2021

Tube Tool Crib

Elliott Tool Technologies

Fabrication & Maintenance Tools

How To Expand Welded Tubes

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All New 850 Rolling Motor

USA Quality & Performance.

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ELLIOTT TOOL TECHNOLOGIES

A History Of Innovation
1892 – Present

Why Choose Elliott Tool?

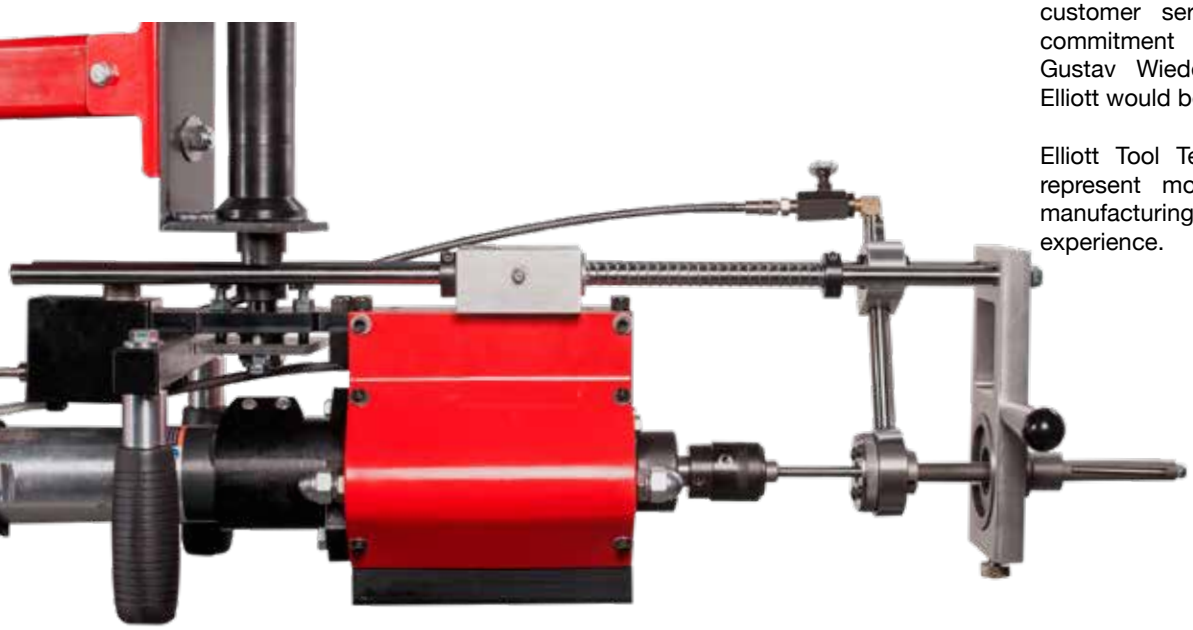
In September 1892, an inventor and manufacturer named Gustav Wiedeke began a small manufacturing business in a modest building at the rear of his Dayton, Ohio home. Today, over 100 years later, Wiedeke Dayton has become Elliott Tool Technologies Ltd. due to Mr. Wiedeke's efforts.

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.

2021

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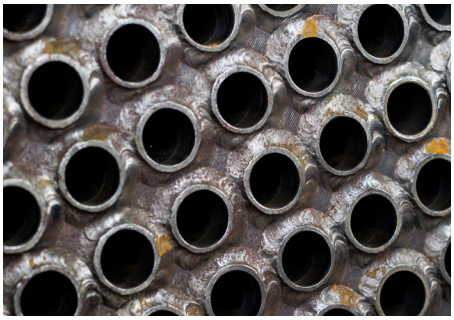
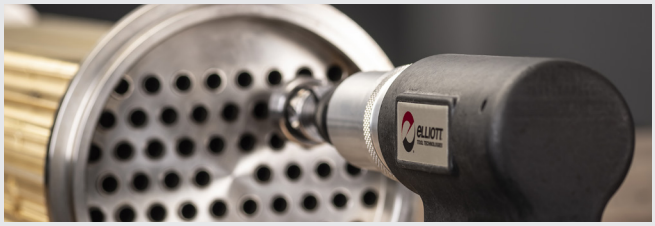
FEATURED ARTICLES



ARTICLES

RESULTS REPORTS



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Tube Tools
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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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INSTALL

CLEAN

TEST

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 222 for more information on Elliott's rental program.*

INSTALL

U.S. Based Fabricator Metalforms
Increases Productivity & Reduces Cost By 50%

Featured: (from left to right) Joseph Hardy Jr., Trey Frederick, Walter Bearden, Su Ngo, Robert Buentello, Maximo Cardenas III, Mark Chisum, and Ray Hunter.

QUICK SUMMARY

The Challenge

- Produce quality heat exchangers as cost effectively as possible.
- Current tube rolling system was falling short of company goals, with too much cost attributed to re-rolling tubes.
- Increase the safety of their employees in order to maintain a competitive edge in the marketplace.

The Solution

- Elliott's Hybrid Series Rapid Hawk with pneumatic motor and Direct Torque™ electric torque control.
- Production trial to determine the cost, productivity and safety of the system.

The Results

- Cost per expansion reduced by more than 50%.
- No tube leaks due to the system.
- Capable of completing up to 360 expansions per hour.
- Ergonomics & ease of use greatly improved operator working conditions.

The Challenge

Metalforms, Ltd., a fabrication company located in Beaumont, Texas, manufactures heat exchangers and pressure vessels in the highly competitive shell and tube market. Their challenge was three-fold: change the tube expansion process to improve consistency while maintaining their high quality standards, decrease the overall cost of the process, and increase the safety of their employees through better ergonomic efficiency, in order to maintain a competitive edge in the marketplace. With a recent increase in business volume, maintaining efficiency and accuracy was of utmost importance. Their current tube rolling system was falling short of company goals, with too much time and cost attributed to re-rolling tubes.

In addition to productivity and cost concerns, Metalforms was also looking for a method that would benefit operators. Stress and fatigue have become an unwelcome reality for many individuals in the field. One of the lead operators at Metalforms mentioned back pain and muscle fatigue had become an unwanted part of their daily routine. This type of stress not only negatively impacts workers but overall performance as well. In order to reduce costs and operator fatigue associated with rolling and re-rolling a vessel, Mark Chisum and Trey Frederick, Manufacturing Engineers, began looking for an alternative.

The Solution

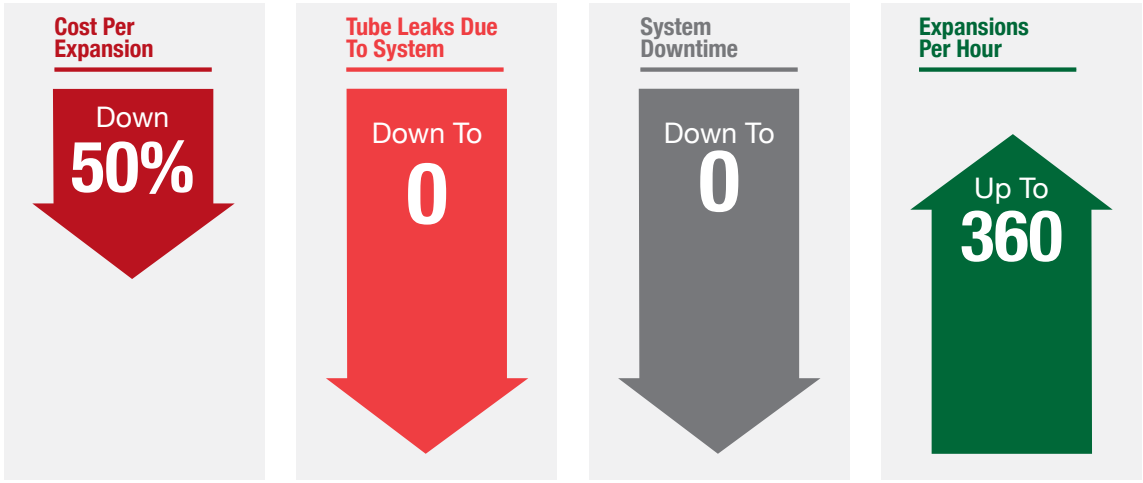
With company and operator challenges in mind, Mark and Trey researched and eliminated a dozen various systems, before wondering if Elliott's Hybrid Series Rapid Hawk could be the best comprehensive solution. After going through the benefits of the system with Dave Hearn, President of Metalforms, they agreed to trial two units.

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 Metalforms 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 a motor regardless of its power source. Metalforms' operators also appreciated the triggerless operation and auto-cycling capabilities, now they

> *"The industry is trending towards thinner wall tubes, tighter tolerances, and defined processes and specifications, which could greatly increase the man-hours that go into a bundle. The Rapid Hawk enables us to get ahead of this trend while at the same time, significantly reducing the number of man-hours."*
>
> *- Trey Frederick, Mechanical Design Engineer, Metalforms*

Benefits of the Rapid Hawk

Key results achieved during extensive production trial at Metalforms



would be able to roll tubes faster and more efficiently while reducing the need for costly rework. In addition to improving productivity and expansion accuracy, the Rapid Hawk's self-supporting arm and built-in safety features would go a long way in improving employee safety.

After receiving the Rapid Hawk units, Metalforms conducted several internal tests to determine the accuracy, productivity, and safety of the system as well as the overall cost to operate it. This was important in helping them determine if the ROI justified the purchase of the system.

The Results

With cost & productivity being primary concerns, Mark and Trey made sure to monitor tool life and the time needed to complete a project. Using both the cost of the tooling and the operator's time, Chisum and Frederick were able to determine Metalforms' cost per expansion. The Hybrid Series Rapid Hawk showed positive results almost immediately, compared to their previous rolling method. "As a result of the changes we made with the Rapid Hawk we can say that our cost to expand a tube has dropped by more than 50%," Chisum explained. This was primarily due to the system's reach and mobility, making it easier for the operator to complete the job. In addition to cost savings, Metalforms saw a significant decrease in the amount of rework needed on their heat exchangers. "We have over 280,000 expansions on the Rapid Hawk, with the capability of 360 expansions per hour, with 0 tube joint leaks due to the system, and with 0 downtime," Chisum stated.

The reduction in time spent rolling not only benefitted their customers, but it also made a positive impact on operators. The ergonomics of the system alleviated unnecessary operator stress. After only four hours of use during the first trial day, one of Metalforms' lead operators commented: "I can't remember a time where my shoulders weren't hurting by now." The new ease with which operators were able to complete the job, made them eager to use the machine. Their enthusiasm and willingness to use the Hybrid Series Rapid Hawk helped Metalforms transition their team to the new system more quickly.

Overall, Dave Hearn was impressed with both the results generated from the Rapid Hawk system, as well as, the customer service provided. "In the competitive environment we are in, Metalforms is always looking for ways to reduce our costs, improve our quality, and improve our safety. It is good when we can find a supplier that can do one of those really well. We are impressed when a supplier can do two of those. Elliott Tool was instrumental in helping us with all three!" Dave Hearn said. After purchasing two additional Hybrid Series Rapid Hawk systems, Metalforms, Ltd. is confident that they can maintain their competitive edge within an increasingly competitive environment.

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		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	876210-500	
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		876211-750
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.

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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

Elliott’s GT Series Grooving Tools, also known as Serrating Tools, can be used manually to clean up existing grooves or can be used in milling or drilling equipment for OEM tube sheet thicknesses of 3/8” (9.5mm) through 2-1/8” (54.0mm).

The GT Series Grooving Tools feature a one-piece mandrel design to significantly improve performance and accuracy. GT Series cutter bits are designed for extended tool life, allowing for repeatable, accurate cuts from tube sheet hole to tube sheet hole.

Features & Benefits:

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

GT Series Grooving Tool includes:

- Cutter Bit
- Mandrel

Spares & Accessories:

- Cutter Bit: Available in ferrous and stainless steel in various cutter bit tooth configurations.
- Mandrel

Dimensions for ABC listed below

Size		Grooving Tool	Mandrel	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	GT1250	GT1250-03	
1-1/2”	38.1	GT1500	GT1500-03	4
1-3/4	44.5	GT1750	GT1750-03	
2”	50.8	GT2000	GT2000-03	
2-1/2”	63.5	GT2500	GT2500-03	
3”	76.2	GT3000	GT3000-03	

GT375	GT500	GT625-GT3000

Grooving Tool Blades			A	B	C
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 for Stainless Steel Blades.*

Contact Elliott for more blade configurations.

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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)

7099-1 Hand Hole Seat Grinder includes:
- Hand hold grinding assembly with pneumatic motor
- Filter-Lubricator
- Shut-off valve
- Hose whip
- Inspection mirror
- Set of wrenches
- Set of 4 Guide rollers
- Carrying case

Spares & Accessories:
- Grinding Wheels
- 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.

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 Number	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	Tube Material	Water Soluble	Lubricant Series
Tube Rolling	Copper Alloy & Ferrous Tubes	Yes	Paste Series P8782
Tube Rolling	Stainless Steel, Titanium & Other Special Alloy Tubes	Yes	Liquid Series P8395
Roll Beading	Carbon Steel	No	Bead Coolant Series P8784
Tube Trimming, Facing & Cutting	All	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

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 tubes parallel 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.

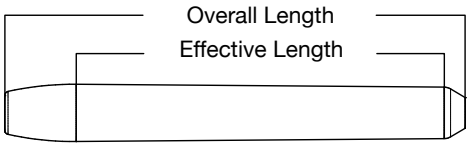
Features & Benefits:
- 3 flare rolls for faster, more uniform flaring. Works evenly to the tube minimizing stress.
- Expander is self-feeding. In one operation expands and flares at 15 degrees.
- Specifically made for use in superheaters in watertube boilers or evaporator tubes. Readily available for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

HOW TO EXPAND FIRE TUBE BOILERS

When expanding fire tube boiler tubes, there are a number of important steps that should be followed to ensure the best expansion. Whether you're using a single roll beading expander or beading by hand, there are several steps that should be followed before expanding can begin.

Pre-Expansion Steps

When the tube sheet is welded into the shell or if the main fire tube is welded to the sheet, the tube holes have a tendency to become oval-shaped. Since it is practically impossible to prevent this, it is advisable to pre-roll tube holes with a pre-rolling tool. This tool must be equipped with four expanding rolls to round out the tube hole and improve the seat. This rolling action also has a tendency to strengthen the ligament between the tube holes.

Once the tube sheet holes are prepped, tubes can be cut to length and inserted into the tube sheet. In smaller boilers, tubes can be cut to length and inserted into the tube holes. For larger boilers, it is best to cut all tubes approximately 3/4" to 1" longer than required. Insert the tubes in the tube holes and set them uniformly at one end, preferably the back end of the boiler, so that the ends of the tubes project 3/16" to 1/4" beyond the face of the tube sheet for the beading operation.

Traditional Expanding & Percussion Beading

One of the most common methods for beading tubes is with a pneumatic hammer and beading tool. Not only is this process hard on operators, but it's also very time consuming depending on the number of tubes in the vessel.

Before the tube ends can be beaded, they will need to be expanded. This can be accomplished with a combination rolling and flaring expander. When expanding, the tube should be rolled sufficiently tight, so it doesn't move as a result of the beading operation. At this point, it's preferred to have an under-rolled joint because the beading operation has a tendency to move the tube end by a few thousandths. This will prevent any ligament damage during the beading process.

Once all of the tubes have been expanded, a pneumatic hammer and beading tool can be used to hand bead the tube. After beading has been completed, the tubes can be re-rolled with a straight expander. This final operation requires only a few seconds per tube to ensure uniform leak-proof joints.

Using A Single Roll Beading Expander

All of the challenges experienced with the manual beading operation can be overcome using a single roll beading expander. Roll beading expanders simultaneously expand and bead the tube end in a single operation. The expander assures the creation of a joint, which is pressure-tight and has a bead in contact with the tube sheet. The expander achieves this objective by utilizing the natural feed forces built into the expander to push the beading roll against the end of the tube while expansion is taking place.

Select The Right Expander

The guide roll and the beading roll must be the proper size for the tube wall. Guide rolls that are too large or too small will prevent proper bead formation. Beading rolls operate on a range of wall thicknesses, but the best results are obtained by using the beading roll specifically designed for that tube gauge.

Set Proper Tube Projection

In order to obtain the best results and properly expand using a roll bead expander, tube ends must be set to the proper projection. Tube projection refers to the distance between a tube end and the tube sheet. The amount of projection can vary depending on the tube diameter, wall thickness, tube sheet thickness, and whether or not the tube is square or has a flare due to the use of an internal type tube cutter. The normal range of tube projection is 3/16" – 9/32". If the tube sheet is bowed or warped and is not parallel to the end of the tube, the desired projection should be measured at the midpoint so that half of the tube will have greater than the desired projection and half will have less than the desired projection.

Apply Coolant

Coolant is necessary in order to reduce the heat created during the expansion process. If the expander overheats it may result in tube material flaking, premature tool failure, and poorly formed beads. In order to avoid these issues, it is recommended that you dip the roll end of the expander in a bucket of coolant between expansions. This will prevent the tool from overheating while also keeping it clean, extending the life of the rolls and mandrel.

Beading Tube Ends

Retract the mandrel and insert the tool into the tube until the bead roll is in contact with the end of the tube. Push the mandrel forward until the rolls make contact with the ID of the tube and adjust the mandrel stop to reflect the expansion requirement. Position the tube projection from the face of the tube sheet using the guide in the operating instructions for the specific tube OD being expanded. Start the expanding operation and continue until the mandrel stop nut is against

the thrust bearing, next allow three additional revolutions of the mandrel to "iron out" the tube bead. Reverse the mandrel rotation and remove the expander from the tube. Verify the target ID and adjust the mandrel stop if needed. Inspect the bead and adjust the tube projection to achieve a "tight to the sheet" tube bead.

Upon completion of the expansion of one end of the boiler, the tube projection on the opposing end can be trimmed using a tube cutter.

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. In only one operation, these expanders roll tubes parallel and flare projecting tube ends at 20 degrees from the tool center line.

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

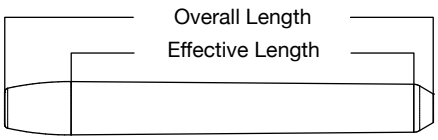
Features & Benefits:
- Most commonly used expander in installation of new boiler tubes due to its solid design and self-feeding parallel rolling operation.
- High quality steel for the most demanding water tube boiler applications.
- Roll retainers hold the rolls in place when changing mandrels.

Mandrels 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.

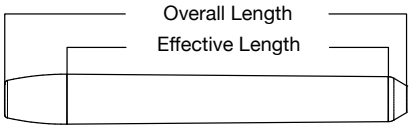
Features & Benefits:
- Prong style thrust collar - uniform flare lengths without risk of driving flare rolling into tube sheet.
- High quality steel for the most demanding boiler applications.

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. They are recommended for any requirement for parallel expansion of tubes in tube sheets.

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

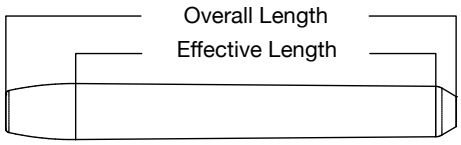
Features & Benefits:
- For performing a straight roll operation or re-rolling leaky joints.
- Ball bearing thrust collar prevents force feed of expander into tube.
- High quality steel for the most demanding boiler applications.

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	1.000" (25.4mm)	0.750" (19.1mm)
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			

**Not available in 2-1/2" (63mm) and larger tube sheet thickness. 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			
OD & BWG	OD & BWG		Min.	Max.	Min.	Max.		
1-3/4" X 9-10	2" X 3	DRE10308	1.375"	1.560"	35.92	39.62	DRE3	150003CHL0
1-3/4" X 11-12	2" X 4-5	DRE10716	1.437"	1.625"	36.64	41.27	DRE4	
1-3/4" X 13-14	2" X 6	DRE10102	1.500"	1.687"	38.1	42.85	DRE5	
2" X 7-8	2-1/4" X 2	DRE10916	1.562"	1.750"	39.67	44.45	DRE6	
2" X 9-10	2-1/4" X 3	DRE10508	1.625"	1.812"	41.28	46.02	DRE5	150003CHL1
2" X 11-12	2-1/4" X 4-5	DRE11116	1.687"	1.937"	42.85	49.2	DRE7	
2" X 13-14	2-1/4" X 6	DRE10304	1.750"	2.000"	44.45	50.8	DRE8	
2" X 15-18	2-1/2" X 2	DRE11316	1.812"	2.062"	46.02	52.37	DRE9	
2-1/4" X 9-10	2-1/2" X 4-5	DRE10708	1.875"	2.125"	47.62	53.97	DRE10	
2-1/4" X 11-12	2-1/2" X 6	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	3" X 2	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	3-1/4" X 3	DRE20916	2.562"	2.875"	65.07	73.02	DRE16	
3" X 10-11	3-1/4" X 4	DRE20508	2.625"	2.937"	66.67	74.6	DRE17	
3" X 12-13	3-1/4" X 5-6	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	3-1/2" X 3	DRE21316	2.812"	3.125"	71.42	79.37	DRE18	
3-1/4" X 10-11	3-1/2" X 4	DRE20708	2.875"	3.187"	73.02	80.95	DRE19	
3-1/4" X 12-13	3-1/2" X 5-6	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	4-1/4" X 3	DRE30916	3.562"	3.937"	90.47	100.0	DRE27	
4" X 10-11	4-1/4" X 4	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

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

Keep Rolling

Motors & Spare Parts You Can Count On

The quality you need.
The compatibility you want.

Now available in torque controlled and stall type motors

The powerful 445 Series Motors are ideal for tough boiler tube applications. The right angle heads are suited for rolling tubes in hard to reach, tight areas.

The 445 Series Motors have undergone hundreds of hours of rigorous testing, proving tool life and ensuring quality. Motor parts are designed to compatible with Cleco® and Airetool® motors, for convenient maintenance of existing motors.

More information on page 72.
Visit our website for more information:
www.elliott-tool.com/right-angle-motors/

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.

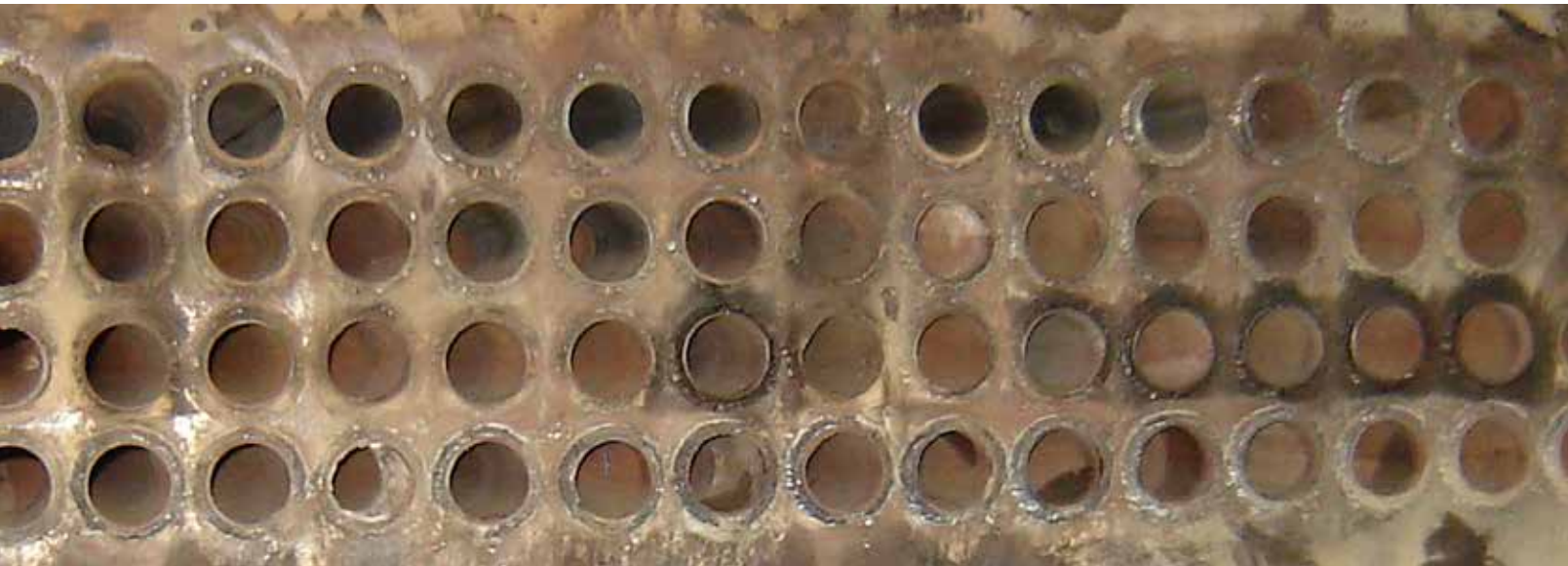
> *"I like the smooth bead to tube sheet transition because it eliminates stress on the tube to make it last longer. I have been asking another roll beading expander manufacturer to improve the quality of their bead and they said they're working on it."*
>
> **- Ted Keller, Operations Director**

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
- 2.000” to 3.000” OD
- (50.8 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 64 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 No.	Guide Roll No.	Expanding Roll Set No.	Mandrel No.	Drive Square	Front Square Drive Mandrel
			Min.	Max.						
2" (50.8mm)	10	4480-2010	1.732" (43.99mm)	1.875" (47.63mm)	4480-20010-011	4480-20110	4480-2000	4480-20-02	3/4"	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		4480-25-02FS
	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	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 Pneuamtic Rolling Motors: ***See page 68.***

3 Roll Expanders											
Tube Size				Expansion Range				Tube Sheet (Min/Max Reach) 1/4" - 3/4” (6.4 - 19.1mm) 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) Roll Length 3/4" (19.1mm)			Tube Sheet (Min/Max Reach) 3/4" - 1-1/4" (19.1 - 31.8mm) 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	

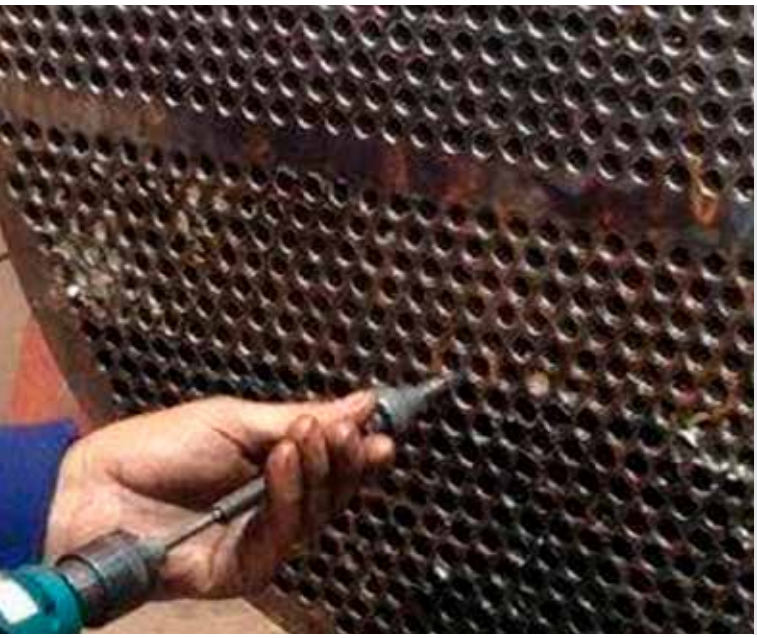
Mandrel drive square size is 1/4"

3 Roll Expanders - 3" Reach														
Tube Size				Expansion Range				Tube Sheet (Min/Max Reach) 1/4"- 3" (6.4 - 76.2mm) Roll Length 3/4" (19.1mm)			Tube Sheet (Min/Max Reach) 3/4" - 3" (19.1 - 76.2mm) 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

Dissatisfied Assembly Manager Finds
A Better Way To Save On Tool Costs



QUICK SUMMARY

The Challenge
- Provide a quality product to customers on time while controlling costs.
- Inconsistent and short tool life from Maus' expanders.
- Halting production due to frequent tool breakage.

The Solution
- Tool life trial to compare Elliott's 24 Series to Maus.

The Results
- 2,500 expansions from the 24 Series using a single expander, mandrel and roll set.
- Reduced tooling expenses by nearly $700 per week.
- Saved 3 man hours or more for every 24 Series expander in tool breakage and repair time.

The Challenge

Chart Cooler Service Company, Inc., a US based heat exchanger manufacturer, has been dealing with the common challenge of controlling costs, but still providing a quality product to its customers on time.

As a company that manufactures and services heat exchangers, tool expenses are a major cost that has to be controlled. Tool costs are primarily driven by two factors, the initial investment for the tools and the tool life. Superior tool life dramatically cuts costs and reduces rework and operator headaches.

In order to meet their customers' demands, Chart Cooler's tool life must be consistent and reliable so that they can produce the most satisfying results.

Chart Cooler had initially chosen Maus' expanders for their low initial cost, but has been continually challenged with Maus' inconsistent and short tool life.

Darrell Simmons, Assembly Manager at Chart Cooler, faced trying to forecast the right number of tools for upcoming projects. Because the tool life from the Maus' expanders varied so greatly from one expander to another he was left with the decision of purchasing more expanders than he needed or risking a shortage that could require extra time to purchase more from his supplier.

Because every minute of production was critical Darrell was regularly purchasing $900 to $1,000 per week in expanders and expander parts.

Because of the short tool life he was experiencing from the Maus' expanders his team was losing productivity. Every time there was an expander, mandrel or roll break, production was halted while the broken pieces were retrieved out of the vessel. Replacing the broken components could take another 10 – 15 minutes of production time.

Darrell found these challenges to be unacceptable and was ready for a better solution.

Tool Life Comparison By Number Of Expansions		
Part	**Maus**	**Elliott's 24 Series**
Expander	300 - 400	3,500+*
Mandrel	100	2,500
Roll Set	175	3,500

** The expander remained intact after the conclusion of the trial*

The Solution

Darrell Simmons chose to do a trial test of Elliott's 24 Series Condenser Expander to compare its tool life to their current expander in order to determine if it could lower his tool costs and improve productivity. Elliott's 24 Series was specifically designed to provide the longest tool life of any condenser expander.

The tool being tested was an Elliott 24 Series 24134-12 for ¾" outside diameter carbon steel tubes. The 24134-12 has a 12" reach.

During the trial Darrell and his team experienced a significant improvement in tool life. The following chart illustrates the difference in the number of expansions between the two expander brands.

In addition, sometimes the Maus' mandrel would break after only 5 expansions. The testing showed that the Elliott 24 Series expander lasted 6 to 7 times longer than the Maus' expander.

Darrell reported that his team continued to use the Elliott 24 Series expander long after the trial was over, and that they were pleased with the consistent tool life. Not only was the tool life more consistent and longer, the quality of the rolled joined was excellent.

After the trial test was complete Darrell commented that even though Maus had a lower initial price. The investment in the Elliott 24 Series was by far the better choice.

The Results

Using Elliott's 24 Series expander, Chart Cooler Service Company was able to get more than 2,500 expansions with a single expander, mandrel and roll set. The expander also never experienced any breakage or malfunctions throughout the entire test.

Because of the increased tool life and less variability from one expander's life to another Darrell is able to make better forecasts on the tools he'll need for a project allowing him to purchase only what he needs. In tool purchases alone Darrell was able to reduce his expense from $900 - $1,000 per week to an average of $315 per week.

In addition to the direct savings in tool costs, Darrell's team experienced a significant improvement in productivity. For every tool break his team would spend 20 – 30 minutes retrieving the broken pieces and assembling a new tool. With the Elliott 24 Series' extended tool life his team would have to replace at least six Maus' expanders for every one Elliott 24 Series expander. That's a savings of 3 man hours (6 x 30 minutes) or more for every Elliott 24 Series expander!

With the help of Elliott's 24 Series Darrell was able to go from a dissatisfied assembly manager to being very pleased that he was able to find a way to significantly cut his tool expense and increase productivity all at the same time.

> *"Elliott's 24 Series Tube Expanders have incredible tool life. Elliott's 24 Series is saving me over a thousand dollars per month."*
>
> **- Darrell Simmons, Assembly Manager**

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.

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

24 Series Expander Offerings:

Contact Elliott for Specialty or Extended Reach Expanders

Spares & Accessories:
- Mandrel
- Roll Set
- Collars: ***See page 43.***
- Lubricant: ***See page 19 for part numbers.***
- Rolling Motors and Torque Controls: ***See page 64.***

“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

To read Jim’s story and see more results reports, go to www.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.

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) 1/2”-4” (12.7-101.6mm) Roll Length 1-5/8” (41.3mm) **Roll Length 1-1/2” (38.1mm)			Tube Sheet (Min/Max Reach) 1-1/4” - 4-3/8” (31.8-111.1mm) Roll Length 2-3/8” (60.3mm)			Common Mandrel
OD	Wall Thickness			Inch		Metric		Expander Assembly		Roll Set	Expander Assembly		Roll Set	
	BWG	In	Metric	Min.	Max.	Min.	Max.	Flush	1/8" Recess	(3 per set)	Flush	1/8" Recess	(3 per set)	
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	24M23
	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 +24M26
	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 +24M26
	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
	15-16	0.072-0.065	1.83-1.65	0.471	0.538	12.0	13.7	24129	24129RA8	241R29-3	24229	24229RA8	242R29-3	24M29
	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	

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

MADE IN USA

3 Roll Expanders														
Tube Size				Expansion Range				Tube Sheet (Min/Max Reach) 1/2"-4" (12.7-101.6mm) Roll Length 1-5/8" (41.3mm) **Roll Length 1-1/2" (38.1mm)			Tube Sheet (Min/Max Reach) 1-1/4" - 4-3/8" (31.8-111.1mm) Roll Length 2-3/8" (60.3mm)			Common Mandrel
OD	Wall Thickness			Inch		Metric		Expander Assembly		Roll Set	Expander Assembly		Roll Set	
	BWG	In	Metric	Min.	Max.	Min.	Max.	Flush	1/8" Recess	(3 per set)	Flush	1/8" Recess	(3 per set)	
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	242R66-3	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**

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) 1/2”-8” (12.7-203.2mm) Roll Length 1-5/8” (41.3mm) **Roll Length 1-1/2” (38.1mm)			Tube Sheet (Min/Max Reach) 1-1/4” - 8-3/8” (31.8-212.7mm) Roll Length 2-3/8” (60.3mm)			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	24M23-8
	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 +24M26-8
	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 +24M26-8
	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
	15-16	0.072-0.065	1.83-1.65	0.471	0.538	12.0	13.7	24129-8	24129RA8-8	241R29-3	24229-8	24229RA8-8	242R29-3	24M29-8
	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

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

MADE IN USA

3 Roll Expanders														
Tube Size				Expansion Range				Tube Sheet (Min/Max Reach) 1/2”-8” (12.7-203.2mm) Roll Length 1-5/8” (41.3mm) **Roll Length 1-1/2” (38.1mm)			Tube Sheet (Min/Max Reach) 1-1/4” - 8-3/8” (31.8-212.7mm) Roll Length 2-3/8” (60.3mm)			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” (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	
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	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	24166-8	24166RA8-8	241R66-3	24266-8	24266RA8-8	242R66-3	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**

*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 - 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) 1-1/2”-12” (38.1-304.8mm) Roll Length 1-5/8” (41.3mm) **Roll Length 1-1/2” (38.1mm)			Tube Sheet (Min/Max Reach) 2-1/4” - 12-3/8” (57.2-314.3mm) Roll Length 2-3/8” (60.3mm)			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 +24M26-12
	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 +24M26-12
	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
	15-16	0.072-0.065	1.83-1.65	0.471	0.538	12.0	13.7	24129-12	24129RA8-12	241R29-3	24229-12	24229RA8-12	242R29-3	24M29-12
	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	
	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

*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.

MADE IN USA

3 Roll Expanders														
Tube Size			Expansion Range				Tube Sheet (Min/Max Reach) 1-1/2”-12” (38.1-304.8mm) Roll Length 1-5/8” (41.3mm) **Roll Length 1-1/2” (38.1mm)			Tube Sheet (Min/Max Reach) 2-1/4” - 12-3/8” (57.2-314.3mm) Roll Length 2-3/8” (60.3mm)			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” (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	
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	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	24166-12	24166RA8-12	241R66-3	24266-12	24266RA8-12	242R66-3	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**

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

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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) 1/2”-4” (12.7-101.6mm) Roll Length 1-5/8” (41.3mm)		Tube Sheet (Min/Max Reach) 1-1/4” - 4-3/8” (31.8-111.1mm) 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) 1/2”-4” (12.7-101.6mm) Roll Length 1-5/8” (41.3mm)			Tube Sheet (Min/Max Reach) 1-1/4” - 4-3/8” (31.8-111.1mm) 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	-	241R36-5	24241-5	-	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	-	241R60-5	24265-5	-	242R60-5	24M65-5*

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

MADE IN USA

24 Series
4 & 5 Roll Expanders With Nylon Pilot

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) 1/2”-4” (12.7-101.6mm) Roll Length 1-5/8” (41.3mm)		Tube Sheet (Min/Max Reach) 1-1/4” - 4-3/8” (31.8-111.1mm) Roll Length 2-3/8” (60.3mm)		Common Mandrel	Mandrel Drive Square
OD	Wall Thickness			Inch		Metric		Expander Assembly Nylon Pilot With Thin Wall Collar*	Roll Set (4 per set)	Expander Assembly Nylon Pilot With Thin Wall Collar*	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	24131PTW-4	241R29-4	24231PTW-4	242R29-4	24MP31-4	3/8”
	20-24	0.035-0.022	0.89-0.56	0.538	0.609	13.7	15.5	24132PTW-4	241R31-4	24232PTW-4	242R31-4	24MP31-4	

**Nylon Pilot Expander Assembly comes with Thin Wall Collar. For other collar options, contact Elliott.*

5 Roll Expanders													
Tube Size				Expansion Range				Tube Sheet (Min/Max Reach) 1/2”-4” (12.7-101.6mm) Roll Length 1-5/8” (41.3mm)		Tube Sheet (Min/Max Reach) 1-1/4” - 4-3/8” (31.8-111.1mm) Roll Length 2-3/8” (60.3mm)		Common Mandrel	Mandrel Drive Square
OD	Wall Thickness			Inch		Metric		Expander Assembly Nylon Pilot With Thin Wall Collar*	Roll Set (5 per set)	Expander Assembly Nylon Pilot With Thin Wall Collar*	Roll Set (5 per set)		
	BWG	In	Metric	Min.	Max.	Min.	Max.						
3/4” (19.1mm)	18-19	0.049-0.042	1.24-1.07	0.626	0.711	15.9	18.1	24136PTW-5	241R33-5	24236PTW-5	242R33-5	24MP36-5	3/8”
	20-24	0.035-0.022	0.89-0.56	0.655	0.740	16.6	18.8	24137PTW-5	241R34-5	24237PTW-5	242R34-5	24MP37-5	
7/8” (22.2mm)	18-19	0.049-0.042	1.24-1.07	0.749	0.831	19.0	21.1	24141PTW-5	241R36-5	24241PTW-5	242R36-5	24MP41-5	1/2”
	20-24	0.035-0.022	0.89-0.56	0.783	0.865	19.9	22.0	24142PTW-5	241R39-5	24242PTW-5	242R39-5	24MP41-5	
1” (25.4mm)	18-19	0.049-0.042	1.24-1.07	0.880	0.976	22.4	24.8	24146PTW-5	241R42-5	24246PTW-5	242R42-5	24MP46-5	
	20-24	0.035-0.022	0.89-0.56	0.894	0.990	22.7	25.2	24147PTW-5	241R43-5	24247PTW-5	242R43-5	24MP46-5	
1-1/8” (28.6mm)	18-24	0.049-0.022	1.24-0.56	0.997	1.116	25.3	28.4	24152PTW-5	241R47-5	24252PTW-5	242R47-5	24MP52-5	
1-1/4” (31.8mm)	18-24	0.049-0.022	1.24-0.56	1.112	1.240	28.2	31.5	24157PTW-5	241R52-5	24257PTW-5	242R52-5	24MP57-5	
1-3/8” (34.9mm)	18-24	0.049-0.022	1.24-0.56	1.237	1.365	31.4	34.7	24161PTW-5	241R58-5	24261PTW-5	242R58-5	24MP61-5	
1-1/2” (38.1mm)	18-24	0.049-0.022	1.24-0.56	1.361	1.490	34.6	37.9	24165PTW-5	241R60-5	24265PTW-5	242R60-5	24MP65-5	

**Nylon Pilot Expander Assembly comes with Thin Wall Collar. For other collar options, contact Elliott.*

MADE IN USA

Tube Size

- 0.750” to 1.000” OD
- (19.0 to 25.4mm) OD

5 Roll Expanders - 8” Reach														
Tube Size				Expansion Range				Tube Sheet (Min/Max Reach) 1/2”-8” (12.7-203.2mm) Roll Length 1-5/8” (41.3mm)			Tube Sheet (Min/Max Reach) 1-1/4” - 8-3/8” (31.8-219.7mm) Roll Length 2-3/8” (60.3mm)			Common Mandrel
	Wall Thickness			Inch		Metric		Expander Assembly		Roll Set (5 per set)	Expander Assembly		Roll Set (5 per set)	
OD	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	24131-5-8	24131RB8-5-8	241R28-5	24231-5-8	24231RB8-5-8	242R28-5	24M31-5-8
	13	0.095	2.41	0.540	0.609	13.7	15.5	24132-5-8	24132RB8-5-8	241R29-5	24232-5-8	24232RB8-5-8	242R29-5	24M32-5-8
	14	0.083	2.11	0.562	0.631	14.3	16.0	24133-5-8	24133RA8-5-8	241R30-5	24233-5-8	24233RA8-5-8	242R30-5	24M33-5-8
	15-16	0.072-0.065	1.83-1.65	0.592	0.672	15.0	17.1	24134-5-8	24134RA8-5-8	241R31-5	24234-5-8	24234RA8-5-8	242R31-5	24M34-5-8
	17-19	0.058-0.042	1.47-1.07	0.626	0.711	15.9	18.0	24136-5-8	24136RA8-5-8	241R33-5	24236-5-8	24236RA8-5-8	242R33-5	24M36-5-8
	20-24	0.035-0.022	0.89-0.56	0.655	0.740	16.6	18.8	24137-5-8	24137RA8-5-8	241R34-5	24237-5-8	24237RA8-5-8	242R34-5	24M37-5-8
1” (25.4mm)	11	0.120	3.05	0.749	0.831	19.0	21.1	24141-5-8	24141RB8-5-8	241R36-5	24241-5-8	24241RB8-5-8	242R36-5	24M41-5-8*
	12-13	0.109-0.095	2.77-2.41	0.769	0.866	19.5	22.0	24143-5-8	24143RA8-5-8	241R39-5	24243-5-8	24243RA8-5-8	242R39-5	24M43-5-8*
	14	0.083	2.11	0.799	0.896	20.3	22.7	24144-5-8	24144RA8-5-8	241R41-5	24244-5-8	24244RA8-5-8	242R41-5	24M44-5-8*
	15-16	0.072-0.065	1.83-1.65	0.841	0.922	21.4	23.4	24145-5-8	24145RA8-5-8	241R41-5	24245-5-8	24245RA8-5-8	242R41-5	24M45-5-8*
	17-19	0.058-0.042	1.47-1.07	0.880	0.976	22.3	24.8	24146-5-8	24146RA8-5-8	241R42-5	24246-5-8	24246RA8-5-8	242R42-5	24M46-5-8*
	20-24	0.035-0.022	0.89-0.56	0.894	0.990	22.7	25.2	24147-5-8	24147RA8-5-8	241R43-5	24247-5-8	24247RA8-5-8	242R43-5	24M46-5-8*

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

5 Roll Expanders - 12” Reach														
Tube Size				Expansion Range				Tube Sheet (Min/Max Reach) 1/2”-4” (12.7-101.6mm) Roll Length 1-5/8” (41.3mm)			Tube Sheet (Min/Max Reach) 1-1/4” - 4-3/8” (31.8-111.1mm) Roll Length 2-3/8” (60.3mm)			Common Mandrel
	Wall Thickness			Inch		Metric		Expander Assembly		Roll Set (5 per set)	Expander Assembly		Roll Set (5 per set)	
OD	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	24131-5-12	24231RB8-5-12	241R28-5	24231-5-12	24231RB8-5-12	242R28-5	24M31-5-12
	13	0.095	2.41	0.540	0.609	13.7	15.5	24132-5-12	24232RB8-5-12	241R29-5	24232-5-12	24232RB8-5-12	242R29-5	24M32-5-12
	14	0.083	2.11	0.562	0.631	14.3	16.0	24133-5-12	24233RA8-5-12	241R30-5	24233-5-12	24233RA8-5-12	242R30-5	24M33-5-12
	15-16	0.072-0.065	1.83-1.65	0.592	0.672	15.0	17.1	24134-5-12	24234RA8-5-12	241R31-5	24234-5-12	24234RA8-5-12	242R31-5	24M34-5-12
	17-19	0.058-0.042	1.47-1.07	0.626	0.711	15.9	18.1	24136-5-12	24236RA8-5-12	241R33-5	24236-5-12	24236RA8-5-12	242R33-5	24M36-5-12
	20-24	0.035-0.022	0.89-0.56	0.655	0.740	16.6	18.8	24137-5-12	24237RA8-5-12	241R34-5	24237-5-12	24237RA8-5-12	242R34-5	24M37-5-12
1” (25.4mm)	11	0.120	3.05	0.749	0.831	19.0	21.1	24141-5-12	24241RB8-5-12	241R36-5	24241-5-12	24241RB8-5-12	242R36-5	24M41-5-12*
	12-13	0.109-0.095	2.77-2.41	0.769	0.866	19.5	22.0	24143-5-12	24243RA8-5-12	241R39-5	24243-5-12	24243RA8-5-12	242R39-5	24M43-5-12*
	14	0.083	2.11	0.799	0.896	20.3	22.7	24144-5-12	24244RA8-5-12	241R41-5	24244-5-12	24244RA8-5-12	242R41-5	24M44-5-12*
	15-16	0.072-0.065	1.83-1.65	0.841	0.922	21.4	23.4	24145-5-12	24245RA8-5-12	241R41-5	24245-5-12	24245RA8-5-12	242R41-5	24M45-5-12*
	17-19	0.058-0.042	1.47-1.07	0.880	0.976	22.3	24.8	24146-5-12	24246RA8-5-12	241R42-5	24246-5-12	24246RA8-5-12	242R42-5	24M46-5-12*
	20-24	0.035-0.022	0.89-0.56	0.894	0.990	22.7	25.2	24147-5-12	24247RA8-5-12	241R43-5	24247-5-12	24247RA8-5-12	242R43-5	24M46-5-12*

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

MADE IN USA

US Fabricator Cut Costs & Boosted Quality
With The 24 Series Expander

QUICK SUMMARY

The Challenge
- Provide a quality product to customers on time while controlling costs.
- Producing custom sized rolls to fit their application leads to inconsistencies in product.
- Halting production due to frequent tool breakage.

