

Airetool®

Tube Service Tools



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Warranty

Subject to the terms and conditions hereinafter set forth, Apex Tool Group, LLC (the company) warrants products and parts sold by it, insofar as they are of its own manufacture, against defects of material and workmanship, under use and service in accordance with Company's written instructions, recommendations, and ratings for installation, operating, maintenance, and service of products, for a period of ONE YEAR FROM THE DATE OF SHIPMENT by Company, or any of Company's authorized Distributors.

This warranty is limited to the repair or replacement, as Company may elect, of any defective parts, regarding which, upon discovery of the defects,

the purchaser has given immediate written notice. Installation and transportation costs are not included. Company shall have the option of requiring the return to it of the defective material, transportation prepaid, for inspection.

COMPANY DOES NOT WARRANT THE MERCHANTABILITY OF ITS PRODUCTS AND DOES NOT MAKE ANY WARRANTY, EXPRESS OR IMPLIED OTHER THAN THE WARRANTY CONTAINED HEREIN, COMPANY HAS NOT AUTHORIZED ANYBODY TO MAKE ANY REPRESENTATION OR WARRANTY OTHER THAN THE WARRANTY CONTAINED HEREIN.

Lubrication Products

Apex Tool Group products are classified as non-hazardous manufactured items, defined in the OSHA 1910.1200 Hazard Communication Standard as "Articles". These products, under conditions of normal use, do not release or cause exposure to a hazardous chemical.

Under normal conditions of use, lubrication products sold separately for or used within these tools should not cause an exposure hazard. Refer to the Material Safety Data Sheet (M.S.D.S.) for Safety and Disposal Information. M.S.D.S. sheets are available upon request from Apex Tool Group.

Apex Tool Group is also aware of, and complies with,

the provisions of section 611 amendments to the Clean Air Act of 1990. No ozone depleting chemicals have been used in the manufacture of our products.

If you resell or distribute these products, you have the responsibility for ensuring that the Material Safety Data Sheets are provided to the purchaser.

Proper lubrication is essential to the economical operation of pneumatic and electric tools. Apex Tool Group perform better and their life is extended by using the recommended lubricants. All lubricants that are listed in the accessory section of this catalog have undergone extensive testing and are recommended for use with Apex Tool Group products.

Airetool Products and Services

Airetool Tube Cleaners and Tube Expanders are used to fabricate and maintain boilers, heat exchangers, condensers and other tubular type equipment. Job proven in a variety of industries, Airetool products serve such facilities as petro chemical plants, oil refineries, nuclear and non-nuclear power plants, paper, sugar and metal mills, air-conditioning servicing and maintenance plants.

Products described in this catalog are representative of the complete Airetool Tube Cleaner and Tube Expander product lines. If a need develops which can not be satisfied by our standard products, please contact your Airetool Distributor, or your Apex Tool Group Sales and Service Center.

The Airetool® family of tube service tools is one of the most diverse in the heat transfer industry with a broad selection of tube expanders, tube rolling controls, tube cleaners, and re-tubing tools to cover various applications.

Airetool®

Tools that perform

Improving production rates and decreasing cost are critical to the success of today's manufacturer or contractor. The Airetool line of tools are designed and manufactured to perform consistently time after time. When it comes to performance and reliability, there is no doubt as to why manufacturers and contractors around the world have come to rely on the Airetool brand of products.

Tools of the highest quality

When we say our tools are built well, we really mean it. Apex Tool Group manufacturing processes are ISO 9001 certified... that means the Airetool brand is manufactured to the highest standard.

Tools that work with the operator

It is simple... give an operator a tool that is comfortable to use and the operator will work better. Airetool tool balancing systems do just that, coupled with extending expander or other tooling life.



Tools that set the standard

Outstanding performance, incredible durability, plus the ease of maintenance have made Airetool tube rolling controls the standard which all other manufacturers are measured against.

Why use torque control when expanding tubes?

Torque controlled tube rolling increases productivity by achieving the desired tube wall reduction each and every time a tube is expanded. Torque-controlled tube rolling compensates for variations in the tube wall thickness and the tube sheet hole dimensions.

What is tube wall reduction?

Tube wall reduction is the percent the tube wall is reduced after the tube OD has contacted the tube sheet ID. The amount of tube wall reduction varies with the tube material, the tube sheet material and the design requirements of the unit. Several factors including pullout strength, tube and tube wall thickness, tube sheet material and thickness, and operating pressure are considered in determining the optimum wall reduction.

Tube Rolling Set - Up Guide

Pick five tubes in the vessel to be rolled and complete the work sheet below. It is important that

the measurements used in the set up are actual. Never use averaged dimensions.

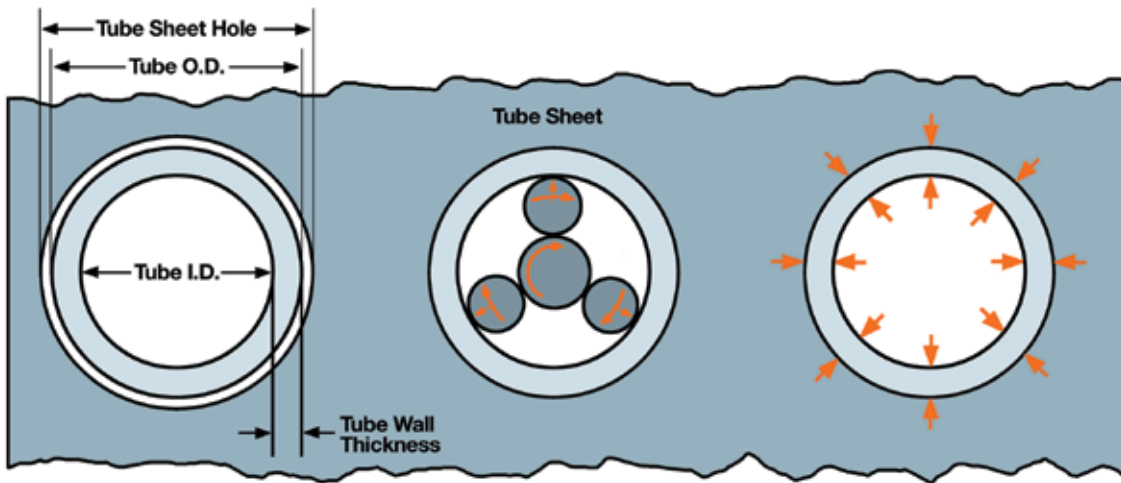
Always Use Engineering Design Specifications for Tube Wall Reduction Percentage

Satisfactory joints are produced using the above listed percentage of tube wall reduction.

- Step A – Measure tube sheet hole
- Step B – Measure tube OD
- Step C – Calculate clearance (A-B)
- Step D – Measure tube ID
- Step E – Calculate 2x wall thickness (B-D)
- Step F – Calculate 5% wall reduction* (.05 x E)
- Step G – Calculate finished rolled ID (C+D+F)

After the work sheet is finished, start setting up the torque control motor by test rolling the first of the five tubes. The first test roll must be done with the Airetrol or Electric tube rolling motor set for low torque to avoid over rolling.

Measure the tube ID after rolling the first tube. If more expansion is needed, increase the torque setting on the control and roll the second tube. Check the finished ID. This step may require repeating on tube three, but by the fifth tube you should have achieved your desired finished rolled ID of step G below. The tubes rolled to calibrate the tube wall reduction can now be re-rolled at the correct setting.



STEP	EXAMPLE	Joint Number				
		1	2	3	4	5
A	Tube Sheet Hole	.760"				
B	- Tube OD	.750"				
C	= Clearance	.010"				
D	Tube ID	.620"				
E	2 x Wall Thickness	.130"				
F	+5% Wall Reduction*	.006"				
G	= Finish Rolled ID	.636"				

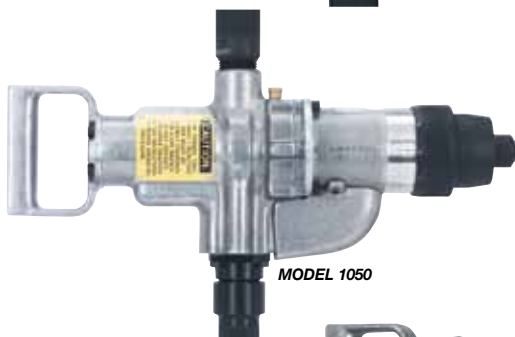
*Example only



MODEL 720



MODEL 850



MODEL 1050



MODEL 1550

Airetrol Air Driven Rolling Motors

Airetool rolling motors control expansion by the accurate measurement of torque. They automatically stop expanding according to a predetermined setting. Torque control prevents over- and under-expansion of tubes, assures uniformly tightened tube joints, and provides maximum holding strength for individual tubes. All Airetrols include torque sensing cams designed and manufactured specifically for tube expanding applications.

- Strong, lightweight aluminum housings for easier handling and less operator fatigue
- Rugged drive combines precision control and measured torque output
- Simple dial-a-torque adjustment collar for easy set up
- Cushioned shut-off reduces torque reaction
- Quick change chucks to improve productivity



Model Number	Order Number	Speed & Torque @ 90 psig Air Pressure*					Overall Length		Weight		Side to Center		Operating Hose		CFM	Square Drive	Tube Capacities*		Quick Change Chuck (in.)	
		Free Speed	Max. Torque	Min. Torque		RPM														
720-2500B	8405541	2500	20.0	2.3	2.0	0.23	7.875	198	2.4	1.09	0.813	20.7	3/8	9.5	17	1/4	1/4	6.4	1/4	3/8
720-2500B 3/8	8405561	2500	20.0	2.3	2.0	0.23	7.875	198	2.4	1.09	0.813	20.7	3/8	9.5	17	1/4	1/4	6.4	1/4	3/8
720-1800B	8405383	1800	27.0	3.1	2.0	0.23	7.875	200	2.4	1.09	0.813	20.7	3/8	9.5	17	1/4	3/8	9.5	1/4	3/8
720-1800B 3/8	8405512	1800	27.0	3.1	2.0	0.23	7.875	200	2.4	1.09	0.813	20.7	3/8	9.5	17	1/4	3/8	9.5	1/4	3/8
720-550B	8405391	550	75.0	8.5	2.0	0.23	8.625	219	2.7	1.22	0.813	20.7	3/8	9.5	17	3/8	1/2	12.7	3/8	1/4
850-1250A	8405399	1100	115.0	13.0	22.0	2.49	12.250	311	10.5	4.76	1.438	36.5	1/2	12.7	48	3/8	3/4	19.1	3/8	1/2
850-600A	8405398	500	192.0	21.7	31.0	3.50	12.250	311	10.5	4.76	1.438	36.5	1/2	12.7	48	3/8	1	25.4	3/8, 1/2	-

*Varies depending on tube material, gauge, and tube sheet thickness

Model Number	Order Number	Speed & Torque @ 90 psig Air Pressure*					Overall Length		Weight		Side to Center		Operating Hose		CFM	Square Drive	Tube Capacities*		Quick Change Chuck (in.)	
		Free Speed	Max. Torque	Min. Torque		RPM														
1050-400	8404200	394	22.0	29.8	6.5	8.8	13.625	346	14	6.35	1.938	49.2	3/4"	19.1	68	1/2	1-1/4	31.8	3/8, 1/2	3/4, 1
1050-400 HD	8404201	394	29.5	40.0	7.5	10.2	13.625	346	14	6.35	1.938	49.2	3/4"	19.1	68	1/2	1-1/4	31.8	3/8, 1/2	3/4, 1
1550-900	8404290	756	30.7	41.6	4.7	6.4	18.000	457	27	12.25	1.938	49.2	3/4"	19.1	70	1/2	1-1/2	38.1	3/8, 1/2	3/4, 1
1550-250	8404280	217	100.0	135.5	25.0	33.9	18.000	457	27	12.25	1.938	49.2	3/4"	19.1	56	3/4	2-1/2	63.5	3/4, 1	3/8, 1/2

*Varies depending on tube material, gauge, and tube sheet thickness

Rolling Controls

Hand-held Torque Controller Rolling Motors

1850 Series Torque Control Rolling Motors

Heavy duty torque controlled rolling motor capable of rolling boiler tubes up to 4-1/2" O.D.

- Offers the highest controlled torque of any rolling motor currently available.
- Torque range 320 - 570 ft.lbs.



1750 Series Right Angle Torque Control Rolling Motors

These right angle torque control rolling motors are used to roll tubes into drums of package and stationary boilers.

- Heavy duty gear train components for increased durability
- External torque control setting for easy adjustment
- Rotating exhaust deflector and indexing angle head for operator control and comfort
- Modular construction simplifies tool maintenance
- Roll Throttle makes for safe operation in any working position



Model Number	Order Number	Speed & Torque 90 psig Air Pressure*					Overall Length		Weight		Side to Center		Operating Hose		CFM	Square Drive	Tube Capacities*		Chucks (in.)†	
		Free Speed	Maximum Torque		Minimum Torque		in.	mm	lbs.	kg	in.	mm	in.	mm			in.	mm	Incl.	Opt.
		RPM	ft. lbs.	Nm	ft. lbs.	Nm														

1850 Series Torque Control Rolling Motors

1850-90	8405315	82	301	408	92	125	13	330	46	20.9	3.375	86	1/2	12.7	60	1	3-1/2	89	3/4, 1	1-1/4, 1-1/2
1850-40	8405314	34	570	772	320	434	15	381	52	23.6	3.625	92.1	1/2	12.7	60	1	4-1/2	114	3/4, 1	1-1/4, 1-1/2

*Varies depending on tube material, gauge, and tube sheet thickness

Model Number	Order Number	Speed & Torque 90 psig Air Pressure*					Overall Length		Weight		Head Dimensions				Square Drive Size	Tube Capacities*		Chuck Size (in.)†	
		Free Speed	Maximum Torque		Minimum Torque		in.	mm	lbs.	kg	Side to Center		Height Less Square Drive			in.	mm		incl.
		RPM	ft. lbs.	Nm	ft. lbs.	Nm					in.	mm	in.	mm					

1750 Series Reversible – Roll Throttle

1753-R-190	8405420	190	140	190	70	95	20.1	530.0	13.0	5.8	1.1	28.0	2.60	65.0	5/8	2.5	63.5	3/4
1753-RS-190	8405422	190	155	210	0	0	19.4	490.0	11.4	5.2	1.1	28.0	2.50	64.0	5/8	2.5	63.5	3/4
1752-R-90	8405421	90	305	413	150	203	21.7	550.0	14.8	6.7	1.5	37.0	2.75	70.0	3/4	4.0	101.5	3/4, 1
1752-RS-90	8405423	90	325	440	0	0	20.1	511.0	13.1	6.0	1.4	37.0	2.8	70.0	3/4	4.0	101.5	3/4, 1

1750 Series Reversible – Lever Throttle

1752-L-90	8405425	90	305	413	150	203	21.7	550.0	14.8	6.7	1.5	37.0	2.60	65.0	3/4	4.0	101.5	3/4, 1
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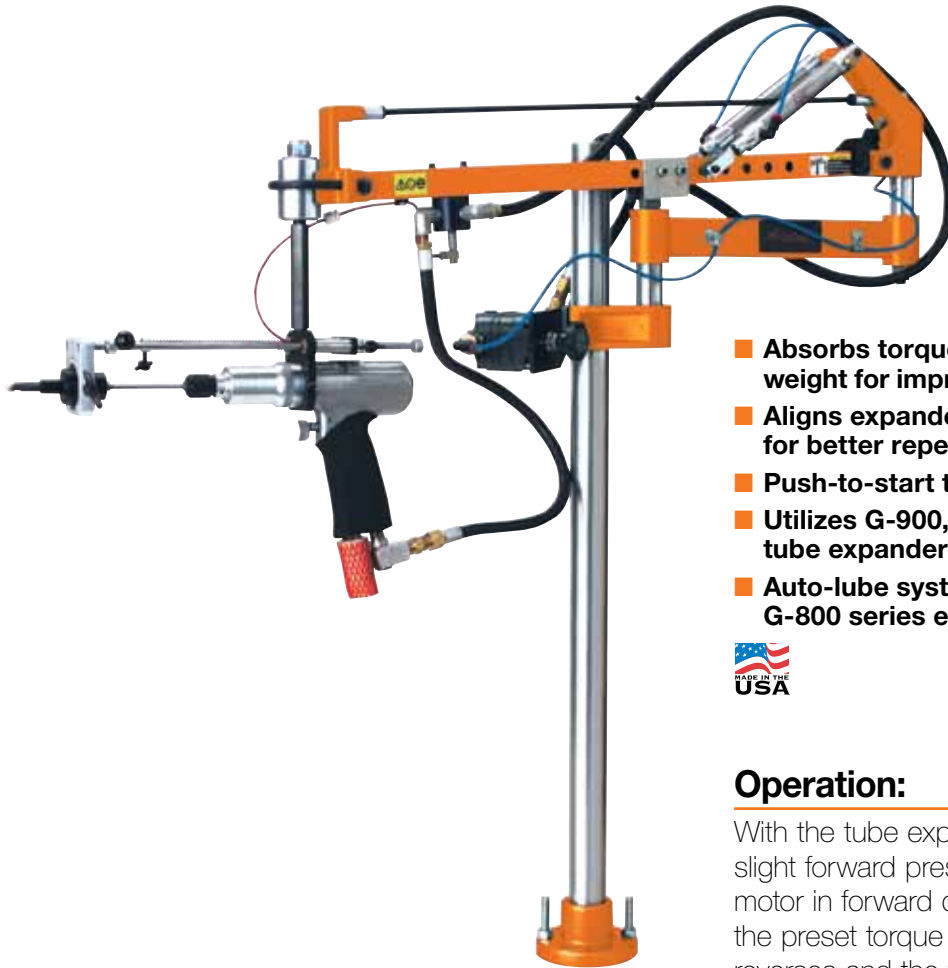
† See page 13 for chuck size chart.

*Varies depending on tube material, gauge, and tube sheet thickness

Standard Equipment
 Air Inlet: 1/2" NPT
 Minimum hose size: 1/2"
 Splined torque reaction plate and reaction bar included (8567610)

DAS-100-TRS Tube Rolling System

Tube rolling system for bench top tube rolling. The support post can be mounted directly on a work-bench or workstation pedestal for easy access. Suitable for tube rolling applications of 1/4" thru 5/8" O.D. tubes.



- Absorbs torque reaction while supporting tool weight for improved productivity and ergonomics
- Aligns expander with tube sheet for better repeatability
- Push-to-start tube rolling cycle
- Utilizes G-900, G-1300 and G-800 series tube expanders
- Auto-lube system configurations for use with G-800 series expanders with lube collars



Operation:

With the tube expander positioned inside the tube, slight forward pressure on the Airetrol starts the motor in forward direction to expand the tube. Once the preset torque is met, the motor automatically reverses and the tube expander can be removed from the tube. The tube expander holder is spring loaded, keeping the tube expander in the retracted position to assist the expander entering the tube.

Model Number	Order Number	Post Height		Vertical Travel		Horizontal Travel	
		in.	mm	in.	mm	in.	mm
DAS 100 THB - Balancer Less Rolling Motor							
DAS 100 THB	5526551PT	29.0	736.6	14.5	368.3	77.0	1955.8

Model Number	Order Number	Free Speed RPM	Speed & Torque 90 psig Air Pressure				CFM	Tube Capacities*		Chucks (in.)†	
			Maximum Torque		Minimum Torque			in.	mm	Included	Optional
			in. lbs.	Nm	in. lbs.	Nm					
DAS 100 TRS 720 Tube Rolling Systems with Motors											
DAS 100 720 2500B	5525242	2500	20.0	2.26	2.0	0.23	17	1/4	6.3	1/4	3/8
DAS 100 720 1800B	5525243	1800	27.0	3.05	2.0	0.23	17	3/8 - 1/2	12.7	1/4	3/8
DAS 100 720 1800B 3/8 L**	5526141	1800	27.0	3.05	2.0	0.23	17	3/8 - 1/2	12.7	3/8	1/4
DAS 100 720 550B	5525244	550	75.0	8.48	2.0	0.23	17	1/2 - 5/8	15.8	3/8	1/4
DAS 100 720 550B L**	5526142	550	75.0	8.47	2.0	0.23	17	1/2 - 5/8	15.8	3/8	1/4

† See page 13 for chuck size chart.

*Varies depending on tube material, gauge, and tube sheet thickness

**L = Auto-lube

Rolling Controls

DAS II Dominator Tube Rolling Systems

DAS II Dominator System

The Airetool DAS II Dominator Tube Rolling System was designed to take pneumatic tube rolling technology to the next level using time proven Airetool rolling motors outfitted with on-board pneumatic control logic.

- Fully pneumatic system for fabrication shops and/or field service work
- “Basic” unit works well with tube pulling, tube end facing, and orbital welding equipment
- Greatly enhances the accuracy of tube rolling reducing costly rework of improperly rolled tubes
- Increases expander life (up to 3X) compared to conventional hand-held equipment
- Ergonomic design supports tool weight and torque reaction
- Floor lock holds system in place for stability while rolling tubes
- Right or left hand operation without conversion
- Five foot vertical and horizontal reach
- Available in three different configurations: Basic Unit*, Standard, Lubricator



DAS II Component	DAS II Dominators		
	Basic Unit*	Standard	With Lube
Base	*	*	*
Tower	*	*	*
Articulating ToolArm	*	*	*
Filter & Lubricator (Tool)		*	*
Airetool Supply Hoses		*	*
Lubricator (Expander)			*

*The basic positioning unit can be used to support a wide variety of tube service tools including drills, end facers, tube cutting tools, tube pulling rams, and tube cleaning motors

Model Number	Order Number	Movement				Lift Capacity		Operating Pressure		Operating Hose		Allowable Torque	
		Vertical		Horizontal		lbs.	kg	PSI	Bar	in.	mm	ft.-lbs.	Nm
		ft.	m	ft.	m								
Automatic Tube Rolling System Less DAS II Airetool													
DAS II Dominator	5526081	5.0	1.5	5.0	1.5	55	25	90	6.2	3/4	19.1	125	169
DAS II Dominator w/lube	5526140	5.0	1.5	5.0	1.5	55	25	90	6.2	3/4	19.1	125	169
Basic Positioning Unit*													
DAS II Dominator Basic Unit	5529158	5.0	1.5	5.0	1.5	55	25	90	6.2	3/4	19.1	125	169



DAS II Dominator System

The Airetool DAS II Dominator Rolling Motors are designed to deliver power, performance, and durability while providing accurate and repeatable tube expansion.

- Time proven torque control rolling motors with on-board pneumatic control logic
- Simple dial-a-torque adjustment collar for easy set up
- Push-to-start configurations (no suffix) run only when activated, reducing noise and conserving shop air
- Timed Start* configurations (T suffix) cycle continuously for trigger free tube rolling
- Tool Options include “Cycle Counter” (C suffix) and “Expander Lubricator” (L suffix)



Examples: DAS II 1550 900 TCL is a timed start model with counter & lube

DAS II 850 1250 CL is a push-to-start model with counter & lube

*Timed Start option will run continuously when the toggle switch is in the “on” position. After the tube is rolled and the tool switches into reverse rotation, an adjustable delay timer is activated. The tool will start running in the forward direction again after the time delay is finished. (Available only on 1050 & 1550 Series.)

Model Number	Order Number	Free Speed	CFM	Maximum Torque		Minimum Torque		Chucks (in.)†	
		RPM		ft. lbs.	Nm	ft. lbs.	Nm	Included	Optional
DAS II Dominator Rolling Motors*									
DAS II 850 1250 Airetrol	8405562	1100	48	9.6	13.0	1.8	2.4	3/8	1/2
DAS II 850 1250 CL Airetrol	8405567	1100	48	9.6	13.0	1.8	2.4	3/8	1/2
DAS II 850 600 Airetrol	8405569	500	48	16.0	21.7	2.6	3.5	3/8, 1/2	-
DAS II 850 600 CL Airetrol	8405578	500	48	16.0	21.7	2.6	3.5	3/8, 1/2	-
DAS II 1050 400 TCL Airetrol	8405594	394	68	29.5	40.0	7.5	10.2	3/8, 1/2	3/4 - 1
DAS II 1550 900 Airetrol	8405563	756	75	30.7	41.6	4.7	6.4	3/8, 1/2	3/4, 1
DAS II 1550 900 CL Airetrol	8405565	756	75	30.7	41.6	4.7	6.4	3/8, 1/2	3/4, 1
DAS II 1550 900 T Airetrol	8405576	756	75	30.7	41.6	4.7	6.4	3/8, 1/2	3/4, 1
DAS II 1550 900 TCL Airetrol	8405580	756	75	30.7	41.6	4.7	6.4	3/8, 1/2	3/4, 1
DAS II 1550 250 Airetrol	8405564	217	75	100.0	135.5	25.0	33.9	3/4, 1	3/8, 1/2
DAS II 1550 250 T Airetrol	8405577	217	75	100.0	135.5	25.0	33.9	3/4, 1	3/8, 1/2
DAS II 1550 250 CL Airetrol	8405568	271	75	100.0	135.5	25.0	33.9	3/4, 1	3/8, 1/2

† 3/8 & 1/2 are QC Chucks (quick change)

* Configurations

No suffix - Basic Airetrol, push-to-start (PTS)

C suffix - PTS with Counter

L suffix - PTS with Lubricator

T suffix - Timer (continuous cycling, negates PTS, available only on 1050 & 1550 Series)

Rolling Controls

Electronic Controller & Electric Rolling Motors

Electronic Controller

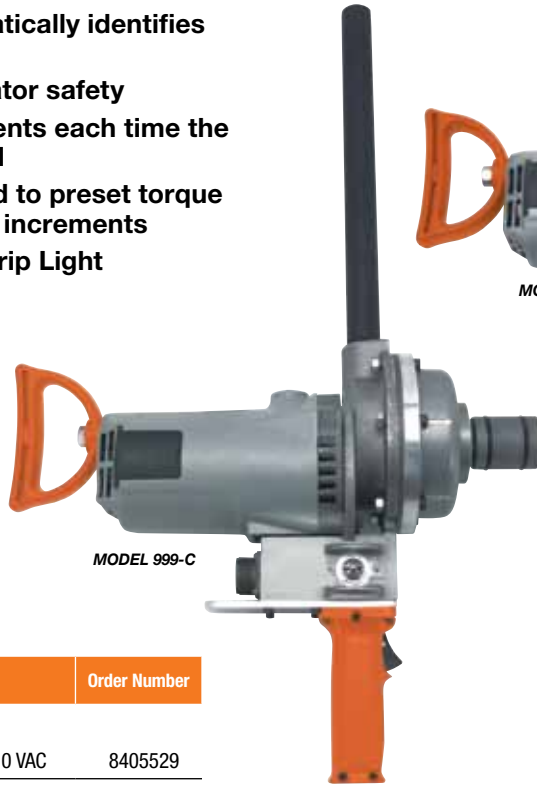
The ATC-900 Electronic Controller is a compact, lightweight and durable microprocessor based electronic motor controller. It is designed to provide accurate torque control for Airetool electric rolling motors by monitoring the amperage that the tool is using and comparing it to a preset current limit value. When the preset current limit value is reached, the controller opens the circuit which stops the motor. The current limit value is adjusted using the up/down push-buttons on the front of the controller to increment or decrement the current limit set point.

- **ATC-900 Controller automatically identifies connected motor**
- **GFCI Power Cord for operator safety**
- **Expansion counter increments each time the controller shuts off the tool**
- **Up/down pushbuttons used to preset torque shutoff set point in 0.1Amp increments**
- **Auxiliary Receptacles for Trip Light and Lubricator**



Airetool Electric Rolling Motors may be used without the ATC-900 Electronic Controller and plugged directly into a wall outlet using a "Optional" Direct Power Cord. (see chart below)

Airetool Electric Rolling Motors may be used with the DAS II Dominator "Basic Unit" (see page 6) by using a 8405583PT Mounting Kit.



Model Number	Order Number
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Accessories

Universal 2KVA Step Down Transformer 220/110 VAC	8405529
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Model Number	Order Number	Input Voltage		Current Requirements		Weight		Dimensions					
		VAC	Hz.	Supply Amps	Adjustment Amps	lbs.	kg	Length		Width		Height	
								in.	mm	in.	mm	in.	mm
Electronic Controller													
ATC 900*	2996326	120	50/60	20	0.1	7.2	3.27	11.75	298.5	12	304.8	7.63	193.8

*Not CE certified

Standard Equipment: Power Cord 2996733PT

Optional Equipment: Step down transformer (220VAC to 110VAC) 8405529

Model Number	Order Number	RPM	Maximum Torque		Minimum Torque		Tube Capacity*		Weight		Chucks
			ft. lbs.	Nm	ft. lbs.	Nm	in.	mm	lbs.	kg	in.
Electric Rolling Motors											
979-C-210	8405489	210	40.0	54.2	20.0	19.0	3/4-2	19.1-50.8	32.0	14.5	3/8-1/2 QC
979-C-300	8405488	300	28.0	37.9	14.0	8.8	3/4-1-1/2	19.1-38.1	32.0	14.5	3/8-1/2 QC
979-C-650	8405487	650	13.0	17.6	6.5	128.7	5/8-1-1/4	15.9-31.8	32.0	14.5	3/8-1/2 QC
999-C-45	8405492	45	190.0	257.5	95.0	128.8	2-4	50.8-101.6	32.0	14.5	3/4-1

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

Standard Equipment: Controller cable

Model Number	Order Number	Length	
		ft.	m

System Cables

ATC 900 Power Cord, GFCI	2996733PT	8.0	2.5
979 Motor to Controller	8405493	15.0	4.6
979 Motor to Wall Outlet	8405495	10.0	3.1
999 Motor to Controller	8405494	15.0	4.6
999 Motor to Wall Outlet	8405545	10.0	3.1



TEC 7000 Series Electronic Controller

TEC 7000 series electronic controller for use with hand-held rolling motors and trolley type units (with telescopic shaft).

TEC 7000 General Specifications

- CE Certified design
- Microprocessor controlled tube expansion
- Memory storage up to 3000 cycles
- Operating language in English or German
- Statistics for Quality Assurance include; Min / Max value for the number of expansion cycles in memory can be shown on display or send to the serial printer port
- Programmable timers for; cycle start, reverse pause, end of cycle, and a suppress timer for low torque value settings.
- Programmable torque shut-off value and high / low torque limits
- Three cycle modes - manual, semi-automatic, and full automatic

Model Number	Order Number	Input Voltage (1 phase)		Power Requirements (Watt)		Weight		Dimensions					
		VAC	Hz.	Input	Output	lbs.	kg.	Width		Height		Depth	
								in.	mm	in.	mm	in.	mm

Electronic Controller

TEC 7000	941204	110-240	50/60	650	1700	25.7	11.7	13.4	340.0	6.7	170.0	16.5	420.0
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Optional Equipment: TEC-9000 FS foot switch, order number 7940080

Model	Order Number	Speed	RPM	Tube Capacities OD*		Voltage	Power (Watt)		Chucks (in.)	
				in.	mm		Input	Output	Standard	Optional

Electric Rolling Motor Specifications

TEC 72636	941312	1	1400	1/4 - 3/8	6.35 - 9.52	230	300	180	1/4 QC	
TEC 7113	941315	2	450-1550	5/8 - 1 1/4	15.88 - 31.75	110	650	450	3/8, 1/2 QC	
TEC 7213	941313	2	450-1550	5/8 - 1 1/4	15.88 - 31.75	230	650	450	3/8, 1/2 QC	
TEC 7132	941203	4	110-190 350-590	3/4 - 2 1/2	19.05 - 63.50	110	1500	980	MC 3 x 3/8 QC	MC 3 x 1/2 SQ
TEC 7232	941202	4	110-190 350-590	3/4 - 2 1/2	19.05 - 63.50	230	1500	980	MC 3 x 3/8 QC	MC 3 x 1/2 SQ MC 3 x 3/4 SQ

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

TEC 8000VS Series Electronic Controller

TEC 8000VS series electronic controller for use with trolley type units (with telescopic shaft)

TEC 8000VS General Specifications

- CE Certified design
- Standard 1-phase operation 230V supply, optional 120V supply
- Universal controller for use with 3-phase motors or brushless servomotors
- Unique variable speed motor control
- Programming functionality the same as TEC 7000
- Custom solutions designed for TEC Controllers working with 3 ph - 42 Volt transformers used in multi-spindle systems, applications with robot and/or articulating arm tool holder systems, and more.



Please contact your authorized Airetool distributor for details, system specifications, and recommendations.

Rolling Controls

Multi-Spindle Tube Rolling Systems

Fixture Mounted Tube Rolling Systems—Electric Driven

Utilizing a microprocessor controlled expanding cycle with programmable expansion parameters including torque, speed, and time. This ensures a very accurate, uniform, and repeatable process. Expansion modules available for single or multiple spindles (up to 16) with fixed or adjustable pitch designs.

- Fully programmable automatic expansion cycle
- View and/or export tube expansion results for data archive and QA analysis
- Through-cage lubricant-injection system increases the durability of the tooling (expanders)
- Robot or articulating arm mounting provides for an ergonomic solution and effortless productivity gains

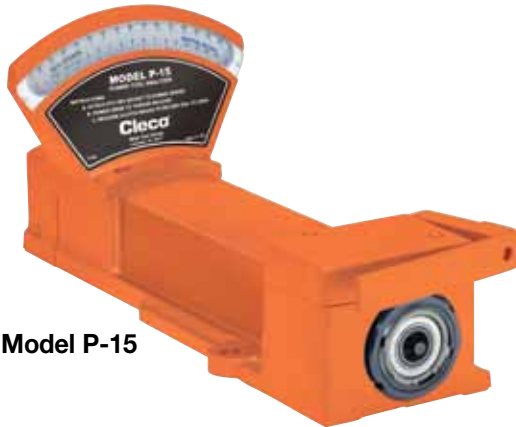


Dual Spindle Torque Control Tube Expansion Systems - Air Driven

Utilizing 720 series Airetool motors to achieve almost twice the production rate of a hand-held rolling motor. A "dual start" button activates both motors, while left-start/right-start buttons are used for independent single tube rolling.

- Torque control tube rolling with automatic reverse
- Commonality of components with other rolling motors





Model P-15

Model P-15 Torque Analyzer

Use the P-15 analyzer to set a specific torque value on Airetrol rolling controls. The torque analyzers' readings may be used as a standard for the Airetrols performance providing greater quality control over rolled tube joints.

- Set rolling motor at a specific torque value
- Enhances quality control with torque value consistency
- Time saver with multiple rolling motor applications

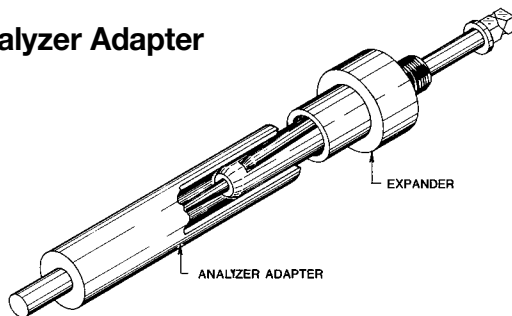


Model Number	Order Number	Graduations	Capacity	Accuracy	Height		Width		Length		Weight	
					in.	mm	in.	mm	in.	mm	lb.	kg
P-15 Torque Analyzer												
P-15	810002PT	2 in.-lbs.	5 - 150 in. lbs.	± 1% +1/2 in.-lbs.	8.0	203.0	5.0	127.0	18.0	457.0	23.0	10.4
MP-15 (metric)	810151	5 cm.-kg.	5 - 180 cm.-kg	± 1% +1 cm.-kg	8.0	203.0	5.0	127.0	18.0	457.0	23.0	10.4

General: Drive Size: 5/16" male hex

Optional Equipment: Calibration Kit – 810080

Analyzer Adapter



Adapter Number	Order Number	Adapter Used with the Following Expanders
Adapters for P-15 Analyzer		
AD-1	8566501	1201 thru 1203 & 801 thru 803
AD-2	8566503	1205 & 805
AD-3	8566502	1207 thru 1210 & 807 thru 810
AD-4	8567012	1211 thru 1214 & 811 thru 814
AD-5	8566521	1215 thru 1220 & 815 thru 820
AD-6	8566518	1221 thru 1224 & 821 thru 824
AD-7	8566519	1225 thru 1230 & 825 thru 830
AD-8	8566514	1231 thru 1234 & 831 thru 834
AD-9	8566531	1235 thru 1240 & 835 thru 840
AD-8	8566475	1241 thru 1242 & 831 thru 842
AD-10	8566475	1243 thru 1248 & 843 thru 846
AD-11	8566520	1247 thru 1254 & 847 thru 854
AD-12	8566676	1255 thru 1260 & 855 thru 860
AD-13	8567332	1261 thru 1266 & 861 thru 866
AD-14	8566649	1267 thru 1272 & 867 thru 872
AD-15	8567039	1273 thru 1276 & 873 thru 878
AD-16	8567289	1279 thru 1288 & 870 thru 888
AD-17	8567050	1289 thru 1290 & 889 thru 890
AD-18	8567602	1291 thru 1294 & 891 thru 894
AD-19	8567230	1295 thru 1300 & 895 thru 900

For information on AD-0 to AD-08 adapters for P2-B Analyzer, contact technical service.

Optional and Replacement Chucks

Chuck Description	Order Number	Input Square Drive (in.)	Output Mandrel Square (in.)
720-720S-735S			
720 250 1/4 Chuck	8405334	3/8	1/4
720 375 B 3/8 Chuck ASSY	8405403	3/8	3/8
850			
850 375 QC chuck	8400100	3/8	3/8
850 500 QC chuck	8400200	3/8	1/2
1050-400 1550-900			
1000 375 QC Chuck complete	8400700	1/2	3/8 QC
1000 500 QC Chuck complete	8400800	1/2	1/2 QC
1000 750 Chuck complete	8400900	1/2	3/4
1000 1000 Chuck complete	8404820	1/2	1
1550-250			
QC 1550 500 QC Chuck complete	8405272	3/4	3/8 QC
QC 1550 500 QC Chuck complete	8405271	3/4	1/2 QC
1550 750 Chuck complete	8405259	3/4	3/4
1550 1000 Chuck complete	8405260	3/4	1
999/1850s			
989 750 3/4 square chuck	8404700	1	3/4
989 1000 1" square chuck	8404960	1	1
1850 1250 chuck complete	8405319	1	1-1/4
1850 1500 chuck complete	8405437	1	1-1/2
1752			
1770 110 3/4 chuck complete	8405299	3/4	3/4
1770 110 1 chuck complete	8405300	3/4	1
1770 110 1-1/4 chuck complete	8405400	3/4	1-1/4
1753			
QC 1770 230 1/2 QC chuck complete	8405302	5/8	1/2
1770 230 3/4 chuck complete	8405298	5/8	3/4
1770 230 1 chuck complete	8405306	5/8	1
966s			
850 375 chuck	8400100	3/8	3/8
979s			
939 375 chuck	8400400	5/8 Hex	3/8
939 500 chuck	8400500	5/8 Hex	1/2
939 750 3/4 chuck	8401100	5/8 Hex	3/4



The world standard in tube expanders

Airetool heat exchanger and condenser expanders have long been recognized as the standard to which all other brands are measured. The extra time spent manufacturing our expanders results in consistent performance and incredible durability that OEM Heat Exchanger Manufacturers expect.

Tube Expanders

Tube expanding is the art of cold working the ends of tubes into intimate contact with the metal of the containing tube holes to form a leak proof mechanical seal and/or joint. In other words, it is a mechanical method of establishing a mechanical joint between a tube and a tube hole. Airetool manufactures condensed/heat exchanger expanders, boiler expanders, furnace expanders and many special application expanders.

Tube expanders consist of:

Mandrel – A tapered pin through the center of the expander to which the power is attached and when advanced pushes the rolls against the tubes.

Rolls – A set of (3 or more) of tapered cylindrical parts which are driven by mandrel and contact the tube wall to be expanded. The taper on the rolls is in the reverse direction and one-half the taper of the mandrel if it is a parallel roll expander.

Cage – This is the expander body (or housing) that holds the mandrel and rolls in place. The slots which contain the rolls also provide a feed angle which helps pull the mandrel in to provide expansion of the rolls



Mandrel, Rolls and Cage are the three things common to all expanders. Other parts added further classify the type of expander.

Thrust Assembly – This assembly attaches to the cage and allows adjustment of the expanding depth. The thrust collar will remain stationary against the tube sheet or tube end while the cage, mandrel and rolls expand the tube. A thrust assembly is used on condenser/heat exchanger expanders, some furnace expanders and special boiler expanders.

Condenser/Heat Exchanger Expanders

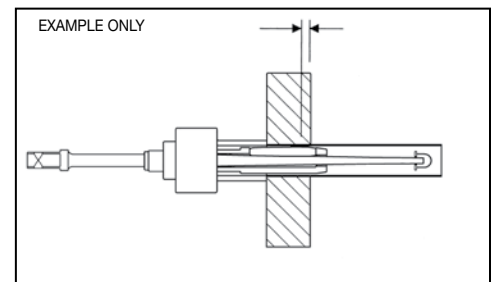
Airetool Condenser Heat Exchanger Expanders are self-feeding, parallel rolling, ball bearing thrust expanders. They are available in standard sizes for 1/4" O.D. through 3" O.D. for tube sheets up to 6-3/4" thick. Other sizes and lengths are available upon request. We supply most of the air conditioning manufacturers with expanders up to sixteen feet in length.

To select the correct tube expander, the following information is required:

- Tube OD
- Tube wall thickness or BWG
- Tube sheet thickness
- Tube material
- Longer reach expanders are available upon request
- Special Conditions, i.e. enhanced tubing, thick tube sheets, double tube sheet, baffle sheets, tubes close to tube sheet channel or other tubes, protrusions, welded tubes, and tube bends close to the tube sheet.

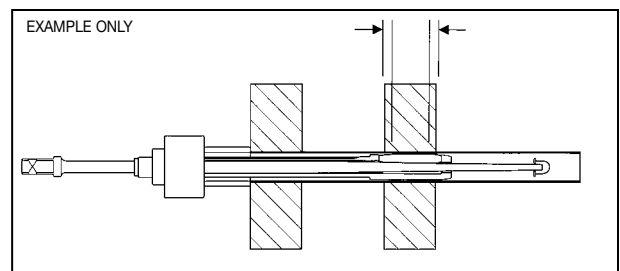
Setting the tube expander's collar on Primary Tube Sheets

It is very important to set the tube expander's collar in the correct position inside the tube sheet. The expander's roll high point should be positioned ~1/8" (3mm) from the inner side of the tube sheet as shown in the figure below. The purpose for setting the expander's collar this way is to allow for thermal expansion and contraction of the tube while it is in service. If the tube is expanded beyond the tube sheet, thermal expansion and contraction of the tube will cause stress on the tube, which may cause the tube to crack or rupture at the inner tube sheet location. When tightening the set screw on the expander's collar, be sure it is aligned with the cage groove.



Double Tube Sheet Applications

In a double tube sheet application additional information is required. The thickness of the outer tube sheet (primary tube sheet) and inner tube sheet (secondary tube sheet) and the distance between the two must be known. When expanding the tube in the primary tube sheet the expanders collar is positioned as in the figure above with an 800 series tube expander. For the secondary tube sheet a 1200 series expander is required with "S" type (double radius) rolls. The "S" type rolls are required to allow the expander to have clearance on each side of the secondary tube sheet as shown in the figure below. The purpose of using "S" type rolls on an inner tube sheet and setting the expander's collar this way is to reduce stresses in the tube due to thermal expansion and contraction of the tube while it is in service.



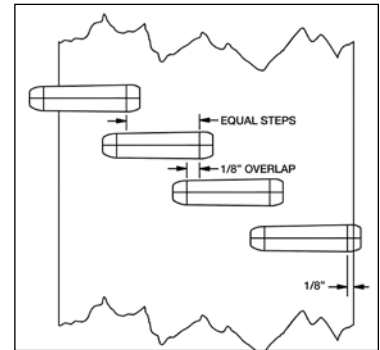
Heat Exchanger – Condenser Expanders

Five roll expander vs. Three roll expander

Many manufacturers prefer the five-roll expander for applications using tube materials that work harden quickly such as stainless steel and titanium. The five-roll expander inherently has more contact area with the tube than the three-roll which reduces the amount of work hardening and spring back effect that is common with these tube materials. They are also used in applications with closely spaced tubes having triangular pitch. The thinner the tube walls, 18 BWG (.049"/1.25mm) and thinner, the more apt work hardening is to occur.

Step Rolling

Step rolling is required when expanding tubes in thick tube sheets. Typically the first expansion is made at the innermost location, away from the inner side of the tube sheet. This is extremely important when rolling the opposite end of the vessel. This allows the tube material to grow in the proper direction towards the operator and keeps the tube from being stressed. After all the tubes have been expanded in this location, adjust the expander's collar to overlap the previously rolled area. Repeat as necessary until the complete thickness of the tube sheet has been expanded. "S" type rolls (double radius) are recommended for step rolling to provide a smooth transition on the I.D. of the tube.



Care and Maintenance of Tube Expanders

Tube expanders are precision tools and should be treated as such. The service demanded of them is severe. Therefore, they must be given a reasonable amount of care to insure satisfactory operation and long life.

All Tube Rolling Applications

1. Before using, clean the expander thoroughly to remove any dirt or foreign matter.
2. Check thrust bearing and grease if needed. This should be done daily.
3. Proper lubrication of the expander during the rolling operation is a must in order to keep the rolls and mandrel cool, to extend their life, and to insure uniform tube to tube sheet joints.
4. Inspect rolls and mandrels for scarring or chips regularly and if found, replace them immediately. One small chip in a roll can cause the complete set of rolls and the mandrel to be damaged in a single rolling cycle. Always replace rolls and mandrels at the same time.
5. When the rolling job is complete, wash the expander thoroughly and then oil and grease generously to prevent rusting during storage.

Lubrication & Cleaning

Hand-Held Rolling Applications

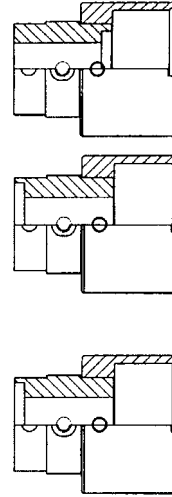
Depending on the severity of the rolling application, the expander should be washed periodically (every 25-100 tubes) in any commercial solvent. For best expander life, the expander should be left in solvent to cool while a second expander is used to continue rolling.

DAS Automated Tube Rolling Applications

An optional automatic lubrication system is offered for the automatic tube rolling systems. Hand cleaning is virtually eliminated with the use of the automatic lubricating system as the air pressure that blows the lubrication into the expander to cool it also blows away dirt or foreign matter during each cycle.

Flip Collars

All G-800 and G-1200 Series tube expanders are supplied with a flip collar with a 10-32 UNF auto-lube port. The flip collar allows for flush and recessed tube rolling. The standard expander is supplied with a recess of 1/8" (3 mm). Other recess lengths are available. Contact technical service for details.



Fixed Recess Thrust Collars

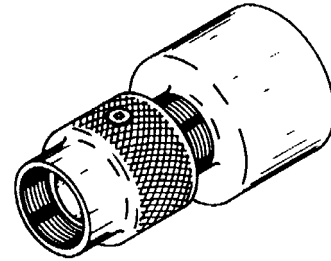
Fixed recess collars are available for tube projections between 3/16" (4.7mm) to 7/8" (22.2 mm) from the tube sheet for special applications and require a quote from technical service.

Full Recess Thrust Collars

The full recess collar accommodates tube projections up to 7/8" (22.2 mm) from the tube sheet.

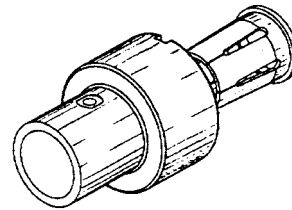
Adjustable Recess Thrust Collars

The adjustable recess collar accommodates tube projections up to 1/2" (12.7 mm) from the tube sheet.



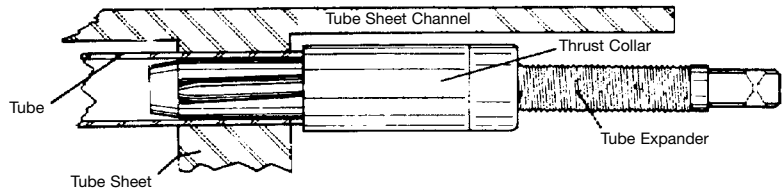
Thin Wall Thrust Collars

Thin wall thrust collars are recommended when expanding 20 BWG .035" (0.9 mm) or lighter wall tubes. This design limits the possibility of the tube being drawn up inside the thrust collar. Removing the collar's collet allows the expander to be used as a full recess style compensating for various length tube projections from the tube sheet. These collars are application specific and require a quote from technical service.



Small Diameter Thrust Collars

Small diameter thrust collars are recommended for rolling tubes in confined areas, close to tube sheet channels, or if there is interference from adjacent tubes.



Tube Expander Lubricant "LUBE-A-TUBE"

- A water soluble lubricant especially compounded for use with tube expanders. It prevents rust and acts as a coolant providing longer life and smoother rolling.
- 5-gallon container: LAT-5 (order number 2981695)



"AN" Series Expanders

Selection Guide AN Series Heat Exchanger & Condenser Tube Expanders

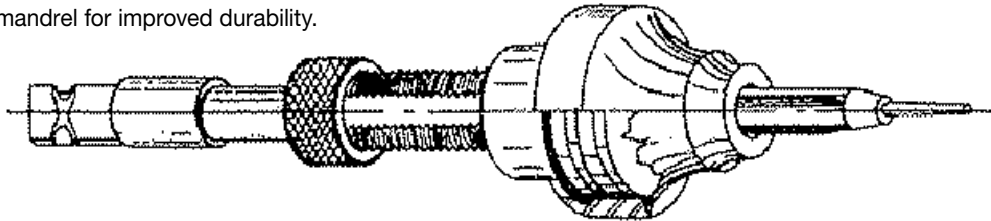
AN Series Expanders

O.D. Range:

1/4 – 3/8 Inches

6.3 – 9.5 mm

- "AN" expanders have 1" (25.4mm) long rolls and will accommodate tube sheet thicknesses from 1/4" to 1" (6.3 to 25.4mm).
- Captive mandrel retained on the rear of the cage instead of an acorn nut on the tip of the mandrel.
- Heavy duty mandrel for improved durability.



