10	8834-450-10	8835-450-10
0.470-0.489	11.94-12.45	0.465	11.81	MPB-470	8830-470-10	8831-470-10	8832-470-10	8833-470-10	8834-470-10	8835-470-10
0.490-0.509	12.45-12.95	0.485	12.32	MPB-490	8830-490-10	8831-490-10	8832-490-10	8833-490-10	8834-490-10	8835-490-10
0.510-0.529	12.95-13.46	0.505	12.83	MPB-510	8830-510-10	8831-510-10	8832-510-10	8833-510-10	8834-510-10	8835-510-10
0.530-0.549	13.46-13.97	0.525	13.34	MPB-530	8830-530-10	8831-530-10	8832-530-10	8833-530-10	8834-530-10	8835-530-10
0.550-0.569	13.97-14.48	0.545	13.84	MPB-550	8830-550-10	8831-550-10	8832-550-10	8833-550-10	8834-550-10	8835-550-10
0.570-0.589	14.48-14.99	0.565	14.35	MPB-570	8830-570-10	8831-570-10	8832-570-10	8833-570-10	8834-570-10	8835-570-10
0.590-0.609	14.99-15.49	0.585	14.86	MPB-590	8830-590-10	8831-590-10	8832-590-10	8833-590-10	8834-590-10	8835-590-10
0.610-0.629	15.49-16.00	0.605	15.37	MPB-610	8830-610-10	8831-610-10	8832-610-10	8833-610-10	8834-610-10	8835-610-10
0.630-0.649	16.00-16.51	0.625	15.88	MPB-630	8830-630-10	8831-630-10	8832-630-10	8833-630-10	8834-630-10	8835-630-10
0.650-0.669	16.51-17.02	0.645	16.38	MPB-650	8830-650-10	8831-650-10	8832-650 -10	8833-650-10	8834-650-10	8835-650-10
0.670-0.689	17.02-17.53	0.665	16.89	MPB-670	8830-670-10	8831-670-10	8832-670-10	8833-670-10	8834-670-10	8835-670-10
0.690-0.709	17.53-18.03	0.685	17.40	MPB-690	8830-690-10	8831-690-10	8832-690-10	8833-690-10	8834-690-10	8835-690-10
0.710-0.729	18.03-18.54	0.705	17.91	MPB-710	8830-710-10	8831-710-10	8832-710-10	8833-710-10	8834-710-10	8835-710-10
0.730-0.749	18.54-19.05	0.725	18.42	MPB-730	8830-730-10	8831-730-10	8832-730-10	8833-730-10	8834-730-10	8835-730-10
0.750-0.769	19.05-19.56	0.745	18.92	MPB-750	8830-750-10	8831-750-10	8832-750-10	8833-750-10	8834-750-10	8835-750-10
0.770-0.789	19.56-20.07	0.765	19.43	MPB-770	8830-770-10	8831-770-10	8832-770-10	8833-770-10	8834-770-10	8835-770-10
0.780-0.799	19.81-20.32	0.775	19.69	MPB-780	8830-780-10	8831-780-10	8832-780-10	8833-780-10	8834-780-10	8835-780-10
0.800-0.819	20.32-20.83	0.795	20.19	MPB-800	8830-800-10	8831-800-10	8832-800-10	8833-800-10	8834-800-10	8835-800-10
0.820-0.839	20.83-21.34	0.815	20.70	MPB-820	8830-820-10	8831-820-10	8832-820-10	8833-820-10	8834-820-10	8835-820-10
0.840-0.859	21.34-21.84	0.835	21.21	MPB-840	8830-840-10	8831-840-10	8832-840-10	8833-840-10	8834-840-10	8835-840-10
0.860-0.879	21.84-22.35	0.855	21.72	MPB-860	8830-860-10	8831-860-10	8832-860-10	8833-860-10	8834-860-10	8835-860-10
0.880-0.899	22.35-22.86	0.875	22.23	MPB-880	8830-880-10	8831-880-10	8832-880-10	8833-880-10	8834-880-10	8835-880-10
0.900-0.919	22.86-23.37	0.895	22.73	MPB-900	8830-900-10	8831-900-10	8832-900-10	8833-900-10	8834-900-10	8835-900-10
0.920-0.939	23.37-23.88	0.915	23.24	MPB-920	8830-920-10	8831-920-10	8832-920-10	8833-920-10	8834-920-10	8835-920-10
0.940-0.959	23.88-24.38	0.935	23.75	MPB-940	8830-940-10	8831-940-10	8832-940-10	8833-940-10	8834-940-10	8835-940-10
0.960-0.979	24.38-24.89	0.955	24.26	MPB-960	8830-960-10	8831-960-10	8832-960-10	8833-960-10	8834-960-10	8835-960-10
0.980-1.000	24.89-25.40	0.975	24.77	MPB-980	8830-980-10	8831-980-10	8832-980-10	8833-980-10	8834-980-10	8835-980-10

** Plugs are only available in 10 packs.*

Note: Elliott offers mechanical tube plugs to meet Nuclear ASME Sec. III or ISO 9002 QA specifications.
Additional sizes and materials are available upon request. A minimum order quantity may be applicable for these special sizes and materials. Contact Customer Service for details.

Required Torque To Set Tube Plug							
Plug OD (Inches)	Brass & Cu-Ni		Carbon Steel		Stainless Steel, Titanium, & Monel		Hex Drive (Inches)
	in lbs.	Nm	in lbs.	Nm	in lbs.	Nm	
0.410-0.550	200	22.5	250	28.2	300	33.9	1/4
0.570-0.710	250	28.2	350	39.5	500	56.5	5/16
0.730-0.980	350	39.5	450	50.8	600	67.8	3/8

The range on the torque wrench is 120 – 960 in. lbs.

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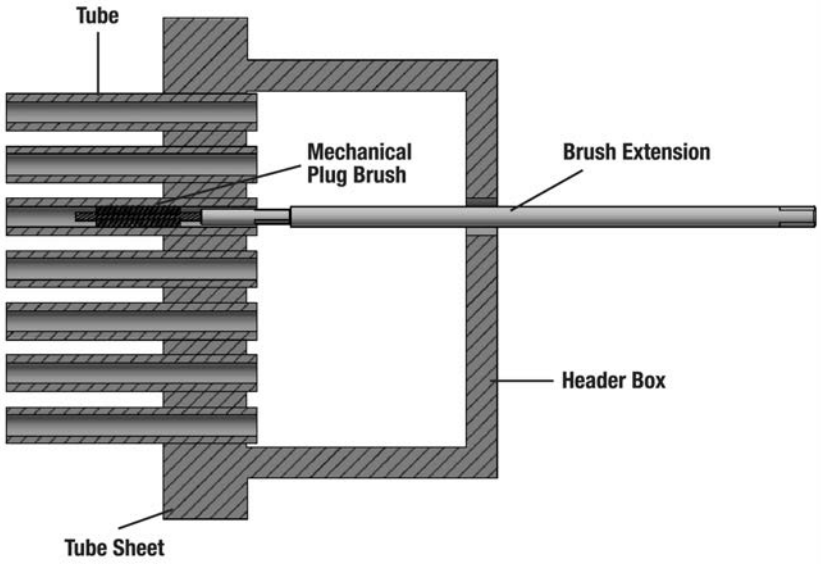
Tube Preparation:

It is highly recommended to clean the tube end prior to plugging. This ensures the surface is free from debris and optimal for positive sealing.

24" Brush Extensions:

Great for reaching through an air cooler header box.

Brush Range	Brush Extensions, 24" (609.6mm)
MPB-410 to MPB-570	MPB-D0375-24
MPB-590 to MPB-1000	MPB-D0500-24



Plug Removal:

Elliott offers plug removal kits to easily remove Elliott's mechanical plugs.

Measured Tube ID Range	Plug Removal Kits
0.410" - 0.569" (10.41 - 14.48mm)	8800-312
0.570" - 0.709" (14.48 - 18.03mm)	8800-375
0.710" - 1.000" (18.03 - 25.40mm)	8800-500

Plug Removal Kit Includes:

- Threaded Rod
- Easy Out
- Slide Hammer
- Hex Jam Nut
- Fender Washer

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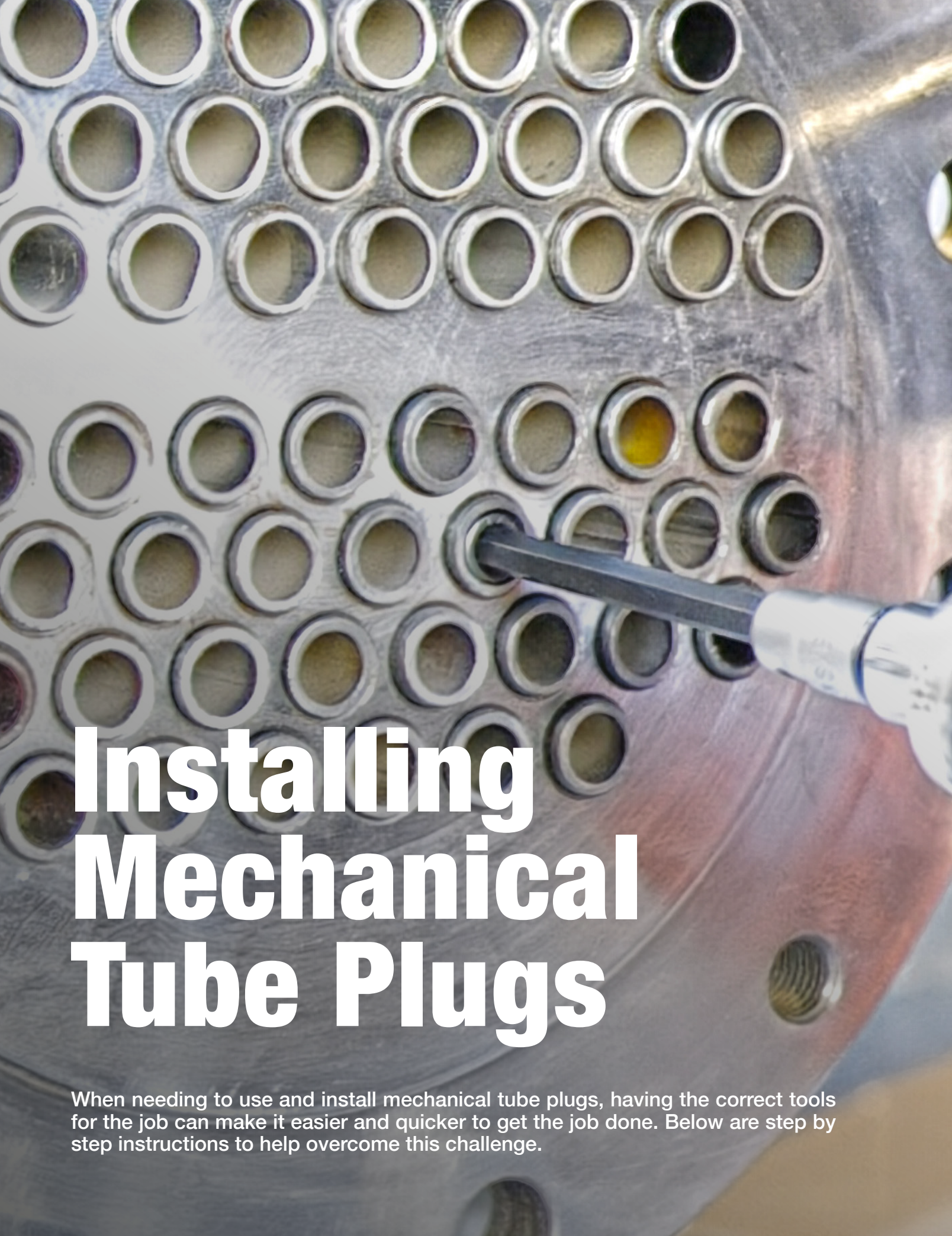


Installing Mechanical Tube Plugs

When needing to use and install mechanical tube plugs, having the correct tools for the job can make it easier and quicker to get the job done. Below are step by step instructions to help overcome this challenge.

Clean and Prep

Prior to any work being done it is important to brush the tube using Elliott's MPB brush sized properly for the tube ID. The MPB brush is a rigid steel wire brush that is designed to remove material from the tube to create a prime surface that the plug can seal against. The brush can be driven by a standard handheld drill. If the MPB brushes does not create a prime surface, an adjustable reamer can be used.

Please note the size and use caution to not over adjust the reamer and remove too much tube wall during this process. Elliott suggests that the adjustable reamer be driven by hand power only to avoid damage and control the reaming.

Measuring

Elliott's Tube Hole Gauge can be ordered for a wide range of sizes and reaches to overcome any reach constraints. When using this tool, it is important to measure in the area that you plan to install the tube plug and ensure that after each measurement, rotate the gauge 5-10° to further check the tube for any tenting or irregular shapes. Be sure to log this information so that it can be tracked for quality assurance.

Venting

One of the most overlooked best practices for plugging a tube is to vent the tube beforehand. Tube venting is a process by which a small

puncture is made inside of the tube, releasing any pressure or chemicals that may be trapped inside. Venting is highly recommended for oil refineries, petrochemical, chemical and other processes that utilize heat exchangers and feed water heaters. Certain chiller applications may specify otherwise, so it's best to check with your manufacturer.

To do this, we recommend using Elliott's One-Rev tube cutter. The vent should be beyond the tube sheet to ensure the tube does not build up pressure and create risk for plug dislodging, fire, or explosion. Venting can be done on both ends of the tube, as well as, on the top and bottom of the tube. This ensures that pressure cannot build-up later on due to corrosion or process fluids.

- Determine how far down the tube you wish to make the cut and lock the collar in place.
- Insert the cutter into the tube and start rotating the cutter clockwise.
- When you begin to feel some resistance, rotate the tool a quarter turn more to pierce the tube.
- Turn the cutter counter-clockwise to reset the cutter bit. Once the bit is retracted, the cutter can be removed.

Tube Plugging

Once the above has been completed, the operator can now choose the correct plug for the tube and application. Remember it's important to match like materials and to select the appropriately sized plug for the tube ID being plugged.