The Solution
- Tool life trial to compare Elliott's 24 Series to current expander.

The Results
- The 24 Series increased performance enough to yield a 10% savings in labor time and costs.
- Significant increase in tool life and ease of use, reducing rework and hassles.

The Challenge

A major US fabricator provides a full range of heat transfer products and services. A large part of their business is providing, manufacturing, and servicing of heat transfer vessels such as heat exchangers, condensers, and feedwater heaters.Producing a quality product in a timely manner for customers is one of the company's primary objectives.

In order to save time and money while still ensuring satisfying results, operators need the right tool for the job and that tool must be able to last. Jim Damon, as a Lean Manufacturing Engineer, understands this statement, as he can personally relate to the challenges involved with using a tool that is not right for a particular job.

Jim and his team's current condenser expanders have rolls, which need to be customized by grinding them down in order to obtain the effective roll length required for their application. Jim was using a 5 roll expander without a thin wall collar. However, the rolls are not precisely machined, as the amount removed varies, giving different effective roll lengths even on the same expander. The lack of a thin wall collar can cause the tube to become jammed in the tube expander's flush thrust collar. Jim and his team also report expansion inconsistencies using these expanders. Due to the poor quality of the customizations, the rolls would constantly fall into the cage ID and get stuck. The operator constantly has to fix this.

In addition to using expanders whose quality could not match their needs, Jim and his team continually wanted an expander that could last longer and reduce their need for frequent replacement expanders or spare rolls and mandrels. The constant hassles, extra work, and rework were costing Jim and his team extra time and extra money. They were not satisfied with their current tools and were ready to make a change.

The Solution

Jim Damon and his team tested Elliott's new 24 Series Condenser Expanders on a nuclear power plant heat exchanger with titanium grade 2 welded tubes.

Benefits of Elliott's 24 Series

Key results achieved during tool life trial

Elliott supplied a 24 Series condenser expander with nylon pilot, 5 rolls, and a thin wall collar. Jim and his team performed a side-by-side test of Elliott's 24 Series Expander versus the current expander brand they were using. During the 2-day visit, the operators expanded approximately 1,300 tube ends. Three expanders were used, and interchanged every ~30 tubes to keep them cool, clean, and lubricated.

Their initial impression of the expander and its design was extremely positive. They liked the design with the nylon pilot as well as the thin wall collar because of added protection from tube scoring and jammed cages. Jim noticed the quality rolled joint from the 24 Series, and the target ID was hit accurately and consistently. The consistent numbers and impressive ease of use were Jim's favorite aspects of the Elliott brand expanders.

Jim and his team were very pleased to discover that the 24 Series Expanders resulted in a highly superior expansion and increased tool life. Just a few of the great benefits Jim experienced were:

- Quality rolled joints.
- Decreased labor time, thus lower costs.
- Minimal hassle using thin wall collars.
- Less downtime with much faster, more efficient cleaning.

After using Elliott's 24 Series, Jim found which tool he preferred. With the inconsistencies in the expansions and the constant hassle of fixing the stuck rolls gone, a winner was decided.

The Results

With Elliott's 24 Series, this fabricator experienced a significant increase in tool life and ease of use, which reduced rework, hassles, and improved productivity. Also, the nylon pilots greatly helped eliminate tube scratches. These benefits mean significant cost savings for them by switching to the 24 Series from their current expanders.

In terms of specific results for Jim and his team, the 24 Series increased performance enough to yield a 10% savings in labor time. Equally, this translates to an impressive 10% savings in labor costs as well. This was directly caused by the eliminated time spent with replacing broken tools or reworking expansions. Essentially, the operators were able to work through continuously without having to stop and deal with hassles and problems.

Based on early results, increased tool life should cut tooling costs by about 35%. In addition to using less tools to complete the job, there is also increased productivity due to less time being spent on replacing tooling or removing broken tooling from the tube.

Jim Damon and his team were highly satisfied with the tool life and consistency of Elliott's 24 Series Condenser Expanders. Overall, he is now certain that the 24 Series is the superior tool, and he prefers Elliott's expanders to any others.

> *"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 Manufacturing Engineer**

6621 Series
Sugar Mill Vacuum Pan Expander

Tube Size
- 3.000” to 4.000” OD
- (76.2 to 101.6mm) OD

Elliott’s 6621 Series Sugar Mill Vacuum Pan Expanders are ideal for the fabrication and re-tube of sugar mill vacuum pans.

They are operated from the top and eliminate the cumbersome and dangerous task of expanding the bottom tube sheet from underneath the pan. The 6621 Series Expanders also remove the need to purchase several short mandrels required for bottom tube sheet expansions.

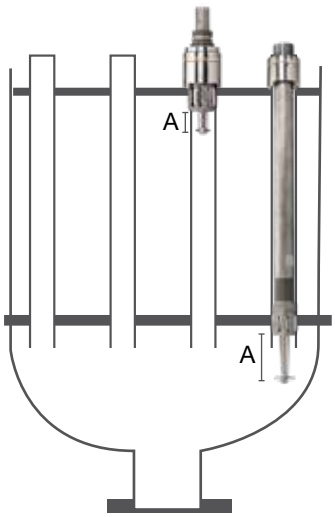
6621 Short Expander Assembly For Rolling Top Sheet.

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

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

6621 Series Sugar Mill Vacuum Pan Expander includes:
- Expander Assembly
- Cage Extension
- Mandrel Extension
- Mandrel Guide
- Square Socket
- 3 Set Screws

Spares & Accessories:
- Extension Set: Includes 1 Cage Extension, 1 Mandrel Extension,
  1 Mandrel Guide, 1 Square Socket, and 3 Set Screws
- Roll Set
- Mandrel



Tube Size	Kit Part Number	30”-42” Reach	42”-54”Reach	54”-66”Reach
3” x 14-16	6621-44-xx	36	48	60
3-1/2” x 14-16	6621-53-xx			
4” x 13-16	6621-60-xx			
xx= Expander Reach				

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

MADE IN USA

3321 Series
Sugar Mill Vacuum Pan Expander

Tube Size
- 3.000” to 4.000” OD
- (76.2 to 101.6mm) OD

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

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

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

Mandrels are sold separately

Spares & Accessories:
- Short Series Mandrel: 6-1/4” (158.8mm) OAL with 1” (25.4mm) square drive. Both mandrels are required for the selected wall gauge.
- Roll Set

Tube OD Size	BWG	Expansion Range	Expander Assembly	**Roll Set	Drum Mandrel*	Short Mandrels	Weight
3”	13	2.687 - 3.000	3321-21116	3321-16A	150003MD8PX	150003N7, 150003N8	18 lbs
	14-17					150003N9, 150003N10	
	18					150003N10	
3-1/2”	13	3.187 - 3.562	3321-30316	3321-23A	150003MD9PX	150003N8, 150003N9	19 lbs
	14-17					150003N10, 150003N11	
	18					150003N11, 150003N12	
4”	13	3.625 - 4.000	3321-30508	3321-28A	150003MD10PX	150003N10, 150003N11	21 lbs
	14					150003N12, 150003N13	
	15-17					150003N13, 150003N14	
	18					150003N14	

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

MADE IN USA

Collet Style Support Sheet Expanders

Tube Size
- 0.750” to 1.000” OD
- (19.1 to 25.4mm) OD

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

Elliott offers two packages for ¾” (19.1mm) and 1” (25.4mm) tubes. Both packages come complete with (3) 4 ft. (1.2M) extensions.

Features & Benefits:
- Expands copper tubes in support sheets in seconds.
- Modular design allows for easy transport and storage.

Collet Style Support Sheet Expanders			
Tube OD	**Expansion Range**	**Expander Part Number**	**Kit Part Number**
3/4” (19.1mm)	0.530” - 0.687” (13.46 - 17.45mm)	B9765A00	B9765PKG
1” (25.4mm)	0.812” - 0.982” (20.62 - 24.94mm)	B10180-00	B10180PKG

Collet Extensions

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

Spares & Accessories:
- Draw Bar
- Draw Bar Extension: Each Draw Bar Extension will add 4 ft. (1.2M) to expander length
- Collet Extension: Each Collet Extension will add 4 ft. (1.2M) to expander length

M5767-00 Hydraulic Pump

MADE IN USA

FOR RENT

Universal Drive Handles

Drive Shaft

Socket

	Part Number	Male Square Drive	Overall Length*
Universal Drive Handles	73UHX12	3/8”	12”
	73UHX20	3/8”	20”
	73UHT12	1/2”	12”
	73UHT20	1/2”	20”
	73UHC12	3/4”	12”
	73UHC20	3/4”	20”
	73UHM12	1”	12”
	73UHM20	1”	20”
Drive Shaft	73DST4	1/2”	4”
	73DST8	1/2”	8”
	73DST12	1/2”	12”
	73DST24	1/2”	24”
	73DSC4	3/4”	4”
	73DSC8	3/4”	8”
	73DSC12	3/4”	12”
	73DSC24	3/4”	24”
	73DSM4	1”	4”
	73DSM8	1”	8”
	73DSM12	1”	12”
	73DSM24	1”	24”

** Available in additional lengths*

Socket	Side A	Side B	Width Across Face
	Female square Socket	Female square Socket	
71SOX	3/8”	3/8”	1-3/4”
71SOXT	3/8”	1/2”	1-7/8”
71SOCX	3/8”	3/4”	1-7/8”
71SOT	1/2”	1/2”	1-3/4”
71SOCT	1/2”	3/4”	1-7/8”
71SOMT	1/2”	1”	1-7/8”
71SOBT	5/8”	1/2”	1-3/8”
71SOCB	5/8”	3/4”	2”
71SOMB	5/8”	1”	2”
71SOC	3/4”	3/4”	2”
71SOMC	3/4”	1”	2”
71SOM	1”	1”	2”

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

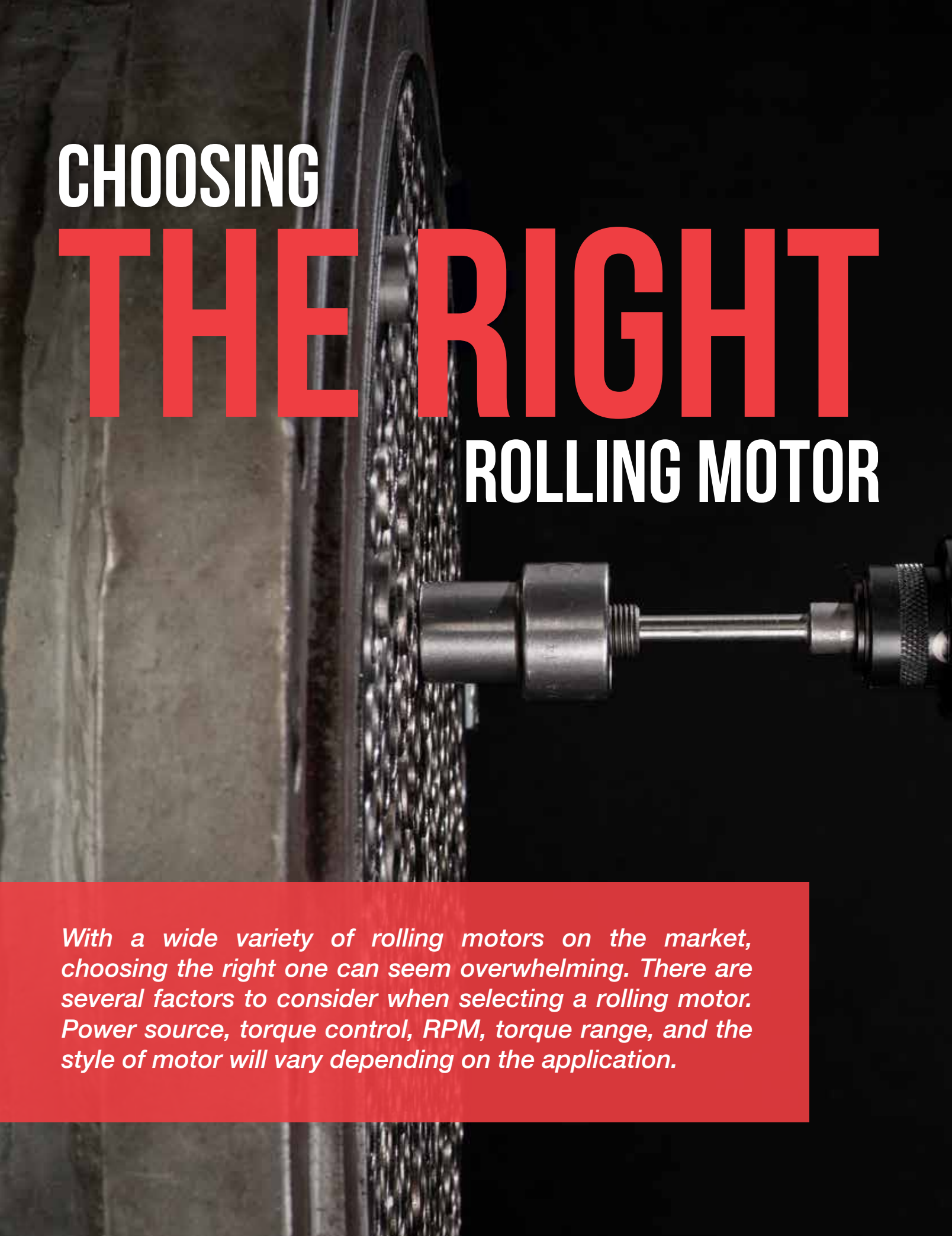
Universal Joints

Universal Joint Drives

Series 1149 and 202

	Part Number	Side A	Side B		Overall Length
		Female Square Socket	Male Square Drive	Female Square Socket	
Universal Joints	72UJX1	3/8”		3/8”	3”
	72UJX2	3/8”	3/8”		
	72UJT1	1/2”		1/2”	
	72UJT2	1/2”	1/2”		
	72UJC3	3/4”		3/4”	4”
	72UJC4	3/4”	3/4”		
	72UJM7	1”		1”	4-1/2”
	72UJM8	1”	1”		
Universal Joint Drives	72-1149XX	3/8”	3/8”		10”
	72-1149TT	1/2”	1/2”		
	72-1149CC	3/4”	3/4”		10”
	72-1149MM	1”	1”		
	72-202JMM	1”	1”		23”

CHOOSING THE RIGHT ROLLING MOTOR



With a wide variety of rolling motors on the market, choosing the right one can seem overwhelming. There are several factors to consider when selecting a rolling motor. Power source, torque control, RPM, torque range, and the style of motor will vary depending on the application.

Electric v Pneumatic Motors

When expanding tubes mechanically, both electric and pneumatic rolling motors can be used. The power source can be determined by operator preference, availability of electricity or air, and the application.

Electricity offers better consistency when expanding tubes and is more readily available than air. Since there is less variation, electric is the best option when a very specific ID or wall reduction needs to be reached.

Pneumatic motors offer faster speeds and more power; however, they can be more susceptible to fluctuations in air supply. These motors are generally preferred in tough boiler applications because of the higher torque required to move a large amount of material.

Types Of Torque Control

Torque controlled tube expanding is the most popular method for tube expansion because it compensates for variables which the operator cannot control, such as variances in the tube sheet hole ID and tube wall thickness tolerances.

Electric Rolling Motor

Pneumatic Rolling Motor

Electronic Torque Control

When using an electric rolling motor, it is recommended to use an Electronic Digital Torque Control to achieve accurate and consistent expansions. An electronic torque control works by monitoring the amperage (amp) draw of the motor and determining the power needed to reach the desired wall reduction. Once the motor reaches the power requirement, the torque control will cut off power to the motor. This allows repeatability and consistency from tube to tube.

Pneumatic Torque Control

Pneumatic motors with torque control act very similarly to electric motors. As resistance is encountered during wall reduction, the pneumatic torque control shifts a valve that stops the flow of compressed air to the motor. Power is reapplied as the motor is activated in reverse to release the tool from the tube.

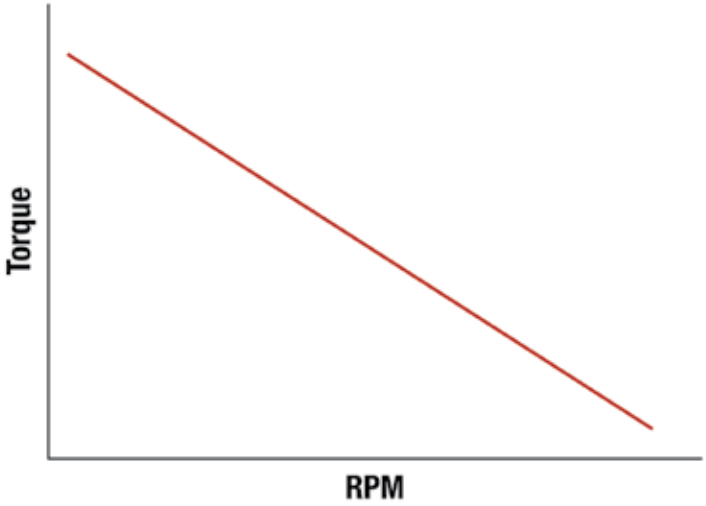
Stall Torque / Dimensional Rolling

Stall torque motors are pneumatic motors with no internal torque control. These are generally used for dimensional rolling in boiler applications. This is when an operator rolls to a predetermined size by stopping the forward travel of the mandrel. This can be done with visual cues or by setting a mandrel stop. For dimensional rolling to be accurate and repeatable, the tubes must have controlled wall thicknesses and diameters. This process is usually used in roll beading or flaring applications.

Determining RPM & Torque

Torque (Power) and RPM (Speed) have an inverse relationship, where as one increases the other decreases. Speed is important because it helps maintain productivity and ensures that jobs get completed on time. However, having the highest RPM motor may not make sense for all applications. If you don't have enough power to expand the tube, then the high speed will not make a difference.

In general, more speed is better when working with softer materials and more power is better when working with tougher materials. Below are some general industry recommendations for torque and RPM settings.



Considering Space Constraints

The style of rolling motor can also be important depending on the application. For example, wet back boilers have limited access to tubes, making standard rolling motors more difficult to use. One method to overcome this is to roll from within the combustion return area. This process requires a right angle rolling motor with a series of short mandrels, since the right angle head is able to work in tight spaces.

Overall, there are a lot of factors to consider when selecting the right rolling motor. Power source, torque control, RPM, torque, and style of motor will vary depending on the application. In general, electric motors are often used in smaller, more precise rolling applications or where air is not easily accessible. Whereas pneumatic motors are preferred in larger applications or environments where electricity cannot be used.

Industry RPM & Torque Guidelines

Tube OD Range	Free Speed RPM	Torque Range
1/4" - 3/8" (6.4 - 15.9mm)	1,800 - 3,000	15 in lbs - 27 in lbs (1.7 - 3.1 Nm)
5/8" - 1" (6.4 - 25.4mm)	760 - 1,100	22 - 396 in lbs (2.5 - 44.7 Nm)
1" - 2" (25.4 - 50.8mm)	75 - 350	30 - 150 ft lbs (40.7 - 203.4 Nm)
2 - 4" (50.8 - 101.6mm)	75 - 190	30 ft lbs - 305 ft lbs (40.7 - 413.5 Nm)
4" - 6" (101.6 - 152.4mm)	70	950 ft lbs (1,288.0 Nm)

*Ranges may vary due to tube wall thickness, material, tube sheet thickness, lubrication, operation conditions, and/or operator technique.

99 Series
Electric Rolling Motors

Tube Size
- 0.250” to 3.000” OD
- (6.4 to 76.2mm) OD

99150 Motor

99062 Motor

Always on, always precise.

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

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

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

99300 Motor

FOR RENT

Features & Benefits:

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

Tube OD Range*		Part Numbers	Included Square Chuck	Included Tool Box	Carbon Brush Replacement Sets
Inch	mm				
1/4 - 5/8	6.4 - 15.9	99062-110-7P	1/4 & 3/8 Fem. Quick Change	153G	44-191627-8
		99062-220-7P			
1/2 - 1-1/2	12.7 - 38.1	99150-110-7P	3/8 & 1/2 Fem. Quick Change	153G	40-80700013-2
		99150-220-7P			
1 - 3	25.4 - 76.2	99300-110	3/4 & 1 Fem. Socket	153K	40-80700021-2
		99300-220			

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

Motor	Voltage	Motor Type	Hz	Amps (Max.)	Free Speed RPM (No Load)	Maximum Torque (@ Max. Amps)	Approx. Weight (lbs/Kg)	Spindle Drive Size
99062-110-7P	110	Auto-Reverse	50-60	4.3	3,000	15 in.-lbs. @ 1,900 RPM	2.7 / 1.2	3/8 Male Sq.
99062-220-7P	220		50-60	2				
99150-110-7P	110		50-60	10	760 (Low Gear)	12 ft.-lbs. @ 290 RPM	8.5 / 3.9	1/2 Male Sq.
					1,250 (High Gear)	8 ft.-lbs. @ 690 RPM		
99150-220-7P	220		50-60	5	760 (Low Gear)	12 ft.-lbs. @ 290 RPM		
					1,250 (High Gear)	8 ft.-lbs. @ 690 RPM		
99300-110	110	Manual Reverse	50-60	16	75 (Low Gear)	102 ft.-lbs. @ 72 RPM	17 / 7.7	3/4 Male Sq.
					250 (High Gear)	30 ft.-lbs. @ 244 RPM		
99300-220	220		50-60	8	75 (Low Gear)	102 ft.-lbs. @ 72 RPM		
					230 (High Gear)	30 ft.-lbs. @ 244 RPM		

Spares & Accessories:

- ELC110220 Electric Torque Controller: ***See page 66 for more information.***
- Motor Adapter Cord: ***See page 67 for more information.***

FOR RENT

ELC110220
Electric Torque Controller

Job setup 2 to 3 times faster.

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

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

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

Additionally, the torque controller is CE Mark and UL & RoHS compliant for operator safety.

MADE IN USA FOR RENT

ELC110220
Electric Torque Controller

Features & Benefits:
- Job setup 2 to 3 times faster.
- Three setup modes to suit your needs.
- A single controller lowers your investment.

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

ELC110220 Electric Torque Controller includes:
- Electric Controller Unit
- 3 Controller Power Cords (110V North American (Nema 5-15), 110V United Kingdom, 220V Continental Europe (Schuko)

Spares & Accessories:
- Replacement Controller Power Cords
- Motor Adapter Cord: Detachable adapter cords to adapt an existing electric motor(s) to the ELC110220 controller’s 7-pin connection. Each adapter cord will measure approximately 1 ft. [0.3M] long. Auto-reversing motors must be of Elliott Tool manufacture. Motor Adapter Cords are available in the following:

1. 110V North American (Nema 5-15) - Manual Reversing
2. 110V North American (5-Pin Amphenol) - Auto Reversing
3. 220V Continental Europe (Schuko) - Manual Reversing
4. 220V Continental Europe (5-Pin Amphenol) - Auto Reversing
5. 110V United Kingdom - Manual Reversing

   Contact Customer Service for other manufacturers’ auto-reversing models
- Electric Rolling Motors: For use with the ELC110220

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

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

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ET Series
Torque Controlled Pneumatic Rolling Motors

Tube Size
- 0.250” to 1-1/4” OD
- (6.4 to 31.8mm) OD

The quality you need. The compatibility you want.

Elliott offers the ET Series for tube sizes 1/4” (6.40mm) to 1-1/4” (31.8mm) to suit your tube expansion needs.

The ET Series Motors are torque controlled and ideal for rolling tubes in heat transfer vessels, ranging in size from small oil coolers to large heat exchangers.

The ET Series Motors have undergone extensive testing, proving long tool life and quality. Parts are truly compatible with the original Airetool® motors for convenient maintenance of existing motors. Elliott also offers repair services for existing Airetool® motors.

Two series to suit your application

Both ET series use torque actuated cams to measure torque and provide consistent expansions each time.

ET720
See page 69

Ergonomic & lightweight design is ideal for rolling small tubes commonly found in oil coolers and other small heat exchangers.
- Tube OD Range: 1/4” - 3/8” (6.4 - 9.5mm)
- Torque Range: 2 - 27 in lbs (0.23 - 3.1 Nm)

ET850
See page 70

Offering the same USA quality and performance you’re used to with additional features to improve the operator experience.
- Tube OD Range: 3/4” - 1-1/4” (19.1 to 31.8mm)
- Torque Range: 22 - 318 in lbs (2.5 - 35.9 Nm)

MADE IN USA FOR RENT

ET720 Series
Torque Controlled Pneumatic Rolling Motors

The quality you need. The compatibility you want.

Fast and consistent method for rolling small tubes.

Lightweight & ergonomic design is ideal for rolling small tubes commonly found in oil coolers and other small heat exchangers.

These motors work great with Elliott's new line of 23 Series expanders. Backed by US quality and proven tool life, the 23 Series and ET720 motors consistently expand tubes in smaller vessels.

Roll Every Tube To Spec

Ergonomic Handle Design

Consistent Tube Expansion

Roll Every Tube To Spec
Torque actuated cams accurately measure torque to provide consistent expansions each time.

Less Operator Fatigue
Lightweight aluminum core reduces operator fatigue.

Highly Durable
Rugged carbon fiber infused handle is designed to improve ergonomics and provide long tool life.

Operator Friendly

Ergonomic Design
Insulated handle doesn't get cold while you use it.

Easy To Use
Simply connect to the air supply, adjust torque, and start rolling.

Spares Kit Includes:

- Paddle Set
- O-Rings
- Radial Ball Bearings

Accessories:

- 3/8" Quick Change Chuck, ET720-037-037
- Spares Kit, ET720SK
- Filter-Lubricator, 6090

Tube OD Range	Motor	Free Speed RPM	Torque Range	Weight	Air Usage	Air Supply Hose	Male Spindle Drive	Standard Quick Change Chuck	Spares Kit
1/4" - 3/8" (6.4 - 9.5mm)	ET720-1800	1,800	2 - 27 in lbs (0.23 - 3.1 Nm)	2.4lbs (1.09kg)	17 cfm (481 l/min)	3/8" (9.5mm)	1/4" (6.4mm)	1/4" Fem Sq.	ET720SK

**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

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	22 - 115 in 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	31 - 192 in 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

Tube Size

- 0.750” to 2.000” OD
- (19.1 to 50.8mm) OD

Elliott offers the Midi/Maxi™ Series for tube sizes 0.750” (19.1mm) to 2.000” (50.8mm) to suit your tube expansion needs.

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

Features & Benefits:

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

Midi/Maxi Series Package includes:

- Torque Controlled Pneumatic Rolling Motor
- 16 oz. Can Lube Oil
- 7-1/2’ Air Hose Whip
- Carrying Box
- Exhaust Hose Assembly
- Filter-Lubricator
- Hose Adapter
- Muffler Unit
- Quick Change Chuck(s)
- Side Handle

9017

9018

		9017 Super Maxi-Torq	9018 Super HD Maxi
Tube OD Range*		3/4” – 1-1/2” (19.1-38.1mm)	1-1/2” – 2” (38.1-50.8mm)
Free Speed RPM		850	175
Torque Range		12 – 33 ft lbs (16.3 – 44.7 Nm)	30 – 150 ft lbs (40.7- 203.4 Nm)
Weight	lbs	21	23
	kg	9.5	10.4
Air Usage		75 cfm (2124 l/min)	75 cfm (2124 l/min)
Air Supply Hose		3/4” (19mm)	3/4” (19mm)
Male Spindle Drive		1/2”	1”
Standard Quick Change Chuck		1/2” Fem. Sq. (3/8” & 3/4” included)	3/4” Fem. Sq. (1” included)

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

445 Series
Right Angle Pneumatic Motors

Tube Size
- 2.000” to 4.000” OD
- (50.8 to 101.6mm) OD

The quality you need.
The compatibility you want.

Elliott offers the 445 Series Motors in both roll and lever throttle for tube sizes 2.000” (50.8mm) to 4.000” (101.6mm) to suit your tube expansion needs.

The powerful 445 Series Motors are ideal for tough boiler tube applications. The right angle heads are suited for rolling tubes in hard to reach, tight areas. Available in torque controlled & stall type motors.

The 445 Series Motors have undergone hundreds of hours of rigorous testing, proving tool life and ensuring quality. Motor parts are designed to truly be compatible with Cleco® and Airetool® motors, for convenient maintenance of existing motors.

Visit Our YouTube Channel To See the 445 Series in action!
www.youtube.com/elliott-tool

MADE IN USA

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445 Series
Right Angle Pneumatic Motors

Features & Benefits:
- Powerful for boiler tube expansion.
- High quality proven design for long-lasting tool life.
- Right angle head enables rolling in hard to reach or tight areas.
- Parts are truly compatible with Cleco® and Airetool® for convenient maintenance of existing motors.

445 Series Package includes:
- Pneumatic Motor
- Torque Reaction Bar
- Socket
- Torque Adjusting Tool*
- Grease Fitting

**Torque Controlled motor only*

Spares & Accessories:
- Spares Kit (445SK & 445SK-ST)
  Includes O-Rings, Paddles, Muffler, Bearings, Bearing Seat Tool, Hex drive, Locknut and Spring*
- 6070 Filter-Lubricator
- Sockets
- Chucks

**Torque Controlled motor only*

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

6070 Filter/Lubricator and 16oz Pneumatic Oil 900082P (Purchased Separately)

	Torque Controlled				Stall Type			
	445L1753-190	445R1753-190	445L1752-90	445R1752-90	445L1753-190ST	445R1753-190ST	445L1752-90ST	445R1752-90ST
Tube OD Range*	2" - 3" (50.8 - 76.2mm)		2" - 4" (50.8 - 101.6mm)		2" - 3" (50.8 - 76.2mm)		2" - 4" (50.8 - 101.6mm)	
Free Speed RPM	190		90		190		90	
Torque Range**	70 - 140 ft lbs (95 - 190 Nm)		150 - 305 ft lbs (200 - 410 Nm)		70 - 155 ft lbs (95 - 210 Nm)		150 - 325 ft lbs (200 - 440 Nm)	
Throttle Type	Lever	Roll	Lever	Roll	Lever	Roll	Lever	Roll
Weight	20 (9.0kg)		22 (9.9kg)		17 (7.7kg)		19 (8.6kg)	
Air Usage	70 cfm @ 90 PSI							
Air Supply Hose	3/4" (19.05mm)							
Spindle Drive Size	5/8" Sq. Male		3/4"		5/8" Sq. Male		3/4"	
Standard Drive Socket	3/4" Fem. Sq.		1" Fem. Sq.		3/4" Fem. Sq.		1" Fem. Sq.	

**May vary due to tube wall, material and tube sheet thickness.*
***Measured using industry standard Hard Joint Torque.*

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Stall Torque Pneumatic Rolling Motors

Tube Size
- 0.750” to 6.000” OD
- (19.1 to 152.4mm) OD

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

Features & Benefits:
- Ideal for expanding tubes with heavy wall thicknesses.

Spares & Accessories:
- 6080 Lubricator
- Morse Taper Adapters
- Sockets
- Chucks

445SA & 445RA

440LA

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

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

*** Available for rent*

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

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

Female Square Both Ends

Quick Change Chucks		
Part Number	Expander End Female Sq.	Motor Drive Sq. or M.T.
810-025-037	1/4”	3/8”
810-037-037	3/8”	3/8”
810-037-050	3/8”	1/2”
810-050-050	1/2”	1/2”
810-050-075	1/2”	3/4”
810-075-050	3/4”	1/2”
810-075-075	3/4”	3/4”
810-075-100	3/4”	1”
810-100-075	1”	3/4”
810-100-100	1”	1”

Female Square To Male Square

Quick Change Chucks		
Part Number	Expander End Female Sq.	Motor Drive Sq. or M.T.
820-075-075	3/4”	3/4”
820-075-100	3/4”	1”
820-100-075	1”	3/4”
820-100-100	1”	1”

Female Square To Male Morse Taper

Quick Change Chucks		
Part Number	Expander End Female Sq.	Motor Drive Sq. or M.T.
830-00-2-037	3/8”	#2 MT
830-00-2-050	1/2”	#2 MT
830-00-2-075	3/4”	#2 MT
830-00-3-037	3/8”	#3 MT
830-00-3-050	1/2”	#3 MT
830-00-3-075	3/4”	#3 MT
830-00-3-100	1”	#3 MT
830-00-4-075	3/4”	#4 MT
830-00-4-100	1”	#4 MT
830-00-5-075	3/4”	#5 MT
830-00-5-100	1”	#5 MT

Female Square Both Ends (Ball Retention Both Ends)

Quick Change Chucks		
Part Number	Expander End Female Sq.	Motor Drive Sq. or M.T.
858400-1/4	1/4”	1/2”
858400-3/8	3/8”	1/2”
858400-1/2	1/2”	1/2”
858400-3/4	3/4”	1/2”
858400-1	1”	1/2”
902200-3/4	3/4”	1”
902200-1	1”	1”

Female To Female Square (Set Screw Both Ends)

Drive Sockets		
Part Number	Size	OAL
71SOX	3/8” x 3/8”	1-3/4”
71SOXT	3/8” x 1/2”	1-7/8”
71SOCX	3/8” x 3/4”	1-7/8”
71SOT	1/2” x 1/2”	1-3/4”
71SOCT	1/2” x 3/4”	1-7/8”
71SOMT	1/2” x 1”	1-7/8”
71SOBT	5/8” x 1/2”	1-5/8”
71SOCB	5/8” x 3/4”	2”
71SOMB	5/8” x 1”	2”
71SOC	3/4” x 3/4”	2”
71SOMC	3/4” x 1”	2”
71SOM	1” x 1”	2”

Male Morse Taper To Male Square

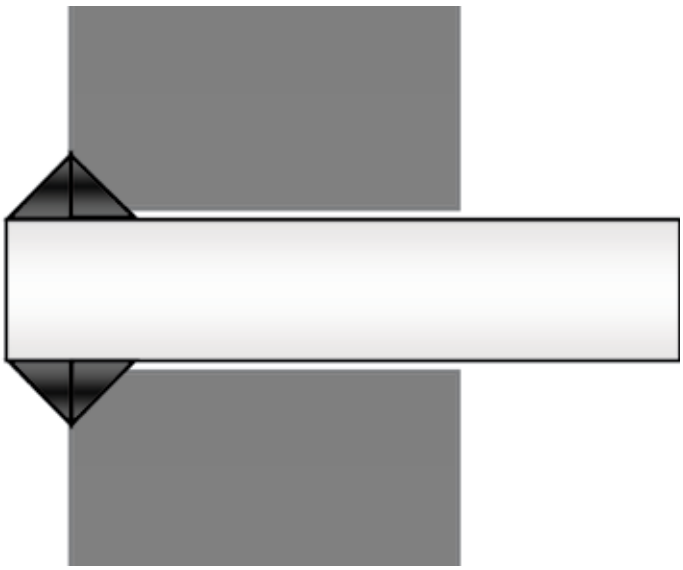
Morse Taper Adapters		
Part Number	Male Morse Taper	Male Square
830-12-2-037	#2 MT	3/8”
830-12-2-050		1/2”
830-12-2-075		3/4”
830-12-3-050	#3 MT	1/2”
830-12-3-075		3/4”
830-12-3-100		1”
830-12-4-075	#4MT	3/4”
830-12-4-100		1”
830-12-5-075	#5MT	3/4”
830-12-5-100		1”

MADE IN USA

How To Expand

WELDED TUBES

Seal Weld



Strength Weld

Expanding tubes after they have been welded can be frustrating for operators. If not rolled properly, tube material can build up and put stress on the weld. In extreme cases the tube material can build up so much that the expander can get stuck in the tube, delaying the job.

Seal and strength welds are the two main types of welds used when building exchangers.

Seal welds are primarily used to transfer heat to the tubesheet to prevent the tube from cracking. Additionally, seal welds can provide additional strength to the tube-to-tubesheet joint.

Strength welds are designed to carry longitudinal tube loads and provide leak tightness. These welds are essentially the same as seal welds, except the tube hole in the tube sheet is grooved. This allows filler metal to be deposited and provide joint strength.

If a tube is strength welded, mechanical expansion is not technically required, since the weld acts as the mechanical joint. However, many customers choose to mechanically expand anyway to prevent crevice corrosion. After a tube is welded, a small gap can be left between the tube OD and the ID of the tube sheet hole. Overtime, corrosion can occur in the gap and cause leaks or weaken the integrity of the joint. Mechanically expanding after strength welding will eliminate any gaps that are present and prevent corrosion.

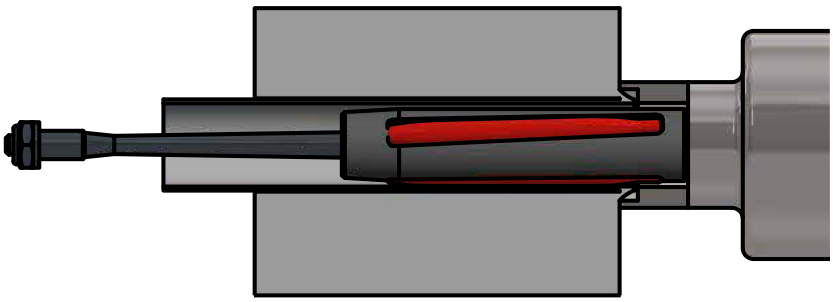
Expanding Welded Tube Joints

While expanding seal welded tubes can be a challenge, there are a few methods that can make this process easier.

Use Relief Rolls

When tube ends are welded, the amount of heat needed to create the weld causes the material to harden. If the expanding rolls come in contact with the welded bead during expansion, they will break.

In order to prevent the rolls from coming into contact with the weld, a relief can be used. Relief rolls work the same as traditional rolls, however, the back of the roll has a smaller diameter to prevent it from coming into contact with the welded portion of the tube. Relief rolls allow the tube to be expanded normally while preventing premature tool failure.

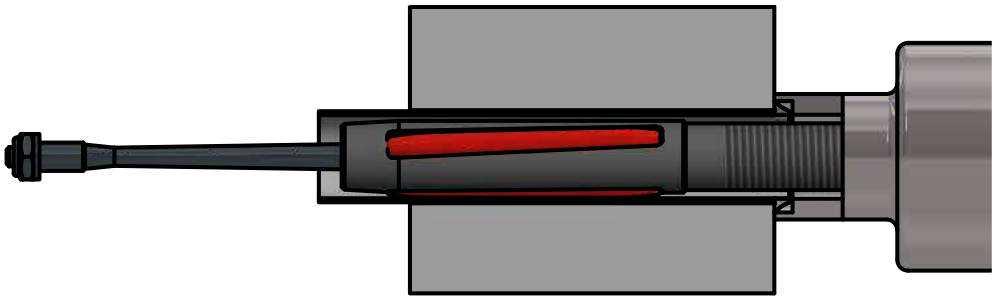


Expander With Relief Rolls

Adjust Expander Roll Depth

Generally, when setting up an expander the rolls are set slightly back from the tube sheet. This ensures that the tool doesn't roll beyond the tube sheet. However, in cases where the tube sheet is thicker than the roll length, the expander roll depth can be set past the weld.

In this scenario, an expander with double radius rolls should be used. Double radius refers to the smooth taper that is present on both ends of the roll. This allows for a smooth transition and prevents any ridges or lips from being left inside of the tube after expansion.



Expander With Double Radius Rolls

Traditional Expander

Parallel Pin Expander

Parallel Pin Expansion

Parallel pin expansion refers to the alignment of the rolls with the mandrel. A traditional expander's rolls are set at an angle to the mandrel. This feed angle causes a screw-like action that automatically feeds the mandrel into the tube as it rotates. With parallel pin expansion, the rolls are set parallel to the mandrel with zero feed angle. This means that the mandrel will not self-feed as a traditional expander would. Instead, the mandrel is pushed through the expander by force causing the tube to expand.

Some end customers are requiring manufacturers to use parallel pin expansion on seal welded tubes, because they believe this process can better protect the integrity of the weld. In traditional expansion, the feeding of the mandrel introduces a pulling force on the tube, which can create stress at the weld. With parallel pin expansion this force could be reduced or eliminated since the mandrel is being pushed into the tube and the rolls are being forced directly outward towards the tube wall.

Since a parallel pin expander requires force to push and pull the mandrel, this type of expansion is most commonly used with an assisted rolling system. Assisted tube rolling systems are one of the most effective ways to prolong tool life and increase productivity. This is because they're often equipped with features like a built-in torque control, an expander holder, and an auto-lubrication system. Thus, an assisted tube rolling system would be a good option for businesses that are looking to do more parallel pin rolling.

Overall, expanding tubes after they have been welded can be very frustrating for operators if not done properly. Using relief rolls, rolling past the weld, and parallel pin expansion can make expanding welded tubes easier, while maintaining the integrity of the weld.

TABLE HAWK™

Tabletop Assisted Tube Rolling System

Tube Size

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

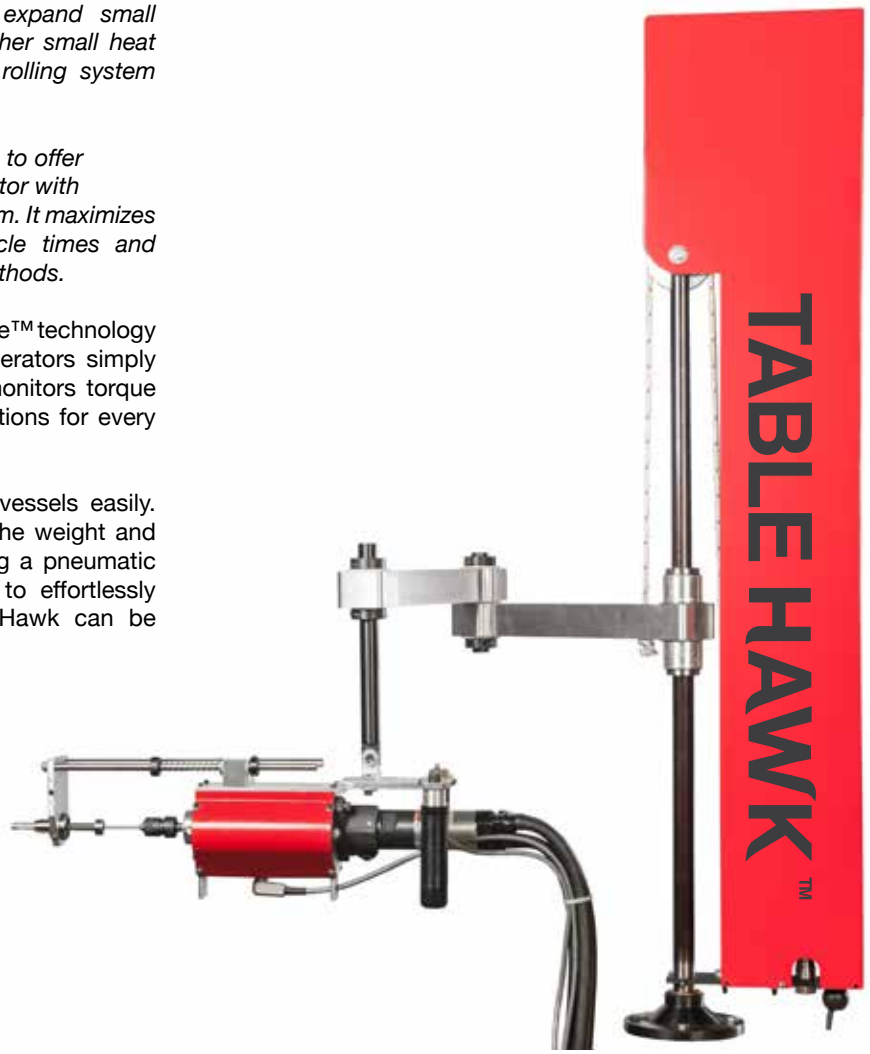
Small tubes, high precision.