Tube O.D.		Tube Gauge		Tube I.D.		Tube Sheet Thickness		Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel No. (Order No.) Square Drive 1/4 in. (6.3 mm)	Bearing No. (Order No.)	Recommended Rolling Motor (Order No.)	
						1/4 in. to 1 in. (6.3 mm to 25.4 mm)									
in.	mm	BWG	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	in.	mm	in.	mm			
1/4	6.3	18	.049	1.24	.152	3.86	A-25018 (5515689)	R-20018 (5515705)	.148	3.76	.167	4.24	M-21819 (2980037)	NTA-613-A (5515716)	720-2500B (8405541)
		19	.042	1.06	.166	4.21	A-25019 (5515653PT)	R-21920 (5515706)	.160	4.06	.180	4.57			
		20	.035	0.88	.180	4.57	A-25020 (5515654)	R-21920 (5515706)	.175	4.44	.196	4.97	M-22021 (2980038)		
		21	.032	0.81	.186	4.72	A-25021 (5515690)	R-22124 (5515707)	.180	4.57	.202	5.13			
		22	.028	0.71	.194	4.92	A-25022 (5515691)	R-22124 (5515707)	.190	4.82	.213	5.41	M-220022 (2980158)		
		23	.025	0.63	.200	5.08	A-25023 (5515692)	R-21920 (5515706)	.195	4.95	.216	5.48	M-22324 (2980149)		
		24	.022	0.55	.206	5.23	A-25024 (5515693)	R-22124 (5515707)	.201	5.10	.224	5.69			
		28	.014	0.35	.222	5.63	A-25028 (5515694)	R-22830 (5515709)	.217	5.51	.243	6.17	M-22830 (2980150)		
		29	.013	0.33	.224	5.68									
		30	.012	0.30	.226	5.74									
3/8	9.5	14	.083	2.10	.209	5.30	A-37514 (5515695)	R-21920 (5515706)	.204	5.18	.230	5.84	M-22830 (2980150)	NTA-613-A (5515716)	720-2500B (8405541)
		15	.072	1.82	.231	5.86	A-37515 (5515696)	R-31516 (5515711)	.225	5.71	.265	6.73			
		16	.065	1.65	.245	6.22	A-37516 (5515697)		R-31720 (5515712)	.238	6.04	.278	7.06		
		17	.058	1.47	.259	6.57	A-37517 (5515698)	.253		6.42	.293	7.44			
		18	.049	1.24	.277	7.03	A-37518 (5515699)	R-32122 (5515713)	.270	6.85	.310	7.87	M-30018 (2980155)		
		19	.042	1.06	.291	7.39	A-37519 (5515700)		.285	7.24	.325	8.25	M-30019 (2980156)		
		20	.035	0.88	.305	7.74	A-37520 (5515701)	R-32324 (5515715)	.295	7.49	.335	8.51	M-32021 (2980157)		
		21	.032	0.81	.311	7.90	A-37521 (5515702)		.305	7.74	.345	8.76			
		22	.028	0.71	.319	8.10	A-37522 (5515703)	M-32224 (2980159)	.312	7.92	.353	8.96			
		23	.025	0.63	.325	8.25	A-37523 (5515704)		R-32324 (5515715)	.318	8.07	.363	9.22		
		24	.022	0.55	.331	8.40									

Condenser Expanders

Selection Guide G-900 Series Heat Exchanger & Condenser Tube Expanders



G-900 Series Expanders

O.D. Range:
1/4 – 3/8 Inches
6.3 – 9.5 mm

- Expander with 3/4 in. (19.0 mm) long rolls will accommodate tube sheet thicknesses from 1/4 in. to 3/4 in. (6.3 mm to 19.0 mm)
- Expander with 1-1/4 in. (31.7 mm) long rolls will accommodate tube sheet thicknesses from 3/4 in. to 1-1/4 in. (19.0 mm to 31.7 mm)



NOTE: Information on any size of tube not listed will be furnished upon request.

Tube O.D.		Tube Gauge		Tube I.D.		Tube Sheet Thickness				Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel No. (Order No.) 1/4 in. Sq. Dr. 6.3 mm	Recommended Controlled Rolling Motors Airetrol (Order No.)		
						1/4 in. to 3/4 in. (6.3 mm to 19.0 mm)		3/4 in. to 1-1/4 in. (19.0 mm to 31.7 mm)									
in.	mm	bwg	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	Tool No. (Order No.)	Roll Set No. (Order No.)	in.	mm	in.	mm			
1/4	6.3	18	.049	1.24	.152	3.86	921 (5016710)	921 (5175610)	920 (5016700)	904 (5174800)	.151	3.83	.173	4.39	(921) M-39 (2520300) (920) M-38 (2520100)	720-2500B (8405541)	
		19	.042	1.06	.166	4.21	922 (5016800)	923 (5175700)			.165	4.19	.185	4.70	M-39 (2520300)		
		20	.035	0.88	.180	4.57	923 (5016901)	923 (5175700)			.175	4.44	.200	5.08	M-40 (2520500)		
		21	.032	0.81	.186	4.72	924 (5017000)	924 (5175800)			.180	4.57	.207	5.25	M-40 (2520500)		
		22	.028	0.71	.194	4.92	925 (5017100)	925 (5175900)			.190	4.82	.216	5.48	M-41 (2520700)		
		23	.025	0.63	.200	5.08	926 (5017200)	923 (5175700)			.195	4.95	.222	5.63	M-41 (2520700)		
		24	.022	0.55	.206	5.23	927 (5017300)	924 (5175800)			.201	5.10	.230	5.84	M-41 (2520700)		
		28	.014	0.35	.222	5.63					.222	5.63	.238	6.04	928 (2161300)		
		29	.013	0.33	.224	5.68	928 (5017400)	903 (5174700)			.222	5.63	.238	6.04	928 (2161300)		
		30	.012	0.30	.226	5.74	929 (5519723)	929 (5519757)			.205	5.21	.235	5.99	M-40 (2520500)		
3/8	9.5	14	.083	2.10	.209	5.30	927 (5017300)	924 (5175800)			.201	5.10	.232	5.89	M-41 (2520700)	720-2500B (8405541)	
		15	.072	1.82	.231	5.86	915 (5016410)	903 (5174700)			.230	5.84	.265	6.73	M-42 (2520900)		
		16	.065	1.65	.245	6.22	916* (5016500)	916 (5175600)			.240	6.09	.275	6.98	M-36 (2519700)		
		16	.065	1.65	.245	6.22			916L* (5512156)	916L (5512157)	.240	6.09	.275	6.98	M-36L (2968803)		
		17	.058	1.47	.259	6.57	918 (5016600)	903 (5174700)	920 (5016700)			.255	6.47	.289	7.34		M-38 (2520100)
		18	.049	1.24	.277	7.03	901 (5015200)	903 (5174700)	902 (5015300)	904 (5174800)	.272	6.90	.307	7.79	M-30 (2518400)		
		19	.042	1.06	.291	7.39	903 (5015400)	903 (5174700)	904 (5015500)			.286	7.26	.330	8.38		M-31 (2518700)
		20	.035	0.88	.305	7.74	905 (5015600)	907 (5174900)	906 (5015700)	908 (5175000)	.300	7.62	.334	8.48	M-32 (2518900)		
		21	.032	0.81	.311	7.90	907 (5015800)	907 (5174900)	908 (5015900)			.306	7.77	.340	8.63		M-33 (2519100)
		22	.028	0.71	.319	8.10	909 (5016000)	909 (5175100)	910 (5016100)	910 (5175200)	.314	7.97	.349	8.86	M-34 (2519300)		
		23	.025	0.63	.325	8.25	911 (5016200)	911 (5175300)	912 (5016300)	912 (5175400)	.320	8.12	.357	9.06	M-34 (2519300)		
		24	.022	0.55	.331	8.40	911 (5016200)	911 (5175300)	912 (5016300)			.320	8.12	.357	9.06		M-34 (2519300)

* This expander has 1" long rolls.

Condenser Expanders

Selection Guide G-1300 Series Heat Exchanger & Condenser Tube Expanders

G-1300 Series Expanders

O.D. Range:
3/8 Inches
9.5 mm

- Expanders with 3/4 in. (19.0 mm) long rolls will accommodate tube sheet thicknesses of 3/4 in. to 3 in. (19 mm to 76.2 mm)
- Expanders with 1-1/4 in. (31.7 mm) long rolls will accommodate tube sheet thicknesses from 1-1/4 in. to 3-1/2 in. (31.7 mm to 88.9 mm)



NOTE: Information on any size of tube not listed will be furnished upon request.

Tube O.D.		Tube Gauge		Tube I.D.		Tube Sheet Thickness				Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel No. (Order No.) 1/4 in. Sq. Dr. 6.3 mm	Recommended Rolling Motors (Order No.)	
						3/4 in. to 3 in. (19.0 mm to 76.0 mm) *		1-1/4 in. to 3-1/2 in. (31.7 mm to 88.9 mm) *								
in.	mm	bwg	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	Tool No. (Order No.)	Roll Set No. (Order No.)	in.	mm	in.	mm		
3/8	9.5	15	.072	1.82	.231	5.86	1315 (5512183)	1315 (5512184)	1316 (5512185)	1316 (5512180)	.230	5.84	.265	6.73	M-86 (2541400)	720-2500B (8405541)
		16	.065	1.65	.245	6.22	1319 (5512187)	903 (5174700)	1319-L (5512190)	916-L (5512157)	.240	6.09	.275	6.98		
		17	.058	1.47	.259	6.57	1317 (5512191)		1318 (5512192-5)	904 (5174800)	.286	7.26	.320	8.12	M-88 (2541600)	
		18	.049	1.24	.277	7.03	1301 (5055100)		1302 (5055200)						M-80 (2540000)	
		19	.042	1.06	.291	7.39	1303 (5055300)		1304 (5055400)						M-81 (2540200)	
		20	.035	0.88	.305	7.74	1305 (5055500)	907 (5174900)	1306 (5055600)	908 (5175000)	.300	7.62	.334	8.48	M-82 (2540400)	
		21	.032	0.81	.311	7.90	1307 (5055700)		1308 (5055800)		M-83 (2540600)					
		22	.028	0.71	.319	8.10	1309 (5055900)	909 (5175100)	1310 (5056000)	910 (5175200)	.314	7.97	.349	8.86	M-84 (2540800)	
		23	.025	0.63	.325	8.25	1311 (5056100)	911 (5175300)	1312 (5056200)	912 (5175400)	.320	8.12	.357	9.06		
		24	.022	0.55	.331	8.40					.320	8.12	.357	9.06		

* NOTE: Step expanding becomes necessary if the tube sheet thickness exceeds the length of the roll.

Condenser Expanders

Selection Guide G-800 Series Heat Exchanger & Condenser Tube Expanders



G-800 Series – 3-Roll Expanders

O.D. Range:
1/2 – 1-1/2 Inches
12.7 – 38.1 mm

- Expanders with 1-1/2 in. (38.1 mm) long rolls will accommodate tube sheet thicknesses of 1/2 in. to 1-1/2 in. (12.7 mm to 38.1 mm)
- Expanders with 2-1/4 in. (57.1mm) long rolls will accommodate tube sheet thicknesses from 1-1/4 in. to 2-1/4 in. (31.7 mm to 57.1 mm)
- **Reversible Thrust Collar** design allows flush and 1/8 in. recess tube rolling. Collars have lubrication port for use with auto-lube configured ATR and DAS tube rolling systems.



Sizes not listed available upon request.

Tube O.D.		Tube Gauge		Tube I.D.		Tube Sheet Thickness				Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel Number (Order No.) 3/8 in. Sq. Dr. (9.5 mm)	Recommended Rolling Motors (Order No.)		
						1/2 in. to 1-1/2 in. (12.7 mm to 38.1 mm)		1-1/4 in. to 2-1/4 in. (31.7 mm to 57.1 mm)							Airetrol	Electric	
in.	mm	bwg	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	Tool No. (Order No.)	Roll Set No. (Order No.)	in.	mm	in.	mm			
1/2	12.7	14	.083	2.10	.334	8.48	797 (5005780)	R-1 (5512194)			.324	8.22	.374	9.49	797 (2131300)	720-550-B (8405391)	
		15	.072	1.82	.356	9.04	799 (5005782)	R-1 (5284800)			.348	8.83	.398	10.10	799 (2131900)		
		16	.065	1.65	.370	9.39	801 (5005800)				.360	9.14	.410	10.41	M-1 (2511800)	720-1800-B-3/8 (8405512)	
		17	.058	1.47	.384	9.75	803 (5005900)	R-2 (5285000)			.374	9.49	.424	10.76	M-2 (2512100)		
		18	.049	1.24	.402	10.21	805 1/2 (5006000)	R-3 (5285200)			.392	9.95	.447	11.35	M-3 (2512400)		
		20	.035	0.88	.430	10.92	807 1/2 (5525444)	R-4 (5285400)			.420	10.66	.480	12.19	M-4 (2512700)		
5/8	15.8	12	.109	2.76	.407	10.33	805 5/8 (5006001)	R-3 (5285200)			.392	9.95	.447	11.35	M-2 (2512100)	850-600-A (8405398)	
		13	.095	2.41	.435	11.04	807 5/8 (5006100)	R-4 (5285400)			.420	10.66	.480	12.19	M-3 (2512400)		
		14	.083	2.10	.459	11.65	809 (5006200)	R-4 (5285400)	810 (5006300)	R-4-A (5285500)	.449	11.40	.509	12.92	M-4 (2512700)		
		15	.072	1.82	.481	12.21	811 5/8 (5006400)	R-5 (5285800)	812 5/8 (5006500)	R-5-A (5285900)	.471	11.96	.536	13.61	M-5 (2513000)		
		16	.065	1.65	.495	12.57	813 (5006600)	R-6 (5286200)	814 (5006700)	R-6-A (5286300)	.485	12.31	.550	13.97	M-6 (2513300)	850-1250-A (8405399)	
		17	.058	1.47	.509	12.92	815 5/8 (5006800)		816 5/8 (5006900)		.499	12.67	.564	14.32	M-6 (2513300)		
		18	.049	1.24	.527	13.38	817 5/8 (5007000)	R-7 (5286600)	818 5/8 (5007100)	R-7-A (5286700)	.517	13.13	.582	14.78			
		19	.042	1.06	.541	13.74											
		20	.035	0.88	.555	14.09											
		21	.032	0.81	.561	14.24											
		22	.028	0.71	.569	14.45	819 (5007200)	R-7 (5286600)	820 (5007300)	R-7-A (5286700)	.531	13.48	.596	15.13	M-8 (2513900)		

Condenser Expanders

Selection Guide G-800 Series Heat Exchanger & Condenser Tube Expanders – continued

Tube O.D.		Tube Gauge		Tube I.D.		Tube Sheet Thickness				Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel Number (Order No.) 3/8 in. Sq. Dr. (9.5 mm)	Recommended Rolling Motors (Order No.)			
						1/2 in. to 1-1/2 in. (12.7 mm to 38.1 mm)		1-1/4 in. to 2-1/4 in. (31.7 mm to 57.1 mm)							Airetrol	Electric		
in.	mm	bwg	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	Tool No. (Order No.)	Roll Set No. (Order No.)	in.	mm	in.	mm				
3/4	19.0	10	.134	3.40	.482	12.24	811 3/4 (5006401)	R-5 (5285800)	812 3/4 (5006501)	R-5-A (5285900)	.471	11.96	.536	13.61	M-5 (2513000)	850-600-A (8405398)		
		11	.120	3.04	.510	12.95	815 3/4 (5006801)	R-6 (5286200)	816 3/4 (5006901)	R-6-A (5286300)	.499	12.67	.564	14.32	M-6 (2513300)			
		12	.109	2.76	.532	13.51	817 3/4 (5007001)	R-7 (5286600)	818 3/4 (5007101)	R-7-A (5286700)	.517	13.13	.582	14.78				
		13	.095	2.41	.560	14.22	821 (5007400)	R-8 (5287000)	822 (5007500)	R-8-A (5287100)	.550	13.97	.615	15.62	M-8 (2513900)			
		14	.083	2.10	.584	14.83	823 (5007600)	R-9 (5287400)	824 (5007700)	R-9-A (5287500)	.574	14.57	.639	16.23				
		15	.072	1.82	.606	15.39	825 3/4 (5007800)	R-10 (5287800)	826 3/4 (5007900)	R-10-A (5287900)	.596	15.13	.661	16.78				
		16	.065	1.65	.620	15.74	827 (5008000)		828 (5008100)		.605	15.36	.685	17.39				
		17	.058	1.47	.634	16.10	829 3/4 (5008200)	R-11 (5288200)	830 3/4 (5008300)	R-11-A (5288300)	.619	15.72	.699	17.75	M-9 (2514200)	850-1250-A (8405399)		
		18	.049	1.24	.652	16.56												
		19	.042	1.06	.666	16.91	831 3/4 (5008400)	R-12 (5288600)	832 3/4 (5008500)	R-12-A (5288700)	.642	16.30	.722	18.33				
		20	.035	0.88	.680	17.27												
		21	.032	0.81	.686	17.42												
22	.028	0.71	.694	17.62														
7/8	22.2	10	.134	3.40	.607	15.41	825 7/8 (5007801)	R-10 (5287800)	826 7/8 (5007901)	R-10-A (5287900)	.596	15.13	.661	16.78	M-8 (2513900)	850-600-A (8405398)		
		11	.120	3.04	.635	16.12	829 7/8 (5008201)	R-11 (5288200)	830 7/8 (5008301)	R-11-A (5288300)	.619	15.72	.699	17.75	M-9 (2514200)			
		12	.109	2.76	.657	16.68	831 7/8 (5008401)	R-12 (5288600)	832 7/8 (5008501)	R-12-A (5288700)	.642	16.30	.722	18.33				
		13	.095	2.41	.685	17.39	833 (5008600)	R-13 (5289000)	834 (5008700)	R-13-A (5289100)	.670	17.01	.750	19.05	M-10 (2514500)			
		14	.083	2.10	.709	18.00	835 (5008800)	R-14 (5289400)	836 (5008900)	R-14-A (5289500)	.685	17.39	.774	19.65	M-11 (2514800)			
		15	.072	1.82	.731	18.56	837 (5009000)	R-15 (5289800)	838 (5009100)	R-15-A (5289900)	.712	18.08	.801	20.34				
		16	.065	1.65	.745	18.92	839 (5009200)		840 (5009300)		.726	18.44	.815	20.70				
		17	.058	1.47	.759	19.27	843 (5009600)	R-16 (5290200)	844 (5009700)	R-16-A (5290300)	.740	18.79	.829	21.05	M-12 (2515100)			850-1250-A (8405399)
		18	.049	1.24	.777	19.73												
1	25.4	8	.165	4.19	.670	17.01	841 (5009400)	R-13 (5289000)	842 (5009500)	R-13-A (5289100)	.655	16.63	.735	18.66	M-9 (2514200)	1050-400 (8404200)		
		9	.148	3.75	.704	17.88	835 (5008800)	R-14 (5289400)	836 (5008900)	R-14-A (5289500)	.685	17.39	.774	19.65	M-11 (2514800)			
		10	.134	3.40	.732	18.59	837 (5009000)	R-15 (5289800)	838 (5009100)	R-15-A (5289900)	.712	18.08	.801	20.34				
		11	.120	3.04	.760	19.30	843 (5009600)	R-16 (5290200)	844 (5009700)	R-16-A (5290300)	.740	18.79	.829	21.05	M-12 (2515100)			
		12	.109	2.76	.782	19.86	845 (5009800)	R-17 (5290600)	846 (5009900)	R-17-A (5290700)	.763	19.38	.852	21.64				
		13	.095	2.41	.810	20.57	847 (5010000)	R-18 (5291000)	848 (5010100)	R-18-A (5291100)	.791	20.09	.880	22.35				
		14	.083	2.10	.834	21.18	849 (5010200)		850 (5010300)		.810	20.57	.909	23.08				M-13 (2515400)

Condenser Expanders

Selection Guide G-800 Series Heat Exchanger & Condenser Tube Expanders – continued



Tube O.D.		Tube Gauge		Tube I.D.		Tube Sheet Thickness				Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel Number (Order No.) 3/8 in. Sq. Dr. (9.5 mm)	Recommended Rolling Motors (Order No.)							
						1/2 in. to 1-1/2 in. (12.7 mm to 38.1 mm)		1-1/4 in. to 2-1/4 in. (31.7 mm to 57.1 mm)							Airetrol	Electric						
in.	mm	bwg	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	Tool No. (Order No.)	Roll Set No. (Order No.)	in.	mm	in.	mm								
1	25.4	15	.072	1.82	.856	21.74	851 (5010400)	R-19 (5291400)	852 (5010500)	R-19-A (5291500)	.837	21.25	.936	23.77	M-13 (2515400)	850-600-A (8405398)	979-C-650/ ATC-900					
		16	.065	1.65	.870	22.09	855 (5010800)	R-21 (5292200)	856 (5010900)	R-21-A (5292300)	.865	21.97	.964	24.48		850-1250-A (8405399)						
		17	.058	1.47	.884	22.45																
		18	.049	1.24	.902	22.91																
		19	.042	1.06	.916	23.26																
		20	.035	0.88	.930	23.62																
1-1/8	28.5	8	.165	4.19	.795	20.19	853 (5010600)	R-20 (5291800)	854 (5010700)	R-20-A (5291900)	.776	19.71	.875	22.22	M-13 (2515400)		979-C-300/ ATC-900					
		9	.148	3.75	.829	21.05	849 (5010200)	R-18 (5291000)	850 (5010300)	R-18-A (5291100)	.810	20.57	.909	23.08								
		10	.134	3.40	.857	21.76	851 (5010400)	R-19 (5291400)	852 (5010500)	R-19-A (5291500)	.837	21.25	.936	23.77								
		11	.102	3.04	.885	22.47	855 (5010800)	R-21 (5292200)	856 (5010900)	R-21-A (5292300)	.865	21.97	.964	24.48								
		12	.109	2.76	.907	23.03	857 (5011000)		858 (5011100)		.883	22.42	.982	24.94	M-14 (2515700) *							
		13	.095	2.41	.935	23.74	859 (5011200)	R-22 (5292600)	860 (5011300)	R-22-A (5292700)	.916	23.26	1.015	25.78	M-15 (2516000) *	1050-400 (8404200)						
		14	.083	2.10	.959	24.35	861 (5011400)	R-23 (5293000)	862 (5011500)	R-23-A (5293100)	.935	23.74	1.044	26.51								
		15	.072	1.82	.981	24.91	863 (5011600)	R-24 (5293400)	864 (5011700)	R-24-A (5293500)	.962	24.43	1.071	27.20								
		16	.065	1.65	.995	25.27	867 (5012000)	R-26 (5294200)	868 (5012100)	R-26-A (5293500)	.990	25.14	1.099	27.91	M-16 (2516300) *							
		17	.058	1.47	1.009	25.62																
18	.049	1.24	1.027	26.08	865 (5011800)	R-25 (5293800)	866 (5011900)	R-25-A (5293900)	.901	22.88	1.010	25.65	M-15 (2516000) *									
9	.148	3.75	.954	24.23										861 (5011400)	R-23 (5293000)		862 (5011500)	R-23-A (5293100)	.935	23.74	1.044	26.51
10	.134	3.40	.982	24.94										863 (5011600)	R-24 (5293400)		864 (5011700)	R-24-A (5293500)	.962	24.43	1.071	27.20
11	.120	3.04	1.010	25.65									867 (5012000)	R-26 (5294200)	868 (5012100)		R-26-A (5293500)	.990	25.14	1.099	27.91	M-16 (2516300) *
12	.109	2.76	1.032	26.21									869 (5012200)	R-27 (5294600)	870 (5012300)		R-27-A (5294700)	1.013	25.73	1.122	28.49	
13	.095	2.41	1.060	26.92									871 (5012400)	R-28 (5295000)	872 (5012500)	R-28-A (5295100)	1.041	26.44	1.150	29.21	M-17 (2516600) *	
14	.083	2.10	1.084	27.53									873 (5012600)	R-29 (5295400)	874 (5012700)	R-29-A (5295500)	1.060	26.92	1.169	29.69		
15	.072	1.82	1.106	28.09									875 (5012800)	R-30 (5295800)	876 (5012900)	R-30-A (5295900)	1.087	27.60	1.196	30.37		
16	.065	1.65	1.120	28.44																		
17	.058	1.47	1.134	28.80	879 (5013200)	R-30 (5295800)	880 (5013300)	R-30-A (5295900)	1.115	28.32	1.224	31.08	M-18 (2516900) *									
18	.049	1.24	1.152	29.26																		

* 1/2 in. Sq. Dr. (12.7 mm)

Condenser Expanders

Selection Guide G-800 Series Heat Exchanger & Condenser Tube Expanders – continued

Tube O.D.		Tube Gauge		Tube I.D.		Tube Sheet Thickness				Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel Number (Order No.) 1/2 in. Sq. Dr. (12.7 mm)	Recommended Rolling Motors (Order No.)			
						1/2 in. to 1-1/2 in. (12.7 mm to 38.1 mm)		1-1/4 in. to 2-1/4 in. (31.7 mm to 57.1 mm)							Airetrol	Electric		
in.	mm	bwg	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	Tool No. (Order No.)	Roll Set No. (Order No.)	in.	mm	in.	mm				
1-3/8	34.9	8	.165	4.19	1.045	26.54	877 (5013000)	R-31 (5296200)	878 (5013100)	R-31-A (5296300)	1.026	26.06	1.135	28.82	M-17 (2516600)	1550-250 (8404280)	979-C-210/ ATC-900	
		9	.148	3.75	1.079	27.40	873 (5012600)	R-29 (5295400)	874 (5012700)	R-29-A (5295500)	1.060	26.92	1.169	29.69				
		10	.134	3.40	1.107	28.11	875 (5012800)	R-30 (5295800)	876 (5012900)	R-30-A (5295900)	1.087	27.60	1.196	30.37				
		11	.120	3.04	1.135	28.82	879 (5013200)		880 (5013300)		1.115	28.32	1.224	31.08	M-18 (2516900)			
		12	.109	2.76	1.157	29.38	881 (5013400)	R-32 (5296600)	882 (5013500)	R-32-A (5296700)	1.133	28.77	1.242	31.54	M-19 (2517200)	1550-900 (8404290)	979-C-300/ ATC-900	
		13	.095	2.41	1.185	30.09	883 (5013600)	R-33 (5297000)	884 (5013700)	R-33-A (5297100)	1.160	29.46	1.275	32.38				
		14	.083	2.10	1.209	30.70	885 (5013800)	R-34 (5297400)	886 (5013900)	R-34-A (5297500)	1.179	29.94	1.294	32.86	M-20 (2517500)			
		15	.072	1.82	1.231	31.26			887 (5014000)	R-35 (5297800)	888 (5014100)	R-35-A (5297900)	1.206	30.63				1.321
		1-1/2	38.1	8	.165	4.19	1.170	29.71	889 (5014200)	R-34 (5297400)	890 (5014300)	R-34-A (5297500)	1.145	29.08	1.260	32.00	M-19 (2517200)	1550-250 (8404280)
9	.148			3.75	1.204	30.58	885 (5013800)	886 (5013900)	1.177		29.89		1.294	32.86				
10	.134			3.40	1.232	31.29	887 (5014000)	R-35 (5297800)	888 (5014100)	R-35-A (5297900)	1.206	30.63	1.321	33.55	M-20 (2517500)			
11	.120			3.04	1.260	32.00	891 (5014400)	R-36 (5298200)	892 (5014500)	R-36-A (5298300)	1.235	31.36	1.350	34.29				
12	.109			2.76	1.282	32.56	893 (5014600)	R-37 (5298600)	894 (5014700)	R-37-A (5298700)	1.257	31.92	1.372	34.84	M-21 (2517800)	1550-900 (8404290)	979-C-300/ ATC-900	
13	.095			2.41	1.310	33.27	895 (5014800)	R-37 (5298600)	896 (5014900)	R-37-A (5298700)	1.285	32.63	1.400	35.56				
14	.083			2.10	1.334	33.88	897 (5015000)	R-38 (5299000)	898 (5015100)	R-38-A (5299100)	1.331	33.80	1.446	36.72				
15	.072			1.82	1.356	34.44			899 (5015120)	R-38 (5299000)	900 (5015150)	R-38-A (5299100)	1.331	33.80				1.472
16	.065			1.65	1.370	34.79												
17	.058			1.47	1.384	35.15												
18	.049			1.24	1.402	35.61												
19	.042	1.06	1.416	35.96														
20	.035	0.88	1.430	36.32														

G-800 Series – 5-Roll Expanders

O.D Range:
5/8 – 1-1/2 Inches
15.8 – 38.1 mm

- Expanders with 1-1/2 in. (38.1 mm) long rolls will accommodate tube sheets from 1/2 in. to 1-1/2 in. (12.7mm to 38.1 mm)
- Expanders with 2-1/4 in. (57.1 mm) long rolls will accommodate tube sheets from 1-1/4 in. to 2-1/4 in. (31.7mm to 57.1 mm)
- Reversible Thrust Collar** design allows flush and 1/8 in. recess tube rolling. Collars have lubrication port for use with auto-lube configured ATR and DAS tube rolling systems. 20 BWG .035" (0.9 mm).



NOTE: For best results the Airetool five-roll expander should be fitted with a thin wall thrust collar when being used to roll tubing with 20 BWG .035" (0.9 mm).

Sizes not listed available upon request.



Tube O.D.		Tube Gauge		Tube I.D.		Tube Sheet Thickness				Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel Number (Order No.) 3/8 in. Sq. Dr. (9.5 mm)	Recommended Rolling Motors (Order No.)		
						1/2 in. to 1-1/2 in. (12.7 mm to 38.1 mm)		1-1/4 in. to 2-1/4 in. (31.7 mm to 57.1 mm)							Airetool	Electric	
in.	mm	bwg	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	Tool No. (Order No.)	Roll Set No. (Order No.)	in.	mm	in.	mm			
5/8	15.8	17	.058	1.47	.509	12.92	815-5 (5517135)	R-4-5 (5513832)	816-5 (5519516)	R-4-A-5 (5517897PT)	.499	12.67	.564	14.32	M-9 (2514200)	850-1250-A (8405399)	
		18	.049	1.24	.527	13.38	817-5 (5514294)		818-5 (5521051)		.517	13.13	.576	14.63			
		19	.042	1.06	.541	13.74	819-5 (5514295)	R-4-5 (5513832)	820-5 (5515647)	R-4-A-5 (5517897)	.531	13.48	.596	15.13	M-11 (2514800)		
		20	.035	0.88	.555	14.09											
		21	.032	0.81	.561	14.24											
		22	.028	0.71	.569	14.45											
3/4	19.0	13	.095	2.41	.560	14.22	821-5 (5513230)	R-5-5 (5513231)	822-5 (5514482)	R-5-A-5 (5518189)	.550	13.97	.615	15.62	M-11 (2514800)	850-600-A (8405398)	979-C-650/ ATC-900
		14	.083	2.10	.584	14.83	823-5 (5515375)	R-6-5 (5518187)	824-5 (5514171)	R-6-A-5 (5517898)	.574	14.57	.629	15.97			
		15	.072	1.82	.606	15.39	825-5 (5522104)	R-7-5 (5514393)	826-5 (5518376)	R-7-A-5 (5517899)	.590	14.98	.661	16.78	M-12 (2515100)		
		16	.065	1.65	.620	15.74	827-5 (5513799)		828-5 (5513542)		.605	15.36	.680	17.27	M-13 (2515400)		
		17	.058	1.47	.634	16.10	829-5 (5513426)	R-8-5 (5515995)	830-5 (5513413)	R-8-A-5 (5515996)	.619	15.72	.699	17.75	M-13 (2515400)		
		18	.049	1.24	.652	16.56											
		19	.042	1.06	.666	16.91	831-5 (5513427)	R-9-5 (5517888)	832-5 (5513264)	R-9-A-5 (5517900)	.642	16.30	.729	18.51	M-13 (2515400)		
		20	.035	0.88	.680	17.27											
		21	.032	0.81	.685	17.39											
		22	.028	0.71	.694	17.62											
7/8	22.2	13	.095	2.41	.685	17.39	833-5 (5517076)	R-9-5 (5517888)	834-5 (5514704)	R-9-A-5 (5517900)	.670	17.01	.747	18.97	M-14 (2515700) *	850-600-A (8405398)	979-C-650/ ATC-900
		14	.083	2.10	.709	18.00	835-5 (5517735)	R-10-5 (5518191)	836-5 (5515680)	R-10-A-5 (5517901)	.685	17.39	.774	19.65	M-15 (2516000) *		
		16	.065	1.65	.745	18.93	839-5 (5518154)	R-11-5 (5517889)	840-5 (5514564)	R-11-A-5 (5517902)	.685	17.39	.750	19.05			
		17	.058	1.47	.759	19.27	843-5 (5517922)	R-11-5 (5517889)	844-5 (5517923)	R-11-A-5 (5517902)	.740	18.79	.824	20.92	M-17 (2516600) *		
		18	.049	1.24	.777	19.73											

* 1/2 in. Sq. Dr. (12.7 mm)

Condenser Expanders

Selection Guide G-800 Type Five-Roll Expanders – continued

Tube O.D.		Tube Gauge		Tube I.D.		Tube Sheet Thickness				Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel Number (Order No.) 1/2 in. Sq. Dr. (12.7 mm)	Recommended Rolling Motors (Order No.)		
						1/2 in. to 1-1/2 in. (12.7 mm to 38.1 mm)		1-1/4 in. to 2-1/4 in. (31.7 mm to 57.1 mm)							Airetrol	Electric	
in.	mm	bwg	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	Tool No. (Order No.)	Roll Set No. (Order No.)	in.	mm	in.	mm			
7/8	22.2	19	.042	1.06	.791	20.09	845-5 (5513810)	R-11-5 (5517889)	846-5 (5517924)	R-11-A-5 (5517902)	.763	19.38	.851	21.61	M-18 (2516900)	850-1250-A (8405399)	
		20	.035	0.88	.805	20.44											
		21	.032	0.81	.811	20.59											
		22	.028	0.71	.819	20.80											
1	25.4	12	.109	2.76	.782	19.86	845-5 (5513810)	R-11-5 (5517889)	846-5 (5517924)	R-11-A-5 (5517902)	.763	19.38	.852	21.64	M-18 (2516900)	850-600-A (8405398)	979-C-650/ ATC-900
		13	.095	2.41	.810	20.57	847-5 (5513379)	R-13-5 (5513741)	848-5 (5517099)	R-13-A-5 (5517903)	.791	20.09	.880	22.35			
		14	.083	2.10	.834	21.18	849-5 (5514922)	R-12-5 (5517890)	850-5 (5513331)	R-12-A-5 (5515825)	.810	20.57	.909	23.08	M-20 (2517500)		
		15	.072	1.82	.856	21.74	851-5 (5513778)	R-14-5 (5517894)	852-5 (5513330)	R-14-A-5 (5515826)	.837	21.25	.936	23.77			
		16	.065	1.65	.870	22.09											
		17	.058	1.47	.884	22.45	855-5 (5515194)	R-13-5 (5513741)	856-5 (5513745)	R-13-A-5 (5517903)	.865	21.97	.965	24.51	M-21 (2517800)	850-1250-A (8405399)	
		18	.049	1.24	.902	22.91											
		19	.042	1.06	.916	23.26											
		20	.035	0.88	.930	23.62											
		21	.032	0.81	.936	23.77	857-5 (5513825)	R-15-5 (5513833)	858-5 (5515935)	R-15-A-5 (5517907)	.883	22.42	.997	25.32	M-21 (2517800)		
1-1/8	28.5	12	.109	2.76	.907	23.03	857-5 (5513825)	R-15-5 (5513833)	858-5 (5515935)	R-15-A-5 (5517907)	.883	22.42	.997	25.32	M-21 (2517800)	1050-400 (8404200)	979-C-300/ ATC-900
		13	.095	2.41	.935	23.74	859-5 (5514397)	R-16-5 (5518056)	860-5 (5513492)	R-16-A-5 (5517904)	.916	23.26	1.000	25.40			
		14	.083	2.10	.959	24.35	861-5 (5513325)	R-17-5 (5517891)	862-5 (5513747)	R-17-A-5 (5517905)	.935	23.74	1.043	26.49			
1-1/4	31.8	15	.072	1.82	1.106	28.09	875-5 (5513884)	R-21-5 (5517887)	876-5 (5519970)	R-21-A-5 (5513291)	1.087	27.60	1.196	30.37	876-5 (2975348)	1050-400 (8404200)	979-C-650/ ATC-900
		16	.065	1.65	1.120	28.44											
		17	.058	1.47	1.134	28.80	879-5 (5513993)	R-21-5 (5517887)	880-5 (5512151)	R-21-A-5 (5513291)	1.115	28.32	1.231	31.26			
		18	.049	1.24	1.152	29.26											
		19	.042	1.06	1.166	29.61											
		20	.035	0.88	1.180	29.97											
		21	.032	0.81	1.186	30.12											
22	.028	0.71	1.194	30.32													
1-3/8	34.9	12	.109	2.76	1.154	29.31	881-5 (5516001)	R-21-5 (5517887)	882-5 (5514657)	R-21-A-5 (5513291)	1.133	28.77	1.242	31.54	882-5 (2973230)	1550-250 (8404280)	979-C-210/ ATC-900
		14	.083	2.10	1.209	30.70	885-5 (5513252)	R-23-5 (5517892)	886-5 (5515778)	R-23-A-5 (5518192)	1.179	29.94	1.296	32.91			
1-1/2	38.1	17	.058	1.47	1.384	35.15	899-5 (5513850)	R-29-5 (5517893)	900-5 (5517605)	R-29-A-5 (5517906)	1.331	33.80	1.489	37.82	900-5 (2975262)	1550-900 (8404290)	979-C-300/ ATC-900
		18	.049	1.24	1.402	35.61											
		19	.042	1.06	1.416	35.96											
		20	.035	0.88	1.430	36.32											
		21	.032	1	1.436	36.47											
		22	.028	0.71	1.444	36.67											

Condenser Expanders

Standard Reach G-1200 Series Heat Exchanger & Condenser Tube Expanders



G-1200 Series – 3-Roll Expander, Standard Reach

O.D Range:
1/2 – 1-1/2 Inches
12.7 – 38.1 mm

- Expanders with 1-1/2 in. (38.1 mm) long rolls will accommodate tube sheet thicknesses from 1/2" to 5" (12.7 mm to 127.0 mm)
- Expanders with 2-1/4 in. (57.1 mm) long rolls will accommodate tube sheet thicknesses from 1-1/4" to 5-3/4" (31.7 mm to 146.0 mm)
- Reversible Thrust Collar** design allows flush and 1/8 in. recess tube rolling. Collars have lubrication port for use with auto-lube configured ATR and DAS tube rolling systems.



NOTE: Step expanding becomes necessary if the tube sheet thickness exceeds the length of the roll. Specify "S" Type rolls for step rolling applications.

Sizes not listed available upon request.



Standard Reach						Tube Sheet Thickness				Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel Number (Order No.) 3/8 in. Sq. Dr. (9.5 mm)	Recommended Rolling Motors (Order No.)			
Tube O.D.		Tube Gauge		Tube I.D.		1/2 in. to 5 in. (12.7 mm to 127.0 mm)		1-1/4 in. to 5-3/4 in. (31.7 mm to 146.0 mm)							Airetrol	Electric		
in.	mm	bwg	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	Tool No. (Order No.)	Roll Set No. (Order No.)	in.	mm	in.	mm				
1/2	12.7	14	.083	2.10	.334	8.48	1197 (5017460)	797 (5512194)			.324	8.22	.374	9.49	1197 (2165300)	720-550-B (8405391)		
		15	.072	1.82	.356	9.04	1199 (5056204)	R-1 (5284800)			.348	8.83	.398	10.10	1199 (2166400)			
		16	.065	1.65	.370	9.39	1201 (5017500)					.360	9.14	.410	10.41		M-51 (2521100)	
				17	.058	1.47	.384	9.75	1203 (5017900)	R-2 (5285000)			.374	9.49	.424	10.76		720-1800-B (8405512)-3/8
				18	.049	1.24	.402	10.21	1205 1/2 (5018300)	R-3 (5285200)			.392	9.95	.447	11.35	M-52 (2522000)	
				20	.035	0.88	.430	10.92	1207 1/2 (5018701)	R-4 (5285400)			.420	10.66	.480	12.19	M-53 (2522900)	
5/8	15.8	12	.109	2.76	.407	10.33	1205 5/8 (5018301)	R-3 (5285200)			.392	9.95	.447	11.35	M-52 (2522000)	850-600-A (8405398)		
		13	.095	2.41	.435	11.04	1207 5/8 (5018700)	R-4 (5285400)			.420	10.66	.480	12.19	M-53 (2522900)			
		14	.083	2.10	.459	11.65	1209 (5019100)		1210 (5019500)	R-4-A (5285500)		.449	11.40	.509	12.92		M-54 (2523800)	
				15	.072	1.82	.481	12.21	1211 5/8 (5019900)	R-5 (5285800)	1212 5/8 (5020300)	R-5-A (5285900)	.471	11.96	.536	13.61	M-55 (2524700)	850-1250-A (8405399)
				16	.065	1.65	.495	12.57	1213 (5020700)	R-6 (5286200)	1214 (5021100)	R-6-A (5286300)	.485	12.31	.550	13.97		
				17	.058	1.47	.509	12.92	1215 5/8 (5021500)		1216 5/8 (5021900)		.499	12.67	.564	14.32	M-56 (2525600)	
				18	.049	1.24	.527	13.38	1217 5/8 (5022300)	R-7 (5286600)	1218 5/8 (5022700)	R-7-A (5286700)	.517	13.13	.582	14.78		
				19	.042	1.06	.541	13.74										
				20	.035	0.88	.555	14.09										
				21	.032	0.81	.561	14.24										
		22	.028	0.71	.569	14.45	1219 (5023100)	R-7 (5286600)	1220 (5023500)	R-7-A (5286700)	.531	13.48	.596	15.13	M-58 (2527400)			

Condenser Expanders

Standard Reach G-1200 Series Heat Exchanger & Condensor Tube Expanders – continued

Standard Reach						Tube Sheet Thickness				Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel Number (Order No.) 3/8 in. Sq. Dr. (9.5 mm)	Recommended Rolling Motors (Order No.)		
Tube O.D.		Tube Gauge		Tube I.D.		1/2 in. to 5 in. (12.7 mm to 127.0 mm)		1-1/4 in. to 5-3/4 in. (31.7 mm to 146.0 mm)							Airetrol	Electric	
in.	mm	bwg	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	Tool No. (Order No.)	Roll Set No. (Order No.)	in.	mm	in.	mm			
3/4	19.0	10	.134	3.40	.482	12.24	1211 3/4 (5019901)	R-5 (5285800)	1212 3/4 (5020301)	R-5-A (5285900)	.471	11.96	.536	13.61	M-55 (2524700)	850-600-A (8405398)	979-C-650/ ATC-900
		11	.120	3.04	.510	12.95	1215 3/4 (5021501)	R-6 (5286200)	1216 3/4 (5513251)	R-6-A (5286300)	.499	12.67	.564	14.32	M-56 (2525600)		
		12	.109	2.76	.532	13.51	1217 3/4 (5022301)	R-7 (5286600)	1218 3/4 (5022701)	R-7-A (5286700)	.517	13.13	.582	14.78	M-58 (2527400)		
		13	.095	2.41	.560	14.22	1221 (5023900)	R-8 (5287000)	1222 (5024300)	R-8-A (5287100)	.550	13.97	.615	15.62			
		14	.083	2.10	.584	14.83	1223 (5024700)	R-9 (5287400)	1224 (5025100)	R-9-A (5287500)	.574	14.57	.639	16.23	M-59 (2528300)		
		15	.072	1.82	.606	15.39	1225 3/4 (5025500)	R-10 (5287800)	1226 3/4 (5025900)	R-10-A (5287900)	.596	15.13	.661	16.78			
		16	.065	1.65	.620	15.74	1227 (5026300)		1228 (5026700)				.605	15.36	.685	17.39	
		17	.058	1.47	.634	16.10	1229 3/4 (5027100)	R-11 (5288200)	1230 3/4 (5027500)	R-11-A (5288300)	.619	15.72	.699	17.75	M-59 (2528300)		
		18	.049	1.24	.652	16.56											
		19	.042	1.06	.666	16.91	1231 3/4 (5027900)	R-12 (5288600)	1232 3/4 (5028300)	R-12-A (5288700)	.642	16.30	.722	18.33	850-1250-A (8405399)		
		20	.035	0.88	.680	17.27											
		21	.032	0.81	.686	17.42											
22	.028	0.71	.694	17.62													
7/8	22.2	10	.134	3.40	.607	15.41	1225 7/8 (5025501)	R-10 (5287800)	1226 7/8 (5025901)	R-10-A (5287900)	.596	15.13	.661	16.78	M-58 (2527400)	850-600-A (8405398)	979-C-650/ ATC-900
		11	.120	3.04	.635	16.12	1229 7/8 (5027101)	R-11 (5288200)	1230 7/8 (5027501)	R-11-A (5288300)	.619	15.72	.699	17.75	M-59 (2528300)		
		12	.109	2.76	.657	16.68	1231 7/8 (5027901)	R-12 (5288600)	1232 7/8 (5028301)	R-12-A (5288700)	.642	16.30	.722	18.33	M-60 (2529200)		
		13	.095	2.41	.685	17.39	1233 (5028700)	R-13 (5289000)	1234 (5029100)	R-13-A (5289100)	.670	17.01	.750	19.05			
		14	.083	2.10	.709	18.00	1235 (5029500)	R-14 (5289400)	1236 (5029900)	R-14-A (5289500)	.685	17.39	.774	19.65	M-61 (2530100)		
		15	.072	1.82	.731	18.56	1237 (5030300)	R-15 (5289800)	1238 (5030700)	R-15-A (5289900)	.712	18.08	.801	20.34			
		16	.065	1.65	.745	18.92	1239 (5031100)		1240 (5031500)				.726	18.44	.815	20.70	M-62 (2531000)
		17	.058	1.47	.759	19.27	1243 (5032700)	R-16 (5290200)	1244 (5033100)	R-16-A (5290300)	.740	18.79	.829	21.05	850-1250-A (8405399)		
18	.049	1.24	.777	19.73													
1	25.4	8	.165	4.19	.670	17.01	1241 (5031900)	R-13 (5289000)	1242 (5032300)	R-13-A (5289100)	.665	16.89	.735	18.66	M-59 (2528300)	1050-400 (8404200)	979-C-300/ ATC-900
		9	.148	3.75	.704	17.88	1235 (5029500)	R-14 (5289400)	1236 (5029900)	R-14-A (5289500)	.685	17.39	.774	19.65	M-61 (2530100)		
		10	.134	3.40	.732	18.59	1237 (5030300)	R-15 (5289800)	1238 (5030700)	R-15-A (5289900)	.712	18.08	.801	20.34			
		11	.120	3.04	.760	19.30	1243 (5032700)	R-16 (5290200)	1244 (5033100)	R-16-A (5290300)	.740	18.79	.829	21.05	M-62 (2531000)		
		12	.109	2.76	.782	19.86	1245 (5033500)	R-17 (5290600)	1246 (5033900)	R-17-A (5290700)	.763	19.38	.852	21.64			
		13	.095	2.41	.810	20.57	1247 (5034300)	R-18 (5291000)	1248 (5034700)	R-18-A (5291100)	.791	20.09	.880	22.35	850-600-A (8405398)		

Condenser Expanders

Standard Reach G-1200 Series Heat Exchanger & Condenser Tube Expanders – continued



Standard Reach						Tube Sheet Thickness				Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel Number (Order No.) 3/8 in. Sq. Dr. (9.5 mm)	Recommended Rolling Motors (Order No.)		
Tube O.D.		Tube Gauge		Tube I.D.		1/2 in. to 5 in. (12.7 mm to 127.0 mm)		1-1/4 in. to 5-3/4 in. (31.7 mm to 146.0 mm)							Airetrol	Electric	
in.	mm	bwg	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	Tool No. (Order No.)	Roll Set No. (Order No.)	in.	mm	in.	mm			
1	25.4	14	.083	2.10	.834	21.18	1249 (5035100)	R-18 (5291000)	1250 (5035500)	R-18-A (5291100)	.810	20.57	.909	23.08	M-63 (2531900)	850-600-A (8405398)	979-C-300/ATC-900
		15	.072	1.82	.856	21.74	1251 (5035900)	R-19 (5291400)	1252 (5036300)	R-19-A (5291500)	.837	21.25	.936	23.77			
		16	.065	1.65	.870	22.09											
		17	.058	1.47	.884	22.45	1255 (5037500)	R-21 (5292200)	1256 (5037900)	R-21-A (5292300)	.865	21.97	.964	24.48	M-63 (2531900)	850-1250-A (8405399)	979-C-650/ATC-900
		18	.049	1.24	.902	22.91											
		19	.042	1.06	.916	23.26											
		20	.035	0.88	.930	23.62											
1-1/8	28.5	8	.165	4.19	.795	20.19	1253 (5036700)	R-20 (5291800)	1254 (5037100)	R-20-A (5291900)	.776	19.71	.875	22.22	M-63 (2531900)	979-C-300/ATC-900	
		9	.148	3.75	.829	21.05	1249 (5035100)	R-18 (5291000)	1250 (5035500)	R-18-A (5291100)	.810	20.57	.909	23.08			
		10	.134	3.40	.857	21.76	1251 (5035900)	R-19 (5291400)	1252 (5036300)	R-19-A (5291500)	.837	21.25	.936	23.77			
		11	.120	3.04	.885	22.47	1255 (5037500)	R-21 (5292200)	1256 (5037900)	R-21-A (5292300)	.865	21.97	.964	24.48			
		12	.109	2.76	.907	23.03	1257 (5038300)		1258 (5038700)		.883	22.42	.982	24.94	M-64 (2532800) *	1050-400 (8404200)	
		13	.095	2.41	.935	23.74	1259 (5039100)	R-22 (5292600)	1260 (5039500)	R-22-A (5292700)	.916	23.26	1.015	25.78			
		14	.083	2.10	.959	24.35	1261 (5039900)	R-23 (5293000)	1262 (5040300)	R-23-A (5293100)	.935	23.74	1.044	26.51	M-65 (2533700) *	979-C-650/ATC-900	
		15	.072	1.82	.981	24.91	1263 (5040700)	R-24 (5293400)	1264 (5041100)	R-24-A (5293500)	.962	24.43	1.071	27.20			
		16	.065	1.65	.995	25.27	1267 (5042300)	R-26 (5294200)	1268 (5042700)	R-26-A (5294300)	.990	25.14	1.099	27.91	M-66 (2534600) *	979-C-300/ATC-900	
		17	.058	1.47	1.009	25.62											
18	.049	1.24	1.028	26.11													
1-1/4	31.7	8	.165	4.19	.920	23.36	1265 (5041500)	R-25 (5293800)	1266 (5041900)	R-25-A (5293900)	.901	22.88	1.010	25.65	M-65 (2533700) *	1550-250 (8404280)	979-C-300/ATC-900
		9	.148	3.75	.954	24.23	1261 (5039900)	R-23 (5293000)	1262 (5040300)	R-23-A (5293100)	.935	23.74	1.044	26.51			
		10	.134	3.40	.982	24.94	1263 (5040700)	R-24 (5293400)	1264 (5041100)	R-24-A (5293500)	.962	24.43	1.071	27.20			
		11	.120	3.04	1.010	25.65	1267 (5042300)	R-26 (5294200)	1268 (5042700)	R-26-A (5294300)	.990	25.14	1.099	27.91	M-66 (2534600) *	979-C-300/ATC-900	
		12	.109	2.76	1.032	26.21	1269 (5043100)	R-27 (5294600)	1270 (5043500)	R-27-A (5294700)	1.013	25.73	1.122	28.49			
		13	.095	2.41	1.060	26.92	1271 (5043900)	R-28 (5295000)	1272 (5044300)	R-28-A (5295100)	1.041	26.44	1.150	29.21	M-67 (2535500) *	1050-400 (8404200)	979-C-650/ATC-900
		14	.083	2.10	1.084	27.53	1273 (5044700)	R-29 (5295400)	1274 (5045100)	R-29-A (5295500)	1.060	26.92	1.169	29.69			
		15	.072	1.82	1.106	28.09	1275 (5045500)	R-30 (5295800)	1276 (5045900)	R-30-A (5295900)	1.087	27.60	1.196	30.37			
		16	.065	1.65	1.120	28.44	1279 (5047100)		1280 (5047500)		1.115	28.32	1.224	31.08	M-68 (2536400) *		
		17	.058	1.47	1.134	28.80											
18	.049	1.24	1.152	29.26													

* 1/2 in. Sq. Dr. (12.7 mm)

Condenser Expanders

Standard Reach G-1200 Series Heat Exchanger & Condenser Tube Expanders – continued

Standard Reach						Tube Sheet Thickness				Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel Number (Order No.) 1/2 in. Sq. Dr. (12.7 mm)	Recommended Rolling Motors (Order No.)		
Tube O.D.		Tube Gauge		Tube I.D.		1/2 in. to 5 in. (12.7 mm to 127.0 mm)		1-1/4 in. to 5-3/4 in. (31.7 mm to 146.0 mm)							Airetrol	Electric	
in.	mm	bwg	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	Tool No. (Order No.)	Roll Set No. (Order No.)	in.	mm	in.	mm			
1-3/8	34.9	8	.165	4.19	1.045	26.54	1277 (5046300)	R-31 (5296200)	1278 (5046700)	R-31-A (5295900)	1.026	26.04	1.135	28.82	M-67 (2535500)	1550-250 (8404280)	979-C-210/ ATC-900
		9	.148	3.75	1.079	27.40	1273 (5044700)	R-29 (5295400)	1274 (5045100)	R-29-A (5295500)	1.060	26.92	1.169	29.69			
		10	.134	3.40	1.107	28.11	1275 (5045500)	R-30 (5295800)	1276 (5045900)	R-30-A (5295900)	1.087	27.60	1.196	30.37			
		11	.120	3.04	1.135	28.82	1279 (5047100)		1280 (5047500)	R-30-A (5295900)	1.115	28.32	1.224	31.08	M-68 (2536400)		
		12	.109	2.76	1.157	29.38	1281 (5047900)	R-32 (5295800)	1282 (5048300)	R-32-A (5296700)	1.133	28.77	1.242	31.54			
		13	.095	2.41	1.185	30.09	1283 (5048700)	R-32 (5295800)	1284 (5049100)	R-32-A (5296700)	1.160	29.46	1.275	32.38	M-70 (2538200)	1550-900 (8404290)	979-C-300/ ATC-900
		14	.083	2.10	1.209	30.70	1285 (5049500)	R-34 (5297400)	1286 (5049900)	R-34-A (5297500)	1.179	29.94	1.294	32.86			
		15	.072	1.82	1.231	31.26	1287 (5050300)	R-35 (5297800)	1288 (5050700)	R-35-A (5297900)	1.206	30.63	1.321	33.55			
		16	.065	1.65	1.245	31.62											
1-1/2	38.1	8	.165	4.19	1.170	29.71	1289 (5051100)	R-34 (5297400)	1290 (5051500)	R-34-A (5297500)	1.145	29.08	1.260	32.00	M-69 (2537300)		
		9	.148	3.75	1.204	30.58	1285 (5049500)	R-34 (5297400)	1286 (5049900)	R-34-A (5297500)	1.179	29.94	1.294	32.86			
		10	.134	3.40	1.232	31.29	1287 (5050300)	R-35 (5297800)	1288 (5050700)	R-35-A (5297900)	1.206	30.63	1.321	33.55	M-70 (2538200)	1550-250 (8404280)	979-C-210/ ATC-900
		11	.120	3.04	1.260	32.00	1291 (5051900)	R-36 (5298200)	1292 (5052300)	R-36-A (5298300)	1.235	31.36	1.350	34.29			
		12	.109	2.76	1.282	32.56	1293 (5052700)	R-37 (5298600)	1294 (5053100)	R-37-A (5298700)	1.257	31.92	1.372	34.84			
		13	.095	2.41	1.310	33.27	1295 (5053500)	R-37 (5298600)	1296 (5053900)	R-37-A (5298700)	1.285	32.63	1.400	35.56			
		14	.083	2.10	1.334	33.88											
		15	.072	1.82	1.356	34.44	1297 (5054300)	R-38 (5299000)	1298 (5054700)	R-38-A (5299100)	1.331	33.80	1.446	36.72	M-71 (2539100)		
		16	.065	1.65	1.370	34.79											
		17	.058	1.47	1.384	35.15	1299 (5512167)	R-38 (5299000)	1300 (5055075)	R-38-A (5299100)	1.331	33.80	1.472	37.38	M-72 (2539920)		
		18	.049	1.24	1.402	35.61											
		19	.042	1.06	1.416	35.96											
20	.035	0.88	1.430	36.32													

Condenser Expanders

"A" Reach G-1200 Series Heat Exchanger & Condenser Tube Expanders



G-1200 Series – 3-Roll Expander, "A" Reach

O.D Range:
1/2 – 1-1/2 Inches
12.7 – 38.1 mm

- Expanders with 1-1/2 in. (38.1 mm) long rolls will accommodate tube sheet thicknesses from 1-1/4" to 7-3/4" (31.7 mm to 196.8 mm)
- Expanders with 2-1/4 in. (57.1 mm) long rolls will accommodate tube sheet thicknesses from 2" to 8-1/2" (50.8 mm to 215.9 mm)
- **Reversible Thrust Collar** design allows flush and 1/8 in. recess tube rolling



NOTE: Step expanding becomes necessary if the tube sheet thickness exceeds the length of the roll. Specify "S" Type rolls for step rolling applications.