During installation you may find that you need accessories to reach

through channels for water boxes. This will be dependent on the vessel and space constraints. Things to keep in mind:

- If using socket extensions, be aware that extreme reaches could result in slight loss in torque. Double check the torque value on a test stand to anticipate and account for any loses.
- Brush extension kits are available from Elliott to ensure you can reach through headers, water boxes, and channels to clean the tube end.
- Air coolers pose a unique challenge as a 12’ reach expander could be needed to expand the tube past the tube sheet so that the eccentric cam has room to lock into place during installation.

To install the plug, select the correct size and place the plug on the end of the provided hex key until you hear a slight ‘snap’. This indicates that the plug is secure. When positioning the plug, be sure that the serrated portion of the plug lands within the tube sheet area. This will ensure that the plug seals against the tube and tube sheet to allow for optimal performance. If the serrated area lands outside of the tube sheet area, the plug and torque wrench could reach torque but during testing and operation, the plug could come lose and leaks would be present.

Once the plug is placed in the appropriate spot, take your torque wrench and start turning until torque increases. Elliott recommends the use of a digital torque wrench that features color, audio, and vibration alerts when you meet your desired torque. Once you reach the desired torque, stop applying force and remove the hex key from the plug and repeat this process for the next tube.

REMOVE

Avoiding Common Pitfalls of Tube Extraction

Tube removal can be a daunting task, especially when encountering challenges like corrosion or tight spaces. One of the most frustrating situations operators face is the inability to pull a tube using a hydraulic puller.

Why Won't This Tube Pull?

Tube Isn't Cut

A common oversight in tube removal is failing to cut the tube on the opposite side behind the tube sheet. This is particularly easy to miss when removing multiple tubes or sections. To prevent delays due to missed tubes, it's recommended to check that all tubes in the removal area have been successfully cut through on the other side prior to pulling.

Weld Hasn't Been Removed

With many manufacturers opting for seal or strength welds, welded tubes have become extremely common. While they are beneficial for the vessel when in operation, they can make tube removal much more time consuming. In order to remove a welded tube, the weld must first be removed.

One of the best methods for weld removal is to use an end prep tool, also known as a tube auger, boiler gun, or mill hog. This tool uses a collet jaw to grip the inside of the tube while the operator advances the blade until the weld is fully removed.

Wrong Size or Worn-Out Tool

When using a pulling spear, the ID of the tube is critical. If the spear is undersized for the tube, you will see it bottom out when being driven into the tube. This means it will go in the tube a quarter or halfway (up to the shoulder) before being driven in with an impact. If a spear is too small, the teeth won't be able to bite into the tube material enough to break the mechanical joint.

If the spear is oversized it will be difficult to drive it into the tube. This means that it will require more force to drive it into the tube with an impact and it won't be able to grip the tube effectively. Instead, this will result in spear breakage where the very end will snap off in use.

In addition to improper spear sizing, the inability to remove the tube can also be related to worn-out tooling. This can mean that the teeth of the spear are worn down and have lost their inability to grip the material. It can also mean that the collets are worn out and are not grabbing the spear or tube in the hydraulic puller itself. Many customers will know the collet set is worn out when they feel they need additional leverage to pull the tube.

Too Much Corrosion

In certain petrochemical applications, the hot pass side of an exchanger can see extensive corrosion due to temperature and caustic materials. If the tube is too worn and brittle, it will be very challenging to remove the tube with a spear. This will be evident if the tube breaks or fractures into pieces when trying to pull. In these situations, it's preferred to pull the tube from the back or punch them out with a knockout tool.

By understanding and addressing the common tube removal challenges outlined in this article, operators can significantly improve efficiency and reduce downtime. Proper tool selection and adherence to best practices are essential for successful tube extraction. By investing in training and staying updated on the latest techniques, operators can ensure that tube removal remains a smooth and efficient process.

9060 Series
One-Revolution Tube Cutter

Tube Size
- 0.375” to 2.500” OD
- (9.525 to 63.5mm) OD

Let the revolution begin.

Elliott’s 9060 One-Revolution Series tube cutters are unlike any other one-revolution cutter. Using more advanced engineering principles the cutter and blade have been designed to last longer, withstand more wear and require less force to cut the tube.

Elliott’s One-Rev is for hand use only with the employment of a ratchet or wrench. The 9060 One-Revolution Series tube cutters can be used for both cutting a tube for removal and puncturing the tube for venting prior to plugging.

The One-Revolution Tube Cutter is available in have a 6” (152.4mm) & 12” (304.8mm) reach. The Cutting Blades are manufactured from premium quality tool steel. For longer reach cutters, contact Customer Service for details.

Features & Benefits:
- Increased tool life - engineered to last longer than any other cutter and blade.
- Quick setup and use - greater productivity.
- Hex head drive - lower capital investment for drive motor.

Spares & Accessories:
- Cutter Blade
- Cutter Pin
- Cutter Lubricant: P8790A for 4 oz (0.118 liter) or P8790B for 1.000 gallon (3.785 liter). Recommended to maximize cutter blade life when applied to blade.

9060 One-Revolution Series Tube Cutter includes:
- Cutter Blade
- Cutter Pin

> *“Using the 2 one rev cutters Elliott provided, our guys vented 128 1” x 0.134 Wall (10 BWG) tubes without breaking a single cutting blade.”*
>
> **-Mike Menzel, General Superintendent**
> **CIMS Ltd.**

Visit Our YouTube Channel To See the One-Rev in action!
www.youtube.com/elliott-tool

24x More Punctures.

MADE IN USA

Tube OD Range	BWG	Body OD		Part #		Drive Shank Size	Cutter Blade	Cutter Pin
		Inch	mm	6" Reach	12" Reach			
3/8" (9.5mm)	18	0.272	6.9	9060-050	-	7/32" Hex	9060N375-1	9060P5
1/2" (12.7mm)	18-19	0.394	10.0	9060-100	9060-100-12	5/16" Hex	9060N500-1	9060P1
	20	0.425	10.8	9060-108	9060-108-12			
5/8" (15.9mm)	14	0.445	11.3	9060-113	9060-113-12	3/8" Hex	9060N625-3	
	15-16	0.469	11.9	9060-119	9060-119-12			
	17-18	0.484	12.3	9060-123	9060-123-12	7/16" Hex	9060N625-2	
	19-21	0.516	13.1	9060-131	9060-131-12		9060N750-2	
	22	0.547	13.9	9060-139	9060-139-12			
3/4" (19.1mm)	10-11*	0.461	11.7	9060-117	9060-117-12	3/8" Hex	9060N750-1	
	12-13	0.516	13.1	9060-131	9060-131-12	7/16" Hex	9060N750-2	
	14-15	0.571	14.5	9060-145	9060-145-12	1/2" Hex		
	16	0.594	15.1	9060-151	9060-151-12			
	17-18	0.602	15.3	9060-153	9060-153-12			
	19-20	0.642	16.3	9060-163	9060-163-12		9060N1000-1	9060P2
7/8" (22.2mm)	12-13	0.642	16.3	9060-163	9060-163-12			
	14-15	0.685	17.4	9060-174	9060-174-12	5/8" Hex		
	16-17	0.724	18.4	9060-184	9060-184-12			
	18	0.748	19.0	9060-190	9060-190-12			
	19-20	0.760	19.3	9060-193	9060-193-12		9060N1000-2	9060P3
1" (25.4mm)	10*	0.685	17.4	9060-174	9060-174-12		9060N1000-1	9060P2
	11	0.724	18.4	9060-184	9060-184-12			
	12-13	0.760	19.3	9060-193	9060-193-12	3/4" Hex	9060N1000-2	9060P3
	14	0.807	20.5	9060-205	9060-205-12			
	15	0.827	21.0	9060-210	9060-210-12			
	16-17	0.846	21.5	9060-215	9060-215-12			
	18-21	0.878	22.3	9060-223	9060-223-12			
	22	0.913	23.2	9060-232	9060-232-12			
1-1/4" (31.8mm)	10-11	0.965	24.5	9060-245	9060-245-12	7/8" Hex		
	12	1.004	25.5	9060-255	9060-255-12			
	13-14	1.039	26.4	9060-264	9060-264-12			
	15-16	1.079	27.4	9060-274	9060-274-12			
	17-19	1.114	28.3	9060-283	9060-283-12			
	20-24	1.160	29.5	9060-295	-			

Tube OD Range	BWG	Body OD		Part #		Drive Shank Size	Cutter Blade	Cutter Pin
		Inch	mm	6" Reach	12" Reach			
1-1/2" (38.1mm)	10-11	1.217	30.9	9060-309	9060-309-12	7/8" Hex	9060N1500-1	9060P3
	12-13	1.260	32.0	9060-320	9060-320-12			
	14-15	1.311	33.3	9060-333	9060-333-12			
	16-17	1.335	33.9	9060-339	9060-339-12			
	18-19	1.378	35.0	9060-350	9060-350-12			
1-3/4" (44.5mm)	10-11	1.453	36.9	9060-369	-	1" Hex		
	12-14	1.508	38.3	9060-383	-			
	15-16	1.587	40.3	9060-403	-			
	17-18	1.614	41.0	9060-410	-			
2" (50.8mm)	10	1.713	43.5	9060-435	9060-435-12			
	11	1.740	44.2	9060-442	-			
	12-13	1.760	44.7	9060-447	9060-447-12			
	14-15	1.799	45.7	9060-457	-			
	16-17	1.843	46.8	9060-468	-			
	18-19	1.874	47.6	9060-476	9060-476-12			
2-1/4" (57.2mm)	10	1.957	49.7	9060-497	-	1 1/4" Hex	9060N2250-1	9060P4
	11	1.988	50.5	9060-505	-			
	12-13	2.012	51.1	9060-511	-			
	14-15	2.063	52.4	9060-524	-			
	16-17	2.098	53.3	9060-533	-			
	18-19	2.130	54.1	9060-541	-			
2-1/2" (63.5mm)	10	2.213	56.2	9060-562	-			
	11	2.240	56.9	9060-569	-			
	12-13	2.252	57.2	9060-572	-			
	14-15	2.303	58.5	9060-585	-			
	16-17	2.346	59.6	9060-596	-			
	18-19	2.370	60.2	9060-602	-			

* Intended for puncturing only, cannot be used to cut tubes.
NOTE: Some thick wall tubes cannot be cut with the One-Rev cutter, but can still be punctured. This is due to the large material ribbon that is produced during cutting that can catch on adjacent tubes, preventing the cutter from fully rotating.

MADE IN USA

PTTC Series
Push Type Tube Cutter

Tube Size
- 0.375” to 2.500” OD
- (9.5 to 63.5mm) OD

Elliott’s PTTC (Push Type Tube Cutter) Series Cutters accommodate heat exchangers and boilers with tube OD sizes 0.375” to 2.500” (9.5 to 63.5mm) with tube sheets 5” (127.0mm) to 12” (304.8mm) thick. The adjustable collar allows tubes to be cut or scored just beyond the tube sheet. The cutting blades are specially coated to increase longevity. Elliott offers two blade styles for Non-Ferrous Steel and Stainless Steel to achieve optimum cutting efficiency.

Each PTTC Tube Cutter Assembly is supplied with an installed blade, complete pilot set, and Allen wrenches.* The ½” hex drive shank on cutters up to 1” OD allows the use of common Jacobs drill chucks for driver connection. 1-1/4” to 2-1/2” OD cutters require a ¾” square drive and adapter.

*The 3/8” (9.5mm) PTTC Tube Cutter Assembly does not require pilots.

Features & Benefits:
- Quick setup and use - greater productivity.
- Includes complete pilot set for wide range of gauges - lower tooling expense.
- Hex head drive on cutters up to 1” OD - lower capital investment for drive motor.

PTTC Series Tube Cutter Kits include:
- Tube Cutter
- Cutter Blades with Pin
- Tube Cutter Pilots ***(For sizes 5/8” to 2-1/2” (15.9mm to 63.5mm))***

Spares & Accessories:
- Non-Ferrous/Steel Cutter Blades
- Stainless Steel Cutter Blades
- Cutter Lubricant: P8790A for 4 oz (0.118 liter) or P8790B for 1.000 gallon (3.785 liter). Recommended to maximize cutter blade life when applied to blade.
- Electric and Pneumatic Tube Cutter Drive Motors:
  - Morse Taper Adapter: Included with Electric Drive Motor
  - Drive Socket: Included with Electric Drive Motor
  - Jacobs Chuck

MADE IN USA

FOR RENT

Tube OD	Cutter Kit # (Includes Pilot Set)		Drive Shank Size	Non-Ferrous/ Steel Blade with Pin	Stainless Steel Blade with Pin	*Cutter Pin #	Number of Pilots in a Set	Tube Gauge Sizes for Pilot
	5" Reach	12" Reach						
3/8" (9.53mm)	PTTC375-22**	-	1/2"Hex	PTTC25210	-	PTTC375-22D10	**	22-24
5/8" (15.9mm)	PTTC625K	PTTC625K12		PTTC25186	PTTC25186S1	PTTC625CP	3	16-22
3/4" (19.1mm)	PTTC750K	PTTC750K12		PTTC25186-1	PTTC25186S2	PTTC750CP	4	14-22
7/8" (22.2mm)	PTTC875K	PTTC875K12		PTTC25194	PTTC25194S1	PTTC875CP	5	12-22
1" (25.4mm)	PTTC1000K	PTTC1000K12		PTTC25199	PTTC25199S1	PTTC1000CP		
1-1/4" (31.8mm)	PTTC1250K	PTTC1250K12	3/4" Sq	PTTC25206	PTTC25206S1	PTTC1250CP	4	12-19
1-1/2" (38.1mm)	PTTC1500K	PTTC1500K12		PTTC25206-1	PTTC25206S2	PTTC1500CP		10-17
1-3/4" (44.45mm)	PTTC1750K	PTTC1750K12				PTTC25206CP	3	12-17
2" (50.8mm)	PTTC2000K	PTTC2000K12		PTTC25221	PTTC25221S1	PTTC2000CP	5	10-14
2-1/4" (57.2mm)	PTTC2250K	PTTC2250K12		PTTC25222	PTTC25222S1	PTTC25222CP		
2-1/2" (63.5mm)	PTTC2500K	PTTC2500K12		PTTC25223	PTTC25223S1	PTTC2500CP		

NOTE: Kits for OD sizes 1" and larger include 2 blades.
**Included with cutter blade but can be purchased separately.*
***The 3/8" (9.5mm) PTTC Tube Cutter Assembly does not require pilots. To be used only with P5154 drive motor.*

Elliott's Tube Cutter Drive Motors are used to power the PTTC Series Tube Cutter. They are available in both electric and pneumatic models to suit your application needs.