Engineered to productively and precisely expand small tubes commonly found in oil coolers and other small heat exchangers. Elliott’s tabletop assisted tube rolling system completes the job right the first time.

Elliott’s Table Hawk is the first tabletop system to offer the speed and productivity of a pneumatic motor with the precision and control of an electronic system. It maximizes productivity by providing best in class cycle times and eliminating costly rework from less precise methods.

Combining Elliott’s patent pending Direct Torque™ technology with a pneumatically driven power head, operators simply set a torque and start rolling. The system monitors torque and provides consistently precise wall reductions for every expansion.

Ergonomically and productively roll smaller vessels easily. The Table Hawk’s articulated arm supports the weight and absorbs the torque of the rolling motor using a pneumatic counterbalance, which allows the operator to effortlessly move the motor into position. The Table Hawk can be mounted to a table or wheeled cart.



MADE IN USA

TABLE HAWK™
Tabletop Assisted Tube Rolling System

Operator Friendly Controls

Auto-Cycle & Triggerless Operation

Power Head & Expander Holder

Increased Productivity & Ergonomics

Start, Stop, & Reverse Automatically
Auto-Cycling increases speed and precision with a Power Head that runs automatically –starting, stopping, and reversing without operator intervention.

Faster Motor, Same Precise Control
Increase speed with a pneumatic motor and roll each tube to spec with the electronic control system.

Trigger-less Operation
Increases ergonomics with a simple on/off switch for operation. No need to hold down a trigger during the entire job.

Articulated Arm
Increases operator ergonomics and decreases operator fatigue by supporting tool weight and absorbing torque.

Counterbalance
Decreases operator fatigue by allowing effortless and exact positioning of the articulated arm and rolling motor.

Change Tooling Quickly
Quickly change out Elliott's long-lasting 24 Series Condenser Expanders with the built-in quick change chuck system.

Quick & Easy Setup

Fully Assembled Articulated Arm
Minimizes setup time by arriving fully assembled. Simply mount the arm to a tabletop or cart and connect the airlines.

Operator Friendly Controls
User simply sets torque with the easy-to-use control panel.

Filter/Regulator and Lubrication
Allows for simple setup of the Table Hawk and decreases maintenance by extending the life of the air motor.

Consistent Tube Expansion

Roll Every Tube To Spec
Direct Torque™ Electric Torque Control measures torque and controls system functions regardless of fluctuations in air supply. Allows you to roll to the target wall reduction each time to eliminate costly re-rolling.

Increase Tool Life
Swivel Mount securely supports the Power Head to ensure expander alignment and increase expander life.

Maintain Tool Alignment
Expander holder increases tool life and ensures consistently rolled tubes with an expander holder that guides the expander and maintains tool alignment.

MADE IN USA

TABLE HAWK™
Tabletop Assisted Tube Rolling System

Packages			
Tube OD Range	**Package**	**Motor**	**Power Head**
1/4" - 5/8"	TTRS1900	TTRM1900	TTR100
Each package includes the Articulated Arm, Motor, Pneumatic Power Head, and Swivel Mount System.			

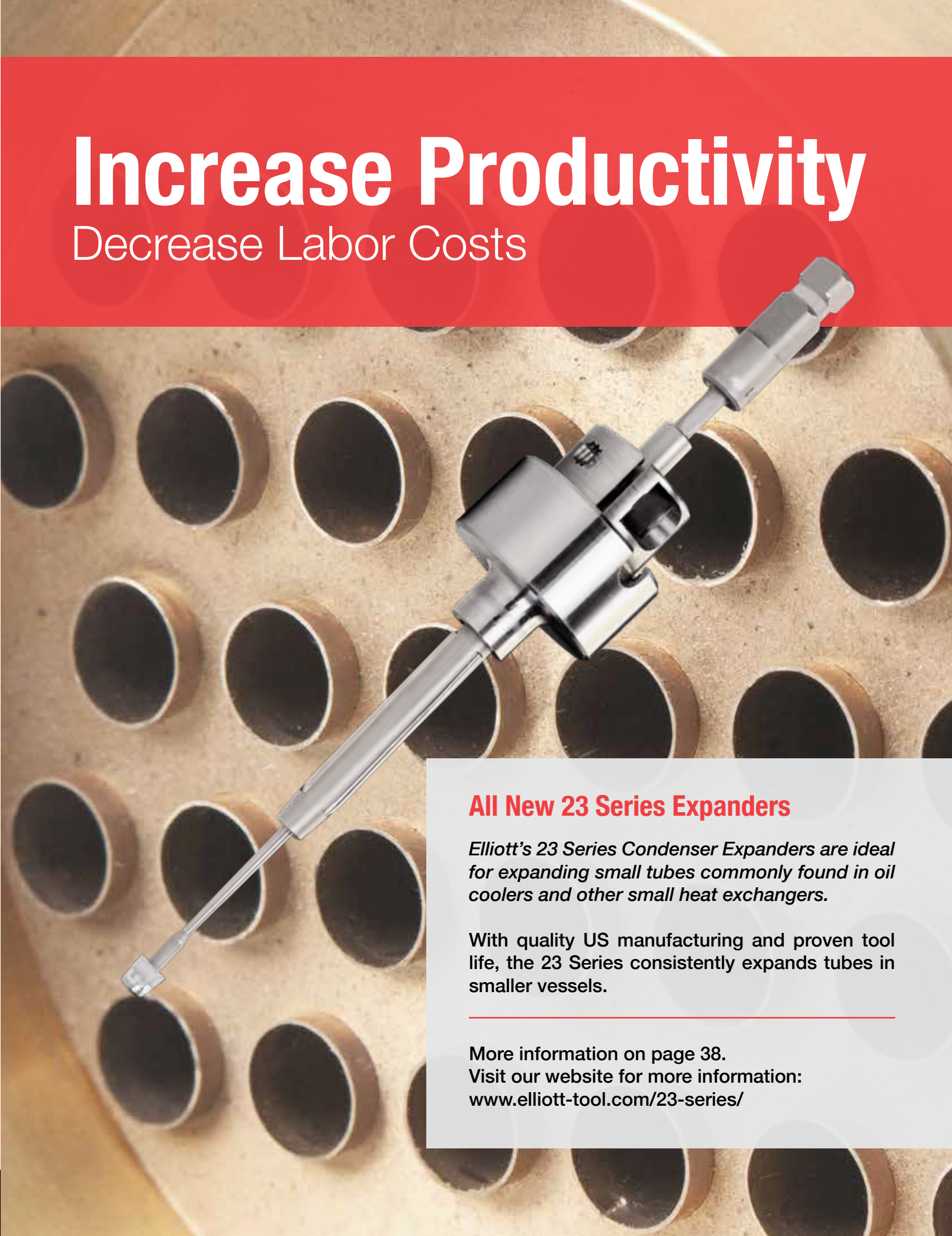
Articulated Arm Specifications		Articulated Arm Specifications	
Specifications		**Dimensions & Weight**	
Maximum Torque Absorption	10 ft. lbs	Working Area/Footprint	22.5" (648 mm) maximum height
Maximum Weight Supported	80 lbs (36.30 Kg)		18.5" (470 mm) minimum height
Standard Tool Mount Diameter Range	1-2" (25.4-50.8 mm)		30.75" (781 mm) maximum width
Horizontal Radius Reach	28" (711 mm)		16" (406 mm) minimum width
Vertical Range (without tool)	30" (762 mm)		5.5" (140 mm) depth (mounting base diameter)
Arm Rotation	360°	Unit Weight	40 lbs. (18.1 Kg)

Power Head Specifications									
Motor Part Number	**Power Head Part Number**	**Air Consumption**	**Free Speed RPM (No Load)**	**Torque At Max Power**	**Min Torque**	**Max Torque**	**Power Head Weight**	**Transducer Part Number**	**Included Square Quick Chuck**
TTRM1900	TTR100	29.7 cfm @ 90PSI	1900	42 in-lbs	2 in-lbs	42 in-lbs	8.7 lbs. (3.9kg)	TTR121	1/4"

MADE IN USA

Increase Productivity

Decrease Labor Costs



All New 23 Series Expanders

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

With quality US manufacturing and proven tool life, the 23 Series consistently expands tubes in smaller vessels.

More information on page 38.
Visit our website for more information:
www.elliott-tool.com/23-series/

RAPID HAWK™
Assisted Tube Rolling System

Bold precision, fierce productivity.

Engineered with productivity and precision in mind, Elliott's assisted tube rolling system completes the job right the first time.

The Rapid Hawk's articulated arm supports the weight and absorbs the torque of the rolling motor using a pneumatic counterbalance, which allows the operator to effortlessly move the motor into position.

Ergonomically roll a large area of tubes without readjusting the Rapid Hawk, with its large radial reach. For convenient transportation of the unit, it is equipped with heavy-duty casters, forklift pockets, and a hoist ring.

Two series to meet demanding production schedules

Both Rapid Hawk series utilize an electronic torque control system to precisely measure tube expansion and consistently hit target every time. For the first time, an electronic torque control can be used regardless of the motor's power source.

> *"For the first time, an electronic torque control can be used regardless of the motor's power source."*

Electric Series

See page 86

Elliott's proven electric rolling system combines an electric rolling motor and ELC110220 torque controller.

- Rolling Motor: Electric
- Electronic Torque Control: ELC110220
- Tube Range: 1/2" - 1-1/2" (12.7mm - 38.1mm)*

MADE IN USA

Hybrid Series

See page 88

Elliott's robust power head driven by a pneumatic motor with electric torque control provided by Elliott's patent pending Direct Torque technology.

- Rolling Motor: Pneumatic
- Electronic Torque Control: Direct Torque™
- Tube Range: 5/8" - 1-1/2" (15.9mm - 38.1mm)*

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

RAPID HAWK™
Assisted Tube Rolling System

Safe & Ergonomic

Supports Tool Weight
Pneumatic Counterbalance decreases operator fatigue by absorbing torque and allowing effortless positioning of the arm & rolling motor.

Effortless Positioning
The Articulated Arm increases operator ergonomics and decreases operator fatigue by supporting tool weight.

More Reach, Less Re-Adjusting
Large radial reach increases productivity by allowing a large area of tubes to be rolled without re-adjusting the unit.

Built-in Safety Features
Safety Control Valve protects the operator by eliminating a sudden drop of the articulated arm in case of pneumatic air loss.

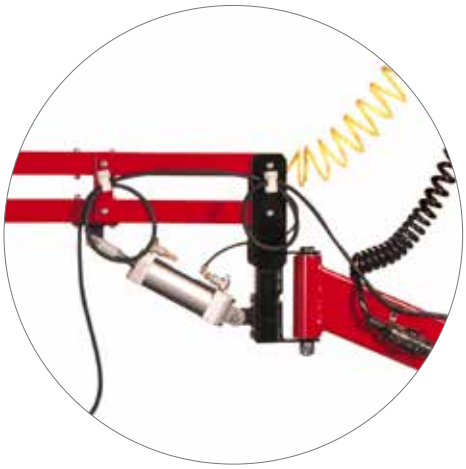
Works Great In Smaller Work Spaces
Weighted Pedestal allows for convenient placement of the Rapid Hawk, even in a small workspace, with its compact design and small footprint.

Quick & Easy Setup

Get Up & Running Quickly
Fully assembled articulated arm minimizes setup time by arriving fully assembled.

Easy To Move
Heavy-duty casters, forklift pockets, and hoist ring, provide a variety of methods to easily move the Rapid Hawk around facilities.

Simple To Setup
Filter/Regulator & Lubrication allows for simple setup of the Rapid Hawk and decreases maintenance by extending the life of the pneumatic counterbalance.



Effortless Positioning

Built-in Safety Features

Supports Tool Weight

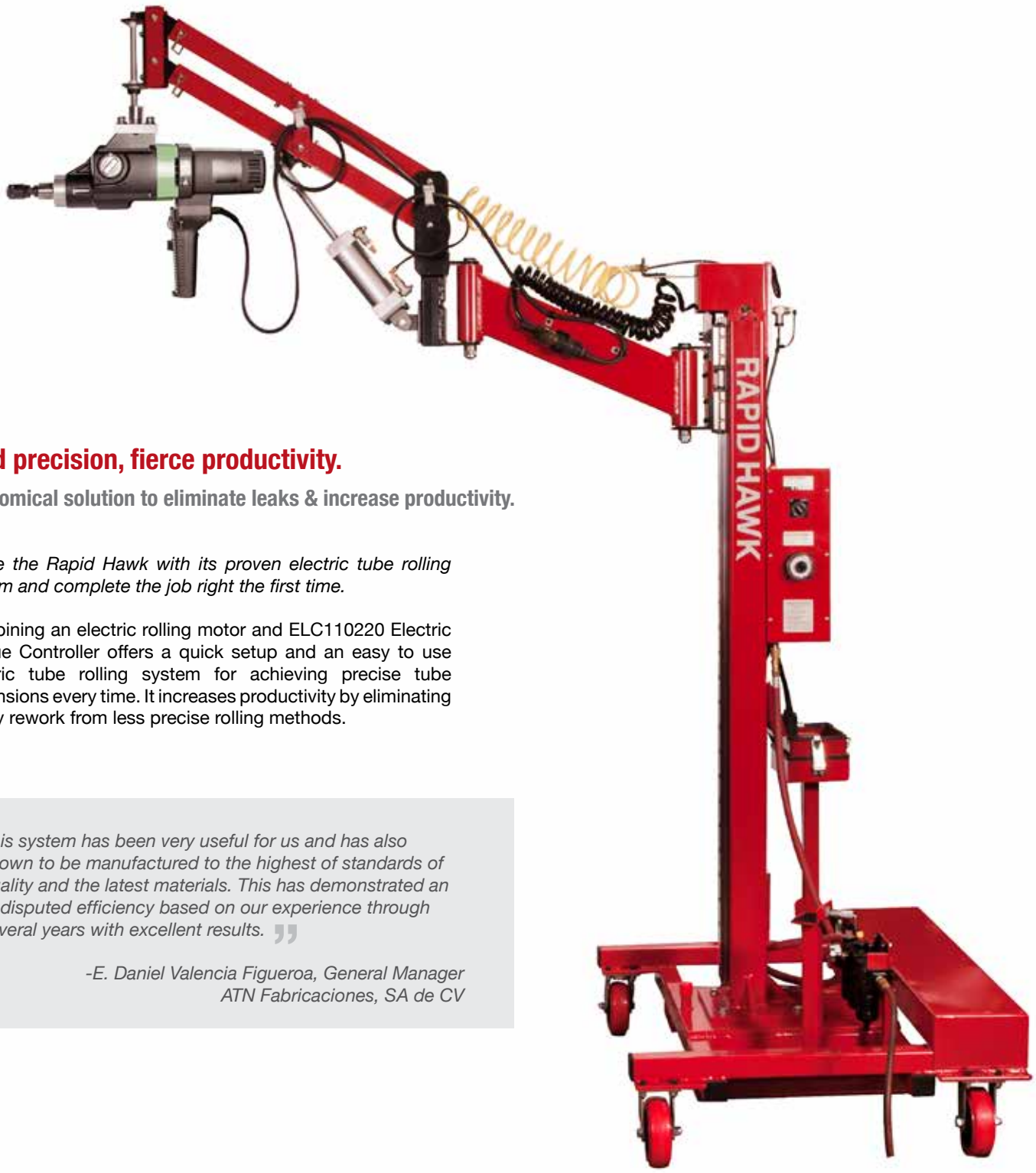
Rapid Hawk Specifications	
Power	
Pneumatic Requirements	1.5 CFM, 100 PSI
Power Requirements*	115/230 V IPH 50/60Hz
Specifications	
Maximum Torque Absorption	135 ft. lbs
Maximum Weight Supported	66 lbs (30 Kg)
Horizontal Radius Reach	5.5’ (1.68 m)
Minimum Vertical Reach	2’ (610 mm)
Maximum Vertical Reach	8’ (2.44 m)
Tube OD Range	0.5” - 1-1/2” (12.7mm - 38.1mm)
Transport Methods	Forklift Pockets, Hoist Ring, Casters

Rapid Hawk Specifications	
Dimensions & Weight	
Working Area/Footprint	119” (3.02 m) maximum height
	79” (2.01 m) minimum height
	43” (1.09 m) width
	95” (2.41 m) maximum depth
	34” (864 mm) minimum depth
Unit Weight	725 lbs. (329 Kg)
Shipping Dimensions (crated)	88” (2.24 m) height
	50” (1.27 m) width
	40” (1.02 m) depth
Shipping Weight (crated)	825 lbs. (374 Kg)

** May require removal of supplied plug & installation of plug suitable based on locality requirement.*

MADE IN USA

RAPID HAWK™- Electric Series
Assisted Tube Rolling System



Bold precision, fierce productivity.

Economical solution to eliminate leaks & increase productivity.

Utilize the Rapid Hawk with its proven electric tube rolling system and complete the job right the first time.

Combining an electric rolling motor and ELC110220 Electric Torque Controller offers a quick setup and an easy to use electric tube rolling system for achieving precise tube expansions every time. It increases productivity by eliminating costly rework from less precise rolling methods.

> *"This system has been very useful for us and has also shown to be manufactured to the highest of standards of quality and the latest materials. This has demonstrated an undisputed efficiency based on our experience through several years with excellent results."*
>
> *-E. Daniel Valencia Figueroa, General Manager*
> *ATN Fabricaciones, SA de CV*

MADE IN USA

RAPID HAWK™ - Electric Series
Assisted Tube Rolling System

Consistent Tube Expansion

Roll Every Tube To Spec
The electric rolling motors offer better consistency than pneumatic motors when rolling tubes to ensure every tube is rolled to spec.

Easy For Operators To Use
The ELC110220 Electric Torque Controller, the best torque controller on the market, provides 2-3 times faster setup and allows you to roll to the target ID each time to eliminate costly re-rolling.

Increase Tool Life
Swivel Mount securely supports the motor to ensure expander alignment and increase expander life.

Optional Accessories For More Productivity
Expander holder increases tool life and ensures consistently rolled tubes with an expander holder that guides the expander and maintains tool alignment.

Roll Every Tube To Spec

Easy For Operators To Use

Rapid Hawk- Electric Series Packages						
Tube OD Range	**Rapid Hawk Package**	**Motor**	**Swivel Mount System**	**Optional Expander Holder**	**Spares Kit**	**ELC**
1/2" - 1-1/2"	ETRS150-110	99150-110-7P	ETR6001-150	ETR6200-150	ETR9001-150	ELC110220
	ETRS150-220	99150-220-7P				

**Each Rapid Hawk Package includes the Rapid Hawk, Electric Motor, Swivel Mount System, and Electronic Torque Controller.*

Spares Kit includes:

- Replacement filter
- Rod-less cylinder repair kit
- Tie rod cylinder seal set
- Replacement carbon brush set

Motor Specifications									
Motor Part Number	**Motor Type**	**Voltage**	**Amps (Max.)**	**Free Speed RPM (No Load)**	**Max Torque (@ Max Amps)**	**Approx. Weight (lbs/Kg)**	**Spindle Drive Size**	**Included Square Chuck**	**Carbon Brush Replacement Sets**
99150-110-7P	Auto Reverse	110	10	760 (Low Gear) 1,250 (High Gear)	12 ft.-lbs. @ 290 RPM 8 ft.-lbs. @ 690 RPM	8.5/3.9	1/2 Male Sq.	3/8 & 1/2 Fem. Quick Change	40-80700013-2
99150-220-7P		220	5						

MADE IN USA

RAPID HAWK™- Hybrid Series
Assisted Tube Rolling System

Bold precision, fierce productivity.

Uncompromising consistency with faster productivity.

Elliott's Hybrid Series Rapid Hawk is a first of its kind. Offering the speed and productivity of a pneumatic motor with the precision and control of an electronically controlled system. It maximizes productivity by providing best in class cycle times and eliminating costly rework from less precise methods.

Combining a pneumatically driven power head with Elliott's patent pending Direct Torque™ technology, operators simply set a target torque and start rolling. The system monitors torque and provides consistently precise wall reductions for every expansion.

The Hybrid Series takes ergonomics and productivity to a new level with trigger-less operation and auto-cycling. Simply turn the system on and it will start, stop and reverse without any operator intervention.

> *"We have over 280,000 expansions on the Rapid Hawk, with the capability of 360 expansions per hour, with 0 tube joint leaks due to the system, and with 0 downtime."*
>
> *-Mark Chisum, Manufacturing Engineer*
> *Metalforms, Ltd.*

MADE IN USA

Rapid Hawk- Hybrid Series Packages			
Rapid Hawk Package	**Motor**	**Power Head**	**Spares Kit**
PTRS830L	PTRM830	PTR100	PTR180SK
PTRS500L	PTRM500		
PTRS370L	PTRM370		

Each Rapid Hawk Package includes the Rapid Hawk, Electronic Torque Control, Auto Cycle, Expander Holder, Through The Cage Auto-Lubrication, Rotary Lube Adapter, Expander Adapter, Pneumatic Power Head and Swivel Mount System.

Spares Kit includes:

- Air motor spares kit
- Cable cylinder spares kit
- Tie rod cylinder seal set
- 40 micron filter (air filter/regulator)
- Lubricator service kit (air motor lubricator)
- 5 micron filter (air motor filter/regulator)

RAPID HAWK™- Hybrid Series
Assisted Tube Rolling System

Increased Productivity

Start, Stop, & Reverse Automatically
Auto-Cycling increases speed and precision with a Power Head that runs automatically –starting, stopping, and reversing without operator intervention.

Faster Motor, Same Precise Control
Increase speed with a pneumatic motor and roll each tube to spec with the electronic control system.

Zero Trigger Cycling
Trigger-less operation increases ergonomics with a simple on/off switch for operation. No need to hold down a trigger during the entire job.

Automatic Tool Lubrication
Through the cage Auto-Lubrication increases tool life by providing automatic expander lubrication exactly where it's needed, through the cage and directly to the rolls & mandrels. No messy cleanup by providing the right amount of lube with each expansion. See page 72 for more information.

Change Tooling Quickly
Quickly change out Elliott's long-lasting 24 Series Condenser Expanders with the built-in quick change chuck system.

Operator Friendly

Operator Friendly Controls
User simply sets torque with the easy to use control panel.

Modular Motor System
Purchase additional motors to quickly change between various torque and OD ranges due to the system's modular design.

Consistent Tube Expansion

Roll Every Tube To Spec
Direct Torque™ Electric Torque Control measures torque and controls system functions regardless of fluctuations in air supply. Allows you to roll to the target wall reduction each time to eliminate costly re-rolling.

Increase Tool Life
Swivel Mount securely supports the Power Head to ensure expander alignment and increase expander life.

Maintain Tool Alignment
Expander holder increases tool life and ensures consistently rolled tubes with an expander holder that guides the expander and maintains tool alignment.

Operator Friendly Controls

Roll Every Tube To Spec

Power Head Specifications									
Motor Part Number	Power Head Part Number	Air Consumption	Free Speed RPM (No Load)	Torque At Max Power	Min Torque	Max Torque	Power Head Weight	Transducer Part Number	Included Square Quick Chuck
PTRM830	PTR100	66 cfm @ 90 psi	830	21 ft-lbs	3.5 ft-lbs	35 ft-lbs	21 lbs (9.5kg)	PX121	3/8
PTRM500			500	35 ft-lbs	3.5 ft-lbs	55 ft-lbs			3/8 & 1/2
PTRM370			370	47 ft-lbs	3.5 ft-lbs	80 ft-lbs			

MADE IN USA

RAPID HAWK™- Hybrid Series
Through The Cage Auto-Lubrication System

The Rapid Hawk's through the cage Auto-Lubrication system provides lubricant where it's needed most, to the rolls and mandrel. Most lubrication systems only provide lubricant through the collar, which is often positioned too far from the working end of the tool, especially when working with thicker tube sheets or header boxes. By providing the lubricant through a sealed cage, Elliott's revolutionary new design increases tool life and reduces time wasted applying and cleaning up excess lubricant.

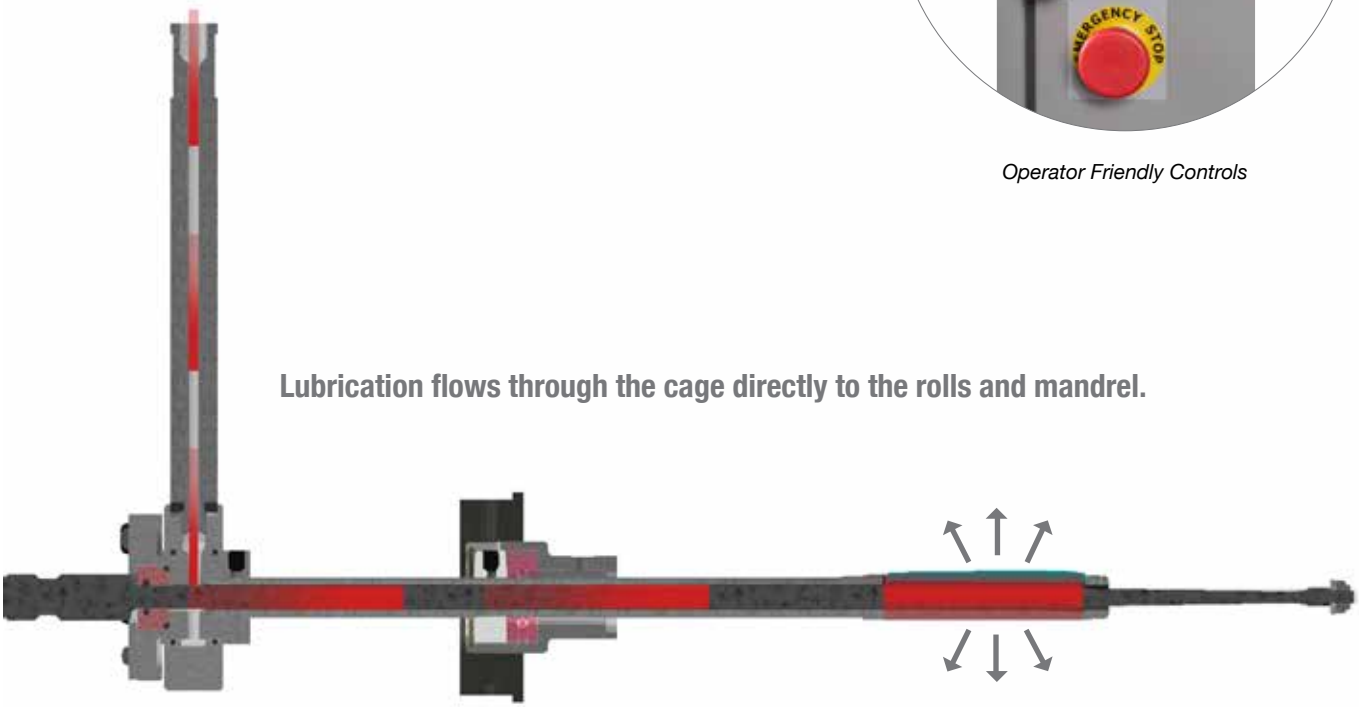
The Auto-Lubrication system is designed to work seamlessly with the Hybrid Series Rapid Hawk. Working in conjunction with the Auto-Cycle feature, the system will apply a consistent amount of lubricant during each expansion cycle. The amount of lubricant used for each expansion is easily adjustable and the system is capable of handling a variety of lubricant viscosities.

In order to allow for proper sealing of the cage for lubrication flow, a specially designed 24 Series expander is needed. However, when necessary, the Auto-Lubrication system can be turned off and any expander can be used with the Rapid Hawk.

Auto-Lubrication System With Expander Holder

Operator Friendly Controls

Lubrication flows through the cage directly to the rolls and mandrel.



MADE IN USA

Features & Benefits

Lubrication Where It's Needed

Through the cage Auto-Lubrication increases tool life by providing lubrication directly to the working end of the tool.

Automatically Dispenses

Reduces time wasted applying and cleaning up excess lubrication by providing a consistent amount of lubricant with each expansion.

More Consistent Expansions

Pressurized lubrication tank increases expansion consistency by providing a consistent flow of lubricant for a wide variety of lubricant viscosities.

Spares & Accessories

- P8395 & P8784 Tube Rolling Lubricant: See page 19 for part numbers.
- Rotary Lube Adapter: Connects the expander cage to the lubrication system.
- Cage Adapter: Connects the expander cage to the rotary lube adapter. One included with the rotary lube adapter.
- Lube Spacer w/ O-ring: One included with each expander. Seals the mandrel and back of cage adapter.
- Expander Adapter: Holds the expander in the expander holder.

Auto-Lubrication Tank

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Spares & Accessories			
Expander	Rotary Lube Adapter	Lube Spacer 10-Pack	Expander Adapter
21L	24RLA250	24LS21-10	ETA100A-1-1-4
22L	24RLA313	24LS22-10	
23L	24RLA343	24LS23-10	
24L	24RLA375	24LS24-10	
25L		24LS25-10	
27L		24LS27-10	
28L	24RLA437	24LS28-10	ETA100A-1-5-16
29L		24LS29-10	
30L		24LS30-10	
31L	24RLA500	24LS31-10	
32L		24LS32-10	
33L			
34L	24RLA562	24LS34-10	ETA100A-1-7-16
35L		24LS35-10	
36L		24LS36-10	
38L	24RLA625		ETA100A-1-5-8
39L			
40L		24LS40-10	
41L			
42L		24LS42-10	
43L	24RLA750		ETA100A-1-7-8
44L			
45L		24LS45-10	
46L		24LS46-10	
47L			
49L	24RLA875	24LS49-10	ETA100A-2-1-16
50L			
51L		24LS51-10	
52L			
53L		24LS53-10	
55L	24RLA1000	24LS55-10	
56L		24LS56-10	
57L			
58L		24LS58-10	
59L		24LS59-10	ETA100A-2-1-4
60L		24LS60-10	
61L			
63L		24LS63-10	
64L			
65L			

**Expander size (i.e. 24229L or 24129L-8= *29L*)*
Rotary Lube Adapter includes the cage adapter.

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.

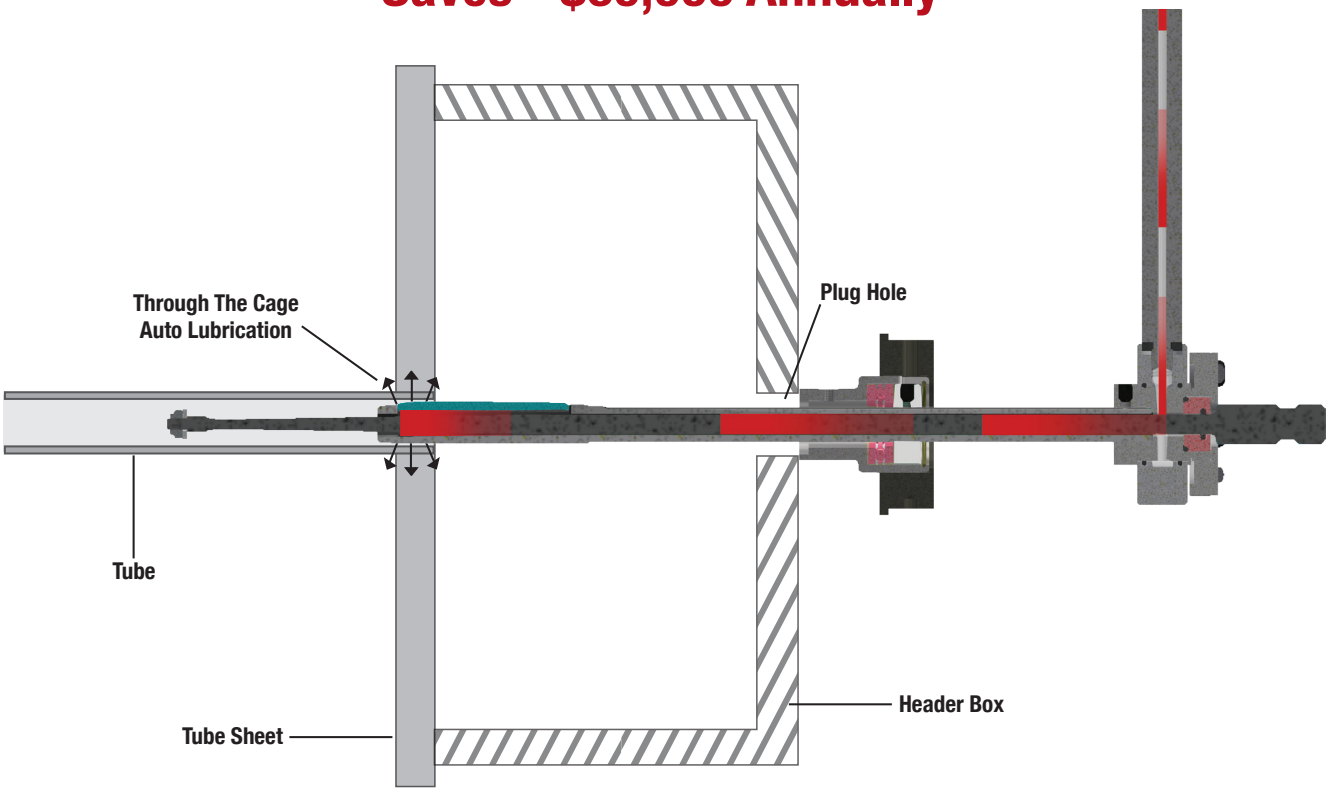
In addition to consistency, Alfa Laval was also looking for a method that would reduce the number of man-hours spent on a project. Due to their current tube rolling method, operators not only needed to regulate the amount of expansion taking place, they also had to stop periodically to re-lubricate the 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.”

RAPID HAWK™ - Hybrid Series

3 Roll Auto-Lubrication Condenser Expanders

Tube Size

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

Rapid Hawk 24 Series Auto-Lubrication Expanders should only be used with the Rapid Hawk through the cage lubrication system.

3 Roll Expanders														
Tube Size				Expansion Range				Tube Sheet (Min/Max Reach) 1/2” - 4” (12.7-101.6mm) Roll Length 1-5/8” (41.3mm)			Tube Sheet (Min/Max Reach) 1-1/4” - 4-3/8” (31.8-111.1mm) Roll Length 2-3/8” (60.3mm)			Common Mandrel
OD	Wall Thickness			Inch		Metric		Expander Assembly		Roll Set	Expander Assembly		Roll Set	
	BWG	In	Metric	Min.	Max.	Min.	Max.	Flush	1/8" Recess	(3 per set)	Flush	1/8" Recess	(3 per set)	
1/2” (12.7mm)	13	0.095	2.41	0.305	0.340	7.7	8.6	24121L	24121RB8L	241R21-3**	24221L	24221RB8L	242R21-3	24ML23
	14	0.083	2.11	0.324	0.366	8.4	9.3	24122L	24122RB8L	241R22-3**	24222L	24222RB8L	242R22-3	24ML22
	15	0.072	1.83	0.346	0.386	8.8	9.7	24123L	24123RA8L		24223L	24223RA8L		24ML23
	16-17	0.065-0.085	1.65-1.47	0.367	0.410	9.1	10.4	24124L	24124RA8L	241R24-3**	24224L	24224RA8L	242R24-3	24ML24
	18	0.049	1.24	0.392	0.447	10.0	11.3	24125L	24125RA8L	241R25-3**	24225L+	24225RA8L+	242R25-3	24ML25
	19-20	0.042-0.035	1.07-0.89	0.402	0.457	10.2	11.6	24126L	24126RA8L	241R26-3**	24226L+	24226RA8L+	242R26-3	24ML26+
	21-22	0.035-0.028	0.81-0.71	0.425	0.482	10.8	12.3	24127L	24127RA8L	241R27-3**	24227L	24227RB8L	242R27-3	24ML27
5/8” (15.9mm)	12	0.109	2.77	0.392	0.447	10.0	11.3	24125L	24125RB8L	241R25-3**	24225L+	24225RB8L+	242R25-3	24ML25 24ML26+
	13	0.095	2.41	0.425	0.482	10.8	12.3	24127L	24127RB8L	241R27-3**	24227L	24227RB8L	242R27-3	24ML27
	14	0.083	2.11	0.449	0.506	11.4	12.8	24128L	24128RA8L	241R28-3	24228L	24228RA8L	242R28-3	24ML28
	15-16	0.072-0.065	1.83-1.65	0.471	0.538	12.0	13.7	24129L	24129RA8L	241R29-3	24229L	24229RA8L	242R29-3	24ML29
	17	0.058	1.47	0.499	0.564	12.7	14.3	24130L	24130RA8L	241R30-3	24230L	24230RA8L	242R30-3	24ML30
	18-19	0.049-0.042	1.24-1.07	0.517	0.584	13.1	14.8	24131L	24131RA8L	241R31-3	24231L	24231RA8L	242R31-3	24ML31
	20-22	0.035-0.028	0.89-0.71	0.540	0.609	13.7	15.5	24132L	24132RA8L	241R32-3	24232L	24232RA8L	242R32-3	24ML32
3/4” (19.14mm)	10	0.134	3.40	0.471	0.538	12.0	13.7	24129L	24129RB8L	241R29-3	24229L	24229RB8L	242R29-3	24ML29
	11	0.120	3.05	0.499	0.564	12.7	14.3	24130L	24130RB8L	241R30-3	24230L	24230RB8L	242R30-3	24ML30
	12	0.109	2.77	0.517	0.584	13.1	14.8	24131L	24131RB8L	241R31-3	24231L	24231RB8L	242R31-3	24ML31
	13	0.095	2.41	0.540	0.609	13.7	15.5	24132L	24132RB8L	241R32-3	24232L	24232RB8L	242R32-3	24ML32
	14	0.083	2.11	0.562	0.631	14.3	16.0	24133L	24133RA8L	241R33-3	24233L	24233RA8L	242R33-3	
	15-16	0.072-0.065	1.83-1.65	0.592	0.672	15.0	17.1	24134L	24134RA8L	241R34-3	24234L	24234RA8L	242R34-3	24ML34
	17-18	0.058-0.049	1.47-1.24	0.620	0.697	15.7	17.7	24135L	24135RA8L	241R35-3	24235L	24235RA8L	242R35-3	24ML35
	19-22	0.042-0.028	1.07-0.71	0.641	0.731	16.3	18.6	24136L	24136RA8L	241R36-3	24236L	24236RA8L	242R36-3	24ML36
7/8” (22.2mm)	10	0.134	3.40	0.592	0.672	15.0	17.1	24134L	24134RB8L	241R34-3	24234L	24234RB8L	242R34-3	24ML34
	11	0.120	3.05	0.620	0.697	15.7	17.7	24135L	24135RB8L	241R35-3	24235L	24235RB8L	242R35-3	24ML35
	12	0.109	2.77	0.641	0.731	16.3	18.6	24136L	24136RB8L	241R36-3	24236L	24236RB8L	242R36-3	
	13	0.095	2.41	0.655	0.745	16.6	18.9	24138L	24138RA8L	241R38-3	24238L	24238RA8L	242R38-3	24ML36
	14	0.083	2.11	0.675	0.765	17.1	19.4	24139L	24139RA8L	241R39-3	24239L	24239RA8L	242R39-3	
	15-16	0.072-0.065	1.83-1.65	0.715	0.800	18.2	20.3	24140L	24140RA8L		24240L	24240RA8L		24ML40
	17-19	0.058-0.049	1.47-1.07	0.743	0.828	18.9	21.0	24141L	24141RA8L	241R41-3	24241L	24241RA8L	242R41-3	
	20-22	0.035-0.028	0.89-0.71	0.795	0.865	20.2	22.0	24142L	24142RA8L	241R42-3	24242L	24242RA8L	242R42-3	24ML42

MADE IN USA

Rapid Hawk 24 Series Auto-Lubrication Expanders should only be used with the Rapid Hawk through the cage lubrication system.

3 Roll Expanders														
Tube Size				Expansion Range				Tube Sheet (Min/Max Reach) 1/2" - 4" (12.7-101.6mm) Roll Length 1-5/8" (41.3mm)			Tube Sheet (Min/Max Reach) 1-1/4" - 4-3/8" (31.8-111.1mm) Roll Length 2-3/8" (60.3mm)			Common Mandrel
OD	Wall Thickness			Inch		Metric		Expander Assembly		Roll Set	Expander Assembly		Roll Set	
	BWG	In	Metric	Min.	Max.	Min.	Max.	Flush	1/8" Recess	(3 per set)	Flush	1/8" Recess	(3 per set)	
1" (25.4mm)	8	0.165	4.19	0.655	0.745	16.6	18.9	24138L	24138RB8L	241R38-3	24238L	24238RB8L	242R38-3	24ML36
	9	0.148	3.76	0.675	0.765	17.1	19.4	24139L	24139RB8L	241R39-3	24239L	24239RB8L	242R39-3	
	10	0.134	3.40	0.715	0.800	18.2	20.3	24140L	24140RB8L		24240L	24240RB8L		24ML40
	11	0.120	3.05	0.743	0.828	18.9	21.0	24141L	24141RB8L	241R41-3	24241L	24241RB8L	242R41-3	
	12-13	0.109-0.095	2.77-2.41	0.769	0.866	19.5	22.0	24143L	24143RA8L	241R42-3	24243L	24243RA8L	242R42-3	24ML43
	14	0.083	2.11	0.799	0.896	20.3	22.7	24144L	24144RA8L	241R44-3	24244L	24244RA8L	242R44-3	
	15-16	0.072-0.065	1.83-1.65	0.841	0.922	21.4	23.4	24145L	24145RA8L		24245L	24245RA8L		24ML45
	17-19	0.058-0.042	1.47-1.07	0.872	0.968	22.1	24.6	24146L	24146RA8L	241R46-3	24246L	24246RA8L	242R46-3	24ML46
	20-22	0.035-0.028	0.89-0.71	0.894	0.990	22.7	25.2	24147L	24147RA8L	241R47-3	24247L	24247RA8L	242R47-3	
1-1/8" (28.6mm)	8	0.165	4.19	0.769	0.866	19.5	22.0	24143L	24143RB8L	241R42-3	24243L	24243RB8L	242R42-3	24ML43
	9	0.148	3.76	0.799	0.896	20.3	22.7	24144L	24144RB8L	241R44-3	24244L	24244RB8L	242R44-3	
	10	0.134	3.40	0.841	0.922	21.4	23.4	24145L	24145RB8L		24245L	24245RB8L		24ML45
	11-12	0.120-0.109	3.05-2.77	0.872	0.968	22.1	24.6	24146L	24146RB8L	241R46-3	24246L	24246RB8L	242R46-3	24ML46
	13	0.095	2.41	0.894	1.009	22.7	25.6	24149L	24149RA8L	241R47-3	24249L	24249RA8L	242R47-3	24ML49
	14-15	0.083-0.072	2.11-1.83	0.924	1.039	23.5	26.4	24150L	24150RA8L	241R50-3	24250L	24250RA8L	242R50-3	
	16-18	0.065-0.049	1.65-1.24	0.978	1.078	24.8	27.4	24151L	24151RA8L		24251L	24251RA8L		24ML51
	19-22	0.042-0.028	1.07-0.71	1.016	1.116	25.8	28.4	24152L	24152RA8L	241R52-3	24252L	24252RA8L	242R52-3	
1-1/4" (31.8mm)	8	0.165	4.19	0.894	1.009	22.7	25.6	24149L	24149RB8L	241R47-3	24249L	24249RB8L	242R47-3	24ML49
	9	0.148	3.76	0.924	1.039	23.5	26.4	24150L	24150RB8L	241R50-3	24250L	24250RB8L	242R50-3	
	10-11	0.134-0.120	3.40-3.05	0.962	1.083	24.4	27.5	24153L	24153RA8L	241R53-3	24253L	24253RA8L	242R53-3	24ML53
	12-13	0.109-0.095	2.77-2.41	1.012	1.128	25.7	28.7	24155L	24155RA8L	241R52-3	24255L	24255RA8L	242R52-3	24ML55
	14-17	0.083-0.058	2.11-1.47	1.066	1.195	27.1	30.3	24156L	24156RA8L	241R56-3	24256L	24256RA8L	242R56-3	24ML56
	18-22	0.049-0.028	1.24-0.71	1.112	1.240	28.2	31.5	24157L	24157RA8L	241R57-3	24257L	24257RA8L	242R57-3	
1-3/8" (34.9mm)	8	0.165	4.19	1.012	1.128	25.7	28.7	24155L	24155RB8L	241R52-3	24255L	24255RB8L	242R52-3	24ML55
	9-10	0.148-0.134	3.76-3.40	1.066	1.195	27.1	30.3	24156L	24156RB8L	241R56-3	24256L	24256RB8L	242R56-3	24ML56
	11	0.120	3.05	1.115	1.218	28.3	30.9	24158L	24158RA8L	241R58-3	24258L	24258RA8L	242R58-3	24ML58
	12-13	0.109-0.095	2.77-2.41	1.127	1.263	28.6	32.1	24159L	24159RA8L	241R57-3	24259L	24259RA8L	242R57-3	24ML59
	14-17	0.083-0.058	2.11-1.47	1.180	1.322	30.0	33.6	24160L	24160RA8L	241R60-3	24260L	24260RA8L	242R60-3	24ML60
	18-22	0.049-0.028	1.24-0.71	1.224	1.365	31.1	34.7	24161L	24161RA8L	241R61-3	24261L	24261RA8L	242R61-3	
1-1/2" (38.1mm)	8	0.165	4.19	1.127	1.263	28.6	32.1	24159L	24159RB8L	241R57-3	24259L	24259RB8L	242R57-3	24ML59
	9-10	0.148-0.134	3.76-3.40	1.180	1.322	30.0	33.6	24160L	24160RB8L	241R60-3	24260L	24260RB8L	242R60-3	24ML60
	11-12	0.120-0.109	3.05-2.77	1.224	1.365	31.1	34.7	24161L	24161RB8L	241R61-3	24261L	24261RB8L	242R61-3	
	13-14	0.095-0.083	2.41-2.11	1.285	1.415	32.6	35.9	24163L	24163RA8L		24263L	24263RA8L		24ML63
	15-17	0.072-0.058	1.83-1.47	1.325	1.455	33.7	36.9	24164L	24164RA8L	241R64-3	24264L	24264RA8L	242R64-3	
	18-22	0.049-0.028	1.24-0.71	1.361	1.490	34.6	37.9	24165L	24165RA8L	241R65-3	24265L	24265RA8L	242R65-3	

MADE IN USA

RAPID HAWK™ - Hybrid Series
3 Roll Auto-Lubrication Condenser Expanders - 8” Reach

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

Rapid Hawk 24 Series Auto-Lubrication Expanders should only be used with the Rapid Hawk through the cage lubrication system.