Sizes not listed available upon request.

Tube O.D.		"A" Reach					Tube Sheet Thickness				Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel Number (Order No.) 3/8 in. Sq. Dr. (9.5 mm)	Recommended Rolling Motors (Order No.)			
		Tube Gauge		Tube I.D.			1-1/4 in. to 7-3/4 in. (31.7 mm to 196.8 mm)		2 in. to 8-1/2 in. (50.8 mm to 215.9 mm)							Airetrol	Electric		
in.	mm	bwg	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	Tool No. (Order No.)	Roll Set No. (Order No.)	in.	mm	in.	mm					
1/2	12.7	14	.083	2.10	.334	8.48	1197 A (5514943)	797 (5512194)			.324	8.22	.374	9.49	1197-A (2165900)	720-550-B (8405391)			
		15	.072	1.82	.356	9.04	1199 A (5515077)	R-1 (5284800)			.348	8.83	.398	10.10	1199 A (2972749)				
		16	.065	1.65	.370	9.39	1201 A (5017600)	R-2 (5285000)			.360	9.14	.410	10.41	M-51-A (2521200)				
		17	.058	1.47	.384	9.75	1203 A (5018000)	R-3 (5285200)			.374	9.49	.424	10.76	M-52-A (2522100)	720-1800-B (8405512)-3/8			
		18	.049	1.24	.402	10.21	1205 A (5018400)	R-4 (5285400)			.392	9.95	.447	11.35	M-53-A (2523000)				
		20	.035	0.88	.430	10.92	1207 A (5018800)	R-5 (5285800)			.420	10.66	.480	12.19	M-54-A (2523900)				
5/8	15.8	12	.109	2.76	.407	10.33	1205 A (5018400)	R-3 (5285200)			.392	9.95	.447	11.35	M-52-A (2522100)	850-600-A (8405398)			
		13	.095	2.41	.435	11.04	1207 A (5018800)	R-4 (5285400)			.420	10.66	.480	12.19	M-53-A (2523000)				
		14	.083	2.10	.459	11.65	1209 A (5019200)	R-5 (5285800)	1210 A (5019600)	R-4-A (5285500)	.449	11.40	.509	12.92	M-54-A (2523900)				
		15	.072	1.82	.481	12.21	1211 A (5020000)	R-6 (5286200)	1212 A (5020400)	R-5-A (5285900)	.471	11.96	.536	13.61	M-55-A (2524800)				
		16	.065	1.65	.495	12.57	1213 A (5020800)	R-7 (5286600)	1214 A (5021200)	R-6-A (5286300)	.485	12.31	.550	13.97	M-56-A (2525700)	850-1250-A (8405399)			
		17	.058	1.47	.509	12.92	1215 A (5021600)	R-7 (5286600)	1216 A (5022000)	R-7-A (5286700)	.499	12.67	.564	14.32	M-58-A (2527500)				
		18	.049	1.24	.527	13.38	1217 A (5022400)	R-7 (5286600)	1218 A (5022800)	R-7-A (5286700)	.517	13.13	.582	14.78	M-58-A (2527500)				
		19	.042	1.06	.541	13.74													
		20	.035	0.88	.555	14.09													
				21	.032	0.81	.561	14.24	1219 A (5023200)	R-7 (5286600)	1220 A (5023600)	R-7-A (5286700)	.531	13.48	.596	15.13			M-58-A (2527500)
		22	.028	0.71	.569	14.45													

Condenser Expanders

"A" Reach G-1200 Series Heat Exchanger & Condensor Tube Expanders – continued

"A" Reach						Tube Sheet Thickness				Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel Number (Order No.) 3/8 in. Sq. Dr. (9.5 mm)	Recommended Rolling Motors (Order No.)			
Tube O.D.		Tube Gauge		Tube I.D.		1-1/4 in. to 7-3/4 in. (31.7 mm to 196.8 mm)		2 in. to 8-1/2 in. (50.8 mm to 215.9 mm)							in.	mm	in.	mm
in.	mm	bwg	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	Tool No. (Order No.)	Roll Set No. (Order No.)	in.	mm	in.	mm				
3/4	19.0	10	.134	3.40	.482	12.24	1211 A (5020000)	R-5 (5285800)	1212 A (5020400)	R-5-A (5285900)	.471	11.96	.536	13.61	M-55-A (2524800)	850-600-A (8405398)	979-C-650/ ATC-900	
		11	.120	3.04	.510	12.95	1215 A (5021600)	R-6 (5286200)	1216 A (5022000)	R-6-A (5286300)	.499	12.67	.564	14.32	M-56-A (2525700)			
		12	.109	2.76	.532	13.51	1217 A (5022400)	R-7 (5286600)	1218 A (5022800)	R-7-A (5286700)	.517	13.13	.582	14.78	M-58-A (2527500)			
		13	.095	2.41	.560	14.22	1221 A (5024000)	R-8 (5287000)	1222 A (5024400)	R-8-A (5287100)	.550	13.97	.615	15.62				
		14	.083	2.10	.584	14.83	1223 A (5024800)	R-9 (5287400)	1224 A (5025200)	R-9-A (5287500)	.574	14.57	.639	16.23				
		15	.072	1.82	.606	15.39	1225 A (5025600)	R-10 (5287800)	1226 A (5026000)	R-10-A (5287900)	.596	15.13	.661	16.78				
		16	.065	1.65	.620	15.74	1227 A (5026400)		1228 A (5026801)		.605	15.36	.685	17.39				
		17	.058	1.47	.634	16.10	1229 A (5027100)	R-11 (5288200)	1230 A (5027600)	R-11-A (5288300)	.619	15.72	.699	17.75	M-59-A (2528400)	850-1250-A (8405399)		
		18	.049	1.24	.652	16.56												
		19	.042	1.06	.666	16.91												
		20	.035	0.88	.680	17.27												
		21	.032	0.81	.686	17.42												
22	.028	0.71	.694	17.62	1231 A (5028000)	R-12 (5288600)					1232 A (5028400)	R-12-A (5288700)	.642	16.30			.722	18.33
7/8	22.2	10	.134	3.40	.607	15.41	1225 A (5025600)	R-10 (5287800)	1226 A (5026000)	R-10-A (5287900)	.596	15.13	.661	16.78	M-58-A (2527500)	850-600-A (8405398)	979-C-650/ ATC-900	
		11	.120	3.04	.635	16.12	1229 A (5027200)	R-11 (5288200)	1230 A (5027600)	R-11-A (5288300)	.619	15.72	.699	17.75	M-59-A (2528400)			
		12	.109	2.76	.657	16.68	1231 A (5028000)	R-12 (5288600)	1232 A (5028400)	R-12-A (5288700)	.642	16.30	.722	18.33				
		13	.095	2.41	.685	17.39	1233 A (5028800)	R-13 (5289000)	1234 A (5029200)	R-13-A (5289100)	.670	17.01	.750	19.05	M-60-A (2529300)			
		14	.083	2.10	.709	18.00	1235 A (5029600)	R-14 (5289400)	1236 A (5030000)	R-14-A (5289500)	.685	17.39	.774	19.65	M-61-A (2530200)			
		15	.072	1.82	.731	18.56	1237 A (5030400)	R-15 (5289800)	1238 A (5030800)	R-15-A (5289900)	.712	18.08	.801	20.34				
		16	.065	1.65	.745	18.92	1239 A (5031200)		1240 A (5031600)		.726	18.44	.815	20.70				
		17	.058	1.47	.759	19.27	1243 A (5032800)	R-16 (5290200)	1244 A (5033200)	R-16-A (5290300)	.740	18.79	.829	21.05	M-62-A (2531100)			850-1250-A (8405399)
		18	.049	1.24	.777	19.73												
1	25.4	8	.165	4.19	.670	17.01	1241 A (5032000)	R-13 (5289000)	1242 A (5032400)	R-13-A (5289100)	.665	16.89	.735	18.66	M-59-A (2528400)	1050-400 (8404200)	979-C-300/ ATC-900	
		9	.148	3.75	.704	17.88	1235 A (5029600)	R-14 (5289400)	1236 A (5030000)	R-14-A (5289500)	.685	17.39	.774	19.65	M-61-A (2530200)			
		10	.134	3.40	.732	18.59	1237 A (5030400)	R-15 (5289800)	1238 A (5030800)	R-15-A (5289900)	.712	18.08	.801	20.34				
		11	.120	3.04	.760	19.30	1243 A (5032800)	R-16 (5290200)	1244 A (5033200)	R-16-A (5290300)	.740	18.79	.829	21.05	M-62-A (2531100)			
		12	.109	2.76	.782	19.86	1245 A (5033600)	R-17 (5290600)	1246 A (5034000)	R-17-A (5290700)	.763	19.38	.852	21.64				
		13	.095	2.41	.810	20.57	1247 A (5034400)	R-18 (5291000)	1248 A (5034800)	R-18-A (5291100)	.791	20.09	.880	22.35				
													850-600-A (8405398)					

Condenser Expanders

"A" Reach G-1200 Series Heat Exchanger & Condenser Tube Expanders – continued



"A" Reach						Tube Sheet Thickness				Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel Number (Order No.) 3/8 in. Sq. Dr. (9.5 mm)	Recommended Rolling Motors (Order No.)		
Tube O.D.		Tube Gauge		Tube I.D.		1-1/4 in. to 7-3/4 in. (31.7 mm to 196.8 mm)		2 in. to 8-1/2 in. (50.8 mm to 215.9 mm)							Airetrol	Electric	
in.	mm	bwg	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	Tool No. (Order No.)	Roll Set No. (Order No.)	in.	mm	in.	mm			
1	25.4	14	.083	2.10	.834	21.18	1249 A (5035200)	R-18 (5291000)	1250 A (5035600)	R-18-A (5291100)	.810	20.57	.909	23.08	M-63-A (2532000)	850-600-A (8405398)	979-C-300/ ATC-900
		15	.072	1.82	.856	21.74	1251 A (5036000)	R-19 (5291400)	1252 A (5036400)	R-19-A (5291500)	.837	21.25	.936	23.77			
		16	.065	1.65	.870	22.09											
		17	.058	1.47	.884	22.45	1255 A (5037600)	R-21 (5292200)	1256 A (5038000)	R-21-A (5292300)	.865	21.97	.964	24.48	M-63-A (2532000)	850-1250-A (8405399)	979-C-650/ ATC-900
		18	.049	1.24	.902	22.91											
		19	.042	1.06	.916	23.26											
		20	.035	0.88	.930	23.62											
1-1/8	28.5	8	.165	4.19	.795	20.19	1253 A (5036800)	R-20 (5291800)	1254 A (5037200)	R-20-A (5291900)	.776	19.71	.875	22.22	M-63-A (2532000)	1050-400 (8404200)	979-C-300/ ATC-900
		9	.148	3.75	.829	21.05	1249 A (5035200)	R-18 (5291000)	1250 A (5035600)	R-18-A (5291100)	.810	20.57	.909	23.08			
		10	.134	3.40	.857	21.76	1251 A (5036000)	R-19 (5291400)	1252 A (5036400)	R-19-A (5291500)	.837	21.25	.936	23.77			
		11	.120	3.04	.885	22.47	1255 A (5037600)	R-21 (5292200)	1256 A (5038000)	R-21-A (5292300)	.865	21.97	.964	24.48			
		12	.109	2.76	.907	23.03	1257 A (5038300)		1258 A (5038800)		.883	22.42	.982	24.94			
		13	.095	2.41	.935	23.74	1259 A (5039200)	R-22 (5292600)	1260 A (5039600)	R-22-A (5292700)	.916	23.26	1.015	25.78	M-64-A (2532900PT) *	1050-400 (8404200)	979-C-650/ ATC-900
		14	.083	2.10	.959	24.35	1261 A (5040000)	R-23 (5293000)	1262 A (5040400)	R-23-A (5293100)	.935	23.74	1.044	26.51	M-65-A (2533800) *		
		15	.072	1.82	.981	24.91	1263 A (5040800)	R-24 (5293400)	1264 A (5041200)	R-24-A (5293500)	.962	24.43	1.071	27.20			
		16	.065	1.65	.995	25.27											
		17	.058	1.47	1.009	25.62	1267 A (5042400)	R-26 (5294200)	1268 A (5042800)	R-26-A (5294300)	.990	25.14	1.099	27.91	M-66-A (2534700) *		
18	.049	1.24	1.028	26.11													
1-1/4	31.7	8	.165	4.19	.920	23.36	1265 A (5041600)	R-25 (5293800)	1266 A (5042000)	R-25-A (5293900)	.901	22.88	1.010	25.65	M-65-A (2533800) *	1550-250 (8404280)	979-C-300/ ATC-900
		9	.148	3.75	.954	24.23	1261 A (5040000)	R-23 (5293000)	1262 A (5040400)	R-23-A (5293100)	.935	23.74	1.044	26.51			
		10	.134	3.40	.982	24.94	1263 A (5040800)	R-24 (5293400)	1264 A (5041200)	R-24-A (5293500)	.962	24.43	1.071	27.20			
		11	.120	3.04	1.010	25.65	1267 A (5042400)	R-26 (5294200)	1268 A (5042800)	R-26-A (5294300)	.990	25.14	1.099	27.91	M-66-A (2534700) *	1050-400 (8404200)	979-C-650/ ATC-900
		12	.109	2.76	1.032	26.21	1269 A (5043200)	R-27 (5294600)	1270 A (5043600)	R-27-A (5294700)	1.013	25.73	1.122	28.49			
		13	.095	2.41	1.060	26.92	1271 A (5044000)	R-28 (5295000)	1272 A (5044400)	R-28-A (5295100)	1.041	26.44	1.150	29.21	M-67-A (2535600) *		
		14	.083	2.10	1.084	27.53	1273 A (5044800)	R-29 (5295400)	1274 A (5045200)	R-29-A (5295500)	1.060	26.92	1.169	29.69			
		15	.072	1.82	1.106	28.09	1275 A (5045600)	R-30 (5295800)	1276 A (5046000)	R-30-A (5295900)	1.087	27.60	1.196	30.37			
		16	.065	1.65	1.120	28.44											
		17	.058	1.47	1.134	28.80	1279 A (5047200)	R-30 (5295800)	1280 A (5047600)	R-30-A (5295900)	1.115	28.32	1.224	31.08	M-68-A (2536500) *		
18	.049	1.24	1.152	29.26													

* 1/2 in. Sq. Dr. (12.7 mm)

Condenser Expanders

"A" Reach G-1200 Series Heat Exchanger & Condenser Tube Expanders – continued

"A" Reach						Tube Sheet Thickness				Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel Number (Order No.) 1/2 in. Sq. Dr. (12.7 mm)	Recommended Rolling Motors (Order No.)		
Tube O.D.		Tube Gauge		Tube I.D.		1-1/4 in. to 7-3/4 in. (31.7 mm to 196.8 mm)		2 in. to 8-1/2 in. (50.8 mm to 215.9 mm)							Airetrol	Electric	
in.	mm	bwg	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	Tool No. (Order No.)	Roll Set No. (Order No.)	in.	mm	in.	mm			
1-3/8	34.9	8	.165	4.19	1.045	26.54	1277 A (5046400)	R-31 (5296200)	1278 A (5046800)	R-31-A (5295900)	1.026	26.04	1.135	28.82	M-67-A (2535600)	1550-250 (8404280)	979-C-210/ ATC-900
		9	.148	3.75	1.079	27.40	1273 A (5044800)	R-29 (5295400)	1274 A (5045200)	R-29-A (5295500)	1.060	26.92	1.169	29.69			
		10	.134	3.40	1.107	28.11	1275 A (5045600)	R-30 (5295800)	1276 A (5046000)	R-30-A (5295900)	1.087	27.60	1.196	30.37			
		11	.120	3.04	1.135	28.82	1279 A (5047200)		1280 A (5047600)			1.115	28.32	1.224	31.08	M-68-A (2536500)	
		12	.109	2.76	1.157	29.38	1281 A (5048000)	R-32 (5295800)	1282 A (5048400)	R-32-A (5296700)	1.133	28.77	1.242	31.54			
		13	.095	2.41	1.185	30.09	1283 A (5048800)	R-32 (5295800)	1284 A (5049200)	R-32-A (5296700)	1.160	29.46	1.275	32.38	M-70-A (2538300)	1550-900 (8404290)	979-C-300/ ATC-900
		14	.083	2.10	1.209	30.70	1285 A (5049600)	R-34 (5297400)	1286 A (5050000)	R-34-A (5297500)	1.179	29.94	1.294	32.86			
		15	.072	1.82	1.231	31.26	1287 A (5050400)	R-35 (5297800)	1288 (5050700)	R-35-A (5297900)	1.206	30.63	1.321	33.55			
		16	.065	1.65	1.245	31.62											
1-1/2	38.1	8	.165	4.19	1.170	29.71	1289 A (5051200)	R-34 (5297400)	1290 A (5051600)	R-34-A (5297500)	1.145	29.08	1.260	32.00	M-69-A (2537300)	1550-250 (8404280)	979-C-210/ ATC-900
		9	.148	3.75	1.204	30.58	1285 A (5049600)	R-34 (5297400)	1286 A (5050000)	R-34-A (5297500)	1.179	29.94	1.294	32.86			
		10	.134	3.40	1.232	31.29	1287 A (5050400)	R-35 (5297800)	1288 A (5050800)	R-35-A (5297900)	1.206	30.63	1.321	33.55	M-70-A (2538300)		
		11	.120	3.04	1.260	32.00	1291 A (5052000)	R-36 (5298200)	1292 A (5052400)	R-36-A (5298300)	1.235	31.36	1.350	34.29			
		12	.109	2.76	1.282	32.56	1293 A (5052800)	R-37 (5298600)	1294 A (5053200)	R-37-A (5298700)	1.257	31.92	1.372	34.84			
		13	.095	2.41	1.310	33.27	1295 A (5053600)	R-37 (5298600)	1296 A (5054000)	R-37-A (5298700)	1.285	32.63	1.400	35.56	M-71-A (2539200)	1550-900 (8404290)	979-C-300/ ATC-900
		14	.083	2.10	1.334	33.88											
		15	.072	1.82	1.356	34.44	1297 A (5054400)	R-38 (5299000)	1298 A (5054800)	R-38-A (5299100)	1.331	33.80	1.446	36.72			
		16	.065	1.65	1.370	34.79											
		17	.058	1.47	1.384	35.15	1299 A (5515074)	R-38 (5299000)	1300 A (5515089)	R-38-A (5299100)	1.331	33.80	1.472	37.38	M-72-A (2980795)		
		18	.049	1.24	1.402	35.61											
		19	.042	1.06	1.416	35.96											
20	.035	0.88	1.430	36.32													

G-1200 Series – 3-Roll Expander, "C" Reach

O.D Range:
1/2 – 1-1/2 Inches
12.7 – 38.1 mm

- Expanders with 1-1/2 in. (38.1 mm) long rolls will accommodate tube sheet thicknesses from 1-1/2" to 11-3/4" (38.1 mm to 298.4 mm)
- Expanders with 2-1/4 in. (57.1 mm) long rolls will accommodate tube sheet thicknesses from 2-1/4" to 12-1/2" (57.1 mm to 317.5 mm)
- **Reversible Thrust Collar** design allows flush and 1/8 in. recess tube rolling



NOTE: Step expanding becomes necessary if the tube sheet thickness exceeds the length of the roll. Specify "S" Type rolls for step rolling applications.

Sizes not listed available upon request.

"C" Reach						Tube Sheet Thickness				Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel Number (Order No.) 3/8 in. Sq. Dr. (9.5 mm)	Recommended Rolling Motors (Order No.)					
Tube O.D.		Tube Gauge		Tube I.D.		1-1/2 in. to 11-3/4 in. (38.1 mm to 298.4 mm)		2-1/4 in. to 12-1/2 in. (57.1 mm to 317.5 mm)		in.	mm	in.	mm		Airetrol	Electric				
in.	mm	bwg	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	Tool No. (Order No.)	Roll Set No. (Order No.)										
1/2	12.7	14	.083	2.10	.334	8.48	1197 C (5515076)	797 (5512194)			.324	8.22	.374	9.49	1197 C (2979579)	720-550-B (8405391)				
		15	.072	1.82	.356	9.04	1199 C (5515079)	R-1 (5284800)			.348	8.83	.398	10.10	1199 C (2978730)					
		16	.065	1.65	.370	9.39	1201 C (5017800)				.360	9.14	.410	10.41	M-51-C (2521600)					
		17	.058	1.47	.384	9.75	1203 C (5018200)	R-2 (5285000)			.374	9.49	.424	10.76			720-1800-B (8405512)-3/8			
		18	.049	1.24	.402	10.21	1205 C (5018600)	R-3 (5285200)			.392	9.95	.447	11.35	M-52-C (2522500)					
		20	.035	0.88	.430	10.92	1207 C (5019000)	R-4 (5285400)			.420	10.66	.480	12.19	M-53-C (2523400)					
5/8	15.8	12	.109	2.76	.407	10.33	1205 C (5018600)	R-3 (5285200)			.392	9.95	.447	11.35	M-52-C (2522500)	850-600-A (8405398)				
		13	.095	2.41	.435	11.04	1207 C (5019000)	R-4 (5285400)			.420	10.66	.480	12.19	M-53-C (2523400)					
		14	.083	2.10	.459	11.65	1209 C (5019400)		1210 C (5019800)	R-4-A (5285500)	.449	11.40	.509	12.92	M-54-C (2524300)					
		15	.072	1.82	.481	12.21	1211 C (5020200)	R-5 (5285800)	1212 C (5020600)	R-5-A (5285900)	.471	11.96	.536	13.61	M-55-C (2525200)					
		16	.065	1.65	.495	12.57	1213 C (5021000)	R-6 (5286200)	1214 C (5021400)	R-6-A (5286300)	.485	12.31	.550	13.97						
		17	.058	1.47	.509	12.92	1215 C (5021800)		1216 5/8 C (5022200)			.499	12.67	.564	14.32	M-56-C (2526100)				
		18	.049	1.24	.527	13.38	1217 C (5022600)	R-7 (5286600)	1218 C (5023000)	R-7-A (5286700)	.517	13.13	.582	14.78			850-1250-A (8405399)			
		19	.042	1.06	.541	13.74	1219 C (5023400)	R-7 (5286600)	1220 C (5023800)	R-7-A (5286700)										
		20	.035	0.88	.555	14.09														
		21	.032	0.81	.561	14.24														
22	.028	0.71	.569	14.45									.531	13.48	.596	15.13	M-58-C (2527900)			

Condenser Expanders

"C" Reach G-1200 Series Heat Exchanger & Condensor Tube Expanders – continued

"C" Reach						Tube Sheet Thickness				Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel Number (Order No.) 3/8 in. Sq. Dr. (9.5 mm)	Recommended Rolling Motors (Order No.)			
Tube O.D.		Tube Gauge		Tube I.D.		1-1/2 in. to 11-3/4 in. (38.1 mm to 298.4 mm)		2-1/4 in. to 12-1/2 in. (57.1 mm to 317.5 mm)							Airetrol	Electric		
in.	mm	bwg	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	Tool No. (Order No.)	Roll Set No. (Order No.)	in.	mm	in.	mm				
3/4	19.0	10	.134	3.40	.482	12.24	1211 C (5020200)	R-5 (5285800)	1212 C (5020600)	R-5-A (5285900)	.471	11.96	.536	13.61	M-55-C (2525200)	850-600-A (8405398)	979-C-650/ ATC-900	
		11	.120	3.04	.510	12.95	1215 C (5021800)	R-6 (5286200)	1216 3/4 C (5526691PT)	R-6-A (5286300)	.499	12.67	.564	14.32	M-56-C (2526100)			
		12	.109	2.76	.532	13.51	1217 C (5022600)	R-7 (5286600)	1218 C (5023000)	R-7-A (5286700)	.517	13.13	.582	14.78	M-58-C (2527900)			
		13	.095	2.41	.560	14.22	1221 C (5024200)	R-8 (5287000)	1222 C (5024600)	R-8-A (5287100)	.550	13.97	.615	15.62				
		14	.083	2.10	.584	14.83	1223 C (5025000)	R-9 (5287400)	1224 C (5025400)	R-9-A (5287500)	.574	14.57	.639	16.23				
		15	.072	1.82	.606	15.39	1225 C (5025800)	R-10 (5287800)	1226 C (5026200)	R-10-A (5287900)	.596	15.13	.661	16.78				
		16	.065	1.65	.620	15.74	1227 C (5026600)		1228 C (5027000)		.605	15.36	.685	17.39				
		17	.058	1.47	.634	16.10	1229 C (5027400)	R-11 (5288200)	1230 C (5027800)	R-11-A (5288300)	.619	15.72	.699	17.75	M-59-C (2528800)	850-1250-A (8405399)		
		18	.049	1.24	.652	16.56												
		19	.042	1.06	.666	16.91												
		20	.035	0.88	.680	17.27												
		21	.032	0.81	.686	17.42												
22	.028	0.71	.694	17.62	1231 C (5028200)	R-12 (5288600)					1232 C (5028600)	R-12-A (5288700)	.642	16.30			.722	18.33
7/8	22.2	10	.134	3.40	.607	15.41	1225 C (5025800)	R-10 (5287800)	1226 C (5026200)	R-10-A (5287900)	.596	15.13	.661	16.78	M-58-C (2527900)	850-600-A (8405398)	979-C-650/ ATC-900	
		11	.120	3.04	.635	16.12	1229 C (5027400)	R-11 (5288200)	1230 C (5027800)	R-11-A (5288300)	.619	15.72	.699	17.75	M-59-C (2528800)			
		12	.109	2.76	.657	16.68	1231 C (5028200)	R-12 (5288600)	1232 C (5028600)	R-12-A (5288700)	.642	16.30	.722	18.33				
		13	.095	2.41	.685	17.39	1233 C (5029000)	R-13 (5289000)	1234 C (5029400)	R-13-A (5289100)	.670	17.01	.750	19.05	M-60-C (2529700)			
		14	.083	2.10	.709	18.00	1235 C (5029800)	R-14 (5289400)	1236 C (5030200)	R-14-A (5289500)	.685	17.39	.774	19.65	M-61 (2530600)			
		15	.072	1.82	.731	18.56	1237 C (5030600)	R-15 (5289800)	1238 C (5031000)	R-15-A (5289900)	.712	18.08	.801	20.34				
		16	.065	1.65	.745	18.92	1239 C (5031400)		1240 C (5031800)		.726	18.44	.815	20.70				
		17	.058	1.47	.759	19.27	1243 C (5033000)	R-16 (5290200)	1244 C (5033400)	R-16-A (5290300)	.740	18.79	.829	21.05	M-62-C (2531500)			850-1250-A (8405399)
		18	.049	1.24	.777	19.73												
1	25.4	8	.165	4.19	.670	17.01	1241 C (5032200)	R-13 (5289000)	1242 C (5032600PT)	R-13-A (5289100)	.665	16.89	.735	18.66	M-59-C (2528800)	1050-400 (8404200)	979-C-300/ ATC-900	
		9	.148	3.75	.704	17.88	1235 C (5029800)	R-14 (5289400)	1236 C (5030200)	R-14-A (5289500)	.685	17.39	.774	19.65	M-61-C (2530600)			
		10	.134	3.40	.732	18.59	1237 C (5030600)	R-15 (5289800)	1238 C (5031000)	R-15-A (5289900)	.712	18.08	.801	20.34				
		11	.120	3.04	.760	19.30	1243 C (5033000)	R-16 (5290200)	1244 C (5033400)	R-16-A (5290300)	.740	18.79	.829	21.05	M-62-C (2531500)			
		12	.109	2.76	.782	19.86	1245 C (5033800)	R-17 (5290600)	1246 C (5034200)	R-17-A (5290700)	.763	19.38	.852	21.64				
		13	.095	2.41	.810	20.57	1247 C (5034600)	R-18 (5291000)	1248 C (5035000)	R-18-A (5291100)	.791	20.09	.880	22.35				
													850-600-A (8405398)					

Condenser Expanders

"C" Reach G-1200 Series Heat Exchanger & Condenser Tube Expanders – continued



"C" Reach						Tube Sheet Thickness				Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel Number (Order No.) 3/8 in. Sq. Dr. (9.5 mm)	Recommended Rolling Motors (Order No.)		
Tube O.D.		Tube Gauge		Tube I.D.		1-1/2 in. to 11-3/4 in. (38.1 mm to 298.4 mm)		2-1/4 in. to 12-1/2 in. (57.1 mm to 317.5 mm)							Airetrol	Electric	
in.	mm	bwg	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	Tool No. (Order No.)	Roll Set No. (Order No.)	in.	mm	in.	mm			
1	25.4	14	.083	2.10	.834	21.18	1249 C (5035400)	R-18 (5291000)	1250 C (5035800)	R-18-A (5291100)	.810	20.57	.909	23.08	M-63-C (2532400)	850-600-A (8405398)	979-C-300/ ATC-900
		15	.072	1.82	.856	21.74	1251 C (5036200)	R-19 (5291400)	1252 C (5036600)	R-19-A (5291500)	.837	21.25	.936	23.77			
		16	.065	1.65	.870	22.09											
		17	.058	1.47	.884	22.45	1255 C (5037800)	R-21 (5292200)	1256 C (5038200)	R-21-A (5292300)	.865	21.97	.964	24.48	M-63-C (2532400)	850-1250-A (8405399)	979-C-650/ ATC-900
		18	.049	1.24	.902	22.91											
		19	.042	1.06	.916	23.26											
		20	.035	0.88	.930	23.62											
1-1/8	28.5	8	.165	4.19	.795	20.19	1253 C (5037000)	R-20 (5291800)	1254 C (5037400)	R-20-A (5291900)	.776	19.71	.875	22.22	M-63-C (2532400)	1050-400 (8404200)	979-C-300/ ATC-900
		9	.148	3.75	.829	21.05	1249 C (5035400)	R-18 (5291000)	1250 C (5035800)	R-18-A (5291100)	.810	20.57	.909	23.08			
		10	.134	3.40	.857	21.76	1251 C (5036200)	R-19 (5291400)	1252 C (5036600)	R-19-A (5291500)	.837	21.25	.936	23.77			
		11	.120	3.04	.885	22.47	1255 C (5037800)	R-21 (5292200)	1256 C (5038200)	R-21-A (5292300)	.865	21.97	.964	24.48			
		12	.109	2.76	.907	23.03	1257 C (5038600)		1258 C (5039000)		.883	22.42	.982	24.94			
		13	.095	2.41	.935	23.74	1259 C (5039400)	R-22 (5292600)	1260 C (5039800)	R-22-A (5292700)	.916	23.26	1.015	25.78	M-64-C (2533300) *	1050-400 (8404200)	979-C-650/ ATC-900
		14	.083	2.10	.959	24.35	1261 C (5040200)	R-23 (5293000)	1262 C (5040600)	R-23-A (5293100)	.935	23.74	1.044	26.51	M-65-C (2534200) *		
		15	.072	1.82	.981	24.91	1263 C (5041000)	R-24 (5293400)	1264 C (5041400)	R-24-A (5293500)	.962	24.43	1.071	27.20			
		16	.065	1.65	.995	25.27											
		17	.058	1.47	1.009	25.62	1267 C (5042600)	R-26 (5294200)	1268 C (5043000)	R-26-A (5294300)	.990	25.14	1.099	27.91	M-66-C (2535100) *		
18	.049	1.24	1.028	26.11													
1-1/4	31.7	8	.165	4.19	.920	23.36	1265 C (5041800)	R-25 (5293800)	1266 C (5042200)	R-25-A (5293900)	.901	22.88	1.010	25.65	M-65-C (2534200) *	1550-250 (8404280)	979-C-300/ ATC-900
		9	.148	3.75	.954	24.23	1261 C (5040200)	R-23 (5293000)	1262 C (5040600)	R-23-A (5293100)	.935	23.74	1.044	26.51			
		10	.134	3.40	.982	24.94	1263 C (5041000)	R-24 (5293400)	1264 C (5041400)	R-24-A (5293500)	.962	24.43	1.071	27.20			
		11	.120	3.04	1.010	25.65	1267 C (5042600)	R-26 (5294200)	1268 C (5043000)	R-26-A (5294300)	.990	25.14	1.099	27.91	M-66-C (2535100) *	1050-400 (0)	979-C-650/ ATC-900
		12	.109	2.76	1.032	26.21	1269 C (5043400)	R-27 (5294600)	1270 C (5043800)	R-27-A (5294700)	1.013	25.73	1.122	28.49			
		13	.095	2.41	1.060	26.92	1271 C (5044200)	R-28 (5295000)	1272 C (5044600)	R-28-A (5295100)	1.041	26.44	1.150	29.21	M-67-C (2536000) *		
		14	.083	2.10	1.084	27.53	1273 C (5045000)	R-29 (5295400)	1274 C (5045400)	R-29-A (5295500)	1.060	26.92	1.169	29.69			
		15	.072	1.82	1.106	28.09	1275 C (5045800)	R-30 (5295800)	1276 C (5046200)	R-30-A (5295900)	1.087	27.60	1.196	30.37			
		16	.065	1.65	1.120	28.44											
		17	.058	1.47	1.134	28.80	1279 C (5047400)		1280 C (5047800)		1.115	28.32	1.224	31.08	M-68-C (2536900) *		
18	.049	1.24	1.152	29.26													

* 1/2 in. Sq. Dr. (12.7 mm)

Condenser Expanders

"C" Reach G-1200 Series Heat Exchanger & Condensor Tube Expanders – continued

"C" Reach						Tube Sheet Thickness				Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel Number (Order No.) 1/2 in. Sq. Dr. (12.7 mm)	Recommended Rolling Motors (Order No.)		
Tube O.D.		Tube Gauge		Tube I.D.		1-1/2 in. to 11-3/4 in. (38.1 mm to 298.4 mm)		2-1/4 in. to 12-1/2 in. (57.1 mm to 317.5 mm)							Airetrol	Electric	
in.	mm	bwg	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	Tool No. (Order No.)	Roll Set No. (Order No.)	in.	mm	in.	mm			
1-3/8	34.9	8	.165	4.19	1.045	26.54	1277 C (5046600)	R-31 (5296200)	1278 C (5047000)	R-31-A (5295900)	1.026	26.04	1.135	28.82	M-67-C (2536000)	1550-250 (8404280)	979-C-210/ ATC-900
		9	.148	3.75	1.079	27.40	1273 C (5045000)	R-29 (5295400)	1274 C (5045400)	R-29-A (5295500)	1.060	26.92	1.169	29.69			
		10	.134	3.40	1.107	28.11	1275 C (5045800)	R-30 (5295800)	1276 C (5046200)	R-30-A (5295900)	1.087	27.60	1.196	30.37			
		11	.120	3.04	1.135	28.82	1279 C (5047400)		1280 C (5047800)		1.115	28.32	1.224	31.08	M-68-C (2536900)		
		12	.109	2.76	1.157	29.38	1281 C (5048200)	R-32 (5295800)	1282 C (5048600)	R-32-A (5296700)	1.133	28.77	1.242	31.54			
		13	.095	2.41	1.185	30.09	1283 C (5049000)	R-32 (5295800)	1284 C (5049400)	R-32-A (5296700)	1.160	29.46	1.275	32.38	M-70-C (2538700)	1550-900 (8404290)	979-C-300/ ATC-900
		14	.083	2.10	1.209	30.70	1285 C (5049800)	R-34 (5297400)	1286 C (5050201PT)	R-34-A (5297500)	1.179	29.94	1.294	32.86			
		15	.072	1.82	1.231	31.26	1287 C (5050600)	R-35 (5297800)	1288 C (5051000)	R-35-A (5297900)	1.206	30.63	1.321	33.55			
		16	.065	1.65	1.245	31.62					1.206	30.63	1.321	33.55			
1-1/2	38.1	8	.165	4.19	1.170	29.71	1289 C (5051400)	R-34 (5297400)	1290 C (5051800)	R-34-A (5297500)	1.145	29.08	1.260	32.00	M-69-C (2537800)	1550-250 (8404280)	979-C-210/ ATC-900
		9	.148	3.75	1.204	30.58	1285 C (5049800)	R-34 (5297400)	1286 C (5050201PT)	R-34-A (5297500)	1.179	29.94	1.294	32.86	M-70-C (2538700)		
		10	.134	3.40	1.232	31.29	1287 C (5050600)	R-35 (5297800)	1288 C (5051000)	R-35-A (5297900)	1.206	30.63	1.321	33.55			
		11	.120	3.04	1.260	32.00	1291 C (5052200)	R-36 (5298200)	1292 C (5052600)	R-36-A (5298300)	1.235	31.36	1.350	34.29			
		12	.109	2.76	1.282	32.56	1293 C (5053000)	R-37 (5298600)	1294 C (5053400)	R-37-A (5298700)	1.257	31.92	1.372	34.84	M-71-C (2539600)	1550-900 (8404290)	979-C-300/ ATC-900
		13	.095	2.41	1.310	33.27	1295 C (5053800)	R-37 (5298600)	1296 C (5054200)	R-37-A (5298700)	1.285	32.63	1.400	35.56			
		14	.083	2.10	1.334	33.88					1.285	32.63	1.400	35.56			
		15	.072	1.82	1.356	34.44	1297 C (5054600)	R-38 (5299000)	1298 C (5055000PT)	R-38-A (5299100)	1.331	33.80	1.446	36.72			
		16	.065	1.65	1.370	34.79					1.331	33.80	1.446	36.72			
		17	.058	1.47	1.384	35.15	1299 C (5513991)	R-38 (5299000)	1300 C 5515091	R-38-A (5299100)	1.331	33.80	1.472	37.38	M-72-C (2975538)		
		18	.049	1.24	1.402	35.61											
		19	.042	1.06	1.416	35.96											
20	.035	0.88	1.430	36.32													

Condenser Expanders

G-1200 Series Heat Exchanger & Condenser Tube Expanders



G-1200 Series – 5-Roll Expanders

O.D Range: 5/8 – 1-1/2 Inches 15.8 – 38.1 mm

- Expanders with 1-1/2 in. (38.1 mm) long rolls will accommodate tube sheet thicknesses as follows:
 Standard Reach 1/2" to 5" (12.7 mm to 127.0 mm)
 "A" Reach 1-1/4" to 7-3/4" (31.7 mm to 196.8 mm)
 "C" Reach 1-1/2" to 11-3/4" (38.1 mm to 298.5 mm)
- Expanders with 2-1/4 in. (57.1 mm) long rolls will accommodate tube sheet thicknesses as follows:
 Standard Reach 1-1/4" to 5-3/4" (31.7 mm to 146.0 mm)
 "A" Reach 2" to 8-1/2" (50.8 mm to 215.9 mm)
 "C" Reach 2-1/4" to 12-1/2" (57.1 mm to 317.5 mm)
- Longer reaches available upon request.
- **Reversible Thrust Collar** design allows flush and 1/8 in. recess tube rolling. Reversible thrust collars on Standard Reach expanders and have lubrication port for use with auto-lube configured ATR and DAS tube rolling systems.



NOTE: Step expanding becomes necessary if the tube sheet thickness exceeds the length of the roll. Specify "S" Type rolls for step rolling applications.

Sizes not listed available upon request.



Tube O.D.		Standard Reach				Tube Sheet Thickness				Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel Number (Order No.) 3/8 in. Sq. Dr. (9.5 mm)	Recommended Rolling Motors (Order No.)	
		Tube Gauge		Tube I.D.		1/2 in. to 5 in. (12.7 mm to 127.0 mm)		1-1/4 in. to 5-3/4 in. (31.7 mm to 146.0 mm)							in.	mm
in.	mm	bwg	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	Tool No. (Order No.)	Roll Set No. (Order No.)	in.	mm	in.	mm		
5/8	15.8	17	.058	1.47	.509	12.92	1215-5 (5519905)	R-4-5 (5513832)	1216-5 (5516284)	R-4-A-5 (5517897)	.499	12.67	.564	14.32	M-59 (2528300)	850-1250-A (8405399)
		18	.049	1.24	.527	13.38	1217-5 (5517561)	R-4-5 (5513832)	1218-5 (5516230)	R-4-A-5 (5517897)	.517	13.13	.576	14.63		
		19	.042	1.06	.541	13.74	1219-5 (5517601)	R-4-5 (5513832)	1220-5 (5515836)	R-4-A-5 (5517897)	.531	13.48	.596	15.13	M-61 (2530100)	
		20	.035	0.88	.555	14.09										
		21	.032	0.81	.561	14.24										
		22	.028	0.71	.569	14.45										
3/4	19.0	13	.095	2.41	.560	14.22	1221-5 (5518046)	R-5-5 (5513231)	1222-5 (5515972)	R-5-A-5 (5518189)	.550	13.97	.615	15.62	M-61 (2530100)	850-600-A (8405398)
		14	.083	2.10	.584	14.83	1223-5 (5514699)	R-6-5 (5518187)	1224-5 (5513968)	R-6-A-5 (5517898)	.574	14.57	.629	15.97		
		15	.072	1.82	.606	15.39	1225-5 (5515940)	R-7-5 (5514393)	1226-5 (5523014)	R-7-A-5 (5517899)	.590	14.98	.661	16.78	M-62 (2531000)	
		16	.065	1.65	.620	15.74	1227-5 (5514698)	R-7-5 (5514393)	1228-5 (5512230)	R-7-A-5 (5517899)	.605	15.36	.680	17.27	M-63 (2531900)	
		17	.058	1.47	.634	16.10	1229-5 (5515536)	R-8-5 (5515995)	1230-5 (5513536)	R-8-A-5 (5515996)	.619	15.72	.699	17.54		
		18	.049	1.24	.652	16.56	1231-5 (5514862)	R-9-5 (5517888)	1232-5 (5513488)	R-9-A-5 (5517900)	.642	16.30	.729	18.51		
		19	.042	1.06	.666	16.91										
		20	.035	0.88	.680	17.27										
		21	.032	0.81	.686	17.42										
		22	.028	0.71	.694	17.62										
7/8	22.2	13	.095	2.41	.685	17.39	1233-5 (5515915)	R-9-5 (5517888)	1234-5 (5518158)	R-9-A-5 (5517900)	.670	17.01	.747	18.97	M-64 (2532800) *	850-600-A (8405398)
		14	.083	2.10	.709	18.00	1235-5 (5518682)	R-10-5 (5518191)	1236-5 (5520939)	R-10-A-5 (5517901)	.685	17.39	.774	19.65	M-65 (2533700) *	
		16	.065	1.65	.745	18.92	1239-5 (5525733)	R-11-5 (5517889)	1240-5 (5525734)	R-11-A-5 (5517902)	.685	17.39	.750	19.05	M-67 (2535500) *	850-1250-A (8405399)
		17	.058	1.47	.759	19.27	1243-5 (5518366)	R-11-5 (5517889)	1244-5 (5521320)	R-11-A-5 (5517902)	.740	18.79	.824	20.92		
		18	.049	1.24	.777	19.73	1245-5 (5525740)	R-11-5 (5517889)	1246-5 (5515924)	R-11-A-5 (5517902)	.763	19.38	.851	21.61		
		19	.042	1.06	.791	20.09										
		20	.035	0.88	.805	20.44										

* 1/2 in. Sq. Dr. (12.7 mm)

Condenser Expanders

Selection Guide G-1200 Type Five-Roll Expanders – continued

Standard Reach						Tube Sheet Thickness				Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel Number (Order No.) 1/2 in. Sq. Dr. (12.7 mm)	Recommended Rolling Motors (Order No.)		
Tube O.D.		Tube Gauge		Tube I.D.		1/2 in. to 5 in. (12.7 mm to 127.0 mm)		1-1/4 in. to 5-3/4 in. (31.7 mm to 146.0 mm)							Airetrol	Electric	
in.	mm	bwg	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	Tool No. (Order No.)	Roll Set No. (Order No.)	in.	mm	in.	mm			
7/8	22.2	21	.032	0.81	.811	20.59	1245-5 (5525740)	R-11-5 (5517889)	1246-5 (5515924)	R-11-A-5 (5517902)	.763	19.38	.851	21.61	M-68 (2536400)	850-1250-A (8405399)	979-C-650/ ATC-900
		22	.028	0.71	.819	20.80											
1	25.4	12	.109	2.76	.782	19.86	1245-5 (5525740)	R-11-5 (5517889)	1246-5 (5515924)	R-11-A-5 (5517902)	.763	19.38	.851	21.61	M-68 (2536400)	850-600-A (8405398)	979-C-650/ ATC-900
		13	.095	2.41	.810	20.57	1247-5 (5516336)	R-13-5 (5513741)	1248-5 (5517558)	R-13-A-5 (5517903)	.791	20.09	.880	22.35			
		14	.083	2.10	.834	21.18	1249-5 (5514121)	R-12-5 (5517890)	1250-5 (5514700)	R-12-A-5 (5515825)	.810	20.57	.909	23.08	M-70 (2538200)		
		15	.072	1.82	.856	21.74	1251-5 (5513797)	R-14-5 (5517894)	1252-5 (5512231)	R-14-A-5 (5515826)	.837	21.25	.936	23.77			
		16	.065	1.65	.870	22.09											
		17	.058	1.47	.884	22.45	1255-5 (5513740)	R-13-5 (5513741)	1256-5 (5513809)	R-13-A-5 (5517903)	.865	21.97	.965	24.51	M-71 (2539100)	850-1250-A (8405399)	
		18	.049	1.24	.902	22.91											
		19	.042	1.06	.916	23.26											
		20	.035	0.88	.930	23.62											
		21	.032	0.81	.936	23.77	1257-5 (5514329)	R-15-5 (5513833)	1258-5 (5513627)	R-15-A-5 (5517907)	.883	22.42	.997	25.32			
22	.028	0.71	.944	23.97													
1-1/8	28.5	12	.109	2.76	.907	23.03	1257-5 (5514329)	R-15-5 (5513833)	1258-5 (5513627)	R-15-A-5 (5517907)	.883	22.42	.997	25.32	M-71 (2539100)	1050-400 (8404200)	979-C-300/ ATC-900
		13	.095	2.41	.935	23.74	1259-5 (5524563)	R-16-5 (5518056)	1260-5 (5525735)	R-16-A-5 (5517904)	.916	23.26	1.000	25.40			
		14	.083	2.10	.959	24.35	1261-5 (5525736)	R-17-5 (5517891)	1262-5 (5514470)	R-17-A-5 (5517905)	.935	23.74	1.043	26.49			
1-1/4	31.8	15	.072	1.82	1.106	28.09	1275-5 (5521923)	R-21-5 (5517887)	1276-5 (5516623)	R-21-A-5 (5513291)	1.087	27.60	1.196	30.37	1276-5 (2982367)	1050-400 (8404200)	979-C-650/ ATC-900
		16	.065	1.65	1.120	28.44											
		17	.058	1.47	1.134	28.80	1279-5 (5525540)	R-21-5 (5517887)	1280-5 (5517875)	R-21-A-5 (5513291)	1.115	28.32	1.231	31.26	1280-5 (2983613)		
		18	.049	1.24	1.152	29.26											
		19	.042	1.06	1.166	29.61											
		20	.035	0.88	1.180	29.97											
		21	.032	0.81	1.186	30.12											
22	.028	0.71	1.194	30.32													
1-3/8	34.9	12	.109	2.76	1.154	29.31	1281-5 (5518823)	R-21-5 (5517887)	1282-5 (5525737)	R-21-A-5 (5513291)	1.133	28.77	1.242	31.54	1282-5 (2986615)	1550-250 (8404280)	979-C-210/ ATC-900
		14	.083	2.10	1.209	30.70	1285-5 (5522166)	R-23-5 (5517982)	1286-5 (5525869)	R-23-A-5 (5518192)	1.179	29.94	1.296	31.91			
1-1/2	38.1	17	.058	1.47	1.384	35.15	1299-5 (5513442)	R-29-5 (5517893)	1300-5 (5514833)	R-29-A-5 (5517906)	1.331	33.80	1.489	37.82	1299-5 (2973869)	1550-900 (8404290)	979-C-300/ ATC-900
		18	.049	1.24	1.402	35.61											
		19	.042	1.06	1.416	35.96											
		20	.035	0.88	1.430	36.32											
		21	.032	0.81	1.436	36.47											
		22	.028	0.71	1.444	36.67											

Condenser Expanders

G-8012 Series Heat Exchanger & Condenser Tube Expanders



G-8012 Series

O.D. Range:
1-3/4 – 4 Inches
44.4 – 76.2 mm

- Expanders with 2-1/4 in. (57.1mm) long rolls will accommodate tube sheet thicknesses from 1/2 in. to 4 in. (12.7 mm to 101.6 mm)



NOTE: Step expanding becomes necessary if the tube sheet thickness exceeds the length of the roll. Specify "S" Type rolls for step expanding applications.