Motor Specifications					
Motor	OD Range	Motor Type	RPM	Requirements	Weight
P5154	3/8"-1"	Pneumatic	325	23 CFM @90 PSI	5.5lbs (2.5Kg)
P5476C*	1-1/4" & Up	Pneumatic	190	70 CFM @90 PSI	13 lbs (5.8Kg)
447000	3/8"-2 1/2"	Electric (110V)	60-140 200-470	50/60Hz, 16 Amp	16lbs (7.3Kg)
447000-220	3/8"-2 1/2"	Electric (220V)	60-140 200-470	50/60Hz, 8 Amp	16lbs (7.3Kg)

**Motor P5476C requires 3/4" Jacobs Chuck (P5476CH) for operation*

447000 & 447000-220 electric motors include:

- 5/8" (15.9mm) Jacobs Chuck
- 3/4" (19.1mm) Square Female Socket Adapter
- Morse Taper Adapter

P5154 & P5476C pneumatic motors include:

- 1/2" (12.7mm) Jacobs Chuck

Spares & Accessories:

- 830-12-3-075 Morse Taper Adapter
- 71S0C 3/4" (19.1mm) Square Female Socket Adapter
- 4470JA Jacobs Chuck for the 447000 and 447000-220 electric motors
- 40-80700021-2 Spare Carbon Brush Set for the 447000 and 447000-220 electric motors
- P5476CH Jacobs Chuck for the P5154 and P5476C pneumatic motors

MADE IN USA

FOR RENT

300 Series
Boiler Tube Cutter

Tube Size
- 2.000” to 3.000” OD
- (50.8 to 76.2mm) OD

Elliott’s 376 / 396 Series Boiler Tube Cutters are power driven to cut tubes in firetube and watertube boilers. The Series’ primary purpose is to cut tubes to length on the common end of a firetube boiler. It is extremely important to cut tubes to a uniform length prior to beading the tubes with a roll beading expander.

The 376 / 396 Boiler Tube Cutters have a 1” (25.4mm) male square drive that is easily adapted to tube rolling motors that are 150 RPM or less. The cutters may also be employed with a ratchet for applications in space restricted areas.

The wheel style boiler cutters are designed to have a long tool life, giving you years of trouble-free service.

Features & Benefits:
- Rugged tool design - long tool life.
- Places tube to length before rolling - reduces operator error.
- Creates a non-abrasive cut which:
  - Eliminates prep time - less labor costs.
  - Operator can easily insert new tubes - less labor costs.
- Cuts tubes chip-free so no need to clean out vessel - less labor costs.

Spares & Accessories:
- Cutter Blade
- 37419P20000 Cutter Pin
- Feed Wedge
- 374170-20000 Feed Rod
- Drive Motors: Low RPM (≤150) motors are highly recommended for use with boiler tube cutters. Options include 447000 *(see page 193)*, -90 right angle motors *(see page 72)*, or 99300 series motors *(see page 62)*.
- Drive Socket required for use with Drive Motor. See page 75 for more information.

Boiler Tube Cutter includes:
- Cutter Wheel
- Cutter Pin
- Feed Wedge
- Feed Rod

Tube OD		BWG	Tube Cutter Part #	Weight		Cutter Wheel	Cutter Pin	Feed Wedge
Inch	mm			Lbs.	Kg.			
2”	50.8	10-16	376-00-20000	15	6.8	374190-20000	37419P20000	374180-20000
2-1/2”	63.5	10-16	376-00-20102	18	8.2	374190-20104		
3”	76.2	10-16	396-00-30000	40	18.2			375FW30000

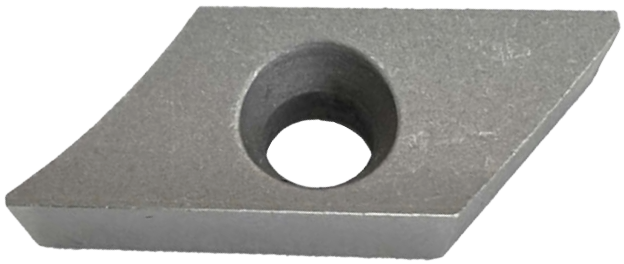
MADE IN USA

FOR RENT

Elliott's cutting inserts are designed to quickly remove welded tube ends and trim tubes flush to the tube sheet. Featuring a variety of geometric shapes and coatings, each insert is optimized to perform in a specific cutting application, providing a smooth and accurate finish.

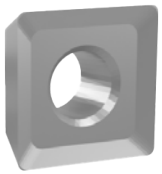
These cutting inserts are commonly used to help maximize tool life in milling applications and can handle a wide range of materials including aluminum, steel, and titanium.

Other sizes and coatings are available upon request.



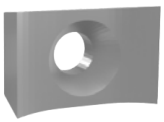
Features & Benefits:

- Precise cutting for complex workpieces
- Easy changeover design reduces downtime
- Ability to withstand high temperatures and speeds prolongs tool life, reducing consumable costs
- Reduces vibration during cutting, resulting in a smoother finish



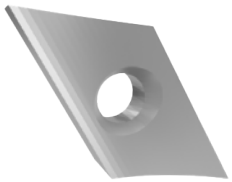
Tube Facing Bit - Carbide

Part Number	Vertical Width		Horizontal Width		Screw
	inches	mm	inches	mm	
TFB500-500-CB	0.197”	5.00	0.197”	5.00	MTS-20



Tube Facing Bit - Cobalt

Part Number	Vertical Width		Horizontal Width		Screw
	inches	mm	inches	mm	
TFB630-950-CO	0.248”	6.30	0.374”	9.50	MTS-40
TFB950-950-CO	0.374"	9.50	0.374"	9.50	



Strength Weld Bit - Cobalt

Part Number	Vertical Width		Horizontal Width		Screw
	inches	mm	inches	mm	
SWB1350-950-CO	0.531”	13.50	0.374”	9.50	MTS-25

MADE IN USA

SpeedCut
Tube Bundle Cutter

Cut tough jobs down to size.

Equipped with a rugged Baldor® Motor and the highly productive Automatic Cutting Force Control, Elliott's SpeedCut is a quick and cost effective way to cut through tube bundles and shells in a single pass.

It features a heavy-duty frame and powerful drivetrain to withstand the rigors of a production environment. Safe and efficient operation is possible without the need for a constant attendant.

The unit offers Automatic Cutting Force Control as a standard feature. The cutting cross section of the vessel is smaller at the top and bottom rows because there are fewer tubes per row. During larger portions of the cutting cycle the saw feed automatically pauses while maintaining constant cutting force. The result is that overall cutting time is reduced without sacrificing blade life.

Setup is easy. Simply position and secure the tube bundle to the Tube Sheet Support Table (an optional Bundle Support Table is available to support the rest of the bundle). If necessary the operator can adjust the blade tension with a simple torque wrench. Minimal attendance by the operator of the unit is enabled by three control systems that constantly monitor the cutting cycle. Should the blade break or stall, the system automatically stops the blade.

An MQL (Minimum Quantity Lubricant) Mist Lubrication System is a standard feature on the SpeedCut. A very thin film of lubricant is spread on the teeth of the blade just before the blade contacts the tube. As the heat from the cut is absorbed by the lubricant, the liquid is dissipated from the blade and the resulting chip. Environmental hazards and disposal costs are minimized, the cutting speed is increased, and the blade life is prolonged.

MADE IN USA

Features & Benefits:

- The Hydraulic Feed Rate Control combined with the Automatic Cutting Force Control optimizes saw feed while maintaining consistent cutting force.
- Powerful 7.5 HP or 10 HP Baldor® Blade Drive Motor quickly cuts through a wide variety of tough materials.
- Heavy Duty Cone Drive® gearbox with powerful "Double Enveloping"® gear set for increased torque.
- Low voltage operator controls front mounted and easily accessible to operator.
- Remote Pedestal Control Console for added safety and convenience.
- Convenient digital band speed display.
- Control Legend Plates in English or Spanish (other languages available upon request).
- Hour Meter: Allows for more precisely scheduled preventative maintenance which lowers operating costs.
- Includes Machine Leveling Bolts.
- Three control systems and Blade Break/Stall Proximity Switch features enable safe unattended operation.
- Overload and under voltage protection.
- Maintenance Lockout for operator safety and protection during maintenance.
- MQL Mist Lubrication System to minimize disposal costs and prolong blade life.
- Tube Sheet Support Table & Ratchet Straps: Helps to secure the bundle during cutting operation.
- Rotary Blade Brush cleans and extends blade life.

Spares & Accessories:

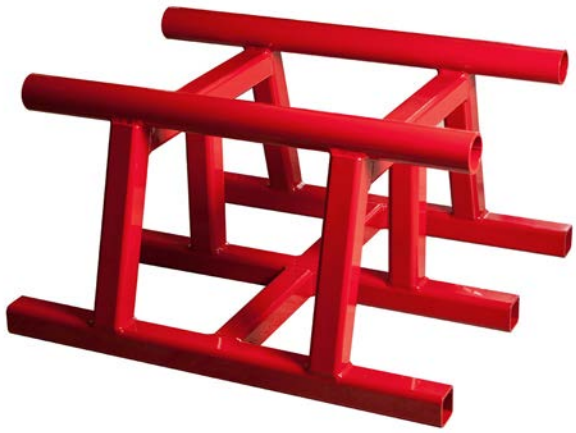
- Bi-Metal Bandsaw Blades: Long-life, high quality blades for most materials, including copper, stainless steel and exotic materials.
- Clamp System: Allows for improved stability of the tube sheet during the sawing process and an added measure of safety for the crew and the machine.
- Bundle Support Table: Provides support for the end of the bundle while the other side is cut.
- MQL System Lubricant: Specially formulated for use with the SpeedCut.
- Recommended Spares Kit: Includes spare maintenance parts for quick replacement and no downtime. Includes: Blade Brushes, Drive Belt, Gear Oil, Bearings, Fuses, Roller Axles, and Roller Supports.

MADE IN USA

SpeedCut
Tube Bundle Cutter

Automatic Cutting Force Control

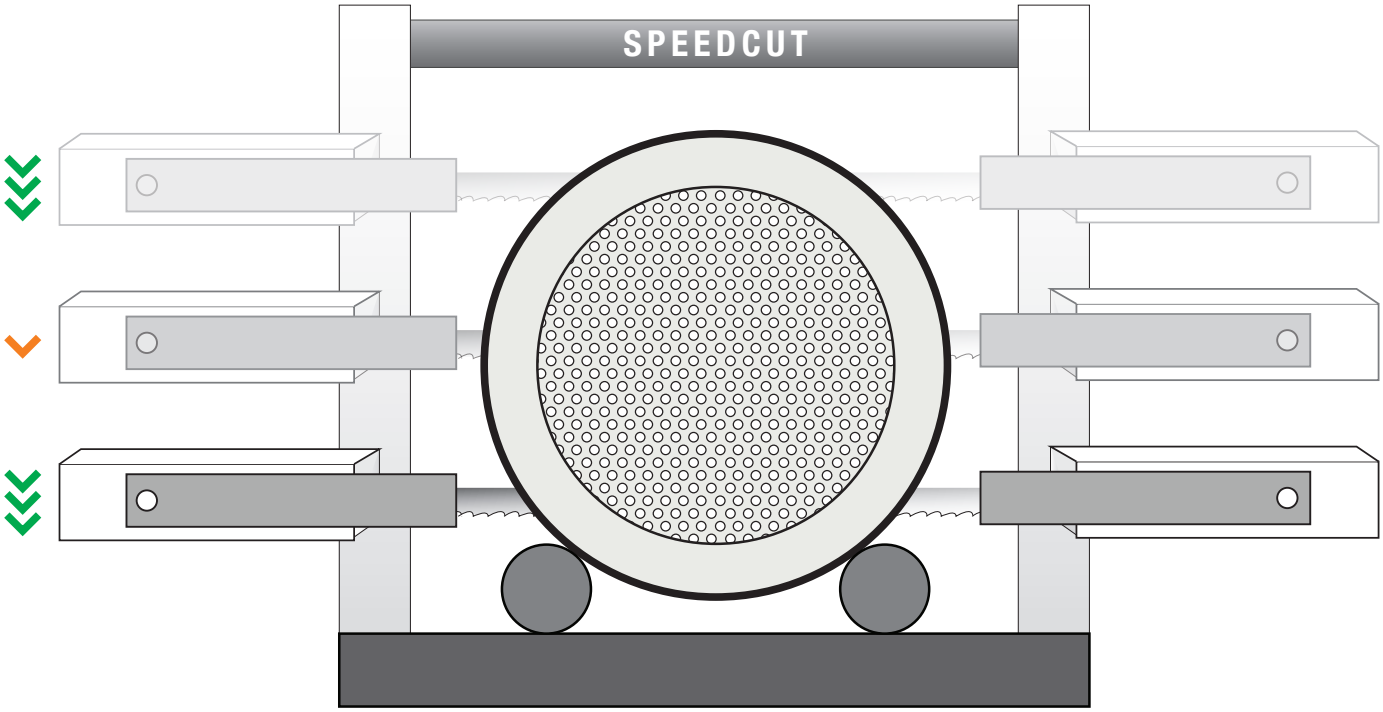
Cutting Speed



Bundle Support Table (optional)

Heavy Duty Gearbox

Safety Shutoff Sensor



Automatic Cutting Force Control:
During larger sections of the vessel, the saw feed automatically pauses while maintaining consistent cutting force to increase productivity without sacrificing blade life.