3 Roll Expanders														
Tube Size				Expansion Range				Tube Sheet (Min/Max Reach) 1/2” - 8” (12.7-203.2mm) Roll Length 1-5/8” (41.3mm)			Tube Sheet (Min/Max Reach) 1-1/4” - 8-3/8” (31.8-212.7mm) Roll Length 2-3/8” (60.3mm)			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	24121L-8	24121RB8L-8	241R21-3**	24221L-8	24221RB8L-8	242R21-3	24ML23-8
	14	0.083	2.11	0.324	0.366	8.4	9.3	24122L-8	24122RB8L-8	241R22-3**	24222L-8	24222RB8L-8	242R22-3	24ML22-8
	15	0.072	1.83	0.346	0.386	8.8	9.7	24123L-8	24123RA8L-8		24223L-8	24223RA8L-8		24ML23-8
	16-17	0.065-0.085	1.65-1.47	0.367	0.410	9.1	10.4	24124L-8	24124RA8L-8	241R24-3**	24224L-8	24224RA8L-8	242R24-3	24ML24-8
	18	0.049	1.24	0.392	0.447	10.0	11.3	24125L-8	24125RA8L-8	241R25-3**	24225L-8+	24225RA8L-8+	242R25-3	24ML25-8
	19-20	0.042-0.035	1.07-0.89	0.402	0.457	10.2	11.6	24126L-8	24126RA8L-8	241R26-3**	24226L-8+	24226RA8L-8+	242R26-3	24ML26-8+
	21-22	0.035-0.028	0.81-0.71	0.425	0.482	10.8	12.3	24127L-8	24127RA8L-8	241R27-3**	24227L-8	24227RB8L-8	242R27-3	24ML27-8
5/8” (15.9mm)	12	0.109	2.77	0.392	0.447	10.0	11.3	24125L-8	24125RB8L-8	241R25-3**	24225L-8+	24225RB8L-8+	242R25-3	24ML25-8 24ML26-8+
	13	0.095	2.41	0.425	0.482	10.8	12.3	24127L-8	24127RB8L-8	241R27-3**	24227L-8	24227RB8L-8	242R27-3	24ML27-8
	14	0.083	2.11	0.449	0.506	11.4	12.8	24128L-8	24128RA8L-8	241R28-3	24228L-8	24228RA8L-8	242R28-3	24ML28-8
	15-16	0.072-0.065	1.83-1.65	0.471	0.538	12.0	13.7	24129L-8	24129RA8L-8	241R29-3	24229L-8	24229RA8L-8	242R29-3	24ML29-8
	17	0.058	1.47	0.499	0.564	12.7	14.3	24130L-8	24130RA8L-8	241R30-3	24230L-8	24230RA8L-8	242R30-3	24ML30-8
	18-19	0.049-0.042	1.24-1.07	0.517	0.584	13.1	14.8	24131L-8	24131RA8L-8	241R31-3	24231L-8	24231RA8L-8	242R31-3	24ML31-8
	20-22	0.035-0.028	0.89-0.71	0.540	0.609	13.7	15.5	24132L-8	24132RA8L-8	241R32-3	24232L-8	24232RA8L-8	242R32-3	24ML32-8
3/4” (19.1mm)	10	0.134	3.40	0.471	0.538	12.0	13.7	24129L-8	24129RB8L-8	241R29-3	24229L-8	24229RB8L-8	242R29-3	24ML29-8
	11	0.120	3.05	0.499	0.564	12.7	14.3	24130L-8	24130RB8L-8	241R30-3	24230L-8	24230RB8L-8	242R30-3	24ML30-8
	12	0.109	2.77	0.517	0.584	13.1	14.8	24131L-8	24131RB8L-8	241R31-3	24231L-8	24231RB8L-8	242R31-3	24ML31-8
	13	0.095	2.41	0.540	0.609	13.7	15.5	24132L-8	24132RB8L-8	241R32-3	24232L-8	24232RB8L-8	242R32-3	24ML32-8
	14	0.083	2.11	0.562	0.631	14.3	16.0	24133L-8	24133RA8L-8	241R33-3	24233L-8	24233RA8L-8	242R33-3	
	15-16	0.072-0.065	1.83-1.65	0.592	0.672	15.0	17.1	24134L-8	24134RA8L-8	241R34-3	24234L-8	24234RA8L-8	242R34-3	24ML34-8
	17-18	0.058-0.049	1.47-1.24	0.620	0.697	15.7	17.7	24135L-8	24135RA8L-8	241R35-3	24235L-8	24235RA8L-8	242R35-3	24ML35-8
	19-22	0.042-0.028	1.07-0.71	0.641	0.731	16.3	18.6	24136L-8	24136RA8L-8	241R36-3	24236L-8	24236RA8L-8	242R36-3	24ML36-8
7/8” (22.2mm)	10	0.134	3.40	0.592	0.672	15.0	17.1	24134L-8	24134RB8L-8	241R34-3	24234L-8	24234RB8L-8	242R34-3	24ML34-8
	11	0.120	3.05	0.620	0.697	15.7	17.7	24135L-8	24135RB8L-8	241R35-3	24235L-8	24235RB8L-8	242R35-3	24ML35-8
	12	0.109	2.77	0.641	0.731	16.3	18.6	24136L-8	24136RB8L-8	241R36-3	24236L-8	24236RB8L-8	242R36-3	
	13	0.095	2.41	0.655	0.745	16.6	18.9	24138L-8	24138RA8L-8	241R38-3	24238L-8	24238RA8L-8	242R38-3	24ML36-8
	14	0.083	2.11	0.675	0.765	17.1	19.4	24139L-8	24139RA8L-8	241R39-3	24239L-8	24239RA8L-8	242R39-3	
	15-16	0.072-0.065	1.83-1.65	0.715	0.800	18.2	20.3	24140L-8	24140RA8L-8		24240L-8	24240RA8L-8		24ML40-8
	17-19	0.058-0.049	1.47-1.07	0.743	0.828	18.9	21.0	24141L-8	24141RA8L-8	241R41-3	24241L-8	24241RA8L-8	242R41-3	
	20-22	0.035-0.028	0.89-0.71	0.795	0.865	20.2	22.0	24142L-8	24142RA8L-8	241R42-3	24242L-8	24242RA8L-8	242R42-3	24ML42-8

MADE IN USA

Rapid Hawk 24 Series Auto-Lubrication Expanders should only be used with the Rapid Hawk through the cage lubrication system.

3 Roll Expanders														
Tube Size				Expansion Range				Tube Sheet (Min/Max Reach) 1/2” - 8” (12.7-203.2mm) Roll Length 1-5/8” (41.3mm)			Tube Sheet (Min/Max Reach) 1-1/4” - 8-3/8” (31.8-212.7mm) Roll Length 2-3/8” (60.3mm)			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” (25.4mm)	8	0.165	4.19	0.655	0.745	16.6	18.9	24138L-8	24138RB8L-8	241R38-3	24238L-8	24238RB8L-8	242R38-3	24ML36-8
	9	0.148	3.76	0.675	0.765	17.1	19.4	24139L-8	24139RB8L-8	241R39-3	24239L-8	24239RB8L-8	242R39-3	
	10	0.134	3.40	0.715	0.800	18.2	20.3	24140L-8	24140RB8L-8		24240L-8	24240RB8L-8		24ML40-8
	11	0.120	3.05	0.743	0.828	18.9	21.0	24141L-8	24141RB8L-8	241R41-3	24241L-8	24241RB8L-8	242R41-3	
	12-13	0.109-0.095	2.77-2.41	0.769	0.866	19.5	22.0	24143L-8	24143RA8L-8	241R42-3	24243L-8	24243RA8L-8	242R42-3	24ML43-8
	14	0.083	2.11	0.799	0.896	20.3	22.7	24144L-8	24144RA8L-8	241R44-3	24244L-8	24244RA8L-8	242R44-3	
	15-16	0.072-0.065	1.83-1.65	0.841	0.922	21.4	23.4	24145L-8	24145RA8L-8		24245L-8	24245RA8L-8		24ML45-8
	17-19	0.058-0.042	1.47-1.07	0.872	0.968	22.1	24.6	24146L-8	24146RA8L-8	241R46-3	24246L-8	24246RA8L-8	242R46-3	24ML46-8
	20-22	0.035-0.028	0.89-0.71	0.894	0.990	22.7	25.2	24147L-8	24147RA8L-8	241R47-3	24247L-8	24247RA8L-8	242R47-3	
1-1/8” (28.6mm)	8	0.165	4.19	0.769	0.866	19.5	22.0	24143L-8	24143RB8L-8	241R42-3	24243L-8	24243RB8L-8	242R42-3	24ML43-8
	9	0.148	3.76	0.799	0.896	20.3	22.7	24144L-8	24144RB8L-8	241R44-3	24244L-8	24244RB8L-8	242R44-3	
	10	0.134	3.40	0.841	0.922	21.4	23.4	24145L-8	24145RB8L-8		24245L-8	24245RB8L-8		24ML45-8
	11-12	0.120-0.109	3.05-2.77	0.872	0.968	22.1	24.6	24146L-8	24146RB8L-8	241R46-3	24246L-8	24246RB8L-8	242R46-3	24ML46-8
	13	0.095	2.41	0.894	1.009	22.7	25.6	24149L-8	24149RA8L-8	241R47-3	24249L-8	24249RA8L-8	242R47-3	24ML49-8
	14-15	0.083-0.072	2.11-1.83	0.924	1.039	23.5	26.4	24150L-8	24150RA8L-8	241R50-3	24250L-8	24250RA8L-8	242R50-3	
	16-18	0.065-0.049	1.65-1.24	0.978	1.078	24.8	27.4	24151L-8	24151RA8L-8		24251L-8	24251RA8L-8		24ML51-8
	19-22	0.042-0.028	1.07-0.71	1.016	1.116	25.8	28.4	24152L-8	24152RA8L-8	241R52-3	24252L-8	24252RA8L-8	242R52-3	
1-1/4” (31.8mm)	8	0.165	4.19	0.894	1.009	22.7	25.6	24149L-8	24149RB8L-8	241R47-3	24249L-8	24249RB8L-8	242R47-3	24ML49-8
	9	0.148	3.76	0.924	1.039	23.5	26.4	24150L-8	24150RB8L-8	241R50-3	24250L-8	24250RB8L-8	242R50-3	
	10-11	0.134-0.120	3.40-3.05	0.962	1.083	24.4	27.5	24153L-8	24153RA8L-8	241R53-3	24253L-8	24253RA8L-8	242R53-3	24ML53-8
	12-13	0.109-0.095	2.77-2.41	1.012	1.128	25.7	28.7	24155L-8	24155RA8L-8	241R52-3	24255L-8	24255RA8L-8	242R52-3	24ML55-8
	14-17	0.083-0.058	2.11-1.47	1.066	1.195	27.1	30.3	24156L-8	24156RA8L-8	241R56-3	24256L-8	24256RA8L-8	242R56-3	24ML56-8
	18-22	0.049-0.028	1.24-0.71	1.112	1.240	28.2	31.5	24157L-8	24157RA8L-8	241R57-3	24257L-8	24257RA8L-8	242R57-3	
1-3/8” (34.9mm)	8	0.165	4.19	1.012	1.128	25.7	28.7	24155L-8	24155RB8L-8	241R52-3	24255L-8	24255RB8L-8	242R52-3	24ML55-8
	9-10	0.148-0.134	3.76-3.40	1.066	1.195	27.1	30.3	24156L-8	24156RB8L-8	241R56-3	24256L-8	24256RB8L-8	242R56-3	24ML56-8
	11	0.120	3.05	1.115	1.218	28.3	30.9	24158L-8	24158RA8L-8	241R58-3	24258L-8	24258RA8L-8	242R58-3	24ML58-8
	12-13	0.109-0.095	2.77-2.41	1.127	1.263	28.6	32.1	24159L-8	24159RA8L-8	241R57-3	24259L-8	24259RA8L-8	242R57-3	24ML59-8
	14-17	0.083-0.058	2.11-1.47	1.180	1.322	30.0	33.6	24160L-8	24160RA8L-8	241R60-3	24260L-8	24260RA8L-8	242R60-3	24ML60-8
	18-22	0.049-0.028	1.24-0.71	1.224	1.365	31.1	34.7	24161L-8	24161RA8L-8	241R61-3	24261L-8	24261RA8L-8	242R61-3	
1-1/2” (38.1mm)	8	0.165	4.19	1.127	1.263	28.6	32.1	24159L-8	24159RB8L-8	241R57-3	24259L-8	24259RB8L-8	242R57-3	24ML59-8
	9-10	0.148-0.134	3.76-3.40	1.180	1.322	30.0	33.6	24160L-8	24160RB8L-8	241R60-3	24260L-8	24260RB8L-8	242R60-3	24ML60-8
	11-12	0.120-0.109	3.05-2.77	1.224	1.365	31.1	34.7	24161L-8	24161RB8L-8	241R61-3	24261L-8	24261RB8L-8	242R61-3	
	13-14	0.095-0.083	2.41-2.11	1.285	1.415	32.6	35.9	24163L-8	24163RA8L-8		24263L-8	24263RA8L-8		
	15-17	0.072-0.058	1.83-1.47	1.325	1.455	33.7	36.9	24164L-8	24164RA8L-8	241R64-3	24264L-8	24264RA8L-8	242R64-3	24ML63-8
	18-22	0.049-0.028	1.24-0.71	1.361	1.490	34.6	37.9	24165L-8	24165RA8L-8	241R65-3	24265L-8	24265RA8L-8	242R65-3	

MADE IN USA

RAPID HAWK™ - Hybrid Series
3 Roll Auto-Lubrication Condenser Expanders - 12” Reach

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

Rapid Hawk 24 Series Auto-Lubrication Expanders should only be used with the Rapid Hawk through the cage lubrication system.

3 Roll Expanders														
Tube Size				Expansion Range				Tube Sheet (Min/Max Reach) 1-1/2”-12” (38.1-304.8mm) Roll Length 1-5/8” (41.3mm)			Tube Sheet (Min/Max Reach) 2-1/4” - 12-3/8” (57.2-314.3mm) Roll Length 2-3/8” (60.3mm)			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	24122L-12	24122RB8L-12	241R22-3**	24222L-12	24222RB8L-12	242R22-3	24ML22-12
	15	0.072	1.83	0.346	0.386	8.8	9.7	24123L-12	24123RA8L-12		24223L-12	24223RA8L-12		24ML23-12
	16-17	0.065-0.085	1.65-1.47	0.367	0.410	9.1	10.4	24124L-12	24124RA8L-12	241R24-3**	24224L-12	24224RA8L-12	242R24-3	24ML24-12
	18	0.049	1.24	0.392	0.447	10.0	11.3	24125L-12	24125RA8L-12	241R25-3**	24225L-12+	24225RA8L-12+	242R25-3	24ML25-12
	19-20	0.042-0.035	1.07-0.89	0.402	0.457	10.2	11.6	24126L-12	24126RA8L-12	241R26-3**	24226L-12+	24226RA8L-12+	242R26-3	24ML26-12+
	21-22	0.035-0.028	0.81-0.71	0.425	0.482	10.8	12.3	24127L-12	24127RA8L-12	241R27-3**	24227L-12	24227RB8L-12	242R27-3	24ML27-12
5/8” (15.9mm)	12	0.109	2.77	0.392	0.447	10.0	11.3	24125L-12	24125RB8L-12	241R25-3**	24225L-12+	24225RB8L-12+	242R25-3	24ML25-12 24ML26-12+
	13	0.095	2.41	0.425	0.482	10.8	12.3	24127L-12	24127RB8L-12	241R27-3**	24227L-12	24227RB8L-12	242R27-3	24ML27-12
	14	0.083	2.11	0.449	0.506	11.4	12.8	24128L-12	24128RA8L-12	241R28-3	24228L-12	24228RA8L-12	242R28-3	24ML28-12
	15-16	0.072-0.065	1.83-1.65	0.471	0.538	12.0	13.7	24129L-12	24129RA8L-12	241R29-3	24229L-12	24229RA8L-12	242R29-3	24ML29-12
	17	0.058	1.47	0.499	0.564	12.7	14.3	24130L-12	24130RA8L-12	241R30-3	24230L-12	24230RA8L-12	242R30-3	24ML30-12
	18-19	0.049-0.042	1.24-1.07	0.517	0.584	13.1	14.8	24131L-12	24131RA8L-12	241R31-3	24231L-12	24231RA8L-12	242R31-3	24ML31-12
	20-22	0.035-0.028	0.89-0.71	0.540	0.609	13.7	15.5	24132L-12	24132RA8L-12	241R32-3	24232L-12	24232RA8L-12	242R32-3	24ML32-12
3/4” (19.1mm)	10	0.134	3.40	0.471	0.538	12.0	13.7	24129L-12	24129RB8L-12	241R29-3	24229L-12	24229RB8L-12	242R29-3	24ML29-12
	11	0.120	3.05	0.499	0.564	12.7	14.3	24130L-12	24130RB8L-12	241R30-3	24230L-12	24230RB8L-12	242R30-3	24ML30-12
	12	0.109	2.77	0.517	0.584	13.1	14.8	24131L-12	24131RB8L-12	241R31-3	24231L-12	24231RB8L-12	242R31-3	24ML31-12
	13	0.095	2.41	0.540	0.609	13.7	15.5	24132L-12	24132RB8L-12	241R32-3	24232L-12	24232RB8L-12	242R32-3	24ML32-12
	14	0.083	2.11	0.562	0.631	14.3	16.0	24133L-12	24133RA8L-12	241R33-3	24233L-12	24233RA8L-12	242R33-3	
	15-16	0.072-0.065	1.83-1.65	0.592	0.672	15.0	17.1	24134L-12	24134RA8L-12	241R34-3	24234L-12	24234RA8L-12	242R34-3	24ML34-12
	17-18	0.058-0.049	1.47-1.24	0.620	0.697	15.7	17.7	24135L-12	24135RA8L-12	241R35-3	24235L-12	24235RA8L-12	242R35-3	24ML35-12
	19-22	0.042-0.028	1.07-0.71	0.641	0.731	16.3	18.6	24136L-12	24136RA8L-12	241R36-3	24236L-12	24236RA8L-12	242R36-3	24ML36-12
7/8” (22.2mm)	10	0.134	3.40	0.592	0.672	15.0	17.1	24134L-12	24134RB8L-12	241R34-3	24234L-12	24234RB8L-12	242R34-3	24ML34-12
	11	0.120	3.05	0.620	0.697	15.7	17.7	24135L-12	24135RB8L-12	241R35-3	24235L-12	24235RB8L-12	242R35-3	24ML35-12
	12	0.109	2.77	0.641	0.731	16.3	18.6	24136L-12	24136RB8L-12	241R36-3	24236L-12	24236RB8L-12	242R36-3	
	13	0.095	2.41	0.655	0.745	16.6	18.9	24138L-12	24138RA8L-12	241R38-3	24238L-12	24238RA8L-12	242R38-3	24ML36-12
	14	0.083	2.11	0.675	0.765	17.1	19.4	24139L-12	24139RA8L-12	241R39-3	24239L-12	24239RA8L-12	242R39-3	
	15-16	0.072-0.065	1.83-1.65	0.715	0.800	18.2	20.3	24140L-12	24140RA8L-12		24240L-12	24240RA8L-12		24ML40-12
	17-19	0.058-0.049	1.47-1.07	0.743	0.828	18.9	21.0	24141L-12	24141RA8L-12	241R41-3	24241L-12	24241RA8L-12	242R41-3	
	20-22	0.035-0.028	0.89-0.71	0.795	0.865	20.2	22.0	24142L-12	24142RA8L-12	241R42-3	24242L-12	24242RA8L-12	242R42-3	24ML42-12

MADE IN USA

Rapid Hawk 24 Series Auto-Lubrication Expanders should only be used with the Rapid Hawk through the cage lubrication system.

3 Roll Expanders														
Tube Size			Expansion Range				Tube Sheet (Min/Max Reach) 1-1/2"-12" (38.1-304.8mm) Roll Length 1-5/8" (41.3mm)			Tube Sheet (Min/Max Reach) 2-1/4" - 12-3/8" (57.2-314.3mm) Roll Length 2-3/8" (60.3mm)			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" (25.4mm)	8	0.165	4.19	0.655	0.745	16.6	18.9	24138L-12	24138RB8L-12	241R38-3	24238L-12	24238RB8L-12	242R38-3	24ML36-12
	9	0.148	3.76	0.675	0.765	17.1	19.4	24139L-12	24139RB8L-12	241R39-3	24239L-12	24239RB8L-12	242R39-3	
	10	0.134	3.40	0.715	0.800	18.2	20.3	24140L-12	24140RB8L-12		24240L-12	24240RB8L-12		24ML40-12
	11	0.120	3.05	0.743	0.828	18.9	21.0	24141L-12	24141RB8L-12	241R41-3	24241L-12	24241RB8L-12	242R41-3	
	12-13	0.109-0.095	2.77-2.41	0.769	0.866	19.5	22.0	24143L-12	24143RA8L-12	241R42-3	24243L-12	24243RA8L-12	242R42-3	24ML43-12
	14	0.083	2.11	0.799	0.896	20.3	22.7	24144L-12	24144RA8L-12	241R44-3	24244L-12	24244RA8L-12	242R44-3	
	15-16	0.072-0.065	1.83-1.65	0.841	0.922	21.4	23.4	24145L-12	24145RA8L-12		24245L-12	24245RA8L-12		24ML45-12
	17-19	0.058-0.042	1.47-1.07	0.872	0.968	22.1	24.6	24146L-12	24146RA8L-12	241R46-3	24246L-12	24246RA8L-12	242R46-3	24ML46-12
	20-22	0.035-0.028	0.89-0.71	0.894	0.990	22.7	25.2	24147L-12	24147RA8L-12	241R47-3	24247L-12	24247RA8L-12	242R47-3	
1-1/8" (28.6mm)	8	0.165	4.19	0.769	0.866	19.5	22.0	24143L-12	24143RB8L-12	241R42-3	24243L-12	24243RB8L-12	242R42-3	24ML43-12
	9	0.148	3.76	0.799	0.896	20.3	22.7	24144L-12	24144RB8L-12	241R44-3	24244L-12	24244RB8L-12	242R44-3	
	10	0.134	3.40	0.841	0.922	21.4	23.4	24145L-12	24145RB8L-12		24245L-12	24245RB8L-12		24ML45-12
	11-12	0.120-0.109	3.05-2.77	0.872	0.968	22.1	24.6	24146L-12	24146RB8L-12	241R46-3	24246L-12	24246RB8L-12	242R46-3	24ML46-12
	13	0.095	2.41	0.894	1.009	22.7	25.6	24149L-12	24149RA8L-12	241R47-3	24249L-12	24249RA8L-12	242R47-3	24ML49-12
	14-15	0.083-0.072	2.11-1.83	0.924	1.039	23.5	26.4	24150L-12	24150RA8L-12	241R50-3	24250L-12	24250RA8L-12	242R50-3	
	16-18	0.065-0.049	1.65-1.24	0.978	1.078	24.8	27.4	24151L-12	24151RA8L-12		24251L-12	24251RA8L-12		24ML51-12
	19-22	0.042-0.028	1.07-0.71	1.016	1.116	25.8	28.4	24152L-12	24152RA8L-12	241R52-3	24252L-12	24252RA8L-12	242R52-3	
1-1/4" (31.8mm)	8	0.165	4.19	0.894	1.009	22.7	25.6	24149L-12	24149RB8L-12	241R47-3	24249L-12	24249RB8L-12	242R47-3	24ML49-12
	9	0.148	3.76	0.924	1.039	23.5	26.4	24150L-12	24150RB8L-12	241R50-3	24250L-12	24250RB8L-12	242R50-3	
	10-11	0.134-0.120	3.40-3.05	0.962	1.083	24.4	27.5	24153L-12	24153RA8L-12	241R53-3	24253L-12	24253RA8L-12	242R53-3	24ML53-12
	12-13	0.109-0.095	2.77-2.41	1.012	1.128	25.7	28.7	24155L-12	24155RA8L-12	241R52-3	24255L-12	24255RA8L-12	242R52-3	24ML55-12
	14-17	0.083-0.058	2.11-1.47	1.066	1.195	27.1	30.3	24156L-12	24156RA8L-12	241R56-3	24256L-12	24256RA8L-12	242R56-3	24ML56-12
	18-22	0.049-0.028	1.24-0.71	1.112	1.240	28.2	31.5	24157L-12	24157RA8L-12	241R57-3	24257L-12	24257RA8L-12	242R57-3	
1-3/8" (34.9mm)	8	0.165	4.19	1.012	1.128	25.7	28.7	24155L-12	24155RB8L-12	241R52-3	24255L-12	24255RB8L-12	242R52-3	24ML55-12
	9-10	0.148-0.134	3.76-3.40	1.066	1.195	27.1	30.3	24156L-12	24156RB8L-12	241R56-3	24256L-12	24256RB8L-12	242R56-3	24ML56-12
	11	0.120	3.05	1.115	1.218	28.3	30.9	24158L-12	24158RA8L-12	241R58-3	24258L-12	24258RA8L-12	242R58-3	24ML58-12
	12-13	0.109-0.095	2.77-2.41	1.127	1.263	28.6	32.1	24159L-12	24159RA8L-12	241R57-3	24259L-12	24259RA8L-12	242R57-3	24ML59-12
	14-17	0.083-0.058	2.11-1.47	1.180	1.322	30.0	33.6	24160L-12	24160RA8L-12	241R60-3	24260L-12	24260RA8L-12	242R60-3	24ML60-12
	18-22	0.049-0.028	1.24-0.71	1.224	1.365	31.1	34.7	24161L-12	24161RA8L-12	241R61-3	24261L-12	24261RA8L-12	242R61-3	
1-1/2" (38.1mm)	8	0.165	4.19	1.127	1.263	28.6	32.1	24159L-12	24159RB8L-12	241R57-3	24259L-12	24259RB8L-12	242R57-3	24ML59-12
	9-10	0.148-0.134	3.76-3.40	1.180	1.322	30.0	33.6	24160L-12	24160RB8L-12	241R60-3	24260L-12	24260RB8L-12	242R60-3	24ML60-12
	11-12	0.120-0.109	3.05-2.77	1.224	1.365	31.1	34.7	24161L-12	24161RB8L-12	241R61-3	24261L-12	24261RB8L-12	242R61-3	
	13-14	0.095-0.083	2.41-2.11	1.285	1.415	32.6	35.9	24163L-12	24163RA8L-12		24263L-12	24263RA8L-12		24ML63-12
	15-17	0.072-0.058	1.83-1.47	1.325	1.455	33.7	36.9	24164L-12	24164RA8L-12	241R64-3	24264L-12	24264RA8L-12	242R64-3	
	18-22	0.049-0.028	1.24-0.71	1.361	1.490	34.6	37.9	24165L-12	24165RA8L-12	241R65-3	24265L-12	24265RA8L-12	242R65-3	

MADE IN USA

MONSTER HAWK™

Hydraulically-Driven Assisted Tube Rolling System

When every second counts.

True parallel pin rolling with the highest productivity of any system.

Elliott's Monster Hawk is a hydraulically driven parallel tube rolling system. Offering the speed, power and productivity of a hydraulic motor with the precision and control of an electronic system, it maximizes productivity by providing the fastest cycle times for mechanical expansion while eliminating costly rework from less precise methods.

The system offers true parallel pin rolling, which can reduce the stress created on welded tube joints when compared to tapered rolling.

Combining a hydraulically driven power head with Elliott's patent pending Direct Torque™ technology, operators simply set a target torque and start rolling. The system monitors torque and provides consistently precise wall reductions for every expansion.

The Monster Hawk's articulated arm supports the weight and absorbs the torque of the rolling motor using a pneumatic counterbalance, which allows the operator to effortlessly move the motor into position.

Ergonomically roll a large area of tubes without readjusting the Monster Hawk, with its large radial reach. For convenient transportation of the unit, it is equipped with heavy-duty casters, forklift pockets and a hoist ring.

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MONSTER HAWK™
Hydraulically-Driven Assisted Tube Rolling System

Increased Productivity

Blazingly Fast, Same Precise Control
Increase speed with up to twice the speed of tapered rolling while expanding each tube to spec with Direct Torque™ electronic control system.

Automatic Tool Lubrication
Through the cage Auto-Lubrication increases tool life by providing automatic expander lubrication exactly where it's needed, through the cage and directly to the rolls and mandrels. No messy cleanup by providing the right amount of lube with each expansion.

Change Tooling Quickly
Quickly change out Elliott's long-lasting PX24 Series Parallel Condenser Expanders with the built-in quick-change chuck system.

Consistent Tube Expansion

Roll Every Tube To Spec
Direct Torque™ measures the torque and controls system functions regardless of fluctuations in hydraulic oil temperatures. Allowing you to roll to the target wall reduction each time to eliminate costly re-rolling.

Increase Tool Life
Swivel Mount securely supports the Power Head to relieve weight stress and increase expander life.

Operator Friendly

Operator Friendly Controls
No need to understand hydraulic pressures with the easy to use control panel, the operator simply sets the torque.

Instant On
Allows the operator to start rolling immediately without waiting for the hydraulics to warm up.

Hydraulic Oil Cooler
Keeps the hydraulic oil cool in even the most demanding applications.

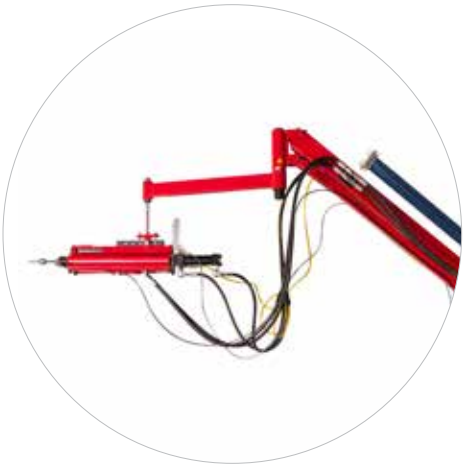
MADE IN USA

Quick & Easy Setup

Get Up & Running Quickly
Fully assembled articulated arm minimizes setup time. Just attach the power head to the arm and get started.

Easy To Move
Heavy-duty casters, forklift pockets, and hoist ring, provide a variety of methods to easily move the Monster Hawk around the facilities.

Simple To Setup
Filter/Regulator with Lubricator allows for simple setup of the Monster Hawk and decreases maintenance by extending the life of the pneumatic counterbalance and air motor.



More Reach, Less Re-Adjusting

True Parallel Pin Tube Rolling

Roll Every Tube To Spec

Up To 2x The Speed Of Conventional Rolling

Automatic Through-The-Cage Tool Lubrication

MONSTER HAWK™
Hydraulically-Driven Assisted Tube Rolling System

Safe & Ergonomic

Supports Tool Weight
Pneumatic Counterbalance decreases operator fatigue by absorbing torque and allowing effortless positioning of the arm and rolling motor.

Effortless Positioning
The Articulated Arm increases operator ergonomics and decreases operator fatigue by supporting tool weight.

More Reach, Less Re-Adjusting
Large reach radius increases productivity by allowing a large area of tubes to be rolled without re-adjusting the unit.

Built-in Safety Features
Safety Control Valve protects the operator by eliminating a sudden drop of the articulated arm in case of pneumatic air loss.

Works Great In Smaller Work Spaces
Weighted Pedestal allows for convenient placement of the Monster Hawk, even in a small workspace, with its compact design and small footprint.

Supports Tool Weight

Monster Hawk Specifications	
Horizontal Radius Reach	7’
Minimum Vertical Reach	24”
Maximum Vertical Reach	84”
Working Area/Footprint	91” height
	42.5” width (base)
	42.0” depth (base)
Unit Weight	1,690 lbs.
Hydraulic Pump Electric Motor	15 HP
Hydraulic Oil Tank Capacity	20 gallon
Min/Max Torque	5 ft-lbs / 70 ft-lbs

Easy To Move

Monster Hawk Packages		
Tube OD Range	**Monster Hawk Package**	**Voltage**
3/4” - 1” (19.05 - 25.4mm)	PXS230	230 / 3PH
	PXS460	460 / 3PH

**Each Monster Hawk Package includes the Monster Hawk, Articulated Arm, Hydraulic Drive Source, Electronic Control System and Filter/Regulator.*
Other voltage configurations available upon request.

Operator Friendly Controls

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MONSTER HAWK™ - PX24 Series

3 Roll Parallel Pin Condenser Expanders

Tube Size

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

3 Roll Monster Hawk Expanders

Tube Size				Expansion Range				Tube Sheet 3/4"- 3-3/4" (12.7-101.6mm) Roll Length 1-5/8" (41.3mm)			Tube Sheet 1-1/2" - 4-1/8" (31.8-111.1mm) Roll Length 2-3/8" (60.3mm)			Common Mandrel	Lube Spacer
OD	Wall Thickness			Inch		Metric		Expander Assembly		Roll Set	Expander Assembly		Roll Set		
	BWG	In	Metric	Min.	Max.	Min.	Max.	Flush	1/8" Recess	(3 per set)	Flush	1/8" Recess	(3 per set)		
3/4" (19.1mm)	10	0.134	3.40	0.471	0.538	12.0	13.7	PX24129	PX24129RB8	241R29-3	PX24229	PX24229RB8	242R29-3	PX24M29	PX24LS29
	11	0.120	3.05	0.499	0.564	12.7	14.3	PX24130	PX24130RB8	241R30-3	PX24230	PX24230RB8	242R30-3	PX24M30	PX24LS30
	12	0.109	2.77	0.517	0.584	13.1	14.8	PX24131	PX24131RB8	241R31-3	PX24231	PX24231RB8	242R31-3	PX24M31	PX24LS31
	13	0.095	2.41	0.540	0.609	13.7	15.5	PX24132	PX24132RB8	241R32-3	PX24232	PX24232RB8	242R32-3	PX24M32	PX24LS32
	14	0.083	2.11	0.562	0.631	14.3	16.0	PX24133	PX24133RA8	241R33-3	PX24233	PX24233RA8	242R33-3		
	15-16	0.072-0.065	1.83-1.65	0.592	0.672	15.0	17.1	PX24134	PX24134RA8	241R34-3	PX24234	PX24234RA8	242R34-3	PX24M34	PX24LS34
	17-18	0.058-0.049	1.47-1.24	0.620	0.697	15.7	17.7	PX24135	PX34135RA8	241R35-3	PX24235	PX24235RA8	242R35-3	PX24M35	PX24LS35
1" (25.4mm)	10	0.134	3.40	0.715	0.800	18.2	20.3	PX24140	PX24140RB8	241R39-3	PX24240	PX24240RB8	242R39-3	PX24M40	PX24LS40
	11	0.120	3.05	0.743	0.828	18.9	21.0	PX24141	PX24141RB8	241R41-3	PX24241	PX24241RB8	242R41-3		
	12-13	0.109-0.095	2.77-2.41	0.769	0.866	19.5	22.0	PX24143	PX24143RA8	241R42-3	PX24243	PX24243RA8	242R42-3	PX24M43	PX24LS43
	14	0.083	2.11	0.799	0.896	20.3	22.7	PX24144	PX24144RA8	241R44-3	PX24244	PX24244RA8	242R44-3		
	15-16	0.072-0.065	1.83-1.65	0.841	0.922	21.4	23.4	PX24145	PX24145RA8		PX24245	PX24245RA8		PX24M45	PX24LS45

3 Roll 8" Reach Monster Hawk Expanders

Tube Size				Expansion Range				Tube Sheet 1/2"-8" (12.7-203.2mm) Roll Length 1-5/8" (41.3mm)			Tube Sheet 1-1/4" - 8-3/8" (31.8-212.7mm) Roll Length 2-3/8" (60.3mm)			Common Mandrel	Lube Spacer
OD	Wall Thickness			Inch		Metric		Expander Assembly		Roll Set	Expander Assembly		Roll Set		
	BWG	In	Metric	Min.	Max.	Min.	Max.	Flush	1/8" Recess	(3 per set)	Flush	1/8" Recess	(3 per set)		
3/4" (19.1mm)	10	0.134	3.40	0.471	0.538	12.0	13.7	PX24129-8	PX24129RB8-8	241R29-3	PX24229-8	PX24229RB8-8	242R29-3	PX24M29-8	PX24LS29
	11	0.120	3.05	0.499	0.564	12.7	14.3	PX24130-8	PX24130RB8-8	241R30-3	PX24230-8	PX24230RB8-8	242R30-3	PX24M30-8	PX24LS30
	12	0.109	2.77	0.517	0.584	13.1	14.8	PX24131-8	PX24131RB8-8	241R31-3	PX24231-8	PX24231RB8-8	242R31-3	PX24M31-8	PX24LS31
	13	0.095	2.41	0.540	0.609	13.7	15.5	PX24132-8	PX24132RB8-8	241R32-3	PX24232-8	PX24232RB8-8	242R32-3	PX24M32-8	PX24LS32
	14	0.083	2.11	0.562	0.631	14.3	16.0	PX24133-8	PX24133RA8-8	241R33-3	PX24233-8	PX24233RA8-8	242R33-3		
	15-16	0.072-0.065	1.83-1.65	0.592	0.672	15.0	17.1	PX24134-8	PX24134RA8-8	241R34-3	PX24234-8	PX24234RA8-8	242R34-3	PX24M34-8	PX24LS34
	17-18	0.058-0.049	1.47-1.24	0.620	0.697	15.7	17.7	PX24135-8	PX24135RA8-8	241R35-3	PX24235-8	PX24235RA8-8	242R35-3	PX24M35-8	PX24LS35
1" (25.4mm)	10	0.134	3.40	0.715	0.800	18.2	20.3	PX24140-8	PX24140RB8-8	241R39-3	PX24240-8	PX24240RB8-8	242R39-3	PX24M40-8	PX24LS40
	11	0.120	3.05	0.743	0.828	18.9	21.0	PX24141-8	PX24141RB8-8	241R41-3	PX24241-8	PX24241RB8-8	242R41-3		
	12-13	0.109-0.095	2.77-2.41	0.769	0.866	19.5	22.0	PX24143-8	PX24143RA8-8	241R42-3	PX24243-8	PX24243RA8-8	242R42-3	PX24M43-8	PX24LS43
	14	0.083	2.11	0.799	0.896	20.3	22.7	PX24144-8	PX24144RA8-8	241R44-3	PX24244-8	PX24244RA8-8	242R44-3		
	15-16	0.072-0.065	1.83-1.65	0.841	0.922	21.4	23.4	PX24145-8	PX24145RA8-8		PX24245-8	PX24245RA8-8		PX24M45-8	PX24LS45

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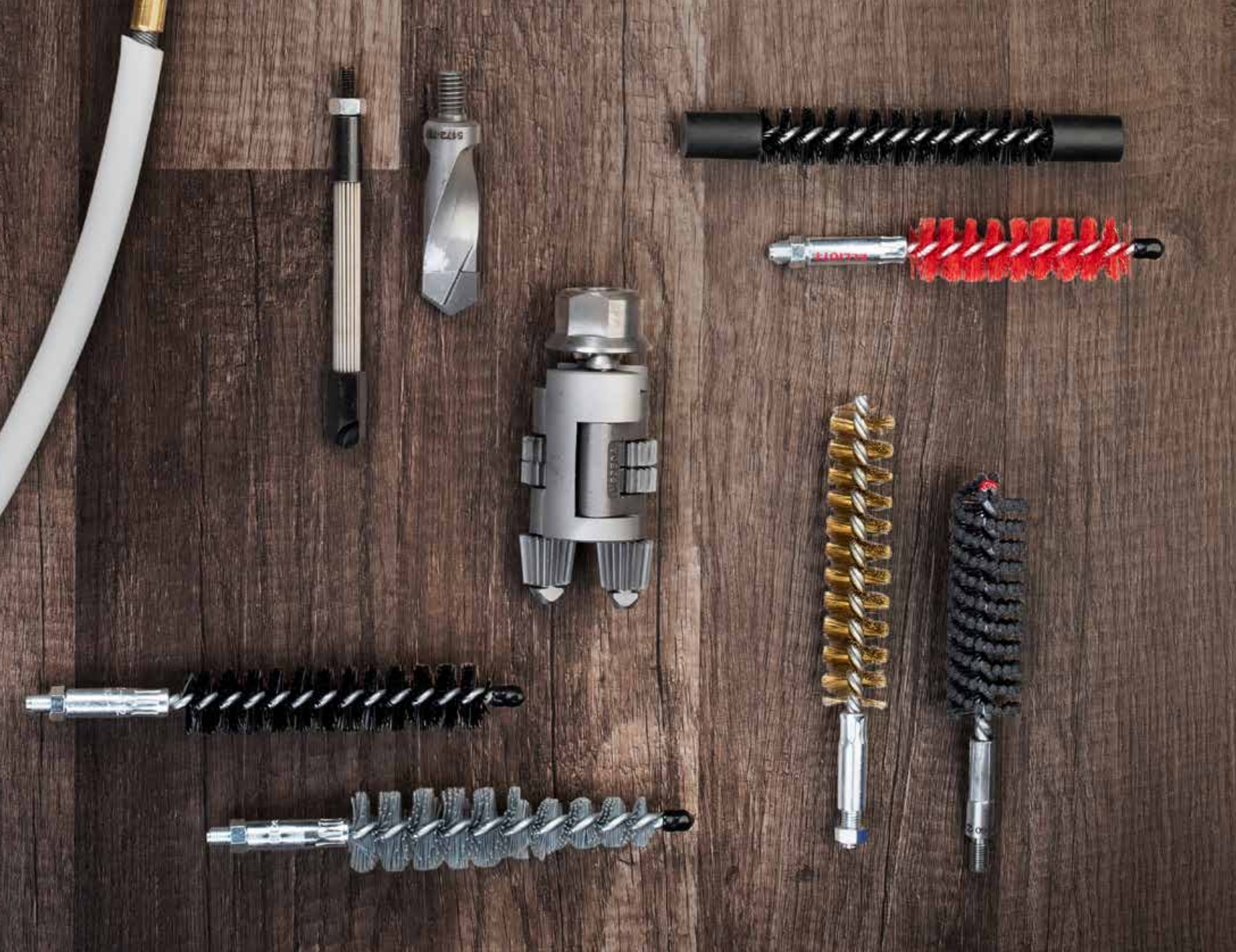
CLEAN



Select The Right TUBE CLEANER *For The Job*

Tube Cleaner	Tube Section	Type Of Deposit	Thickness Of Deposit	Flush	Page #
Shoot Through Tube Cleaner	Straight	Soft, Gummy, Or Organic	Light to Medium	Wet	108
Heat Exchanger / Rigid Shaft Tube Cleaner	Straight	Soft, Gummy, Organic, Or Rock Solid	Light to Heavy	Wet or Dry	110
Rotary Style Tube Cleaner	Straight & Curved	Soft, Gummy, Or Organic	Light To Medium	Wet or Dry	114
Cableless Tube Cleaner	Straight			Wet	120
Firetube Boiler Tube Cleaner		Soft	Light To Medium	Dry	122
Air Turbine Style Tube Cleaner	Straight & Curved	Soft, Gummy, Organic, Hard Powder, Or Rock Solid	Light to Heavy	Dry	126
Turbine Style Aluminum Siphon Tube Cleaner	Curved	Hard Powder Or Rock Solid	Heavy		146
Gas Line Cleaners	Straight	Soft, Gummy, Organic, Or Hard Powder	Light to Medium		147
Pipe Rattling Equipment		Hard Powder Or Rock Solid	Medium to Heavy		150

Cleaning tubes increases energy efficiency. Every tubed vessel (ex: boilers, heat exchangers, condensers, chillers, etc.) requires the surface of the tubes to be clean and scale-free to function efficiently. If deposits or scale are present, the flow through the vessel and the efficiency of the vessel decreases. Debris will force the vessel to overcompensate for the decrease in energy production, causing an increase in pump horsepower and flows of fuel. In addition to efficiency loss, some deposits are corrosive in nature and will eventually cause damage to the tube walls. Deposits and scale (silicates, sulphates, sulphites, carbonates, calcium, organic growths, etc.) all have the potential to cause tube wall damage and/or decrease efficiency.