Sizes not listed available upon request.

Tube O.D.		Tube Gauge		Tube I.D.		Tube Sheet Thickness		Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel No. (Order No.) 3/4 in. Sq. Dr. (19.0 mm)	Recommended Rolling Motors (Order No.)		
in.	mm	bwg	in.	mm	in.	mm	1/2 in. to 4 in. (12.7 mm to 101.6 mm)		in.	mm	in.		mm	Airetrol	Electric
						Tool No. (Order No.)		Roll Set No. (Order No.)							
1-3/4	44.4	8	.165	4.19	1.420	36.06	8012-1-3/4-8 (5518639)	R-33-A (5297100)	1.368	34.74	1.550	39.37	M-90 (2541900)	1550-250 (8404280)	979-C-210/ ATC-900
		10	.134	3.40	1.482	37.64	8012-1-3/4-10 (5139000)	R-37-A (5298700)	1.420	36.06	1.607	40.81			
		11	.120	3.04	1.510	38.35	8012-1-3/4-11 (5139100)	R-42 (5299400)	1.454	36.93	1.635	41.52			
		12	.109	2.76	1.532	38.91	8012-1-3/4-12 (5139200)	R-44 (5299500)	1.482	37.64	1.657	42.08			
		13	.095	2.41	1.560	39.62	8012-1-3/4-13 (5139300)	R-46 (5299600)	1.510	38.35	1.685	42.79			
		14	.083	2.10	1.584	40.23	8012-1-3/4-14 (5139400)	R-48 (5299700)	1.532	38.91	1.709	43.40			
2	50.8	8	.165	4.19	1.670	42.41	8012-2-8 (5518643)	R-48 (5299700)	1.595	40.51	1.795	45.59	M-91 (2542200)	1550-250 (8404280)	979-C-210/ ATC-900
		10	.134	3.40	1.732	43.99	8012-2-10 (5139500)	R-50 (5299800)	1.640	41.65	1.857	47.16			
		11	.120	3.04	1.760	44.70	8012-2-11 (5139600)	R-52 (5299900)	1.670	42.41	1.885	47.87			
		12	.109	2.76	1.782	45.26	8012-2-12 (5139700)	R-54 (5300000)	1.704	43.28	1.907	48.43			
		13	.095	2.41	1.810	45.97	8012-2-13-18 (5139800)	R-56 (5300100)	1.732	43.99	1.956	49.68			
		14	.083	2.10	1.834	46.58									
		15	.072	1.82	1.856	47.14									
		16	.065	1.65	1.870	47.49									
		17	.058	1.47	1.884	47.85									
18	.049	1.24	1.902	48.31											
2-1/4	57.1	10	.134	3.40	1.982	50.34	8012-2-1/4-10 (5140100)	R-56 (5300100)	1.890	48.00	2.107	53.51	M-92 (2542300)	1550-250 (8404280)	999-C-45/ ATC-900
		11	.120	3.04	2.010	51.05	8012-2-1/4-11 (5140200)	R-58 (5300200)	1.920	48.76	2.135	54.22			
		12	.109	2.76	2.032	51.61	8012-2-1/4-12 (5140300)	R-60 (5300300)	1.954	49.63	2.157	54.78			
		13	.095	2.41	2.060	52.32	8012-2-1/4-13-16 (5140400)	R-62 (5300400)	1.982	50.34	2.185	55.49			
		14	.083	2.10	2.084	52.93									
		15	.072	1.82	2.106	53.49									
16	.065	1.65	2.120	53.84											

Condenser Expanders

G-8012 Series Heat Exchanger & Condenser Tube Expanders – continued

Tube O.D.		Tube Gauge		Tube I.D.		Tube Sheet Thickness 1/2 in. to 4 in. (12.7 mm to 101.6 mm)		Min. I.D. Tool Enters		Max. Expan. of Tool		Mandrel No. (Order No.) 3/4 in. Sq. Dr. (19.0 mm)	Recommended Rolling Motors (Order No.)		
in.	mm	bwg	in.	mm	in.	mm	Tool No. (Order No.)	Roll Set No. (Order No.)	in.	mm	in.		mm	Airetrol	Electric
2-1/2	63.5	10	.134	3.40	2.232	56.69	8012-2-1/2-10-12 (5139900)	R-64 (5300500)	2.140	54.35	2.407	61.13	M-93 (2542400)	1550-250 (8404280)	999-C-45/ ATC-900
		11	.120	3.04	2.260	57.40									
		12	.109	2.76	2.282	57.96									
		13	.095	2.41	2.310	58.67	8012-2-1/2-13-18 (5140000)	R-64 (5300500)	2.232	56.69	2.450	62.23	M-94 (2542500)		
		14	.083	2.10	2.334	59.28									
		15	.072	1.82	2.356	59.84									
		16	.065	1.65	2.370	60.19									
		17	.058	1.47	2.384	60.55									
		18	.049	1.24	2.402	61.01									
2-3/4	69.8	10	.134	3.40	2.482	63.04	8012-2-3/4-10-16 (5140500)	R-66 (5300700)	2.390	60.70	2.702	68.63	M-96 (2542700)	1850-90 (8405315)	999-C-45/ ATC-900
		11	.120	3.04	2.510	63.75									
		12	.109	2.76	2.532	64.31									
		13	.095	2.41	2.560	65.02									
		14	.083	2.10	2.584	65.63									
		15	.072	1.82	2.606	66.19									
		16	.065	1.65	2.620	66.54									
3	76.2	8	.165	4.19	2.670	67.81	8012-3-8-9 (5512193)	R-67 (5300800)	2.560	65.02	2.829	71.85	M-97 (2968867)	1850-90 (8405315)	999-C-45/ ATC-900
		9	.148	3.75	2.704	68.68									
		10	.134	3.40	2.732	69.39	8012-3-10-18 (5140600)	R-67 (5300800)	2.640	67.05	2.952	74.98	M-96 (25)		
		11	.120	3.04	2.760	70.10									
		12	.109	2.76	2.782	70.66									
		13	.095	2.41	2.810	71.37									
		14	.083	2.10	2.834	71.98									
		15	.072	1.82	2.856	75.54									
		16	.065	1.65	2.870	72.89									
			.058	1.47	2.884	73.25									
		18	.049	1.24	2.902	73.71									



Linsen Flaring Expander

O.D. Range:
1/4 - 2-5/8 Inches
6.3 - 66.7mm

These special expanders are designed for making tubing connections without fittings. Using a drill press, lathe, or other power-driven tool, the Linsen expander enlarges the end of the tube leaving a .015" clearance for slip-fit and soldering of another tube of the same size. Can be used on copper, brass, aluminum, and thin steel tubing. Always specify tube gauge when ordering.

- Rolls out tubes smoothly and evenly so it doesn't distort or buckle the tube
- Eliminates extra fittings which saves on installation costs

Expander*	Order Number	Tube O.D.		Cup Length		Shank Diameter (Round)	
		in.	mm	in.	mm	in.	mm
AL 250	5518385	1/4	6.3	.437	11.1	.250	6.35
AL 312	5146300	5/16	7.9	.625	15.87	.250	6.35
AL 375	5146400	3/8	9.5	.625	15.87	.250	6.35
AL 500	5146600	1/2	12.7	.625	15.87	.312	7.92
AL 625	5146800	5/8	15.8	.750	19.05	.312	7.92
AL 750	5146900	3/4	19.0	.750	19.05	.375	9.52
AL 875	5147000	7/8	22.2	.750	19.05	.375	9.52
AL 1000	5146000	1	25.4	1.000	25.40	.500	12.70
AL 1125	5147100	1-1/8	28.5	1.000	25.40	.500	12.70
AL 1250	5147200	1-1/4	31.7	1.000	25.40	.500	12.70
AL 1375	5147300	1-3/8	34.9	1.000	25.40	.500	12.70
AL 1500	5146100	1-1/2	38.1	1.000	25.40	.625	15.87
AL 1625	5147400	1-5/8	41.2	1.000	25.40	.625	15.87
AL 2000	5146200	2	50.8	1.000	25.40	.625	15.87
AL 2125	5512247	2-1/8	53.9	1.000	25.40	.625	15.87
AL 2625	5524547	2-5/8	66.6	1.000	25.40	.562 (Hex)	14.27 (Hex)

* Other sizes may be available. Contact customer service for details.



SR Expander*

The "SR" Short Reach Expanders incorporate a rapid taper on the mandrel that allows full expansion of a tube with minimum travel of the mandrel. The mandrel is retained at the rear of the expander to shorten the mandrel length which allows use near sharp tube bends. These expanders are made to order so application details must be provided ahead of time.

- Compact expander allows operation in confined areas
- Short mandrel length used in "bent tube" applications



Diesel Engine Expander*

Diesel engine expanders are a special line of expanders designed for rolling the injector sleeves into the heads of diesel engines. Detailed drawings of the injector sleeve and engine head must accompany the order to insure proper design. These expanders are made to order for each application.

- Used in manufacturing, re-manufacturing, and repair of diesel engines
- Expands sleeve against top injector bore in cylinder head forming a tight seal



"PST" Pipe Sizing Expander*

The "PST" Expanders are designed to true pipe ends and enlarge the pipe end diameter in two easy steps, providing the correct clearance between the pipe O.D. and the I.D. of a fitting before making a silver solder or brazed welded joint.

- Portable expanders suitable for field work using hand tools or ratchet wrenches
- Accurate expansion of pipe end using quality hardened parts for greater durability
- Threaded mandrel allows fine adjustment for accurate sizing of the pipe end



Collins Expander*

O.D. Range:
1/2 - 4-1/2 Inches
12.7 - 113.8mm

Collins self-feeding tube expanders are tough, durable, and powerful. These nonparallel rolling, self-feeding expanders are suitable for close quarter tube installation and repair work.

- Compact design works well in thin tube sheet applications
- No setup or adjustments make it quick and easy to use
- Self-contained rolls that won't fall out

* Please contact your Apex Tool Group sales representative for further information on these products.

Tube Installation Accessories

Heat Exchanger & Condenser Tube Expanders Accessories

GT Serrating Tools

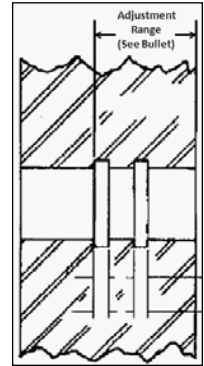
An innovative line of serrating tools that re-defines grooving technology. The GT Serrating tools efficiently cut grooves in tube sheet holes which increases the strength of the rolled joint between the tube and tube sheet.



Tube sheet hole application range:

1/2 - 1 in. (12.7 - 25.4mm) I.D.

- Ti coated bits available in SAE and Metric sized groove configurations & shapes
- Serrating Tools available with standard mandrel or mandrels with carbide inserts
- Mandrels with carbide inserts remove burrs left on grooves eliminating an extra de-burring process
- Compact design for extreme rigidity, extended bit life, less run-out and increased accuracy
- Unique through-spindle coolant delivery system provides superior groove quality and unmatched bit life
- Catalog tools have two bit patterns to choose from, all others are special, made to order, and priced on request
- Designed for easy bit replacement which saves time and money
- Depth from face of tube sheet to the back of the second groove is adjustable from 1/2" to 1-1/4" (12,7 - 31,75mm)



Complete serrating tool, furnished with carbide insert mandrel, SAE tool bit

Tube Sheet Hole		Inch Tool Number* (Order Number)	Shank	Standard Tool Bit	Optional Tool Bit
in.	mm			1/8 x 1/4 x 1/8"	1/8 x 3/8 x 1/8"
1/2	12.70	GT 500C 3MT (5526083)	3MT	GT 5003 S (2902039)	GT 5003 (2902030)
5/8	15.80	GT 625C 3MT (5525886)	3MT	GT 5003 S (2902039)	GT 5003 (2902030)
3/4	19.05	GT 750C 3MT (5525756)	3MT	GT 7503 S (2901403)	GT 7503 (2900686)
7/8	22.20	GT 875C3MT (5525587)	3MT	GT 7503 S (2901403)	GT 7503 (2900686)
1	25.40	GT 1000C 3MT (5525706)	3MT	GT 7503 S (2901403)	GT 7503 (2900686)
3/4	19.05	GT 750C 1SP (5526137)	1" RD	GT 7503 S (2901403)	GT 7503 (2900686)
1	25.40	GT 1000C 1SP (5526138)	1" RD	GT 7503 S (2901403)	GT 7503 (2900686)

* Includes "Standard Tool Bit"

Complete serrating tool, furnished with carbide insert mandrel, Metric tool bit

Tube Sheet Hole		Inch Tool Number* (Order Number)	Shank	Standard Tool Bit	Optional Tool Bit
in.	mm			3 x 6 x 3 mm	3 x 10 x 3 mm
1/2	12.70	GT 1270C 3MT (5526115)	3MT	GT 50 363 (2902091)	GT 50 3103 (2902117)
5/8	15.80	GT 1588C 3MT (5526116)	3MT	GT 50 363 (2902091)	GT 50 3103 (2902117)
3/4	19.05	GT 1905C 3MT (5526117)	3MT	GT 75 363 (2902092)	GT 75 3103 (2902118)
7/8	22.20	GT 2223C 3MT (5526118)	3MT	GT 75 363 (2902092)	GT 75 3103 (2902118)
1	25.40	GT 2540C 3MT (5526119)	3MT	GT 75 363 (2902092)	GT 75 3103 (2902118)
3/4	19.05	GT 1905C 1SP (5526164)	1" RD	GT 75 363 (2902092)	GT 75 3103 (2902118)
1	25.40	GT 2540C 1SP (5526165)	1" RD	GT 75 363 (2902092)	GT 75 3103 (2902118)

* Includes "Standard Tool Bit"

Complete serrating tool, furnished with standard mandrel, SAE tool bit

Tube Sheet Hole		Inch Tool Number* (Order Number)	Shank	Standard Tool Bit	Optional Tool Bit
in.	mm			1/8 x 1/4 x 1/8"	1/8 x 3/8 x 1/8"
1/2	12.70	GT 500NC 3MT (5526299)	3MT	GT 5003 S (2902039)	GT 5003 (2902030)
5/8	15.80	GT 625NC 3MT (5526296)	3MT	GT 5003 S (2902039)	GT 5003 (2902030)
3/4	19.05	GT 750NC 3MT (5526297)	3MT	GT 7503 S (2901403)	GT 7503 (2900686)
7/8	22.20	GT 875NC 3MT	3MT	GT 7503 S (2901403)	GT 7503 (2900686)
1	25.40	GT 1000NC 3MT (5526298)	3MT	GT 7503 S (2901403)	GT 7503 (2900686)
3/4	19.05	GT 750NC 1SP	1" RD	GT 7503 S (2901403)	GT 7503 (2900686)
1	25.40	GT 1000NC 1SP	1" RD	GT 7503 S (2901403)	GT 7503 (2900686)

* Includes "Standard Tool Bit"

Complete serrating tool, furnished with standard mandrel, Metric tool bit

Tube Sheet Hole		Inch Tool Number* (Order Number)	Shank	Standard Tool Bit	Optional Tool Bit
in.	mm			3 x 6 x 3 mm	3 x 10 x 3 mm
1/2	12.70	GT 1270NC 3MT	3MT	GT 50 363 (2902091)	GT 50 3103 (2902117)
5/8	15.80	GT 1588NC 3MT	3MT	GT 50 363 (2902091)	GT 50 3103 (2902117)
3/4	19.05	GT 1905NC 3MT (526421)	3MT	GT 75 363 (2902092)	GT 75 3103 (2902118)
7/8	22.20	GT 2223NC 3MT (5526305PT)	3MT	GT 75 363 (2902092)	GT 75 3103 (2902118)
1	25.40	GT 2540NC 3MT	3MT	GT 75 363 (2902092)	GT 75 3103 (2902118)
3/4	19.05	GT 1905NC 1SP	1" RD	GT 75 363 (2902092)	GT 75 3103 (2902118)
1	25.40	GT 2540NC 1SP	1" RD	GT 75 363 (2902092)	GT 75 3103 (2902118)

* Includes "Standard Tool Bit"

GT Serrating Tool Nomenclature

XX	-	XXXX	-	XX	-	XXX	-	XXX
↓		↓		↓		↓		↓
Tool Series		Tube Sheet Hole Dia.		Mandrel Type		Shank Size		Specials
GT		500 = 1/2"		C = Carbide		3MT = #3 Morse Taper		Longer reach
		625 = 5/8"		NC = Non-carbide		1SP = 1" (25.4mm) Round		
		750 = 3/4"						
		875 = 7/8"						
		1000 = 1"						
		1270 = 12.70mm						
		1588 = 15.88mm						
		1905 = 19.05mm						
		2223 = 22.23mm						
		2540 = 25.40mm						

Example

GT 5003 S
(2902039)



Tube Installation Accessories

Heat Exchanger & Condenser Tube Expanders Accessories



Cleco Drill Series 135 DPV



Cleco Drill Series 15 DP



Cleco 135DPV and 15DP Hand Drills

Tool solutions for various applications and materials. For use with Airetool Tube End Facers and push-type tube cutters.

- 0.7 & 1.0 Hp non-reversible drills provides plenty of power
- Low RPM models are ideal for hard and/or exotic materials and larger diameter tubes
- 135DPV drill have governed RPM set points for precise calibrated speed control without loss of power
- 135DPV manufactured with sand cast handle and a hardened steel back cap for strength and durability
- Dead Handles are standard on drills with 1/2" chucks to provide better leverage

Model Number	Speed (rpm)		Chuck Capacity*		Length		Weight	
	Free	Governed	in.	mm	in.	mm	lbs.	kg

0.7 hp (0.5 kW) – Variable Speed

135DPV-7B-43	600	150 - 550	3/8	10	9.63	244	3.63	1.6
135DPV-7B-50	600	150 - 550	1/2	13	9.63	244	3.63	1.6
135DPV-14B-50	1250	400 - 1200	1/2	13	9.25	235	3.38	1.5
135DPV-14B-51	1250	400 - 1200	3/8	10	9.25	235	3.38	1.5
135DPV-28B-51	2600	700 - 2400	3/8	10	8.50	216	3.13	1.4

Model Number	Free Speed	Stall Torque		Chuck Capacity*		Length		Weight	
	rpm	ft. lbs.	Nm	in.	mm	in.	mm	lbs.	kg

1.0 hp (0.67 kW) – Non-reversible

15DP-1.6B-53	160	160†	217†	1/2	13	9.75	248	6.00	2.7
15DP-4B-53	400	44†	60.0†	1/2	13	8.50	216	5.50	2.5
15DP-8B-53	800	22.0	30.0	1/2	13	8.50	216	5.50	2.5
15DP-14B-49	1400	14.0	19.0	3/8	10	8.25	210	4.50	2.0

General:

Air Inlet: 1/4" NPT
 Minimum Hose Size: 1/4" (6mm)
 Spindle Offset: 25/32" (20mm)
 Tool performance rated at 90 psi (620kPa) air pressure.

Standard Equipment:

Technical Documentation
 Dead handles on all models with 1/2" chuck (861006PT)
 3-Jaw Chuck and Key

* Capacity CAUTION NOTE:

135DPV Drills must be equipped with support handle (861006PT) if 1/2" (13mm) capacity chuck is specified.

† Caution :

High reaction torque may be experienced with any drill at breakthrough. Caution must be exercised when using any cutting tool because of the possibility of the cutting tool bending or breaking. Cutting tool maximum speed rating must equal or exceed speed of tool. Eye protection must be worn while operating power tools.



Tube End Facer



The Airetool TEF Tube End Facer is ideally suited for facing tube ends on heat exchangers and condensers. Tools can also be used to remove welds until they are flush with the tube sheet during tube removal and re-tubing processes.

Tube application range: 3/8 - 2-1/2 in. (9.5 - 63.5mm) O.D.

- Includes full set of free-turning pilots allowing use with several tube gauges
- Adjustable ball bearing thrust collar assures uniform tube facing
- Tube End Facers are equipped with 7/16" hex shank to fit standard drill chucks
- Cutting bits are made from quality tool steel or stainless steel for extended life

Tube O.D.		Tool No. (Order No.)	Gauge	Hex Shank		Spare Bits	
in.	mm			in.	mm	non-ferrous or Carbon Steel	Stainless Steel
3/8	9.5	TEF-375 (5519632)	16-20	5/16	7.9	TEF-376 (2987908)	TEF-376-SS (2991788)
1/2	12.7	TEF-500 (5332415)	16-20	3/8	9.5	TEF-506 (2662531)	TEF-506-SS (2983169)
5/8	15.8	TEF-625 (5332425)	14-18	3/8	9.5	TEF-626 (2662558)	TEF-626-SS (2983170)
3/4	19.0	TEF-750 (5332450)	10-18	3/8	9.5	TEF-756 (2662585)	TEF-756-SS (2983162)
7/8	22.2	TEF-875 (5332460)	14-18	3/8	9.5	TEF-876 (2662603)	TEF-876-SS (2983163)
1	25.4	TEF-1000 (5332475)	10-18	3/8	9.5	TEF-1006 (2662633)	TEF-1006-SS (2983164PT)
1	25.4	TEF-1000 (5526476)	20-24	3/8	9.5	TEF-1006 (2662633)	TEF-1006-SS (2983164PT)
1-1/8	28.5	TEF-1125 (5514016)	12-14	3/8	9.5	TEF-1126 (2975739)	TEF-1126 SS (2990074)
1-1/8	28.5	TEF-1125 (5526477)	20-24	3/8	9.5	TEF-1126 (2975739)	TEF-1126 SS (2990074)
1-1/4	31.7	TEF-1250 (5513801)	12-18	3/8	9.5	TEF-1256 (2968692)	TEF-1256 SS (2987497)
1-1/4	31.7	TEF-1250 (5526478)	20-24	3/8	9.5	TEF-1256 (2968692)	TEF-1256 SS (2987497)
1-1/4	31.7	TEF-1500-SS (5524268PT)	14-18	3/8	9.5	TEF-1256 SS (2987497)	TEF-1256 SS (2987497)
1-1/2	38.1	TEF-1500 (5512103)	12-14	7/16	11.1	TEF-1506 (2968598)	TEF-1506 SS (2990665)
1-3/4	44.4	TEF-1750 (5513605)	12-14	7/16	11.1	TEF-1756 (2974354)	TEF-1756 SS
2	50.8	TEF-2000 (5512102)	12-14	7/16	11.1	TEF-2006 (2968544)	TEF-2006 SS (2991618)
2-1/2	63.5	TEF-2500 (5512202PT)	5-7	3/4	19.0	TEF-2506 (2968963PT)	TEF-2506 SS

A set of even gauge pilots are supplied with tube end facing tools shown above.

Other Sizes available. Contact customer service for details.

Tube Installation Accessories

Heat Exchanger & Condenser Tube Expanders Accessories



Flaring Tools



The Airetool FT-515 –60° flaring tools are designed to flare 1/2 - 1-1/2 inch (12.7 - 38.1mm) OD tubes. Furnished with Type 01 or Type 06 round shanks for use with standard chipping hammers.

Model Number	Ordering Number	Flare Angle	Shank
FT 515 01 Flaring Tool	2470950	60 Degree	-01
FT 515 06 Flaring Tool	2973803	60 Degree	-06



Belling and Flaring Tools



Belling tool – pilot end fits tube I.D. with Type 01 shank. Specify tool OD, gauge, radius in tube sheets.



Beading Tool



Model Number	Ordering Number	Radius (in.)	Shank Type
12-RM -9-5/32-R-01	2968677	5/32	Type 01
12-RM -9-1/4-R-01	2968676	1/4	(.680" round x 2 3/8" long)

Sleeve Type Extensions

Designed for use where tubes are close to the shell of the condenser. Small diameter of female end allows access to these tubes.

Sleeve Type Extension Complete	Order Number	Square Drive Size (Male/Female)		Overall Length	
		In.	mm	In.	mm
3/8 x 12	5515758	3/8	9.5	12	305
3/8 x 18	5513774	3/8	9.5	18	457
3/8 x 24	5515759	3/8	9.5	24	610
3/8 x 36	5515761	3/8	9.5	36	915
1/2 x 12	5515733	1/2	12.7	12	305
1/2 x 18	5513775	1/2	12.7	18	457
1/2 x 24	5515734	1/2	12.7	24	610
3/4 x 12	5515735	3/4	19.0	12	305
3/4 x 18	5515736	3/4	19.0	18	457
3/4 x 24	5515737	3/4	19.0	24	610



Extensions with Quick-Change Chuck



Varying extension lengths are used for hard-to-reach tubes. Quick-change chuck enables operator to change expanders quickly. Specify size of square drive and extension length.

Quick Change Extension Complete	Order Number	Square Drive Size (Male/Female)		Overall Length	
		In.	mm	In.	mm
QC-375-6	5501200	3/8	9.5	6	152
QC-375-8	5501600	3/8	9.5	8	203
QC-375-12	5502000	3/8	9.5	12	305
QC-375-18	5503000	3/8	9.5	18	457
QC-375-24	5504000	3/8	9.5	24	610
QC-375-30	5504500	3/8	9.5	30	762
QC-375-36	5505000	3/8	9.5	36	915
QC-500-12	5507000	1/2	12.7	12	305
QC-500-18	5508000	1/2	12.7	18	457
QC-500-24	5509000	1/2	12.7	24	610
QC-500-30	5510000	1/2	12.7	30	762
QC-500-36	5511000	1/2	12.7	36	915



Universal Joints and Extensions

Designed for hard-to-reach tubes, the universal joint performs smoothly without binding. Specify size of square drive and extension length.



Universal Joints

Universal Joint	Order Number	Square Drive Size Female		Overall Length	
		In.	mm	In.	mm
3/8 x 3/8	2115300	3/8	9.5	2.50	64
1/2 x 1/2	2039800	1/2	12.7	2.75	70
3/4 x 3/4	2974913	3/4	19.0	3.50	89

Universal Extensions

Universal Extensions	Order Number	Square Drive Size Male/Female		Overall Length	
		In.	mm	In.	mm
GP-3/8 x 6	5514896	3/8	9.5	6	152
GP-3/8 x 12	5514898	3/8	9.5	12	305
GP-3/8 x 18	5514899	3/8	9.5	18	457



Airetool Hole Gauge for Heat Exchanger Tubes

These easy to use inline hole gauges feature three-point contact for self-centering and direct reading scale. All hole gauges furnished with test ring for scale verification. Standard reach tools up to 1" (25.4mm) include carrying case.

Tube Range: 0.500 - 2.500" O.D. (12.70 - 63.50mm)

- Graduated scale in 0.002" (.05mm) increments for fast, accurate measurement of tube I.D.
- Each hole gauge also has the range to measure tube sheet holes in next smaller size
- Standard adjustable reach of 6" (152.4mm) and 12" (304.8mm) lengths.



Tube O.D.		Hole Gauge Reach*		Measurement Range	
in.	mm	6" (152.4mm)	12" (304.8mm)	in.	mm
1/2"	12.7	HG-500-6 (5171001)	HG-500-12 (5171100)	.350 - .440	8.89 - 11.18
5/8"	15.8	HG-625-6 (5171200)	HG-625-12 (5171300)	.440 - .545	11.18 - 13.84
3/4"	19.0	HG-750-6 (5171400)	HG-750-12 (5171500)	.550 - .700	13.97 - 17.78
7/8"	22.2	HG-875-6 (5171600)	HG-875-12 (5171700)	.675 - .825	17.15 - 20.96
1"	25.4	HG-1000-6 (5171800)	HG-1000-12 (5171900)	.800 - .950	20.32 - 24.13
1-1/4"	31.7	HG-1250-6 (5172000)	HG-1250-12 (5172100)	.955 - 1.105	24.26 - 28.07
1-3/8"	34.9	HG-1375-6	HG-1375-12 (5521640)	1.060 - 1.220	26.92 - 30.99
1-1/2"	38.1	HG-1500-6 (5518603)	HG-1500-12 (5519614)	1.200 - 1.430	30.48 - 36.22
1-3/4"	44.5	HG-1750-6 (5521886)	HG-1750-12 (5524917)	1.450 - 1.610	36.83 - 40.89
2	50.8	HG-2000-6 (5521825)	HG-2000-12 (5521143)	1.700 - 1.930	43.18 - 49.02
2-1/2"	63.5	HG-2500-6 (5521098)	HG-2500-12	2.130 - 2.360	54.10 - 59.94

*Longer reaches available on request



Airetool (TSHB) Tube Sheet Hole Brush

Tube Sheet Hole Brushes are used to clean and polish the inside surface of the tube sheet holes prior to tube stuffing process.

Model Number	Order Number	Hole Size (in.)	
		in.	mm
TSHB-1/2	1716654	0.500	12.7
TSHB-5/8	1716655	0.625	15.9
TSHB-3/4	1716656	0.750	19.0
TSHB-7/8	1716657	0.875	22.2
TSHB-1	1716658	1.000	25.4
TSHB-1-1/4	1716659	1.250	31.8
TSHB-1-1/2	1717065	1.500	38.1



Airetool (BTG) Tube Guide

Tube guides have a tapered aluminum pilot with a replaceable nylon brush and are used to guide tubes through tube sheets and support plate holes.

- Nylon brush fits in the tube end, holding pilot firmly in place.
- Speeds "tube stuffing" process which can lower installation costs
- Prevents damage to the tube end reducing rework and scrap materials

Tube O.D.		Gauge	Model Number	Order Number
in.	mm			
1/2	12.7	16-18	BTG 050 1618 TUBE GUIDE BTG-1	5342004
1/2	12.7	19-20	BTG 050 1920 TUBE GUIDE BTG-2	5342006
1/2	12.7	21-23	BTG 050 2123 TUBE GUIDE BTG-2-1/2	5515585
5/8	15.8	12-13	BTG 062 1213 TUBE GUIDE BTG-3	5342008
5/8	15.8	14-16	BTG 062 1416 TUBE GUIDE BTG-4	5342010
5/8	15.8	17-20	BTG 062 1720 TUBE GUIDE BTG-5	5342012
5/8	15.8	19-22	BTG 060 1922 TUBE GUIDE	5526534PT
5/8	15.8	22-24	BTG 062 2224 TUBE GUIDE BTG-5-1/2	5512197
3/4	19	10-12	BTG 075 1012 TUBE GUIDE BTG-6	5342014
3/4	19	13-16	BTG 075 1316 TUBE GUIDE BTG-7	5342016
3/4	19	17-20	BTG 075 1720 TUBE GUIDE BTG-8	5342018
3/4	19	22-24	BTG 075 2224 TUBE GUIDE BTG 8-1/2	5515738
7/8	22.2	10-12	BTG 087 1012 TUBE GUIDE BTG 9	5342020PT
7/8	22.2	13-16	BTG 087 1316 TUBE GUIDE BTG-10	5342022
7/8	22.2	17-20	BTG 087 1720 TUBE GUIDE BTG-11	5342024
7/8	22.2	21-22	BTG 087 2122 TUBE GUIDE BTG 11-1/2	5342026
1	25.4	8-9	BTG 100 89 TUBE GUIDE BTG-12-1/2	5516015
1	25.4	10-12	BTG 100 1012 TUBE GUIDE BTG 12	5342028
1	25.4	13-16	BTG 100 1316 TUBE GUIDE BTG 13	5342030
1	25.4	17-20	BTG 100 1720 TUBE GUIDE BTG 14	5342032
1	25.4	21-23	BTG 100 2123 TUBE GUIDE BTG 14-1/2	5512141
1 - 1/4	31.8	10-13	BTG 125 1013 TUBE GUIDE BTG 15	5342034
1 - 1/4	31.8	14-20	BTG 125 1420 TUBE GUIDE BTG 16	5342036
1 - 1/2	38.1	9-13	BTG 150 913 TUBE GUIDE	5342038
1 - 1/2	38.1	14-20	BTG 150 1420 TUBE GUIDE	5342040

Other sizes are available upon request. Pilots made of other materials also available. A minimum order quantity of 50 per size applies for special sizes or materials.

Tube Installation Accessories

Tube Testers

Tube Testing Tools

The advanced design of the Airetool "ATT" Tube Testers enable an operator to test the entire length of the tube between the tube sheets for leaks, merely by pressing a button. Air pressure is induced through the gun causing the seals to expand. Easy to read gauges will display and hold pressure if there are no leaks. The tester comes complete with two #ATT-15-312 support tubes, two #ATT-15-405 support tubes and two seals for the tube size specified. Specify tube O.D. and gauge when ordering.

Tube Range: 0.625 -1.250" O.D. (15.875 - 31.75mm)

Air Requirements: 40 -125 PSI (2.7 - 8.5 bar)

- Standard method for testing tubes providing reliable results
- Fast acting, easy to use tester saves time and reduces labor costs
- Seals are sized specifically for the tube I.D. creating a positive seal



ATT-6525 TUBE TESTER

Tube Size		ATT-6525 Tube Tester placement Parts		
Tube in. (mm)	BWG	Tube Seal & Washer (2 required)	Support Tube Seal & Washer (2 required)	Support Tube Assembly*
5/8 (18.5)	8-9	ATT 300 N (2996173)	ATT -500-U (2984659)	ATT-15-125 (2984870)
	10-11	ATT 350 N (2900798)		
	12-13	ATT 370-N (2988090)		
	14-15	ATT 450 N (2984360)		
	16-17	ATT 470 N (2900799)		
	18-19	ATT 490 N (2984361)		
3/4 (19.0)	20-24	ATT 530 N (2984362)	ATT -900-U (2984660)	ATT-15-312 (2984871)
	8-9	ATT 430 N (2995248)		
	10-11	ATT 450 N (2984360)		
	12-13	ATT 490 N (2984361)		
	14-15	ATT 530 N (2984362)		
	16-17	ATT 570 N (2984363)		
7/8 (22.2)	18-19	ATT 610 N (2984364)	ATT-15-312 (2984871)	ATT-15-312 (2984871)
	20-24	ATT 650 N (2984365)		
	8-9	ATT 530 N (2984362)		
	10-11	ATT 570 N (2984363)		
	12-13	ATT 610 N (2984364)		
	14-15	ATT 690 N (2984366)		
1 (25.4)	16-17	ATT 730 N (2900800)	ATT -1250-U (2987062)	ATT-15-312 (2984871)
	18-19	ATT 740 N (2984367)		
	20-24	ATT 790 N 405 (2984929)		
	8-9	ATT 650 N (2984365)		
	10-11	ATT 690 N (2984366)		
	12-13	ATT 740 N (2984367)		
1-1/8 (28.5)	14-15	ATT 790 N (2984368)	ATT -1500-U (2984661)	ATT-15-405 (2984872)
	16-17	ATT 840 N (2984369)		
	18-19	ATT 870 N (2900801)		
	20-24	ATT 890 N (2984370)		
	8-9	ATT 790 N 405 (2984929)		
	10-11	ATT 840 N (2984369)		
1-1/4 (31.7)	12-13	ATT 870 N (2900801)	ATT-15-405 (2984872)	ATT-15-405 (2984872)
	14-15	ATT 940 N (2984492)		
	16-17	ATT 980 N (2900802)		
	18-19	ATT 990 N (2984671)		
	20-24	ATT 1040 N (2984672)		
	8-9	ATT 890 N (2984370)		
1-1/4 (31.7)	10-11	ATT 940 N (2984492)	ATT-15-405 (2984872)	ATT-15-405 (2984872)
	12-13	ATT 990 N (2984671)		
	14-15	ATT-1080 N (2900803)		
	16-17	ATT 1090 N (2984673)		
	18-19	ATT 1100 N (2900804)		
	20-24	ATT 1140 N (2984674)		

Tube Tester Kit*	Ordering Number	Tube Sizes	
		in.	mm
ATT 6526 Tube Tester Kit 5/8 7/8		5/8 - 7/8	18.5 - 22.2
ATT 6526 Tube Tester Kit 1 1-1/4		1 - 1-1/4	25.4 - 31.7
ATT 6526 Tube Tester Kit 5/8 1-1/4	5520174PT	5/8 - 1-1/4	18.5 - 31.7
ATT 6525 Gun and Support Tube Kit**	5518407PT	5/8 - 1-1/4	18.5 - 31.7

* Kits include: Guns, standard length Support Tubes, Seals, Washers, and carrying case for range indicated
 ** Includes: Guns and standard length Support Tubes in carrying case

ATT Tube Tester Guns	Ordering Number
ATT 6525 1 Injection Gun	2984876
ATT 6525 2 Plugging Gun	2984877

Support Tube Assemblies	Ordering Number	Support Tube Length		Tube I.D. Range	
		in.	mm	in.	mm
ATT-15-125	2984870	4	101.6		
ATT-15-125-12	2902119	12	304.8	.280 - .480	7.1 - 12.3
ATT-15-125-24	2903223PT	24	609.6		
ATT-15-312	2984871	4	101.6		
ATT-15-312-12	2985236	12	304.8	.490 - .830	12.4 - 21.2
ATT-15-312-24	2985238	24	609.6		
ATT-15-405	2984872	4	101.6		
ATT-15-405-12	2902120	12	304.8	.840 - 1.230	21.3 - 31.2
ATT-15-405-24	2985242	24	609.6		

* Support Tube Assembly consists of: Support Tube, Back-up Washer Set, and Locknut



AJT-6500 JOINT TESTER

Joint Testing Tools

The Airetool "AJT" Joint Tester is designed to test for leaks between the tube & the tube sheet on both rolled and welded joints. Easy to use push buttons activate, test and reset the Joint Tester for quick verification. Joint testers comes complete with one manifold assembly and one seal for the tube size ordered. Specify tube O.D. and gauge when ordering.

Tube Range: 0.625 -1.250" O.D. (15.87 - 31.75mm)

Air Requirements: 40 -125 PSI (2.7 - 8.5 bar)

- Standard method for testing tube joints providing reliable results
- Fast acting, easy to use tester saves time and reduces labor costs
- Seals are sized specifically for the tube I.D. creating a positive seal

Tube Size		AJT-6500 Joint Tester Assembly	AJT-6500 Joint Tester Replacement Parts		
Tube	BWG	Assembly Number	Seal Description Number (1 Required)	Manifold W/ Square O-Ring	Square O-Ring
5/8"	8-9 10-11 12-13 14-15 16-17	AJT 6500 5/8SP (5525585)	ATT 300 N (2996173) ATT 350 N (2900798) ATT 370 N (2988090) ATT 450 N (2984360) ATT 470 N (2900799)	AJT 6500 5/8SP (2900823)	AJT 16 5/8 (2984663)
	18-19 20-24		ATT 490 N (2984361) ATT 530 N (2984362)		
3/4"	8-9 10-11	AJT 6500 3/4SP (5525586)	ATT 430 N (2995248) ATT 450 N (2984360)	AJT 6500 3/4SP (2900824)	AJT 16 3/4 (2984664)
	12-13 14-15 16-17 18-19 20-24		ATT 490 N (2984361) ATT 530 N (2984362) ATT 570 N (2984363) ATT 610 N (2984364) ATT 650 N (2984365)		
7/8"	8-9 10-11 12-13 14-15 16-17 18-19 20-24	AJT 6500 7/8 (5525567)	ATT 530 N (2984362) ATT 570 N (2984363) ATT 610 N (2984364) ATT 690 N (2984366) ATT 730 N (2900800) ATT 740 N (2984367) ATT 790 N 405 (2984929)	AJT 6500 7/8 (2984358)	AJT 16 7/8 (2984665)
	8-9 10-11 12-13 14-15 16-17 18-19 20-24		ATT 650 N (2984365) ATT 690 N (2984366) ATT 740 N (2984367) ATT 790 N (2984368) AJT 840 N (2984502) AJT 870 N (2900810) AJT 890 N (2984503)		
1"	8-9 10-11 12-13 14-15 16-17 18-19 20-24	AJT 6500 1 (5525568PT)	ATT 790 N 405 (2984933) ATT 840 N (2984369) ATT 870 N (2900801) ATT 940 N (2984492) ATT 980 N (2900802) ATT 990 N (2984671) ATT 1040 N (2984672)	AJT 6500 1 (2984359)	AJT 16 1 (2984666)
	8-9 10-11 12-13 14-15 16-17 18-19 20-24		ATT 890 N (2984370) ATT 940 N (2984492) ATT 990 N (2984671) ATT 1080 N (2900803) ATT 1090 N (2984673) ATT 1100 N (2900804) ATT 1140 N (2984674)		

AJT Joint Tester	Ordering Number
AJT 6500 Joint Tester Kit*	5520175PT
AJT 6500 Gun w/o manifold	2900807

* Kit consists of: Joint Tester, 6 manifolds (5/8" - 1-1/4"), and 1 ea. ATT470 - ATT1140 seals

AJT 6500 Manifold Assemblies	Ordering Number	Tube I.D. Range	
		in.	mm
AJT 6500 5/8SP	2900823	.280 - .480	7.1 - 12.3
AJT 6500 5/8	2984356	.490 - .830	12.4 - 21.2
AJT 6500 3/4SP	2900824	.280 - .480	7.1 - 12.3
AJT 6500 3/4	2984357	.490 - .830	12.4 - 21.2
AJT 6500 7/8	2984358	.490 - .830	12.4 - 21.2
AJT 6500 1	2984359	.490 - 1.230	12.4 - 31.2
AJT 6500 1 1/8	2984669	.840 - 1.230	21.3 - 31.2
AJT 6500 1 1/4	2984670	.840 - 1.230	21.3 - 31.2



SEAL WITH WASHER



SEAL WITH BACKUP WASHER

Tube Removal Tools

Tube Drifts & Collapsing Tools

Tube Drifts and Collapsing Tools

For the quickly removal of tube stubs from tube sheets.

- For 1/2" - 1" (12.7 - 25.4mm) OD tubes
- Select 01 or 06 style shanks
- For use with Cleco CH-30 chipping hammer
- Standard length is 6". Longer length available upon request.

Tube Drifts

Tube O.D.		Gauge	Description / Order Number	
in.	mm		-01 Shank	-06 Shank
1/2	12.7	12	TD 500 12 01 (2952840)	TD 500 12 06 (2952890)
1/2	12.7	14	TD 500 14 01 (2953200)	TD 500 14 06 (2953250)
1/2	12.7	16	TD 500 16 01 (2953560)	TD 500 16 06 (2953610)
1/2	12.7	18	TD 500 18 01 (2953920)	TD 500 18 06 (2953970)
1/2	12.7	20	TD 500 20 01 (2972633)	TD 500 20 06 (2979763)
5/8	15.8	10	TD 625 10 01 (2954280)	TD 625 10 06 (2954330)
5/8	15.8	12	TD 625 12 01 (2954640)	TD 625 12 06 (2954690)
5/8	15.8	13	TD 625 13 01 (2954820)	TD 625 13 06 (2954870)
5/8	15.8	14	TD 625 14 01 (2955000)	TD 625 14 06 (2955050)
5/8	15.8	15	TD 625 15 01 (2955180)	TD 625 15 06 (2955230)
5/8	15.8	16	TD 625 16 01 (2955360)	TD 625 16 06 (2955410)
5/8	15.8	17	TD 625 17 01 (2955540)	TD 625 17 06 (2955590)
5/8	15.8	18	TD 625 18 01 (2955720)	TD 625 18 06 (2955770)
5/8	15.8	19	TD 625 19 01 (2972630)	TD 625 19 06 (2979765)
5/8	15.8	20	TD 625 20 01 (2972631)	TD 625 20 06 (2978637)
3/4	19.1	10	TD 750 10 01 (2956080)	TD 750 10 06 (2956130)
3/4	19.1	12	TD 750 12 01 (2956440)	TD 750 12 06 (2956490)
3/4	19.1	13	TD 750 13 01 (2956620)	TD 750 13 06 (2956670)
3/4	19.1	14	TD 750 14 01 (2956800)	TD 750 14 06 (2956850)
3/4	19.1	15	TD 750 15 01 (2956980)	TD 750 15 06 (2957030)
3/4	19.1	16	TD 750 16 01 (2957160)	TD 750 16 06 (2957210)
3/4	19.1	17	TD 750 17 01 (2957340)	TD 750 17 06 (2957390)
3/4	19.1	18	TD 750 18 01 (2957520)	TD 750 18 06 (2957570)
3/4	19.1	19	TD 750 19 01 (2972617)	TD 750 19 06 (2979767)
3/4	19.1	20	TD 750 20 01 (2972618)	TD 750 20 06 (2979768)
7/8	22.2	14	TD 875 14 01 (2958600)	TD 875 14 06 (2958650)
7/8	22.2	15	TD 875 15 01 (29587800)	TD 875 15 06 (2958830)
7/8	22.2	16	TD 875 16 01 (2958960)	TD 875 16 06 (2959010)
7/8	22.2	18	TD 875 18 01 (2959320)	TD 875 18 06 (2959370)
7/8	22.2	20	TD 875 20 01 (2972620)	TD 875 20 06 (2979771)
1	25.4	10	TD 1000 10 01 (2959680)	TD 1000 10 06 (2959730)
1	25.4	12	TD 1000 12 01 (2960040)	TD 1000 12 06 (2960090)
1	25.4	13	TD 1000 13 01 (2960220)	TD 1000 13 06 (2960270)
1	25.4	14	TD 1000 14 01 (2960400)	TD 1000 14 06 (2960450)
1	25.4	15	TD 1000 15 01 (2960580)	TD 1000 15 06 (2960630)
1	25.4	16	TD 1000 16 01 (2960760)	TD 1000 16 06 (2960810)
1	25.4	17	TD 1000 17 01 (2960940)	TD 1000 17 06 (2960990)
1	25.4	18	TD 1000 18 01 (2961120)	TD 1000 18 06 (2961170)
1	25.4	19	TD 1000 19 01 (2972622)	TD 1000 19 06 (2979773)
1	25.4	20	TD 1000 20 01 (2972623)	TD 1000 20 06 (2979774)



TUBE DRIFT

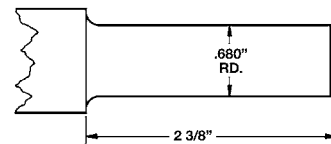


COLLAPSING TOOL

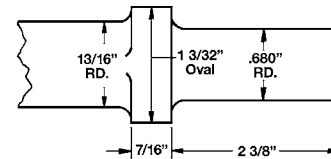


Collapsing Tools

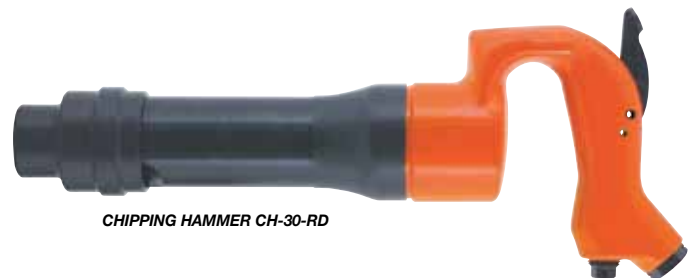
Tube O.D.		Gauge	Description / Order Number	
in.	mm		-01 Shank	-06 Shank
3/8	9.5	16-22	CT-375-01 (2950000)	CT-375-06 (2980055)
1/2	12.7	16-22	CT-500-01 (2950030)	CT-500-06 (2950080)
5/8	15.8	16-22	CT-625-01 (2950210)	CT-625-06 (2950260)
3/4	19.1	16-22	CT-750-01 (2950390)	CT-750-06 (2950440)
7/8	22.2	16-22	CT-875-01 (2950570)	CT-875-06 (2950620)
1	25.4	16-22	CT-1000-01 (2950750)	CT-1000-06 (2950800)



Type No. 01



Type No. 06



CHIPPING HAMMER CH-30-RD

Cleco CH-30 Series Chipping Hammer

Heavy duty chipping hammer has forged steel hammer for rugged use in repair and remanufacturing of heat exchanger vessels. For use with Airetool tube drifts and collapsing tools.