MADE IN USA

	SpeedCut 78	SpeedCut 98
Power		
Blade Motor	7.5 HP (5.6kW)	10 HP (7.4kW)
Hydraulic Motor	1 HP (.75kW)	
Hydraulic Capacity	10 gal	
Power Requirement	3 Phase - 50/60 Hz (Select from 208V - 600V)	
Cutting		
Cutting Capacity (round)	78.5” (2,000mm)	98.5” (2,500mm)
Cutting Capacity (rectangular)	78.5” (2,000mm) height	98.5” (2,500mm) height
	85” (2,160mm) width	98.5” (2,500mm) width
Cutting Depth/ Throat	33.75” (857mm)	
Blade Speed (typical speed)	50 - 275 FPM Infinitely Variable (15 - 84 mpm)	
Blade Size	1.5” x .05” x 375” (38mm x 1mm x 9,779mm)	1.5” x .05” x 402” (38mm x 1mm x 10,211mm)
Typical Bundle Cutting Time	20 - 60 minutes	
Dimensions & Weight		
Working Area	168” (4,267mm) height	213” (5,410mm) height
	178” (4,521mm) width	192” (4,877mm) width
	87” (2,210mm) depth	
Minimum Height	117” (2,972mm)	134” (3,404mm)
Bandwheels	36” (914mm) cast iron	
Weight	7,500 lbs. (3,402Kg)	8,500 lbs. (3,856Kg)
Shipping Dimensions (Crated)	130” (3,302mm) height	143” (3,632mm) height
	186” (4,724mm) width	199” (5,054mm) width
	100” (2,540mm) depth	
Shipping Weight* (Crated)	9,500 lbs. (4,309Kg)	10,500 lbs. (4,763Kg)
Bundle Support Table (uncrated)	20” (508mm) height	
	33” (838mm) width	
	36” (914mm) depth	
Support Table Weight (uncrated)	225lbs (102Kg)	

Crate weight is based on an average unit. The final weight may vary.

Spares & Accessories		
Bi-Metal Bandsaw Blades*	SCT78B1	SCT98B1
	SCT78B2	SCT98B2
	SCT78B3	SCT98B3
MQL Lubricant (1 gal)	SCT100318-028	
Bundle Support Table	SCTBT	
Clamp System	SCTMC	
Recommended Spares Kit	SCT155291	

**For help with blade selection, use the Blade Selection Tool at www.elliott-tool.com/speedcut or contact Elliott for assistance.*

SpeedCut 78 shown with Clamp System (optional)

MADE IN USA

Hydraulic Pumps

Elliott's hydraulic pumps are used to power the Collet Style Tube Puller, Cyclgrip Semi-Continuous Puller, Tube Tuggers, and Stub Tugger. The hydraulic pumps' compact design is ideal for use in confined work areas. Other key features include an integral gauge, protective roll cage, and hydraulic quick disconnect.

Features & Benefits:

- Hydraulic Pump Run & Pressure On Demand - pump only runs when pendant switch is activated to reduce the size of the oil reservoir and increase efficiency.

Spares & Accessories:

- 17-9637 Standard Oil
- M5773SO Synthetic Oil (Used in hot environments)
- 17-10804 Brush Assembly

Part Number	Pump Type	HP	Maximum Operating Pressure (psi)	Power Requirement	Weight		Repair Kit	Elliott Puller Used
					Lbs.	Kg.		
M5783-00	110V Electric	1.13	5,000	25 Amps @110V	80	36.3	17-300839	• Collet Tube Puller • Cyclgrip
M5783-00-220	220V Electric			15 Amps @220V				
M5773-00	110V Electric		10,000	25 Amps @110V	88	39.9	17-300332	• Super Collet Tube Puller • Tube Tugger • Super Tube Tugger • Stub Tugger
M5776-00	220V Electric			15 Amps @220V				
M5775-00	Pneumatic	3		50 cfm @80 psi	91	41.3		
80-36102D3	Manual	NA	10,000	NA	28	12.7	17-300508	• Stub Tugger

MADE IN USA

FOR RENT

Collet Tube Puller

Tube Size
- 0.625” to 1.000” OD
- (15.9 to 25.4mm) OD

Elliott’s Model B10552-00 Collet Tube Puller was designed for fast and efficient tube removal in condensers, chiller, and other heat exchangers.

With its 6 Ton pulling capacity, the Collet Tube Puller automatically grips, pulls, and releases the tube in a matter of seconds. The puller’s compact design allows access to confined work areas. Additionally, the 360° Positioning Handle enables access to those hard-to-reach tubes that are near channel plates and water box conditions.

The Collet Tube Puller can quickly and successfully pull over 100 tube stubs in less than an hour! To allow for even faster tube pulling, use Elliott’s Cyclgrip Semi-Continuous Tube Puller – the perfect partner for the Collet Tube Puller.

Features & Benefits:
- Quick stroke cylinder - increases productivity.
- Lightweight pulling ram - reduces operator fatigue.
- Wide gripping range - less tooling expense.
- 360 degree positioning handle - more access to tubes.

Spares & Accessories:
- M5783-00 110V Electric Hydraulic Pump:
  You must have this pump in order to properly operate the Collet Style Tube Puller.
- M5783-00-220 220V Electric Hydraulic Pump:
  You must either purchase or already have this pump on order to properly operate the Collet Style Tube Puller.
- Tool Kit: Consists of a Collet Set, Draw Bar, and Nose Piece.
- Collet Set*: Consists of a Collet, Flat Spring, and an O-ring.
- Draw Bar*
- Nose Piece*
- TCB20-33 Counter Balance
- 17-300576 Seal Kit

**** Required to operate the Collet Puller***

Specifications:
- Pulling capacity: 6 Ton
- Stroke: 3” (76.0mm) Pulling Stroke 2.25” (57.2mm)
- Weight: 25 Lbs. (11 Kg)
- Overall Length:
  - Retracted: 20.5” (520.7mm)
  - Extended: 21.75” (552.6mm)

B10552-00 Collet Style Tube Puller kit includes:
- B10552 Collet Tube Puller Assembly
- B10552D5-750 Collet Retainer for 5/8” (15.9mm) and 3/4” (19.1mm) tube ODs
- B10552D7-750 Pull Rod for 5/8” (15.9mm) and 3/4” (19.1mm) tube ODs
- B10552D5-1000 Collet Retainer for 7/8” (22.2mm) and 1” (25.4mm) tube ODs
- B10552D7-1000 Pull Rod for 7/8” (22.2mm) and 1” (25.4mm) tube ODs
- B10552D20 15 ft. (4.6M) Hydraulic Hose Assembly

Tube OD	BWG*	Collet Puller	Tool Kit**	Collet Set	Draw Bar	Nose Piece
5/8” (15.9mm)	18-20	B10552-00	B10552-625KIT	B10552D3-625	B10552D2-625	B10552D4-625
3/4” (19.1mm)	16-20		B10552-750KIT	B10552D3-750	B10552D2-750	B10552D4-750
7/8” (22.2mm)	16-20		B10552-875KIT	B10552D3-875	B10552D2-1000	B10552D4-875
1” (25.4mm)	16-20		B10552-1000KIT	B10552D3-1000	B10552D2-1000	B10552D4-1000

** NOTE: Softer metals could go up to 22 gauge.*
***Includes a Collet Set, Draw Bar, and Nose Piece.*

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Super Collet Tube Puller

Hole Size
- 0.50” to 2.50” OD
- (12.70 to 63.5mm) OD

Powerful Grip For Fast Tube Pulling.

With the same gripping power of Elliott’s proven spears.

Elliott’s super collet tube puller is designed to quickly pull tube stubs from tube sheets without damaging the tube sheet hole. The collet teeth have been designed using the same principles as Elliott’s proven TT Spear. Offering the gripping power of a spear with the speed and convenience of a collet.

The super collet tube puller is powered by an electric or pneumatic hydraulic pump to provide up to 25 tons of pulling capacity. Available in 2 pulling heads to cover tube sizes from ½” up to 2-1/2”.

Puller Specifications				
Puller	**Requirements**	**Stroke**	**Pulling Stroke**	**Weight**
CPS15	15 Ton @ 10,000 PSI	6.75”	6.00”	40 lbs
CPS25	25 Ton @ 10,000 PSI			55 lbs

Collets Offer Powerful Spear-Like Gripping Power

Vertical Or Horizontal Eye Bolts

Built-in Pump Control

Quickly Remove Tube Stubs

Robust & Powerful For Fast Tube Removal
Just insert the collet and quickly remove the tube stub.

Save Hours Of Machine Time
Pull stubs easily without the need to machine the tube ID for knockout.

Protects The Tube Sheet
Don’t risk damaging tube sheets from drilling and/or tube knockout tools.

No spears!
One step operation lowers cost and saves time by avoiding inserting, removing, and breaking spears as you pull.

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Safe & Simple For Operators

One-Man Operation
Convenient pump control is built into the handles and works seamlessly with Elliott’s electric hydraulic pumps.

Easy To Use
Eye-bolts for easily connecting to a counterbalance in both horizontal or vertical pulling applications.

Improves Safety
The deflector shield protects the opposite end of tube sheet during horizontal pulling applications.

Package Includes:
- Pulling Head
- Two Hydraulic Hoses
- Deflector Shield: CP300

Spares & Accessories:
- Collet
- Draw Bar
- Tie Rod
- Nose Piece
- Counterbalance: TCB48-66
- Hydraulic Pump Retrofit Kit: M5773RFK
  (Allows existing M5773-00 & M5776-00 pumps to be used with the Super Collet Puller)

Pumps:
- 110V: M5773-00 ***(See page 200)***
- 220V: M5776-00 ***(See page 200)***
- Pneumatic: M5775-00* ***(See page 200)***

**Does not work with side handle buttons.*

Tube OD	BWG	Expansion Range				Collet	Draw Bar	Tie Rod	Nose Piece
		Inch		mm					
		Min	Max	Min	Max				
1/2" (12.7 mm)	14 - 15	0.326	0.418	8.28	10.62	CPC500-14	CPD500	CPT500	CPN500
	16 - 18	0.362	0.454	9.19	11.53	CPC500-16			
	19 - 22	0.408	0.500	10.36	12.7	CPC500-19			
5/8" (15.9 mm)	14 - 15	0.451	0.543	11.46	13.80	CPC625-14	CPD625	CPT625	CPN625
	16 - 18	0.487	0.579	12.37	14.71	CPC625-16			
	19 - 22	0.533	0.625	13.54	15.88	CPC625-19			
3/4" (19.05 mm)	12 - 13	0.530	0.622	13.46	15.80	CPC750-12	CPD750	CPT750	CPN750
	14 - 15	0.576	0.668	14.63	16.97	CPC750-14			
	16 - 18	0.612	0.704	15.54	17.88	CPC750-16			
	19 - 22	0.658	0.750	16.71	19.05	CPC750-19			
7/8" (22.2 mm)	12 - 13	0.655	0.747	16.64	18.97	CPC875-12	CPD875	CPT875	CPN875
	14 - 15	0.701	0.793	17.81	20.14	CPC875-14			
	16 - 18	0.737	0.829	18.72	21.06	CPC875-16			
	19 - 22	0.783	0.875	19.89	22.23	CPC875-19			
1" (25.4 mm)	10 - 11	0.730	0.822	18.54	20.88	CPC1000-10	CPD1000	CPT1000	CPN1000
	12 - 13	0.780	0.872	19.81	22.15	CPC1000-12			
	14 - 15	0.826	0.918	20.98	23.32	CPC1000-14			
	16 - 18	0.862	0.954	21.90	24.23	CPC1000-16			
	19 - 22	0.908	1.000	23.06	25.40	CPC1000-19			
1-1/8" (28.58 mm)	10 - 11	0.855	0.947	21.72	24.05	CPC1125-10	CPD1125	CPT1125	CPN1125
	12 - 13	0.905	0.997	22.99	25.32	CPC1125-12			
	14 - 15	0.951	1.043	24.16	26.50	CPC1125-14			
	16 - 18	0.987	1.079	25.07	27.41	CPC1125-16			
	19 - 22	1.033	1.125	26.24	28.58	CPC1125-19			
1-1/4" (31.8 mm)	10 - 11	0.980	1.072	24.89	27.23	CPC1250-10	CPD1250	CPT1250	CPN1250
	12 - 13	1.030	1.122	26.16	28.50	CPC1250-12			
	14 - 15	1.076	1.168	27.33	29.67	CPC1250-14			
	16 - 18	1.112	1.204	28.25	30.58	CPC1250-16			
	19 - 22	1.158	1.250	29.41	31.75	CPC1250-19			
1-3/8" (34.9 mm)	10 - 11	1.105	1.197	28.07	30.40	CPC1375-10	CPD1375		CPN1375
	12 - 13	1.155	1.247	29.34	31.67	CPC1375-12			
	14 - 15	1.201	1.293	30.51	32.84	CPC1375-14			
	16 - 18	1.237	1.329	31.42	33.76	CPC1375-16			
	19 - 22	1.283	1.375	32.59	34.93	CPC1375-19			
1-1/2" (38.1 mm)	10 - 11	1.230	1.322	31.24	33.58	CPC1500-10	CPD1500	CPT1500	CPN1500
	12 - 13	1.280	1.372	32.51	34.85	CPC1500-12			
	14 - 15	1.326	1.418	33.68	36.02	CPC1500-14			
	16 - 18	1.362	1.454	34.60	36.93	CPC1500-16			
	19 - 22	1.408	1.500	35.76	38.10	CPC1500-19			
2" (50.8mm)*	10-11	1.730	1.824	43.94	46.33	CPC2000-10	CPD2000	CPT2000	CPN2000
	12-13	1.780	1.871	45.21	47.52	CPC2000-12			
	14-15	1.826	1.917	46.38	48.69	CPC2000-14			
	16-18	1.862	1.954	47.29	49.63	CPC2000-16			
	19-22	1.908	1.986	48.46	50.44	CPC2000-19			
2-1/2" (63.5mm)*	10-11	2.230	2.324	56.64	59.03	CPC2500-10	CPD2500	CPT2500	CPN2500
	12-13	2.280	2.371	57.91	60.22	CPC2500-12			
	14-15	2.326	2.417	59.08	61.39	CPC2500-14			
	16-18	2.362	2.454	59.99	62.33	CPC2500-16			
	19-22	2.408	2.486	61.16	63.14	CPC2500-19			

*** Requires CP2000P pulling head package.**

MADE IN USA

Faster Tube Removal

With The Elliott Cyclgrip Semi-Continuous Tube Puller

> **"AREVA expects to double the tube removal speed by using the Elliott Cyclgrip tool. Since this tool only requires two people, AREVA can use other personnel more effectively."**
> **-Michael Mansfield**

AREVA performed speed and load tests on the Elliott Cyclgrip tube removal tool... The purpose of these tests was to determine the pull speed at various loads and the maximum tool load. The tube material used during testing was either 3/4" x 0.035" wall stainless steel or 3/4" x 0.049" wall copper.