In order to properly maintain heat exchangers and boilers, the right cleaning tools must be selected to clean the tubes. Choosing the correct cleaning tool depends on many different factors:

- tube dimensions
- tube material
- tube u-bend or curve
- deposit type
- thickness of the deposit
- evenness of the deposit
- and others

Additionally, there are several styles of cleaning tools and heads ranging from brushes to air-powered motors to cableless cleaners. All of these variables, in addition to the wide range of conditions in which cleaners operate, increases the difficulty of selecting a cleaning tool. No two vessels will have the same type and thickness of deposits to remove. Therefore, each tube cleaning job should be considered and treated individually with its own solution.

Due to the variety of cleaning methods available, a couple issues may occur when cleaning tubes. The first issue may arise if the wrong tool is selected for the job. Similar to no two vessels being alike, no two tube cleaners may work for the same job. This makes it very important to communicate details about the job to find the right tube cleaner, brush, or head. The second issue involves incorrect usage of a product. Each tube cleaning method is different based upon the application. Thus, it is important to be well informed on how to use the tool properly before cleaning.

As a general rule, drills are most often used for cleaning of hard powder, hard deposit, and rock solid deposits. Occasionally, they can also be used for scale or soft deposits of medium or heavy thickness. For lighter deposits or for more organic, soft deposits, other cleaning tools (i.e. brushes or descaling tools) would be more economical and efficient.

In order to make the right decision, make sure you are well informed on your vessel and the equipment you will be using. Refer to the following table for more information on the different styles and applications for tube cleaners.

Jumbo Jiffy Gun
Shoot Through Tube Cleaning System

Tube Size
- 3/8” to 1-1/4” OD
- 9.5 to 31.8mm OD

Tube Section
- Straight

Type
- Soft, gummy or organic

Thickness
- Light
- Medium

Flush
- Wet

The Jumbo Jiffy Gun is powered by an air and water combination to propel a wide range of reusable shoot through devices. Soft deposits such as mud and algae are removed from the tube in seconds!

Elliott’s Jumbo Jiffy Gun Tube Cleaning System is the preferred method for cleaning condenser tubes in power utility plants, pulp, paper, steel mills and petrochemical plants.

Features & Benefits:
- Tapered nozzle covers wide range of sizes eliminating need for multiple nozzle sizes.
- Utilizes reusable shoot through devices for lower cost.
- Cleans without damaging tubes.
- On board pet cock to relieve pressure in clogged tubes.

Spares & Accessories:
- 5371CL Lexan Shield*
- Tapered Nozzle (See table on right.)*
- 5371NA Nozzle Adapter*
- P5371N15 Air Hose Whip 15’ (4.6M) Long
- P5371N25 Air Hose Whip 25’ (7.6M) Long
- P5371N50 Air Hose Whip 50’ (15.2M) Long
- P5371N100 Air Hose Whip 100’ (30.5M) Long
- P5224-12-15 Water Hose Whip 15’ (4.6M) Long
- P5224-12-25 Water Hose Whip 25’ (7.6M) Long
- P5224-12-50 Water Hose Whip 50’ (15.2M) Long
- P5224-12-100 Water Hose Whip 100’ (30.5M) Long

**** Included In Kit***

Jiffy Gun Kit includes:
- Jumbo Jiffy Gun and Tapered Nozzle Assembly
- Tapered Nozzle
- Nozzle Adapter
- Lexan Shield
- 7-1/2’ (2.3M) Water Hose Whip
- 7-1/2’ (2.3M) Air Hose Whip
- Carrying Case

Tube OD		Kit Number	Tapered Nozzle	Air Pressure	Max Water Pressure	Weight
Inch	mm					
3/8” - 1/2”	9.5-12.7	5371CK0	5371-0608	45-90 PSI (3.1-6.2 bar)	50 PSI (3.4 bar)	3.5 lbs (1.6 Kg)
3/4”	19	5371CK1	5371-12			
7/8” - 1”	22-25	5371CK2	5371-1416			
1-1/8” - 1-1/4”	26-32	5371CK3	5371-1820			

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5022 Series

Shoot through brush commonly used for soft and organic deposits with light thickness.

Tube OD	BWG	Part #
1/2" (12.7mm)	12	5022-312
	13	
	14	5022-342
	15	5022-375
	16	
	17	5022-396
	18	5022-437
	19	
	20	
	21	5022-460
	22	
5/8" (15.9mm)	12	5022-437
	13	
	14	5022-472
	15	5022-500
	16	
	17	5022-524
	18	5022-562
	19	
	20	
	21	5022-580
	22	
3/4" (19.1mm)	12	5022-562
	13	
	14	5022-602
	15	5022-625
	16	
	17	5022-654
	18	5022-687
	19	
	20	
	21	5022-715
	22	

Tube OD	BWG	Part #
7/8" (22.2mm)	12	5022-687
	13	
	14	5022-730
	15	5022-750
	16	
	17	5022-782
	18	5022-812
	19	
	20	
	21	5022-845
	22	
1" (25.4mm)	12	5022-812
	13	
	14	5022-858
	15	5022-875
	16	
	17	5022-912
	18	5022-937
	19	
	20	
	21	5022-975
	22	
1-1/8" (28.6mm)	12	5022-937
	13	
	14	5022-985
	15	5022-1000
	16	
	17	5022-1041
	18	5022-1057
	19	5022-1076
	20	5022-1091
	21	
	22	

MADE IN USA

5224XL & 5125 Series
Heat Exchanger Cleaners

Tube Size
- 0.305” to 1.902” ID
- 7.75mm to 48.31mm ID

Tube Section
- Straight

Type
- Soft, gummy or organic
- Hard powder
- Rock solid

Thickness
- Light
- Medium
- Heavy

Flush
- Wet
- Dry

Elliott Tool’s Heat Exchanger Tube Cleaners utilize a rigid shaft to provide high torque cleaning to remove hard deposits often found in heat exchanger tubes. These cleaners are ideal for use in sugar mills, paper mills, chemical plants, and oil refineries.

The trigger-operated cleaner features an air-powered motor that remains external to the tube, providing a powerful rotary motion to the shaft and cleaning tool. The 5224XL utilizes water flush operation to wash away all those loose deposits.

Air purge models are also available for any cleaning application where water flush can not be used. Contact Customer Service for details.

Features & Benefits:
- High torque for hard or gummy deposits.
- 5125 heavy duty motor ideal for refineries.
- Standard model features water flush operation, convenient for flushing away loose deposits.
- Lightweight and powerful.
- Safer & much less expensive than water blasting.

Spares & Accessories:
- P5370N 7-1/2 ft. (2.3M) Water Hose Whip (for 5224XL)
- P5224-12 7-1/2 ft. (2.3M) Air Hose Whip (for 5224XL)
- 835200-25 25 ft. (7.6M) Air Hose Whip (for 5125)
- 835200-50 50 ft. (15.2M) Air Hose Whip (for 5125)
- 512513 Paddles (1 set) (for 5125)
- See page 112 for brushes & drills

5224XL & 5125 Specifications						
Cleaner	**ID Range**	**RPM**	**Air Hose Supply**	**Air Specifications**	**Water Specifications**	**Motor Weight**
5224XL	0.305” - 1.032” (7.75 - 26.21mm)	1,500	1/2” (12.7mm) Air Hose Supply	45 CFM (1.3 M^3/min.) @ 90 PSI (6.2 bar)	50 PSI (3.4 bar) Water Pressure	6 lbs. (2.72 Kg.)
5125	0.481” - 1.902” (12.22 - 48.31mm)	1,600	1” (25.0mm) Filtered Air Hose Supply	175 CFM (5.0 M^3/min.) @ 90 PSI (6.2 bar)		35 lbs. (15.9 Kg)

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Motor Coupling- Connects 5224XL and 5215 Motor to Motor Shaft

Motor Coupling
Connects to the 5125 or 5224XL cleaner.

Motor Shaft
Connects Motor Coupling to the Extension Coupling.

Extension Coupling
Connects Motor Shaft to the Extension Shaft.

Extension Shaft
Extends the reach of the cleaning tool by 5' (1.5M)

Elliott Tool offers a number of shafts and couplings to be used with the 5224XL and 5125 Heat Exchanger Tube Cleaners to accommodate different tube sizes and tube lengths.

Tube ID Range	Cleaning Shaft OD	*Motor Shaft Part #	Motor Shaft Thread Size	Motor Coupling Part #	**Extension Coupling Gasket Part #	Extension Coupling Part #	Extension Shaft Part #
0.370" - 0.407" (9.40 - 10.32 mm)	5/16" (7.9mm)	5213-(FT)	#10-32 F	5213C			
0.435" - 0.459" (11.05 - 11.66 mm)	3/8" (9.5mm)	5214-(FT)	1/4-20 F	5214C		501406	5014-(FT)
0.481" - 0.560" (12.22 - 14.22 mm)	7/16" (11.1mm)	5215-(FT)	5/16-18 F	5215C	P5034A	CS113106	5015-(FT)
0.584" - 0.685" (14.83 - 16.56 mm)	1/2" (12.7mm)	5216-(FT)	3/8-16 F	5216C	P5034B	CS113206	5016-(FT)
0.709" - 0.810" (18.01 - 20.57 mm)	5/8" (15.9mm)	5218-(FT)		5218C	P5034C	CS113406	5018-(FT)
0.834" - 1.06" (21.18 - 22.91 mm)	3/4" (19.1mm)	5219-(FT)	1/2-13 F	5219C	P5034D	CS113506	5059-(FT)
1.084" - 1.902" (27.53 - 43.31 mm)	7/8" (22.2mm)	5220-(FT)	5/8"-11 F	5220C	P5034E	CS113606	5060-(FT)

*Note: * Specify shaft length in feet (i.e. 5213-**5**). ** Included with each Extension Coupling, except where noted. For Additional Lengths and Sizes Contact Customer Service.*

Tube ID Range	5125 Series Kits	
	Water Flush	Air Flush
0.481- 0.56 (12.22 - 14.22 mm)	5125-43	5125AP43
0.584 - 0.685 (14.83 - 16.56 mm)	5125-50	5125AP50
0.709 - 0.81 (18.01 - 20.57 mm)	5125-62	5125AP62
0.834 - 1.06 (21.18 - 22.91 mm)	5125-75	5125AP75
1.084 - 1.902 (27.53 - 43.31 mm)	5125-87	5125AP87

Kit Includes: Cleaner Motor, Wrench, Hex Key, Set of Paddles, 15ft. (1.5M) Water Feed Hose, Motor Coupling, 5 ft. (1.5) Motor Shaft, (3) 5ft (1.5M) Extension Shafts, Extension Coupling, Lubricator.

Tube ID Range	5224XL Series Kits	
	Water Flush	Air Flush
0.37 - 0.407 (9.40 - 10.32 mm)	5224XL31	5224XLBMC31
0.435 - 0.459 (11.05 - 11.66 mm)	5224XL37	5224XLBMC37
0.481- 0.560 (12.22 - 14.22 mm)	5224XL43	5224XLBMC43
0.584 - 0.685 (14.83 - 16.56 mm)	5224XL50	5224XLBMC50
0.709 - 0.81 (18.01 - 20.57 mm)	5224XL62	5224XLBMC62
0.834 - 1.032 (21.18 - 22.91 mm)	5224XL75	5224XLBMC75

Kit Includes: Cleaner Motor, Wrench, Tool Box, 5 ft. (1.5M) Motor Shaft, Motor Coupling, (3) 5ft. (1.5m) Extension Shafts, Extension Coupling, Set of Paddles, Filter/Lubricator, 7-1/2ft. (2.3M) Hose Whip.

MADE IN USA

5224XL & 5125 Series
Heat Exchanger Cleaner - Brushes & Drills

CT Drill
For Hard Deposits

El Paso Drill
For Soft Deposits

Drill Tip
For Gummy Deposits

Twist Drill
Carbide tipped for hard deposits

Fulfilled Brush
For Powder Deposits and Polishing

Tube ID		CT Drill	El Paso Drill	Fulfilled Brush*	Drill Tip	Twist Drill	Thread Size (Male)
Inch	mm						
0.370	9.40	5029-359	5005-359	5024A22	NA	NA	#10-32
0.384	9.75			5024A24			
0.402	10.21	5029-390	5005-390				
0.407	10.32						
0.435	11.05	5029-422	5005-422	5024B26	5100-422	5172-426	1/4-20
0.459	11.66	5029-446		5226B28			
0.481	12.22	5029-446A	5005-468	5226C28	5100-468	5172-475	5/16-18
0.495	12.57	5029-480	5005-480	5226C30	5100-480		
0.509	12.93						
0.527	13.39	5029-512	5005-512	5226C32	5100-512		
0.532	13.51					5172-507	
0.560	14.22			5226C34	5100-544		
0.584	14.83	5029-568	5005-568	5226D36	5100-568	5172-564	3/8-16
0.606	15.39						
0.620	15.75	5029-604	5005-604	5226D38	5100-604	5172-600	
0.634	16.10						
0.652	16.56	5029-640	5005-640	5226D40	5100-640	5172-632	
0.657	16.69						
0.685	17.40			5226D42			
0.709	18.01	5029-691	5005-691	5226D44	5100-691	5172-689	
0.731	18.57						
0.745	18.92	5029-727	5005-727	5226D46	5100-727	5172-725	
0.759	19.28						
0.777	19.74	5029-759	5005-759	5226D48	5100-759	5172-757	
0.782	19.86						
0.810	20.57			5226D50	5100-790		
0.834	21.18	5029-812	5005-812	5226E52	5100-812	5172-814	1/2-13
0.856	21.74						
0.870	22.09	5029-848	5005-848	5226E54	5100-848	5172-850	
0.884	22.45						
0.902	22.91	5029-880	5005-880	5226E64	5100-880	5172-882	

** Brush standard material is steel, brushes are also available in brass and stainless steel materials.*
Additional Sizes Available

MADE IN USA

Elliott Cleaners Excel

During A Major Tube Cleaning Project

“Our client was very pleased with the results from our work with Elliott’s equipment because the job was done faster and at better quality than with any other contractor on this application.”

-Sheik Mohammed

We purchased last year several cleaning motors from Elliott Tool for use on a project with a major client cleaning over 8,000 tubes. Our client was very pleased with the results from our work with this equipment because the job was done faster and at better quality than with any other contractor on this application.

More recently the client even wrote an internal memo to other departments in their company suggesting Majed Alrammah and Elliott Tool be the top consideration for future cleaning jobs.

Three separate contractors attempted to clean this very challenging application which is summarized below. One contractor used high pressure water blasting to practically no effect.

Vessel: Fin Fan Cooler
Type of deposit: Rock Solid.
Composition: Calcium carbonate.
Thickness of deposit: 75%, entire length
Tube section: Straight, horizontal

Tube OD: 1”
Tube wall thickness: 14 BWG
Tube material: Carbon steel
Tube length: 18 M
Tubes cleaned: >8,000

Elliott’s Roto Jet I and air motor were used to drive the cleaning heads. The Roto Jet I was most commonly used, but when near complete tube blockage was encountered, the air motor was used. The two cleaning heads used were Elliott’s Cone Cutter and Twist Drill. The Cone Cutter worked best, though in places where the tubes sagged due to long lengths we used the Elliott Twist Drill to good effect. It would take 6-10 minutes to clean an 18 meter long tube.

Elliott Tool’s product quality and customer support is something Majed A Alrammah can depend on implicitly and I can highly recommend that you consider Elliott Tool.

Sheik Mohammed
Majed A. Alrammah
General Contracting Est.

MARCON

Roto-Jet
Rotary Tube Cleaning Systems

Tube Size
- 0.275” to 3.000” ID
- 6.99 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.

Roto-Jet II Series
Electric models 0650R (110V) and 0750R (220V) are recommended for operating sites such as hospitals, schools, and other institutions that perform tube cleaning on a periodic basis. Equipped with a 1/2 HP motor, these cleaners are economical and reversible, making them easy to operate and handle.

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


Pneumatic Roto-Jet

Roto-Jet II

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

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Moisture	Application Notes
Wet	Commonly used in chillers, watertube boilers, and other applications where water does not inhibit cleaning. Never operate wet shafts without water flushing through the shaft's casing.
Dry	Commonly used in firetube boilers and sugar mill cleaning.

Flexible Wet Shaft

Flexible Dry Shaft

Wet Shaft															
Tube ID		Flexible Shaft Part #'s Lengths								Shaft Case Diameter		Drive Coupling	Break-Away Coupling	Solid Coupling	Tool Coupling	Female Tool Coupling Thread
Inch	mm	Ft	Mtrs	Ft	Mtrs	Ft	Mtrs	Ft	Mtrs	Inch	mm					
		15	4.5	25	7.6	35	10.7	50	15.2							
0.250-0.375	6.99-9.53	051115		051125		051135		051150		0.250	6	0516			0513	#8-32
0.437-0.500	11.10-12.70	051215		051225		051235		051250		0.375	10	0503	0501	0502	0504	1/4"-28
0.562-1.000	14.27-25.40	051315		051325		051335		051350		0.500	13	0506			0507	
0.750-1.500	19.05-38.10	0514A15		0514A25		0514A35		0514A50		0.625	16	0514-3			0514-1	
1.000-2.000	25.40-50.80	051415		051425		051435		051450		0.750	19	0508			0509	1/2" WHIT
2.000+	50.80+	051515		051525		051535		051550		1.000	25	0510			0511	
Dry Shaft																
1.000+	25.40-50.80	053415		053425		053435		053450				0508			0509	1/2" WHIT

Spares & Accessories:

- Break-Away Coupling: 0501-10
- Solid Coupling: 0502-10
- Drive Coupling
- Tool Coupling
- 6070 Filter/Lubricator (Pneumatic)
- Flexible Shaft Repair Kit Includes 3 Coupling Adapters, 3 Tool Couplings, Brass Coupling, 3 Shaft Washers, 1 Male Connector, 3 O Rings, Crimping Block (on K1 kits only).

Break-Away Coupling

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Roto-Jet
Brushes

0942 Stainless
Deposit: Light Scale
Tube: Non-Ferrous, Prime
Flush: Wet

0942B Brass
Deposit: Light Scale
Tube: Non-Ferrous, Prime
Flush: Wet

5508 Turbo
Deposit: Light Scale
Tube: Non-Ferrous & Ferrous, Enhanced
Flush: Wet

5510 Turbo
Deposit: Light Scale
Tube: Non-Ferrous & Ferrous Prime
Flush: Wet

0954 Flex Hones
Deposit: Light Scale
Tube: Ferrous, Prime
Flush: Wet

HD Nylon
Deposit: Medium to Heavy Mud
Tube: Non-Ferrous & Ferrous, Prime
Flush: Wet

5513 Turbo
Deposit: Light to Medium Scale
Tube: Non-Ferrous & Ferrous, Prime
Flush: Wet

0904 Steel Wire
Deposit: Light (Soot) Scale
Tube: Ferrous, Prime
Cleaning Type: Dry

Tube ID		Shaft Size	0942 Stainless	0942B Brass	5508 Turbo	5510 Turbo	0954 Flex Hone	5502 HD Nylon	5513 Turbo
Inch	mm								
0.180 - 0.250	4.57 - 6.35	0511	0942250	0942B250				5502-250	
0.250 - 0.312	6.35 - 7.92		0942312	0942B312				5502-312	
0.312 - 0.375	7.92 - 9.53		0942375	0942B375				5502-375	
0.375 - 0.437	9.53 - 11.10	0512	0942437	0942B437			0954-437	5502-437	
0.437 - 0.500	11.10 - 12.70		0942500	0942B500		5510-8*	0954-500	5502-500	
0.500 - 0.562	12.70 - 14.27	0513	0942562	0942B562	5508-12		0954-562	5502-562	
0.562 - 0.625	14.27 - 15.88		0942625	0942B625			0954-625	5502-625	
0.625 - 0.687	15.88 - 17.45		0942687	0942B687			0954-687	5502-687	
0.687 - 0.750	17.45 - 19.05		0942750	0942B750	5508-16	5510-12**	0954-750	5502-750	
0.750 - 0.812	19.05 - 20.62		0942812	0942B812				5502-812	
0.875	22.22		0942875	0942B875			0954-875	5502-875	
0.937	23.80		0942937	0942B937				5502-937	
1.000	25.40	0514A	09421000	0942B1000	5508-18	5510-16	0954-1000	5502-1000	
1.062	26.97		09421062	0942B1062					
1.125	28.58		09421125	0942B1125		5510-18			
1.187	30.15		09421187	0942B1187					
1.250	31.75		09421250	0942B1250		5510-20			
1.312	33.32		09421312	0942B1312					
1.437	36.50		09421437	0942B1437					
1.500	38.10		09421500	0942B1500					5513-24***
1.750	44.45	0515							5513-28
2.000	50.80								5513-32

*Use 0511 shaft with 5510-8 brush **Use 0512 shaft with 5510-12 brush ***Use 0515 shaft with 5513-24 brush

Tube ID		Shaft Size	0904 Steel Wire
Inch	mm		
0.687-0.750	17.45-19.05	0534	0904750
1.000	25.40		09041000
1.250	31.75		09041250
1.500	38.10		09041500
1.750	44.45		09041750
2.000	50.80		09042000
2.250	57.15		09042250
2.500	63.50		09042500
2.750	69.85		09042750
3.000	76.20		09043000
3.250	82.55		09043250
3.500	88.90		09043500
3.750	95.25		09043750
4.000	101.60		09044000
4.500	114.30		09044500
5.000	127.00		09045000
5.500	139.70		09045500
6.000	152.40		09046000

Tube ID		Descaling Tool	Descaling Tool w/ Drill Tip	Blade Refills	Shaft Size
Inch	mm				
0.312-0.375	7.92-9.53	09461*	09471*	0946RF2	0511
0.375-0.500	9.53-12.70	09462	09472	0946RF2	0512
0.500-0.625	12.70-14.28	09463	09473	0946RF3	0513
0.625-1.000	15.88-25.40	09464	09474	0946RF4	0514A
1.000-3.000	25.40-76.20	09465	09475	0946RF5	0514

Requires adapter 5100AC (included with 0511 shafts).

Ferrous materials include: steels, titanium, hastelloy. Non-Ferrous materials include: copper, brass, bronze, aluminum.

0946 Descale No Drill
Deposit: Medium Scale
Tube: Ferrous, Prime
Flush: Wet or Dry

0947 Descale With Drill
Deposit: Medium Scale
Tube: Ferrous, Prime
Flush: Wet

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Vacuums and Accessories		Part #	Description
Vacuums		08520	110V/60 Hz, 115 CFM for dry or wet service 20 gallon capacity, 13 AMPS, 2 HP, 08522 10' suction hose included
		08520-220	220V/50 Hz, 115 CFM for dry or wet service 20 gallon capacity, 7 AMPS, 2 HP, 08522 10' suction hose included
		08509	Cloth Filter Bag
		08510	Paper Filter Bag (3 per pkg.)
		08511	Canvas Filter Bag
Suction Adapter		0970A	For combination cleaning and vacuum extraction nozzle adapter see below. Sold separately.
		08540	10 feet (3M) long Diameter: 2" (50.8mm) includes 2" Hose to 1-1/2" Tool Cuff
		08542	25 feet (7.6M) long Diameter: 2" (50.8mm) includes 2" Hose to 1-1/2" Tool Cuff
Nozzles		0901 (Dia.)*	Standard
		0902 (Dia.)*	18" (457.2mm) Offset
		0903 (Dia.)*	18" (457.2mm) Extension
		08537	5" (127mm) Dusting Brush
		08539	6" (152.4mm) Aluminum Utility Tool
		08529	2" (50.8mm) "Y" Adapter

** Diameter: 7/8" thru 3-1/2" (22.2 thru 88.9mm) in 1/8" (3.2mm) increments*

MADE IN USA

University Of Texas At Austin Chooses Die Hard As Their Preferred Tube Cleaning Machine

QUICK SUMMARY

The Challenge

- Every time they used their previous machine, something broke.
- Passing the annual bore scope inspections was becoming a challenge.

The Solution

- Tried Elliott's Die-Hard tube cleaning system during their year round cleaning season.
- Die-Hard offered a cableless design eliminating the need to replace cables.
- Quad cleaning brush action powered by water pressure and pulse-jet actuator.

The Results

- Dependable cleaning machines and hoses last the whole season.
- Brush with actuator does a better job cleaning tubes.
- Elliott's service has always been reliable and parts are available
- Improved productivity.

The Challenge

The Chilling Station Maintenance Supervisor, Charles Gardinier and the operators who work with him at the University of Texas at Austin are faced with the challenge of keeping several 5,000 ton chillers in peak operating condition. Part of their maintenance is cleaning the vessels to maintain high efficiency.

However, they were experiencing daily challenges with their previous machines breaking down every time they were used. According to Charles, the spinning cable tended to be the worst problem. Either the spring of the cable would break or the cable would kink, which would cost about $400 each time in parts and labor.

The operators also like to use a tighter brush and brush hard due to scale buildup. Getting a good clean on their chillers with their previous cleaning system was becoming a very difficult job.

Charles was looking for a reliable tube cleaner with brushes to handle their application that would enable his operators to efficiently clean tubes.

The Solution

The technicians used Elliott's Die-Hard during a year-round cleaning season. The Die-Hard is a cableless tube cleaning system designed for light to medium deposits found in chiller, condenser and heat exchanger tubes.

Instead of using a rotating cable with a spinning brush, the Die-Hard utilizes water pressure to power the brushing action. This eliminated Charles' need to constantly replace broken cables.

A pulse-jet actuator enables the brush to

> *The Elliott system is much more reliable than our previous supplier's and the Die-Hard's brush with actuator does a lot better job cleaning our tubes.*
> **- Charles Gardinier, Chilling Station Maintenance Supervisor**

provide a quad cleaning action that quickly flushes tube debris such as scale, algae and mud out of the tube.

The Results

"Operators like the tool a lot," says Charles.

They immediately appreciated:

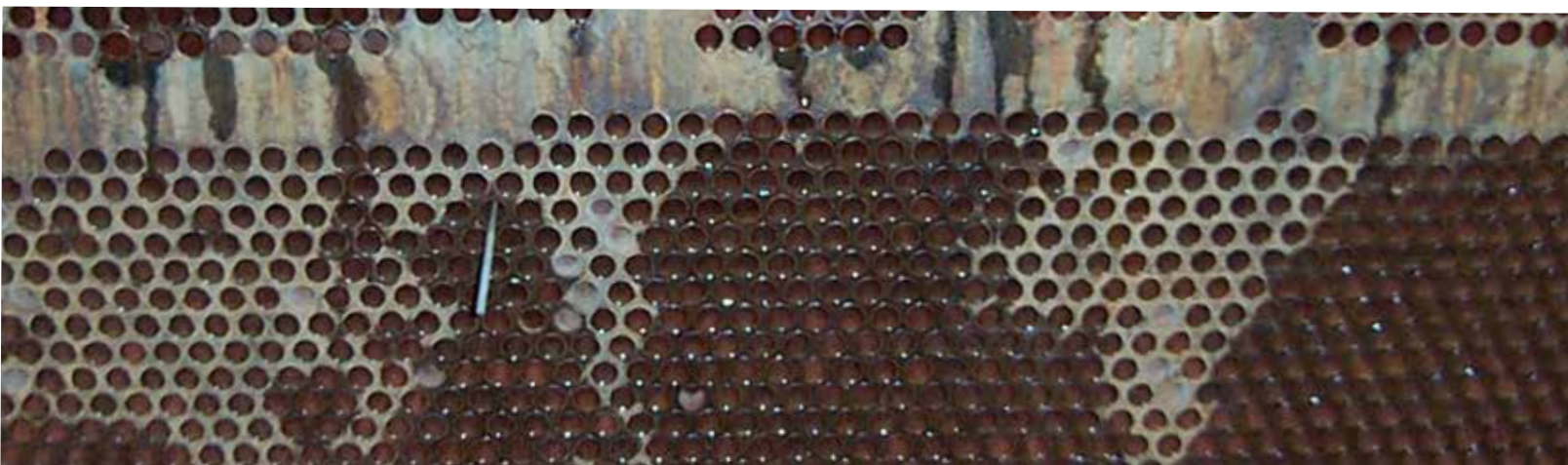
- Rugged engineering and construction of the Die-Hard and its brushes for a better clean, higher uptime, lower repair costs.
- Automatic feeding unit: Roughly the same automatic feeding speed as his older unit.
- No broken cables and very minimal maintenance required for Elliott's Die-Hard.

"All we do is replace the consumable items due to wear and tear and the ruggedness and dependability of Elliott machines and hoses mean they last the whole, annual season," said Charles. This means the University avoids the approximate $400 cost in parts and labor that would inevitably happen with each use of their previous machines.

The Elliott system is "much more reliable than our previous supplier's and the Die-Hard's brush with actuator does a lot better job cleaning our tubes."

On top of the improvements in uptime and the more efficient cleaning of tubes with the Die-Hard, "Elliott's service has always been good and reliable and replacement parts and consumables are available if we need them," said Charles.

Charles is very pleased with his Die-Hard Tube Cleaner and the time and money that he has saved his operators and the University of Texas at Austin.



Die-Hard™
Cableless Tube Cleaner

Tube Size
- 3/4” and 1” OD
- 19.1mm and 25.4mm OD

Tube Section
- Straight

Type
- Soft, gummy or organic

Thickness
- Light
- Medium

Flush
- Wet

Cleans better in less time.

Elliott Tool’s Die-Hard™ is the first cableless tube cleaner that successfully cleans light to medium deposits found in chiller, condenser, and heat exchanger tubes.

Water pressure is utilized instead of a spinning cable to provide the power for the brushing action. A patented pulse-jet actuator with brush provides a quad cleaning action to flush tube debris such as scale, mud, and algae out the back end of the tube. The Die-Hard™’s quad cleaning action enables you to be more productive while getting tubes cleaner!

Features & Benefits:
- Cleans better in less time.
- No cable! That’s right - never spend time or money on replacement flex shafts or cables again.
- Rugged engineering and construction for higher uptime and lower repair costs.
- Three feet/second auto feed for high productivity.
- Ergonomic design for lower labor costs and higher operator satisfaction.
- Quad cleaning action for better cleaning and productivity.
- Drain port design prevents the actuator from being pulled into the system and damaging gears.

Specifications:
- 110/1/60 electric, 14 amps
- 0.5 GPM water consumption
- 10 pulses / second ~ 800 PSI
- Hydro powered brush actuator

M5801-00 Die-Hard™ Cleaner Package includes:
- M5801-21 Auto-Feed Pump Unit
- M5801-02-45 45 ft. (13.7M) Auto-Feed Hose (includes M5801-03-03 Auto-feed Casing)
- M5801-03T Trigger Switch Feed Gun Assembly (includes M5808-20 Trigger Switch Feed Gun and M5801-03-01 3/4” (19.1mm) and M5801-03-02 1” (25.4mm) Gun Nozzles)
- M5801-04 Actuator (0.520” OD)
- M5803-02 Antifreeze w/ Adapter
- (2) M5801-09 3/8-7/16 Combination Wrenches
- M5801-11 Mesh Bag
- Brushes sold separately.

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

MADE IN USA

FOR RENT

M5801-10 Rocker Style Footswitch

M5807-00 Detachable Contractor Dolly

M5803-00 Spares Kit

M5803-02 Antifreeze with Adapter

Spares & Accessories:

- Detachable Contractor Dolly: M5807-00
- Rocker Style Footswitch: M5801-10
- Spares Kit (M5803-00) Includes: A toolbox, five nylon brushes of 20 different sizes for 3/4" and 1" tubes, and a 0.5 gallon of antifreeze with an adapter (M5803-02). For 7/8" applications Elliott offers the M5803-00-875 Spare Brush Kit that includes five nylon brushes of five different sizes.
- Tool Box Expansion Tray: M5803-01-02
- Antifreeze with Adapter: M5803-02
- Trigger Switch Feed Gun: M5808-20
- Actuator: M5801-04
- Feed Hose: Available in 35 ft (M5801-02-35) and 45 ft (M5801-02-45). Other sizes available.
- Auto-feed Casing: M5801-03-03
- Gun Nozzle: Available in 3/4" (19.1mm) M5801-03-01, 7/8" (22.23mm) M5801-03-09 and 1" (25.4mm) M5801-03-02.
- Tube Hole Gauge: 3/4" (19.1mm) 876200-750 and 1" (25.4mm) 876200-1000.

Brushes				
Tube ID		Brush Diameter	Part #	
Inch	mm		Single Brush	25 Pack
0.530-0.544	13.46-13.82	0.530	5535-530	5535-530PK
0.545-0.559	13.84-14.20	0.545	5535-545	5535-545PK
0.560-0.572	14.22-14.53	0.560	5535-560	5535-560PK
0.573-0.589	14.55-14.96	0.573	5535-573	5535-573PK
0.590-0.607	14.99-15.42	0.590	5535-590	5535-590PK
0.608-0.624	15.44-15.85	0.608	5535-608	5535-608PK
0.625-0.637	15.88-16.18	0.625	5535-625	5535-625PK
0.638-0.651	16.21-16.54	0.638	5535-638	5535-638PK
0.652-0.665	16.56-16.89	0.652	5535-652	5535-652PK
0.666-0.679	16.92-17.25	0.666	5535-666	5535-666PK
0.680-0.694	17.27-17.63	0.680	5535-680	5535-680PK
0.695-0.709	17.65-18.01	0.695	5535-695	5535-695PK
0.740-0.754	18.80-19.15	0.740	5535-740	5535-740PK
0.755-0.769	19.18-19.53	0.755	5535-755	5535-755PK
0.770-0.784	19.56-19.91	0.770	5535-770	5535-770PK
0.785-0.799	19.94-20.29	0.785	5535-785	5535-785PK
0.800-0.819	20.32-20.80	0.800	5535-800	5535-800PK
0.820-0.839	20.83-21.31	0.820	5535-820	5535-820PK
0.840-0.859	21.34-21.82	0.840	5535-840	5535-840PK
0.860-0.879	21.84-22.33	0.860	5535-860	5535-860PK
0.880-0.899	22.35-22.83	0.880	5535-880	5535-880PK
0.900-0.915	22.86-23.24	0.900	5535-900	5535-900PK
0.916-0.932	23.27-23.67	0.916	5535-916	5535-916PK
0.933-0.943	23.70-23.95	0.933	5535-933	5535-933PK
0.944-0.956	23.98-24.28	0.944	5535-944	5535-944PK

Note: Do not use other brushes with your Die-Hard™ Cleaner.

MADE IN USA

Soot Buster
Firetube Boiler Tube Cleaning System

Tube Size
- 1-1/4” to 4” OD
- 31.8 to 101.6mm OD

Tube Section
- Straight

Type
- Soft (Soot)

Thickness
- Light
- Medium

Flush
- Dry

Soot Buster, for cleaning firetube boilers, is a pneumatically actuated cleaning tool that propels itself inside of tubes at 1.5 feet per second and scrubs the tube ID with each pulse. Simply insert it into the tube and the unique oscillating action of the attached brush will drive the cleaner to the end of the tube. When it senses the end of the tube, it reverses the direction of thrust and returns to the operator.

With a capability of cleaning 60 tubes per hour, the time required to clean a firetube boiler or oil field drill pipe is greatly reduced.

Features & Benefits:
- The operator stays completely dry.
- Lightweight and compact design that reduces operator fatigue.
- Rugged construction with no plastic gears or parts for long lasting cleaning action.
- Significant job savings from fast setup and operation.
- Higher operator satisfaction provides increased productivity.
- Low initial and ongoing investment.
- Setup is fast:
  - No cables to arrange.
  - Only setup issue is the brush size.
- Cleaning takes half the time as rotary cleaning:
  - Auto-feed is standard feature.
  - Reverses at tube end without need to “measure-off” the tube.
- No downtime with broken cables or shafts.

Soot Buster package includes:
- Pneumatic air pulsator motor
- Pneumatic foot control valve
- Filter/lubricator with pressure gauge
- Y-tube for vacuum hose
- 33 ft. (10M) air source hose
- 33 ft. (10M) heavy-duty pulsator motor hose
- 16-1/2 ft. (5M) filter/lubricator air hose

FOR RENT

Tube OD	BWG	ID Range	Brush OD	Brush Part Number	Soot Buster Package	Air Requirement
1-1/4" (31.8mm)	13-16	1.060" - 1.120"	1-1/8" (28.6mm)	26B10	M5784-01	13-15 cfm* 80 psi (5.5 bar)**
	19-26	1.166" - 1.214"	1-1/4" (31.8mm)	26B11		
1-1/2" (38.1mm)	13-16	1.310" - 1.370"	1-3/8" (34.9mm)	26B12		
	19-26	1.416" - 1.464"	1-1/2" (38.1mm)	26B13	M5784-02	16-20 cfm* 100 psi (7 bar)**
1-3/4" (44.5mm)	13-16	1.560" - 1.620	1-5/8" (41.3mm)	26B14		
	19-26	1.666" - 1.714"	1-3/4" (44.5mm)	26B15		
2" (50.8mm)	10-14	1.760" - 1.834"	1-7/8" (47.6mm)	26B16	M5784-00	23-25 cfm* 100 psi (7 bar)**
	15-26	1.856" - 1.964"	2" (50.8mm)	26B17		
2-1/4" (57.2mm)	7-14	1.890" - 2.084"	2-1/8" (53.9mm)	26B18		
	15-26	2.106" - 2.214"	2-1/4" (57.2mm)	26B19		
2-1/2" (63.6mm)	7-14	2.140" - 2.334"	2-3/8" (60.4mm)	26B20		
	15-26	2.356" - 2.464"	2-1/2" (63.5mm)	26B21		
2-3/4" (70.0mm)	7-14	2.390" - 2.584"	2-5/8" (66.8mm)	26B22		
	15-26	2.606" - 2.714"	2-3/4" (69.9mm)	26B23		
3" (76.3mm)	7-14	2.640" - 2.834"	2-7/8" (73.0mm)	26B24		
	15-26	2.856" - 2.964"	3" (76.2mm)	26B25		
3-1/4" (82.6mm)	7-14	2.890" - 3.084"	3-1/8" (79.4mm)	26B26	M5784-03	25-28 cfm* 80 psi (5.5 bar)**
	15-26	3.106" - 3.214"	3-1/4" (82.6mm)	26B27		
3-1/2" (88.9mm)	7-14	3.140" - 3.334"	3-3/8" (85.7mm)	26B28		
	15-26	3.356" - 3.464"	3-1/2" (88.9mm)	26B29		
3-3/4" (95.3mm)	7-14	3.390" - 3.584"	3-5/8" (92.1mm)	26B30		
	15-26	3.606" - 3.714"	3-3/4" (95.3mm)	26B31		
4" (101.6mm)	7-14	3.640" - 3.834"	3-7/8" (98.4mm)	26B32		
	15-26	3.856" - 3.964"	4" (101.6mm)	26B33		

* Actual volume required- not the cfm stated on the compressor.
** +/- 5%

Spares & Accessories*	Part #	Description
Vacuums	08520	110V/60 Hz, 115 CFM for dry or wet service 20 gallon capacity, 13 AMPS, 2 HP, 08522 10' suction hose included
	08520-220	220V/50 Hz, 115 CFM for dry or wet service 20 gallon capacity, 7 AMPS, 2 HP, 08522 10' suction hose included
	08510	Paper Filter Bag (3 per pkg.)
	08509	Cloth Filter Bag
	08511	Canvas Filter Bag
Suction Hoses	08540	10 feet (3.0M) long- 2" (50.8mm) Diameter: 2" (50.8mm) includes 2" Hose to 1-1/2" Tool Cuff
	08542	25 feet (7.6M) long- 2" (50.8mm) Diameter: 2" (50.8mm) includes 2" Hose to 1-1/2" Tool Cuff

** Not available for rent*

Recycling Plant Finds A
Superior & Productive Way To Clean Boiler Tubes

QUICK SUMMARY

The Challenge
- Minimize downtime while keeping a tight maintenance schedule.
- Cable cleaners required too much time to set-up and were difficult to use in tight spaces.
- High consumable cost replacing broken cables..

The Solution
- Trial Elliott's Soot Buster on an upcoming maintenance job cleaning 680 tubes.

The Results
- Less than 1/2 the time for maintenance.
- Less consumable costs.
- Worked well in tight spaces.

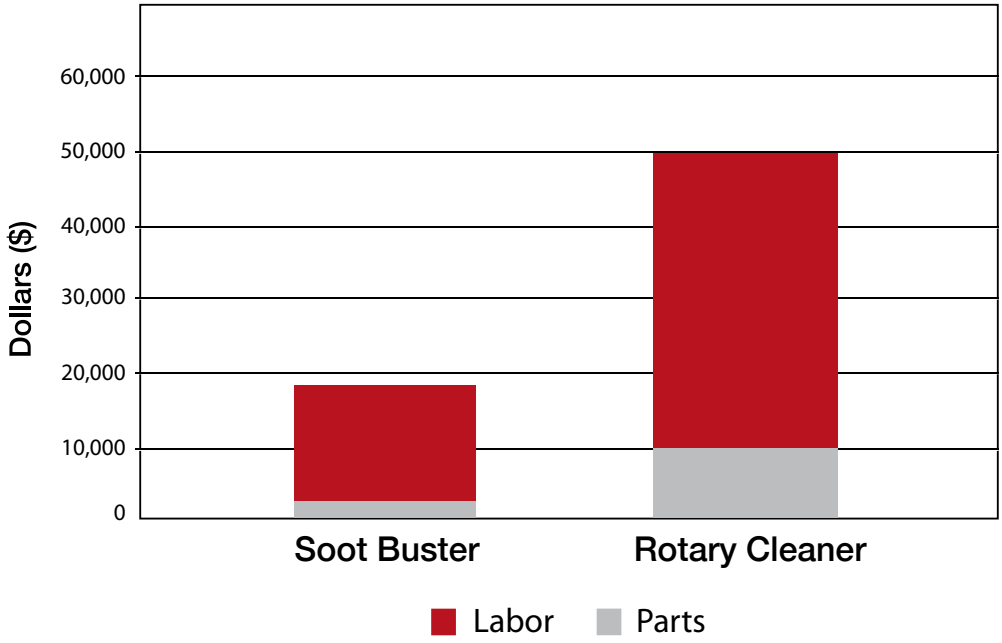
The Challenge

With a very tight schedule and the demands for minimal down time, Chris Lewis, Maintenance Manager at Neath Port Talbot Ltd, needed to find a way to clean his two Cochran Boilers. On a limited budget and with 340 tubes in each boiler, he needed to find a quick and efficient tube cleaning method.

There are many tube cleaning methods – water, electric, or air. After using electric rotary tools for a short period of time, he was disappointed with the results. The expensive cables broke regularly and the tool damaged tubes and tube ends. Chris was looking for a fast, but efficient, air operated tool. Water was not an option because of the effluent problems and resulting mess. He needed to overcome the following major problems he was experiencing:

- Too much set-up time in laying out the cables.
- Cleaning in tight spaces.
- Major consumable costs each year with the constant replacement of cables.
- Operators tied up in non-value added maintenance time fixing equipment and running time operating the tool.

Typical Cost Savings After Five Years



> *"Approved by all my operators as effective and easy to use as opposed to a rotary tool, cutting cleaning time by at least half."*
>
> **- Chris Lewis, Maintenance Manager**

The Solution

After Chris' operators tried the Soot Buster, they were impressed and immediately appreciated its key features:

- The operator stays completely dry due to dry cleaning of the tubes.
- No spinning cables, flexible shafts, or rotating rods.
- After initial system purchase, maintenance and consumable costs are very low.
- Less downtime with much faster, more efficient cleaning.
- Tool is auto-reversing at the end of the tube eliminating the need for any feed, pulling, or pushing from the operator resulting in minimum operator fatigue.
- Minimum health and safety risks.

"The Soot Buster is the best tool on the market for cleaning tubes in confined spaces."

The Results

Maintenance time and costs have been reduced by more than half. After the initial, low investment of the cleaning system, the consumable and maintenance costs are minimal. The illustration above shows the savings that Chris projects to find using the Soot Buster over a five year period.