- Chisel retainer for Type-06 shank
- Ring valve hard hitting hammer

Chipping Hammer

Model	Blows per Minute	Bore in. (mm)	Stroke in. (mm)	Weight lbs (Kg)
CH-30-RD	1650	1-1/8 (28.5)	2-1/2 (63.5)	15 (6.8)



Tube Wall Reducing Tools (TWRT)

Tube Wall Reducing Tools are used on heavy gauge tubes in order to reduce the tube wall thickness prior to removing them with a tube drift tool. Available with Morse taper shank.

- Thins tube wall for easier removal with tube drift

Minimum order quantity 3 pieces



Tube O.D.		Tube Gauge	Model	Order Number	Morse Taper*	Tube Sheet Thickness**	
in.	mm					in.	mm
3/8	9.5	16	TWRT-375-16	2980132	#1	2.88	73.03
3/8	9.5	17	TWRT-375-17	2992775	#1	2.88	73.03
3/8	9.5	18	TWRT-375-18	2974712	#1	2.88	73.03
3/8	9.5	20	TWRT-375-20	2978341	#1	2.88	73.03
3/8	9.5	21	TWRT-375-21	2976259	#1	2.88	73.03
3/8	9.5	22	TWRT-375-22	2989963	#1	2.88	73.03
1/2	12.7	17	TWRT-500-17	2677209	#2	2.88	73.03
1/2	12.7	18	TWRT-500-18	2677210	#2	2.88	73.03
1/2	12.7	19	TWRT-500-19	2998102	#2	2.88	73.03
1/2	12.7	20	TWRT-500-20	2982800	#2	2.88	73.03
1/2	12.7	21	TWRT-500-21	2998103	#2	2.88	73.03
1/2	12.7	22	TWRT-500-22	2998104	#2	2.88	73.03
5/8	15.8	12	TWRT-625-12	2677216	#2	3.38	85.73
5/8	15.8	13	TWRT-625-13	2677217	#2	3.38	85.73
5/8	15.8	14	TWRT-625-14	2677218	#2	3.38	85.73
5/8	15.8	15	TWRT-625-15	2677219	#2	3.38	85.73
5/8	15.8	16	TWRT-625-16	2677220	#2	3.38	85.73
5/8	15.8	17	TWRT-625-17	2677221	#2	3.38	85.73
5/8	15.8	18	TWRT-625-18	2677222	#2	3.38	85.73
5/8	15.8	19	TWRT-625-19	2972480	#2	3.38	85.73
5/8	15.8	20	TWRT-625-20	2972479	#2	3.38	85.73
5/8	15.8	21	TWRT-625-21	2984261	#2	3.38	85.73
5/8	15.8	22	TWRT-625-22	2993158	#2	3.38	85.73
3/4	19.1	10	TWRT-750-10	2677226	#2	4.38	111.13
3/4	19.1	11	TWRT-750-11	2677227	#2	4.38	111.13
3/4	19.1	12	TWRT-750-12	2677228	#2	4.38	111.13
3/4	19.1	13	TWRT-750-13	2677229	#2	4.38	111.13
3/4	19.1	14	TWRT-750-14	2677230	#2	4.38	111.13
3/4	19.1	15	TWRT-750-15	2677231	#2	4.38	111.13
3/4	19.1	16	TWRT-750-16	2677232	#2	4.38	111.13
3/4	19.1	17	TWRT-750-17	2677233	#2	4.38	111.13

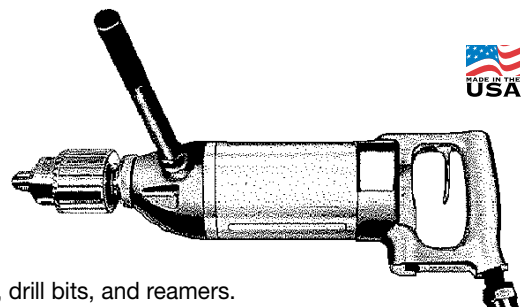
* Other shanks styles available on request

**Longer reach available on request

600-D Air Drill

Powerful Heavy Duty air drill recommended for use with Airetool serrating tools, push-type tube cutters, and tube wall reducing tools.

- 4.5 Horsepower D-Handle drill provides plenty of power
- Governed motor for consistent cutting speeds
- Reversible support handle for added leverage
- Optional Morse taper adapter makes it universal with tube wall reducing tools, drill bits, and reamers.



Model	Order Number	Horsepower	Speed	Drill Capacity		Reamer Capacity		Length		Weight		Spindle Thread	Side-to-Center		Air Inlet		Hose Size	
		Hp.	rpm	in.	mm	in.	mm	in.	mm	lbs.	kg	in.	in.	mm	in.	mm	in.	mm
600 D 100	8405289	4.5	100	3/4	19.0	5/8	15.8	18.0	457.0	16.0	7.3	5/8 - 16	1.5	38.1	1/2	12.7	1/2	12.7
600 D 200	6024900	4.5	200	3/4	19.0	5/8	15.8	18.0	457.0	16.0	7.3	5/8 - 16	1.5	38.1	1/2	12.7	1/2	12.7
600 D 265	6025000	4.5	265	3/4	19.0	5/8	15.8	18.0	457.0	16.0	7.3	5/8 - 16	1.5	38.1	1/2	12.7	1/2	12.7
600 D 335	6025100	4.5	335	5/8	15.8	5/8	15.8	18.0	457.0	16.0	7.3	5/8 - 16	1.5	38.1	1/2	12.7	1/2	12.7
600 D 625	6025200	4.5	625	1/2	12.7	7/16	11.1	18.0	457.0	16.0	7.3	5/8 - 16	1.5	38.1	1/2	12.7	1/2	12.7

Stock numbers for Drills with Jacobs Chuck
Chucks and Morse Taper adapter part numbers

Tube Removal Tools

Cutter Feed Assist

Airetool Cutter Feed Assist (CF)

Increase your productivity with the Airetool Cutter Feed Assist. The Cutter Feed Assist is designed to work in conjunction with Airetool PIC push-type tube cutters to reduce operator fatigue and increase productivity.

- For use with 5/8" through 1" (15.8 - 25.4mm) PIC tube cutters
- Powered by Cleco® DPV-135 variable speed drills to match the best cutting speed to the tube material
- Provides constant pressure which increases durability of tool bits
- Independent cutter bit feed trigger for operator safety
- Positive-feed stop controls tube cutting depth
- Compact design allows the Cutter Feed Assist easier access to confined areas.



PIC Tube Cutter sold separately. See page 55.

Two Models Available:

Part Number	Order Number	RPM
CF-150/500	5523443	150-500
CF-400/1200	5523444	400-1200

HOW TO ORDER:

See selection chart below*. Select the Airetool Cutter Feed Assist that corresponds to tube sizes and tube material.

Tube Material	Tube O.D.			
	5/8" (16mm)	3/4" (19mm)	7/8" (22mm)	1" (25mm)
Aluminum	CF-400/1200	CF-400/1200	CF-400/1200	CF-400/1200
Brass	CF-400/1200	CF-400/1200	CF-400/1200	CF-400/1200
Copper	CF-400/1200	CF-400/1200	CF-400/1200	CF-400/1200
Carbon Steel	CF-400/1200	CF-400/1200	CF-400/1200	CF-400/1200
Stainless	CF-150/500	CF-150/500	CF-150/500	CF-150/500
Titanium	CF-150/500	CF-150/500	CF-150/500	CF-150/500

* Refer to the Machinery's Handbook for actual recommended tube cutting speeds for specific materials.



Airetool PIC Internal Tube Cutters

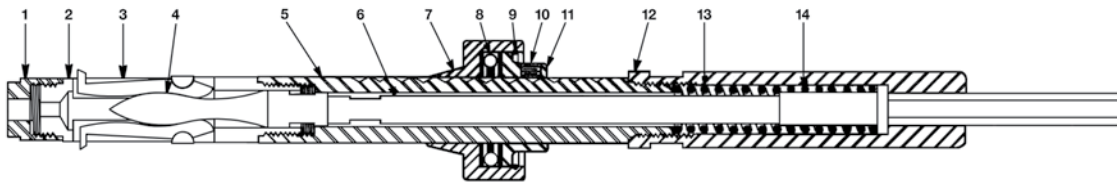
The "PIC" internal tube cutters are an economical solution to low volume tube cutting of various tube materials. Optimum tube cutting performance and tooling life are obtained when the Airetool CF Series cutter feed assist is used to match the cutting speed to the tube material.

Available for tube sizes
5/8" - 1-1/4" OD (15.8 - 31.8mm)

- Two-piece construction allows for quick and easy tool bit replacement.
- Cutter bits are now available with TiN coating, increasing the cutter bit life.
- Airetool PIC tube cutters are sold with a complete set of pilots and two spare tool bit sets
- Larger sizes and longer reaches available upon request.

Tube O.D.		PIC Tube Cutter Reach*			Pilots (incl.)
(in.)	mm	Standard	"A"	"C"	(gauge)
1/2	12.70	PIC 500 (5519733)	PIC 500 A	PIC 500 C	18 - 20
5/8	15.88	PIC 625 (5515553)	PIC 625 A (5515557)	PIC 625 C (5515559)	16 - 20
3/4	19.05	PIC 750 (5515560)	PIC 750 A (5515540)	PIC 750 C (5515514)	14 - 20
7/8	22.22	PIC 875 (5515562)	PIC 875 A (5515564PT)	PIC 875 C (5515566PT)	15 - 20
1	25.4	PIC 1000 (5515567)	PIC 1000 A (5515568)	PIC 1000 C (5515554)	12 - 20
1-1/8	28.57	PIC 1125 (5515820)	PIC 1125 A	PIC 1125 C	14, 16, 18
1-1/4	31.75	PIC 1250 (5518134PT)	PIC 1250 A	PIC 1250 C	14, 16, 18

* Standard Reach = 1-11/16 to 4-7/16" (43 to 110mm)
 "A" Reach = 4-11/16 to 7-7/16" (119 to 189mm)
 "C" Reach = 8-3/16 to 10-15/16" (208 to 278mm)



Item Number	Description	5/8" (16mm) 16-20GA	3/4" (19mm) 14-20GA	7/8" (22mm) 16-20GA	1" (25mm) 12-20GA
		Part No. (Order No.)	Part No. (Order No.)	Part No. (Order No.)	Part No. (Order No.)
	Complete PIC Cutter*	PIC-625 (5515553)	PIC-750 (5515560)	PIC-875 (5515562)	PIC-1000 (5515567)
1	Pilot	TTC 6 (2675000)	TTC-6-14 (2668900)	TTC-56-15 (2676400)	TTC-36-12 (2672500)
1	Pilot	TTC-46-18 (2675100)	TTC-6-15 (2669000)	TTC-56-16 (2990534)	TTC-36-13 (2672600)
1	Pilot	TTC-46-19 (2675200)	TTC-6-16 (2669100)	TTC-56-17 (2990535)	TTC-36-14 (2672700)
1	Pilot	TTC-46-20 (2675300)	TTC-6-17 (2669200)	TTC-56-18 (2676500)	TTC-36-15 (2672800)
1	Pilot	TTC 46 22 (2974902)	TTC-6-18 (2669300)	TTC-56-19 (2676600)	TTC-36-16 (2672900)
1	Pilot	TTC 46 23 (2976001)	TTC-6-19 (2669400)	TTC-56-20 (2676700)	TTC-36-17 (2673000)
1	Pilot	TTC 46 24 (2976002)	TTC-6-20 (2669500)		TTC-36-18 (2673100)
1	Pilot				TTC-36-19 (2673200)
1	Pilot				TTC-36-20 (2673300)
2	Body Tip	IC-41 (2979725)	IC-1 (2979306)	IC-51 (2979726)	IC-31 (2979419)
3	Tool Bit* (Non-ferrous)	TTC-43 (5338869)	TTC-3 (5338865)	TTC-53 (5338871)	TTC-33 (5338867)
3	Tool Bit* (Ferrous)	TTC-43-S (5338870)	TTC-3-S (5338866)	TTC-53-S (5338872)	TTC-33-S (5338868)
3	Tool Bit* (Stainless)	TTC-43-SS (5518303)	TTC-3-SS (5517614)	TTC-53-S (5517757)	TTC-33-SS (5516337)
4	Mandrel Tip	IC-44-T (2979724)	IC-4-T (2979308)	IC-34-T (2979409)	IC-34-T (2979409)
5	Body Extension	IC-41X (2979688)	IC-1X (2979672)	IC-51X (2979692)	IC-31X (2979680)
6	Mandrel Extension	IC-4X (2979676)	IC-4X (2979676)	IC-34X (2979684)	IC-34X (2979684)
7	Thrust Body	TTC-47 (2675400)	TTC-7 (2669600)	TTC-57 (2676800)	TTC-37 (2673300)
8	Bearing	TTC-9 (2670000)	TTC-9 (2670000)	TTC-39 (2673800)	TTC-39 (2673800)
9	Thrust Spring	TTC-10 (2670100)	TTC-10 (2670100)	TTC-40 (2673900)	TTC-40 (2673900)
10	Set Screw	10-32X1/4 (8000800)	10-32X1/4 (8000800)	10-32X1/4 (8000800)	10-32X1/4 (8000800)
11	Thrust Nut	TTC-48 (2675700)	TTC-8 (2669900)	TTC-58 (2677100)	TTC-38 (2673700)
12	Spring Housing	PIC-21 (2979752)	PIC-21 (2979752)	PIC-21 (2979752)	PIC-21 (2979752)
13	Spring	PTC-5 (2574180)	PTC-5 (2574180)	PTC-5 (2574180)	PTC-5 (2574180)
14	Driver	PIC-4 (2979751)	PIC-4 (2979751)	PIC-4 (2979751)	PIC-4 (2979751)

*Standard length listed

Tube Removal Tools

Air Driven Tube Cutter (TIC)

Complete tube cutting system for various tube materials. Five models available in speeds from 100 to 625 rpm for various steel and non-ferrous tube applications.

- Powerful, 4.5 Horsepower motor with D-handle
- Governed motor for consistent cutting speeds
- Positive lever-operated feed of cutter bit
- One mandrel drive adapter works with all sizes of cutters (TTC-30, ordering number 2671400)



Electric Tube Cutter (EIC)

Where compressed air supply is unavailable, the EIC tube internal tube cutter will perform satisfactorily for low volume tube cutting jobs. The variable speed motor can be used to cut various steel and non-ferrous tube materials.

- Powerful, 120VAC, 7 amp reversible motor
- Trigger speed control: 0 - 600 RPM
- Triple gear reduction provides abundant torque output
- One mandrel drive adapter works with all sizes of cutters (ETC-30, ordering number 3073240)



RPM	Tube Material	Cutter Complete			
		5/8" O.D.	3/4" O.D.	7/8" O.D.	1" O.D.
Pneumatic Models					
625	Non-ferrous	TIC-625-625 (5515586)	TIC625-750 (5515590)	TIC-625-875 (5515594)	TIC-625-1000 (5515598)
335	Non-ferrous/Ferrous	TIC-350-625 (5515602)	TIC-350-750 (5515606)	TIC-350-875 (5515610)	TIC-350-1000 (5515614)
265	Ferrous-Stainless	TIC-265-625 (5515618)	TIC-265-750 (5515622)	TIC-265-875 (5515626)	TIC-265-1000 (5515630)
200	Ferrous-Stainless	TIC-200-625 (5518909)	TIC-200-750 (5518459)	TIC-200-875 (5522345)	TIC-200-1000 (5519460)
100	Stainless & Titanium	TIC-100-625 (5519526)	TIC-100-750 (5517806)	TIC-100-875 (5522125)	TIC-100-1000 (5518512)
40	Titanium & Inconel	TIC-40-625 (5521860)	TIC-40-750 (5518184)	TIC-40-875	TIC-40-1000
Electric Models					
EIC 100/600 RPM	See Above	EIC 100/600 625 (5515772)	EIC 100/600 750 (5515635)	EIC 100/600 875 (5523035)	EIC 100/600 1000 (5518583PT)

Cutter Bodies Complete for TIC & EIC Models

Several design improvements have been incorporated for maintenance and increased service life

- Shorter and stronger cutter body improves durability and increases bit life
- Cutter body is threaded into body extension for easier bit replacement
- Standard mandrel driver fits all sizes of Airetool tube cutters
- Adjustable reach "IC" cutter bodies:
 - Standard reach 1-11/16" to 4-7/16" (42 - 112mm) shown above
 - "A" reach = 4-11/16" to 7-7/16" (112 - 188mm)
 - "C" reach = 8-3/16" to 10-15/16" (207 - 277mm)
- Larger sizes and longer lengths available upon request.

Description	Tube O.D.			
	5/8" O.D.	3/4" O.D.	7/8" O.D.	1" O.D.
Tube Cutter body Sub-assemblies for TIC & EIC models				
Cutter Body Complete	IC-625 (5515574)	IC-750 (5515577)	IC-875 (5515581)	IC-1000 (5515571)
Tool Bit* (Non-ferrous)	TTC-43 (5338869)	TTC-3 (5338865)	TTC-53 (5338871)	TTC-33 (5338867)
Tool Bit* (Ferrous)	TTC-43-S (5338870)	TTC-3-S (5338866)	TTC-53-S (5338872)	TTC-33-S (5338868)
Tool Bit* (Stainless)	TTC-43-SS (5518303)	TTC-3-SS (5517614)	TTC-53-SS (5517757)	TTC-33-SS (5516337)

* Tool Bit part numbers above consist of 2 bits each.

Tube Cutter Bodies consists of all parts necessary to convert models TIC & EIC to different tube size.

Specify desired reach:
Standard Reach 4-7/16" (112.7mm) shown
"A" Reach 7-7/16" (188.9mm)
"C" Reach 10-15/16" (277.8mm)



RCM One Revolution Tube Cutters

For cutting tubes beyond the tube sheet in heat exchangers, condensers, and boilers. RCM series tube cutters are also an excellent tool for puncturing defective tubes prior to tube plugging. This reduces the risk of pressure buildup in plugged tubes.

- Designed for hand use by employing a ratchet or hand wrench for manual operation
- Available in standard reaches of 6" (152mm) and 10" (254mm)
- Longer reaches are available in 10" increments upon request



Tube O.D.		BWG	Tube I.D.	Tool Reach		Cutting Bit
in.	mm			6" (152.4mm)	10" (254.0mm)	
1/2	12.70	18-19	.400"-.420" 10.2-10.7mm	RCM-105 (5522994)	RCM-105-10 (5523116)	RC-500-2 (2993368)
1/2	12.70	20	.430"-.450" 11.0-11.3mm	RCM-110 (5522929)	RCM-110-10	RC-500-2 (2993368)
5/8	15.88	14	.450"-.470" 11.4-11.9mm	RCM-115 (5522995)	RCM-115-10 (5523118)	RC-625-2 (2993372)
5/8	15.88	15-16	.472"-.510" 12-12.9mm	RCM-120 (5522930)	RCM-120-10 (5523119)	RC-625-2 (2993372)
5/8	15.88	17-18	.500"-.531" 12.7-13.5mm	RCM-130 (5522931)	RCM-130-10 (5523120)	RC-625-2 (2993372)
5/8	15.88	19-20	.531"-.560" 13.5-14.2mm	RCM-135 (5522996)	RCM-135-10 (5523121)	RC-625-2 (2993372)
5/8	15.88	22	.550"-.580" 14.0-14.7mm	RCM-140 (5522932)	RCM-140-10 (5524952)	RC-625-2 (2993372)
3/4	19.05	12-13	.530"-.560" 13.5-14.2mm	RCM-135-3/4 (5523115)	RCM-135-3/4-10 (5526397)	RC-750-2A (2995865)
3/4	19.05	14-15	.580"-.610" 14.7-15.5mm	RCM-150 (5522933)	RCM-150-10 (5523123)	RC-750-2 (2993374)
3/4	19.05	16	.600"-.630" 15.2-16.0mm	RCM-155 (5522997)	RCM-155-10 (5523124)	RC-750-2 (2993374)
3/4	19.05	17-18	.625"-.650" 15.9-16.5mm	RCM-160 (5522934)	RCM-160-10 (5523125)	RC-750-2 (2993374)
3/4	19.05	19-20	.660"-.690" 16.7-17.5mm	RCM-170 (5522935)	RCM-170-10 (5523126PT)	RC-750-2 (2993374)
7/8	22.22	14-15	.700"-.730" 17.8-18.5mm	RCM-180 (5522936)	RCM-180-10 (5523127)	RC-875-2 (2993384)
7/8	22.22	16-17	.740"-.770" 18.8-19.5mm	RCM-190 (5522937)	RCM-190-10 (5523128)	RC-875-2 (2993384)
7/8	22.22	18	.760"-.790" 19.3-20.0mm	RCM-195 (5522998)	RCM-195-10 (5524478)	RC-875-2 (2993384)
7/8	22.22	19-20	.780"-.810" 19.8-20.6mm	RCM-200 (5522938)	RCM-200-10 (5523241PT)	RC-875-2 (2993384)
1	25.40	12	.760"-.790" 19.3-20.0mm	RCM-195 (5522998)	RCM-195-10 (5524478)	RC-875-2 (2993384)
1	25.40	14	.820"-.850" 20.8-21.6mm	RCM-210 (5522939)	RCM-210-10 (5523131)	RC-1000-2 (2993394)
1	25.40	15	.840"-.870" 21.3-22.1mm	RCM-215 (5522999)	RCM-215-10 (5523132)	RC-1000-2 (2993394)
1	25.40	16-17	.860"-.890" 21.8-22.6mm	RCM-220 (5522940)	RCM-220-10 (5523133)	RC-1000-2 (2993394)

Tube O.D.		BWG	Tube I.D.	Tool Reach		Cutting Bit
in.	mm			6" (152.4mm)	10" (254.0mm)	
1	25.40	18-19	.890"-.910" 22.6-23.1mm	RCM-230 (5522941)	RCM-230-10 (5523134)	RC-1000-2 (2993394)
1	25.40	22	.940"-.970" 23.9-24.6mm	RCM-240 (5522942)	RCM-240-10 (5525584)	RC-1000-2 (2993394)
1-1/4	31.75	12	1.020"-.1.050" 25.9-26.7mm	RCM-260 (5523000)	RCM-260-10 (5523136)	RC-1250-2 (2993404)
1-1/4	31.75	13-14	1.050"-.1.080" 26.7-27.4mm	RCM-270 (5523001)	RCM-270-10 (5523137)	RC-1250-2 (2993404)
1-1/4	31.75	15-16	1.100"-.1.130" 27.9-28.7mm	RCM-280 (5523002)	RCM-280-10 (5523138)	RC-1250-2 (2993404)
1-1/4	31.75	17-19	1.130"-.1.160" 28.7-29.6mm	RCM-290 (5523003)	RCM-290-10 (5523139)	RC-1250-2 (2993404)
1-3/8	34.93	13-14	1.180"-.1.210" 30-30.7mm	RCM-300 (5523709)	RCM-300-10 (5525838)	RC-1500-2 (2993417)
1-1/2	38.10	12-13	1.280"-.1.310" 32.5-33.3mm	RCM-330 (5523004)	RCM-330-10 (5523140)	RC-1500-2 (2993417)
1-1/2	38.10	14-15	1.330"-.1.360" 33.8-34.5mm	RCM-340 (5523005)	RCM-340-10 (5523005)	RC-1500-2 (2993417)
1-1/2	38.10	16-17	1.360"-.1.390" 34.5-35.3mm	RCM-350 (5523006)	RCM-350-10 (5523142)	RC-1500-2 (2993417)
1-1/2	38.10	18-19	1.390"-.1.420" 35.3-36.1mm	RCM-360 (5523007)	RCM-360-10 (5523143)	RC-2000-2 (2993427)
2	50.80	12-13	1.770"-.1.810" 45.0-46.0mm	RC-2012 (5521677)	RC-2012-10	RC-2000-2 (2993427)
2	50.80	14-15	1.820"-.1.860" 46.2-47.2mm	RC-2014 (5521678PT)	RC-2014-10	RC-2000-2 (2993427)
2	50.80	16-17	1.860"-.1.900" 46.2-48.2mm	RC-2016 (5521679)	RC-2016-10	RC-2000-2 (2993427)
2	50.80	18-19	1.890"-.1.930" 48.0-49.0mm	RC-2018 (5521680)	RC-2018-10	RC-2000-2 (2993427)
2-1/2	63.50	12-13	2.270"-.2.310" 57.6mm-58.6	RC-2512 (5521681)	RC-2512-10	RC-2000-2 (2993427)
2-1/2	63.50	14-15	2.320"-.2.360" 58.9-60.0mm	RC-2514 (5521682)	RC-2514-10	RC-2000-2 (2993427)
2-1/2	63.50	16-17	2.360"-.2.400" 60.0-61.0mm	RC-2516 (5521683)	RC-2516-10	RC-2000-2 (2993427)
2-1/2	63.50	18-19	2.390"-.2.430" 60.7-61.7mm	RC-2518 (5521684)	RC-2518-10	RC-2000-2 (2993427)

Impact Wrenches

Pistol Grip & Spade Handle

Impact Wrenches

Used in the construction, maintenance, and repair of heat exchangers, boilers, and coolers. Cleco Impact Wrenches provide an industrial solution that goes hand-in-hand with Airetool tube service tools. Used to open flanges and water boxes, remove plugs in fin-fan coolers, and an array of other heavy duty applications.

- Biased reverse power to loosen the most stubborn fasteners
- Exclusive through-bolt construction reduces replacement costs
- Unique oil-foam bath provides positive lubrication for the hammer, anvil, and other working parts
- Forged hammer and anvil for greater durability



WP-2049-6



WT-2109-8

Model Number	Bolt Size		Square Drive	Recommended Torque Range		Breakaway Torque Capacity in Reverse		Impacts per Minute	Free Speed RPM	Length		Weight		Side to Center		Air Consumption			
	Gr. 5	Gr. 9.8		ft.-lbs.	Nm	ft.-lbs.	Nm			in.	mm	lbs.	kg	in.	mm	NPT	Hose I.D.	SCFM	
	in.	mm	in.																
Pistol Grip – Trigger Start – Biased Reverse Power																			
WP-2049-6	7/8	M20	3/4	125-550	170-750	750	1000	1,000	6,200	6.4	162	7.8	3.5	1.6	42	3/8"	3/8"	45	
WP-2059-6	1 1/8	M24	3/4	250-700	350-950	1200	1600	1,000	4,000	7.8	197	12	5.4	1.8	46	3/8"	3/8"	60	
WP-2059-8	1 1/8	M24	1	250-800	350-1100	1200	1600	1,000	4,000	7.8	197	12.1	5.5	1.8	46	3/8"	3/8"	60	
Trigger Start - Spade Handle - Biased Reverse Power*																			
WT-2109-8	1 3/8	M30	1	750-1650	1000-2250	2500	3400	880	4,300	12.9	327	21	9.5	2.2	56	1/2"	1/2"	100	
WT-2119-12	1 1/2	M36	1 1/2	1200-2600	1600-3500	3500	4700	820	3,300	14.3	362	29	13.1	2.3	59	1/2"	5/8"	105	

*Includes dead handle dead handle bracket.

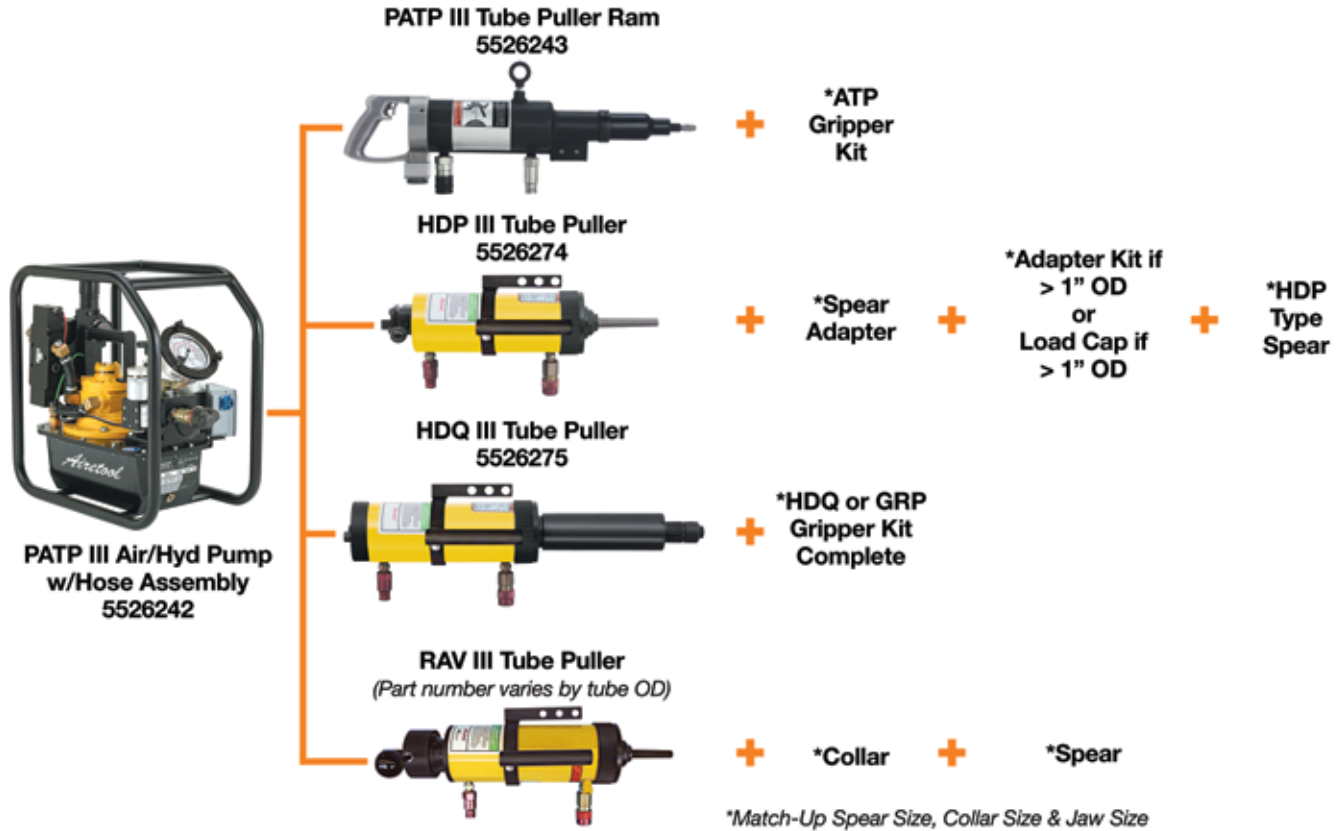
General: Tool performance rated at 90 psi (620kPa) air pressure.

Standard Equipment: Operating instructions & service manual

Tube Pulling Systems & Pumps

Tube Pulling Systems consist of:

1. Pump Assembly - air/hydraulic or electric/hydraulic (includes hose assembly)
2. Ram Assembly - gripper or spear type
3. Grippers or Spears - Gripper kit / adapter kit with spear / collar with spear (depends on ram selected)



Tube Pulling Pumps & Accessories

The ATP III & PATP III Pumps are engineered to deliver superior performance and durability. They work in combination with a variety of different tube pulling RAMs.

- Pumps come mounted in a roll cage with casters and large wheels for protection and increased mobility
- Control cables and hydraulic hoses are bundled together for greater safety
- Hydraulic hoses have quick connect fittings for easy attachment to the pump and tube pulling ram

Description	Ordering Number
ATP III Electric/Hydraulic Pump with Hoses, Cord and Pendant	5526244
PATP III Air/Hydraulic Pump with Hose Assembly and Pendant	5526242



ATP III Tube Pullers

Electric Driven

ATP III Tube Pullers

Electric/Hydraulic Semi-automatic Tube Pullers For Light & Medium Duty Applications

- The Airetool Model ATP III Tube Pulling Ram develops 13-3/4 tons of pulling power
- Easily remove tubes up to 1 in. O.D. from tube sheets up to 1-1/2 in. thickness*
- Grippers bite uniformly into the tube I.D. as the piston retracts, pulling the tube from the sheet
- Provides a full 4-3/4 inch total pulling length through a double 2-3/8 inch pull
- Electric switch in the handle of the ram enables the hydraulic pump to operate the ram cylinder
- Puller reverses instantly at the end of the pulling cycle or when the trigger is released

* Puller capacity of the ATP Ram will vary with tube wall thickness, tube sheet thickness and tube material.



PUMP SHOWN WITHOUT WHEEL ASSEMBLY ATTACHED



ATP-III TUBE PULLING RAM



ATP-9000B HCA HOSE/CORD ASSEMBLY

The following components are required for most common tube pulling applications

Ordering Number	Description
5526244	ATP III Electric/Hydraulic Pump with Hoses, Cord, and Pendant
5526295	ATP III Tube Puller Ram Assembly
5525470PT	ATP 9000B HCA Hose/Cord Assembly
5522513	ATP 9064A 15 Cord Assembly
See page 62	Gripper Kit (tube size specific)

PATP III Tube Pullers

Air Driven



PUMP SHOWN WITH WHEEL ASSEMBLY ATTACHED

PATP III Tube Pullers

Air/Hydraulic Semi-automatic Tube Pullers For Light & Medium Duty Applications

- The Airetool Model PATP III Tube Pulling Ram develops 13-3/4 tons of pulling power
- Easily remove tubes up to 1 in. O.D. from tube sheets up to 1-1/2 in. thickness*
- Grippers bite uniformly into the tube I.D. as the piston retracts, pulling the tube from the sheet
- Provides a full 4-3/4 inch total pulling length through a double 2-3/8 inch pull
- Electric switch in the handle of the ram enables the hydraulic pump to operate the ram cylinder
- Puller reverses instantly at the end of the pulling cycle or when the trigger is released

* Puller capacity of the PATP Ram will vary with tube wall thickness, tube sheet thickness and tube material.



PATP III TUBE PULLING RAM



PATP-9000B HCA HOSE/
CORD ASSEMBLY



OPTIONAL PENDANT
ASSEMBLY

The following components are required for most common tube pulling applications

Ordering Number	Description
5526242	PATP III Air/Hydraulic Pump with hose assembly and Pendant
5526243	PATP III Tube Puller Ram Assembly
5524903PT	PATP HT Hose/Tube Assembly
See page 62	Gripper Kit (tube size specific)

Optional pendant for use with HDP III, HDQ III, RAV III and PATP Pumps

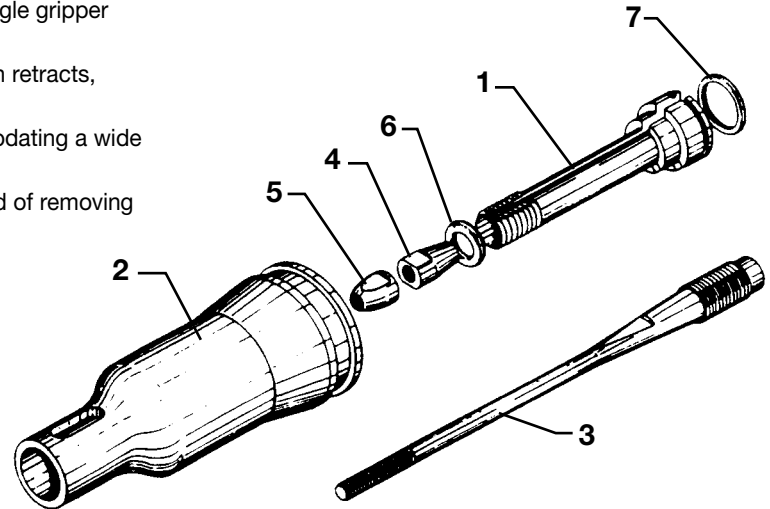
Ordering Number	Description
5524904	PATP HDP Pendant Assembly

ATP III Gripper Kit

ATP III & PATP III Gripper Kit Components

Features of the ATP III Tube Pulling System Include:

- Free-floating gripper design results in uniform contact on the tube ID for better pulling characteristics and increased durability
- Grippers are segmented, allowing replacement of single gripper segment in the event of tooth breakage
- Grippers bite uniformly into the tube I.D. as the piston retracts, pulling the tube from the sheet
- Grippers are available from 5/8" through 1" accommodating a wide range of tube gages
- Optional 18 in. extension kit provides a useful method of removing hard-to-reach tubes



Tube Size (O.D.)		Tube Gauge	Part Number	Gripper Kit* Order Number	1 Gripper Complete** Order Number	2 Nose Bushing	3 Draw Rod	4 Expansion Nut	5 Lock Nut	6 Front O-ring	7 Rear O-ring
in.	mm										
.625	15.9	16-18	ATP-9022-568	5520782	5520793	ATP -9042-5/8 (2991245)	ATP -9034-5/8 (2991237)	ATP -9035-5/8 (2991238)	ATP -9036-5/8 (2991239)	200-9 (3105400)	RTV-65 (3094500)
.625	15.9	20-22	ATP-9022-522	5520783	5520794						
.750	19.1	14-15	ATP-9022-34	5520784	5520795	ATP -9014-3/4 (2991218)	ATP -9015-3/4 (2991224)	ATP -9016-3/4 (2991226)	ATP -9017-3/4 (2991227)	2-113 (3010453)	900-83 (3220900)
.750	19.1	16-18	ATP-9022-368	5520785	5520796						
.750	19.1	20-22	ATP-9022-322	5520786	5520797						
.875	22.2	12-14	ATP-9022-724	5520787	5520798	ATP -9027-7/8 (2991232)	ATP -9037-7/8-1 (2991240)	ATP -9038-7/8-1 (2991241)	ATP -9039-7/8-1 (2991242)	2-113 (3010453)	900-83 (3220900)
.875	22.2	16-18	ATP-9022-768	5520788	5520799						
.875	22.2	20-22	ATP-9022-722	5520789	5520800						
1.000	25.4	12-14	ATP-9022-124	5520790	5520801	ATP -9041-1 (2991244)					
1.000	25.4	16-18	ATP-9022-168	5520791	5520802						
1.000	25.4	20-22	ATP-9022-122	5520792	5520803						

* Gripper Kit consists of 3 gripper segments, one nose bushing, one draw rod, one expansion nut, one lock nut, and both O-Rings.

** Gripper Complete consists of 3 Gripper Segments and both O-Rings.



For Tube Sizes 1/2" thru 1" the following accessories are required:

- HDP 99 3055 3 Spear Adapter (2900051)
- Tube Pulling Spear - refer to the chart below for size selection
- Optional load cap may be required if surrounding tubes are protruding and are closely spaced

For Tube Sizes 1-1/8" thru 2-1/2" the following accessories are required:

- HDP 99 3055 3 Spear Adapter (2900051)
- HDP 99 Adapter Kit - refer to the chart below for size selection
- Tube Pulling Spear - refer to the chart below for size selection
- 5526274 HDP III Ram Kit includes:
5526273 Ram, 5526280 Adapter Lock Assembly, and 2900007 HDP 99 LC 1 Load Cap

HDP III Tube Pulling Spears

Tube Size			Order Number	Small Diameter End		Large Diameter End		Overall Length	Flat Size
in.	mm	Gauge		in.	mm	in.	mm		
1/2	12.7	20	2983511	0.427	10.8mm	0.499	12.7mm		
5/8	15.8	12-13	2968758	0.402	10.2mm	0.61	15.5mm		
5/8	15.8	14-15	2968759	0.454	11.5mm	0.662	16.8mm		
5/8	15.8	16-17	2968760	0.489	12.4mm	0.625	15.9mm		
5/8	15.8	18-19	2968761	0.521	13.2mm	0.625	15.9mm		
5/8	15.8	20	2979942	0.545	13.8mm	0.62	15.7mm		
3/4	19.0	10	2968759	0.454	11.5mm	0.662	16.8mm		
3/4	19.0	11-13	2968762	0.505	12.8mm	0.713	18.1mm		
3/4	19.0	14-15	2968764	0.597	15.2mm	0.75	19.1mm		
3/4	19.0	16-17	2968765	0.614	15.6mm	0.75	19.1mm	8-3/4"	7/8" HEX
3/4	19.0	18-19	2968766	0.646	16.4mm	0.75	19.1mm	222mm	22.2mm
3/4	19.0	20	2979941	0.67	17.0mm	0.745	18.9mm		
7/8	22.2	14-15	2968769	0.699	17.8mm	0.875	22.2mm		3/4-10 MALE Thread
7/8	22.2	16-17	2968768	0.74	18.8mm	0.948	24.1mm		
7/8	22.2	17-18	2968770	0.755	19.2mm	0.963	24.5mm		
7/8	22.2	20	2983512	0.8	20.3mm	0.874	22.2mm		
1	25.4	9-10	2968769	0.699	17.8mm	0.875	22.2mm		
1	25.4	11	2968770	0.755	19.2mm	0.963	24.5mm		
1	25.4	12-13	2968771	0.777	19.7mm	0.985	25.0mm		
1	25.4	14-15	2968772	0.829	21.1mm	1	25.4mm		
1	25.4	16-17	2968773	0.869	22.1mm	1	25.4mm		
1	25.4	18-20	2968774	0.896	22.8mm	1	25.4mm		
1-1/4	31.7	7-8	2968775	0.856	21.7mm	1.114	28.3mm		
1-1/4	31.7	10-11	2968776	0.977	24.8mm	1.206	30.6mm		
1-1/4	31.7	12-13	2968778	1.027	26.1mm	1.256	31.9mm	5-1/2"	1-1/4" HEX
1-1/4	31.7	14-15	2968780	1.079	27.4mm	1.308	33.2mm	140mm	38.8mm
1-1/4	31.7	16-18	2968781	1.115	28.3mm	1.344	34.1mm		
1-1/2	38.1	10-11	2968782	1.227	31.2mm	1.456	37.0mm		3/4-10 FEMALE Thread
1-1/2	38.1	12-13	2968784	1.277	32.4mm	1.5	38.1mm		
1-1/2	38.1	14	2968786	1.329	33.8mm	1.5	38.1mm		



HDP III Ram & Accessories

Model Number	Description	Order Number
	HDP III Tube Pulling Ram	5526273
	HDP III ALA Adapter Lock Assembly	5526280
	HDP 99 3055 3 Adapter	2900051
	HDP 99 3055 5 Adapter Extension	2900011
	HDP 99 3055 3 MF Adapter Extension	2900633
	HDP 99 LC 1 Load Cap	2900007
	HDP 99 LC 5/8 Load Cap	2900008
	HDP 99 LC 3/4 Load Cap	2900009
	HDP 99 LC 7/8 Load Cap	2900010

HDP III Adapter Kits

Tube O.D.		Adapter Kit*		Extension Chair	
in.	mm	Model Number	Order Number	Model Number	Order Number
1-1/8 - 1-1/2	28.5 - 38.1	HDP 99 3055 AK 1 1/2	5525287	HDP 99 3055 7 1 1/2 QC	2900001
1-3/4	44.4	HDP 99 3055 AK 1 3/4	5525288	HDP 99 3055 7 1 3/4 QC	2900002PT
2	50.8	HDP 99 3055 AK 2	5525289	HDP 99 3055 7 2 QC	2900003
2-1/2	63.5	HDP 99 3055 AK 2 1/2	5525290	HDP 99 3055 7 2 1/2 QC	2900004PT

*Kits include: HDP 99 3055 5 Adapter Extension (2900011) and extension chair listed in chart above.



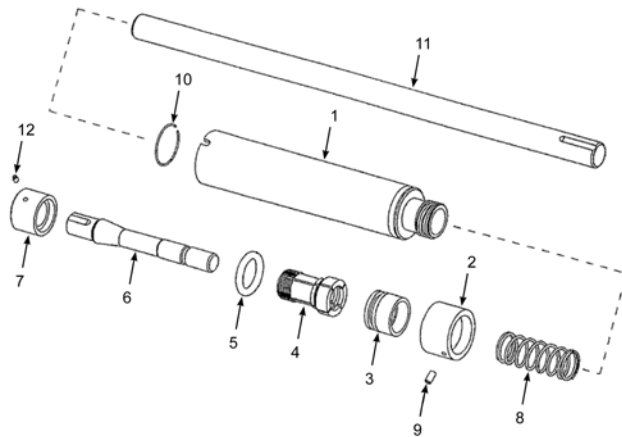
HDQ III Tube Pullers

HDQ-III Tube Pullers

- HDQ III Gripper-type tube puller is designed for pulling 1-1/4" thru 1 - 3/4" O.D. tubes in heat exchangers and fire tube boilers using HDQ Gripper Kits (shown below). This gripper-type tube puller makes tube pulling faster and easier. See selection charts below for ordering gripper kits and components for the tube sizes being pulled.



THE FAST AND EASY OPERATION OF THE HDQ GRIPPER BITES INTO THE TUBE FOR A SECURE TUBE PULLING GRIP, THEN RELEASES AUTOMATICALLY WHEN THE PULL IS COMPLETED.



HDQ III Ram & Accessories

Model Number	Order Number
HDQ III Tube Puller*	5526275PT
HTP III RAM	5526273
HDQ III Adapter Plate	2902631

* Includes RAM and Adapter Plate

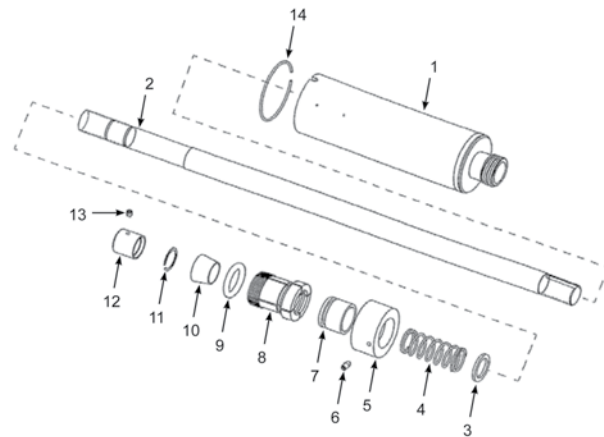
Tube O.D.	Tube Wall BWG	Gripper Kit Complete*	Item Name	HDQ 99 Chair	Position Sleeve	Sleeve Adapter	Gripper	O-Ring	Mandrel	Stop Nut	Spring	Position Sleeve Set Screw	Retainer Ring	Drawbar	Stop Nut Set Screw	
in.	mm		Item Number	1	2	3	4	5	6	7	8	9	10	11	12	
1-1/4	31.7	8-10	HDQ 99 125 8/10 (5525293)	Description	HDQ 99 7 125F QC Chair	HDQ 125 PS	HDQ 125 SA	HDQ 125 1		HDQ 125 M	HDQ 125 1SN	HDQ 31 8	10-32 x 3/16	HDQ 125	HDQ 99 5	10-32 x 3/16
			Order Number	2999993	2985180	2985186	2985168	3094100	2985196	2985191	2985203	8009800	2985357	2900012	8009800	
			Quantity	1	1	1	6	1	1	1	1	1	1	1	1	1
	11-14	HDQ 99 125 11/14 (5525294PT)	Description	HDQ 99 7 125F QC Chair	HDQ 125 PS	HDQ 125 SA	HDQ 125 2	RT V 60	HDQ 125 M	HDQ 125 2SN	HDQ 31 8	10-32 x 3/16	HDQ 125	HDQ 99 5	10-32 x 3/16	
		Order Number	2999993	2985180	2985186	2985169	3094100	2985196	2985192	2985203	8009800	2985357	2900012	8009800		
		Quantity	1	1	1	6	1	1	1	1	1	1	1	1	1	
15-18	HDQ 99 125 15/18 (5525295)	Description	HDQ 99 7 125F QC Chair	HDQ 125 PS	HDQ 125 SA	HDQ 125 3	RT V 60	HDQ 125 M	HDQ 125 3SN	HDQ 31 8	10-32 x 3/16	HDQ 125	HDQ 99 5	10-32 x 3/16		
	Order Number	2999993	2985180	2985186	2988629	3094100	2985196	2988630	2985203	8009800	2985357	2900012	8009800			
	Quantity	1	1	1	6	1	1	1	1	1	1	1	1	1		
1-1/2	38.1	8-12	HDQ 99 150 8/12 (5525296PT)	Description	HDQ 99 7 150F QC Chair	HDQ 150 PS	HDQ 150 SA	HDQ 150 1	2 213	HDQ 150 M	HDQ 150 1SN	HDQ 31 8	10-32 x 3/16	HDQ 150	HDQ 99 5	10 32 x 3/16
			Order Number	2999994	2985181	2985187	2985170	8010303	2985197	2985193	2985203	8009800	2985668	2900012	8009800	
			Quantity	1	1	1	4	1	1	1	1	1	1	1	1	1
	13-18	HDQ 99 150 13/18 (5525297)	Description	HDQ 99 7 150F QC Chair	HDQ 150 PS	HDQ 150 SA	HDQ 150 2	2 213	HDQ 150 M	HDQ 150 2SN	HDQ 31 8	10-32 x 3/16	HDQ 150	HDQ 99 5	10 32 x 3/16	
		Order Number	2999994	2985181	2985187	2985171	8010303	2985197	2985194	2985203	8009800	2985668	2900012	8009800		
		Quantity	1	1	1	4	1	1	1	1	1	1	1	1	1	
1-3/4	44.4	12-18	HDQ 99 175 8/12 (5525298)	Description	HDQ 99 7 175F QC Chair	HDQ 175 PS	HDQ 175 SA	HDQ 175 1	700-30	HDQ 150 M	HDQ 175 1SN	HDQ 31 8	10-32 x 3/16	1 3/8	HDQ 99 5	1/4-20 x 1/4
			Order Number	2999995	2985182	2985189	2985172	3203900	2985197	2985195	2985203	8009800	2349000	2900012	8006600	
			Quantity	1	1	1	4	1	1	1	1	1	1	1	1	1
	13-18	HDQ 99 175 13/18 (5525299)	Description	HDQ 99 7 175F QC Chair	HDQ 175 PS	HDQ 175 SA	HDQ 175 2	2 216	HDQ 150 M	HDQ 175 1SN	HDQ 31 8	10-32 x 3/16	1 3/8	HDQ 99 5	1/4-20 x 1/4	
		Order Number	2999995	2985182	2985189	2985173	8010304	2985197	2985195	2985203	8009800	2349000	2900012	8006600		
		Quantity	1	1	1	4	1	1	1	1	1	1	1	1	1	

HDQ-III Tube Pullers

- HDQ III Gripper-type tube puller is designed for pulling 2" thru 2-1/2" O.D. tubes in heat exchangers and fire tube boilers using GRP Gripper Kits. This gripper-type tube puller makes tube pulling faster and easier. See selection charts below for ordering gripper kits and components for the tube sizes being pulled.