Based on the results, AREVA plans on using a custom designed jaw and the Elliott Cyclgrip setup for field work.

AREVA expects to double the tube removal speed by using the Elliott Cyclgrip tool. In addition, since this tool will only require two people to operate (one running the tool and the other managing the tube that is being removed), AREVA can use other personnel more effectively to perform other tasks associated with the retubing operation.

Michael Mansfield
Program Manager Heat Exchanger Services
AREVA NDE-Solutions, North America
AREVA, Inc.

AREVA

Cyclgrip
Semi-Continuous Tube Puller

Tube Size
- 0.500” to 1.000” OD
- (12.7 to 25.4mm) OD

Elliott’s M5630-00 Cyclgrip Semi-Continuous Tube Puller is an engineered product that continuously pulls chiller, heat exchanger, and condenser tubes after the tubes have been pulled free from the tube sheet, making it the ideal companion for the Collet Style Tube Puller.

The Cyclgrip’s unique design allows it to adjust to tube sizes without any additional tooling or tool adjustments. The puller’s slim profile allows side tube mounting adjacent to water box and channel plates.

Additionally, the Cyclgrip easily pulls tubes that have been expanded into baffle or support plates, eliminating the use of tiresome slam hammers and accelerating the tube removal.

Features & Benefits:
- Lightweight & compact design - easy to move in tight areas.
- 10 ft (3.3M) per minute pulling action - greater productivity.
- Simple design - easy to maintain.
- No extra tooling required - lower tooling expense.

Specifications:
- Pulled tube projection required: 3” (76.2mm)
- Face plate dimensions: 3.75” (95.3mm) wide x 2.94” (74.7mm) high
- Stroke length: 5” (127.0mm)
- Pulling rate: 10’/min. (3.3M/min.)
- Height: 10.75” (273.0mm)
- Length: 8.44” (214.4mm)
- Width: 4.13” (104.9mm)
- Weight: 16 Lbs. (7.3 Kg)

M5630-00 Cyclgrip Semi-Continuous Tube Puller package includes:
- Extractor Unit
- 15 ft (4.6M) Hydraulic Hose
- Control Cable
- Carrying Case

Spares & Accessories:
- *M5783-00 110V Electric Hydraulic Pump: You must either purchase or already have this pump on order to properly operate the Cyclgrip.
- *M5783-00-220 220V Electric Hydraulic Pump: You must either purchase or already have this pump on order to properly operate the Cyclgrip.
- TCB20-33 Counter Balance.

**** Required to operate the Cyclgrip.***

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Tube Tugger
Semi-Continuous Hydraulic Tube Pulling System

Tube Size
- 0.625” to 1.250” OD
- (15.9 to 31.8mm) OD

Elliott’s Tube Tugger is a powerful semi-continuous hydraulic tube pulling system for removing tubes from heat exchangers, chillers, and other heat transfer vessels.

With its 30 Ton pulling capacity, the Elliott Tube Tugger breaks expanded tube sheet joint bonds. The tugger then takes over and continuously pulls the tube when any obstructions are met. In many applications, tubes can be pulled from both tube sheets from one end of the heat exchanger.

The Tube Tugger’s compact length of 15” (381.0mm) allows it to be used in confined space areas. For close clearance conditions or for extended reach, Nose Piece Extensions are available. Contact Customer Service for details.

Features & Benefits:
- Portable ram & pump - easy to move in tight areas.
- High production pulling action - lower labor cost.
- Best value - more productivity & less capital investment.

Tube Tugger kit includes:
- Tube Pulling Hydraulic Cylinder
- Suspension Bracket Assembly with Side Handles
- Collet Holder Assembly
- (2) 15 ft. (4.6M) Hydraulic Hose
- Release Fork
- Nose Piece Adapter
- Set of Spanner Wrenches

Spares & Accessories:
- Hydraulic Pump: M5773-00 110V Electric Pump, M5776-00 220V Electric Pump, M5775-00 Pneumatic Pump. You must either purchase or already have one of these pumps in order to properly operate the Tube Tugger.
- TCB48-66 Counter Balance
- 17-300077 Seal Repair Kit
- Spears ***See page 213.****
- Collet Set ***See table on page 213.****
- Nose Piece ***See table on page 213.****

**** Required to operate the Tube Tugger***

Puller Specifications						
Puller	Capacity	Stroke	Diameter	Lengths		
				Collapsed	Extended	Across Handles
80-40125	30 Ton (27.2Mt)	3.000” (76.2mm)	6.500” (165.1mm)	12.940” (329.0mm)	15.940” (405.0mm)	18.250” (464.0mm)
80-40125-6		6.000” (152.4mm)		18.000” (457.0mm)	22.000” (559.0mm)	

Optional Counterbalance

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Super Tube Tugger
Semi-Continuous Hydraulic Tube Pulling System

Tube Size
- 1.500” to 2.000” OD
- (38.1 to 50.8mm) OD

Elliott’s Super Tube Tugger is a powerful semi-continuous hydraulic tube pulling system for removing tubes from surface condensers and certain boiler applications.

With its 60 Ton pulling capacity, the Elliott Super Tube Tugger breaks expanded tube sheet joint bonds. The tugger then takes over and continuously pulls the tube when any obstructions are met.

The Super Tube Tugger’s compact length of 18” (457.0mm) allows it to be used in confined space areas.

Features & Benefits:
- Portable ram & pump - easy to maneuver in tight areas.
- High production pulling action - lower labor cost.
- High tonnage - makes difficult job easy.

Specifications:
- Capacity: 60 Ton (54.4Mt).
- Stroke: 4.000” (101.0mm).
- Tugger Diameter: 8.500” (215.9mm).
- Lengths:
  - Collapsed: 18.000” (457.0mm).
  - Extended: 22.000” (559.0mm).
- Length Across Handles: 18.250” (464.0mm).
- Weight: 62 Lbs. (28.0Kg).

80-40200 Super Tube Tugger kit includes:
- Tube Pulling Hydraulic Cylinder
- Suspension Bracket Assembly with Side Handles
- Collet Holder Assembly
- (2) 15 ft. (4.6M) Hydraulic Hose
- Release Fork
- Nose Piece Adapter
- Set of Spanner Wrenches

Spares & Accessories:
- Hydraulic Pump: M5773-00 110V Electric Pump, M5776-00 220V Electric Pump, M5775-00 Pneumatic Pump. You must either purchase or already have one of these pumps in order to properly operate the Super Tube Tugger.
- TCB66-88 Counter Balance
- Spears ***See page 213.****
- Collet Set ***See table on page 213.****
- Nose Piece ***See table on page 213.****

**** Required to operate the Super Tube Tugger***

Optional Counterbalance

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Efficient Tube Removal

For Air-Cooled Exchangers

Tube removal is a common challenge regardless of the application. In air cooled exchangers, the layout of the tubes, as well as the outer diameter of the fins could pose some challenges if using traditional methods. However, there are a few tips to make this process quicker.

Complete Retube

A complete retube is often the preferred method for air cooled exchangers due to the design.

1. Remove The Top Cover: Access the exchanger's interior by removing the top cover.
2. Cut Behind The Tube Sheet: Cut the tubes behind the tube sheet, before the finned section begins.
3. Remove Tube Sections: Carefully lower or lift the cut tube sections from the exchanger.
4. Pull Tube Stubs: Use a Collet Style Tube Puller to extract the remaining tube stubs from the back side of the header. This minimizes the risk of damaging the plug hole threads or spot face.

Partial Retube

A partial retube may be required due to plugging or efficiency concerns. However, it can be more complex, especially in multi-row exchangers.

1. Remove Tubes Above Affected Area: To access the plugged or damaged tubes, remove the tubes directly above them, if not in the top row.
2. Extract Finned Tube Section: Carefully life the finned section of the affected tubes from the exchanger.
3. Punch Out Stubs: Use a long-reach knockout tool to remove the tube stubs from the tube sheet. Exercise caution to avoid damaging the header box or plug holes.

Overall, tube removal in air cooled exchangers is a critical maintenance task that requires careful planning and execution. By following the steps outlined above and considering the specific factors involved, you can minimize downtime, ensuring optimal exchanger performance.

Tapping Spears

Tube Size

- 0.625” to 1.000” OD
- (15.9 to 25.4mm) OD

Elliott’s TT Series Tapping Spears are designed to withstand the toughest tube removal applications, for longer tool life on exotic materials.

Used in combination with Elliott's TT pulling spears, tapping spears are manufactured to meet a higher material hardness, allowing them to hold up longer when used on exotic materials. Simply thread the tapping spear into the tube end to create a tooth pattern in the tube ID. Once it's been driven in, remove the tapping spear and insert a standard pulling spear and remove the tube as normal.

Features & Benefits:

- Save on tooling costs by prolonging the life of pulling spears.
- Harder material allows for a better grip on exotic tube materials.

Spares & Accessories:

- P8788 Spear Lubricant: Highly recommended for use on spear threads to greatly increase spear life.

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Tube OD	BWG	Spear	Minimum Spear *Diameter		Maximum Spear *Diameter		Male Sq. Size
			Inch	mm	Inch	mm	
5/8" (15.9mm)	7	TT625-7T	0.245	6.2	0.385	9.8	1/2"
	8-9	TT625-8T	0.280	7.1	0.432	11.0	
	10-12	TT625-10T	0.342	8.7	0.482	12.2	
	13-15	TT625-13T	0.425	10.8	0.545	13.8	
	16-18	TT625-16T	0.485	12.3	0.589	15.0	
	19-24	TT625-19T	0.531	13.5	0.615	15.6	
3/4" (19.1mm)	7	TT750-7T	0.370	9.4	0.528	13.4	5/8"
	8-9	TT750-8T	0.405	10.3	0.576	14.6	
	10-12	TT750-10T	0.467	11.9	0.625	15.9	
	13-15	TT750-13T	0.550	14.0	0.685	17.4	
	16-18	TT750-16T	0.610	15.5	0.727	18.5	
	19-24	TT750-19T	0.656	16.7	0.750	19.1	
7/8" (22.2mm)	7	TT875-7T	0.495	12.6	0.653	16.6	
	8-9	TT875-8T	0.530	13.5	0.701	17.8	
	10-12	TT875-10T	0.592	15.0	0.750	19.1	
	13-15	TT875-13T	0.675	17.1	0.810	20.6	
	16-18	TT875-16T	0.735	18.7	0.852	21.6	
	19-24	TT875-19T	0.781	19.8	0.875	22.2	
1" (25.4mm)	7	TT1000-7T	0.620	15.7	0.778	19.8	3/4"
	8-9	TT1000-8T	0.655	16.6	0.826	21.0	
	10-12	TT1000-10T	0.717	18.2	0.875	22.2	
	13-15	TT1000-13T	0.800	20.3	0.935	23.7	
	16-18	TT1000-16T	0.860	21.8	0.977	24.8	
	19-24	TT1000-19T	0.906	23.0	1.000	25.4	
1-1/4" (31.8mm)	7	TT1250-7T	0.870	22.1	1.028	26.1	1"
	8-9	TT1250-8T	0.905	23.0	1.076	27.3	
	10-12	TT1250-10T	0.967	24.6	1.125	28.6	
	13-15	TT1250-13T	1.050	26.7	1.185	30.1	
	16-18	TT1250-16T	1.110	28.2	1.227	31.2	
	19-24	TT1250-19T	1.156	29.4	1.250	31.8	
1-1/2" (38.1mm)	7	TT1500-7T	1.120	28.4	1.278	32.5	
	8-9	TT1500-8T	1.155	29.3	1.326	33.7	
	10-12	TT1500-10T	1.217	30.9	1.375	34.9	
	13-15	TT1500-13T	1.300	33.0	1.435	36.4	
	16-18	TT1500-16T	1.360	34.5	1.477	37.5	
	19-24	TT1500-19T	1.406	35.7	1.500	38.1	
1-3/4" (44.5mm)	7	TT1750-7T	1.370	34.8	1.528	38.8	
	8-9	TT1750-8T	1.405	35.7	1.576	40.0	
	10-12	TT1750-10T	1.467	37.3	1.625	41.3	
	13-15	TT1750-13T	1.550	39.4	1.685	42.8	
	16-18	TT1750-16T	1.610	40.9	1.727	43.9	
	19-24	TT1750-19T	1.656	42.1	1.750	44.5	
2" (50.8mm)	7	TT2000-7T	1.620	41.1	1.778	45.2	
	8-9	TT2000-8T	1.655	42.0	1.826	46.4	
	10-12	TT2000-10T	1.717	43.6	1.875	47.6	
	13-15	TT2000-13T	1.800	45.7	1.935	49.1	
	16-18	TT2000-16T	1.860	47.2	1.977	50.2	
	19-24	TT2000-19T	1.906	48.4	2.000	50.8	

MADE IN USA

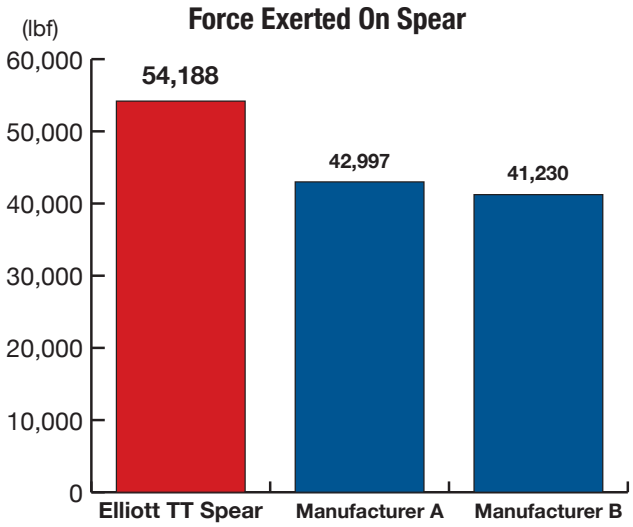
TT Tube Spears

Tube Size

- 0.625” to 2.000” OD
- (15.9 to 50.8mm) OD

Elliott’s TT Spears are used with the Elliott Tube Tugger or Super Tube Tugger to successfully pull tubes in chillers, heat exchangers, condensers, fin fan coolers, and boilers.