Turbine Style Straight Tube Cleaners
D600, 1100 & 1300 Series

D600 Series Air Turbine Style Straight Tube Cleaner

Tube Size
- 0.495” to 1.730” ID
- 12.6mm to 43.9mm ID

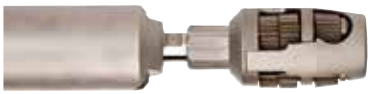
Tube Section
- Straight

Type
- Soft, gummy or organic
- Hard powder

Thickness
- Light
- Medium

Flush
- Dry

Air
- 11-26 CFM (0.3-0.7 M^3/min.) @ 80 PSI (5.5 bar)



1100 Series Air Turbine Style Straight Tube Cleaner

Tube Size
- 2.250” to 13.225” ID
- 57.15mm to 335.9mm ID

Tube Section
- Straight

Type
- Soft, gummy or organic
- Hard powder

Thickness
- Light
- Medium

Flush
- Dry

Air
- 80-200 CFM (2.3-5.7 M3/min.) @ 80 PSI (5.5 bar)

1300 Series Air Turbine Style Straight Tube Cleaner

Tube Size
- 1.750” to 3.999” ID
- 44.5mm to 101.6mm ID

Tube Section
- Straight

Type
- Hard powder
- Rock solid

Thickness
- Medium
- Heavy

Flush
- Dry

Air
- 65-135 CFM (1.8-3.8 M3/min.) @ 80 PSI (5.5 bar)

The air turbine style motor design provides an immediate and powerful startup to drive the cleaning head down the tube at a high speed, removing light to medium deposits of scale, mud, and other process residues.

Features & Benefits:
- Powerful motor design allows for immediate motor startup.
- The motor requires no special tools for repair.
- Armored hose design for rigidity and heat resistance.

Spares & Accessories:
- 6055 Lubricator
- 720700B Foot Valve

Lubricator

MADE IN USA

Turbine Style Straight Tube Cleaners
D600 Series - 0.495” to 1.730” (12.6 to 43.9mm)

D600 Series - 0.495” to 1.730” (12.6 to 43.9mm)										
Tube ID Range		Cleaner Package	Motor Diameter	Motor Part # & Thread Size	Universal Coupling	Threaded Cone Cutter	Adapter	Brush	Flexible Holder	Operating Hose* & Pipe Thread
Inch	mm									
0.495-0.513	12.57-13.03	D669-15-1	0.468” (11.87mm)	D66900-15 10-32	-	16509	8431A	3323-6**	420000	833000-xxP 1/8”
0.514-0.532	13.06-13.51									
0.533-0.609	13.54-15.47	D669-15-2						3323-8**		
0.610-0.687	15.49-17.45	D670-18-1	0.562” (14.27mm)	D67000-18 12-24	L69100	19768	8431B	3324-8**	420000BB	
0.688-0.729	17.48-18.52	D670-18-2						3324-10		
0.730-0.778	18.54-19.76	D671-22-1	0.688” (17.48mm)	D67100-22 5/16-18	L69300	16526	8434C	350000	420100	833100-xxP 1/4”
0.779-0.850	19.79-21.59	D671-22-2						350200		
0.851-0.900	21.62-22.86	D671-22-3				17702		350400		
0.901-0.950	22.89-24.13	D671-22-4						350600		
0.951-1.000	24.16-25.40	D673-28-1	0.875” (22.23mm)	D67300-28 5/16-18	L69400	19062	8436A	350800		
1.001-1.040	25.43-26.42	D673-28-2						351000		
1.041-1.072	26.44-27.23									
1.073-1.138	27.25-28.91	D673-28-3				19840	8436C			
1.139-1.206	28.93-30.63	D675-34-1	1.062” (26.97mm)	D67500-34 3/8-16	L69500	19076		351200	420100BC	1004-xxP 3/8”
1.207-1.230	30.66-31.24	D675-34-2						351400		
1.231-1.256	31.27-31.90									
1.257-1.321	31.93-33.55	D675-34-3						351600		
1.322-1.400	33.58-35.56	D675-40-1	1.250” (31.75mm)	D67500-40 3/8-16	L69600	313500 Single Pin Head Cutter	-	351800	420200BD	
1.401-1.450	35.59-36.83	D675-40-2						352000		
1.451-1.484	36.86-37.69									
1.485-1.563	37.72-39.70	D675-40-3						352200		
1.564-1.635	39.73-41.53	D678-46-1	1.438” (36.53mm)	D67800-46 1/2-13	L76200A	313600 Single Pin Head Cutter		352400	420300DF	1009-xxP 1/2”
1.636-1.675	41.55-42.55	D678-46-2						352600		
1.676-1.700	42.57-43.18	D678-46-3				313700 Single Pin Head Cutter				
1.701-1.730	43.21-43.94	D678-46-4						352800		

** Operating Hoses are available in 25ft & 50ft sizes. xx signifies desired hose length (ex: 833000-25P).*
*** Type “ST” brush available in other sizes and for curved tubes. Contact Customer Service for details.*

MADE IN USA

Turbine Style Straight Tube Cleaners
1300 Series - 1.750” to 3.999” (44.45 a 101.57mm)

1300 Series - 1.750” to 3.999” (44.45 to 101.57mm)								
Tube ID Range		Cleaner Package	Motor Diameter		Motor Part # & Thread Size	Cutter Head	Expanding Brush	Operating Hose* & Pipe Thread
Inch	mm		Inch	mm				
1.720 - 1.780	43.69 - 45.21	D77S-1	1.500	38.10	D7700-1500 1/2-13	H63500	352900	1006-xxP 3/4”
1.781 - 1.820	45.24 - 46.23	D77S-2					353000	
1.821 - 1.880	46.25 - 47.75	D77S-3					353100	
1.881 - 1.920	47.78 - 48.77	D77S-4					353200A	
1.921 - 1.970	48.79 - 50.04	D77S-5					353300A	
1.971 - 1.999	50.06 - 50.77	D77S-6					353400A	
2.000 - 2.050	50.80 - 52.07	D448S-1	1.812	46.02	D44800-1812 5/8-11	H63600	353500A	
2.051 - 2.100	52.10 - 53.34	D448S-2					353600A	
2.101 - 2.150	53.37 - 54.61	D448S-3					353700A	
2.151 - 2.249	54.64 - 57.12	D448S-4					P770A	
2.250-2.499	57.15 - 63.47	1374S-1	2.125	53.98	137400D2125 5/8-11	336000	N770A	
2.500-2.749	63.50 - 69.82	1364S-1	2.375	60.33	136400D2375 3/4-10	336100	R770	
2.750-2.999	69.85 - 76.17	1342S-1	2.625	66.68	134200D2625 3/4-10		T770	
3.000-3.249	76.20 - 82.52	1393S-1	2.875	73.03	139300D2875 3/4-10	336200	V770	1007-xxP 1”
3.250-3.499	82.55 - 88.87	1325S-1	3.000	76.20	132500D3000 7/8-9	336300	V770A	
3.500-3.749	88.90 - 95.22	1325S-2				336400		
3.750-3.999	95.25 - 101.57	1325S-3					Y770A	

** Operating Hoses are available in 25ft & 50ft sizes. xx signifies desired hose length (ex: 833000-25P).*

MADE IN USA

Eliminate Broken Cables

Reduce Downtime

Cleans better in less time.

Elliott Tool's Die-Hard™ is the first cableless tube cleaner that successfully cleans light to medium deposits found in chiller, condenser, and heat exchanger tubes.

More information on page 120.
Visit our website for more information:
www.elliott-tool.com/die-hard/

Turbine Style Straight Tube Cleaners
1100 Series - 2.250” to 6.249” (57.1 to 158.7mm)

Tube ID Range		Cleaner Package	Cutter Head Selection			Motor Diameter		Motor Part # & Thread Size	Operating Hose* & Pipe Thread
Inch	mm		Type UO	Swing Frame	Type H2	Inch	mm		
2.250-2.374	57.15-60.30	1119UO-1	302900			2.062	52.37	111900-2062 5/8-11	835100-xx 3/4”
		1119SF-1		337300					
		1119H2-1			L550				
2.375-2.499	60.33-63.47	1119UO-2	303000						
2.500-2.624	63.50-66.65	1120UO-1				2.312	58.72	112000-2312 3/4-10	
		1120SF-1		337300					
		1120H2-1			L550				
2.625-2.749	66.68-69.82	1120UO-2	303200						
2.750-2.874	69.85-73.00	1121UO-1				2.562	65.07	112100-2562 3/4-10	835200-xx 1”
		1121SF-1		337300					
		1121H2-1			316100				
2.875-2.999	73.03-76.17	1121UO-2	303400						
		1121H2-2			316300				
3.000-3.249	76.20-82.52	1122UO-1	303400			2.812	71.42	112200-2812 7/8-9	835300-xx 1”
		1122SF-1		337500					
		1122H2-1			316300				
3.250-3.499	82.55-88.87	1123UO-1	303600			3.062	77.77	112300-3062 7/8-9	
		1123SF-1		337500					
		1123H2-1			316300				
3.500-3.749	88.90-95.22	1124UO-1	303600			3.250	82.55	112400-3250 1-14	
		1124SF-1		337300					
		1124H2-1			316300				
3.750-3.999	95.25-101.57	1125UO-1	303800			3.500	88.90	112500-3500 1 1/8-12	
		1125SF-1		337700					
		1125H2-1			316500				
4.000-4.249	101.60-107.92	1126UO-1	303800			3.750	95.25	112600-3750 1 1/8-12	
		1126SF-1		337700					
		1126H2-1			316500				
4.250-4.499	107.95-114.27	1126UO-2	304000						
		1126SF-1		337700					
		1126H2-1			316500				
4.500-4.749	114.30-120.62	1126UO-4	304100						
		1126SF-1		337700					
		1126H2-2			316700				
4.750-4.999	120.65-126.97	1126UO-3	304200						
		1126SF-1		337900					
		1126H2-2			316700				
5.000-5.249	127.00-133.32	1128UO-1	304200			4.750	120.65	112800B4750 1 3/8-12	835400-xx 1-1/4”
		1128SF-1		337900					
		1128H2-1			316700				
5.250-5.999	133.35-152.37	1128UO-2	304400						
		1128SF-1		337900					
		1128H2-1			316700				
6.000-6.249	152.40-158.72	1128UO-2	304500						
		1128SF-2		338000					
		1128H2-2			316900				

** Operating Hoses are available in 25ft & 50ft sizes. xx signifies desired hose length (ex: 835100-25).*

MADE IN USA

Turbine Style Straight Tube Cleaners
1100 Series - 6.250” to 9.475” (158.8 to 240.7mm)

For 1100 Series, tube ID range 6.250” to 13.225” (158.8mm to 335.9mm) air turbine motors will be equipped with motor sleeves to allow the use of small, lightweight motors, reducing the size of the operating hose required.

1100 Series - 6.250” to 9.475” (158.8 to 240.7mm)

Tube ID Range		Application	Cutter Head		Cleaner Package	Motor Sleeve Diameter		Motor Diameter		Motor Part # & Thread Size	Universal Coupling	Spares & Accessories		
			Swing Frame	Type H2		Inch	mm	Inch	mm			Operating Hose* & Pipe Thread	Extension Piece	Fiveway Drill
6.250-6.475	158.75-164.46	Heavy Duty	338000		1126SF-2	6.000	152.40	3.750	95.25	112600-3750 1 1/8-12	L45000	835300-xx 1”	4072C	H2509-1125
				316900	1126H2-3								4073C	
		Extra Heavy Duty	338000		1128SF-2			4.750	120.65	112800B4750 1 3/8-12	L75500A	835400-xx 1-1/4”	4072C	
				316900	1128H2-2								4073C	
6.500-6.725	165.10-170.82	Heavy Duty	338000		1126SF-2	6.250	158.75	3.750	95.25	112600-3750 1 1/8-12	L45000	835300-xx 1”	4072C	
				316900	1126H2-3								4073C	
		Extra Heavy Duty	338000		1128SF-2			4.750	120.65	112800B4750 1 3/8-12	L75500A	835400-xx 1-1/4”	4072C	
				316900	1128H2-2								4073C	
6.750-6.975	171.45-177.17	Heavy Duty	338000		1126SF-2	6.500	165.10	3.750	95.25	112600-3750 1 1/8-12	L45000	835300-xx 1”	4072C	
				316900	1126H2-3								4073C	
		Extra Heavy Duty	338000		1128SF-2			4.750	120.65	112800B4750 1 3/8-12	L75500A	835400-xx 1-1/4”	4072C	
				316900	1128H2-2								4073C	
7.000-7.225	177.80-183.52	Heavy Duty			1126H2-3	6.625	168.28	3.750	95.25	112600-3750 1 1/8-12	L45000	835300-xx 1”	4072C	
		Extra Heavy Duty			1128H2-3			4.750	120.65	112800B4750 1 3/8-12	L75500A	835400-xx 1-1/4”	4073C	
7.250-7.475	184.15-189.87	Heavy Duty			1126H2-3	6.875	174.63	3.750	95.25	112600-3750 1 1/8-12	L45000	835300-xx 1”	4072C	
		Extra Heavy Duty			1128H2-3			4.750	120.65	112800B4750	L75500A	835400-xx 1-1/4”	4073C	
7.500-7.725	190.50-196.22	Heavy Duty			1126H2-4	7.125	180.98	3.750	95.25	112600-3750 1 1/8-12	L45000	835300-xx 1”	4072C	
		Extra Heavy Duty			1128H2-3			4.750	120.65	112800B4750 1 3/8-12	L75500A	835400-xx 1-1/4”	4073C	
7.750-7.975	196.85-202.57	Heavy Duty			1126H2-4	7.375	187.33	3.750	95.25	112600-3750 1 1/8-12	L45000	835300-xx 1”	4072C	
		Extra Heavy Duty			1128H2-3			4.750	120.65	112800B4750 1 3/8-12	L75500A	835400-xx 1-1/4”	4073C	
8.000-8.225	203.20-208.92	Heavy Duty			1126H2-4	7.625	193.68	3.750	95.25	112600-3750 1 1/8-12	L45000	835300-xx 1”	4072E	
		Extra Heavy Duty			1128H2-3			4.750	120.65	112800B4750 1 3/8-12	L75500A	835400-xx 1-1/4”	4073E	
8.250-8.475	209.55-215.27	Heavy Duty		317100	1126H2-4	7.875	200.03	3.750	95.25	112600-3750 1 1/8-12	L45000	835300-xx 1”	4072E	
		Extra Heavy Duty			1128H2-3			4.750	120.65	112800B4750 1 3/8-12	L75500A	835400-xx 1-1/4”	4073E	
8.500-8.725	215.90-221.62	Heavy Duty			1126H2-4	8.125	206.38	3.750	95.25	112600-3750 1 1/8-12	L45000	835300-xx 1”	4072E	
		Extra Heavy Duty			1128H2-3			4.750	120.65	112800B4750 1 3/8-12	L75500A	835400-xx 1-1/4”	4073E	
8.750-8.975	222.25-227.97	Heavy Duty			1126H2-4	8.375	212.73	3.750	95.25	112600-3750 1 1/8-12	L45000	835300-xx 1”	4072E	
		Extra Heavy Duty			1128H2-3			4.750	120.65	112800B4750 1 3/8-12	L75500A	835400-xx 1-1/4”	4073E	
9.000-9.225	228.60-234.32	Heavy Duty			1126H2-4	8.625	219.08	3.750	95.25	112600-3750 1 1/8-12	L45000	835300-xx 1”	4072E	
		Extra Heavy Duty			1128H2-3			4.750	120.65	112800B4750 1 3/8-12	L75500A	835400-xx 1-1/4”	4073E	
9.250-9.475	234.95-240.67	Heavy Duty			1126H2-4	8.875	225.43	3.750	95.25	112600-3750 1 1/8-12	L45000	835300-xx 1”	4072G	
		Extra Heavy Duty			1128H2-3			4.750	120.65	112800B4750 1 3/8-12	L75500A	835400-xx 1-1/4”	4073G	

** Operating Hoses are available in 25ft & 50ft sizes. xx signifies desired hose length (ex: 835100-25).*

MADE IN USA

Turbine Style Straight Tube Cleaners
1100 Series - 9.500” to 13.225” (241.3 to 335.3mm)

1100 Series - 9.500” to 13.225” (241.3 to 335.3mm)

Tube ID Range		Application	Cutter Head		Cleaner Package	Motor Sleeve Diameter		Motor Diameter		Motor Part # & Thread Size	Universal Coupling	Spares & Accessories		
Inch	mm		Swing Frame	Type H2		Inch	mm	Inch	mm			Operating Hose* & Pipe Thread	Extension Piece	Fiveway Drill
9.500-9.725	241.30-247.02	Heavy Duty		317100	1126H2-4	9.125	231.78	3.750	95.25	112600-3750 1 1/8-12	L45000	835300-xx 1”	4072G	H2509-1125
		Extra Heavy Duty			1128H2-3			4.750	120.65	112800B4750 1 3/8-12	L75500A	835400-xx 1-1/4”	4073G	
9.750-9.975	247.65-253.37	Heavy Duty			1126H2-4	9.375	238.13	3.750	95.25	112600-3750 1 1/8-12	L45000	835300-xx 1”	4072G	
		Extra Heavy Duty			1128H2-3			4.750	120.65	112800B4750 1 3/8-12	L75500A	835400-xx 1-1/4”	4073G	
10.000-10.225	254.00-259.72	Heavy Duty			1126H2-4	9.625	244.48	3.750	95.25	112600-3750 1 1/8-12	L45000	835300-xx 1”	4072G	
10.250-10.475	260.35-266.07	Extra Heavy Duty			1128H2-3	9.875	250.83	4.750	120.65	112800B4750 1 3/8-12	L75500A	835400-xx 1-1/4”	4073G	
10.500-10.725	266.70-272.24			328000	1128H2-4	10.125	257.18							
10.750-10.975	273.05-278.77					10.375	263.53						4073J	
11.000-11.225	279.40-285.12					10.625	269.88							
11.250-11.475	285.75-291.47					10.875	276.23							
11.500-11.725	292.10-297.82					11.125	282.58							
11.750-11.975	298.45-304.17					11.375	288.93							
12.000-12.225	304.89-310.52					11.625	295.28							
12.250-12.475	311.15-316.87					11.875	301.63						4073N	
12.500-12.725	317.50-323.22					12.125	307.98							
12.750-12.925	323.85-329.57					12.375	314.33							
13.000-13.225	330.20-335.92					12.625	320.68							

Note: Operating hoses are sold separately for these Cleaner Packages.

** Operating Hoses are available in 25ft & 50ft sizes. xx signifies desired hose length (ex: 835100-25).*

MADE IN USA

Turbine Style Curved Tube Cleaners
D600, 1100 & 1300 Series

D600 Series Air Turbine Style Curved Tube Cleaner

Tube Size
- 0.791” to 2.124” ID
- 20.1mm to 54.0mm ID

Tube Section
- Curved

Type
- Soft, gummy or organic
- Hard powder

Thickness
- Light
- Medium

Flush
- Dry

Air
- 11-26 CFM (0.3-0.7 M^3/min.) @ 80 PSI (5.5 bar)

1100 Series Air Turbine Style Curved Tube Cleaner

Tube Size
- 5.000” to 13.225” ID
- 127.0mm to 335.9mm ID

Tube Section
- Curved

Type
- Soft, gummy or organic
- Hard powder

Thickness
- Light
- Medium

Flush
- Dry

Air
- 80-200 CFM (2.3-5.7 M3/min.) @ 80 PSI (5.5 bar)

1300 Series Air Turbine Style Curved Tube Cleaner

Tube Size
- 2.125” to 4.999” ID
- 54.0mm to 127mm ID

Tube Section
- Curved

Type
- Hard powder
- Rock solid

Thickness
- Medium
- Heavy

Flush
- Dry

Air
- 65-135 CFM (1.8-3.8 M3/min.) @ 80 PSI (5.5 bar)

The air turbine style motor design provides an immediate and powerful startup to drive the cleaning head down the tube at a high speed, removing light to medium deposits of scale, mud, and other process residues.

Features & Benefits:
- Powerful motor design allows for immediate motor startup.
- The motor requires no special tools for repair.
- Armored hose design for rigidity and heat resistance.

Spares & Accessories:
- 6055 Lubricator
- 720700B Foot Valve

Lubricator

MADE IN USA

Turbine Style Curved Tube Cleaners
D600 Series - 0.791” to 2.124” (20.1 to 4.0mm)

D600 Series - 0.791” to 2.124” (20.1 to 54.0mm)													
Tube ID Range		Min. Bend Radius		Cleaner Package	Motor Diameter		Motor Part # & Thread Size	Universal Coupling	Cone Cutter	Adapter	Expanding Brush	Flexible Holder	Operating Hose* & Pipe Thread
Inch	mm	Inch	mm		Inch	mm							
0.791-0.815	20.09-20.70	6	152.40	D661-22-1	0.687	17.45	D66100-22 5/16-18	L69300	17702	8434A	350000	420000CC	**833100-xxP 3/16”
0.816-0.890	20.73-22.61			D661-22-2							350200		
0.891-0.910	22.63-23.11			D661-22-3							350400		
0.911-0.940	23.14-23.88												
0.941-1.040	23.90-26.42			D662-25-1	0.781	19.84	D66200-25 5/16-18		19062	8436A	350600		
1.041-1.100	26.44-27.94			D663-28-1	0.875	22.22	D66300-28 5/16-18	L69400	19840	8436C	350800	420100	
1.101-1.140	27.97-28.96			D663-28-2							351000		
1.141-1.180	28.98-29.97			D663-31-1	0.968	24.59	D66300-31 5/16-18		19076				
1.181-1.242	30.00-31.55			D663-31-2							351200		
1.243-1.270	31.57-32.26			D663-31-3							351400		
1.271-1.300	32.28-33.02			D665-34-1	1.062	26.55	D66500-34 3/8-16	L69500	19077	8436E		420100BC	***1004-xxP 3/8”
1.301-1.360	33.05-34.54			D665-34-2							351600		
1.361-1.410	34.57-35.81			D665-34-3				L69600		8440A	351800	420200BD	
1.411-1.445	35.84-36.70			D665-34-4					19078				
1.446-1.490	36.73-37.85			D665-34-5							352000		
1.491-1.525	37.87-38.74			D665-40-1	1.250	31.75	D66500-40 3/8-16						
1.526-1.600	38.76-40.64			D665-40-2					19813		352200		
1.601-1.640	40.67-41.66												
1.641-1.680	41.68-42.67			D665-40-3					19814		352400		
1.681-1.725	42.70-43.82			D665-40-4							352600		
1.726-1.772	43.84-45.01			D668-46-1	1.437	36.50	D66800-46 7/16-14	L45500			352800	420300DD	
1.773-1.820	45.03-46.23			D668-46-2							352900		
1.821-1.910	46.25-48.51			D668-46-3							353000		
1.911-2.000	48.54-50.80	20	508.00	D668C52-1	1.625	41.28	D66800C52 7/16-14		313800		353200A		****1009-xxP 1/2”
2.001-2.040	50.83-51.82			D668C52-2							353400A		
2.041-2.124	51.84-53.95												

** Operating Hoses are available in 25ft & 50ft sizes. xx signifies desired hose length (ex: 833100-25P).*

*** Recommend use with Air Valve 720200. Air Valve sold separately.*
**** Recommend use with Air Valve 720300. Air Valve sold separately.*
***** Recommend use with Air Valve 720400. Air Valve sold separately.*

MADE IN USA

Turbine Style Curved Tube Cleaners
1300 Series - 2.125” to 4.999” (54.0 to 127.0mm)

1300 Series - 2.125” to 4.999” (54.0 to 127.0mm)												
Tube ID Range		Min. Bend Radius		Cleaner Package	Motor Diameter		Motor Part # & Thread Size	Universal Coupling	Cutter Head	Type “G” Brush	Operating Hose* & Pipe Thread	Air Valve
Inch	mm	Inch	mm		Inch	mm						
2.125-2.249	53.98-57.12	12.000	304.80	1370C-1	1.750	44.45	137000C1750 1/2-13	L76200A	336000	3145-6	1009-xxP 1/2”	720400
2.250-2.374	57.15-60.30	9.000	228.60									
		12.00	304.80	1395C-1	1.875	47.63	139500C1875 1/2-13			3145-8	1006-xxP 3/4”	
2.375-2.499	60.33-63.47	9.000	228.60	1395C-2						3146-2		
2.500-2.624	63.50-66.68	10.000	254.00	1395C-3						3146-4		
		15.000	381.00	1374C-1	2.125	53.98	137400D2125 5/8-11	L27600	336100	3147-4		720500
2.625-2.749	66.68-69.82	11.000	297.40	1374C-2						3147-6		
2.750-2.874	69.85-73.00	11.000	297.40	1374C-3						3147-8		
		14.000	355.60	1364C-1	2.375	60.33	136400D2375 3/4-10	L52200				
2.875-2.999	73.03-76.17	12.000	304.80	1364C-2						3151-2		
		21.000	533.40	1342C-1	2.625	66.68	134200D2625 3/4-10	L28000	336200	3151-4		
3.000-3.249	76.20-82.52	12.000	304.80	1364C-3	2.375	60.33	136400D2375 3/4-10	L52200				
		15.000	381.00	1342C-1	2.625	66.68	134200D2625 3/4-10	L28000				
3.250-3.499	82.55-88.87	13.000	330.20	1342C-2				L28000A	336300	3196-8		
		16.000	406.40	1393C-1	2.875	73.03	139300D2875 3/4-10				1007-xxP 1”	720600
3.500-3.749	88.90-95.22	14.000	355.60	1393C-2								
		18.000	457.20	1325C-1	3.000	76.20	132500D3000 7/8-9	L37300	336400			
3.750-3.99	95.25-101.57	14.000	355.60									
4.000-4.249	101.60-107.92	15.000	381.00									
		26.000	660.40	1399C-1	3.625	92.08	139900D3625 1 1/18-12	L51000	316500	3196-10		
4.250-4.499	107.95-114.27	16.000	406.40	1325C-2	3.000	76.20	132500D3000 7/8-9	L37300				
		21.000	533.40	1399C-1	3.625	92.08	139900D3625 1 1/8-12	L51000				
4.500-4.749	117.30-120.62	16.000	406.40									
4.750-4.999	120.65-126.97	18.000	457.20									

Note: Operating hoses are sold separately for these Cleaner Packages.

** Operating Hoses are available in 25ft & 50ft sizes. xx signifies desired hose length (ex: 833100-25P).*

MADE IN USA

Turbine Style Curved Tube Cleaners
1100 Series - 5.000” to 9.975” (127.0 to 253.4mm)

For 1100 Series, tube ID range 6.250” to 13.225” (158.8mm to 335.9mm) air turbine motors will be equipped with motor sleeves to allow the use of small, lightweight motors, reducing the size of the operating hose required.

1100 Series - 5.000” to 9.975” (127.0 to 253.4mm)

Tube ID Range		Min. Bend Radius		Cleaner Package	Motor Sleeve Diameter		Motor Diameter		Motor Part # & Thread Size	Universal Coupling		H2 Cutter Head	Operating Hose* & Pipe Thread	Extension Piece	Fiveway Drill
Inch	mm	Inch	mm		Inch	mm	Inch	mm		HD	Extra HD				
5.000-5.225	127.00-132.72	25	635	1126CH2-1	4.250	107.95	3.750	95.25	112600-3750 1 1/8-12	L45000		316800	835300-xx 1”	8418L	H2347-750
5.250-5.475	133.35-139.07				4.500	114.30									
5.500-5.725	139.70-145.42				4.750	120.65									
5.750-5.975	146.05-151.77				5.000	127.00									
6.000-6.225	152.40-158.12	30	762	1126CH2-2	5.250	133.35						316900		4072C	H2509-1125
6.250-6.475	158.75-164.47				5.500	139.70									
6.500-6.725	165.10-170.82				5.750	146.05									
6.750-6.975	171.45-177.17				6.000	152.40									
7.000-7.225	177.80-183.52	35	889		6.250	158.75									
7.250-7.475	184.15-189.87				6.500	165.10									
7.500-7.725	190.50-196.22			1126CH2-3						L75600A				4073E	
7.750-7.975	196.85-202.57			1128CH2-1**	6.875	174.63	4.750	120.65	112800B4750 1 3/8-12		L75600		835400-xx 1-1/4”		
8.000-8.225	203.20-208.92	40	1016	1126CH2-3	7.125	180.98	3.750	95.25	112600-3750 1 1/8-12	L75600A		317100	835300-xx 1”		
				1128CH2-1**			4.750	120.65	112800B4750 1 3/8-12		L75600		835400-xx 1-1/4”		
8.250-8.475	209.55-215.27			1126CH2-3	7.375	187.33	3.750	95.25	112600-3750 1 1/8-12	L75600A			835300-xx 1”		
				1128CH2-1**			4.750	120.65	112800B4750 1 3/8-12		L75600		835400-xx 1-1/4”		
8.500-8.725	215.90-221.62			1126CH2-3	7.625	193.68	3.750	95.25	112600-3750 1 1/8-12	L75600A			835300-xx 1”		
				1128CH2-1**			4.750	120.65	112800B4750 1 3/8-12		L75600		835400-xx 1-1/4”		
8.750-8.975	222.25-227.97			1126CH2-3	7.875	200.03	3.750	95.25	112600-3750 1 1/8-12	L75600A			835300-xx 1”		
				1128CH2-1**			4.750	120.65	112800B4750 1 3/8-12		L75600		835400-xx 1-1/4”		
9.000-9.225	228.60-234.32	45	1143	1126CH2-4	8.125	206.38	3.750	95.25	112600-3750 1 1/8-12	L75600A		317200	835300-xx 1”	4073G	
				1128CH2-2**			4.750	120.65	112800B4750 1 3/8-12		L75600		835400-xx 1-1/4”		
9.250-9.475	234.95-240.67			1126CH2-4	8.375	212.73	3.750	95.25	112600-3750 1 1/8-12	L75600A			835300-xx 1”		
				1128CH2-2**			4.750	120.65	112800B4750 1 3/8-12		L75600		835400-xx 1-1/4”		
9.500-9.725	241.30-247.02			1126CH2-4	8.625	219.08	3.750	95.25	112600-3750 1 1/8-12	L75600A			835300-xx 1”		
				1128CH2-2**			4.750	120.65	112800B4750 1 3/8-12		L75600		835400-xx 1-1/4”		
9.750-9.975	247.65-253.37			1126CH2-4	8.875	225.43	3.750	95.25	112600-3750 1 1/8-12	L75600A			835300-xx 1”		
				1128CH2-2**			4.750	120.65	112800B4750 1 3/8-12		L75600		835400-xx 1-1/4”		

Note: Operating hoses are sold separately for these Cleaner Packages.

** Operating Hoses are available in 25ft & 50ft sizes. xx signifies desired hose length (ex: 835300-25). **For extra heavy duty cleaning applications.*

MADE IN USA

1100 Series - 10.000” to 13.225” (254.0 to 335.2mm)														
Tube ID Range		Min. Bend Radius		Cleaner Package	Motor Sleeve Diameter		Motor Diameter		Motor Part # & Thread Size	Universal Coupling		H2 Cutter Head	Operating Hose* & Pipe Thread	Extension Piece	Fiveway Drill
Inch	mm	Inch	mm		Inch	mm	Inch	mm		Heavy Duty	Extra Heavy Duty				
10.000-10.225	254.00-259.72	50	1270	1126CH2-4	9.125	231.78	3.750	95.25	112600-3750 1 1/8-12	L75600A	L75600	317200	835300-xx 1”	4073G	H1059-1125
				1128CH2-2**			4.750	120.65	112800B4750 1 3/8-12				835400-xx 1-1/4”		
10.250-10.475	260.35-266.07			1126CH2-4	9.375	238.13	3.750	95.25	112600-3750 1 1/8-12				835300-xx 1”		
10.500-10.725	266.70-272.42			1128CH2-2	9.625	244.48	4.750	120.65	112800B4750 1 3/8-12		L75600	328000	835400-xx 1-1/4”	4073J	
10.750-10.975	273.05-278.77				9.875	250.83									
11.000-11.225	279.40-285.12	55	1397	1128CH2-3**	10.125	257.18									
11.250-11.475	285.75-291.47				10.375	263.53									
11.500-11.725	292.10-297.82				10.625	269.88									
11.750-11.975	298.45-304.17				10.875	276.23									
12.000-12.225	304.80-310.52	60	1524		11.125	282.58									
12.250-12.475	311.15-316.87				11.375	288.93									
12.500-12.725	317.50-323.22				11.625	295.28								4073N	
12.750-12.975	323.85-329.57				11.875	301.63									
13.000-13.225	330.20-335.92				12.125	307.98									

Note: Operating hoses are sold separately for these Cleaner Packages.

** Operating Hoses are available in 25ft & 50ft sizes. xx signifies desired hose length (ex: 835300-25). **For extra heavy duty cleaning applications.*

MADE IN USA

Turbine Style Tube Cleaners
Accessories

Air Valve

Foot Valve

Air Valves								
Threads	Valve Assembled	Valve Body	Valve Stem	Lock Screw	Handle	"O" Ring	Diameter	Length
1/8F x 1/8M	720100	720101	720102	720103	-	P8309-2	31/64"	1-31/32"
1/4F x 1/4M	720200	720201	720202	P8302-61	-	P8309-5	45/64"	1-31/32"
3/8F x 3/8M	720300	720301	720302	P8302-60	-	P8309-7	63/64"	2-13/32"
1/2F x 1/2M	720400	720401	720402	-	720403	P8309-7	1-5/16"	1-13/16"
3/4F x 3/4M	720500	720501	720502	-	720403	P8309-9A	1-19/32"	1-15/16"
1F x 1M	720600	720601	720602	-	720603	P8309-10A	1-7/8"	2-1/4"
Foot Valve								
1" NPT F x 1" NPT F	720700B	720701	-	-	-	P8309-7	-	-

Flexible Holders			
Threads	Shaft Diameter	Approx. Length	Part Number
#10-32F x 10-32F	3/16	4"	420000
#12-24F x 12-24F	3/16	4-1/8"	420000BB
5/16-18F x 5/16-18F	3/16	4-1/4"	420000CC
5/16-18F x 5/16-18F	1/4	5-1/4	420100
5/16-18F x 3/8-16F	1/4	5-1/4	420100BC
3/8-16F x 3/8-16F	5/16	6-1/4	420200BB
3/8-16F x 7/16-14F	5/16	6-1/4	420200BD
7/16-14F x 7/16-14F	5/16	6-1/4	420200DD
7/16-14F x 7/16-14F	3/8	7-1/4	420300DD
1/2-13F x 7/16-14F	3/8	7-1/4	420300DF
5/8-11F x 5/8-11F	1/2	8	420500DD
3/4-10F x 5/8-11F	5/8	9-1/4	420600BD
7/8-9F x 3/4-10F	3/4	10-1/2	420700BD
1-1/8-12F x 3/4-10F	3/4	10-1/2	420707BG
1-1/8-12F x 7/8-9F	1	13	420900EB

Operating Hoses			
Pipe Thread	Hose Size	25' Hose Assy	50' Foot Hose Assy
1/8"	3/16"	833000-25P	833000-50P
1/4"	1/4"	833100-25P	833100-50P
3/8"	3/8"	1004-25P	1004-50P
1/2"	1/2"	1009-25P	1009-50P
3/4"	3/4"	1006-25P	1006-50P
1"	1"	1007-25P	1007-50P

MADE IN USA

Quickly Find Tube Leaks

With The Most Ergonomic Test Gun

Intelligently designed and battle tested for impossible missions.

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

More information on page 156.
Visit our website for more information:
www.elliott-tool.com/tube-tools/tube-testers/

Turbine Style Tube Cleaners
Cleaning Heads

Threaded Cone Cutter

Tube Section: Straight or Curved
Deposit: Light – Medium
Distribution: Even or Uneven
Cleaner Series: D600 Series - smaller ID's

Minimum Tube ID		Head #	Thread	Adapter #	Thread
Inch	mm				
0.437	11.10	16509	#10-32UNF	8431A	10-32 UNF x 10-32 UNF
0.500	12.70	19768	#10-32UNF	8431B	10-32 UNF x 12-24 UNC
0.625	15.88	16526	1/4-20UNC	8434C	1/4-20 UNC x 5/16-18 UNC
0.687	17.45	17702	1/4-20UNC	8434C	1/4-20 UNC x 5/16-18 UNC
0.812	20.62	19062	5/16-18UNC	8436A	5/16-18 UNC x 5/16-18 UNC
0.875	22.23	19840	3/8-16UNC	8436C	5/16-18 UNC x 3/8-16 UNC
1.000	25.40	19076	3/8-16UNC	8436C	5/16-18 UNC x 3/8-16 UNC
1.125	28.58	19077	7/16-14UNC	8436E	5/16-18 UNC x 7/16-14 UNC
1.250	31.75	19078	7/16-14UNC	8440A	7/16-14 UNC x 7/16-14 UNC
1.375	34.94	19813	7/16-14UNC	8440A	7/16-14 UNC x 7/16-14 UNC
1.500	38.10	19814	7/16-14UNC	8440A	7/16-14 UNC x 7/16-14 UNC
1.750	44.45	19824	5/8-11UNC	8440G	7/16-14 UNC x 5/8-11 UNC

Single Pin Head

Tube Section: Straight or Curved
Deposit: Light – Medium
Distribution: Even or Uneven
Cleaner Series: D600 Series - larger ID's

Tube ID		Cutter Diameter	Head #	Thread
Inch	mm			
1.125 - 1.250	28.58 - 31.75	7/8" (22.23mm)	319000	3/8-16 M
1.375	34.93	1" (25.40mm)	313400	3/8-16 M
1.500	38.10	1-1/8" (28.58mm)	313500	7/16-14 M
1.625	41.28	1-1/4" (31.75mm)	313600	7/16-14 M
1.750	44.45	1-3/8" (34.93mm)	313700	7/16-14 M
2.000	50.8	1-1/2" (38.10mm)	313800	7/16-14 M
2.250 - 2.500	57.15 - 63.50	1-3/4" (44.45mm)	315800	5/8-11 M

KM Drill

Tube Section: Straight
Deposit: Medium – Heavy
Distribution: Even or Uneven
Cleaner Series: 1300 Series, 1100 Series

Minimum Tube ID		Head #	Male Thread
Inch	mm		
1.500	38.10	5097-1-1/2N	1/2-13
1.625	41.28	5097-1-5/8N	1/2-13
1.750	44.45	5097-1-3/4N	1/2-13
1.875	47.63	5097-1-7/8N	1/2-13
2.000	50.80	5097-2Q	5/8-11
2.250	57.15	5097-2-1/4Q	5/8-11
2.500	63.50	5097-2-1/2R	3/4-10

Drill Head

Tube Section: Straight or Curved
Deposit: Medium – Heavy
Distribution: Even or Uneven
Cleaner Series: 1300 Series, 1100 Series

Minimum Tube ID		Head #	Thread
Inch	mm		
0.875	22.23	H1145-312	5/16-18 M
1.125	28.58	H1144-437	7/16-14 M
1.250	31.75	H1105-437	7/16-14 M
1.500	38.10	H1058-437	7/16-14 M
1.750	44.45	H1059-437	7/16-14 M
2.000	50.80	H1166-625	5/8-11 M
2.250	57.15	H2356-625	5/8-11 M
2.625	66.68	H2404-750	3/4-10 M
2.875	73.03	H2355-750	3/4-10 M
3.125	79.38	H2347-750	3/4-10 M
3.500	88.90	H2509-1125	1-1/8-12 M

Type "G" Brush

Tube Section: Straight or Curved
Deposit: Light – Medium
Distribution: Even
Cleaner Series: D600 Series, 1300 Series

Minimum Tube ID		Brush #	Brush Diameter	Thread
Inch	mm			
1.750	44.45	3083-8	1.5"	7/16-14 M
2.000	50.80	3145-4	1.75"	7/16-14 M
2.250	57.15	3145-8	2"	7/16-14 M
2.500	63.50	3147-4	2.25"	5/8-11 M
2.750	69.85	3147-8	2.5"	5/8-11 M
3.000	76.20	3196-4	2.75"	3/4-10 M
3.250	82.55	3196-8	3"	3/4-10 M
3.500	88.90	3196-10	3.25"	3/4-10 M
3.750	95.25	3196-10	3.25"	3/4-10 M

MADE IN USA

Swing Frame- Long Surface

Tube Section: Straight
Deposit: Medium – Heavy
Distribution: Even
Cleaner Series: 1300 Series, 1100 Series

Minimum Tube ID		Head Part Number	Expansion Range		Spider	Spider Thread	Arm	Arm Pin	Cutter Pin	Cone Cutter	Straight Cutter	Keeper Pin	Head Lock
Inch	mm		Inch	mm									
2.250	57.15	337300	2.000-2.875	50.80-73.03	337302	1/2”-13 M	337304	337306	337307	H-36008	T-19061	337312	337346
2.625	66.68	337400	2.312-3.250	58.72-82.55	337402	1/2”-13 F	337404	337306	337307	H-36008	T-19061	337312	337446
3.00	76.20	337500	2.625-3.625	66.68-92.08	337502	1/2”-13 F	337504	337506	337507	T-17745-A	T-16986-A	337512	337546
3.750	95.25	337700	3.375-4.625	85.73-117.48	337702	3/4”-10 F	337704	337606	337607	T-17119	T-16686-A	337712	337746
5.000	127.00	337900	6.626-6.375	117.50-161.93	337902	1-1/8”-12 F	337904	337906	337907	T-16863	T-16865	337912	337946
6.000	152.40	338000	5.625-7.375	142.88-187.33	338002	1-1/8”-12 F	337904	337906	337907	T-16863	T-16865	337912	338046

Swing Frame- Short Surface

Tube Section: Straight, Curved
Deposit: Medium
Distribution: Even
Cleaner Series: 1300 Series

Minimum Tube ID		Head Part Number	Expansion Range		Spider	Spider Thread	Arm	Arm Pin	Cutter Pin	Cone Cutter	Star Cutter	Keeper Pin	Head Lock
Inch	mm		Inch	mm									
2.125	53.98	336000	1.937-2.875	49.20-73.03	336002	7/16-14 M	336004	335906	335907	H-35908	H-35909	336012	336046
2.500	63.50	336100	2.125-3.125	53.98-79.38	336102	5/8-11 M	336104	335906	335907	H-35908	H-35909	336112	336146
2.875	73.03	336200	2.875-3.500	73.03-88.90	336202	5/8-11 M	336204	336206	336207	H-36008	H-36009	336212	336246
3.250	82.55	336300	3.250-3.875	82.55-98.43	336302	3/4-10 M	336304	336206	336307	T-17745	H-36209	336312	336346
3.500	88.90	336400	3.500-4.250	88.90-107.95	336402	3/4-10 M	336404	336406	336407	H-36308	H-36309	336412	336446

MADE IN USA

UO Head

Tube Section: Straight
Deposit: Heavy – Very Heavy
Distribution: Even
Cleaner Series: 1300 Series, 1100 Series

Minimum Tube ID		Head #	Expansion Range		Spider	Spider Thread		Center Plate	Head Lock	Cutter Pin	Cone Cutter	Straight Cutter
Inch	mm		Inch	mm		Front	Rear					
1.875	47.63	302600	1.750-1.937	44.45-49.20	302602	1/2"-13 F	1/2"-13 F	302634	302646	19390	T17565	T17564
2.00	50.80	302700	1.875-2.062	47.63-52.37	302702	1/2"-13 F	1/2"-13 F	302734	302746	19390	T17565	T17564
2.125	53.98	302800	2.000-2.312	50.80-58.72	302802	1/2"-13 F	1/2"-13 F	302834	302846	19390	H36008	T19061
2.250	57.15	302900	2.125-2.437	53.98-61.90	302902	1/2"-13 F	1/2"-13 F	302934	302946	19390	H36008	T19061
2.375	60.33	303000	2.250-2.625	57.15-66.68	303002	5/8"-11 F	5/8"-11 F	303034	303046	19390	H153408	T16986
2.500	63.50	303100	2.375-2.750	60.33-69.85	303102	5/8"-11 F	5/8"-11 F	303134	303146	19390	H153408	T16986
2.625	66.68	303200	2.500-2.875	63.50-73.03	303202	5/8"-11 F	5/8"-11 F	303234	303246	18414	H36308	T16983
2.750	69.85	303300	2.532-3.000	65.07-76.20	303202	5/8"-11 F	5/8"-11 F	303334	303346	18414	T19797	T19798
2.875	73.03	303400	2.687-3.187	68.25-80.95	303402	3/4"-10 F	3/4"-10 F	303434	303446	18414	T19797	T19798
3.000	76.20	303500	2.812-3.250	71.42-82.55	303502	3/4"-10 F	3/4"-10 F	303534	303546	18064	T17119	T16658A
3.250	82.55	303600	3.062-3.625	77.77-92.08	303602	3/4"-10 F	1"-8 F	303634	303646	18064	T18539	T17910
3.500	88.90	303700	3.312-3.875	84.12-98.43	303702	3/4"-10 F	1"-8 F	303734	303746	18064	T16657	T16658A
3.750	95.25	303800	3.562-4.250	90.47-107.95	303802	7/8"-9 F	1"-8 F	303834	303846	18086	T19777	T19778
4.000	101.60	303900	3.812-4.500	96.82-114.30	303902	7/8"-9 F	1-1/8"-12 F	303934	303946	303907	T16863	T16865
4.250	107.95	304000	4.000-4.625	101.60-117.48	303902	7/8"-9 F	1-1/8"-12 F	303934	304046	303907	T16863	T16865
4.500	114.30	304100	4.250-5.000	107.95-127.00	304102	7/8"-9 F	1-1/8"-12 F	304134	304146	303907	T19516	T19517
4.750	120.65	304200	4.500-5.250	114.30-133.35	304202	7/8"-9 F	1-1/8"-12 F	304234	304246	303907	T19516	T19517
5.000	127.00	304300	4.750-5.500	120.65-139.70	304202	7/8"-9 F	1-1/8"-12 F	304334	304346	303907	T19516	T19517
5.250	133.35	304400	5.000-5.750	127.00-146.05	304402	1-1/8"-12 F	1-1/8"-12 F	304434	304446	304507	T17079	T18805
5.500	139.70	304500	5.250-6.000	133.35-152.40	304502	1-1/8"-12 F	1-1/8"-12 F	304534	304546	304507	T17079	T18805

Clipless Head

Tube Section: Straight or Curved
Deposit: Medium
Distribution: Even
Cleaner Series: 1100 Series, 1300 Series

Minimum Tube ID		Head #	Expansion Range	Spider	Spider Thread	Arm	Arm Pin	Cutter Pin	Cone Cutter	Straight Cutter
Inch	mm									
1.750	44.45	H63500	1-1/2" - 2" (38.10 - 50.80mm)	H63502	1/2-13 M	H63504	H63506	H63507	T17565	H63509
2.000	50.80	H63600	1- 3/4" - 2-1/4" (44.45 - 57.15mm)	H63602	5/8-11 M	H63604	H63606	H63607	H46108	H47909

MADE IN USA

Expanding Brush/Scraper

Tube Section: Straight or Curved
Deposit: Light
Distribution: Even
Cleaner Series: D600 Series, 1300 Series

Heavy Duty Expanding Brush/Scraper				
Brush Expansion		Assembly #	Brush Refill Sets	Spider Thread
Min.	Max.			
1.937	2.250	P770	N774-6	9/16-12 UNC
1.937	2.250	P770A	N774-6	7/16-14 UNC
1.937	2.250	S770	N774-6	5/8-11 UNC
2.062	2.500	N770	N774-6	9/16-12 UNC
2.062	2.500	N770A	N774-6	7/16-14 UNC
2.062	2.500	M770	N774-6	5/8-11 UNC
2.437	2.750	R770	R774-6	5/8-11 UNC
2.687	3.000	T770	T774-6	5/8-11 UNC
3.125	3.625	V770	V774-6	7/8-9 UNC
3.125	3.625	V770A	V774-6	3/4-10 UNC
3.500	4.187	Y770	Y774-6	7/8-9 UNC
3.500	4.187	Y770A	Y774-6	3/4-10 UNC
4.125	5.250	H770	X474-6	1-1/8 -7 UNC
4.125	5.250	H770A	X474-6	3/4-10 UNC

To order an expanding scraper head assembly, add "SB-#" suffix to expanding brush assembly number (i.e. N774SB-6).