THE FAST AND EASY OPERATION OF THE HDQ GRIPPER BITES INTO THE TUBE FOR A SECURE TUBE PULLING GRIP, THEN RELEASES AUTOMATICALLY WHEN THE PULL IS COMPLETED.



HDQ III Ram & Accessories

Model Number	Order Number
HDQ III Tube Puller*	5526275PT
HTP III RAM	5526273
HDQ III Adapter Plate	2902631

* Includes RAM and Adapter Plate

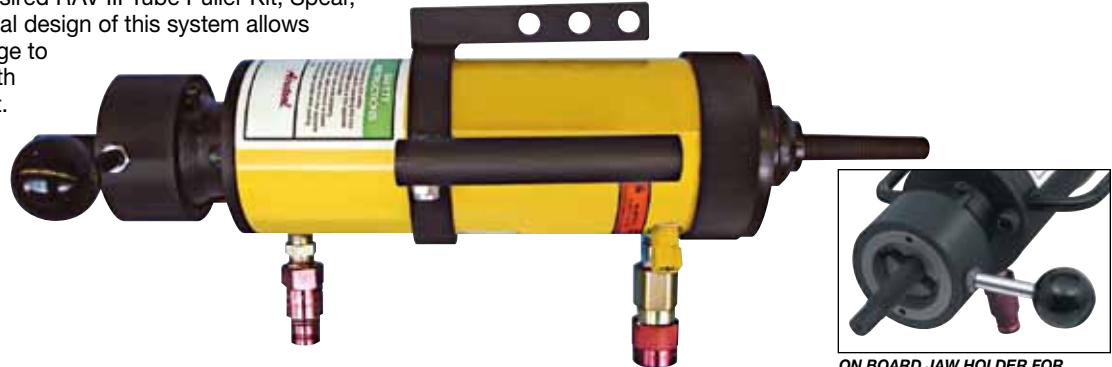
Tube O.D.	Tube Wall BWG	Gripper Kit Complete*	Item Name	HDQ 99 Chair	Drawbar	Stop Plate	Spring	Position Sleeve	Socket Set Screw	Sleeve Adapter	Gripper	O-Ring	Cam	Retainer Ring	Stop Nut	Socket Set Screw	Retainer Spring
				Item Number	1	2	3	4	5	6	7	8	9	10	11	12	13
2	50.8	8-12 GRP 99 200 8/12 (5525300PT)	Description	HDQ 99 7 200F QC Chair	GRP 99 4	GRP 200 STP	GRP 200 SPR	HDQ 200 PS	10-32 x 1/2	GRP 200 SA	GRP 200 1	2 218	GRP 200 CAM	5160 98	GRP 200 SN	1/4-20 X 5/16	1 5/8
			Order Number	2999996	2900052	2987488	2986930	2985183	8010346	2986932	2987091	8010363	2988791	8010362	2986933	8010335	2350300
			Quantity	1	1	1	1	1	1	1	4	1	1	1	1	1	1
	13-18 GRP 99 200 13/18 (5525301)	Description	HDQ 99 7 200F QC Chair	GRP 99 4	GRP 200 STP	GRP 200 SPR	HDQ 200 PS	10-32 x 1/2	GRP 200 SA	GRP 200 2	2 221	GRP 200 CAM	5160 98	GRP 200 SN	1/4-20 X 5/16	1 5/8	
		Order Number	2999996	2900052	2987488	2986930	2985183	8010346	2986932	2987090	8010408	2988791	8010362	2986933	8010335	2350300	
		Quantity	1	1	1	1	1	1	1	4	1	1	1	1	1	1	
2-1/4	57.1	8-12 GRP 99 225 8/12 (5525302)	Description	HDQ 99 7 225F QC Chair	GRP 99 4	GRP 200 STP	GRP 200 SPR	HDQ 225 PS	10-32 x 1/2	GRP 200 SA	GRP 225 1	2 222	GRP 225 CAM	5160 98	GRP 225 SN	1/4-20 X 5/16	1 5/8
			Order Number	2999997	2900052	2987488	2986930	2985184	8010346	2986932	2987092	8010409	2986929	8010362	2986934	8010335	2350300
			Quantity	1	1	1	1	1	1	1	4	1	1	1	1	1	1
	13-18 GRP 99 225 13/18 (5525303)	Description	HDQ 99 7 225F QC Chair	GRP 99 4	GRP 200 STP	GRP 200 SPR	HDQ 225 PS	10-32 x 1/2	GRP 200 SA	GRP 225 2	500 23	GRP 225 CAM	5160 98	GRP 225 SN	1/4-20 X 5/16	2	
		Order Number	2999997	2900052	2987488	2986930	2985184	8010346	2986932	2987094	3165700	2982929	8010362	2986934	8010335	2005500	
		Quantity	1	1	1	1	1	1	1	4	1	1	1	1	1	1	
2-1/2	63.5	8-12 GRP 99 250 8/12 (5525304PT)	Description	HDQ 99 7 250F QC Chair	GRP 99 4	GRP 200 STP	GRP 200 SPR	HDQ 250 PS	10-32 x 1/2	GRP 200 SA	GRP 250 1	2 224	GRP 225 CAM	5160 98	GRP 225 SN	1/4-20 X 5/16	1 5/8
			Order Number	2999998PT	2900052	2987488	2986930	2985185	8010346	2986932	2987095	8010192	2986929	8010362	2986934	8010335	2350300
			Quantity	1	1	1	1	1	1	1	4	1	1	1	1	1	1
	13-18 GRP 99 250 13/18 (5525305)	Description	HDQ 99 7 250F QC Chair	GRP 99 4	GRP 200 STP	GRP 200 SPR	HDQ 250 PS	10-32 x 1/2	GRP 200 SA	GRP 250 2	2 226	GRP 225 CAM	5160 98	GRP 225 SN	1/4-20 X 5/16	2	
		Order Number	2999998PT	2900052	2987488	2986930	2985185	8010346	2986932	2987093	2983713	2986929	8010362	2986934	8010335	2005500	
		Quantity	1	1	1	1	1	1	1	4	1	1	1	1	1	1	

RAV III Tube Pullers

RAV III Tube Pullers

- RAV III Semi-Continuous Tube Pulling Ram allows continuous pulling of tubes up to 1" O.D. (25.4mm)
- Tubes over 1" O.D. have a maximum pulling length of 7" (177mm).

To order: Select the desired RAV III Tube Puller Kit, Spear, and Collar. The universal design of this system allows the user to easily change to a different size tube with minimal additional cost.



ON BOARD JAW HOLDER FOR SEMI-CONTINUOUS PULLING.

RAV SPEARS

Description	Order Number	Tube I.D.		Jaw Size		Square Size	
		in.	mm	in.	mm	in.	mm
RAV 99 406 5/8	2900189	.215 - .255	5.5 - 6.5	5/8	15.8	1/2	12.7
RAV 99 407 5/8	2900190	.255 - .295	6.5 - 7.5	5/8	15.8	1/2	12.7
RAV 99 408 5/8	2900191	.295 - .335	7.5 - 8.5	5/8	15.8	1/2	12.7
RAV 99 409 5/8	2900192	.335 - .375	8.5 - 9.5	5/8	15.8	1/2	12.7
RAV 99 410 5/8	2900193	.375 - .415	9.5 - 10.5	5/8	15.8	1/2	12.7
RAV 99 411 5/8	2900194	.415 - .455	10.5 - 11.5	5/8	15.8	1/2	12.7
RAV 99 412 5/8	2900195	.455 - .495	11.5 - 12.5	5/8	15.8	1/2	12.7
RAV 99 413 5/8	2900196	.495 - .535	12.5 - 13.5	5/8	15.8	1/2	12.7
RAV 99 414 5/8	2900197	.535 - .570	13.5 - 14.5	5/8	15.8	1/2	12.7
RAV 99 413 3/4	2900198	.495 - .535	12.5 - 13.5	3/4	19.0	5/8	15.8
RAV 99 414 3/4	2900199	.535 - .570	13.5 - 14.5	3/4	19.0	5/8	15.8
RAV 99 415 3/4	2900200	.570 - .615	14.5 - 15.5	3/4	19.0	5/8	15.8
RAV 99 416 3/4	2900201	.615 - .650	15.5 - 16.5	3/4	19.0	5/8	15.8
RAV 99 417 3/4	2900202	.650 - .695	16.5 - 17.5	3/4	19.0	5/8	15.8
RAV 99 418 3/4	2900203	.695 - .730	17.5 - 18.5	3/4	19.0	5/8	15.8
RAV 99 415 7/8	2900204	.570 - .615	14.5 - 15.5	7/8	22.2	3/4	19.0
RAV 99 416 7/8	2900205	.615 - .650	15.5 - 16.5	7/8	22.2	3/4	19.0
RAV 99 417 7/8	2900206	.650 - .695	16.5 - 17.5	7/8	22.2	3/4	19.0
RAV 99 418 7/8	2900207	.695 - .730	17.5 - 18.5	7/8	22.2	3/4	19.0
RAV 99 419 7/8	2900208	.730 - .770	18.5 - 19.5	7/8	22.2	3/4	19.0
RAV 99 420 7/8	2900209	.770 - .815	19.5 - 20.5	7/8	22.2	3/4	19.0
RAV 99 421 7/8	2900210	.815 - .850	20.5 - 21.5	7/8	22.2	3/4	19.0
RAV 99 419 1	2900211	.730 - .770	18.5 - 19.5	1	25.4	3/4	19.0
RAV 99 420 1	2900212	.770 - .815	19.5 - 20.5	1	25.4	3/4	19.0
RAV 99 421 1	2900213	.815 - .850	20.5 - 21.5	1	25.4	3/4	19.0
RAV 99 422 1	2900214	.850 - .885	21.5 - 22.5	1	25.4	3/4	19.0
RAV 99 423 1	2900215	.885 - .925	22.5 - 23.5	1	25.4	3/4	19.0
RAV 99 424 1	2900216	.925 - .965	23.5 - 24.5	1	25.4	3/4	19.0
RAV 99 425 1	2900217	.965 - 1.005	24.5 - 25.5	1	25.4	3/4	19.0
RAV 99 426 1	2900218	1.005 - 1.045	25.5 - 26.5	1	25.4	3/4	19.0
RAV 99 427 1	2900219	1.045 - 1.085	26.5 - 27.5	1	25.4	3/4	19.0
RAV 99 428 1	2900220	1.085 - 1.125	27.5 - 28.5	1	25.4	3/4	19.0
RAV 99 429 1	2900221	1.125 - 1.160	28.5 - 29.5	1	25.4	3/4	19.0
RAV 99 430 1	2900222	1.160 - 1.200	29.5 - 30.5	1	25.4	3/4	19.0
RAV 99 431 1	2900223	1.200 - 1.240	30.5 - 31.5	1	25.4	3/4	19.0
RAV 99 432 1	2900224	1.240 - 1.280	31.5 - 32.5	1	25.4	3/4	19.0
RAV 99 433 1	2900225	1.280 - 1.320	32.5 - 33.5	1	25.4	3/4	19.0
RAV 99 434 1	2900226	1.320 - 1.360	33.5 - 34.5	1	25.4	3/4	19.0
RAV 99 435 1	2900227	1.360 - 1.400	34.5 - 35.5	1	25.4	3/4	19.0
RAV 99 436 1	2900228	1.400 - 1.440	35.5 - 36.5	1	25.4	3/4	19.0
RAV 99 437 1	2900229	1.440 - 1.475	36.5 - 37.5	1	25.4	3/4	19.0
RAV 99 438 1	2900230	1.475 - 1.515	37.5 - 38.5	1	25.4	3/4	19.0

RAV III Ram

Model Number	Order Number
HTP III Ram	5526273

Universal Spears

Description	Model Number	Order Number
RAV Spear, 5/8" I.D., 13-24 BWG	RAV 5/8 13-24	7025691PT
RAV Spear, 3/4" I.D., 12-18 BWG	RAV 3/4 12-18	7025689
RAV Spear, 1" I.D., 9-18 BWG	RAV 1 9-18	7025690
RAV Spear, 1-1/8" I.D., 12-18 BWG	RAV 1 1/8 12-18	7025692

RAV III Ram Kits & Components

Model Number	Tube O.D.			
	5/8" (15.8mm)	3/4" (19.0mm)	7/8" (22.2mm)	1" (25.4mm)
RAV III Tube Puller Kits* w/ Jaw Holders & Jaws	5526276	5526277	5526278	5526279
RAV III Jaw Holders & Jaws	5526282	5526283		5526286
RAV III Jaw Set (includes 4 springs)	7025595	7025552		7025553

*RAV III Tube Puller Kits include: RAV III Ram, Jaw Holder Assembly and one set of Jaws



RAV COLLARS

Tube O.D.		Model Number	Order Number	Collar I.D.		Collar O.D.	
in.	mm			in.	mm	in.	mm
1/2	12.7	RAV 99 316	2900176	0.630	16.0	0.865	22.0
5/8	15.8	RAV 99 319	2900177	0.750	19.0	0.985	25.0
3/4	19.0	RAV 99 323	2900178	0.905	23.0	1.14	29.0
7/8	22.2	RAV 99 326	2900179	1.025	26.0	1.26	32.0
1	25.4	RAV 99 326	2900179	1.025	26.0	1.26	32.0
1-1/8	28.5	RAV 99 332	2900181	1.260	32.0	1.495	38.0
1-1/4	31.7	RAV 99 335	2900182	1.375	35.0	1.61	41.0
1-3/8	34.9	RAV 99 339	2900183	1.530	39.0	1.77	45.0
1-1/2	38.1	RAV 99 345	2900184	1.770	45.0	2.005	51.0
1-3/4	44.4	RAV 99 351	2900185	2.005	51.0	2.24	57.0
2	50.8	RAV 99 358	2900186	2.280	58.0	2.515	64.0

JSP Manual Tube Pullers

Manual tube puller provides economical method for tube removal

- For tube removal applications ranging from 1/4" to 1-1/2" O.D.
- No external power requirement makes it ideal for field service applications
- Manual operation with a hand wrench make the JSP easy to use
- All components have clearly marked sizes for a quick matching of tool to job
- Components are heat-treated high strength steel for greater durability



O.D.		Gauge	Tube Size				JSP Tube Puller Complete		Spare Spears	
In.	mm		Wall Thickness		I.D.		Model Number	Order Number	Model Number	Order Number
		In.	mm	In.	mm					
1/4	6.35	18	0.049	1.24	0.152	3.86	JSP 250 18	5520136	JSP 1/4 18	2989364
3/8	9.52	16	0.065	1.65	0.245	6.22	JSP 375 16	5520914	JSP 3/8 16	2991563
3/8	9.52	18	0.049	1.24	0.277	7.04	JSP 375 18	5520030	JSP 3/8 18	2989016
3/8	9.52	20	0.035	0.88	0.305	7.75	JSP 375 20	5519932	JSP 3/8 20	2988750
1/2	12.70	14	0.083	2.11	0.334	8.48	JSP 500 14	5519689	JSP 1/2 14	2987297
1/2	12.70	16	0.065	1.65	0.370	9.40	JSP 500 16	5519690	JSP 1/2 16	2986892
1/2	12.70	18	0.049	1.24	0.402	10.21	JSP 500 18	5519070	JSP 1/2 18	2986893
1/2	12.70	20	0.035	0.88	0.430	10.92	JSP 500 20	5519691PT	JSP 1/2 20	2987298
5/8	15.88	14	0.083	2.11	0.459	11.66	JSP 625 14	5519692	JSP 5/8 14	2986894
5/8	15.88	16	0.065	1.65	0.495	12.57	JSP 625 16	5519693	JSP 5/8 16	2986895
5/8	15.88	18	0.049	1.24	0.527	13.39	JSP 625 18	5518868	JSP 5/8 18	2986771
5/8	15.88	20	0.035	0.88	0.555	14.10	JSP 625 20	5519694	JSP 5/8 20	2987182
3/4	19.05	14	0.083	2.11	0.585	14.86	JSP 750 14	5519695	JSP 3/4 14	2986896
3/4	19.05	16	0.065	1.65	0.620	15.75	JSP 750 16	5519696	JSP 3/4 16	2986897
3/4	19.05	18	0.049	1.24	0.652	16.56	JSP 750 18	5518804	JSP 3/4 18	2986364
3/4	19.05	20	0.035	0.88	0.680	17.27	JSP 750 20	5519697	JSP 3/4 20	2986769
7/8	22.22	14	0.083	2.11	0.709	18.01	JSP 875 14	5519698	JSP 7/8 14	2986898
7/8	22.22	16	0.065	1.65	0.745	18.92	JSP 875 16	5519699	JSP 7/8 16	2986899
7/8	22.22	18	0.049	1.24	0.777	19.74	JSP 875 18	5519071	JSP 7/8 18	2986900
7/8	22.22	20	0.035	0.88	0.805	20.45	JSP 875 20	5518700	JSP 7/8 20	2987534
1	25.40	14	0.083	2.11	0.834	21.18	JSP 1000 14	5519701	JSP 1 14	2986901
1	25.40	16	0.065	1.65	0.870	22.10	JSP 1000 16	5519702	JSP 1 16	2986902
1	25.40	18	0.049	1.24	0.902	22.91	JSP 1000 18	5519072	JSP 1 18	2986903
1	25.40	20	0.035	0.88	0.930	23.62	JSP 1000 20	5519703	JSP 1 20	2987209
1	25.40	22-24	0.028-0.022	0.71-0.55	0.944-0.956	23.98-24.30	JSP 1000 22 24	5519926	JSP 1 22 24	2988730
1-1/2	38.10	14	0.083	2.11	1.334	33.88	JSP 1500 14	5526266PT	JSP 1 1/2 14	2989292

Additional sizes are available. Contact technical service for details.

Boiler Expanders

Boiler Expanders

Tube expanding is the art of cold working the ends of tubes into intimate contact with the metal of the containing tube holes to form a leak proof mechanical seal and/or joint. In other words, it is a mechanical method of establishing a mechanical joint between a tube and a tube hole.

Boiler expanders do not include a mandrel when ordered because its possible to obtain them with three different types of mandrels depending on the application.

Header Mandrel – This is the longest mandrel that incorporates an extension that allows you to reach through manifolds or header boxes.

Drum Mandrel – This mandrel is used when you are expanding inside the boiler drum and can get to the tube at the end.

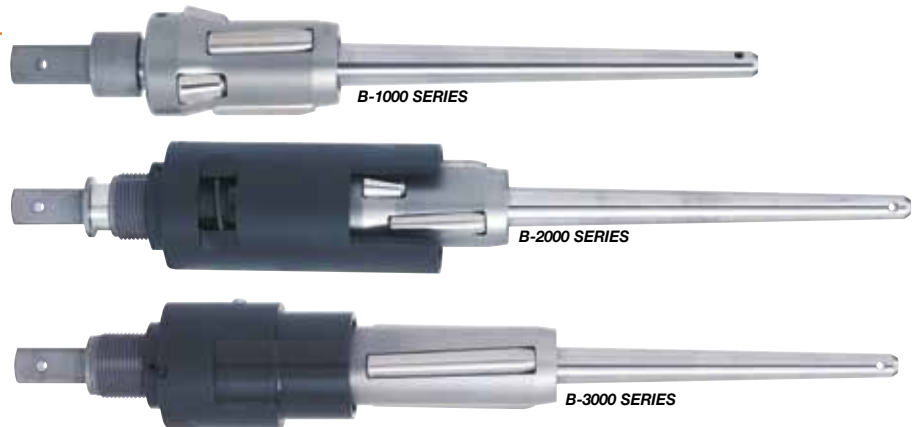
Short Series Mandrel Sets – There are times when the space inside a boiler drum will not allow use of the longer header or drum mandrels. Short series mandrel sets solve this problem by allowing you to expand the tube in multiple steps when space is limited. If you were to take the tapered portion of a header or drum mandrel, cut it in several pieces and add a drive to each section, you would have a short series mandrel set.

Rolls – A set of tapered cylindrical parts which are driven by mandrel and contact the tube wall to be expanded. The taper on the rolls is in the reverse direction and one-half the taper of the mandrel if it is a parallel roll expander.

Flare or Bell Rolls – This type roll is added to the back of the cage on boiler or furnace expanders to flare the tube end after it has been expanded.

Cage – This is the expander body or housing since it holds the mandrel and rolls in place. The slots which contain the rolls also provide a feed angle which helps pull the mandrel in to provide expansion of the rolls.

Thrust Assembly – This assembly attaches to the cage and allows adjustment of the expanding depth. The thrust collar will remain stationary against the tube sheet or tube end while the cage, mandrel and rolls expand the tube. A thrust assembly is used on condenser/heat exchanger expanders, some furnace expanders and special boiler expanders.



When selecting a boiler expander, you must know:

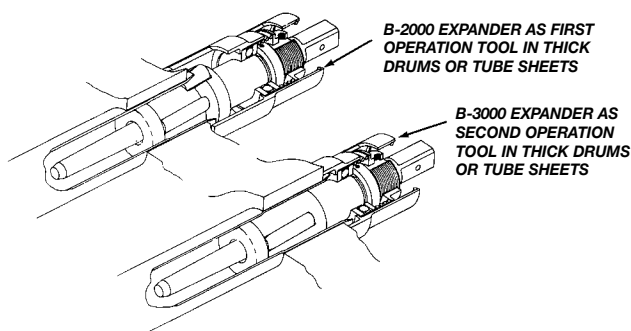
- Tube O.D.
- Tube wall thickness or BWG
- Tube sheet or drum thickness
- Minimum straight section at end of tube
- Drum diameter if less than 18"

This information will allow you to select the proper type boiler expander and mandrels.

B-1000 Series Boiler Expanders - The B-1000 series expanders incorporate tube expanding and tube flaring into one tool. They are used when torque control is not desired or where space is limited such as in a small diameter header. Both expanding and flaring rolls are self contained in the cage. The B-1000 series expanders are available for 1 – 4-1/2" O.D. tubes and can accommodate tube sheet thicknesses from 1/2 – 2-3/4". Short series mandrels are also available. A B-1000 series expander can be converted to a B-2000 series by simply adding the thrust mechanism.

B-2000 Series Boiler Expanders - The B-2000 series expanders are the same basic expander as the B-1000 series except that they have an exclusive drift thrust assembly that makes torque control possible. The thrust assembly is adjustable and allows accurate positioning of the expander in the tube in relation to the drum for consistent joint expansion on every tube. The B-2000 series expanders are available for 1 – 4-1/4" O.D. tubes and can accommodate tube sheet thicknesses from 1/2 - 2-3/4".

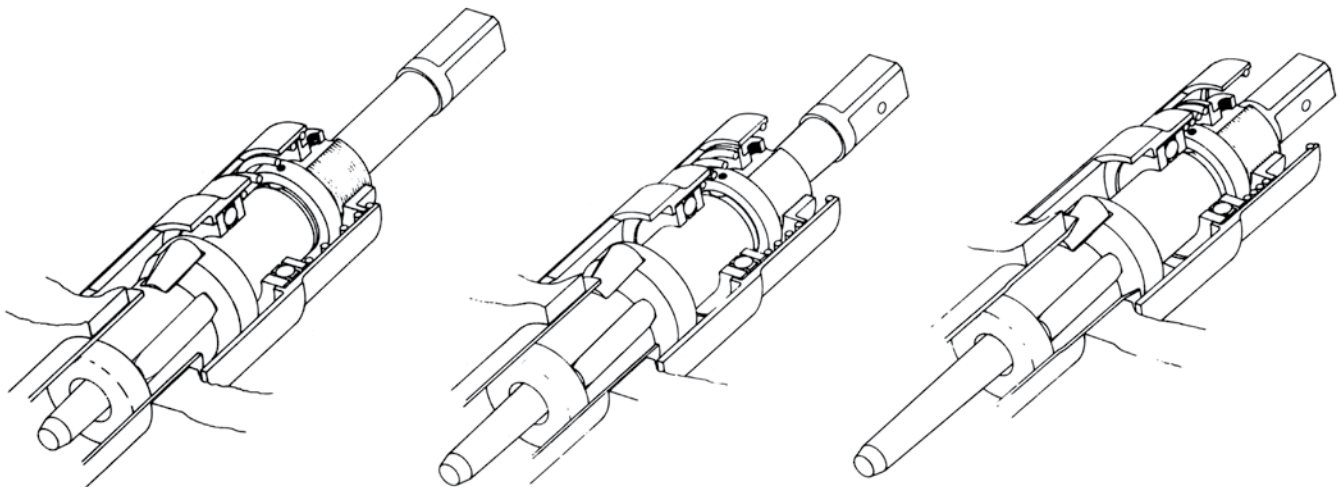
B-3000 Series Boiler Expanders - Straight roll expander for non-flare fire tube boiler applications. It can be used in conjunction with Airetool B-1000 or B-2000 flare type expanders in thicker tube sheet applications. The B-3000 expanders are available for 1-1/4 – 4-1/4" O.D. tubes and can accommodate drums up to 5-3/8" thick.



B-2000 Operation

Boiler Tube Expanders B-2000 Series Patented Thrusts Assembly

- Airetool B-2000 Series boiler tube expander with its exclusive drift thrust assembly represents a major advancement in boiler tube expanding. Using a ball bearing, spring loaded drift thrust collar, the B-2000 Series expanders can be accurately positioned in the boiler tube in relation to the drum for consistent joint expansion.
- In operation, the initial positioning of the expander in the tube allows the self-feed rolls to draw the expander into the tube and to engage the flaring rolls at the proper point during the operation. The use of either an electric or air driven torque controlled rolling motor with the B-2000 Series expanders produces more uniform flares and very precise tube wall reduction.
- Accomplishes three unique functions in one operation



First

The unique depth adjustable ball bearing drift thrust collar enables the B-2000 Series expander to be positioned into the tube at exactly the same setting every time. Once set, the mandrel is inserted in the expander causing the rolls to be forced outward into contact with the tube I.D., starting the rolling process.

Second

As the mandrel is rotated, the initial rolling of the straight section takes place. As the mandrel rotation is continued, the drift thrust collar stops the expander at its final operating depth in the tube. During this phase the flaring rolls have also moved into their final depth position.

Third

Continued mandrel rotation now will allow the straight rolled area to be finished. At this point the amount of torque required is greatly increased. The torque mechanism in the motor measures the torque and when the set torque is reached the motor automatically shuts off. During this phase the expander being held in place by the thrust collar allows the flare rolls to iron out the end of the tube to a smooth and precisely located flare. After shut-off, reversing the motor will back the expander out of the finished tube while at the same time resetting it for the next tube.

B-1000 Series Boiler Expanders

(Mandrels Sold Separately)

B-1000 Series Boiler Expanders (Mandrels Sold Separately)

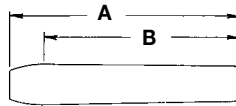
- Tube expanding & tube flaring in one tool combines operations
- Used when torque control is not desired or when space is limited
- Self contained rolls keep tool components together
- Convertible to B-2000 series



B-1000 Series: x = Tube Sheet Thickness

Refer to the Expander Table: Replace the X with the appropriate number

X	Tube Sheet Thickness		"A" Dimension		"B" Dimension	
	in.	mm	in.	mm	in.	mm
3	1/2 - 3/4	12.7 - 19.05	1-7/16	36.5	1-1/16	26.9
5	7/8 - 1-1/4	22.2 - 31.7	1-15/16	49.2	1-9/16	39.6
7	1-3/8 - 1-3/4	34.9 - 44.4	2-7/16	61.9	2-1/16	52.3
9	1-7/8 - 2-1/4	47.6 - 57.1	2-15/16	74.6	2-9/16	65.0
11	2-3/8 - 2-3/4	60.3 - 69.8	3-7/16	87.3	3-1/16	77.7



SHORT SERIES MANDRELS

Expander Number*	Tube Size				Expander							
	O.D.	Gauge	O.D.	Gauge	Expansion Range		Straight Roll Set*	Complete Roll Set*	Mandrel Options			
					in.	mm			Long Mandrel Set*		Square Drive	Short Mandrel **
								Number	Length			
B-1079-x	1	13-14			0.787-0.921	20.0-23.4	079-x-RS	079-x-FS	83-MP	9-13/32"	1/2	-----
B-1083-x	1	15-16			0.827-0.961	21.0-24.4	083-x-RS	083-x-FS	83-MP	9-13/32"	1/2	-----
B-1087-x	1-1/4	7			0.866-1.004	22.0-25.5	087-x-RS	087-x-FS	91-MP	9-13/32"	1/2	-----
B-1091-x	1-1/4	8-9			0.906-1.043	23.0-26.5	095-x-RS	095-x-FS	91-MP	9-13/32"	1/2	-----
B-1095-x	1-1/4	10			0.945-1.105	24.0-28.1	095-x-RS	095-x-FS	99-MP	10-1/16"	1/2	-----
B-1099-x	1-1/4	11-13			0.984-1.142	25.0-29.0	099-x-RS	099-x-FS	99-MP	10-1/16"	1/2	-----
B-1103-x	1-1/4	14-15			1.024-1.181	26.0-30.0	103-x-RS	103-x-FS	99-MP	10-1/16"	1/2	-----
B-1111-x	1-1/4	16			1.105-1.299	28.1-33.0	111-x-RS	111-x-FS	118-MP	11-11/16"	3/4	MPS-1,2,3
B-1118-x	1-1/2	10-12			1.221-1.378	31.0-35.0	118-x-RS	118-x-FS	118-MP	11-11/16"	3/4	MPS-1,2,3
B-1126-x	1-1/2	13-16			1.300-1.496	33.0-38.0	126-x-RS	126-x-FS	126-MP	12-15/64"	3/4	MPS-2,3,4
B-1134-x	1-3/4	8-9	2	3	1.379-1.575	35.0-40.0	126-x-RS	126-x-FS	134-MP	12-23/32"	3/4	MPS-2,3,4
B-1142-x	1-3/4	10-12	2	4-5	1.457-1.673	37.0-42.5	142-x-RS	142-x-FS	150-MP	12-27/32"	3/4	MPS-3,4,5
B-1150-x	1-3/4	13-16	2	6	1.536-1.752	39.0-44.5	150-x-RS	150-x-FS	150-MP	12-27/32"	3/4	MPS-3,4,5
B-1158-x	2	7-9	2-1/4	3	1.615-1.850	41.0-47.0	158-x-RS	158-x-FS	174-MP	13-27/32"	3/4	MPS-4,5,6,7,8
B-1166-x	2	10-12	2-1/4	4-5	1.693-1.929	43.0-49.0	166-x-RS	166-x-FS	174-MP	13-27/32"	3/4	MPS-4,5,6,7,8
B-1174-x	2	13-16	2-1/4	6	1.722-2.027	45.0-51.5	174-x-RS	174-x-FS	174-MP	13-27/32"	3/4	MPS-4,5,6,7,8
B-1181-x	2	16	2-1/2	3	1.851-2.126	47.0-54.0	181-x-RS	181-x-FS	197-MP	16-15/64"	1	MPS-7,8,9,10,11
B-1189-x	2-1/4	10-13	2-1/2	4-5	1.930-2.205	49.0-56.0	174-x-RS	174-x-FS	197-MP	16-15/64"	1	MPS-7,8,9,10,11
B-1197-x	2-1/4	14-16	2-1/2	6	2.009-2.362	51.0-60.0	205-x-RS	205-x-FS	197-MP	16-15/64"	1	MPS-6,7,8,9,10,11
B-1205-x	2-1/2	7-10			2.087-2.441	53.0-62.0	205-x-RS	205-x-FS	221-MP	16-15/64"	1	MPS-7,8,9,10,11,12
B-1213-x	2-1/2	11-13	3	2	2.116-2.520	55.0-64.0	213-x-RS	213-x-FS	221-MP	16-15/64"	1	MPS-7,8,9,10,11,12
B-1221-x	2-1/2	14-16			2.245-2.598	57.0-66.0	221-x-RS	221-x-FS	221-MP	16-15/64"	1	MPS-7,8,9,10,11,12
B-1229-x	2-3/4	7-9			2.323-2.677	59.0-68.0	221-x-RS	221-x-FS	244-MP	16-3/8"	1	MPS-8,9,10,11,12,13
B-1237-x	2-3/4	10-12			2.402-2.756	61.0-70.0	237-x-RS	237-x-FS	244-MP	16-3/8"	1	MPS-8,9,10,11,12,13
B-1244-x	2-3/4	13-16			2.481-2.835	63.0-72.0	252-x-RS	252-x-FS	244-MP	16-3/8"	1	MPS-8,9,10,11,12,13
B-1252-x	3	7-8			2.560-2.913	65.0-74.0	252-x-RS	252-x-FS	268-MP	15-25/32"	1	MPS-10,11,12,13,14
B-1260-x	3	10-12			2.638-2.992	67.-076.0	260-x-RS	260-x-FS	268-MP	15-25/32"	1	MPS-10,11,12,13,14
B-1268-x	3	13-14			2.717-3.071	69.0-78.0	268-x-RS	268-x-FS	268-MP	15-25/32"	1	MPS-10,11,12,13,14
B-1276-x	3	15-16			2.796-3.150	71.0-80.0	276-x-RS	276-x-FS	300-MP	16-1/4"	1	MPS-12,13,14,15,16
B-1284-x	3-1/4	7-11			2.874-3.228	73.0-82.0	284-x-RS	284-x-FS	300-MP	16-1/4"	1	MPS-12,13,14,15,16
B-1292-x	3-1/4	12-14			2.953-3.307	75.0-84.0	292-x-RS	292-x-FS	300-MP	16-1/4"	1	MPS-12,13,14,15,16
B-1300-x	3-1/4	15-16	3-1/2	7-9	3.032-3.386	77.0-86.0	315-x-RS	315-x-FS	300-MP	16-1/4"	1	MPS-12,13,14,15,16
B-1308-x	3-1/2	10-12			3.111-3.465	79.0-88.0	284-x-RS	284-x-FS	347-MP	18-7/32"	1	MPS-15,16,17,18,19
B-1315-x	3-1/2	13-15			3.190-3.622	81.0-92.0	315-x-RS	315-x-FS	347-MP	18-7/32"	1	MPS-14,15,16,17,18,19
B-1323-x	3-1/2	16	3-3/4	7-8	3.268-3.701	83.0-94.0	323-x-RS	323-x-FS	347-MP	18-7/32"	1	MPS-14,15,16,17,18,19
B-1331-x	3-3/4	9-12			3.347-3.780	95.0-96.0	331-x-RS	331-x-FS	347-MP	18-7/32"	1	MPS-14,15,16,17,18,19
B-1339-x	3-3/4	13-16			3.426-3.858	87.0-98.0	355-x-RS	355-x-FS	347-MP	18-7/32"	1	MPS-14,15,16,17,18,19
B-1347-x	4	7-8			3.505-3.937	89.0-100.0	363-x-RS	363-x-FS	347-MP	18-7/32"	1	MPS-14,15,16,17,18,19
B-1355-x	4	9-12			3.583-4.016	91.0-102.0	355-x-RS	355-x-FS	394-MP	18-17/64"	1	MPS-17,18,19,20,21
B-1363-x	4	13-15			3.662-4.094	93.0-104.0	363-x-RS	363-x-FS	394-MP	18-17/64"	1	MPS-17,18,19,20,21
B-1370-x	4	16	4-1/4	7-8	3.741-4.173	95.0-106.0	370-x-RS	370-x-FS	394-MP	18-17/64"	1	MPS-17,18,19,20,21
B-1378-x	4-1/4	9-11			3.820-4.252	97.0-108.0	378-x-RS	378-x-FS	394-MP	18-17/64"	1	MPS-17,18,19,20,21
B-1386-x	4-1/4	12-16			3.898-4.331	99.0-110.0	386-x-RS	386-x-FS	394-MP	18-17/64"	1	MPS-17,18,19,20,21
B-1394-x	4-1/2	7-14			3.997-4.407	101.5-111.9	394-x-RS	394-x-FS	394-MP	18-17/64"	1	MPS-17,18,19,20,21

*x Signifies tube sheet thickness

** Note: Short Mandrel lengths: MPS-1 thru MPS-10 = 7" (177.8mm), MPS-11 thru MPS-16 = 8" (203.2mm), MPS-17 thru MPS-21 = 9" (228.1mm)

B-3000 Series Boiler Expanders

(Mandrels Sold Separately)

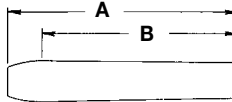
B-3000 Series Boiler Expanders (Mandrels Sold Separately)

- Straight roll expander for non-flare tube rolling
- Use in conjunction with B-1000 & B-2000 expanders for thicker tube sheet applications
- Convertible to B-2000 series



B-3000 Series: x = Tube Sheet Thickness
Refer to the Expander Table: Replace the X with the appropriate number

X	Tube Sheet Thickness		"A" Dimension		"B" Dimension	
	in.	mm	in.	mm	in.	mm
7	1/2 - 4-3/8	12.7 - 111.1	2-7/16	61.9	2-1/16	52.3
11	1-1/2 - 5-3/8	38.1 - 136.5	3-7/16	87.3	3-1/16	77.7



SHORT SERIES MANDRELS

Expander Number*	Tube Size				Expander						
	O.D.	Gauge	O.D.	Gauge	Expansion Range		Straight Roll Set*	Mandrel Options			
					in.	mm		Long Mandrel		Square Drive	Short Mandrels **
								Number	Length		
B-3111-7	1-1/4	16			1.105-1.299	28.1-33.0	111-x-RS	118-M	15-27/32"	3/4	MS-1,2,3
B-3118-7	1-1/2	10-12			1.221-1.378	31.0-35.0	118-x-RS	118-M	15-27/32"	3/4	MS-1,2,3
B-3126-7	1-1/2	13-16			1.300-1.496	33.0-38.0	126-x-RS	126-M	16-31/64"	3/4	MS-2,3,4
B-3134-x	1-3/4	8-9	2	3	1.379-1.575	35.0-40.0	126-x-RS	134-M	16-31/64"	3/4	MS-2,3,4
B-3142-x	1-3/4	10-12	2	4-5	1.457-1.673	37.0-42.5	142-x-RS	150-M	17-3/32"	3/4	MS-3,4,5
B-3150-x	1-3/4	13-16	2	6	1.536-1.752	39.0-44.5	150-x-RS	150-M	17-3/32"	3/4	MS-3,4,5
B-3158-x	2	7-9	2-1/4	3	1.615-1.850	41.0-47.0	158-x-RS	174-M	18-3/32"	3/4	MS-4,5,6,7,8
B-3166-x	2	10-12	2-1/4	4-5	1.693-1.929	43.0-49.0	166-x-RS	174-M	18-3/32"	3/4	MS-4,5,6,7,8
B-3174-x	2	13-16	2-1/4	6	1.722-2.027	45.0-51.5	174-x-RS	174-M	18-3/32"	3/4	MS-4,5,6,7,8
B-3181-x	2	16	2-1/2	3	1.851-2.126	47.0-54.0	181-x-RS	197-M	20-15/32"	1	MS-7,8,9,10,11
B-3189-x	2-1/4	10-13	2-1/2	4-5	1.930-2.205	49.0-56.0	174-x-RS	197-M	20-15/32"	1	MS-7,8,9,10,11
B-3197-x	2-1/4	14-16	2-1/2	6	2.009-2.362	51.0-60.0	205-x-RS	197-M	20-15/32"	1	MS-6,7,8,9,10,11
B-3205-x	2-1/2	7-10			2.087-2.441	53.0-62.0	205-x-RS	221-M	20-21/32"	1	MS-7,8,9,10,11,12
B-3213-x	2-1/2	11-13	3	2	2.116-2.520	55.0-64.0	213-x-RS	221-M	20-21/32"	1	MS-7,8,9,10,11,12
B-3221-x	2-1/2	14-16			2.245-2.598	57.0-66.0	221-x-RS	221-M	20-21/32"	1	MS-7,8,9,10,11,12
B-3229-x	2-3/4	7-9			2.323-2.677	59.0-68.0	221-x-RS	244-M	20-1/2"	1	MS-8,9,10,11,12,13
B-3237-x	2-3/4	10-12			2.402-2.756	61.0-70.0	237-x-RS	244-M	20-1/2"	1	MS-8,9,10,11,12,13
B-3244-x	2-3/4	13-16			2.481-2.835	63.0-72.0	252-x-RS	244-M	20-1/2"	1	MS-8,9,10,11,12,13
B-3252-x	3	7-8			2.560-2.913	65.0-74.0	252-x-RS	268-M	20-1/64"	1	MS-10,11,12,13,14
B-3260-x	3	10-12			2.638-2.992	67.-076.0	260-x-RS	268-M	20-1/64"	1	MS-10,11,12,13,14
B-3268-x	3	13-14			2.717-3.071	69.0-78.0	268-x-RS	268-M	20-1/64"	1	MS-10,11,12,13,14
B-3276-x	3	15-16			2.796-3.150	71.0-80.0	276-x-RS	300-M	20-1/2"	1	MS-12,13,14,15,16
B-3284-x	3-1/4	7-11			2.874-3.228	73.0-82.0	284-x-RS	300-M	20-1/2"	1	MS-12,13,14,15,16
B-3292-x	3-1/4	12-14			2.953-3.307	75.0-84.0	292-x-RS	300-M	20-1/2"	1	MS-12,13,14,15,16
B-3300-x	3-1/4	15-16	3-1/2	7-9	3.032-3.386	77.0-86.0	315-x-RS	300-M	20-1/2"	1	MS-12,13,14,15,16
B-3308-x	3-1/2	10-12			3.111-3.465	79.0-88.0	284-x-RS	347-M	22-15/32"	1	MS-15,16,17,18,19
B-3315-x	3-1/2	13-15			3.190-3.622	81.0-92.0	315-x-RS	347-M	22-15/32"	1	MS-14,15,16,17,18,19
B-3323-x	3-1/2	16	3-3/4	7-8	3.268-3.701	83.0-94.0	323-x-RS	347-M	22-15/32"	1	MS-14,15,16,17,18,19
B-3331-x	3-3/4	9-12			3.347-3.780	95.0-96.0	331-x-RS	347-M	22-15/32"	1	MS-14,15,16,17,18,19
B-3339-x	3-3/4	13-16			3.426-3.858	87.0-98.0	355-x-RS	347-M	22-15/32"	1	MS-14,15,16,17,18,19
B-3347-x	4	7-8			3.505-3.937	89.0-100.0	363-x-RS	347-M	22-15/32"	1	MS-14,15,16,17,18,19
B-3355-x	4	9-12			3.583-4.016	91.0-102.0	355-x-RS	394-M	22-33/64"	1	MS-17,18,19,20,21
B-3363-x	4	13-15			3.662-4.094	93.0-104.0	363-x-RS	394-M	22-33/64"	1	MS-17,18,19,20,21
B-3370-x	4	16	4-1/4	7-8	3.741-4.173	95.0-106.0	370-x-RS	394-M	22-33/64"	1	MS-17,18,19,20,21
B-3378-x	4-1/4	9-11			3.820-4.252	97.0-108.0	378-x-RS	394-M	22-33/64"	1	MS-17,18,19,20,21
B-3386-x	4-1/4	12-16			3.898-4.331	99.0-110.0	386-x-RS	394-M	22-33/64"	1	MS-17,18,19,20,21
B-3394-x	4-1/2	7-14			3.997-4.407	101.5-111.9	394-x-RS	394-M	22-33/64"	1	MS-17,18,19,20,21

*x Signifies tube sheet thickness

** Note: Short Mandrel lengths: MPS-1 thru MPS-10 = 7" (177.8mm), MPS-11 thru MPS-16 = 8" (203.2mm), MPS-17 thru MPS-21 = 9" (228.1mm)

Boiler Expanders

B-1000 & B-2000 Series Boiler Expanders Material Descriptions & Ordering Numbers

Material Description	Material Number	Material Description	Material Number	Material Description	Material Number	Material Description	Material Number	Material Description	Material Number
B-1079-3	5522190	B-1150-3	5522796	B-1244-3		B-1339-3		B-2095-3	
B-1079-5		B-1150-5	5522197	B-1244-5		B-1339-5		B-2095-5	5521961
B-1079-7		B-1150-7	5521883	B-1244-7	5522181	B-1339-7		B-2095-7	
B-1079-9		B-1150-9	5521888	B-1244-9	5522842	B-1339-9		B-2095-9	
B-1079-11		B-1150-11	5521862	B-1244-11	5521952	B-1339-11	5522540	B-2095-11	
B-1083-3		B-1158-3	5521933PT	B-1252-3	5521953	B-1347-3	5526391	B-2099-3	
B-1083-5	5523808	B-1158-5	5521934	B-1252-5	5522327	B-1347-5		B-2099-5	
B-1083-7		B-1158-7	5521935	B-1252-7	5522477	B-1347-7	5522180	B-2099-7	
B-1083-9		B-1158-9	5521845	B-1252-9	5521954	B-1347-9		B-2099-9	
B-1083-11		B-1158-11	5521910	B-1252-11	5522320PT	B-1347-11	5523722	B-2099-11	
B-1087-3	5523735	B-1166-3	5521936	B-1260-3	5521955	B-1355-3		B-2103-3	
B-1087-5	5525513	B-1166-5	5521937	B-1260-5	5522094	B-1355-5		B-2103-5	5522411
B-1087-7		B-1166-7	5521938	B-1260-7	5522095	B-1355-7	5525944	B-2103-7	
B-1087-9		B-1166-9	5521939	B-1260-9	5522096	B-1355-9	5524221	B-2103-9	
B-1087-11		B-1166-11	5521940	B-1260-11	5522097	B-1355-11		B-2103-11	
B-1091-3		B-1174-3	5521941	B-1268-3		B-1363-3	5522062	B-2111-3	
B-1091-5		B-1174-5	5521942PT	B-1268-5	5521957	B-1363-5		B-2111-5	
B-1091-7		B-1174-7	5521943	B-1268-7		B-1363-7		B-2111-7	
B-1091-9		B-1174-9	5521944	B-1268-9		B-1363-9		B-2111-9	
B-1091-11		B-1174-11	5521945	B-1268-11		B-1363-11		B-2111-11	
B-1095-3		B-1181-3	5522017	B-1276-3	5523191	B-1370-3		B-2118-3	5521963
B-1095-5	5521927	B-1181-5	5522149	B-1276-5	5523270	B-1370-5		B-2118-5	
B-1095-7		B-1181-7	5522868	B-1276-7	5524555	B-1370-7		B-2118-7	
B-1095-9		B-1181-9	5522783	B-1276-9		B-1370-9		B-2118-9	
B-1095-11		B-1181-11	5522205PT	B-1276-11		B-1370-11		B-2118-11	
B-1099-3		B-1189-3	5525255	B-1284-3	5522173	B-1378-3		B-2126-3	5525355PT
B-1099-5	5525463	B-1189-5	5522393	B-1284-5	5521958	B-1378-5		B-2126-5	
B-1099-7	5525386	B-1189-7	5522179	B-1284-7		B-1378-7		B-2126-7	5524532PT
B-1099-9		B-1189-9	5522782	B-1284-9		B-1378-9		B-2126-9	
B-1099-11		B-1189-11	5523948	B-1284-11	5525545	B-1378-11		B-2126-11	
B-1103-3	5525904	B-1197-3	5525999	B-1292-3		B-1386-3		B-2134-3	
B-1103-5		B-1197-5		B-1292-5		B-1386-5		B-2134-5	
B-1103-7		B-1197-7	5522178	B-1292-7		B-1386-7		B-2134-7	5523729
B-1103-9		B-1197-9		B-1292-9	5525084	B-1386-9		B-2134-9	
B-1103-11		B-1197-11	5522223	B-1292-11		B-1386-11		B-2134-11	
B-1111-3	5522195	B-1205-3	5522426	B-1300-3		B-1394-3	5525605	B-2142-3	
B-1111-5	5521928	B-1205-5	5521946	B-1300-5	5523696PT	B-1394-5	5526042	B-2142-5	5523064
B-1111-7	5522147	B-1205-7	5521947	B-1300-7		B-1394-7		B-2142-7	5522063
B-1111-9	5526051	B-1205-9	5521948	B-1300-9		B-1394-9	5524597	B-2142-9	5521965
B-1111-11		B-1205-11	5521949	B-1300-11		B-1394-11	5525385	B-2142-11	5521966
B-1118-3	5521929	B-1213-3	5521950	B-1308-3	5523571	B-2079-3		B-2150-3	
B-1118-5	5522360	B-1213-5	5521951PT	B-1308-5	5524747	B-2079-5		B-2150-5	5522167
B-1118-7		B-1213-7	5522175	B-1308-7		B-2079-7		B-2150-7	5521967
B-1118-9		B-1213-9	5522146	B-1308-9		B-2079-9		B-2150-9	5521968
B-1118-11		B-1213-11	5522092	B-1308-11	5523694	B-2079-11		B-2150-11	5521902
B-1126-3	5522795	B-1221-3	5521889	B-1315-3		B-2083-3		B-2158-3	
B-1126-5		B-1221-5	5522313	B-1315-5		B-2083-5		B-2158-5	5521971
B-1126-7	5522204	B-1221-7		B-1315-7		B-2083-7		B-2158-7	5521972
B-1126-9		B-1221-9		B-1315-9		B-2083-9		B-2158-9	5521973
B-1126-11		B-1221-11		B-1315-11		B-2083-11		B-2158-11	5521974
B-1134-3	5526046	B-1229-3	5526082	B-1323-3		B-2087-3		B-2166-3	5521975PT
B-1134-5	5521930	B-1229-5		B-1323-5		B-2087-5		B-2166-5	5521897
B-1134-7	5524036	B-1229-7		B-1323-7	5525891	B-2087-7		B-2166-7	5521977
B-1134-9	5521846	B-1229-9		B-1323-9		B-2087-9		B-2166-9	5521978
B-1134-11		B-1229-11		B-1323-11		B-2087-11		B-2166-11	5521979
B-1142-3	5522196	B-1237-3		B-1331-3		B-2091-3		B-2174-3	5521892
B-1142-5	5522391	B-1237-5	5526020	B-1331-5		B-2091-5		B-2174-5	5521981
B-1142-7	5522423	B-1237-7		B-1331-7		B-2091-7		B-2174-7	5521982
B-1142-9	5521931	B-1237-9		B-1331-9		B-2091-9		B-2174-9	5521983
B-1142-11	5521932	B-1237-11	5523711	B-1331-11	5525198	B-2091-11		B-2174-11	5521984

B-2000, B-3000 Series Boiler Expanders & Mandrel Material Descriptions & Ordering Numbers