Simply size the spear, apply spear lubricant on the pulling teeth, and then set the spear by employing a hand ratchet or impact wrench. To relieve pressure, back the spear off and then employ the Tube Tugger or Super Tube Tugger to successfully remove the tube.



Features & Benefits:

- Reduce tooling costs with an innovative design that withstands significantly more force than other spears.
- Engineered design lowers the chance that the gripping end of the spear will break off in the tube, saving time, money and hassle.

Spares & Accessories:

- P8788 Spear Lubricant: Highly recommended for use on spear threads to greatly increase spear life.

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Tube OD	BWG	Spear		Minimum Spear *Diameter		Maximum Spear *Diameter		Male Sq. Size	Nose Piece	*Collet Set with O-Ring
		29" Overall Length	48" Overall Length	Inch	mm	Inch	mm			
5/8" (15.9mm)	7	TT625-7	TT625-7-48	0.245	6.2	0.385	9.8	1/2"	80-40125N062	80-40125C062
	8-9	TT625-8	TT625-8-48	0.280	7.1	0.432	11.0			
	10-12	TT625-10	-	0.342	8.7	0.482	12.2			
	13-15	TT625-13	-	0.425	10.8	0.545	13.8			
	16-18	TT625-16	-	0.485	12.3	0.589	15.0			
	19-24	TT625-19	-	0.531	13.5	0.615	15.6			
3/4" (19.1mm)	7	TT750-7	TT750-7-48	0.370	9.4	0.528	13.4	5/8"	80-40125N075	80-40125C075
	8-9	TT750-8	TT750-8-48	0.405	10.3	0.576	14.6			
	10-12	TT750-10	TT750-10-48	0.467	11.9	0.625	15.9			
	13-15	TT750-13	TT750-13-48	0.550	14.0	0.685	17.4			
	16-18	TT750-16	TT750-16-48	0.610	15.5	0.727	18.5			
	19-24	TT750-19	TT750-19-48	0.656	16.7	0.750	19.1			
7/8" (22.2mm)	7	TT875-7	TT875-7-48	0.495	12.6	0.653	16.6		80-40125N087	80-40125C087
	8-9	TT875-8	TT875-8-48	0.530	13.5	0.701	17.8			
	10-12	TT875-10	TT875-10-48	0.592	15.0	0.750	19.1			
	13-15	TT875-13	TT875-13-48	0.675	17.1	0.810	20.6			
	16-18	TT875-16	TT875-16-48	0.735	18.7	0.852	21.6			
	19-24	TT875-19	TT875-19-48	0.781	19.8	0.875	22.2			
1" (25.4mm)	7	TT1000-7	TT1000-7-48	0.620	15.7	0.778	19.8	3/4"	80-40125N100	80-40125C100
	8-9	TT1000-8	TT1000-8-48	0.655	16.6	0.826	21.0			
	10-12	TT1000-10	TT1000-10-48	0.717	18.2	0.875	22.2			
	13-15	TT1000-13	TT1000-13-48	0.800	20.3	0.935	23.7			
	16-18	TT1000-16	TT1000-16-48	0.860	21.8	0.977	24.8			
	19-24	TT1000-19	TT1000-19-48	0.906	23.0	1.000	25.4			
1-1/4" (31.8mm)	7	TT1250-7	TT1250-7-48	0.870	22.1	1.028	26.1	1"	80-40125N125	80-40125C125
	8-9	TT1250-8	TT1250-8-48	0.905	23.0	1.076	27.3			
	10-12	TT1250-10	TT1250-10-48	0.967	24.6	1.125	28.6			
	13-15	TT1250-13	TT1250-13-48	1.050	26.7	1.185	30.1			
	16-18	TT1250-16	TT1250-16-48	1.110	28.2	1.227	31.2			
	19-24	TT1250-19	TT1250-19-48	1.156	29.4	1.250	31.8			
1-1/2" (38.1mm)	7	TT1500-7	TT1500-7-48	1.120	28.4	1.278	32.5		80-40200N150	80-40200C150
	8-9	TT1500-8	TT1500-8-48	1.155	29.3	1.326	33.7			
	10-12	TT1500-10	TT1500-10-48	1.217	30.9	1.375	34.9			
	13-15	TT1500-13	TT1500-13-48	1.300	33.0	1.435	36.4			
	16-18	TT1500-16	TT1500-16-48	1.360	34.5	1.477	37.5			
	19-24	TT1500-19	TT1500-19-48	1.406	35.7	1.500	38.1			
1-3/4" (44.5mm)	7	TT1750-7	TT1750-7-48	1.370	34.8	1.528	38.8		80-40200N175	80-40200C175
	8-9	TT1750-8	TT1750-8-48	1.405	35.7	1.576	40.0			
	10-12	TT1750-10	TT1750-10-48	1.467	37.3	1.625	41.3			
	13-15	TT1750-13	TT1750-13-48	1.550	39.4	1.685	42.8			
	16-18	TT1750-16	TT1750-16-48	1.610	40.9	1.727	43.9			
	19-24	TT1750-19	TT1750-19-48	1.656	42.1	1.750	44.5			
2" (50.8mm)	7	TT2000-7	TT2000-7-48	1.620	41.1	1.778	45.2		80-40200N200	80-40200C200
	8-9	TT2000-8	TT2000-8-48	1.655	42.0	1.826	46.4			
	10-12	TT2000-10	TT2000-10-48	1.717	43.6	1.875	47.6			
	13-15	TT2000-13	TT2000-13-48	1.800	45.7	1.935	49.1			
	16-18	TT2000-16	TT2000-16-48	1.860	47.2	1.977	50.2			
	19-24	TT2000-19	TT2000-19-48	1.906	48.4	2.000	50.8			

** O-Ring number P8309-225 is supplied with all Collet Sets. Elliott highly recommends using P8788 Spear Lubricant with your spears to greatly increase spear life.*

MADE IN USA

Stub Tugger
Hydraulic Tube Pulling System

Tube Size
- 0.375” to 3.000” OD
- (9.5 to 76.2mm) OD

Elliott’s Stub Tugger is a powerful hydraulic tube pulling system for removing tubes from heat exchangers and certain boiler applications.

The Elliott Stub Tugger is compatible with other competitive spear type tube pullers and its compact length of 22” (559.0mm) allows it to be used in confined space areas.

Features & Benefits:
- Extensive OD tube range - more versatility.
- Uses E-series spears - lower tooling cost.
- Hydraulic Cylinder Strike Plate - tool can be used as a slide hammer while still protecting the piston and seals, which increases convenience and efficiency.

Specifications:
- Capacity: 30 Ton (27.2Mt).
- Stroke: 6.000” (152.4mm).
- Tugger Diameter: 6.500” (165.1mm).
- Lengths:
  - Collapsed: 18.000” (457.0mm).
  - Extended: 22.000” (559.0mm).
- Length Across Handles: 18.250” (464.0mm).
- Weight: 46 Lbs. (20.9Kg).

80-40130 Stub Tugger kit includes:
- Tube Pulling Hydraulic Cylinder
- Suspension Bracket Assembly with Side Handles
- Nose Piece
- Nose Piece Adapter
- Load Cap
- Safety Shield
- (2) 15 ft. (4.6M) Hydraulic Hose

Spares & Accessories:
- Hydraulic Pump: M5773-00 110V Electric Pump, M5776-00 220V Electric Pump, M5775-00 Pneumatic Pump, or 80-36102D3 Hand Pump. You must either purchase or already have one of these pumps in order to properly operate the Stub Tugger.
- TCB48-66 Counter Balance
- 17-300822 Seal Repair Kit
- Spear ***See table on page 218.***
- Spear Extension ***See table on page 215.***
- Extension Chair (Required when using any extensions) ***See table on page 215.***
- 80-3055-3-00 Spear Adapter ***See table on page 215.***
- 80-3055-4 Horseshoe Lock ***See table on page 215.***

MADE IN USA FOR RENT

Spear and accessory items for tube OD sizes 3/8” (9.5mm) thru 1” (25.4mm).

Spear (See table on page 218 for size)

Spear Adapter

Horseshoe Lock

Optional Spear Extensions Available
Recommended to allow the operator to work from the outside of the water box and channel plate applications.
If using an extension, both the extension chair & spear extension are required.

Extension Chair

+

Male X Female Spear Extension

Spear items for tube OD sizes 1-1/4” (31.8mm) thru 2-1/2” (63.5mm).

All parts below are required for use.

Spear (See table on page 218 for size)

Male X Male Spear Extension

Extension Chair

Spear Adapter

Horseshoe Lock

Spear Accessories:

Spear Accessories	
Accessories	**Part Number**
Spear Adapter	80-3055-3-00
Horseshoe Lock	80-3055-4
Male X Male Spear Extension	80-3055-5
Male X Female Spear Extension	80-3055-10

Extension Chair	
Tube OD	**Part Number**
3/8" - 1” (9.5 - 31.8mm)	80-3055-7
1-1/2” - 1-3/4” (38.1 - 44.5mm)	80-36307
2” (50.8mm)	80-36308
2-1/4” - 2-1/2” (57.2 - 63.5mm)	80-36309
3” (76.2mm)	80-36311
An extension chair is required when using a spear extension.	

MADE IN USA

Manual Tube Puller

Tube Size

- 3/8” to 1” OD
- (9.5 to 25.4mm) OD

Spear and nose pieces must be purchased separately.

Elliott’s Model 904500 Manual Tube Puller is ideal for pulling a limited number of tubes in heat exchangers, chillers, fin fan coolers, and surface condensers.

The Manual Tube Puller incorporates a socket and thrust bearing to allow for use with an impact wrench. Elliott’s manual tube puller is a great value because the puller works on tube ODs 3/8” to 1” (9.5 to 25.4mm), so all you need to purchase is a nose piece for each tube OD. E Series spears must be purchased separately.

The easy to use 904500 Manual Tube Puller allows you to pull tubes at a minimum tooling cost.

Features & Benefits:

- One puller accommodates tube OD sizes 3/8” to 1” (9.5 to 25.4mm) - only need to purchase nose piece.
- Uses standard spears - lower tool cost.
- Minimum investment - lower tool cost.
- Manual tool - no capital expense for pump & ram.
- Compact - easy to store.

Spares & Accessories:

- Spears ***See table on page 218.****
- Nose Piece*

** Required to operate the Manual Tube Puller*

Tube OD	Nose Piece
3/8"	904502-05
1/2"	904502-04
5/8"	904502-01
3/4"	904502-02
7/8"	904502-06
1"	904502-03

MADE IN USA FOR RENT

Tube Size

- 0.375” to 3.000” OD
- (9.5 to 76.2mm) OD

1” (25.4mm) and Smaller Spears with Male Adapter Threads

1-1/4” (31.8mm) and Larger Spears with Female Adapter Threads

Elliott’s E Series Hex Spears are used with the Elliott Stub Tugger or Manual Tube Puller to successfully pull tubes in chillers, heat exchangers, condensers, fin fan coolers, and boilers.

Simply size the spear, apply spear lubricant on the pulling teeth, and then set the spear by employing a hand ratchet or impact wrench. To aid in the removal of the tube stub from the spear, back the spear off and then employ the Stub Tugger or Manual Tube Puller to successfully remove the tube.

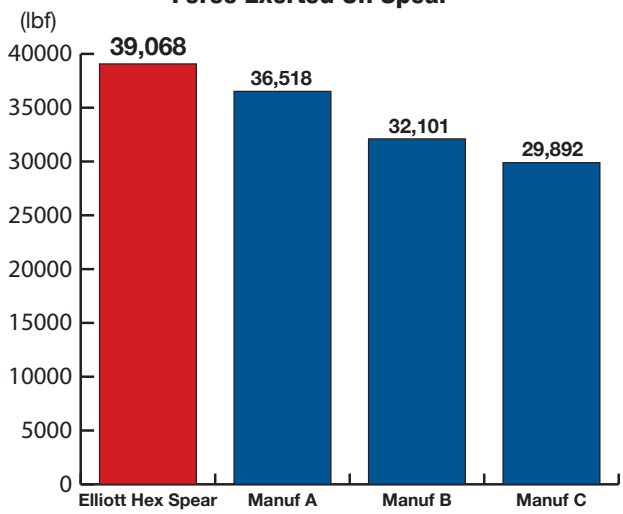
Features & Benefits:

- New, innovative design means the best tool life possible at a competitive price.
- The best value spear on the market.
- Each spear is rated to withstand a minimum of 120,000 psi tensile strength to increase pulling capacity and tool life.
- Engineered design lowers the chance that the gripping end of the spear will break off in the tube, saving time, money and hassle.

Spares & Accessories:

- P8788 Spear Lubricant: Highly recommended for use on spear threads to greatly increase spear life.