Scraper Blade

MADE IN USA

Expanding Brush/Scraper					
Tube ID Range		Assembly #	Brush Refill Sets	Scraper Blade Sets	Frame Thread
Straight Inch	Curved Inch				
0.730-0.752	0.770-0.790	350000	350037-4	SB1-4	
0.753-0.778	0.791-0.815	350100	350137-4	SB1-4	
0.779-0.810	0.816-0.850	350200	350237-4	SB2-4	
0.811-0.850	0.851-0.890	350300	350337-4	SB2-4	
0.851-0.871	0.891-0.910	350400	350437-4	SB3-4	
0.872-0.900	0.911-0.940	350500	350537-4	SB3-4	
0.901-0.950	0.941-0.990	350600	350637-4	SB4-4	
0.951-1.000	0.991-1.040	350700	350737-4	SB4-4	
1.001-1.040	1.041-1.075	350800	350837-4	SB5-4	5/16-18 M
1.041-1.072	1.076-1.100	350900	350937-4	SB5-4	
1.073-1.100	1.101-1.140	351000	351037-4	SB6-4	
1.101-1.138	1.141-1.180	351100	351137-6	SB6-6	
1.139-1.178	1.181-1.220	351200	351237-6	SB7-6	
1.179-1.206	1.221-1.242	351300	351337-6	SB7-6	
1.207-1.230	1.243-1.270	351400	351437-6	SB8-6	
1.231-1.256	1.271-1.300	351500	351537-6	SB9-6	
1.257-1.290	1.301-1.330	351600	351637-6	SB10-6	
1.291-1.321	1.331-1.360	351700	351737-6	SB11-6	
1.322-1.370	1.361-1.410	351800	351837-6	SB11-6	
1.371-1.400	1.411-1.445	351900	351937-6	SB11-6	
1.401-1.450	1.446-1.490	352000	352037-6	SB12-6	
1.451-1.484	1.491-1.525	352100	352137-6	SB12-6	
1.485-1.525	1.526-1.570	352200	352237-6	SB13-6	
1.526-1.563	1.571-1.600	352300	352337-6	SB13-6	
1.564-1.600	1.601-1.640	352400	352437-8	SB14-8	
1.601-1.635	1.641-1.680	352500	352537-8	SB14-8	
1.636-1.675	1.681-1.700	352600	352637-8	SB15-8	
1.676-1.700	1.701-1.725	352700	352737-8	SB16-8	7/16-14 M
1.701-1.730	1.726-1.772	352800	3528378	SB17-8	
1.731-1.780	1.773-1.820	352900	352937-8	SB18-8	
1.781-1.820	1.821-1.865	353000	353037-8	SB19-8	
1.821-1.880	1.860-1.910	353100A	352437-8	SB19-8	
1.881-1.920	1.911-1.950	353200A	352537-8	SB20-8	
1.921-1.970	1.951-2.000	353300A	352637-8	SB20-8	
1.971-2.010	2.001-2.040	353400A	352737-8	SB16-8	
2.011-2.050	2.041-2.080	353500A	352837-8	SB18-8	
2.051-2.100	2.081-2.140	P770A	N774-6	SB21-6	
2.101-2.150	2.141-2.180	353700A	353037-8	SB21-8	

More Accurate

Than Common 2 Point Calipers

3 point contact measures where the actual rolling will occur.

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.

More information on page 10.
Visit our website for more information:
www.elliott-tool.com/tube-hole-gauges/

Two & Three Arm Heads

Tube Section: Straight or Curved
Deposit: Medium – Heavy
Distribution: Uneven
Cleaner Series: 1100 Series, 1300 Series

Minimum Tube ID		Head #	Expansion Range	Spider	Arm	Arm Pin	Short Cutter Pin	Long Arm	Long Cutter Pin	Thread	Cone Cutter
Inch	mm										
1.375	34.93	250L	1-1/8" - 1-1/2" (28.58 - 38.10mm)	251L	253L		255L	252L	254L	7/16-14 F	H35708
1.750	44.45	L550	1-1/2" - 2-3/4" (38.10 - 69.85mm)	K551	L553	K556	L555			7/16-14 M	

H2 Head

Tube Section: Straight or Curved
Deposit: Heavy – Very Heavy
Distribution: Uneven
Cleaner Series: 1300 Series, 1100 Series

Minimum Tube ID		Head #	Expansion Range	Spider	Arm	Long Arm	Short Cutter Pin	Long Cutter Pin	Cone Cutter	Thread
2.500	63.50	316000	2.125" - 2.938" (53.98 - 74.61mm)	316002	17743	17742	17746A	17746	T17745	5/8-11 M
2.750	69.85	316100	2.500" - 3.188" (63.50 - 80.96mm)	316102	4174	16764	17048A	17048	H36308	
3.250	82.55	316300	3.0625" - 3.750" (77.79 - 95.25mm)	316302					T17119A	3/4-10 M
3.500	82.55	316400	3.188" - 4.500" (80.96 - 114.30mm)	316402	16655	16771	17050	17049	T16657	
3.750	88.90	316500	3.500" - 4.563" (88.90 - 115.89mm)	316502						
4.000	95.25	316600	3.750" - 4.813" (95.25 - 122.24mm)	316602						
4.500	101.60	316700	4.250" - 5.625" (107.95 - 142.88mm)	316702			17050A	17049A	T16863A	1-1/8-12 F
5.500	114.30	316800	4.250" - 7.500" (107.95 - 190.5mm)	316802	18039	-	-	18036	T16863	
6.500	139.70	316900	5.250" - 8.500" (133.35 - 219.90mm)	316902				18036	T19516	
8.500	165.10	317100	6.750" - 10.750" (171.45 - 273.05mm)	317102	317104		317107	-	H30708	1-3/8-12 F
10.000	215.90	317200	7.250" - 12.000" (107.95 - 304.80mm)	317202						
14.000	254.00	328000	9.000" - 15.500" (228.60 - 393.70mm)	304902	304904A					1-5/8-12 F
18.000	355.60	328200	14.000" - 20.500" (355.60 - 520.70mm)	305102						

MADE IN USA

Turbine Style Aluminum Siphon Tube Cleaners

Tube Size
- 2.875” to 4.750” ID
- 73.0mm to 120.65mm ID

Tube Section
- Curved

Type
- Hard powder
- Rock solid

Thickness
- Heavy

Flush
- Dry

Why use boiler cleaning heads when cleaning siphon tubes? Elliott’s powerful Turbine Style Motors and Drill Heads offer aggressively fast cleaning and are engineered specifically for aluminum siphon tubes.

Elliott offers a unique Combination Drill Head to clean aggressively reducing cleaning time. Universal Coupling options are available, including welded rivets and Limited Throw, for lasting performance and increased rotor life.

The easy-to-maintain design of Elliott’s Turbine Style Tube Cleaner Motors decreases cost and maintenance.

Elliott’s Aluminum Siphon Tube Cleaners may be hand operated or machine fed. Contact your local support or Elliott for additional details.

Features & Benefits:
- Optional stellited drills for extended life and cleaning performance.
- Our unique Combination Drill Head cleans siphon tubes aggressively reducing cleaning time.
- Optional Universal Coupling Rivets may be welded for lasting performance.
- Optional Limited Throw Universal Coupling increases the motor’s rotor life.
- Design allows for easy change-over of parts and maintenance.

Motors

Motor OD		Part Number	Rotor Thread
Inch	mm		
2.375"	60.33	136400D2375	3/4"-10
2.562"	65.07	ET4325K	3/4"-16
2.625"	66.68	134200D2625	3/4"-10
2.812”	71.42	ET4350K	7/8”-14
3.000"	76.2	132500D3000	7/8"-9
3.625"	92.08	139900D3625	1-1/8"-12

Universal Couplings

Female Threads	Part Number*	Diameter	
		Inch	mm
3/4”-10 x 5/8”-11	L28000**	1.625"	41.27
3/4"-10 x 3/4"-10	L28000A**	1.625"	41.27
3/4"-10 x 5/8"-11	L57700A	1.812"	46.02
3/4"-10 x 3/4"-10	L27700	1.812"	46.02
3/4”-10 x 7/8”-14	L37300F	1.812”	46.02
3/4"-16 x 5/8"-11	L57700C	1.812"	46.02
3/4"-16 x 3/4"-10	L27700D	1.812"	46.02
7/8"-9 x 3/4"-10	L37300	1.812"	46.02
1-1/8"-12 x 7/8"-9	L44800A	2.000"	50.8
1-1/8"-12 x 1-1/8"-12	L44800	2.000"	50.8

**Add ST at end of part number for welded rivet option.*

*** Recommended for 136400D2375 motor for optimum performance.*

Drill Heads

Drill OD		Part Number	Stud Thread
Inch	mm		
2.250"	57.15	H2356-625S	5/8"-11
2.250"	57.15	H2356-750S	3/4"-10
2.625"	66.68	H2404-750S	3/4"-10
2.875	73.03	H2355-750S	3/4”-10
3.500"	88.9	H2509-1125S	1-1/8"-12

Combination Drills

Drill OD		Part Number	Stud Thread
Inch	mm		
2.500"	63.5	78H	5/8"-11
2.500"	63.5	78HS2	3/4"-10
3.000"	76.2	78ES1	3/4"-10

MADE IN USA

Gas Line Renewal

Pipe Size
- 0.750” to 1.500”
- 19.05mm to 38.10mm

Tube Section
- Straight

Type
- Soft, gummy or organic
- Hard powder

Thickness
- Light
- Medium

Flush
- Dry

The air turbine style motor design provides an immediate and powerful startup to drive the cleaning head down the tube at a high speed, removing light to medium deposits of scale, mud, and other process residues.

Features & Benefits:

- Powerful multi vane motors for fast start up.
- Cone shape cutter design for optimum pipe cleaning.
- Reinforced operating hose for longer service life.
- Bearing-less design makes it easy to service, with no special tools required.
- Metal vanes for motor durability and prolonged tool life.
- Optional air valves allow you to turn off supply near the motor, making it a one man operation.

> *“Elliott’s Gas Line Cleaners are phenomenal. They have a long tool life and are easy to rebuild - my guys love them!”*
>
> **-Richard Rizzardi, Manager Gas Operations**
> **Miller Bros**

Gas Line Renewal Kits

Pipe Size		Kit Number	Motor	Universal	Cutter Head
Inch	mm				
0.750"	19.05	75SP	D67000-18	L69100A	478D
1.000"	25.40	100SP	D67300-28M	L69400	319000M
1.250"	31.75	125SP	D67500-36	L51100	313500S
1.500”	38.10	150SP	D67800-46	L76200A	313600S

Kits include 1 motor, universal, cutter head, and motor shaft wrench.

Gas Line Renewal Accessories

Pipe Size		Operating Hose		Air Valve
Inch	mm	25’ Length	50’ Length	
0.750"	19.05	833000-25P	833000-50P	720100
1.000"	25.40	1004-25P	1004-50P	720200
1.250"	31.75			720300
1.500”	38.10	1009-25P	1009-50P	720400

MADE IN USA

Pipe Rattling Motors

Make Them Last Longer, Work Faster, & Clean Better

Making pipe cleaning a regular part of maintenance ensures sound operation and decreases emergency maintenance needs.

Pipe rattling motors are vital to the cleaning processes used at many job sites. You are under many pressures to get the job done quickly and cost-effectively. The last thing you should have to worry about is the life of your motors.

The conditions under which pipe cleaners operate vary widely from industry to industry, therefore, cleaning should be thought of as highly individualized. However, there are several key considerations in the selection, use, and maintenance of cleaning tools (specifically the air motors) that each operator should follow.

Motors are all designed to operate at their maximum efficiency when supplied with the proper amount of pressure at the motor. A motor operating at low pressure will not be as effective and will require more time to clean a pipe. Therefore, reducing the pressure drop ensures the best motor performance.

Check the maximum air volume required through each air line against the pressure drop. Assuming the compressors are in good operating conditions, this requires very little time. For example, a 2 inch air line 1000 feet long with 100 pounds pressure at the compressor end will have a pressure drop of approximately 9.95 pounds while passing 300 cubic feet a minute, and if the pressure is raised to 125 pounds the drop will only be 8.18 pounds. Any handbook will supply data for your condition, but remember that the valves, elbows and other connections increase the pressure drop. If necessary, some pressure drop can be eliminated by streamlining the air lines, removing old lines in use, correcting any leaks and reducing the number of cleaners operating on one line.

Another cause of decreased pressure is a swollen hose. One refinery had several lengths of hose in use that were in excellent shape as far as the exterior, although they had been in service for a good length of time. They were tested for pressure drops and it was found that there was about 40 pounds drop through a 50-foot length of 1-inch hose. A cross-section of the hose revealed that it had swollen so much that the opening of the hose was reduced to 1/2 inch. Pressure drop tests will reveal these issues.

Pipe cleaners are lubricated by oil being introduced into the air stream. There are several methods for this and it varies among industries. Lubrication, no matter the method, is required for the proper operator and maintenance of an air motor. Without oil lubrication, motors will operate at a sub-par level and are very prone to overheating. As one operator has stated, “Oil is cheap compared to burned-out motors.”

Many cutter heads are self-feeding. Let the self-cleaning feed slowly and evenly and if necessary hold it back slightly to keep the head from jumping across hard deposits and coke. Avoid working the motor back and forth as it causes excessive cutter wear.

Finally, after each clean-out, test and repair the air motor to ensure it is ready for the next clean out.

Following these standard procedures and tips, proper maintenance and understanding the operating and technical instructions for the air motor in use will ensure longer tool life and better cleaning jobs.

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
Inch	mm		25’ (7.6M)	50’ (15.2M)	
2.375"	60.3	20308K	835100-25P	835100-50P	720700B
2.875"	73.0	20708K			
3.500"	88.9	30102K	835300-25P	835300-50P	
4.500"	114.3	40102K*			
5.000” & 5.500”	127.0 & 139.7	50000K			
7.000"	177.8	70000K*			
7.625"	193.7	70508K*			
8.625"	219.1	80508K*			
9.625"	244.5	90508K*			
10.750"	273.1	100304K*			
11.750"	298.5	110304K*	835400-25P	835400-50P	-
13.375"	339.7	130308K*			
20.000"	508.0	200000K*			

**Kit also includes Motor Sleeve.*

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*
- Foot Valve*
- 6055 Lubricator*
- 6070 Filter/Lubricator*

** Used in hand cleaning operations*

Optional Hoses & Accessories				
Pipe Thread	**Standard Hose**	**Heavy Duty Hose**	**Air Valve**	**Foot Valve**
1/8”	833000-xxP		720100	720700B
1/4”	833100-xxP		720200	
3/8”	1004-xxP	833300-xx	720300	
1/2”	1009-xxP	837100-xx	720400	
3/4”	1006-xxP	835100-xx	720500	
1”	1007-xxP	835200-xx	720600	

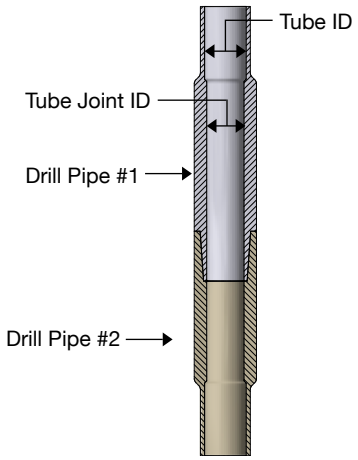
Used in hand cleaning operations
**Hoses are available in 25ft & 50ft sizes. xx signifies desired hose length (ex: 833000-25)*

MADE IN USA

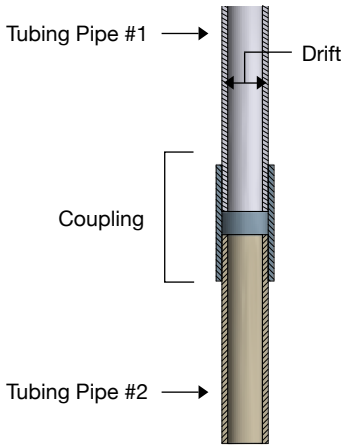
Tube Internal Diameter (ID)
Is a result of the OD and the wall thickness.

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

** Alternative Head & Motor: ETP15PY and ET3225*

MADE IN USA

Spring Head

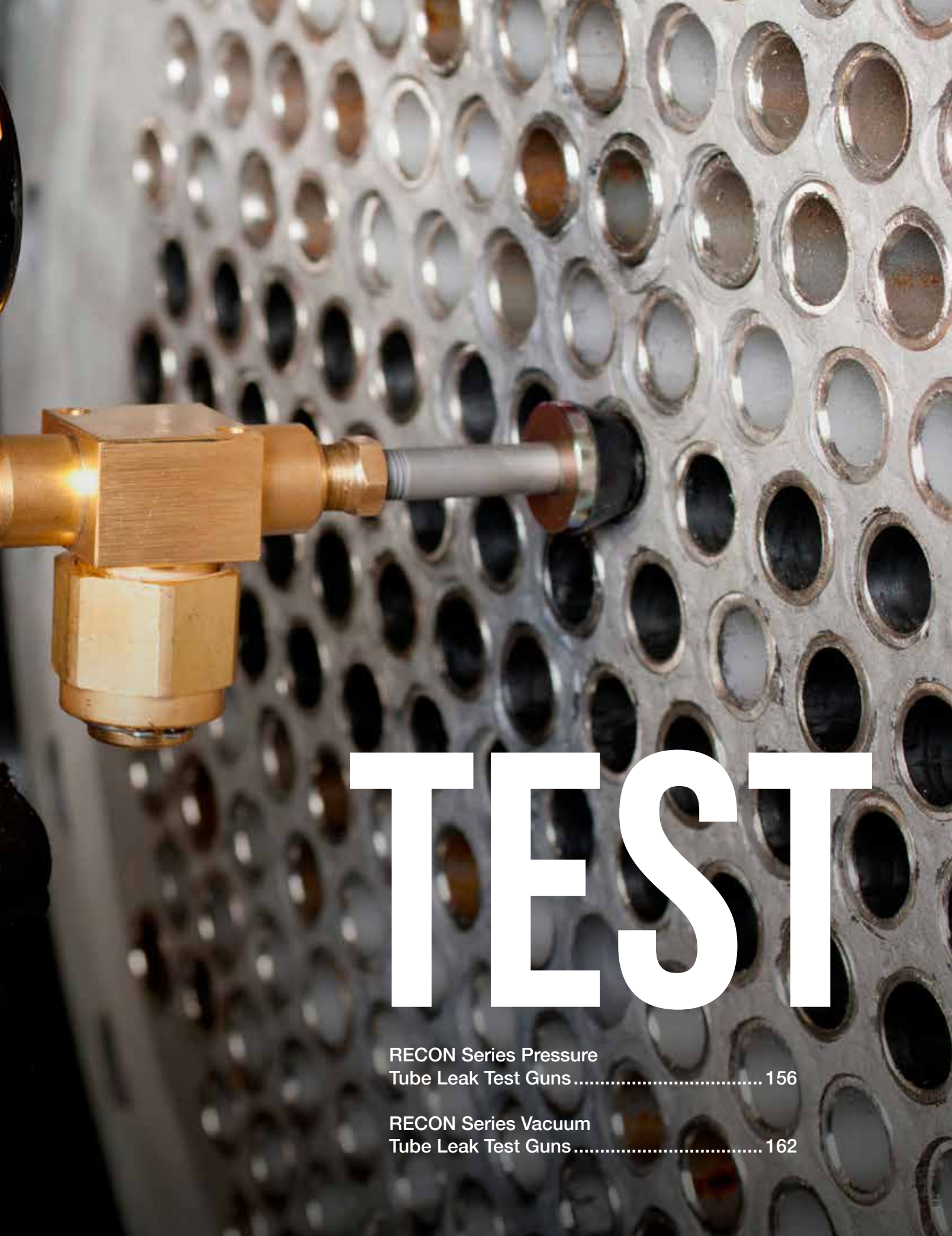
Swing Head

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

** Will be supplied with a barrel style cleaning head*

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

RECON 1250

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.


Easy to hold and use with superior grip ergonomics.


Use in tight workspaces because of its thin profile.

MADE IN USA

FOR RENT

Features & Benefits:
- Easy to hold and use with superior grip ergonomics – modeled after a leading pistol grip – utilizing a non-slip, wrinkle-coat finish on the handle.
- Reduce operator fatigue and increase efficiency with the lightweight aluminum body.
- Easy to use in tight work spaces because of its thin profile.
- Safe operation with a bleed off valve that releases pressure.
- Fast and efficient setup utilizing the quick disconnect airline (¼”).
- Increase accuracy using the dual gauge design to read pressure from both tube ends.
- Due to the increased internal volume of the tubes tested with the RECON 2500, the valve actuator was added to prevent the seals from being released while pressurized.
- Durable cast aluminum body that protects the working components and a steel gauge body to protect the gauge.
- The moving piston is conveniently positioned away from the operator under the rear plate.
- To perform in the toughest working conditions, Elliott’s RECON Series have been rigorously tested.

Specifications:
RECON 1250 & 2500 Air Requirements:
- Minimum - 40 PSI (2.7 bar)
- Maximum - 125 PSI (8.5 bar)

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.*

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
- 1 Support Tube Assembly (TTPST4)
- Washers to support up to 2.5" seal sets.
- Tool Case

Spares & Accessories:
- Seal & Washer Sets: Seals are backwards-compatible. ***See table on next page.***
- 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 above.***
- Support Tubes & Support Tube Extensions: Make finding leaks easier on channel head and water box applications. Support tubes are backwards-compatible. ***See table on next page.***

Moving piston is positioned away from operator.

Steel gauge body to protect the gauge.

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 - TTPS500	TTPST1	TTPST1-12	TTPST1-24	TTPST1-36	TTPST1-48
TTPS530 - TTPS800	TTPST2	TTPST2-12	TTPST2-24	TTPST2-36	TTPST2-48
TTPS840 - TTPS1190	TTPST3	TTPST3-12	TTPST3-24	TTPST3-36	TTPST3-48
TTPS1230 - TTPS1620	TTPST4	TTPST4-12	TTPST4-24	TTPST4-36	TTPST4-48
TTPS1630 - TTPS1950	TTPST5	TTPST5-12	TTPST5-24	TTPST5-36	TTPST5-48
TTPS2000 - TTPS2400	TTPST6	-	-	-	-

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

Most Secure Method

For Plugging Tube Leaks

Have peace of mind with a secure way to plug tubes.

Elliott's Mechanical Tube Plugs create a positive mechanical contact seal in excess of 6,500 PSI (448.2 bar), making them ideal for high pressure applications such as feedwater heaters and other high pressure heat exchangers over 200 PSI (13.8 bar).

As the most secure method to plug leaky tubes, they can also be used in low pressure applications for peace of mind.

More information on page 175.
Visit our website for more information:
www.elliott-tool.com/mechanical-tube-plugs/

Find Leaking Tubes Quickly & Easily

"While tube leaks can occur for numerous reasons, one of the most common causes is the formation of holes. Holes can form within a tube as a result of deposit build-up, corrosion, improper cleaning heads being used, and more."

Tubes within vessels need to be regularly tested for leaks for several reasons. Although vessels undergo hydrostatic or eddy current testing after fabrication to ensure proper construction and quality standards have been met, this does not guarantee the vessel won't develop leaks. Vessels that are in use should be tested when problems are suspected, either from unusual occurrences or decreased efficiency. Vessels in use should also be tested during routine maintenance periods in order to maintain high efficiency and safety standards.

One of the most overlooked best practices for finding tube leaks is to clean the tubes before testing. If the tube is not clean, it is possible for a tube leak to exist, but be covered up by hard deposits or scale. This can result in decreased vessel efficiency later on. Therefore, in order to get accurate test results, make sure the tubes are thoroughly cleaned before testing for leaks.

While tube leaks can occur for numerous reasons, one of the most common causes is the formation of holes. Holes can form within a tube as a result of deposit build-up, corrosion, improper cleaning heads being used, and more. In addition to holes, tube leaks can occur due to joint failures and incomplete expansions. As a result, abiding by installation best practices could potentially reduce the amount of tube leaks that occur within a vessel.

There are several methods of testing for tube leaks. Some small-scale options involve Pressure or Vacuum Leak Test Guns. These handheld test guns are a quick & economical option to detect tube leaks that may be occurring out in the field. Hydrostatic Testing or Eddy Current Testing methods, on the other hand, are usually preferred when testing new vessels in a fabrication environment.

Pressure and Vacuum Leak Test Guns are economical, simple to operate, and are useful for checking vessels that are out in the field. Pressure Leak Test Guns create an airtight seal on both ends of the tube, monitoring for drops in air pressure. When using a Pressure Leak Test Gun, simply connect to an air supply, insert a set of seals into both sides of the tube ends and pressurize the tubes. Once the tubes are pressurized, monitor the gauge on the top of the guns for any drop in air pressure. If the seal breaks, that indicates a tube leak is present. Similar to Pressure Test Guns, Vacuum Leak Test Guns create a vacuum tight seal on each tube end. The gun will then monitor for any loss of vacuum, indicating a tube leak. When using a vacuum test gun, first connect to an air supply and then plug one tube end with the test gun and the other end with the Plugging Tool. When you are ready, press the lever to trigger the vacuum system, which will quickly and efficiently evacuates the tube. Again, make sure to monitor the gauge on the gun for any loss of vacuum to indicate a tube leak.

Hydrostatic Testing is most often used in fabrication environments to check new vessels for proper mechanical joints. The vessel is filled with a liquid (usually dyed water) and pressurized to the specified test pressure. Once complete, the vessel is observed for leaks, pressure drops and any changes to the vessel or shape of the vessel. Hydrostatic tests are conducted under the constraints of either the industry's or the customer's specifications or may be required by law.

Eddy Current Testing (ECT) is most often used in fabrication to check new vessels for a variety of flaws and ensure high-quality standards. ECT is an electromagnetic testing method that can detect and characterize surface and sub-surface flaws in conductive metals and materials. Different types of tube defects can be detected and sized using ECT, including ID and OD pitting, axial and circumferential cracking, corrosion and tube sheet abnormalities.

Once a leak is found, the best practice is to vent the tube and plug it. Venting is done to eliminate any pressure build-up that may occur and plugging the tube takes the individual tube out of service to ensure the highest vessel efficiency possible.

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

Easy to hold and use with superior grip ergonomics.

Use in tight workspaces because of its thin profile.

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Features & Benefits:
- Easy to hold and use with superior grip ergonomics – modeled after a leading pistol grip – utilizing a non-slip, wrinkle-coat finish on the handle.
- Reduce operator fatigue and increase efficiency with the lightweight aluminum body.
- Easy to use in tight work spaces because of its thin profile.
- Increase efficiency with a tapered seal design that allows the operator to test a large range of tube IDs without changing seals, washers or support tube assemblies.
- Seals are backwards compatible.
- Fast and efficient setup utilizing the quick disconnect airline (¼”).
- Durable cast aluminum body that protects the working components, a steel gauge body to protect the gauge and an enclosed brass filter body.
- Avoid replacing the entire Test Gun in the case of damage, with the field replaceable Venturi System.
- Quick and easy to replace filter element that protects the test gun from harmful debris.
- To perform in the toughest working conditions, Elliott’s RECON Series have been rigorously tested.

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

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

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 backwards-compatible. ***See table to the left.***
- Filter Element (TTV1500FE)

Enclosed brass filter body

Field replaceable Venturi System

RECON 1500

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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 “9060 Series” on page 184.

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Tube OD		BWG	Tube ID Range	Brass- 10 Pack*	Carbon Steel- 10 Pack*	Stainless Steel- 10 Pack*			Aluminum- 10 Pack*	Monel
Inch	mm					316	304	416		
3/8”	9.5	13-22	0.185” - 0.319” (4.7 - 8.1mm)	7180-209-10	7181-209-10	7182-209-10	7183-209-10	7184-209-10	7185-209-10	7186-209
1/2”	12.7	11-12								
1/2”	12.7	13-22	0.310” - 0.444” (7.9 - 11.3mm)	7180-334-10	7181-334-10	7182-334-10	7183-334-10	7184-334-10	7185-334-10	7186-334
5/8”	15.9	11-12								
5/8”	15.9	13-22	0.435” - 0.569” (11.0 - 14.5mm)	7180-459-10	7181-459-10	7182-459-10	7183-459-10	7184-459-10	7185-459-10	7186-459
3/4”	19.1	11-12								
3/4”	19.1	13-22	0.560” - 0.694” (14.2 - 17.6mm)	7180-584-10	7181-584-10	7182-584-10	7183-584-10	7184-584-10	7185-584-10	7186-584
7/8”	22.2	11-12								
7/8”	22.2	13-22	0.685” - 0.819” (17.4 - 20.8mm)	7180-709-10	7181-709-10	7182-709-10	7183-709-10	7184-709-10	7185-709-10	7186-709
1”	25.4	11-12								
1”	25.4	13-22	0.810” - 0.944” (20.6 - 24.0mm)	7180-834-10	7181-834-10	7182-834-10	7183-834-10	7184-834-10	7185-834-10	7186-834
1-1/8”	28.6	11-12								
1-1/8”	28.6	13-22	0.935” - 1.069” (23.7 - 27.2mm)	7180-959-10	7181-959-10	7182-959-10	7183-959-10	7184-959-10	7185-959-10	7186-959
1-1/4”	31.8	11-12								
1-1/4”	31.8	13-22	1.060” - 1.194” (26.9 - 30.3mm)	7180-1084-10	7181-1084-10	7182-1084-10	7183-1084-10	7184-1084-10	7185-1084-10	7186-1084
1-3/8”	34.9	11-12								
1-3/8”	34.9	13-22	1.185” - 1.319” (30.1 - 33.5mm)	7180-1209-10	7181-1209-10	7182-1209-10	7183-1209-10	7184-1209-10	7185-1209-10	7186-1209
1-1/2”	38.1	11-12								
1-1/2”	38.1	13-22	1.310” - 1.444” (33.3 - 36.7mm)	7180-1334-10	7181-1334-10	7182-1334-10	7183-1334-10	7184-1334-10	7185-1334-10	7186-1334
1-3/4”	44.5	11-12	1.510” - 1.532” (38.4 - 38.9mm)	7180-1459-10	7181-1459-10	7182-1459-10	7183-1459-10	7184-1459-10	7185-1459-10	7186-1459
1-3/4”	44.5	13-22	1.560” - 1.694” (39.6 - 43.0mm)	7180-1584-10	7181-1584-10	7182-1584-10	7183-1584-10	7184-1584-10	7185-1584-10	7186-1584
2”	50.8	11-12	1.760” - 1.782” (44.7 - 45.3mm)	7180-1709-10	7181-1709-10	7182-1709-10	7183-1709-10	7184-1709-10	7185-1709-10	7186-1709
2”	50.8	13-22	1.810” - 1.944” (46.0 - 49.4mm)	7180-1834-10	7181-1834-10	7182-1834-10	7183-1834-10	7184-1834-10	7185-1834-10	7186-1834
2-1/4”	57.2	11-12	2.010” - 2.032” (51.1 - 51.6mm)	7180-1959-10	7181-1959-10	7182-1959-10	7183-1959-10	7184-1959-10	7185-1959-10	7186-1959
2-1/4”	57.2	13-22	2.060” - 2.194” (52.3 - 55.7mm)	7180-2084-10	7181-2084-10	7182-2084-10	7183-2084-10	7184-2084-10	7185-2084-10	7186-2084
2-1/2”	63.5	11-12	2.260” - 2.282” (57.4 - 57.9mm)	7180-2209-10	7181-2209-10	7182-2209-10	7183-2209-10	7184-2209-10	7185-2209-10	7186-2209
2-1/2”	63.5	13-22	2.310” - 2.444” (58.7 - 62.1mm)	7180-2334-10	7181-2334-10	7182-2334-10	7183-2334-10	7184-2334-10	7185-2334-10	7186-2334
2-3/4”	69.9	11-12	2.510” - 2.532” (63.8 - 64.3mm)	7180-2459-10	7181-2459-10	7182-2459-10	7183-2459-10	7184-2459-10	7185-2459-10	7186-2459
2-3/4”	69.9	13-22	2.560” - 2.694” (65.0 - 68.4mm)	7180-2584-10	7181-2584-10	7182-2584-10	7183-2584-10	7184-2584-10	7185-2584-10	7186-2584
3”	76.2	11-12	2.760” - 2.782” (70.1 - 70.7mm)	7180-2709-10	7181-2709-10	7182-2709-10	7183-2709-10	7184-2709-10	7185-2709-10	7186-2709
3”	76.2	13-22	2.810” - 2.944” (71.4 - 74.8mm)	7180-2834-10	7181-2834-10	7182-2834-10	7183-2834-10	7184-2834-10	7185-2834-10	7186-2834

** 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.

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How To Remove A TORQ N' SEAL® Mechanical Tube Plug

Mechanical tube plugs are a secure and easy method for plugging tubes in low, medium, and high-pressure applications. Torq N' Seal® Mechanical Plugs are simple to install and remove since they don't require any special equipment. While mechanical tube plugs are strong enough to remain inside of tubes for long periods of time, in cases where they are going to be removed it is important to follow these easy steps.

1. Remove the drive screw

Determine the hex size of the drive screw and select the corresponding hex driver. Insert the drive into the end of the plug and begin rotating to unthread and remove the drive screw.

2. Remove the expansion ferrule

Once the drive screw is removed, the expansion ferrule can be taken out. This is the section of the plug that expands inside the tube during installation. In order to remove it correctly, select an easy out tool sized to the expansion ferrule ID and insert the easy out tool into the plug. Turn and pull the easy out with a wrench until the expansion ferrule is removed.

3. Remove the plug body

There are a few different methods that may be used to remove the remaining plug body. The most common method is to use a slide hammer. A slide hammer uses a short piece of tube over a threaded rod. Begin by threading a rod into the plug with a piece of tube over top. Once the rod is secure, thread a washer and nut on the end. Pull the piece of tube and slide it towards the end of the rod, striking the washer, until the plug body is knocked out of the tube.

Another way to remove the plug is by using a washer and nut. Insert a threaded rod into the plug body, then place a washer and nut on the end of the rod. Thread the nut up the rod until the washer comes in contact with the tube sheet. Using a wrench, continue tightening the nut until the plug body is loose and can be removed from the tube.

Lastly, a hydraulic cylinder may be used to remove the plug body. Similar to a slide hammer, the hydraulic cylinder exerts a greater pulling force in order to remove the plug. Begin by inserting a threaded rod into the plug body. Next, place a hollow hydraulic cylinder over the rod with a washer and nut on the end. Then, energize the cylinder so that it pulls out the plug body.

Overall, mechanical tube plugs are a secure and easy method for plugging tubes in a variety of applications. While they're strong enough to remain inside of tubes for long periods of time, these three steps make it easy to remove a Torq N' Seal® plug when needed.

Unthread the drive screw using a hex drive.

Insert an easy out tool and turn until released.

Thread a rod with a tube over top into the plug. Secure with washer & nut.

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 176.

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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	853103-312-10	853102-315-10	853003-312-10	861802-315-10	861803-312-10	852902-315-10	852903-312-10	861902-315-10	861903-312-10
	22	853002-322-10	853103-312-10	853102-322-10	853003-312-10	861802-322-10	861803-312-10	852902-322-10	852903-312-10	861902-322-10	861903-312-10
	23	853002-322-10	853103-312-10	853102-322-10	853003-312-10	861802-322-10	861803-312-10	852902-322-10	852903-312-10	861902-322-10	861903-312-10
	24	853002-333-10	853103-312-10	853102-333-10	853003-312-10	861802-333-10	861803-312-10	852902-333-10	852903-312-10	861902-333-10	861903-312-10
1/2" (12.7mm)	15	853002-363-10	853103-312-10	853102-363-10	853003-312-10	861802-363-10	861803-312-10	852902-363-10	852903-312-10	861902-363-10	861903-312-10
	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	853103-375-10	853102-390-10	853003-375-10	861802-390-10	861803-375-10	852902-390-10	852903-375-10	861902-390-10	861903-375-10
	18	853002-407-10	853103-375-10	853102-407-10	853003-375-10	861802-407-10	861803-375-10	852902-407-10	852903-375-10	861902-407-10	861903-375-10
	19	853002-418-10	853103-375-10	853102-418-10	853003-375-10	861802-418-10	861803-375-10	852902-418-10	852903-375-10	861902-418-10	861903-375-10
	20	853002-435-10	853103-375-10	853102-435-10	853003-375-10	861802-435-10	861803-375-10	852902-435-10	852903-375-10	861902-435-10	861903-375-10
	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	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
	23	853002-455-10	853103-437-10	853102-455-10	853003-437-10	861802-455-10	861803-437-10	852902-455-10	852903-437-10	861902-455-10	861903-437-10
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	853103-375-10	853102-418-10	853003-375-10	861802-418-10	861803-375-10	852902-418-10	852903-375-10	861902-418-10	861903-375-10
	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	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
	15	853002-488-10	853103-437-10	853102-488-10	853003-437-10	861802-488-10	861803-437-10	852902-488-10	852903-437-10	861902-488-10	861903-437-10
	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	853103-500-10	853102-515-10	853003-500-10	861802-515-10	861803-500-10	852902-515-10	852903-500-10	861902-515-10	861903-500-10
	18	853002-532-10	853103-500-10	853102-532-10	853003-500-10	861802-532-10	861803-500-10	852902-532-10	852903-500-10	861902-532-10	861903-500-10
	19	853002-545-10	853103-500-10	853102-545-10	853003-500-10	861802-545-10	861803-500-10	852902-545-10	852903-500-10	861902-545-10	861903-500-10
	20	853002-559-10	853103-500-10	853102-559-10	853003-500-10	861802-559-10	861803-500-10	852902-559-10	852903-500-10	861902-559-10	861903-500-10
	21	853002-564-10	853103-500-10	853102-564-10	853003-500-10	861802-564-10	861803-500-10	852902-564-10	852903-500-10	861902-564-10	861903-500-10
	22	853002-570-10	853103-500-10	853102-570-10	853003-500-10	861802-570-10	861803-500-10	852902-570-10	852903-500-10	861902-570-10	861903-500-10
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	853103-437-10	853102-495-10	853003-437-10	861802-495-10	861803-437-10	852902-495-10	852903-437-10	861902-495-10	861903-437-10
	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	853103-500-10	853102-545-10	853003-500-10	861802-545-10	861803-500-10	852902-545-10	852903-500-10	861902-545-10	861903-500-10
	13	853002-570-10	853103-500-10	853102-570-10	853003-500-10	861802-570-10	861803-500-10	852902-570-10	852903-500-10	861902-570-10	861903-500-10

** 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	853103-1-10	853102-631-10	853003-1-10	861802-631-10	861803-1-10	852902-631-10	852903-1-10	861902-631-10	861903-1-10
	17	853002-640-10	853103-1-10	853102-640-10	853003-1-10	861802-640-10	861803-1-10	852902-640-10	852903-1-10	861902-640-10	861903-1-10
	18	853002-657-10	853103-1-10	853102-657-10	853003-1-10	861802-657-10	861803-1-10	852902-657-10	852903-1-10	861902-657-10	861903-1-10
	19	853002-670-10	853103-1-10	853102-670-10	853003-1-10	861802-670-10	861803-1-10	852902-670-10	852903-1-10	861902-670-10	861903-1-10
	20	853002-685-10	853103-1-10	853102-685-10	853003-1-10	861802-685-10	861803-1-10	852902-685-10	852903-1-10	861902-685-10	861903-1-10
	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	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
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	853103-1-10	853102-647-10	853003-1-10	861802-647-10	861803-1-10	852902-647-10	852903-1-10	861902-647-10	861903-1-10
	12	853002-670-10	853103-1-10	853102-670-10	853003-1-10	861802-670-10	861803-1-10	852902-670-10	852903-1-10	861902-670-10	861903-1-10
	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	853103-1A-10	853102-719-10	853003-1A-10	861802-719-10	861803-1A-10	852902-719-10	852903-1A-10	861902-719-10	861903-1A-10
	15	853002-738-10	853103-1A-10	853102-738-10	853003-1A-10	861802-738-10	861803-1A-10	852902-738-10	852903-1A-10	861902-738-10	861903-1A-10
	16	853002-752-10	853103-1A-10	853102-752-10	853003-1A-10	861802-752-10	861803-1A-10	852902-752-10	852903-1A-10	861902-752-10	861903-1A-10
	17	853002-765-10	853103-1A-10	853102-765-10	853003-1A-10	861802-765-10	861803-1A-10	852902-765-10	852903-1A-10	861902-765-10	861903-1A-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	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
	20	853002-809-10	853103-2-10	853102-809-10	853003-2-10	861802-809-10	861803-2-10	852902-809-10	852903-2-10	861902-809-10	861903-2-10
	21	853002-809-10	853103-2-10	853102-809-10	853003-2-10	861802-809-10	861803-2-10	852902-809-10	852903-2-10	861902-809-10	861903-2-10
	22	853002-820-10	853103-2-10	853102-820-10	853003-2-10	861802-820-10	861803-2-10	852902-820-10	852903-2-10	861902-820-10	861903-2-10
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	853103-1A-10	853102-719-10	853003-1A-10	861802-719-10	861803-1A-10	852902-719-10	852903-1A-10	861902-719-10	861903-1A-10
	10	853002-745-10	853103-1A-10	853102-745-10	853003-1A-10	861802-745-10	861803-1A-10	852902-745-10	852903-1A-10	861902-745-10	861903-1A-10
	11	853002-772-10	853103-1A-10	853102-772-10	853003-1A-10	861802-772-10	861803-1A-10	852902-772-10	852903-1A-10	861902-772-10	861903-1A-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	853103-2-10	853102-820-10	853003-2-10	861802-820-10	861803-2-10	852902-820-10	852903-2-10	861902-820-10	861903-2-10
	14	853002-845-10	853103-2-10	853102-845-10	853003-2-10	861802-845-10	861803-2-10	852902-845-10	852903-2-10	861902-845-10	861903-2-10

** 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	853103-2A-10	853102-890-10	853003-2A-10	861802-890-10	861803-2A-10	852902-890-10	852903-2A-10	861902-890-10	861903-2A-10
	18	853002-907-10	853103-2A-10	853102-907-10	853003-2A-10	861802-907-10	861803-2A-10	852902-907-10	852903-2A-10	861902-907-10	861903-2A-10
	19	853002-918-10	853103-2A-10	853102-918-10	853003-2A-10	861802-918-10	861803-2A-10	852902-918-10	852903-2A-10	861902-918-10	861903-2A-10
	20	853002-934-10	853103-2A-10	853102-934-10	853003-2A-10	861802-934-10	861803-2A-10	852902-934-10	852903-2A-10	861902-934-10	861903-2A-10
	21	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
	22	853002-945-10	853103-2A-10	853102-945-10	853003-2A-10	861802-945-10	861803-2A-10	852902-945-10	852903-2A-10	861902-945-10	861903-2A-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	853103-2-10	853102-845-10	853003-2-10	861802-845-10	861803-2-10	852902-845-10	852903-2-10	861902-845-10	861903-2-10
	10	853002-870-10	853103-2-10	853102-870-10	853003-2-10	861802-870-10	861803-2-10	852902-870-10	852903-2-10	861902-870-10	861903-2-10
	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	853103-2A-10	853102-918-10	853003-2A-10	861802-918-10	861803-2A-10	852902-918-10	852903-2A-10	861902-918-10	861903-2A-10
	13	853002-945-10	853103-2A-10	853102-945-10	853003-2A-10	861802-945-10	861803-2A-10	852902-945-10	852903-2A-10	861902-945-10	861903-2A-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	853103-3-10	853102-988-10	853003-3-10	861802-988-10	861803-3-10	852902-988-10	852903-3-10	861902-988-10	861903-3-10
	16	853002-1002-10	853103-3-10	853102-1002-10	853003-3-10	861802-1002-10	861803-3-10	852902-1002-10	852903-3-10	861902-1002-10	861903-3-10
	17	853002-1015-10	853103-3-10	853102-1015-10	853003-3-10	861802-1015-10	861803-3-10	852902-1015-10	852903-3-10	861902-1015-10	861903-3-10
	18	853002-1032-10	853103-3-10	853102-1032-10	853003-3-10	861802-1032-10	861803-3-10	852902-1032-10	852903-3-10	861902-1032-10	861903-3-10
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	853103-3-10	853102-995-10	853003-3-10	861802-995-10	861803-3-10	852902-995-10	852903-3-10	861902-995-10	861903-3-10
	11	853002-1022-10	853103-3-10	853102-1022-10	853003-3-10	861802-1022-10	861803-3-10	852902-1022-10	852903-3-10	861902-1022-10	861903-3-10
	12	853002-1043-10	853103-3-10	853102-1043-10	853003-3-10	861802-1043-10	861803-3-10	852902-1043-10	852903-3-10	861902-1043-10	861903-3-10
	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	853103-3A-10	853102-1092-10	853003-3A-10	861802-1092-10	861803-3A-10	852902-1092-10	852903-3A-10	861902-1092-10	861903-3A-10
	15	853002-1113-10	853103-3A-10	853102-1113-10	853003-3A-10	861802-1113-10	861803-3A-10	852902-1113-10	852903-3A-10	861902-1113-10	861903-3A-10
	16	853002-1127-10	853103-3A-10	853102-1127-10	853003-3A-10	861802-1127-10	861803-3A-10	852902-1127-10	852903-3A-10	861902-1127-10	861903-3A-10
	17	853002-1140-10	853103-3A-10	853102-1140-10	853003-3A-10	861802-1140-10	861803-3A-10	852902-1140-10	852903-3A-10	861902-1140-10	861903-3A-10
	18	853002-1157-10	853103-3A-10	853102-1157-10	853003-3A-10	861802-1157-10	861803-3A-10	852902-1157-10	852903-3A-10	861902-1157-10	861903-3A-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

24X More Punctures
Than The Competition

Let The Revolution Begin.