Material Description	Material Number	Material Description	Material Number	Material Description	Material Number	Material Description	Material Number	Material Description	Material Number
B-2181-3		B-2276-3		B-2370-3		B-3276-11	5523194	83-M	
B-2181-5		B-2276-5	5523087	B-2370-5		B-3284-7	5523026	91-M	2995063
B-2181-7		B-2276-7		B-2370-7		B-3284-11		99-M	2995057
B-2181-9	5523784	B-2276-9		B-2370-9		B-3292-7	5524448	118-M	2993819
B-2181-11	5523785	B-2276-11		B-2370-11		B-3292-11		126-M	2993820
B-2189-3	5522452	B-2284-3		B-2378-3		B-3300-7	5526349	134-M	2902805
B-2189-5		B-2284-5		B-2378-5		B-3300-11		150-M	2993821
B-2189-7		B-2284-7		B-2378-7		B-3308-7		174-M	2993545
B-2189-9		B-2284-9	5525237	B-2378-9		B-3308-11		197-M	2994636
B-2189-11		B-2284-11		B-2378-11		B-3315-7	5523710	221-M	2993822
B-2197-3	5525873	B-2292-3		B-2386-3		B-3315-11		244-M	2993823
B-2197-5		B-2292-5		B-2386-5		B-3323-7	5523763	268-M	2993824
B-2197-7		B-2292-7		B-2386-7		B-3323-11		300-M	2994303
B-2197-9		B-2292-9		B-2386-9		B-3331-7	5523220	347-M	2994235
B-2197-11		B-2292-11		B-2386-11		B-3331-11	5525197	394-M	2994208
B-2205-3		B-2300-3		B-2394-3	5526218	B-3339-7			
B-2205-5		B-2300-5		B-2394-5		B-3339-11	5522269		
B-2205-7	5521986	B-2300-7		B-2394-7		B-3347-7	5522319	83-MP	2993831
B-2205-9	5521987	B-2300-9		B-2394-9		B-3347-11	5523311PT	91-MP	2995080
B-2205-11	5521988	B-2300-11		B-2394-11	5525608	B-3355-7	5524218	99-MP	2993832
B-2213-3	5521989	B-2308-3	5525607	B-3111-7	5522000	B-3355-11		118-MP	2993833
B-2213-5	5521990	B-2308-5		B-3118-7	5522001	B-3363-7	5522111	126-MP	2994714
B-2213-7	5522498	B-2308-7		B-3126-7	5522002PT	B-3363-11		134-MP	2994065
B-2213-9	5522499	B-2308-9		B-3134-7	5522206	B-3370-7	5522020	150-MP	2993834
B-2213-11	5522200	B-2308-11	5526011	B-3134-11		B-3370-11		174-MP	2993835
B-2221-3	5521991	B-2315-3		B-3142-7	5522003	B-3378-7		197-MP	2994196
B-2221-5	5522812	B-2315-5		B-3142-11	5522004	B-3378-11	5526556PT	221-MP	293836
B-2221-7		B-2315-7		B-3150-7	5522005	B-3386-7		244-MP	2993837
B-2221-9		B-2315-9		B-3150-11	5521861	B-3386-11		268-MP	2993838
B-2221-11		B-2315-11		B-3158-7	5522006	B-3394-7	5522427	300-MP	2994133
B-2229-3		B-2323-3	5525510	B-3158-11	5522007	B-3394-11	5524626	347-MP	2994675
B-2229-5		B-2323-5	5525498	B-3166-7	5522008			394-MP	2994321
B-2229-7		B-2323-7		B-3166-11	5522009				
B-2229-9	5525606	B-2323-9		B-3174-7	5521692				
B-2229-11		B-2323-11	5523775	B-3174-11	5522010			MPS-1	2994289
B-2237-3		B-2331-3		B-3181-7	5522918			MPS-2	2994290
B-2237-5		B-2331-5		B-3181-11				MPS-3	2994070
B-2237-7		B-2331-7	5525050	B-3189-7				MPS-4	2994071
B-2237-9		B-2331-9		B-3189-11	5523691			MPS-5	2994072
B-2237-11	5524444PT	B-2331-11		B-3197-7	5522318PT			MPS-6	2994073
B-2244-3		B-2339-3		B-3197-11	5522032			MPS-7	2994074
B-2244-5		B-2339-5		B-3205-7	5522011PT			MPS-8	2994075
B-2244-7		B-2339-7		B-3205-11	5522012			MPS-9	2994192
B-2244-9		B-2339-9		B-3213-7	5522260			MPS-10	2994193
B-2244-11	5521992	B-2339-11	5522544	B-3213-11	5522121			MPS-11	2994194
B-2252-3		B-2347-3		B-3221-7	5522098			MPS-12	2994293
B-2252-5		B-2347-5		B-3221-11	5522099			MPS-13	2994294
B-2252-7	5523089	B-2347-7	5523730	B-3229-7	5522869			MPS-14	2994295
B-2252-9	5521994	B-2347-9		B-3229-11	5525863			MPS-15	2994296
B-2252-11	5522293	B-2347-11	5522240	B-3237-7	5522013			MPS-16	2994297
B-2260-3	5521995	B-2355-3		B-3237-11	5522014			MPS-17	2994298
B-2260-5	5523357PT	B-2355-5		B-3244-7	5522787			MPS-18	2994299
B-2260-7	5524223	B-2355-7	5524219	B-3244-11	5522425			MPS-19	2994300
B-2260-9	5525158	B-2355-9		B-3252-7	5521893			MPS-20	2994301
B-2260-11	5522294	B-2355-11		B-3252-11	5522015			MPS-21	2994302
B-2268-3		B-2363-3		B-3260-7	5521894				
B-2268-5		B-2363-5		B-3260-11	5522292				
B-2268-7		B-2363-7		B-3268-7	5524157				
B-2268-9		B-2363-9		B-3268-11	5523193				
B-2268-11		B-2363-11		B-3276-7	5522407PT				

Boiler Expanders

Roll Set Material Descriptions & Ordering Numbers

Material Description	Material Number	Material Description	Material Number	Material Description	Material Number	Material Description	Material Number	Material Description	Material Number	Material Description	Material Number
079-3-FS		103-9-RS		158-7-FS	5522373	221-3-RS		276-11-FS	5525382PT	355-7-RS	5524220
079-3-RS	5523172	103-11-FS		158-7-RS	5522225	221-5-FS	5522054	276-11-RS	5525381	355-9-FS	5524222PT
079-5-FS	5525164	103-11-RS		158-9-FS	5521848	221-5-RS		284-3-FS	5523578	355-9-RS	
079-5-RS		111-3-FS		158-9-RS	5522519	221-7-FS	5522055	284-3-RS		355-11-FS	5523010PT
079-7-FS	5526561PT	111-3-RS		158-11-FS	5522048PT	221-7-RS	5523687	284-5-FS	5522873	355-11-RS	5523011
079-7-RS		111-5-FS	5522312PT	158-11-RS	5521911	221-9-FS		284-5-RS	5523246	363-3-FS	5526393
079-9-FS		111-5-RS		166-3-FS	5522348	221-9-RS		284-7-FS		363-3-RS	5526392
079-9-RS		111-7-FS	5524554	166-3-RS	5523155	221-11-FS	5522056	284-7-RS	5523415	363-5-FS	
079-11-FS		111-7-RS	5522493	166-5-FS	5522049	221-11-RS	5522150	284-9-FS		363-5-RS	
079-11-RS		111-9-FS		166-5-RS	5522064	237-3-FS	5523599	284-9-RS		363-7-FS	5522182
083-3-FS	5523046	111-9-RS		166-7-FS	5522027	237-3-RS		284-11-FS	5523695	363-7-RS	5523024
083-3-RS		111-11-FS		166-7-RS	5522531	237-5-FS	5526021	284-11-RS		363-9-FS	
083-5-FS		111-11-RS		166-9-FS	5522036	237-5-RS		292-3-FS		363-9-RS	
083-5-RS		118-3-FS	5522786	166-9-RS	5522779	237-7-FS	5523399	292-3-RS		363-11-FS	5523309
083-7-FS	5526562PT	118-3-RS	5526018	166-11-FS	5522037	237-7-RS	5523818	292-5-RS		363-11-RS	5523310
083-7-RS		118-5-FS	5522361	166-11-RS	5522126	237-9-FS	5522144	292-5-RS		370-3-FS	
083-9-FS		118-5-RS		174-3-FS	5523113	237-9-RS		292-7-FS		370-3-RS	
083-9-RS		118-7-FS	5522814	174-3-RS	5523950	237-11-FS	5522142	292-7-RS	5524449	370-5-FS	
083-11-FS		118-7-RS	5522828	174-5-FS	5522051	237-11-RS	5522141	292-9-FS		370-5-RS	
083-11-RS		118-9-FS		174-5-RS	5525683PT	252-3-FS	5524791	292-9-RS		370-7-FS	
087-3-FS		118-9-RS	5523453	174-7-FS	5522050	252-3-RS		292-11-FS		370-7-RS	5522441
087-3-RS		118-11-FS		174-7-RS	5522271	252-5-FS	5522328	292-11-RS		370-9-FS	
087-5-FS		118-11-RS		174-9-FS	5522270	252-5-RS		315-3-FS		370-9-RS	
087-5-RS		126-3-FS	5522792PT	174-9-RS	5522992	252-7-FS	5522183	315-3-RS		370-11-FS	
087-7-FS		126-3-RS	5525356	174-11-FS	5522052	252-7-RS	5522436	315-5-FS	5523697PT	370-11-RS	
087-7-RS		126-5-FS	5522876	174-11-RS	5523215	252-9-FS	5522848	315-5-RS		378-3-FS	
087-9-FS		126-5-RS		181-3-FS	5524738	252-9-RS	5524331	315-7-FS		378-3-RS	
087-9-RS		126-7-FS	5523731	181-3-RS		252-11-FS	5522038	315-7-RS	5523762	378-5-FS	
087-11-FS		126-7-RS	5522989	181-5-FS	5522369	252-11-RS	5522087	315-9-FS		378-5-RS	
087-11-RS		126-9-FS	5521849	181-5-RS		260-3-FS	5523152	315-9-RS		378-7-FS	
095-3-FS	5522322	126-9-RS	5525691	181-7-FS	5522164	260-3-RS		315-11-FS		378-7-RS	
095-3-RS		126-11-FS	5525168	181-7-RS	5522913	260-5-FS	5522057PT	315-11-RS		378-9-FS	
095-5-FS	5522412	126-11-RS	5524958PT	181-9-FS	5522849	260-5-RS		323-3-FS		378-9-RS	
095-5-RS		142-3-FS		181-9-RS		260-7-FS	5522058	323-3-RS		378-11-FS	
095-7-FS		142-3-RS		181-11-FS	5523786	260-7-RS	5522911	323-5-FS	5525499	378-11-RS	5526557PT
095-7-RS		142-5-FS	5522392	181-11-RS	5522850	260-9-FS	5522059	323-5-RS	5525500	386-3-FS	
095-9-FS		142-5-RS	5525911PT	205-3-FS	5522867	260-9-RS		323-7-FS		386-3-RS	
095-9-RS		142-7-FS	5522066PT	205-3-RS		260-11-FS	5522060	323-7-RS	5523764	386-5-FS	
095-11-FS		142-7-RS	5522065	205-5-FS	5522395	260-11-RS	5522481	323-9-FS		386-5-RS	
095-11-RS		142-9-FS	5521850	205-5-RS	5522529	268-3-FS		323-9-RS		386-7-FS	
099-3-FS		142-9-RS	5522947	205-7-FS	5522177	268-3-RS		323-11-FS	5523776	386-7-RS	
099-3-RS		142-11-FS	5522235	205-7-RS	5522317	268-5-FS	5522370	323-11-RS	5522031	386-9-FS	
099-5-FS	5526003	142-11-RS	5522028	205-9-FS	5522316	268-5-RS	5522895	331-3-FS	5522893	386-9-RS	
099-5-RS		150-3-FS	5522813	205-9-RS		268-7-FS	5525323	331-3-RS		386-11-FS	
099-7-FS		150-3-RS		205-11-FS	5522221	268-7-RS	5525876	331-5-FS		386-11-RS	
099-7-RS		150-5-FS	5522781	205-11-RS	5522033	268-9-FS		331-5-RS		394-3-FS	
099-9-FS		150-5-RS	5524531	213-3-FS	5522339	268-9-RS		331-7-FS		394-3-RS	5526219
099-9-RS		150-7-FS	5521884	213-3-RS	5523777	268-11-FS	5522061	331-7-RS	5523221	394-5-FS	5523360
099-11-FS		150-7-RS	5522086	213-5-FS	5522805	268-11-RS	5521976	331-9-FS		394-5-RS	
099-11-RS		150-9-FS	5521891	213-5-RS	5522530	276-3-FS	5524737	331-9-RS		394-7-FS	
103-3-FS		150-9-RS	5522518	213-7-FS	5522176	276-3-RS		331-11-FS	5525200	394-7-RS	
103-3-RS	5526024	150-11-FS	5521864	213-7-RS	5522315	276-5-FS	5523091	331-11-RS	5525199	394-9-FS	
103-5-FS	5522390	150-11-RS	5521863	213-9-FS	5522314	276-5-RS		355-3-FS		394-9-RS	
103-5-RS		158-3-FS	5522238	213-9-RS		276-7-FS	5523092PT	355-3-RS		394-11-FS	
103-7-FS		158-3-RS		213-11-FS	5522053	276-7-RS	5524323	355-5-FS	5522483	394-11-RS	
103-7-RS		158-5-FS	5522302	213-11-RS	5522155	276-9-FS		355-5-RS			
103-9-FS		158-5-RS	5523693	221-3-FS		276-9-RS		355-7-FS	5523090		

Boiler Expanders

FTE Series Firetube Boiler Tube Expanders

Airetool product engineers have designed an economical, yet durable Firetube boiler tube expander for non-flaring (FTE) applications with 3/8" to 1" thick tube sheets. This unique design increases the expansion range for a given expander and includes a metal roll retainer that keeps the rolls in the expander's cage when the mandrel is removed. Mandrels are sold separately with choices based on application and space limitations.

Available for 2", 2-1/2" and 3" O.D. Tubes with 10-14 gauge tube walls. The FTE Series are excellent tube expanders for expanding air heater tubes in power utility boilers.

- Flip collar accommodates different tube sheet thicknesses
- 3-roll design expands and seals tubes in round or oval tube sheet holes
- Increased expansion range means less inventory and lower operating costs
- Ball bearing thrust collar allows torque controlled tube rolling
- Short mandrels for use in limited space applications



FTE Series Expanders

Expander		Tube Size			Expansion Range w/ Drum Mandrel		Drum Mandrel		Mandrel Square		Mandrel Length	
Model No.	Order No.	in.	mm	Gauge	in.	mm	Model No.	Order No.	in.	mm	in.	mm
FTE 200	5523811	2	50.8	10-14	1.656 - 1.940	42.1 - 49.2	FTE-200-M	2997688	3/4	19.0	11.75	298.5
FTE 250	5523812	2-1/2	63.5	10-14	2.125 - 2.440	53.9 - 61.9	FTE-250-M	2997689	1	25.4	12.13	308.0
FTE 300	5523813	3	76.2	10-14	2.565 - 2.940	65.0 - 74.6	FTE-300-M	2997690	1	25.4	13.13	333.4

Short Mandrels for FTE Expanders

Expander		Expansion Range w/ Drum Mandrel	
Model No.	Order No.	in.	mm
FTE 200 SM1	2997994	1.656 - 1.780	42.1 - 45.2
FTE 200 SM2	2997995	1.730 - 1.854	44.0 - 47.1
FTE 200 SM3	2997996	1.820 - 1.940	46.3 - 49.2
FTE 250 SM1	2997997	2.125 - 2.265	53.9 - 57.5
FTE 250 SM2	2997998	2.205 - 2.353	56.0 - 59.7
FTE 250 SM3	2997999	2.290 - 2.440	58.2 - 62.0
FTE 300 SM1	2998000	2.565 - 2.730	65.1 - 69.3
FTE 300 SM2	2998001	2.660 - 2.835	67.6 - 72.0
FTE 300 SM3	2998002	2.770 - 2.940	70.3 - 74.6

FTE Replacement Roll Sets

Expander		Tube Size	
Model No.	Order No.	in.	mm
FTE-200-RS	5524570	2	50.8
FTE-250-RS	5524571	2-1/2	63.5
FTE-300-RS	5524572	3	76.2

FTF Series Firetube Boiler Flaring Tube Expanders

The FTF series expanders complement the FTE series boiler expanders but include tube flaring capabilities. This design incorporates a thrust collar for torque controlled tube rolling, roll retainers, and offset flare rolls.

Available in tube sizes of 2", 2-1/2" and 3" O.D. and 10-14 gauge wall thickness for tube sheets of 3/8" - 1" thick. Mandrels are sold separately with choices based on application and space limitations

- 3-roll design expands and seals tubes in round or oval tube sheet holes
- Offset flare rolls eliminate ridges produced by competitive models
- Metal roll retainers keep the rolls in tool when mandrel is removed
- Increased expansion range: Accommodates more tube sizes, reducing inventory cost
- Thrust collar: Provides uniform flared tube ends
- Short mandrel options for use in limited space applications



FTF Series Expanders

Expander		Tube Size			Tube Sheet Thickness		Expansion Range w/ Drum Mandrel		Drum Mandrel		Mandrel Square		Mandrel Length	
Model No.	Order No.	in.	mm	Gauge	in.	mm	in.	mm	Model No.	Order No.	in.	mm	in.	mm

Tube Sheet Thickness 3/8 - 5/8" (9.5 - 15.8mm)

FTF 200 A	5524470	2	50.8	10-14	3/8 - 5/8	9.5 - 16.0	1.656 - 1.940	42.1 - 49.2	FTE-200-M	2997688	3/4	19.0	11.75	298.5
FTF 250 A	5524472	2-1/2	63.5	10-14	3/4 - 1	19.0 - 25.0	2.125 - 2.440	53.9 - 61.9	FTE-250-M	2997689	1	25.4	12.13	308.0
FTF 300 A	5524474	3	76.2	10-14	3/8 - 5/8	9.5 - 16.0	2.565 - 2.940	65.0 - 74.6	FTE-300-M	2997690	1	25.4	13.13	333.4

Tube Sheet Thickness 3/4 - 1" (19.05 - 25.48mm)

FTF 200 B	5524471	2	50.8	10-14	3/4 - 1	19.0 - 25.0	1.656 - 1.940	42.1 - 49.2	FTE-200-M	2997688	3/4	19.0	11.75	298.5
FTF 250 B	5524473	2-1/2	63.5	10-14	3/8 - 5/8	9.5 - 16.0	2.125 - 2.440	53.9 - 61.9	FTE-250-M	2997689	1	25.4	12.13	308.0
FTF 300 B	5524475	3	76.2	10-14	3/4 - 1	19.0 - 25.0	2.565 - 2.940	65.0 - 74.6	FTE-300-M	2997690	1	25.4	13.13	333.4

Short Mandrels

Expander		Expansion Range w/ Drum Mandrel	
Model No.	Order No.	in.	mm
FTE 200 SM1	2997994	1.656 - 1.780	42.1 - 45.2
FTE 200 SM2	2997995	1.730 - 1.854	44.0 - 47.1
FTE 200 SM3	2997996	1.820 - 1.940	46.3 - 49.2
FTE 250 SM1	2997997	2.125 - 2.265	53.9 - 57.5
FTE 250 SM2	2997998	2.205 - 2.353	56.0 - 59.7
FTE 250 SM3	2997999	2.290 - 2.440	58.2 - 62.0
FTE 300 SM1	2998000	2.565 - 2.730	65.1 - 69.3
FTE 300 SM2	2998001	2.660 - 2.835	67.6 - 72.0
FTE 300 SM3	2998002	2.770 - 2.940	70.3 - 74.6
FTF 300 B FS	5524638	3	76.2

FTF Replacement Roll Sets

Expander		Tube Size	
Model No.	Order No.	in.	mm

Tube Sheet Thickness 3/8 - 5/8" (9.5 - 15.8mm)

FTF 200 A FS	5524633	2	50.8
FTF 250 A FS	5524635	2-1/2	63.5
FTF 300 A FS	5524637	3	76.2

Tube Sheet Thickness 3/4 - 1" (19.05 - 25.48mm)

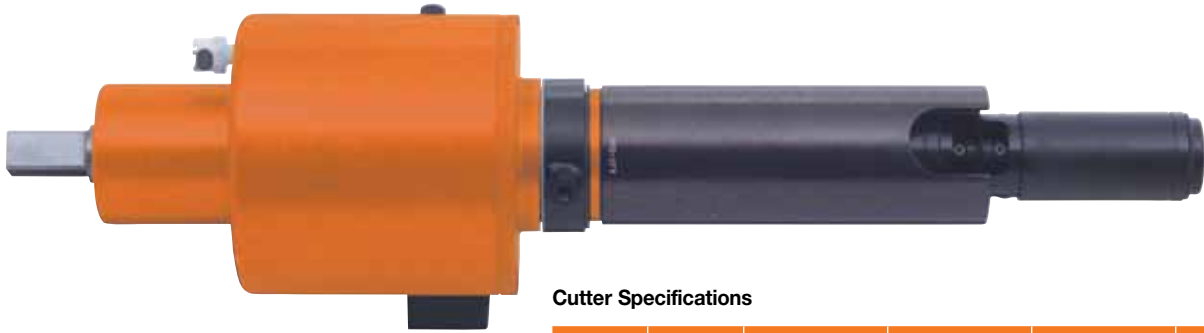
FTF 200 B FS	5524634	2	50.8
FTF 250 B FS	5524636	2-1/2	63.5
FTF 300 B FS	5524638	3	76.2

Boiler Expanders

FTC Series Firetube Cutters

FTC series firetube tube cutters are air cylinder operated to increase productivity. One operator can easily position the cutter in the tube with the aid of a tool balancer. A 2" x 13 gauge tube can be cut in less than ten seconds. Available for 2", 2-1/2", and 3" O.D. tubes with 10 - 14 gauge tube walls.

- Modular design allows for quick adaptation to different tube OD and reduces inventory costs
- Cutter wheel features a quick change mechanism for fast easy replacement
- Excellent tool for cutting tubes to length prior to beading operation
- Short collars available allowing tubes to be cut inside the tube sheet during tube removal phase



Cutter Specifications

Square Drive	Free Speed	Minimum Cutoff Length	Maximum Cutoff Length	Length	Weight
in. (mm)	RPM	in. (mm)	in. (mm)	in. (mm)	lbs. (kg)
3/4 (19.0)	250	1.0 (25.4)	6.0 (152.4)	22.0 (558.8)	15.75 (7.16)

FTC Firetube Tube Cutters

Tube Size in. (mm)	Tube Cutter		Gauge	Front Pilots		Rear Pilots		Carriage		Collar	
	Model No.	Order No.		Model No.	Order No.	Model No.	Order No.	Model No.	Order No.	Model No.	Order No.

2" size sensitive parts

2 (50.8)	FTC-200*	5524338	11	FTC 29 200 11	2998561	FTC 30 200 11	2998562	FTC 6 200	2998536	FTC 9 200	2998539
2 (50.8)	FTC-200*	5524338	12	FTC 27 200 12	2998559	FTC 28 200 12	2998560	FTC 6 200	2998536	FTC 9 200	2998539
2 (50.8)	FTC-200*	5524338	13	FTC 2 200 13	2998532	FTC 8 200 13	2998538	FTC 6 200	2998536	FTC 9 200	2998539

2-1/2" size sensitive parts

2-1/2 (63.5)	FTC-250*	5524339	10	FTC 35 250 10	2998567	FTC 36 250 10	2998568	FTC 43 250	2998575	FTC 45 250	2998577
2-1/2 (63.5)	FTC-250*	5524339	11	FTC 33 250 11	2998565	FTC 34 250 11	2998566	FTC 43 250	2998575	FTC 45 250	2998577
2-1/2 (63.5)	FTC-250*	5524339	12	FTC 31 250 12	2998563	FTC 32 250 12	2998564	FTC 43 250	2998575	FTC 45 250	2998577

3" size sensitive parts

3 (76.2)	FTC-300*	5524340	10	FTC 41 300 10	2998573	FTC 42 300 10	2998574	FTC 44 300	2998576	FTC 46 300	2998578
3 (76.2)	FTC-300*	5524340	11	FTC 39 300 11	2998571	FTC 40 300 11	2998572	FTC 44 300	2998576	FTC 46 300	2998578
3 (76.2)	FTC-300*	5524340	12	FTC 38 300 12	2998569	FTC 39 300 12	2998570	FTC 44 300	2998576	FTC 46 300	2998578

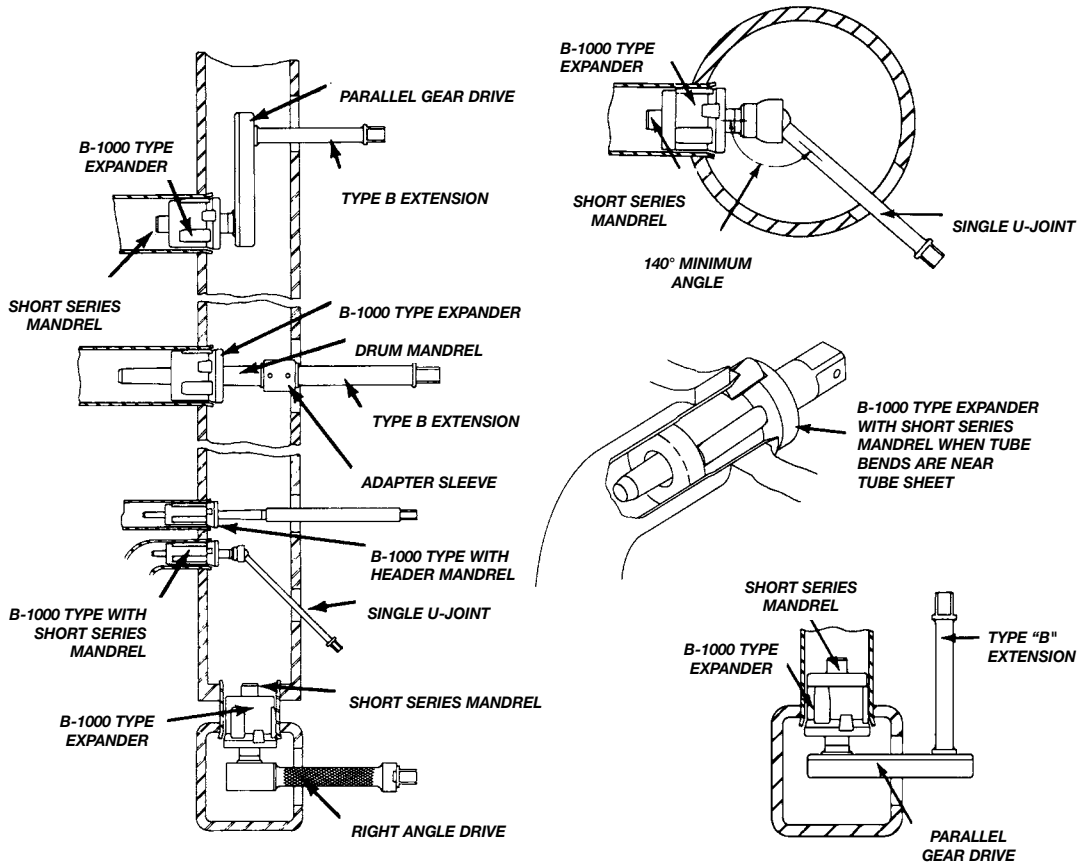
Recommended Spare Parts

Model No.	Order No.
FTC 4 Cutter Wheel	2998534
FTC 5 Cutter Wheel Pin	2998535
FTC 7 Feed Wedge	2998537
FTC 10 Feed Rod	2998540

Accessories - Valve Kits

Model No.	Order No.
1752 Valve Kit	5524341
1550 Valve Kit	5524343

A valve kit consists of a cylinder activation switch, anti-rotation rod and pneumatic plumbing hardware for adapting to the Airetrol



Ratchet Wrenches

Close-action ratchet wrenches designed for use with boiler expanders, universal joints, and extensions when air or electric power sources are unavailable.

Model Number	Order Number	Female Square Drive		Overall Length		Weight	
		in.	mm	in.	mm	lbs.	Kg
21 3/8	2021700	3/8	9.5	7.0	177.8	1.0	0.45
21 1/2	2021600	1/2	12.7	7.0	177.8	1.0	0.45
23 1/2	2023000	1/2	12.7	13.0	330.2	3.75	1.70
24 3/4	2023900	3/4	19.0	15.0	381.0	6.0	2.73
24 1	2023800	1	25.4	15.0	381.0	6.0	2.73



Adapter Sleeve



Model Number	Order Number	Female Square Drive		Weight	
		in.	mm	lbs.	Kg
3/8 X 3/8	2113900	3/8	9.5	0.25	0.11
1/2 X 1/2	2038850	1/2	12.7	0.50	0.23
3/4 X 3/4	2113400	3/4	19.0	1.25	0.57
1 X 1	2001900	1	25.4	1.75	0.80

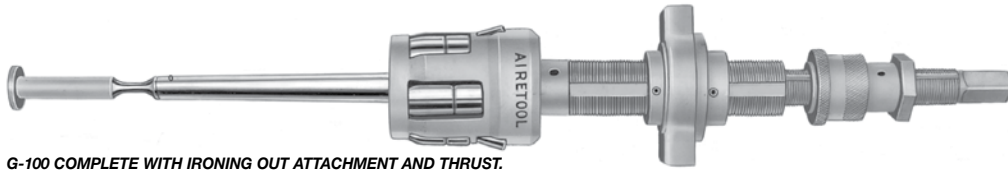
Universal Joint



Universal Joint	Order Number	Female Square Size		Overall Length	
		in.	mm	in.	mm
3/8 x 3/8	2115300	3/8	9.5	2.50	64
1/2 x 1/2	2039800	1/2	12.7	2.75	70
3/4 x 3/4	2974913	3/4	19.0	3.50	89

Tube Expanders for Refinery Fittings

Airetool refinery fitting tube expanders are self-feeding, with five expanding rolls which produce uniform tube expansion and tightness throughout the full thickness of the tube fitting. Contact customer service for ordering details.



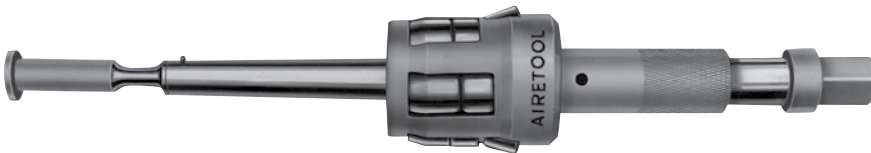
G-100 COMPLETE WITH IRONING OUT ATTACHMENT AND THRUST.



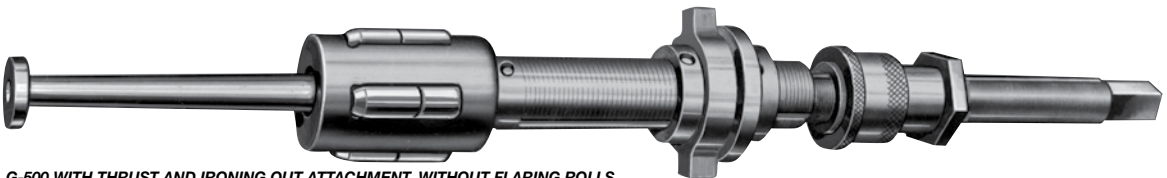
G-200 COMPLETE WITH IRONING OUT ATTACHMENT, WITHOUT THRUST.



G-300 WITH THRUST AND WITHOUT IRONING OUT ATTACHMENT.



G-400 WITHOUT THRUST OR IRONING OUT ATTACHMENT.



G-500 WITH THRUST AND IRONING OUT ATTACHMENT, WITHOUT FLARING ROLLS.

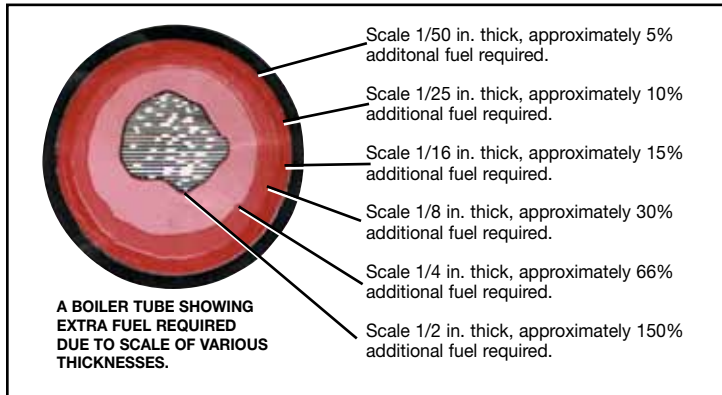


G-600 WITH THRUST ONLY AND WITHOUT FLARING ROLLS.

Tube Cleaners Introduction

Clean tubes mean lower fuel costs.

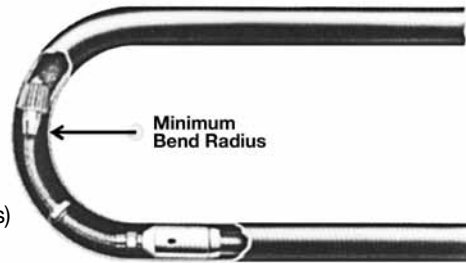
All piping, heat exchangers, condensers, chillers, and boiler tubes accumulate scale over various periods of use. This scale decreases flow and retards heat transfer. This consequently increases fuel consumption which lowers overall efficiency.



1/2 inch scale in 6 inch pipe, 1000 feet long, has a transfer capacity loss of 150 gallons per minute.

For selecting the proper Airetool tube cleaner components the following information is required:

- Tube ID
- Tube length
- Type of deposit
- Thickness of deposit
- Straight or curved tube
- If curved, the minimum bend radius (see charts)



Rigid shaft cleaning systems for straight tubes in heat exchangers and condensers are shown on pages 85-89.

Flexible shaft cleaning systems for straight and curves tubes in condensers, chillers, evaporators and other tubular heat transfer apparatus are shown on pages 90-91.

Refer to the overview of motors and cleaning heads based on tube scale thickness and composition on pages 92 (straight tubes) and 93 (curved tubes), then use the selection guide on pages 94-97 that match boiler tube cleaning motors and heads together.

Note: Operating hoses are not included with boiler tube cleaners. It is always recommended to use an in-line lubricator and foot valve when operating the Airetool boiler tube cleaners. See page 117 for more information on these accessories.

Boiler tube cleaner applications include:

- Oil field drill pipe renewal
- Natural gas line renewal
- Aluminum smelter siphon tube cleaning
- Catalyst cleaners
- Process line cleaning
- Sugar Refinery Transfer line cleaning

Tube Cleaners

Heat Exchanger & Condenser Cleaning Systems

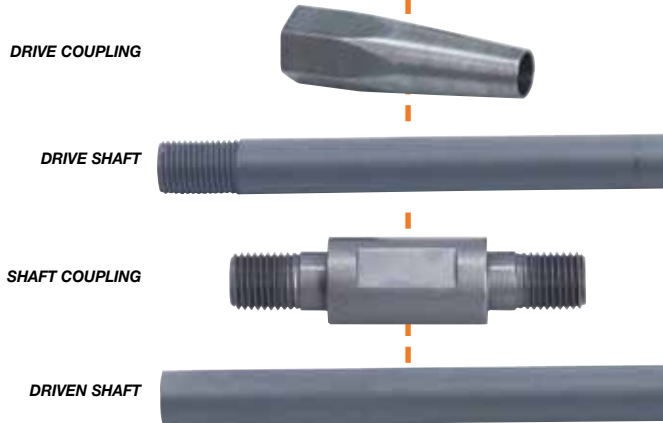


System Components

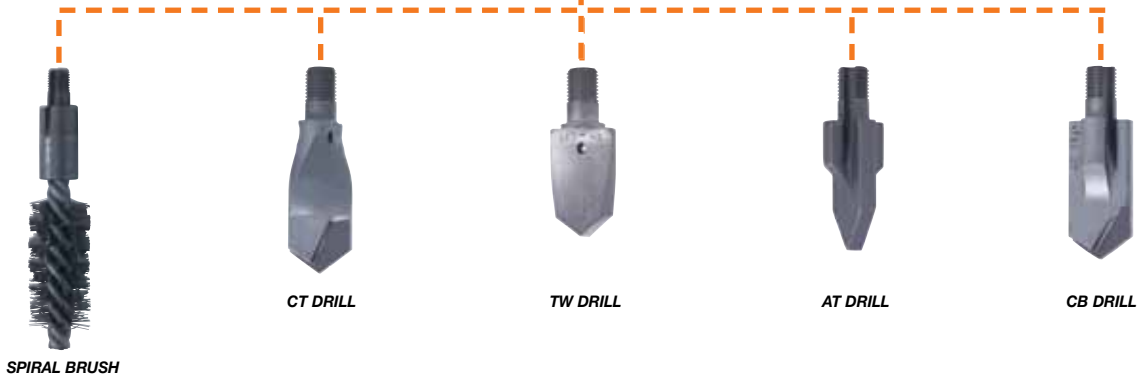
Motors



Shafts



Drills and Brushes



Complete Cleaning Systems

- Complete cleaners consist of an air motor with integral water feed valve couplings; up to 22 ft. of shafting with necessary couplings (please specify shaft length required); motor shaft wrench and an extra set of motor blades.
- The CC 475 Cleaner Complete includes two drills of any type or size up to 1", three spiral brushes up to 1" and 15 feet of 3/8 inch water hose.
- The CC 475-PS Cleaner Complete includes two drills of any type or size up to 1-1/2", three spiral brushes up to 1-1/2" and 15 feet of 3/8 inch water hose.
- CC-375-1, 325-1 & 325-HP: Includes Ball bearing trolley and rope block.

Model Number	Order Number
Lightweight Condenser Cleaners Complete	
CC-475	4105601
CC-475-PS	4105602
Geared Drive Cleaners Complete	
CC-375-1	
CC-325-1	4105603
CC-325-HP	4105604PT
15 feet of 3/8 inch Water Hose	
Water Hose	4105082
Water Feed Attachment	
WF-100	4098700

Tube Cleaners

Heat Exchanger & Condenser Cleaning Systems

Cleaning Motors

Clean Tubes Equal Higher Operating Efficiencies

Airetool lightweight condenser & geared drive cleaners make it easy to maintain your industrial process at a high level of efficiency by providing cleaning motors that are both powerful and durable.



Model Number	Order Number	Range.5	RPM	Weight		Length		Air Inlet	Operating Air Pressure		Water Inlet	Max. Water Pressure	
				lbs.	Kg	in.	mm	NPT	PSI	kg/cm2	NPT	PSI	kg/cm2
Lightweight Condenser Cleaners													
CC-475	4090900	up to 1 in. (25.4 mm) ID Tubes	3800	10	4.53	15-3/4	400.0	1/2	90-100	6-7	3/8	100	7
CC-475-PS	4105343	up to 1-1/2 in. (38.1 mm) ID Tubes	2300	10	4.53	15-3/4	400.0	1/2	90-100	6-7	3/8	100	7
Geared Drive Cleaners*													
CC-375-1	4090700	up to 1-3/4 in. (44.4 mm) ID Tubes	1200	38	17.20	19	482.6	1	90-100	6-7	3/8	100	7
CC-325-1	4090600	up to 2 in. (50.8 mm) ID Tubes	800	42	19.00	19	482.6	1	90-100	6-7	3/8	100	7
CC-325-HP	4104821	up to 2 in. (50.8 mm) ID Tubes	800	44	19.90	19	482.6	1	90-100	6-7	1/2	5000	350

* Water hose not included.

Shaft Components

Shafting components connect the motor to the drill head or brush.

- Drive Shafts & Driven Shafts come in standard lengths of five and ten foot
- Other lengths available on request

DRIVE COUPLING



DRIVE SHAFT



SHAFT COUPLING



DRIVEN SHAFT



Tube I.D.		Shaft Diameter		Drive Coupling For CC-475 CC-475-PS & WF-100	Drive Coupling Thread	Drive Coupling For CC-375-1 CC-325-1 & CC-325-HP	Drive Coupling Thread	Drive Shaft Length*		Drive Shaft Thread	Shaft Coupling	Shaft Coupling Thread	Driven Shaft Length*		Driven Shaft Thread
in.	mm	in.	mm					5 ft.	10 ft.				5 ft.	10 ft.	
.291-.358	7.39-9.09	1/4	6.35	AT-337-A (1201100)	5/8" NF X 1/4" NF	—	—	CC-336-5 (1717133)	CC-336-10 (1717151)	1/4" NFM X 10-32 F	CC-334 (1232800)	10-32M	CC-335-5 (1717132)	CC-335-10 (1717150)	10-32 F X 10-32 F
.359-.420	9.09-10.67	5/16	7.94	AT-333-A (1201000)	5/8" NF X 5/16" NF	AT-333 (1200900)	1" NF X 5/16" NF	CC-332-5 (1717135)	CC-332-10 (1717153)	5/16" NFM X 1/4" NFF	CC-330 (1232500)	1/4" NFM	CC-331-5 (1717134)	CC-331-10 (1717152)	1/4" NFF X 1/4" NFF
.421-.483	10.67-12.27	3/8	9.52	AT-321-A (1200700)	5/8" NF X 3/8" NF	AT-352 (1201300)	1" NF X 3/8" NF	CC-324-5 (1717137)	CC-324-10 (1717155)	3/8" NFM X 1/4" NFF	CC-322 (1231900)	1/4" NFM	CC-323-5 (1717136)	CC-323-10 (1717154)	1/4" NFF X 1/4" NFF
.484-.608	12.27-15.44	7/16	11.11	AT-313-A (1200300)	5/8" NF X 7/16" NF	AT-353 (1201400)	1" NF X 7/16" NF	CC-316-5 (1717139)	CC-316-10 (1717157)	7/16" NFM X 5/16" NFF	CC-314 (1230800)	5/16" NFM	CC-315-5 (1717138)	CC-315-10 (1717156)	5/16" NFF X 5/16" NFF
.609-.831	15.44-21.11	1/2	12.7	AT-309-A (1200100PT)	5/8" NF X 1/2" NF	AT-359 (1201900)	1" NF X 1/2" NF	CC-312-5 (1717141)	CC-312-10 (1717159)	1/2" NFM X 3/8" NFF	CC-310 (1230400)	3/8" NFM	CC-311-5 (1717140)	CC-311-10 (1717158)	3/8" NFF X 3/8" NFF
.832-1.055	21.11-28.80	5/8	15.88	AT-301-A (1199100)	5/8" NF X 5/8" NF	AT-351 (1201200)	1" NF X 5/8" NF	CC-304-5 (1717144)	CC-304-10 (1717163)	5/8" NFM X 3/8" NFF	CC-302 (1229500)	3/8" NFM	CC-303-5 (1717143)	CC-303-10 (1717162)	3/8" NFF X 3/8" NFF
1.056-1.561	28.80-39.65	3/4	19.05	AT-317-A (1200500)	5/8" NF X 3/4" NF	AT-357 (1201800)	1" NF X 3/4" NF	CC-320-5 (1717146)	CC-320-10 (1717165)	3/4" NFM X 7/16" NFF	CC-318 (1231400)	7/16" NFM	CC-319-5 (1717145)	CC-319-10 (1717164)	7/16" NFF X 7/16" NFF
1.562-2.374	39.65-60.30	1	25.4	AT-325-A (1200800)	5/8" NF X 1" NF	AT-354 (1201500)	1" NF X 1" NF	CC-328-5 (1717148)	CC-328-10 (1717167)	1" NFM X 7/16" NFF	CC-326 (1232200)	7/16" NFM	CC-327-5 (1717147)	CC-327-10 (1717166)	7/16" NFF X 7/16" NFF

* Standard lengths available upon request

Tube Cleaners

Heat Exchanger & Condenser Cleaning Systems

Drills and Brushes

Airetool drills are designed especially to prevent damage to the tube I.D., and are available in a variety of shapes to remove all types of scale deposits. Passages in the drill shaft enable flushing fluid to reach the drill cutting edge. Larger sizes available on request.

- Type "AT" - standard drill for medium deposits
- Type "CB" - standard drill ("AT" style) for medium deposits with carbide insert for better durability
- Type "CB-xxx-HP" - high pressure drills provide better flushing power when used with the CC-325-HP motor
- Type "TW" - standard twist drill for thick deposits
- Type "CT" - standard twist drill ("TW" style) for thick deposits with carbide insert for better durability
- Wire Brushes are for light deposits



Minimum order quantities may apply.

Tube I.D.		Diameter of Drill or Brush		Stud Thread	AT (Standard) Drills	CB (Carbide) Drills	CB (Carbide) "HP" Drills*	CT (Carbide Twist) Drills	TW (Twist) Drills	Wire Brush
in.	mm	in.	mm		Model (Order No.)	Model (Order No.)	Model (Order No.)	Model (Order No.)	Model (Order No.)	Model (Order No.)
.291-.306	7.39-7.77	0.281	7.14	10-32 UNC	AT-199 (1192200)	CB-199 (1220400)	-	-	-	199-B (1020412)
.306-.321	7.77-8.15	0.296	7.52	10-32 UNC	AT-199-5 (1192300)	CB-199-5 (1220500)	-	-	-	199-5-B (1020415)
.322-.337	8.18-8.56	0.312	7.92	10-32 UNC	AT-200 (1192400)	CB-200 (1715666)	-	-	-	200-B (1020460)
.338-.353	8.51-8.97	0.328	8.33	10-32 UNC	AT-200-5 (1192500)	CB-200-5 (1220600)	-	-	-	200-5-B (1020450)
.359-.389	9.12-9.88	0.343	8.71	1/4" UNF	AT-201 (1192600)	CB-201 (1220700)	-	-	TW-201 (1311400PT)	201-B (1020500)
.390-.420	9.91-10.67	0.375	9.52	1/4" UNF	AT-202 (1192700)	CB-202 (1220800)	-	-	TW-202 (1311500)	202-B (1020600)
.421-.452	10.69-11.48	0.406	10.31	1/4" UNF	AT-203 (1192800)	CB-203 (1220900)	-	-	TW-203 (1311600)	203-B (1020700PT)
.452-.483	11.48-12.27	0.437	11.10	1/4" UNF	AT-204 (1192900)	CB-204 (1221000)	-	-	TW-204 (1311700)	204-B (1020800)
.484-.514	12.29-13.06	0.468	11.89	5/16" UNF	AT-205 (1193000)	CB-205 (1221100)	CB-205-HP (1715190)	CT-205 (1241600)	TW-205 (1311800)	205-B (1020900)
.515-.545	13.08-13.84	0.500	12.7	5/16" UNF	AT-206 (1193100)	CB-206 (1221200)	CB-206-HP (1715565)	CT-206 (1241700)	TW-206 (1311900)	206-B (1021000)
.546-.577	13.87-14.66	0.531	13.49	5/16" UNF	AT-207 (1193200)	CB-207 (1221300)	CB-207-HP (1715561)	CT-207 (1241800)	TW-207 (1312000)	207-B (1021201)
.578-.608	14.68-15.44	0.562	14.27	5/16" UNF	AT-208 (1193300)	CB-208 (1221400)	CB-208-HP (1715566)	CT-208 (1241900)	TW-208 (1312100)	208-B (1021400)
.578-.608	14.68-15.44	0.562	14.27	3/8" UNF	AT-108 (1192000)	CB-108 (1220300)	CB-108-HP (1715567PT)	CT-108 (1241100)	TW-108 (1311300)	108-B (1021500)
.609-.639	15.47-16.23	0.593	15.06	3/8" UNF	AT-209 (1193400)	CB-209 (1221500)	CB-209-HP (1715562)	CT-209 (1242000)	TW-209 (1312200)	209-B (1021600)
.640-.675	16.26-17.15	0.625	15.88	3/8" UNF	AT-210 (1193500)	CB-210 (1221600)	CB-210-HP (1715568)	CT-210 (1242100)	TW-210 (1312300PT)	210-B (1021810)
.676-.706	17.17-17.93	0.656	16.66	3/8" UNF	AT-211 (1193600)	CB-211 (1221700)	CB-211-HP (1716249)	CT-211 (1242200)	TW-211 (1312400)	211-B (1022001)
.707-.737	17.96-18.72	0.687	17.45	3/8" UNF	AT-212 (1193700)	CB-212 (1221800)	CB-212-HP (1715569PT)	CT-212 (1242300)	TW-212 (1312500)	212-B (1022100)

* "HP" Style drills are used for more aggressive cleaning with CC-325-HP cleaning motor

Tube Cleaners

Heat Exchanger & Condenser Cleaning Systems



Drills and Brushes (continued)

Tube I.D.		Diameter of Drill or Brush		Stud Thread	AT (Standard) Drills	CB (Carbide) Drills	CB (Carbide) "HP" Drills*	CT (Carbide Twist) Drills	TW (Twist) Drills	Wire Brush
in.	mm	in.	mm		Model (Order No.)	Model (Order No.)	Model (Order No.)	Model (Order No.)	Model (Order No.)	Model (Order No.)
.738-.769	18.75-19.53	0.718	18.24	3/8" UNF	AT-213 (1193800)	CB-213 (1221900)	CB-213-HP (1715570PT)	CT-213 (1242400)	TW-213 (1312600)	213-B (1022500)
.770-.800	19.56-20.32	0.750	19.05	3/8" UNF	AT-214 (1193900)	CB-214 (1222000)	CB-214-HP (1715571)	CT-214 (1242500)	TW-214 (1312700)	214-B (1022700)
.801-.831	20.35-21.11	0.781	19.84	3/8" UNF	AT-215 (1194000)	CB-215 (1222100)	CB-215-HP (1715859)	CT-215 (1242600)	TW-215 (1312800)	215-B (1022802)
.832-.862	21.13-21.89	0.812	20.62	3/8" UNF	AT-216 (1194100)	CB-216 (1222200)	CB-216-HP (1715572)	CT-216 (1242700)	TW-216 (1312900)	216-B (1022900)
.863-.894	21.92-22.71	0.843	21.41	3/8" UNF	AT-217 (1194200)	CB-217 (1222300)	CB-217-HP (1715573)	CT-217 (1242800PT)	TW-217 (1313000)	217-B (1023000)
.895-.925	22.73-23.50	0.875	22.23	3/8" UNF	AT-218 (1194300)	CB-218 (1222400)	CB-218-HP (1715950)	CT-218 (1242900)	TW-218 (1313100)	218-B (1023100)
.926-.956	23.52-24.28	0.906	23.01	3/8" UNF	AT-219 (1194400)	CB-219 (1222500)	CB-219-HP (1715730PT)	CT-219 (1243000)	TW-219 (1313200)	219-B (1023200)
.957-.987	24.31-25.07	0.937	23.80	3/8" UNF	AT-220 (1194500)	CB-220 (1222600)	CB-220-HP (1716142PT)	CT-220 (1243100)	TW-220 (1313300)	220-B (1023304)
.998-1.024	25.35-26.01	0.968	24.59	3/8" UNF	AT-221 (1194600)	CB-221 (1222700)	CB-221-HP (1716434)	CT-221 (1243200PT)	TW-221 (1313400)	221-B (1023400)
1.025-1.055	26.04-26.80	1.000	25.40	3/8" UNF	AT-222 (1194700)	CB-222 (1222800)	CB-222-HP (1716223)	CT-222 (1243300PT)	TW-222 (1313500)	222-B (1023600)
1.056-1.086	26.82-27.58	1.031	26.19	7/16" UNF	AT-223 (1194800)	CB-223 (1223000PT)	-	CT-223 (1243400)	TW-223 (1313600)	223-B (1023700)
1.087-1.117	27.61-28.37	1.062	26.97	7/16" UNF	AT-224 (1194900)	CB-224 (1223000PT)	-	CT-224 (1243500)	TW-224 (1313700)	224-B (1023800)
1.118-1.149	28.40-29.18	1.093	27.76	7/16" UNF	AT-225 (1195000)	CB-225 (1223100)	-	CT-225 (1243600)	TW-225 (1313800)	225-B (1023900)
1.150-1.180	29.21-29.97	1.125	28.58	7/16" UNF	AT-226 (1195100)	CB-226 (1223200)	-	CT-226 (1243700)	TW-226 (1313900)	226-B (1024001PT)
1.181-1.211	30.00-30.76	1.156	29.36	7/16" UNF	AT-227 (1195200)	CB-227 (1223300)	-	CT-227 (1243800)	TW-227 (1314000)	227-B (1024100)
1.212-1.242	30.78-31.55	1.187	30.15	7/16" UNF	AT-228 (1195300)	CB-228 (1223400)	-	CT-228 (1243900)	TW-228 (1314100)	228-B (1024200)
1.243-1.280	31.57-32.51	1.218	30.94	7/16" UNF	AT-229 (1195400)	CB-229 (1223500)	-	CT-229 (1244000)	TW-229 (1314200)	229-B (1024300)

* "HP" Style drills are used for more aggressive cleaning with CC-325-HP cleaning motor

Large Diameter Twist Brushes (LDTB)

Brush should be sized 1/8" -3/16" smaller than the nominal tube I.D. for best results.