Force Exerted On Spear



MADE IN USA

E-Series Hex Spears

Tube OD	BWG	Part #	"A" Ø		Hex Size
			Inch	mm	
3/8" (9.5mm)	16-17	E375-16	0.240	6.1	5/8" Flat
	18-19	E375-18	0.272	6.9	
	20-22	E375-20	0.295	7.5	
1/2" (12.7mm)	16-17	E500-16	0.365	9.3	7/8"
	18-19	E500-18	0.397	10.1	
	20-22	E500-20	0.427	10.9	
5/8" (15.8mm)	12-13	E625-12	0.402	10.2	
	14-15	E625-14	0.454	11.5	
	16-17	E625-16	0.489	12.4	
	18-19	E625-18	0.521	13.2	
	20-22	E625-20	0.545	13.8	
3/4" (19.1mm)	8-9	E750-8	0.410	10.4	
	10-11	E750-10	0.470	11.9	
	12-13	E750-12	0.520	13.2	
	14-15	E750-14	0.579	14.7	
	16-17	E750-16	0.614	15.6	
	18-19	E750-18	0.646	16.4	
	20-22	E750-20	0.670	17.0	
7/8" (22.2mm)	12-13	E875-12	0.652	16.6	
	14-15	E875-14	0.699	17.8	
	16-17	E875-16	0.740	18.8	
	18-19	E875-18	0.760	19.3	
	20-22	E875-20	0.800	20.3	
1" (25.4mm)	8-9	E1000-8	0.660	16.8	
	10-11	E1000-10	0.720	18.3	
	12-13	E1000-12	0.777	19.7	
	14-15	E1000-14	0.829	21.1	
	16-17	E1000-16	0.864	22.0	
	18-19	E1000-18	0.896	22.8	
	20-22	E1000-20	0.920	23.3	
1-1/4" (31.8mm)	8-9	E1250-8	0.900	22.9	1-1/8"
	10-11	E1250-10	0.977	24.8	
	12-13	E1250-12	1.027	26.1	
	14-15	E1250-14	1.079	27.4	
	16-17	E1250-16	1.115	28.3	
	18-19	E1250-18	1.145	29.1	
1-1/2" (38.1mm)	8-9	E1500-8	1.165	29.6	1-1/4"
	10-11	E1500-10	1.227	31.2	
	12-13	E1500-12	1.277	31.9	
	14-15	E1500-14	1.329	33.8	
	16-17	E1500-16	1.365	34.7	
1-3/4" (44.5mm)	10-11	E1750-10	1.462	37.1	1-5/8"
	12-13	E1750-12	1.512	38.4	
	14-15	E1750-14	1.564	39.7	
	16-17	E1750-16	1.600	40.6	
2" (50.8mm)	7-9	E2000-7	1.620	41.2	
	10-11	E2000-10	1.710	43.4	
	12-13	E2000-12	1.770	45.0	
	14-15	E2000-14	1.820	46.2	
	16-17	E2000-16	1.865	47.4	
	18-19	E2000-18	1.897	48.2	
2-1/2" (63.5mm)	7-9	E2500-7	2.120	53.9	2-1/4"
	10-11	E2500-10	2.220	56.4	
	12-13	E2500-12	2.270	57.7	
	14-15	E2500-14	2.320	58.9	
3" (76.2mm)	10-11	E3000-10	2.722	69.1	2-3/4"
	12-13	E3000-12	2.772	70.4	
	14-15	E3000-14	2.820	71.6	

MADE IN USA

430G Series
Pneumatic Hammer

Tube Size
- 0.375” to 2.000” OD
- (9.5 to 50.8mm) OD

Elliott’s 430G Pneumatic Hammer is the recommended driving tool for Elliott’s Knockout Tools and Collapsing Tools to remove tube stubs in heat exchangers or beading tubes in firetube boilers.

Knockout Tools are used to punch the tubes out of the tube sheet while Collapsing Tools collapse tubes from one end of a heat exchanger and then the tube is pulled from the other end.

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.
- Used also for tube collapsing and flaring - greater productivity.

430G Pneumatic Hammer package includes:
- Hose Whip
- Filter-Lubricator
- Carrying Case

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).

Spares & Accessories:
- 6070 Filter-Lubricator: Included with the 430G Pneumatic Hammer package.
- Knockout Tools
- Collapsing Tools

MADE IN USA

FOR RENT

Knockout Tools

Elliott's Knockout Tools, also known as tube drifts, are used to punch the tubes out of a tube sheet with the 430G Pneumatic Hammer.

The Type No. 6 Shank 0.680 (17.3mm) diameter by 2-3/8" (60.3mm) long with retainer is the standard shank supplied with these tools. Other style shanks are available. Contact Customer Service for details.

Tube OD	BWG	Part #	Tube OD	BWG	Part #
1/2" (12.7mm)	15	8496-29T6	3/4" (19.1mm)	17	8496-76T6
	16	8496-30T6		18	8496-77T6
	17	8496-31T6		19	8496-78T6
	18	8496-32T6		20	8496-79T6
	19	8496-33T6	7/8" (22.2mm)	10	8496-87T6
	20	8496-34T6		11	8496-88T6
5/8" (15.9mm)	10	8496-45T6		12	8496-89T6
	11	8496-46T6		13	8496-90T6
	12	8496-47T6		14	8496-91T6
	13	8496-48T6		15	8496-92T6
	14	8496-49T6		16	8496-93T6
	15	8496-50T6		17	8496-94T6
	16	8496-51T6		18	8496-95T6
	17	8496-52T6		19	8496-96T6
	18	8496-53T6		20	8496-97T6
	19	8496-54T6		21	8496-98T6
	20	8496-55T6		22	8496-99T6
3/4" (19.1mm)	8	8496-67T6	1" (25.4mm)	10	8496-102T6
	9	8496-68T6		11	8496-103T6
	10	8496-69T6		12	8496-104T6
	11	8496-70T6		13	8496-105T6
	12	8496-71T6		14	8496-106T6
	13	8496-72T6		15	8496-107T6
	14	8496-73T6		16	8496-108T6
	15	8496-74T6		17	8496-109T6
	16	8496-75T6		18	8496-110T6

Collapsing Tools

Elliott's Collapsing Tools are used to collapse one end of the tube; then the tube is pulled from the other end of the heat exchanger. Collapsing tools may either be used by hand or with the 430G Pneumatic Hammer.

The Collapsing Tool with the 430G Pneumatic Hammer can also be used as a tube ripper. Simply place the ripping edge of the chisel into one of the flutes of the tube pulling spear and press the trigger, then run the chisel down the spear's flute to the end. The tube can then be easily removed from the spear by hand.

The Type No. 6 Shank 0.680 (17.3mm) diameter by 2-3/8" (60.3mm) long with retainer is the standard shank supplied with these tools. Other style shanks are available. Contact Customer Service for details.

Tube OD	Part #	Maximum Sheet
3/8"	8637-6T6	1-3/4"
1/2"	8637-8T6	2-1/2"
5/8"	8637-10T6	2-1/2"
3/4"	8637-12T6	2-5/8"
7/8"	8637-14T6	2-3/4"
1"	8637-16T6	3"
1-1/8"	8637-18T6	3-1/4"

Tube OD	Part #	Maximum Sheet
1-1/4"	8637-20T6	3-1/4"
1-3/8"	8637-22T6	3-1/4"
1-1/2"	8637-24T6	3-1/4"
1-5/8"	8637-26T6	3-3/8"
1-3/4"	8637-28T6	3-1/2"
1-7/8"	8637-30T6	4"
2"	8637-32T6	4-1/4"

MADE IN USA

Elliott's Wall-Reducing Tools are used to reduce the tube wall in cases where it is necessary in order to remove the tube.

These specially designed tools have a piloted ground nose to keep the drill centered in the tube. The drill is sized to leave approximately .015" tube wall material left in the tube. The remaining tube material can then easily quickly be removed with a companion knockout tool and pneumatic hammer.

Tube OD	BWG	Part #	Morse Taper
3/8"	16-17	8660-16	1
	18-19	8660-18	
	20-21	8660-20	
	22-23	8660-22	
1/2"	16-17	8661-16	2
	18-19	8661-18	
	20-21	8661-20	
	22-23	8661-22	
5/8"	12-13	8662-12	
	14-15	8662-14	
	16-17	8662-16	
	18-19	8662-18	
	20-21	8662-20	
	22-23	8662-22	
3/4"	10-11	8663-10	
	12-13	8663-12	
	14-15	8663-14	
	16-17	8663-16	
	18-19	8663-18	
	20-21	8663-20	
	22-23	8663-22	

Tube OD	BWG	Part #	Morse Taper
7/8"	10-11	8664-10	3
	12-13	8664-12	
	14-15	8664-14	
	16-17	8664-16	
	18-19	8664-18	
	20-21	8664-20	
	22-23	8664-22	
1"	10-11	8665-10	
	12-13	8665-12	
	14-15	8665-14	
	16-17	8665-16	
	18-19	8665-18	
	20-21	8665-20	
	22-23	8665-22	

Other sizes and shank types are available. Contact Customer Service for details.

MADE IN USA

430D Series
Jumbo Tube Buster

Tube Size
- 0.625” to 2.500” OD
- (15.9 to 63.5mm) OD

Elliott’s 430D Jumbo Tube Buster is the recommended driving tool for Elliott’s Jumbo Knockout Tools to remove tube stubs in heat exchangers, firetube boilers, and watertube boilers.

Jumbo Knockout Tools are used to punch the tubes out of the tube sheet and are available in either 8” (203.0mm) or 16” (406.0mm) reach. The tools are piloted to prevent damage to the tube sheet.

The 430D Jumbo Tube Buster uses a number 15 shank. The tool features a barrel design that captures the compression piston and the inside trigger feature permits throttle control of the tool.

Features & Benefits:
- Lightweight & compact design - easy to move in tight areas.
- Uses retainers on tools - improved operator safety.
- Used also for tube collapsing, belling, and flaring - greater productivity.

430D Jumbo Tube Buster package includes:
- Hose Whip
- Filter-Lubricator
- Carrying Case

Specifications:
- Piston Diameter & Stroke: 1-3/16” X 8”
- (30.2 X 203.2mm).
- Net Weight: 30 lbs. (13.6 Kg.).
- Air Requirement: 42 CFM @ 90 PSI.
- Hose Diameter: 1/2” (12.7mm) NPT.

Spares & Accessories:
- 6070 Filter-Lubricator: Included with the 430D Jumbo Tube Buster package.
- Knockout Tools: Available with 8” (203.0mm) or 16” (406.0mm) reaches.

MADE IN USA FOR RENT

Elliott's Jumbo Knockout Tools, also known as tube drifts, are used to punch the tubes out of a tube sheet with the 430D Jumbo Tube Buster.

The 430D Jumbo Tube Buster uses shank number 15. The Jumbo Knockout Tools are available in reaches of both 8" (203.2mm) and 16" (406.4mm).

8" (203.2mm) Reach Jumbo Knockout Tools (Tube Drifts)					
Tube OD	Gauges 10-11	Gauges 12-13	Gauges 14-15	Gauges 16-17	Gauges 18-19
5/8" (15.9mm)	8777-1010	8777-1012	8777-1014	8777-1016	8777-1018
3/4" (19.1mm)	8777-1210	8777-1212	8777-1214	8777-1216	8777-1218
7/8" (22.2mm)	8777-1410	8777-1412	8777-1414	8777-1416	8777-1418
1" (25.4mm)	8777-1610	8777-1612	8777-1614	8777-1616	8777-1618
1-1/4" (31.8mm)	8777-2010	8777-2012	8777-2014	8777-2016	8777-2018
1-1/2" (38.1mm)	8777-2410	8777-2412	8777-2414	8777-2416	8777-2418
1-3/4" (44.5mm)	8777-2810	8777-2812	8777-2814	8777-2816	8777-2818
2" (50.8mm)	8777-3210	8777-3212	8777-3214	8777-3216	8777-3218
2-1/2" (63.5mm)	8777-4010	8777-4012	8777-4014	8777-4016	8777-4018

16" (406.4mm) Reach Jumbo Knockout Tools (Tube Drifts)					
Tube OD	Gauges 10-11	Gauges 12-13	Gauges 14-15	Gauges 16-17	Gauges 18-19
5/8" (15.9mm)	8777-1010-16	8777-1012-16	8777-1014-16	8777-1016-16	8777-1018-16
3/4" (19.1mm)	8777-1210-16	8777-1212-16	8777-1214-16	8777-1216-16	8777-1218-16
7/8" (22.2mm)	8777-1410-16	8777-1412-16	8777-1414-16	8777-1416-16	8777-1418-16
1" (25.4mm)	8777-1610-16	8777-1612-16	8777-1614-16	8777-1616-16	8777-1618-16
1-1/4" (31.8mm)	8777-2010-16	8777-2012-16	8777-2014-16	8777-2016-16	8777-2018-16
1-1/2" (38.1mm)	8777-2410-16	8777-2412-16	8777-2414-16	8777-2416-16	8777-2418-16
1-3/4" (44.5mm)	8777-2810-16	8777-2812-16	8777-2814-16	8777-2816-16	8777-2818-16
2" (50.8mm)	8777-3210-16	8777-3212-16	8777-3214-16	8777-3216-16	8777-3218-16
2-1/2" (63.5mm)	8777-4010-16	8777-4012-16	8777-4014-16	8777-4016-16	8777-4018-16

Note: Split Sleeve 430D1 is required for operating 1" (25.4mm) and larger Jumbo Knockout Tools.

MADE IN USA

Why Choose ELLIOTT?

As the original tube tool company since 1892, you can count on Elliott Tool Technologies for high quality products that are available when you need them.

"The team at Elliott Tool not only sold me exactly what I needed, they took the time to come to my office and train my team on the proper way to use the tools and proper maintenance of the tools... A wise man once told me to surround yourself with successful people and you will be successful. Elliott Tool will always be part of my team!"

-James Williams, Owner
Williams Mechanical Services

"Elliott's service has always been good and reliable and replacement parts and consumables are available if we need them."

-Charles Gardinier, Chilling Station Maintenance Supervisor
University of Texas at Austin

"At Trane, we have an unceasing pursuit for improving our manufacturing processes. Having manufacturing partners that are equally engaged is essential to a sustainable future. Elliott Tool Technologies has embraced that role with swift response by leading and providing custom tool solutions to match our continuous improvement goals."

-Max Ford, Manufacturing Engineer
Trane Technologies, La Crosse, Wi

"Support was the reason we went with the Elliott equipment. The product is great and the people we worked with have been great."

-Ryan Pitre, Manufacturing Engineer
Alfa Laval Inc

"Elliott really paid attention to what I needed to accomplish on the job... Visiting Elliott's solution center allowed me to see several systems first hand, helping us choose a safer and more cost effective method. Their team was also able to provide valuable on-site training to make sure we got the best results out of our tooling."

-Matt Sauls, Project Manager
Midwest Environmental Services

SUPPORT


TRANE

Quality Assurance

Elliott Tool Technologies has always stood for quality tube tools. From engineering, manufacturing and quality control Elliott is committed to producing a product that you can be confident in using time after time.

Elliott's Quality

You can rely on Elliott to provide tools that are tougher than the job and are the best in the industry. To achieve this goal, we utilize continuous improvement, Six Sigma and 5-S. Elliott firmly believes the last thing you should have to worry about is the quality of your tools. However, if you require a more formal assurance of quality we do offer the following options.

Certificate of Compliance/Conformance

A Certificate of Compliance/Conformance will certify your tool is manufactured according to our engineer specifications. Some refer to a Certificate of Compliance and a Certificate of Conformance as two separate Certificates; Elliott considers them as one Certificate. Should you require a Certificate of Compliance/Conformance, there is no additional charge. In most cases, customer requests for a Certificate of Compliance/Conformance will not delay the delivery of your tools. Requests for Certificates of Compliance/Conformance must be made at the time of your order.