The 9060 Series tube cutters can be used for both cutting a tube for removal and puncturing the tube for venting prior to plugging. Using the most advanced engineering principles, the cutter and blade have been designed to last longer, withstand more wear and require less force to cut tubes.

More information on page 184.
Visit our website for more information:
www.elliott-tool.com/one-revolution-tube-cutter/

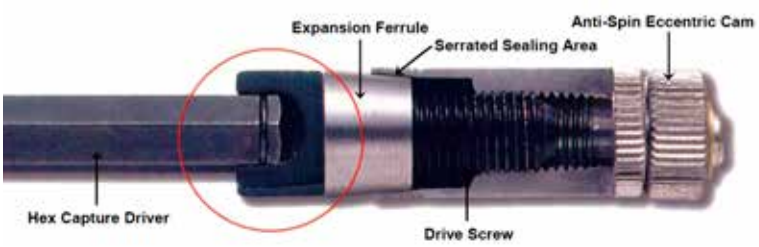
Tube Size
- 0.410" to 1.000" ID
- 10.4mm to 25.4mm ID

Maximum Pressure
- 1,000 or 6,500 PSI

Elliott's Torq N' Seal® 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 Torq N' Seal® 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 Torq N' Seal® Tube 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

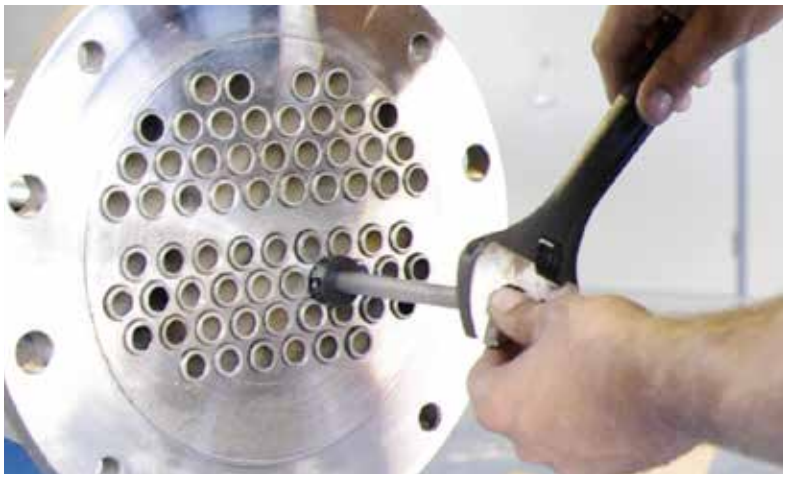
Torq N' Seal®
Mechanical Tube Plugs

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
Nuclear Class 3 and Balance-Of-Plant Certification for CANDU Power
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)
ASME Section III Nuclear: • 10 CFR 50 Appendix B • ANSI N45.2 • Ontario (TSSA)
Visit our website to read the comprehensive testing report, www.elliott-tool.com/mechanical-tube-plugs/

Spares & Accessories:
- 8830TW Torque Wrench: 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 176.

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

Measured Tube ID Range (Up to 1,000 PSI)		Plug OD		Plug Part # (10 Packs)*					
Inch	mm	Inch	mm	Brass	Carbon Steel	316 Stainless Steel	Titanium	Monel	90/10 Cu-Ni
0.410-0.445	10.41-11.30	0.405	10.29	8830-410-10	8831-410-10	8832-410-10	8833-410-10	8834-410-10	8835-410-10
0.430-0.465	10.92-11.81	0.425	10.80	8830-430-10	8831-430-10	8832-430-10	8833-430-10	8834-430-10	8835-430-10
0.450-0.485	11.43-12.32	0.445	11.30	8830-450-10	8831-450-10	8832-450-10	8833-450-10	8834-450-10	8835-450-10
0.470-0.505	11.94-12.83	0.465	11.81	8830-470-10	8831-470-10	8832-470-10	8833-470-10	8834-470-10	8835-470-10
0.490-0.525	12.45-13.34	0.485	12.32	8830-490-10	8831-490-10	8832-490-10	8833-490-10	8834-490-10	8835-490-10
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
0.530-0.565	13.46-14.35	0.525	13.34	8830-530-10	8831-530-10	8832-530-10	8833-530-10	8834-530-10	8835-530-10
0.550-0.585	13.97-14.86	0.545	13.84	8830-550-10	8831-550-10	8832-550-10	8833-550-10	8834-550-10	8835-550-10
0.570-0.605	14.48-15.37	0.565	14.35	8830-570-10	8831-570-10	8832-570-10	8833-570-10	8834-570-10	8835-570-10
0.590-0.625	14.99-15.88	0.585	14.86	8830-590-10	8831-590-10	8832-590-10	8833-590-10	8834-590-10	8835-590-10
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
0.630-0.665	16.00-16.89	0.625	15.88	8830-630-10	8831-630-10	8832-630-10	8833-630-10	8834-630-10	8835-630-10
0.650-0.685	16.51-17.40	0.645	16.38	8830-650-10	8831-650-10	8832-650 -10	8833-650-10	8834-650-10	8835-650-10
0.670-0.705	17.02-17.91	0.665	16.89	8830-670-10	8831-670-10	8832-670-10	8833-670-10	8834-670-10	8835-670-10
0.690-0.725	17.53-18.42	0.685	17.40	8830-690-10	8831-690-10	8832-690-10	8833-690-10	8834-690-10	8835-690-10
0.710-0.745	18.03-18.92	0.705	17.91	8830-710-10	8831-710-10	8832-710-10	8833-710-10	8834-710-10	8835-710-10
0.730-0.765	18.54-19.43	0.725	18.42	8830-730-10	8831-730-10	8832-730-10	8833-730-10	8834-730-10	8835-730-10
0.750-0.785	19.05-19.94	0.745	18.92	8830-750-10	8831-750-10	8832-750-10	8833-750-10	8834-750-10	8835-750-10
0.770-0.805	19.56-20.45	0.765	19.43	8830-770-10	8831-770-10	8832-770-10	8833-770-10	8834-770-10	8835-770-10
0.780-0.815	19.81-20.70	0.775	19.69	8830-780-10	8831-780-10	8832-780-10	8833-780-10	8834-780-10	8835-780-10
0.800-0.835	20.32-20.21	0.795	20.19	8830-800-10	8831-800-10	8832-800-10	8833-800-10	8834-800-10	8835-800-10
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
0.840-0.875	21.34-22.23	0.835	21.21	8830-840-10	8831-840-10	8832-840-10	8833-840-10	8834-840-10	8835-840-10
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
0.880-0.915	22.35-23.24	0.875	22.23	8830-880-10	8831-880-10	8832-880-10	8833-880-10	8834-880-10	8835-880-10
0.900-0.935	22.86-23.75	0.895	22.73	8830-900-10	8831-900-10	8832-900-10	8833-900-10	8834-900-10	8835-900-10
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
0.940-0.975	23.88-24.77	0.935	23.75	8830-940-10	8831-940-10	8832-940-10	8833-940-10	8834-940-10	8835-940-10
0.960-0.995	24.38-25.27	0.955	24.26	8830-960-10	8831-960-10	8832-960-10	8833-960-10	8834-960-10	8835-960-10
0.980-1.015	24.89-25.78	0.975	24.77	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.

MADE IN USA

Torq N' Seal®
Mechanical Tube Plugs - Up to 6,500 PSI

Measured Tube ID Range (Up to 6,500 PSI)		Plug OD		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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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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Measured Tube ID Range		Cleaning Brush Kits			Plug Removal Kits
Inch	mm	Brass	Carbon Steel	Stainless Steel*	
0.410-0.429	10.41-10.92	8802-365B	8802-410CS	8802-365SS	8800-312
0.430-0.449	10.92-11.43	8802-430B	8802-450CS	8802-430SS	
0.450-0.469	11.43-11.94		8802-470CS		
0.470-0.489	11.94-12.45				
0.490-0.509	12.45-12.95	8802-490B	8802-510CS	8802-490SS	
0.510-0.529	12.95-13.46				
0.530-0.549	13.46-13.97				
0.550-0.569	13.97-14.48	8802-550B	8802-550CS	8802-550SS	8800-375
0.570-0.589	14.48-14.99		8802-570CS		
0.590-0.609	14.99-15.49				
0.610-0.629	15.49-16.00	8802-610B	8802-610CS	8802-610SS	
0.630-0.649	16.00-16.51		8802-630CS		
0.650-0.669	16.51-17.02				
0.670-0.689	17.02-17.53		8802-670CS		
0.690-0.709	17.53-18.03	8802-690B	8802-690CS	8802-690SS	8800-500
0.710-0.729	18.03-18.54				
0.730-0.749	18.54-19.05		8802-730CS		
0.750-0.769	19.05-19.56	8802-750B	8802-750CS	8802-750SS	
0.770-0.789	19.56-20.07				
0.780-0.799	19.81-20.32				
0.800-0.819	20.32-20.83	8802-800B	8802-800CS	8802-800SS	
0.820-0.839	20.83-21.34		8802-820CS		
0.840-0.859	21.34-21.84				
0.860-0.879	21.84-22.35		8802-860CS		
0.880-0.899	22.35-22.86	8802-880B	8802-880CS	8802-880SS	
0.900-0.919	22.86-23.37				
0.920-0.939	23.37-23.88		8802-920CS		
0.940-0.959	23.88-24.38	8802-940B	8802-940CS	8802-940SS	
0.960-0.979	24.38-24.89				
0.980-1.000	24.89-25.40		8802-980CS		

** Brushes for Stainless Steel and exotic materials.*

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.

Brush Kit Includes:

- 3 Brushes

Plug Removal:

Elliott offers plug removal kits to easily remove TNS plugs.

Plug Removal Kit Includes:

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

MADE IN USA

REMOVE


45

Elliott's One-Rev Tube Cutter Produces
24X More Punctures Than The Competition

QUICK SUMMARY

The Challenge
- According to ASME PCC-2, tubes should be vented prior to plugging.
- Blades for one-revolution style tube cutters, typically used for venting thick-walled tubes, tend to break too quickly.
- 2205 duplex tubes, and other tough materials, often wear blades very quickly.

The Solution
- Elliott's One-Rev cutter is engineered to specifically handle tough tube venting applications.
- Tested using ¾" x 12 BWG carbon steel and 1" x 12 BWG 2205 duplex to prove the strength and endurance of the new cutter design.

The Results
- The on-site customer test resulted in twice as many cuts with Elliott's One-Rev compared to the competition, with the Elliott blade still intact and "looked almost brand-new."
- A separate test resulted in 24 times more tube punctures from the Elliott blade versus the competition.
- Approximate savings of over $1,100 per 100 tube punctures.

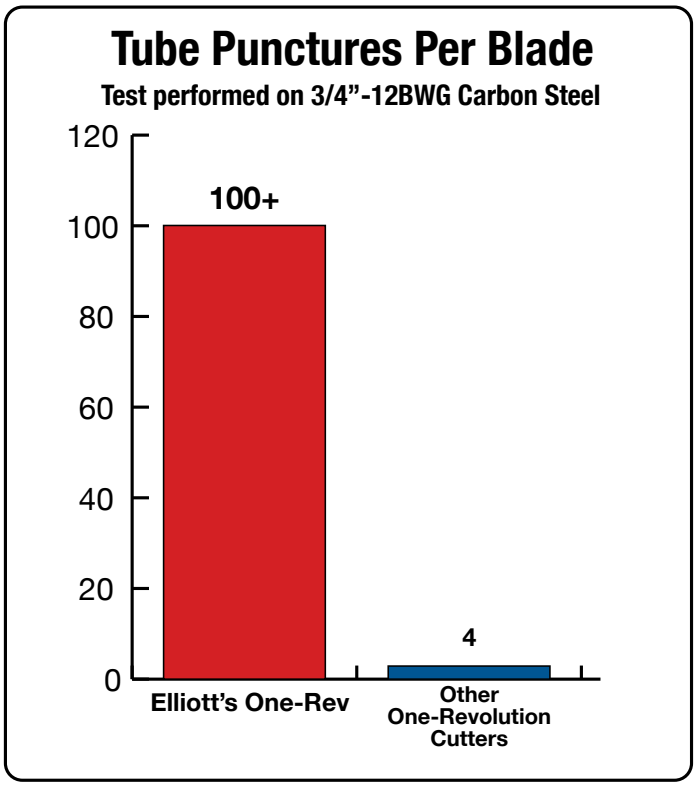
The Challenge

One of the most overlooked required practices for plugging a tube is to vent the tube beforehand. 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. ASME PCC-2 Repair of Pressure Equipment and Piping states that tube venting should be done to ensure the safety of people and equipment. If leaking tubes are plugged without being vented, corrosion deposits or polymerized process fluids can seal the perforation or crack that lead to the original leak. Fluid and/or gas captured inside the tube can result in a buildup of pressure that may be high enough to eject the plug, causing injury to nearby operators or equipment. Due to the severity of these concerns, tube venting is recommended.

The most common method for venting a tube is to use a one-revolution style tube cutter. While a one-revolution tube cutter is designed to cut a tube, it also works extremely well for venting. In order to create a small puncture in the tube material, the operator must manually turn the cutter with a ratchet or wrench approximately ¼ turn. Due to the high forces at work on a small area of the cutting tool, the quality and strength of the cutter blade is important to complete the job quickly and efficiently. One of the most common challenges associated with a one-revolution style cutter, is the short lifespan of the cutting bit. While a majority of cutting bits may perform well on softer materials, they struggle to cut tougher materials. When used over an extended period of time on tougher applications such as, 12 BWG (0.109") carbon steel tubes or 2205 duplex, the bit may only make it through a few punctures before breaking.

The Solution

While many one revolution cutters have similar exteriors, Elliott's One-Rev



> *"After already getting two times the number of punctures out of Elliott Tool's bit than a competing product, I inspected your bit and was really surprised that it still looked almost brand new."*
>
> *-Operator*

The Results

deploys more advanced engineering principles with over 12 key differences that result in a superior product. When designing the One-Rev, Elliott focused on two main areas: increasing the life of the cutter bit to withstand increased wear and reducing the amount of force required to use the product. As a result, Elliott's One-Rev cutter blade is designed to withstand even the toughest of materials.

This report will present two tests. During the initial test, operators utilized ¾" x 12BWG (0.109") carbon steel to test the strength and endurance of the improved One-Rev blade. Additionally, operators measured the amount of force required to use the One-Rev cutter, in comparison to other designs. The second customer test used 1" x 12BWG (0.109") duplex steel. This test primarily focused on the blade strength of Elliott's One-Rev, in comparison to other types of one-

After conducting the two tests above, the quality of Elliott's One-Rev clearly surpassed that of other manufacturers. The initial test on ¾" x 12BWG (0.109") carbon steel tubes, was able to create more than 110 punctures using the same blade. The blade still remained intact after the conclusion of the trial (See Picture, Page 1). Additionally, the operator reported a 20% reduction in the amount of force required to operate the One-Rev, making it easier for the operator to utilize. Overall, Elliott's One-Rev was able to puncture significantly more tubes with less blade wear and force when compared to alternative one-revolution cutters.

The second test was conducted using 1" x 12BWG (.109") 2205 duplex. Elliott's One-Rev was able to create multiple punctures within the tube material, whereas other one-revolution style cutters struggle to puncture the tube at all. One of the operators commented "after already getting two times the number of punctures out of Elliott Tool's bit than a competing product, I inspected your bit and was really surprised that it still looked almost brand new." Overall, this test was able to demonstrate the strength and quality of Elliott's One-Rev blade design.

When comparing Elliott's One-Rev to that of other manufacturers, Elliott's cutter was able to create over 100 punctures while leading competitors only produced 4. As a result, Elliott's One-Rev has the power to produce over 24X more tube punctures per blade when compared to other brands. On a job requiring 100 punctures, that's an approximate savings of over $1,100 in blades. Overall, Elliott's improved One-Rev cutter design performs significantly higher than that of other manufacturers.

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	-	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	-			
	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

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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)

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

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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
- Pneumatic Motors: Are highly recommended over electric motors for use with boiler tube cutters.
- Drive Socket required for use with Drive Motor. See page 95 for more information.

Each 376 / 396 Series 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 SpeedCut

Saves Time & Increases Safety

“...it would take us two to three days to dismantle heat exchanger bundles. Now we do so in only a few hours, bringing down maintenance costs and safeguarding the health and safety of workers.”
-Eng. Rogelio Gómez Jiménez

SpeedCut 78 shown with Clamp System (optional)

We are writing to express our satisfaction with the performance of the Elliott Tool Tech SpeedCut 78 Tube Bundle Cutter, which was acquired by our refinery.

Ever since, this equipment has saved significant amounts of time in terms of carrying out work for our heat exchangers workshop. Prior to purchasing this machine, it would take us two to three days to dismantle heat exchanger tube bundles, employing rudimentary methods. Now, however, we do so in only a few hours, bringing down maintenance costs as well as safeguarding the health and safety of workers.

All of this, by reducing execution time and the number of workers, allows us to better organize our work, which implies an increase in our productivity.

In summary, we are very satisfied with our purchase.

ENG. ROGELIO GÓMEZ JIMÉNEZ
DIRECTOR OF MAINTENANCE ENGINEERING

SUB-DIRECTORATE OF PRODUCTION
ENG. ANTONIO DOVALI JAIME
OFFICE OF THE DIRECTOR OF THE REFINERY

PEMEX Refinacion
Salina Cruz, Oaxaca

PEMEX

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

SpeedCut
Tube Bundle Cutter

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:

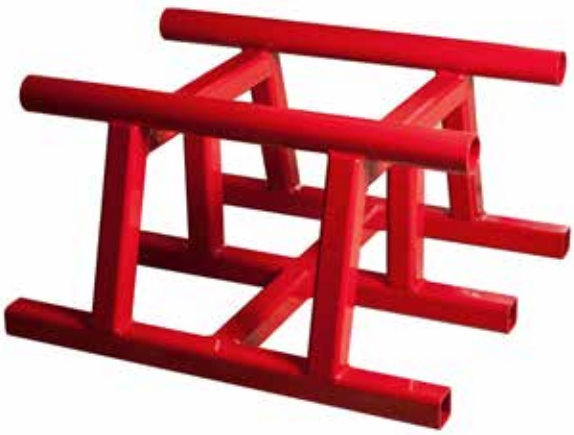
- Bi-Metal Bandsaw Blades: Long-life, high quality blades for most materials, including copper, stainless steel and exotic materials.
- Clamp System: Allows for improved stability of the tube sheet during the sawing process and an added measure of safety for the crew and the machine.
- Bundle Support 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

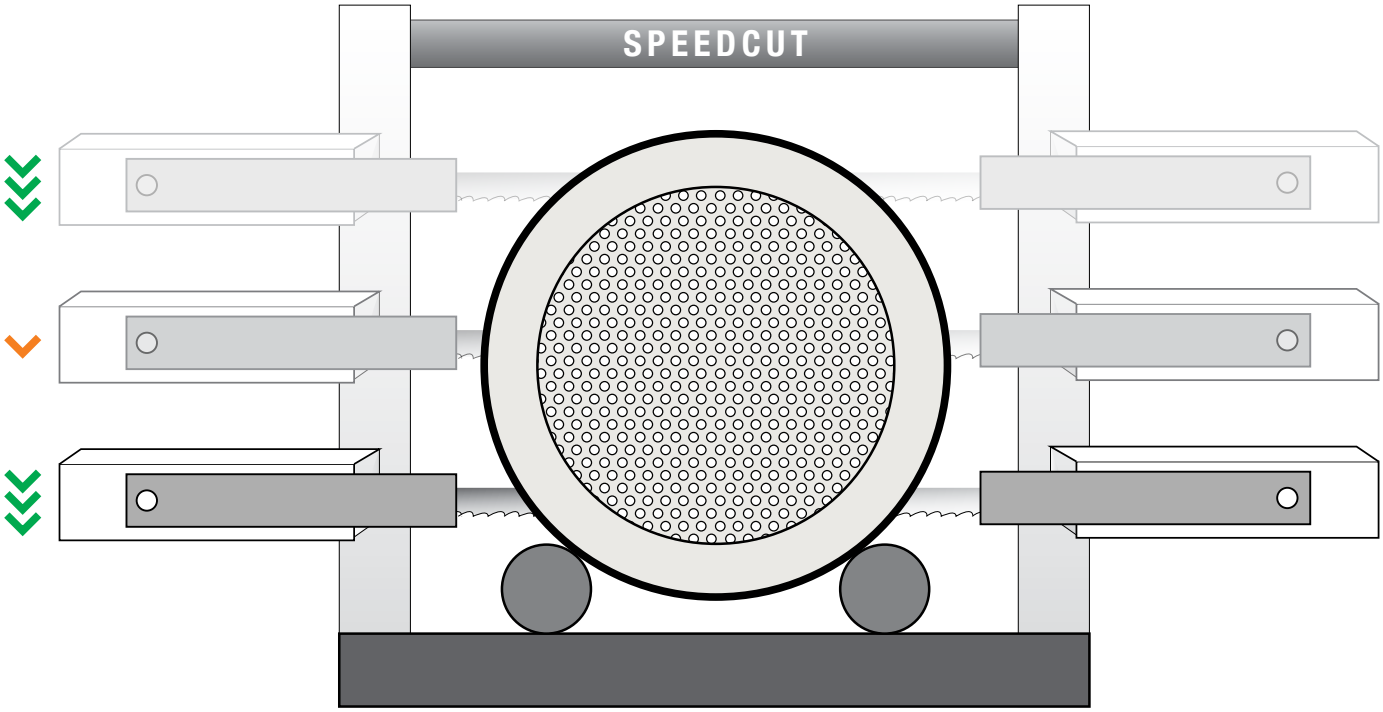
Cutting Speed



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)

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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

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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*	Tool Kit**	Collet Set	Draw Bar	Nose Piece
5/8” (15.9mm)	18-20	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 194)***
- 220V: M5776-00 ***(See page 194)***
- Pneumatic: M5775-00* ***(See page 194)***

**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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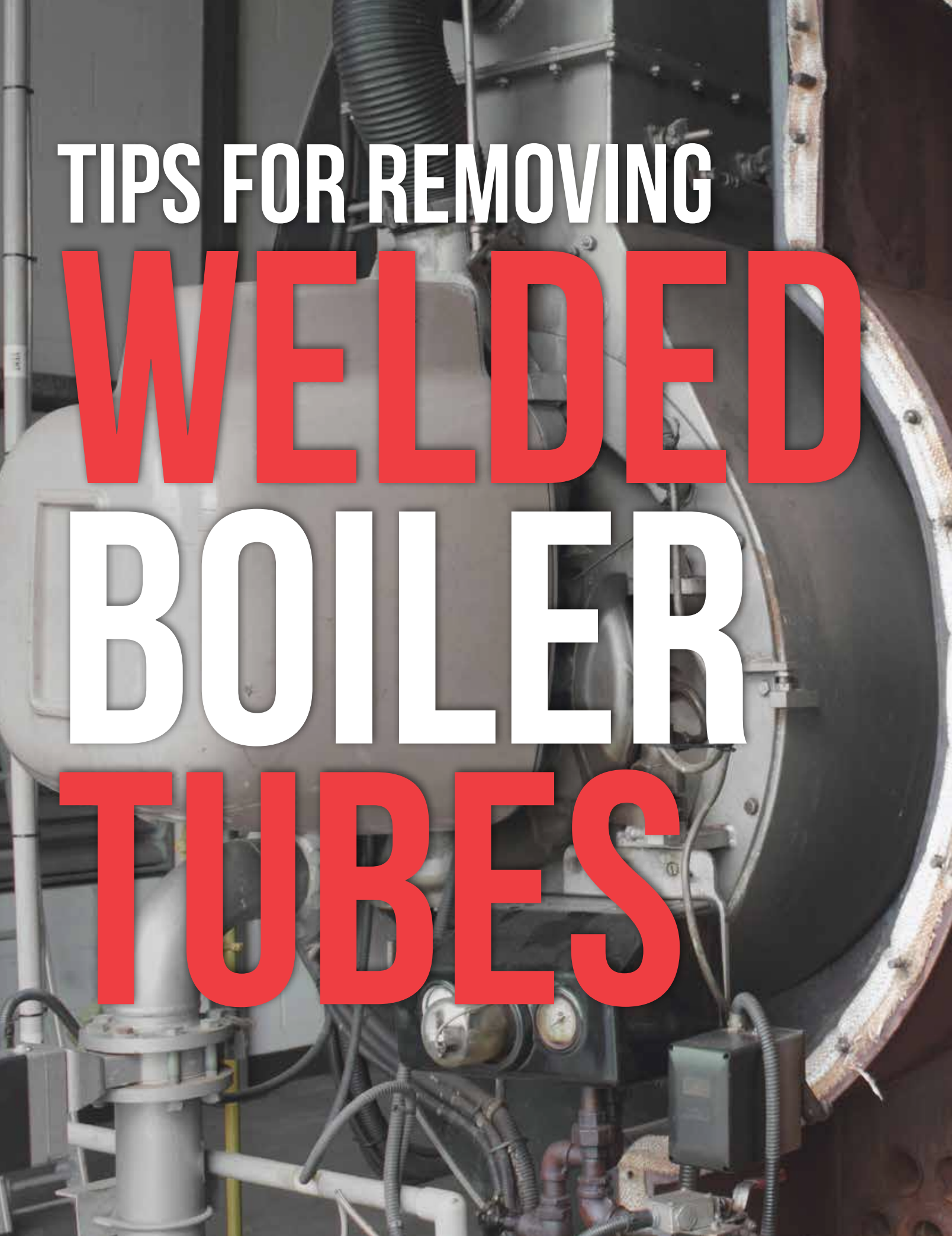

TIPS FOR REMOVING WELDED BOILER TUBES

Tubes are welded for many different reasons, such as providing additional leak protection or to carry additional load. Although welds can be beneficial while the vessel is in service, it can cause some challenges during the removal process.

Removing The Weld

If a tube end is flared, welded, or roll beaded, the end will need to be removed prior to being pulled or knocked out. One common method for weld removal is with a grinder. While this is a fairly inexpensive method for removal, it does have a lot of challenges. The grinding process can be very time consuming and hard on operators. Additionally, if it's not used carefully, the grinder can gouge or damage the tube sheet and tube sheet hole. If this happens, the tube sheet hole will need to be reformed or smoothed out before new tubes are installed. If damage is not repaired, it can result in a poor metal-to-metal joint.

Another method for weld removal is with an end prep tool, also known as a tube auger, boiler gun, or mill hog. This tool can be used to remove welds, flares, or beads from a tube end. End prep tools are easy to use and don't require the same amount of precision as a grinder. The tool uses collet jaws to grip the inside of the tube while the operator turns a series of ratchets, slowly advancing a blade towards the tube sheet until the weld is fully removed.

Removing The Tube

Once the weld has been removed from the tube end, the tube removal process can begin. There are several methods that can be used to remove boiler tubes such as spear pulling, knockout tools, torching, and induction heating of the tube.

Spear Pulling

Spear pulling can be used to remove both tube stubs and tubes, depending on the style of puller. For this method, a spear is set into a tube using an impact drill. This allows the teeth of the spear to grip the ID of the tube. Once the spear is in place, a hydraulic ram is used to pull the tube free from the tube sheet. This is an operator friendly option that removes tubes without causing damage to the tube sheet. However, this method is not always guaranteed as corrosion, grooves, and expanded sections behind the tube sheet can make removal a challenge or impossible.

Knockout Tools

One of the most common methods for tube removal is a knockout tool and pneumatic hammer. When tubes can't be pulled with a spear, a knockout tool can be used to punch tubes out of the tube sheet. While effective, this process is hard on operators and can cause damage to the face of the tube sheet if not used carefully. As a result, many operators choose to start with a tube puller and reserve knockout tools for difficult tubes.

Torching

Torching is often used to cut a seem or notch down the center of a tube to relieve the "hoop strength" at the joint. After which a knockout tool or strike method would need to be used to free the stubs from the tube sheet or drum.

Induction Heating

Induction Heat Tube Extraction, developed by Babcock & Wilcox, is an innovative method of removing tube stubs from water tube boilers. This process heats the tube stub where it is expanded into the drum, then quickly cools it to shrink the tube. Once the seal is broken, a tube puller with pull rods can be used to extract the tube stub from the drum. This method of removal offers minimal risk of possible damage to the drum. A knockout tool (tube drift) and tube buster (Rivet Buster) can also be used to drive out the tube stub, but it increases the risk of potential damage to the drum tube hole.

While removing welded boiler tubes may be challenging, there are a few tips that can make the process easier. End prep tools are a quick and easy way to remove welds from the tube sheet. Additionally, using a tube puller with spears or induction heating reduces further risk to the tube sheet and can be easier than using a knockout tool or tube buster.

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 205.****
- Collet Set ***See table on page 205.****
- Nose Piece ***See table on page 205.****

**** 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 205.****
- Collet Set ***See table on page 205.****
- Nose Piece ***See table on page 205.****

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

Optional Counterbalance

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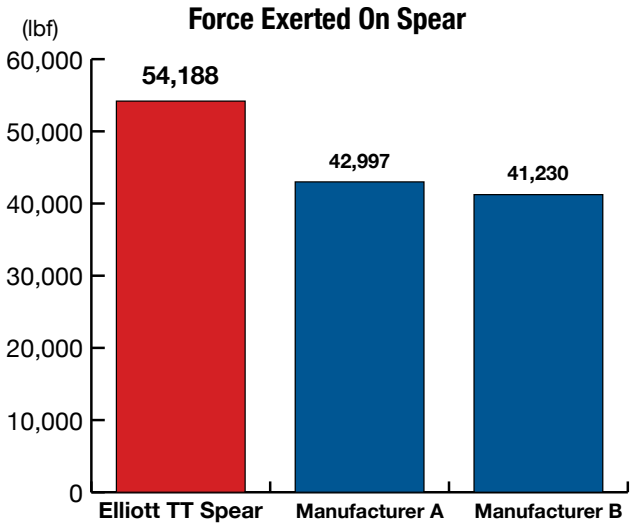
TT Tube Spears

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" Reach	48" Reach	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			

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** 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.*

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 209.***
- Spear Extension ***See table on page 207.***
- Extension Chair ***See table on page 207.***
- 80-3055-3-00 Spear Adapter ***See table on page 207.***
- 80-3055-4 Horseshoe Lock ***See table on page 207.***

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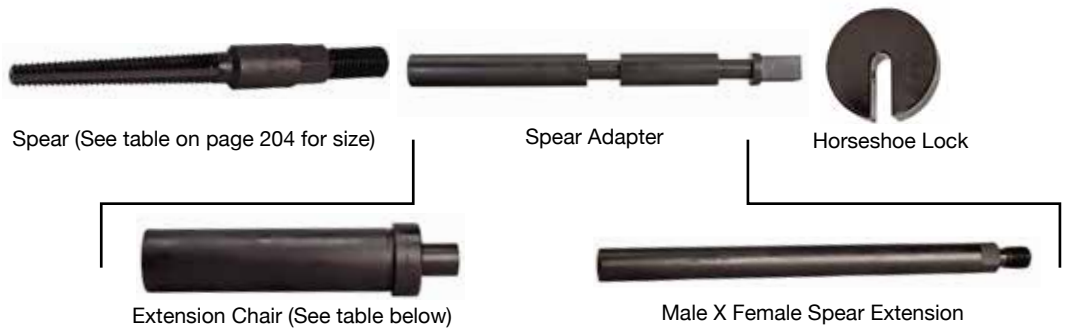
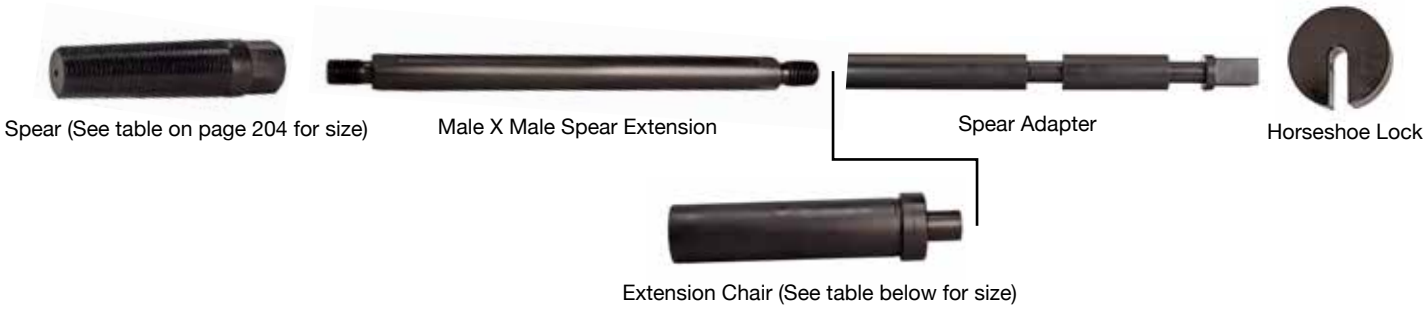
Spear and accessory items for tube OD sizes 3/8” (9.5mm) thru 1” (25.4mm).



80-3055-10 Spear Extension and 80-3055-7 Extension Chair are recommended to allow the operator to work from the outside of the water box and channel plate applications.

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



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**
1” - 1/4” (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

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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 209.****
- 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

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Tube Size

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

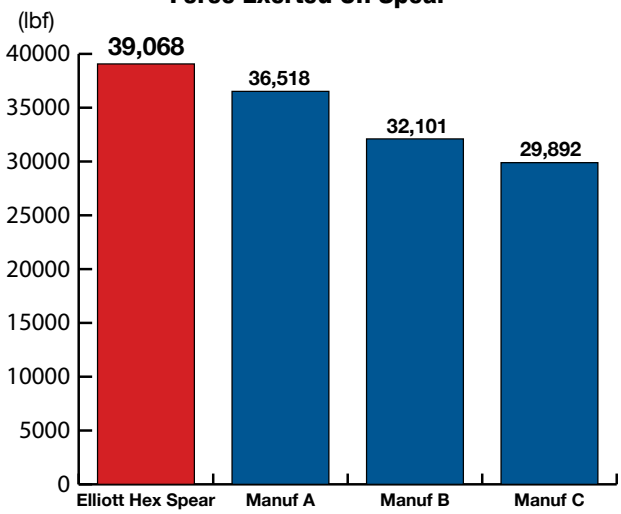
1” (25.4mm) and Smaller Spears with Male Adapter Threads

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.

Force Exerted On Spear



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.

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.

"In the competitive environment we are in, Metalforms is always looking for ways to reduce our costs, improve our quality, and improve our safety. It is good when we can find a supplier that can do one of those really well. We are impressed when a supplier can do two of those. Elliott Tool was instrumental in helping us with all three!"

-Dave Hearn, President
Metalforms, Ltd.

"They [Elliott] have always strived to have on-time shipments, great service, and maintain 100% stocking levels. We have had several other companies try to supply this facility, but no one will give us the attention, service, or quality that Elliott has always given us. Elliott is a true team player."

-Anthony Conti, Site Manager
Bruckner Supply Co.

"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

"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

"I could only wish the majority of my supplier base could improve to Elliott's level of customer satisfaction we here at Parker Hannifin Aerospace business unit have become used to. I would be honored to be called upon to recommend Elliott as a source of supply."

-Paul Irwin, Procurement Manager
Parker Hannifin - Aerospace

SUPPORT


ELLIOTT

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.

Rentals are made on a daily basis that begins when you receive the item and finishes when you ship the item back to Elliott. *In other words, you do not pay for transit time to and from Elliott Tool.* Rentals are quoted and charged on a daily basis with a 7-day minimum. Upon shipment Elliott will invoice you for 7 days of rental, any consumable items, plus outbound freight. Upon receipt of your rental return, Elliott will invoice for the remaining balance. In the case of rentals spanning more than a month, Elliott may charge in monthly increments for customers with credit terms of that length or longer.

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.

Expert Tips & Tricks

Do you have a tough application question or want to learn more about a product? Then sign up to receive our monthly newsletters!

Elliott Tool Newsletters Offer:

- Tips & Tricks
- Expert Advice
- Results Reports
- New Product Announcements

For more information about our newsletter or to subscribe, visit www.elliott-tool.com.

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

Productivity. Speed. Ergonomics.

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Uncompromising consistency with faster productivity.

1 Roll Every Tube To Spec

Direct Torque™ Electric Torque Control measures torque and controls system functions regardless of fluctuations in air supply. Allows you to roll to the target wall reduction each time to eliminate costly re-rolling.

2 Automatic Tool Lubrication

Through the cage Auto Lubrication increases tool life by providing automatic expander lubrication exactly where it's needed, through the cage and directly to the rolls & mandrels.

3 Zero Trigger Cycling

Trigger-less operation increases ergonomics with a simple on/off switch for operation. No need to hold down a trigger during the entire job.

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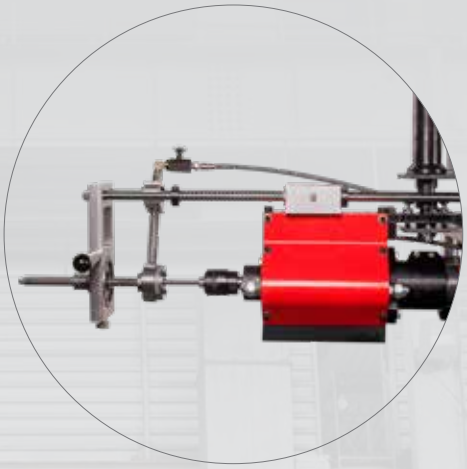
>
> **-Ryan Pitre, Manufacturing Engineer, Alfa Laval**

For more information, see page 88.

To see the Rapid Hawk in action, go to www.elliott-tool.com/rapidhawk

1



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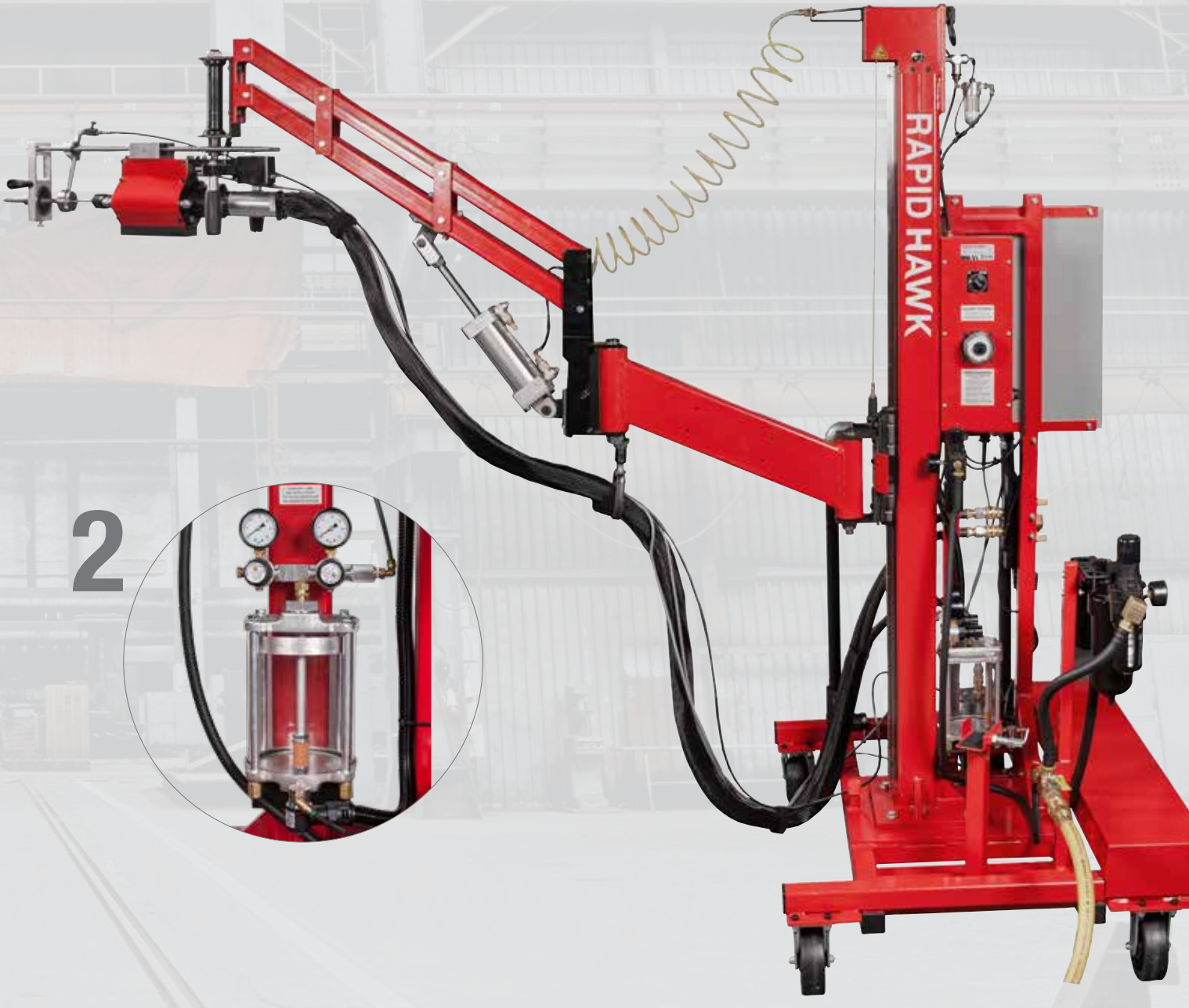

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For more information see page 100.

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