Materials Certificate

A Materials Certificate certifies the material used to manufacture the tools. The price of a Materials Certificate will vary based on the complexity of the tool. Requests for a Materials Certificate could change availability and delivery time of your tools depending on the complexity of the part. A complete quote for pricing and availability is available upon request. Requests for Materials Certificates must be made at the time of your order.

For more specific information, contact your Elliott sales representative.

> *"I can go to our tube rolling equipment drawers and pull out serviceable rolling equipment that could easily be older than my 62 years!"*
>
> *- Don Poush*

“I Need It Yesterday”

Elliott Tool strives to be the industry’s leading supplier of *Quality tube tools for an ‘I need it yesterday’ world.*™ Here are the services you can count on.

Catalog Items

Many of the items shown in this catalog are in stock and available for same day shipment when we receive your order on business days before 5:00 PM US Eastern. Orders destined for export or requiring shipment via freight usually can be shipped the next day. If the catalog item is not available for immediate shipment in the quantities you need, we will rapidly explore all of these options:

- Partial shipment to get you started while Elliott manufactures the balance of your needs.
- Expediting your need through the manufacturing process.
- If your need is recurring, revising Elliott’s stock accordingly.

If after you have submitted an order to Elliott and later decide you need it sooner, Elliott will do everything possible to meet your needs. Your Elliott sales representative will investigate for free if the item(s):

- Are already available for complete shipment.
- Are available for partial shipment.
- If expediting through manufacturing according to your new need is possible.

If expediting is possible, a service fee of the lesser of $250 or 25% of the extended amount of the line item(s) being expedited is applied. This service fee helps to defray Elliott’s additional costs related to manufacturing rescheduling, overtime labor, and expediting fees Elliott incurs with our suppliers.

Special Items

Elliott Tool welcomes the opportunity to meet your needs for tube tools not included in this catalog and has more than 100 years of development experience to back you up. Normal lead times are 30 business days after receipt of your approval of our design. If your need is more urgent Elliott can usually provide expediting for a service fee of the greater of $250 or 25% of the extended amount of the line item(s) being expedited. This service fee helps to defray Elliott’s additional costs related to manufacturing rescheduling, overtime labor, and expediting fees Elliott incurs with our suppliers.

Should your need for a special item be ongoing then Elliott Tool will commit to understand and supply the items to you according to your forecast. Contact your Elliott Tool sales representative for more information.

Rental Capability

Many of the products in this catalog are available for rent to customers and sites located in the United States and Canada. There are many practical considerations prohibitively affecting rental commerce outside of the United States and Canada but such customers are invited to contact Elliott to discuss ways to overcome them.

Elliott offers daily, weekly, and monthly rental rates. Unless otherwise noted, all quotes are at the weekly rate. Rentals accrue daily, have a 1 week minimum rental period, and will be charged according to the daily, weekly or monthly rate for the rental period. The rental period begins when you receive the item and stops when you ship it back to Elliott.

Upon shipment Elliott will invoice for the first 7 days of rental, any consumable items, and outbound freight. Every 28 days of rent, Elliott will issue a progress bill based on the monthly rate for that item less the pre-paid amount for the first week. After the item is returned, a final bill for any outstanding rent will be invoiced. For rentals that are paid by credit card, a one-month deposit is required. At each progress bill, an additional month will be charged for the next rental period. Once the item is returned, the difference between the pre-charged amount and the actual rental will be credited back to the credit card on file.

Return all rental equipment to:

Elliott Tool Technologies, Ltd
Attn: Rental Department
1760 Tuttle Avenue
Dayton, OH 45403
United States

A Return Material Authorization (RMA) is not required.

If you choose to purchase a new item, Elliott will credit 50%* of the current rental charges for that item towards the purchase of the same item.

The maximum credit you will receive towards the purchase of a new tool may not exceed 25% of the Retail List Price of that brand new tool.

If you choose to purchase the rental item, Elliott will credit 50%** of the current rental charges towards the purchase of the used rental item.

****The maximum credit you will receive towards the purchase of a used tool may not exceed 25% of the Retail List Price. (Retail List Price of a rental tool is 15% less than the list price of that of the same tool in brand new condition).***

You must notify Elliott of your interest in doing so while the rental period is still open. Please note that some equipment is excluded from this offer.

Repairs of rental equipment due to reasons other than normal wear will be charged to the renter. Rental equipment not returned will be invoiced at Elliott's list price in addition to the rental charges. Consumable items that are returned will be credited in accordance with the customer returns terms and conditions.

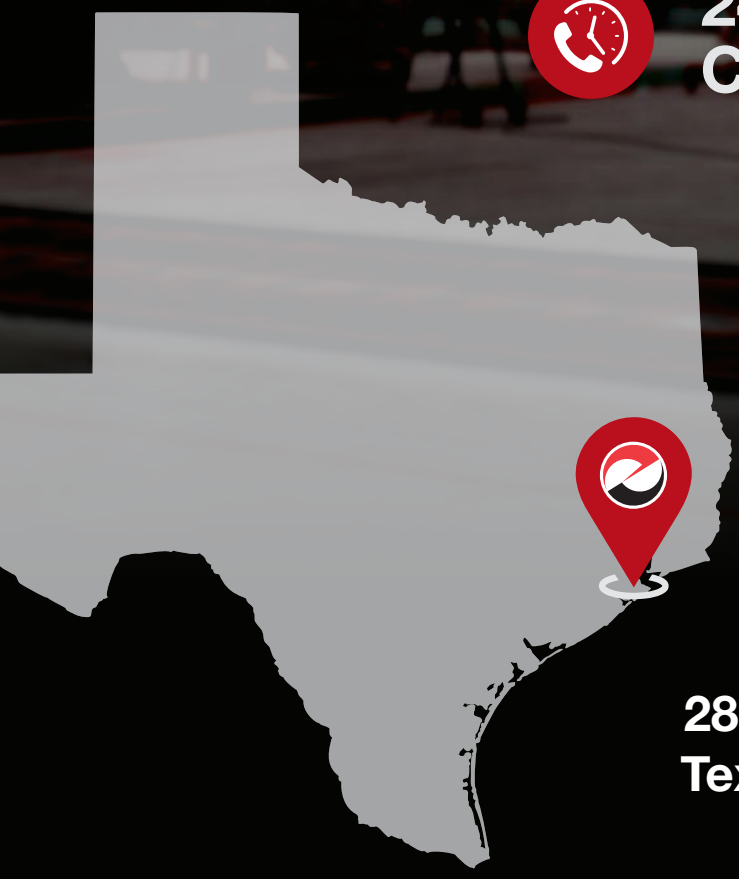
FOR RENT

Look for the "FOR RENT" stamp at the bottom of the product page.

Local Inventory You Can Count On

USA Quality Tube Tools Available When You Need Them

- Local Support & Service
- Same Day Inventory
- 24/7 Emergency Call Out Service



Offering same day inventory and 24/7 emergency call out-service, Elliott's Texas City location is here to support you.

Located at:

2814 25th Ave North
Texas City, TX 77590

Tube Wall Conversion Table

B.W.G.	Wall Thickness	Outside Diameter Tubes																				
		1/4"	3/8"	1/2"	5/8"	3/4"	7/8"	1"	11/4"	11/2"	13/4"	2"	21/4"	21/2"	23/4"	3"	31/4"	31/2"	33/4"	4"	41/4"	41/2"
		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	3.932
	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	99.87
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	3.982
	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	101.14
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	4.024
	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	102.21
5	inch 0.220			0.060	0.185	0.310	0.435	0.560	0.810	1.060	1.310	1.560	1.810	2.050	2.310	2.560	2.810	3.060	3.310	3.560	3.810	4.060
	mm 5.59			1.52	4.70	7.87	11.05	14.22	20.57	26.92	33.27	39.62	45.97	52.07	58.67	65.02	71.37	77.72	84.07	90.42	96.77	103.12
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	3.844	4.094
	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	97.64	103.99
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	3.890	4.140
	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	98.81	105.16
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	3.920	4.170
	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	99.57	105.92
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	3.704	3.954	4.204
	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	94.08	100.43	106.78
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	3.732	3.982	4.232
	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	94.79	101.14	107.49
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	3.760	4.010	4.260
	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	95.50	101.85	108.20
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	1.935										
	mm 0.81	4.72	7.90	11.07	14.25	17.42	20.60	23.77	30.12	36.47	42.82	49.15										
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.)	OD (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
3/4	1.050	.113	.824	.154	.742			.218	.614
1	1.315	.133	1.049	.179	.957			.250	.815
1-1/4	1.660	.140	1.380	.191	1.278			.250	1.160
1-1/2	1.900	.145	1.610	.200	1.500			.281	1.338
2	2.375	.154	2.067	.218	1.939			.343	1.689
2-1/2	2.875	.203	2.469	.276	2.323			.375	2.125
3	3.500	.216	3.068	.300	2.900			.437	2.626
3-1/2	4.000	.226	3.548	.318	3.364				
4	4.500	.237	4.026	.337	3.826	.437	3.626	.531	3.438
5	5.563	.258	5.047	.375	4.813	.500	4.563	.625	4.313
6	6.625	.280	6.065	.432	5.761	.562	5.501	.718	5.189
8	8.625	.322	7.981	.500	7.625	.718	7.189	.906	6.813
10	10.750	.365	10.020	.593	9.564	.843	9.064	1.125	8.500
12	12.750	.406	11.938	.687	11.376	1.000	10.750	1.312	10.126

Recommended Cutting Speed Specifications

Revolutions Per Minute

To obtain maximum cutting performance and cutter blade life, refer to the table below for the recommended cutting RPM. A slower RPM is recommended when the optimum cannot be obtained to maximize cutter blade life.

Tube OD	Inconel 10 SFM	Hastelloy 20 SFM	300 Series Stainless Steel 30 SFM	Monel 40 SFM	400 Series Stainless Steel 50 SFM	Titanium 60 SFM	Carbon Steel 80 SFM	Copper 90 SFM	Copper Nickel 100 SFM	Red Brass 200 SFM	Admiralty Brass 225 SFM	Aluminum 250 SFM
1/4" (6.35mm)	153	306	458	611	764	917	1222	1376	1528	3056	3438	3818
5/16" (7.94mm)	122	244	367	489	611	733	978	1100	1222	2445	2750	3055
3/8" (9.53mm)	102	204	306	408	509	611	815	916	1018	2037	2292	2545
7/16" (11.11mm)	87	175	262	349	437	524	699	786	874	1746	1964	2182
1/2" (12.7mm)	76	153	229	306	382	459	611	688	764	1528	1719	1909
9/16" (14.30mm)	68	137	204	272	340	407	543	611	679	1358	1528	1697
5/8" (15.88mm)	61	122	184	245	306	367	489	552	612	1222	1375	1527
11/16" (17.46mm)	55	112	167	222	278	333	444	500	555	1111	1250	1388
3/4" (19.05mm)	51	102	153	203	254	306	408	458	508	1019	1146	1273
13/16" (20.64mm)	47	95	142	190	237	284	379	427	474	940	1058	1175
7/8" (22.23mm)	44	87	131	175	219	262	349	392	438	873	982	1091
1" (25.40mm)	38	76	115	153	191	229	306	344	382	764	859	955
1-1/8" (28.58mm)	34	68	102	136	170	204	272	306	340	679	764	848
1-1/4" (31.75mm)	31	61	92	123	153	183	245	274	306	611	688	764
1-3/8" (34.93mm)	28	56	83	111	139	167	222	250	278	556	625	694
1-1/2" (38.10mm)	25	51	76	102	127	153	204	230	254	509	573	636
1-3/4" (44.45mm)	22	44	66	88	109	131	175	196	218	437	491	545
2" (50.80mm)	19	38	57	76	96	115	153	172	191	382	430	477
2-1/2" (63.50mm)	15	31	46	61	76	92	122	137	153	305	344	382
3" (76.20mm)	13	25	38	51	64	76	102	115	127	255	286	318
4" (101.6mm)	10	19	29	38	48	57	76	86	95	191	215	239

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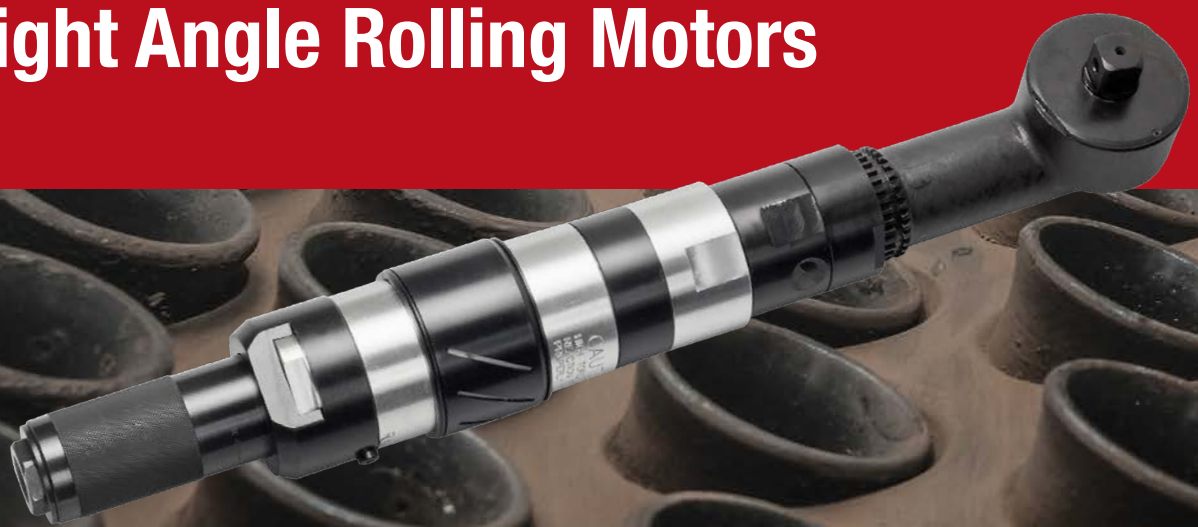

For more information, see page 72 or visit our website
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For more information, see page 122

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