Diameter		Model Number	Order Number	Stud Thread
in.	mm			
1.50	38.1	LDTB 1500	1003700	5/8 NC
1.62	41.2	LDTB 1625	1004500	5/8 NC
1.75	44.4	LDTB 1750	1004300	5/8 NC
1.87	47.6	LDTB 1875	1004600PT	5/8 NC
2.00	50.8	LDTB 2000	1004900	5/8 NC
2.12	53.9	LDTB 2125	1005800PT	5/8 NC
2.25	57.1	LDTB 2250	1005700PT	5/8 NC

Diameter		Model Number	Order Number	Stud Thread
in.	mm			
2.50	63.5	LDTB 2500	1005401	5/8 NC
2.75	69.8	LDTB 2750	1005900	5/8 NC
3.00	76.2	LDTB 3000	1006500	5/8 NC
3.25	82.5	LDTB 3250	1007100	5/8 NC
3.50	88.9	LDTB 3500	1006900	5/8 NC
3.75	95.2	LDTB 3750	1007200	5/8 NC
4.00	101.6	LDTB 4000	1007300	5/8 NC

Condenser Cleaners

Tube Cleaners

Tube cleaners for condensers, chillers, evaporators and other tubular heat transfer apparatus

Model ABM-1800

Variable speed feature allows the operator to operate the shaft at a safe, comfortable speed for the condition of the tubes being cleaned. The lack of o-rings and coupler nut eliminates the risk of the coupler nut loosening and leaking water, leading to possible shaft damage.

- Variable solid state speed control from 0 to 1750 RPM with constant torque
- Quick-release shaft coupling for an easy, fast, positive connection every time
- No o-rings or coupler nut

Model ABM-1900

- Variable solid state speed control from 0 to 1750 RPM with constant torque
- Manifold for screw-on style shafting that is commonly used in competitive models

Reversible Models ABM-1800-R & ABM-1900-R

Same features as ABM-1800 & ABM-1900 above plus

- Bi-directional shaft rotation for the cleaning of internally enhanced tubes
- Identified Forward and Reverse direction foot pedals are included



Model Number	Ordering Number	Horsepower	Volts	Amps	RPM	Bi-directional Operation	Dimensions	Weight (less shaft)	Shipping Dimensions	Shipping Weight (less shaft)
ABM-1800	2900398	1/2	115	6	0-1800	No	11" W x 17" L x 9" H	35 lbs.	12" W x 23" L x 11"H	39 lbs.
ABM-1800-R	2900399	1/2	115	6	0-1800	Yes	11" W x 17" L x 9" H	41 lbs.	12" W x 23" L x 11"H	45 lbs.
ABM-1900	2900400	1/2	115	6	0-1800	No	11" W x 17" L x 9" H	35 lbs.	12" W x 23" L x 11"H	39 lbs.
ABM-1900-R	2900401	1/2	115	6	0-1800	Yes	11" W x 17" L x 9" H	41 lbs.	12" W x 23" L x 11"H	45 lbs.
ABM-1900-R-230V*	2900530	1/2	230	3	0-1800	Yes	11" W x 17" L x 9" H	41 lbs.	12" W x 23" L x 11" H	45 lbs.

*CE Certified

Flexible shafts (sold separately)

To order the correct size Flexible Shaft, measure the tube I.D. and the length of the tube to be cleaned. Then refer to the chart at the right to select the proper shaft.

Tube I.D. Range	Shaft O.D.	Shaft Lengths in Feet - Model No. (Ordering No.)		
		15	25	35

Flexible Shafts for ABM-1800, ABM-1800-R and ABM-1200

.280" - .406	1/4"	FS-1815-1/4 (2900402)	-	-
.407" - .532"	3/8"	-	FS-1825-3/8 (2900403)	FS-1835-3/8 (2900404)
.533" - .812"	1/2"	-	FS-1825-1/2 (2900405)	FS-1835-1/2 (2900406)

Flexible Shafts for ABM-1900 and ABM-1900-R

.280" - .406	1/4"	FS-1915-1/4 (2900407)	-	-
.407" - .532"	3/8"	-	FS-1925-3/8 (2900408)	FS-1935-3/8 (2900409)
.533" - .812"	1/2"	-	FS-1925-1/2 (2900410)	FS-1935-1/2 (2900411)

See next page for brush selection.



Brushmaster Brushes

Super 2D Brushes

Airetool Super 2D Brushes are for cleaning internally enhanced tubing. The brush is constructed from material that out-cleans and out-wears other tube brushes. Super 2 D Brushes have two cleaning diameters to assure all surfaces are being cleaned. These brushes are recommended for removing soft and light scale deposits.

Super Brushes

Super Brushes are for cleaning smooth bore tubing. They are made from the same long-lasting material as the Super 2D Brush. The longer brush cleaning surface reduces the tube cleaning time. They are recommended for removing soft and light scale deposits.

Part Number	Order Number	Tube Inside Diameter	
		in.	mm

Super 2 D Brush

SCB-750	2996773	.500-.700	12.7-17.8
SCB-1000	2996774	.700-.950	17.8-24.1

Super Brush

SB-750	2996555	.437-.700	11.1-14.2
SB-1000	2996556	.625-1.000	15.8-17.5
SB-1250	2996557	1.000-1.200	19.0-25.4

Nylon, Brass and Stainless Steel Brushes

Nylon, brass and stainless steel brushes are available in brush diameters .250" - 1.000" (6.3-25.4mm) in 1/16" (1.6mm) increments. Select the brush size equal to or one size smaller than the I.D. of the tubes to be cleaned.

Minimum order quantity 12 pieces

Brush Diameter		Brush Material		
in.	mm	Nylon	Brass	Stainless Steel
1/4	6.35	N-250 (2996528)	B-250 (2996515)	SS-250 (2996541)
5/16	7.92	N-312 (2996529)	B-312 (2996516)	SS-312 (2996542)
3/8	9.52	N-375 (2996530)	B-375 (2996517)	SS-375 (2996543)
7/16	11.10	N-437 (2996531)	B-437 (2996518)	SS-437 (2996544)
1/2	12.70	N-500 (2996532)	B-500 (2996519)	SS-500 (2996545)
9/16	14.27	N-562 (2996533)	B-562 (2996520)	SS-562 (2996546)
5/8	15.88	N-625 (2996534)	B-625 (2996521)	SS-625 (2996547)
11/16	17.48	N-687 (2996535)	B-687 (2996522)	SS-687 (2996548)
3/4	19.05	N-750 (2996536)	B-750 (2996523)	SS-750 (2996549)
13/16	20.62	N-812 (2996537)	B-812 (2996524)	SS-812 (2996550)
7/8	22.22	N-875 (2996538)	B-875 (2996525)	SS-875 (2996551)
15/16	23.82	N-937 (2996539)	B-937 (2996526)	SS-937 (2996552)
1	25.40	N-1000 (2996540)	B-1000 (2996527)	SS-1000 (2996553)

Boiler Tube Cleaners

Tube Cleaners for Straight Tubes

Complete series of motors and heads available for tube sizes 1/2" to 1-3/8" (12.7 to 34.9 mm) I.D.



**MIDGET MOTOR
WITH OPTIONAL HEADS**

Complete cleaner consists of: air motor with extra set of blades; shaft wrench; metal box; choice of single unit cutter head with four extra cutters and two extra cutter pins. If a Type 2 head (30 series) is ordered, one extra flexible connection is furnished. If expanding blade head is ordered, one extra set of blades is furnished.

For operating hose (not included) refer to page 116.



Drill Head with Universal Joint
Range: 1/2 in. (12.7 mm) - 1-3/8 in. (34.9 mm)
Deposit: heavy-medium to soft



Single Unit Head with Universal Joint
Range: 1/2 in. (12.7 mm) - 1-3/8 in. (34.9 mm)
Deposit: light-hard to medium



Expanding Blade Cutter Head
Range: 1/2 in. (12.7 mm) - 4-1/2 in. (114.3 mm)
Deposit: light-hard to medium

Complete series of motors and heads available for tube sizes 1-1/2" to 13-3/4" (12.7 to 336.5mm) I.D.



**3000 SERIES MOTOR
WITH OPTIONAL HEADS**

Complete cleaner consists of: air motor with extra set of blades; shaft wrench; choice of cutter head with two extra sets of cutters and cutter pins; universal joint with two extra pins; two drills. If single unit head is ordered, four extra sets of cutters are furnished. If arm-type head is ordered, one extra set of arm pins is furnished.

For operating hose (not included) refer to page 116.



TYPE-4 Forward Swing Head
Range: 1-3/4 in. (44.4 mm) - 4 1/4 in. (120.6 mm)
Self feeding
Deposit: 1/2 in. (12.7 mm) thick-soft to medium



TYPE-5 Wing Arm Head
Range: 1-3/4 in. (44.4 mm) - 13 1/4 in. (336.5 mm)
Self feeding
Deposit: 1/2 in. (12.7 mm) thick-hard to medium



TYPE-3 P-Type Head
Range: 2-1/4 in. (57.1 mm) - 7 in. (177.8 mm) Self feeding
Deposit: 3/8 in. (9.5 mm) thick-hard to medium



Drill Head with Universal Joint
Range: 1-1/2 in. (38.1 mm) - 11 in. (279.4 mm)
Deposit: 3/4 in. (19.0 mm) thick-medium to hard and plugged tubes

Boiler Tube Cleaners

Tube Cleaners for Curved Tubes

Airetool[®]

Complete series of motors and heads available for tube sizes 13/16" to 2-1/8" (20.6 to 53.9 mm) I.D.



MIDGET MOTOR WITH
OPTIONAL HEADS

Complete cleaner consists of: air motor with extra set of blades; shaft wrench; metal box; choice of single unit cutter head with four extra cutters and two extra cutter pins; universal joint with two extra pins; two drills. If single unit head is ordered, four extra cutters are furnished.

For operating hose (not included) refer to page 116.



Drill Head with Universal Joint
Range: 1-1/2 in. (38.1 mm) - 2-1/8 in. (53.9 mm)
Deposit: light-hard to medium



TYPE-1 "40" SERIES
Single Unit Head with Universal Joint
Range: 1/2 in. (12.7 mm) - 2-1/8 in. (53.9 mm)
Deposit: light-medium to hard



TYPE-2 "30" SERIES
Single Unit Head with Flexible Shaft
Range: 1/2 in. (12.7 mm) - 2-1/8 in. (53.9 mm)
Deposit: light-medium to hard

Complete series of motors and heads available for tube sizes 1-1/2" to 13-1/4" (38.1 to 336.5 mm) I.D.



4000 SERIES MOTOR WITH
OPTIONAL HEADS

Complete cleaner consists of: air motor with extra set of blades; shaft wrench; choice of cutter head with two extra sets of cutters and cutter pins; universal joint with two extra pins; two drills. If single unit head is ordered, four extra sets of cutters are furnished. If arm-type head is ordered, one extra set of arm pins is furnished.

For operating hose (not included) refer to page 116.



Drill Head with Universal Joint
Range: 1-1/2 in. (38.1 mm) - 11 in. (279.4 mm)
Deposit: 1/2 in. (12.7 mm) - thick-hard to medium



TYPE-4
Forward Swing with Universal Joint
Range: 1-3/4 in. (44.4 mm) - 4-3/4 in. (120.6 mm)
Deposit: 1/2 in. (12.7 mm) - thick-soft to medium



TYPE-5
Wing Arm Head with Universal Joint
Range: 1-3/4 in. (44.4 mm) - 13-1/4 in. (336.5 mm)
Self feeding
Deposit: 1/2 in. (12.7 mm) - thick-hard to medium

Boiler Tube Cleaners

Selection Guide

Midget Tube Cleaners – Curved and Straight

Range: 1/2 to 1-3/4 in.
12.7 to 44.4 mm

Complete cleaner consists of: air motor with extra set of blades; shaft wrench; metal box; choice of single unit cutter head with four extra cutters and two extra cutter pins. If a Type 2 head (30 series) is ordered, one extra flexible connection is furnished. If expanding blade head is ordered, one extra set of blades is furnished. For operating hose (not included) refer to page 116.



MIDGET MOTOR



- Use for straight tubes.
- Use for curved tubes.

Tube I.D.		Minimum Tube Centerline Radius		Motor Number	Motor O.D.		Rotor Thread	Air Coupling Pipe Tap (in.)	Hose Size		Heads Available			Drill*	Universal	Flexible
in.	mm	in.	mm		in.	mm			in.	in.	mm	Universal Type 1	Flexible Type 2			
1/2	12.7	Straight		24	15/32	11.9	10-32	18-20	3/16	4.7	2440	2430	2480	MD-1	2451	2461
5/8	15.8	Straight		30	37/64	14.6	1/4 NF	1/8	1/4	6.3	3040	3030	3080	MD-2	PA-3051	X-6461
3/4	19.0	Straight		27	11/16	17.4	1/4 NF	1/8	1/4	6.3	2740	2730	2780	MD-3	PA-3051	X-6461
13/16	20.6	5.0	126.0	X-64	11/16	17.4	1/4 NF	1/4	1/4	6.3	X-6440	X-6430	-	MD-3	6451	X-6461
7/8	22.2	Straight		29	25/32	19.8	3/8 NF	1/4	3/8	9.5	2940	2930	2980	MD-4	2651-A	-
27/32	21.4	Straight		29	25/32	19.8	3/8 NF	1/4	3/8	9.5	2940	2930	2980	MD-4	2651-A	-
1	25.4	Straight		26	29/32	23.0	3/8 NF	3/8	3/8	9.5	2640	2630	6180	MD-4	2651-A	-
1-1/32	26.1	5.0	127.0	X-61	7/8	22.2	5/16 NF	1/4	1/4	6.3	X-6140	X-6130	-	MD-3	6151-C	X-6161
1-1/8	28.5	Straight		31	1-1/32	26.1	7/16 NF	3/8	3/8	9.5	3140	3130	3180	MD-5	3151	X-6361
1-1/4	31.7	Straight		X-63-A	1-1/16	26.9	3/8 NF	3/8	3/8	9.5	X-6340	X-6330	6380	MD-5	6651	X-6361
1-1/4	31.7	6.0	152.4	X-63	1-1/16	26.9	3/8 NF	3/8	3/8	9.5	X-6340	X-6330	-	MD-5	6651	X-6361
1-3/8	34.9	Straight		X-65-A	1-3/16	30.1	3/8 NF	3/8	3/8	9.5	X-6540	X-6530	6580	0	6651	X-6661
1-1/2	38.1	6.0	152.4	X-65	1-3/16	30.1	3/8 NF	3/8	3/8	9.5	X-6540	X-6530	-	MD-5	6651	X-6661
1-5/8	41.2	24.0	609.6	4200	1-1/2	38.1	5/8 NC	1/2	1/2	12.7	4140	4130	-	1	4151	4161
1-3/4	44.4	6.0	152.4	X-66	1-5/16	33.3	3/8 NF	3/8	3/8	9.5	X-6640	X-6630	-	0	6651	X-6661
1-3/4	44.4	15.0	381.0	4200	1-1/2	38.1	5/8 NC	1/2	1/2	12.7	4140	4130	-	1	4151	4161

Some items are available on a quotation basis only.

* Drill must be used with Universal Joint or flexible connection.

3000 and 4000 Series Tube Cleaners – Curved and Straight

Range: 1-1/2 to 13-1/4 in.
38.1 to 336.5 mm

Complete cleaner consists of: air motor with extra set of blades; shaft wrench; choice of cutter head with two extra sets of cutters and cutter pins; universal joint with two extra pins; two drills. If single unit head is ordered, four extra sets of cutters are furnished. If arm-type head is ordered, an extra set of arm pins is furnished.

For operating hose (not included) refer to page 116 .



- Use for straight tubes.
- Use for curved tubes.

Tube I.D.		Minimum Tube Centerline Radius		Motor Number	Motor O.D.		Rotor Thread	Air Coupling Pipe Tap (in.)	Hose Size		Heads Available				Universal Joint	Drill*
in.	mm	in.	mm		in.	mm			in.	in.	mm	Single Expansion Type 3	Forward Swing Type 4	Single Unit		
												Type 2	Type 1			
1-1/2	38.1	Straight		3150	1-3/8	34.9	9/16 NC	1/2	1/2	12.7	TC-14	-	-	1740	31551	0
1-5/8	41.2	Straight		3162	1-1/2	38.1	5/8 NC	3/4	1/2	12.7	TC-11	-	1840	1940	4151	1
1-3/4	44.4	Straight		3175	1-5/8	41.2	5/8 NC	3/4	1/2	12.7	TC-11	-	1840	1940	4151	1
1-7/8	47.6	Straight		3187	1-3/4	44.4	5/8 NC	3/4	3/4	19.0	TC-17-PY	-	2340	4140	4151	1
2	50.8	Straight		3200	1-7/8	47.6	5/8 NC	3/4	3/4	19.0	TC-16	-	2340	4140	4151	1
2	50.8	15.0	381.0	4225	1-3/4	44.4	5/8 NC	1/2	1/2	12.7	-	-	4130	4140	4151	1
2-1/8	53.9	Straight		3212	2	50.8	5/8 NC	3/4	3/4	19.0	TC-13-PY	2340	-	4140	4151	4
2-1/8	53.9	15.0	381.0	4225	1-3/4	44.4	5/8 NC	1/2	1/2	12.7	-	-	4130	4140	4151	1
2-1/4	57.1	Straight		3225	2-1/8	53.9	3/4 NC	3/4	3/4	19.0	P-15-PY	4470-A	-	-	2151	4
2-1/4	57.1	15.0	381.0	4250	1-7/8	47.6	5/8 NC	1/2	1/2	12.7	-	4470	-	-	4151	4
2-5/16	58.7	12.0	304.8	4250	1-7/8	47.6	5/8 NC	1/2	1/2	12.7	-	4470	-	-	4151	4
2-3/8	60.3	Straight		3225	2-1/8	53.9	3/4 NC	1	1	25.4	P-9-S	4470-A	-	-	2151	4
2-1/2	63.5	Straight		3250	2-5/16	58.7	7/8 NC	1	1	25.4	P-9	4470-B	-	-	21451	4
2-1/2	63.5	15.0	381.0	4250	1-7/8	47.6	5/8 NC	1/2	1/2	12.7	-	-	4470	-	4151	4

Some items are available on a quotation basis only.

* Drill must be used with Universal Joint or flexible connection.

Boiler Tube Cleaners

Selection Guide

Tube I.D.		Minimum Tube Centerline Radius		Motor Number	Motor O.D.		Rotor Thread	Air Coupling Pipe Tap (in.)	Hose Size		Heads Available			Universal Joint	Drill*
in.	mm	in.	mm		in.	mm			in.	in.	mm	Single Expansion Type 3	Wing Arm Type 5		
2-5/8	66.6	Straight		3262	2-1/2	63.5	7/8 NC	1	1	25.4	P-7	2060	4470-A	21451	4
2-5/8	66.6	24	609.6	4300	2-1/4	57.1	3/4 NC	1	3/4	19.0	-	3360	3370	3551	5
2-3/4	69.8	Straight		3275	2-5/8	66.6	7/8 NC	1	1	25.4	P-7	2060	3370-A	651	5
2-3/4	69.8	12	304.8	4300	-1/4	57.1	3/4 NC	1	3/4	19.0	-	3360	3370	3551	5
2-7/8	73.0	Straight		3275	2-5/8	66.6	7/8 NC	1	1	25.4	P-6-A	1060	-	651	5
2-7/8	7.03	28	711.2	4325	2-1/2	63.5	3/4 NC	1	3/4	19.0	-	3560	3270	3551	5
3	76.2	Straight		3300	2-13/16	71.4	1 NF	1	1	25.4	P-6	1060	-	21051	5
3	76.2	16	406.4	4300	2-1/2	63.5	3/4 NC	1	3/4	19.0	-	3560	3270	3551	5
3	76.2	12	304.8	4300	2-1/4	57.1	3/4 NC	1	3/4	19.0	-	3560	3270	3551	5
3-1/16	77.7	Straight		3300	2-13/16	71.4	1 NF	1	1	25.4	P-6	1060	-	21051	5
3-1/8	79.3	Straight		3312	2-15/16	74.6	1 NF	1	1	25.4	P-5	1060	-	1151	6
3-3/16	80.9	Straight		3318	3	76.2	1 NF	1	1	25.4	P-5	1060	-	1151	6
3-1/4	82.5	Straight		3318	3	76.2	1 NF	1	1	25.4	P-5	1060	-	1151	6
3-1/4	82.5	16	406.4	4350	2-3/4	69.8	7/8 NC	1	1	25.4	-	3560	970-B	651	5
3-3/8	85.7	Straight		3318	3	76.2	1 NF	1	1	25.4	P-5	960	-	1151	6
3-12	88.9	Straight		3350	3-5/16	84.1	1-1/8 NF	1	1	25.4	P-4	760	-	20751	6
3-1/2	88.9	20	508	4350	2-3/4	69.8	7/8 NC	1	1	25.4	-	4760	770-B	551	6
3-5/8	92.0	Straight		3350	3-5/16	84.1	1-1/8 NF	1	1	25.4	P-3	760	-	20751	6
3-3/4	95.2	Straight		3350	3-5/16	84.1	1-1/8 NF	1	1	25.4	P-3	760	-	20751	6
3-7/8	98.4	Straight		3350	3-5/16	84.1	1-1/8 NF	1	1	25.4	P-3	760	-	20751	6
4	101.6	Straight		3400	3-3/4	95.2	1-1/8 NF	1	1	25.4	P-2	760	-	20751	6
4	101.6	15	381	4450	3-1/8	79.3	7/8 NC	1	1	25.4	-	4760	770-B	551	6
4-1/8	104.7	Straight		3400	3-3/4	95.2	1-1/8 NF	1	1	25.4	P-2	760	-	20751	6
4-1/4	107.9	Straight		3400	3-3/4	95.2	1-1/8 NF	1	1	25.4	P-1	5060-AS	-	20751	6
4-1/4	107.9	36	91.4	4450	3-1/8	79.3	7/8 NC	1	1	25.4	-	4760	870-B	551	6
4-3/8	111.1	Straight		3400	3-3/4	95.2	1-1/8 NF	1	1	25.4	P-1	5060-AS	-	20751	6
4-1/2	114.3	Straight		3400	3-3/4	95.2	1-1/8 NF	1	1	25.4	P-0	5060-AS	-	20751	6
4-1/2	114.3	15	381	4450	3-1/8	79.3	7/8 NC	1	1	25.4	-	4760	870-B	551	6
4-1/2	114.3	24	609.6	4450	3-1/8	79.3	7/8 NC	1	1	25.4	-	4760	870-B	551	6
4-3/4	120.6	Straight		3400	3-3/4	95.2	1-1/8 NF	1	1	25.4	P-10	5060-AS	-	20751	6
4-13/16	122.2	18	457.2	4481	3-3/4	95.2	1-1/8 NF	1	1	25.4	-	5060-A	-	5051	6
5	127.0	Straight		3500	4-3/4	120.6	1-3/8 NF	1-1/4	1-1/4	31.8	TC-19-H-S	35260	-	21251-E	6
5	127.0	24	609.6	4481	3-3/4	95.2	1-1/8 NF	1	1-1/4	31.8	TC-19-H-S	35260	-	5051	6

Some items are available on a quotation basis only.

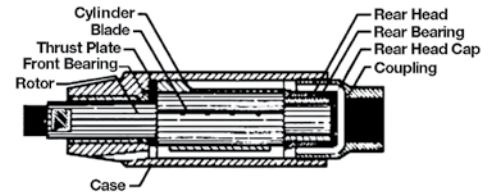
* Drill must be used with Universal Joint or flexible connection.

3000 Series Motors

3000 series straight motors, components and (ordering numbers)



All Motors include Shaft Wrench



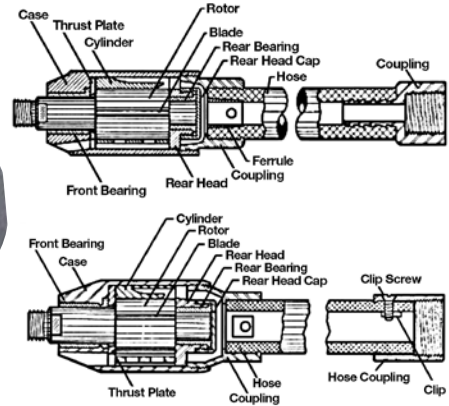
Motor Number	Motor O.D.	Tube I.D.	Case	Cylinder	Rear Head	Machine Coupling	Rotor	Blades (Qty.)	Thrust Plate	Front Bearing	Rear Bearing	Rear Head Cap	Front Dowel	Rear Dowel	Shaft Wrench	Rotor Thread	Hose Size
3150 (4075700)	1-3/8"	1-1/2"	31501 (1138900)	31502 (1139000)	31503 (1139100)	31504 (1139200)	31505 (1139300)	1806 (4) (1049100PT)	1707 (1047500)	X 1708 (1330400)	31509 (1139400)	-	31511 (1139500)	31512 (1139600)	9/16" (14-0809)	9/16" N.C.	1/2"
3162 (4075800)	1-1/2"	1-5/8"	31621 (1139900)	31622 (1140000)	31623 (1140100)	31624 (1140200)	31625 (1140300)	1806 (4) (1049100PT)	1807 (1049200)	X 1808 (1330500PT)	31629 (1140500)	-	31511 (1139500)	31512 (1139600)	5/8" (14-0810)	5/8" N.C.	1/2"
3175 (4075900)	1-5/8"	1-3/4"	31751 (1140600)	31622 (1140000)	31623 (1140100)	31624 (1140200)	31625 (1140300)	1806 (4) (1049100PT)	1807 (1049200)	X 1808 (1330500PT)	31629 (1140500)	-	31511 (1139500)	31512 (1139600)	5/8" (14-0810)	5/8" N.C.	1/2"
3187 (4076000)	1-3/4"	1-7/8"	31871 (1140900)	31872 (1141000)	31873 (1141100)	31874 (1141200)	31875 (1141300PT)	2306 (4) (1053700)	22307 C (1138800)	2208 (1053100)	32129 (1142900)	-	31811 (1140700)	31812 (1140800)	5/8" (14-0810)	5/8" N.C.	3/4"
3200 (4076100)	1-7/8"	2"	32001 (1141400PT)	32002 (1141500)	32003 (1141600)	32004 (1141700)	32005 (1141800)	2306 (4) (1053700)	2307 (1053800)	2208 (1053100)	32009 (1141900)	3213 (1071300)	31811 (1140700)	32012 (1715981)	5/8" (14-0810)	5/8" N.C.	3/4"
3212 (4076200)	2"	2-1/8"	32121 (1142200)	32122 (1142400)	32123 (1142500)	32124 (1142600)	32125 (1142700)	21606 (4) (1135800)	21607 (1135900)	2208 (1053100)	32129 (1142900)	4413 (1081500)	32011 (1142000)	32112 (1142100)	5/8" (14-0810)	5/8" N.C.	3/4"
3225 (4076300)	2-1/8"	2-1/4"	32251 (1143000)	32252 (1143200)	32253 (1143300)	32254 (1143400)	32255 (1143700)	21506 (5) (1134300)	1507 (1045800)	1408 (1045500)	32009 (1141900)	3213 (1071300)	32011 (1142000)	32112 (1142100)	3/4" (14-0812)	3/4" N.C.	3/4"
3250 (4076500)	2-5/16"	2-1/2"	32501 (1144600)	32502 (1144800)	32503 (1144900)	32504 (1145000)	32505 (1145100)	21406 (5) (1133000)	21407 (1133100)	21408 (1133200)	32009 (1141900)	3213 (1071300)	32511 (1145200)	32512 (1145300)	7/8" (14-0814)	7/8" N.C.	1"
3262 (4076600)	2-1/2"	2-5/8"	32621 (1145600)	32622 (1145800)	32623 (1145900)	32624 (1146000)	32755 (1146600)	21306 (5) (1131700)	21907 (1137700)	1008 (1040700)	32759 (1146700)	213 (1022300PT)	32611 (1145400)	32612 (1145500)	7/8" (14-0814)	7/8" N.C.	1"
3275 (4076700)	2-5/8"	2-3/4"	32751 (1146100)	32752 (1146300)	32753 (1146400)	32754 (1146500)	32755 (1146600)	21306 (5) (1131700)	21307 (1131800)	1008 (1040700)	32759 (1146700)	213 (1022300PT)	32611 (1145400)	32612 (1145500)	7/8" (14-0814)	7/8" N.C.	1"
3300 (4076900)	2-13/16"	3"	33001 (1146900)	33002 (1147000)	33003 (1147100)	33004 (1147200)	33005 (1147400)	21006 (5) (1121500)	21007 (1121600)	1108 (1043400)	33009 (1147500)	713 (1030700)	32611 (1145400)	32612 (1145500)	1" (3241600)	1" N.F.	1"
3318 (4077200)	3"	3-3/16"	33181 (1148100)	33252 (1148600)	33253 (1148700)	33254 (1148800)	33255 (1149000)	20706 (5) (1116200)	20907 (1119300)	1108 (1043400)	33009 (1147500)	713 (1030700)	33211 (1148200)	33212 (1148300)	1" (3241600)	1" N.F.	1"
3350 (4077500)	3-5/16"	3-5/8"	33501 (1149200)	33502 (1149500PT)	33503 (1149600PT)	33504 (1149700)	33505 (1149900)	20706 (5) (1116200)	20707 (1116300)	20708 (1116400)	33009 (1147500)	713 (1030700)	33211 (1148200)	33212 (1148300)	1-1/8" (3241800)	1-1/8" N.F.	1"
3400 (4077900)	3-3/4"	4"	34001 (1150800)	34002 (1151100)	34003 (1151200)	34004 (1151300)	34005 (1151600)	20706 (5) (1116200)	34007 (1151800)	20708 (1116400)	33009 (1147500)	713 (1030700)	33211 (1148200)	33212 (1148300)	1-1/8" (3241800)	1-1/8" N.F.	1"
3500 (4078500)	4-3/4"	5"	35001 (1153100)	35502 (1155300)	35503 (1155400)	35504 (1155500)	35505 (1155800)	21206 (5) (1125300)	35507 (1155900)	21208 (1125400)	33009 (1147500)	713 (1030700)	33211 (1148200)	33212 (1148300)	1-3/8" (3241900)	1-3/8" N.F.	1"
3600 (4078900)	5-3/4"	6"	36001 (1156100)	35502 (1155300)	35503 (1155400)	35504 (1155500)	35505 (1155800)	21206 (5) (1125300)	35507 (1155900)	21208 (1125400)	33009 (1147500)	713 (1030700)	33211 (1148200)	33212 (1148300)	1-3/8" (3241900)	1-3/8" N.F.	1"

Motors for tube/pipe sizes larger than 5" ID are supplied with ribs or rib cage to center the motor in tube or pipe being cleaned.

4000 Series Motors

4000 Series Motors

4000 series motors, components and (ordering numbers)

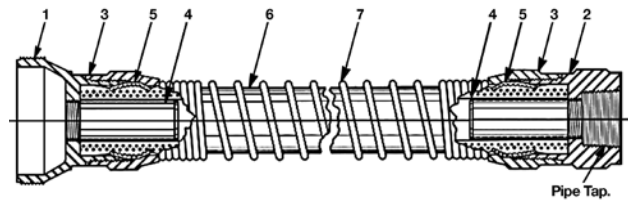


Motor Number	Motor O.D.	Tube I.D.	Case	Cylinder	Rear Head	Machine Coupling	Rotor	Blades (Qty.)	Thrust Plate	Front Bearing	Rear Bearing	Rear Head Cap	Front Dowel	Rear Dowel	Tail Hose Assembly*	Shaft Wrench	Rotor Thread	Hose Size
4250 (4080300)	1-7/8"	2-1/4 X 15R 2-15/16 X 12R 2-1/2 X 15R	42501 (1162700)	42502 (1162900)	42503 (1163000)	42504 (1163100)	42505 (1163700)	4406 (4) (1081300)	2307 (1053800)	4408 (1081400)	42509 (1163800)	4413 (1081500)	32011 (1142000)	42512 (1163900)	Line A Below	5/8" (14-0810)	5/8" N.C.	1/2"
4300 (4080500)	2-1/4"	2-5/8 X 24R 2-3/4 X 12R	43001 (1164400)	43002 (1164800)	43003 (1164900)	43004 (1165000)	43005 (1165500)	3306 (5) (1072600)	3307 (1072700)	3308 (1072800)	32009 (1141900)	3213 (1071300)	43011 (1165700)	43012 (1165800)	Line B Below	3/4" (14-0812)	3/4" N.C.	3/4"
4325 (4080700)	2-1/2"	2-7/8 X 28R 3 X 16R	43251 (1166800)	43252 (1167000)	43253 (1167100)	43254 (1167200)	43255 (1167900)	3206 (5) (1071100)	3207 (1071200)	3308 (1072800)	32009 (1141900)	3213 (1071300)	43211 (1166600)	43212 (1166700)	Line B Below	3/4" (14-0812)	3/4" N.C.	3/4"
4350 (4080800)	2-3/4"	3-1/4 X 16R 3-1/2 X 20R	43501 (1168100)	43502 (1168200)	43503 (1168300)	43504 (1168400)	43505 (1168800)	3706 (5) (1077900)	3307 (1078000)	3708 (1078100)	32759 (1146700)	213 (1022300PT)	32311 (1143900)	43512 (1168900)	Line B Below	7/8" (14-0814)	7/8" N.C.	1"
4450 (4081100)	3-1/8"	4 X 15R	44501 (1169800)	44502 (1170200)	44503 (1170300)	44504 (1170400)	44505 (1170600)	4706 (5) (1082900)	507 (1026400)	4708 (1083000PT)	33009 (1147500)	713 (1030700)	33212 (1148300)	44512 (1170700)	Line B Below	7/8" (14-0814)	7/8" N.C.	1"
4481 (4081400)	3-3/4"	4-13/16 X 18R	44811 (1170800)	44812 (1170900)	34003 (1151200)	34004 (1151300)	44815 (1171100)	5006 (5) (1083700)	34007 (1151800)	5008 (1083800)	33009 (1147500)	713 (1030700)	33212 (1148300)	44512 (1170700)	Not Req'd	1-1/8" (3241800)	1-1/8" N.C.	1"
4600 (4081800)	5"	5-3/4 X 72R 6 X 26R	46001 (1171900)	44812 (1170900)	34003 (1151200)	34004 (1151300)	44815 (1171100)	5006 (5) (1083700)	34007 (1151800)	5008 (1083800)	33009 (1147500)	713 (1030700)	33212 (1148300)	44512 (1170700)	Not Req'd	1-1/8" (3241800)	1-1/8" N.C.	1"

*Includes Machine Coupling

Motors are supplied with ribs or rib cage for tube/pipe sizes larger than 6" ID.

Line Number	Tap Size	Tail Hose	Hose Coupling	Clip	Screw	Ferrule
A	1/2"	4415 (1081600)	4116 (1079000)	-	-	4418 (1081700)
B	1"	3315 (1072900)	3316 (1073100PT)	3317 (1073200)	3318 (8010065)	-

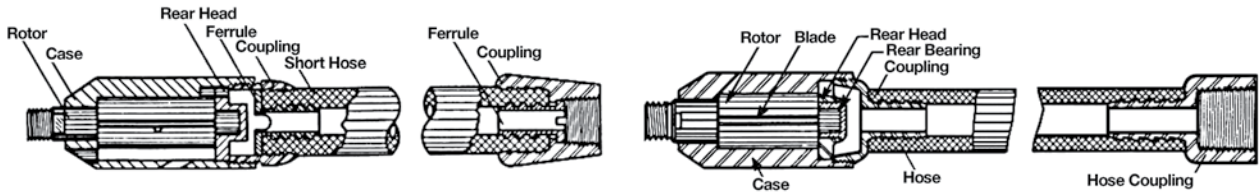


Accessory Heavy Duty Screw Type Tail Hose Assemblies with Wire Inserted Hose and Spring Protector for 4000 Series Motors

Tail Hose Assembly	Used With Motor Assembly									
		Machine Coupling	Hose Coupling	Hose Pipe Tap	Compression Nut	Compression Ferrule	Compression Sleeve	Hose	Spring	
		Detail #	1	2	-	3	4	5	6	7
425019 HD (4092100)	4250	42504 KB (1716866)	425016 (1186900)	1/2"	42504 C (1163300)	42504 D (1163400)	42504 E (1163500)	425015 (1186800)	425017 (1186950)	
430019 HD (4092200)	4300	43004 B (1165000)	432516 (1187300)	3/4"	43254 C (1167400)	43254 D (1167500)	43254 E (1167600)	432515 K (1187250)	43254 K (1167700)	
432519 HD (4092350)	4325	43254 KB (1167800)	432516 (1187300)	3/4"	43254 C (1167400)	43254 D (1167500)	43254 E (1167600)	432515 K (1187250)	43254 K (1167700)	
435019 HD (4092400)	4350	43504 B (1168500)	435016 (1187600PT)	1"	43504 C (1168600)	43254 D (1167500)	43254 E (1167600)	432515 K (1187250)	43254 K (1167700)	
445019 HD (4092500)	4450	44504 B (1170500)	435016 (1187600PT)	1"	43504 C (1168600)	43254 D (1167500)	43254 E (1167600)	432515 K (1187250)	43254 K (1167700)	
460019 HD (4092501)	4600	46004 B (1171950)	460016 (1188010)	1"	46004 C (1171960)	46004 D (1171970)	46004 E (1171980)	460015 K (1188020)	46004 K (1717471)	

60 & 4000 Series Motors

60 & 4000 series motors, components and (ordering numbers)



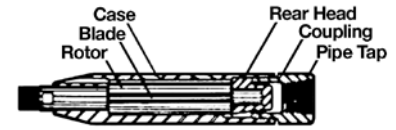
Motor Number	Motor O.D.	Tube I.D. (Radius)	Case	Rear Head w/ Bearing	Machine Coupling	Rotor	Blades (4 req.)	Rear Bearing	Rear Dowel (Qty.)	Tail Hose	Tail Hose Coupling	Tail hose Assembly	Front Ferrule	Rear Ferrule	Shaft Wrench	Rotor Thread	Hose Size
X 64 (4090200)	1 1/16"	13/16" (5")	X 6401 (1334800)	X 6403 (1334900)	X 6404 (1335000)	X 6405 (1335200)	X 6406 (1335300)	-	X 6412 (2) (1335400)	X 6415 (1335500)	X 6416 (1335600)	X 6419	X 6417 (1335700)	X 6418 (1335800)	3/16" (3240200)	1/4" N.F.	1/4"
X 61 (4089900)	7/8"	1-1/32" (5")	X 6101 (1331200)	X 6103 (1331300)	X 6104 (1331400)	X 6105 (1331600)	X 6106 (1331700)	-	X 6112 (2) (1331800)	X 6115 (1331900)	X 6116 (1332000)	X 6119	X 6117 (1332100PT)	X 6118 (1332200)	1/4" (14-0804)	5/16" N.F.	1/4"
X 63 (4090000)	1-1/16"	1-1/4" (6")	X 6301 (1333300)	X 6303 (1333400)	X 6304 (1333500)	X 6305 (1333700)	X 6306 (1333800)	-	X 6312 (2) (1334000)	X 6315 (1334100)	X 6316 (1334200)	X 6319	X 6317 (1334300)	X 6318 (1334400)	5/16" (14-0805)	3/8" N.F.	3/8"
X 65 (4090300)	1-3/16"	1-1/2" (6")	X 6501 (1336300PT)	X 6503 (1336400)	X 6504 (1336500)	X 6505 (1336700)	X 6506 (1336800)	-	X 6312 (2) (1334000)	X 6315 (1334100)	X 6316 (1334200)	X 6519	X 6317 (1334300)	X 6318 (1334400)	5/16" (14-0805)	3/8" N.F.	3/8"
X 66 (4090500)	1-5/16"	1-3/4" (6")	X 6601 (1337300)	X 6603 (1337400)	X 6604 (1337500)	X 6605 (1337700)	X 6606 (1337800)	-	X 6312 (2) (1334000)	X 6315 (1334100)	X 6316 (1334200)	X 6619	X 6617 (1337900)	X 6318 (1334400)	3/8" (2902629)	3/8" N.F.	3/8"
4200 (4080000)	1-1/2"	1-5/8" (24") 1-3/4" (15")	42001 G (1161300)	42003 (1161500)	42004 (1161600)	42005 (1161800)	4106 (1078800)	42009 (1162100)	42012 (1162200)	4115 (1078900)	4116 (1079000)	42019 (4091500)	1 AJ243 (1716170)	1 AJ243 (1716170)	5/8" (14-0810)	5/8" N.C.	1/2"
4225 (4080100)	1-3/4"	2" (15")	42251 G (1162500)	42003 (1161500)	42004 (1161600)	42005 (1161800)	4106 (1078800)	42009 (1162100)	42012 (1162200)	4115 (1078900)	4116 (1079000)	42019 (4091500)	1 AJ243 (1716170)	1 AJ243 (1716170)	5/8" (14-0810)	5/8" N.C.	1/2"

Midget Motors

Midget Motors

For 1/2" - 1-3/8" I.D. tubes

Straight tube midget motors, components and (ordering numbers)

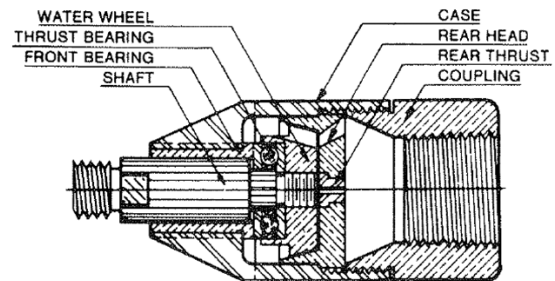


Motor Number	Motor O.D.	Tube I.D.	Case	Rear Head	Machine Coupling	Rotor	Rotor Blade (Qty.)	Dowel pin (Qty.)	Shaft Wrench	Rotor Thread	Air Hose
24 (4074900)	15/32"	1/2"	X 2401 (1056400)	2403 (1056500)	2404 (1056600)	2405 (1056700)	2406 (4) (1056800)	2412 (1056900)	5/32" (3240100)	10-32	3/16"
30 (4075400)	37/64"	5/8"	X 3001 (1067100)	X 3003 (1067300)	X 3004 (1067400)	X 2705 (1063000)	2706 (4) (1063100)	3012 (1067500)	3/16" (3240200)	1/4" N.F.	1/4"
27 (4075100)	11/16"	3/4"	X 2701 (1062600)	X 2703 (1062800)	2704 (1062900PT)	X 2705 (1063000)	2706 (4) (1063100)	3012 (1067500)	3/16" (3240200)	1/4" N.F.	1/4"
29 A (4075310)	25/32"	7/8"	2901 A (1064901)	2903 A (1065001)	2904 (1065100)	2605 (1060800PT)	2606 (4) (1060900)	X 6112 (1331800)	5/16" (14-0805)	3/8" N.F.	3/8"
26 (4075000)	29/32"	1"	2601 G (1060500)	2603 (1060600)	2604 (1060700)	2605 (1060800PT)	2606 (4) (1060900)	X 6312 (1334000)	5/16" (14-0805)	3/8" N.F.	3/8"
31 (4075600)	1-1/32"	1-1/8"	3101 (1069800)	3103 (1069900)	3104 (1070000)	3105 (1070100)	3106 (4) (1070200PT)	3111 (1070300)	5/16" (2902629)	3/8" N.F.	3/8"
X 63 A (4090100)	1-1/16"	1-1/4"	X 6301 (1333300)	X 6303 (1333400)	X 6304 A (1333600)	X 6305 (1333700)	X 6306 (4) (1333800)	X 6312 (2) (1334000)	5/16" (14-0805)	3/8" N.F.	3/8"
X 65 A (4060400)	1-3/16"	1-3/8"	X 6501 (1336300PT)	X 6503 (1336400)	X 6504 A (1336600)	X 6505 (1336700)	X 6506 (4) (1336800)	X 6312 (2) (1334000)	5/16" (14-0805)	3/8" N.F.	3/8"

Water Driven Motors

For 2" and 3-3/4" I.D. tubes

Water driven motors are used only in the overhead cleaning of vertical catalyst tubes.



Model Number	Motor O.D.	Tube I.D.	Case	Water Wheel	Rear Head	Machine Coupling	Pipe Tap	Shaft	Thrust Bearing	Front Bearing	Rear Thrust	Shaft Wrench	Shaft Thread	Hose
W-7 (4088200)	3-1/2"	3-3/4"	W 701 (1319300)	W 702 (1319400PT)	W 703 (1319500)	W 10704 (1326000)	1-1/2"	W 905 (1319900)	W 907 (1320000)	W 908 (1320100)	W 910 (1320200)	7/8" (14-0814)	7/8" N.C.	1-1/2"
W-16-A (4089200)	1-11/16"	2"	W 1601 A (1323300)	W 1602 (1323400)	W 1603 A (1323600)	W 1604 A (1323800)	3/4"	W 1605 (1323900)	W 1607 (1324000)	W 1608 (1324100)	W 1610 (1324200)	5/8" (14-0810)	5/8" N.C.	3/4"

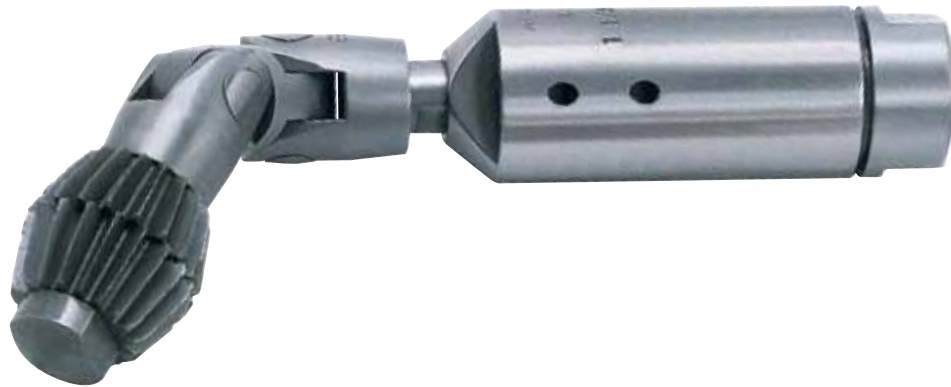
* Other sizes available. Contact customer service for details

Gas Line Cleaners

**Range: 3/4 to 1-1/2 in.
19.05 to 38.10 mm**

Used successfully by gas utilities for cleaning old service lines before inserting new plastic and copper tubing. The thorough cleaning action of the barrel-shaped cutter head assures the removal of material that could cut or rupture the renewal tubing.

- Renews gas service lines instead of replacing them
- Complete kit consists of: motor, with an extra set of blades; head; lubricator; wire wound hose; spare cutters and a metal carrying case
- Other sizes available on request



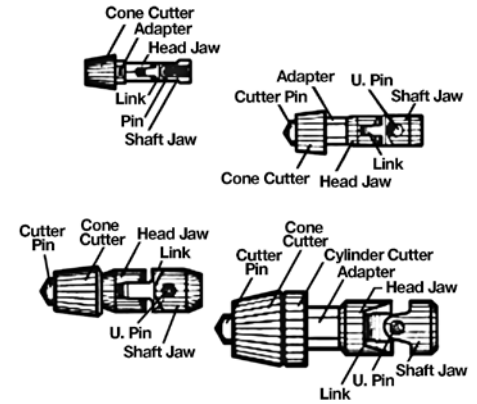
Cleaner Complete	Order Number	Pipe I.D.		Motor Assembly		Motor Diameter		Head Assembly		Air Inlet		Hose Size		Hose Length	
		in.	mm	Model	Order No.	in.	mm	Model	Order No.	in.	mm	in.	mm	ft	M
27 GLC 50	4105416	3/4	19.05	27	4075100	11/16	17.46	2740 S	4104802	1/4	6.35	1/4	6.35	50	15.24
X 64 GLC 50		1	25.4	X 64	4090200	11/16	17.46	2640 S		1/4	6.35	1/4	6.35	50	15.24
X 61 GLC 50		1-1/8	28.58	X 61	4089900	7/8	22.23	3140 S		1/4	6.35	1/4	6.35	50	15.24
X 63 A GLC 25	4105354	1-1/4	31.7	X 63 A	4090100	1-1/16	26.9	6340 S	4104903	3/8	9.5	3/8	9.5	25	7.62
X 63 A GLC 50	4105355	1-1/4	31.7	X 63 A	4090100	1-1/16	26.9	6340 S	4104903	3/8	9.5	3/8	9.5	50	15.24
X 65 GLC 25	4105573	1-1/2	38.1	X 65	4090300	1-3/16	30.16	6340 S	4104903	3/8	9.5	3/8	9.5	25	7.62
X 65 A GLC 25	4104724	1-1/2	38.1	X 65 A	4090400	1-3/16	30.1	1740 S		3/8	9.5	3/8	9.5	25	7.62
X 65 A GLC 50	4105359	1-1/2	38.1	X 65 A	4090400	1-3/16	30.1	1740 S		3/8	9.5	3/8	9.5	50	15.24

* Other sizes may be available. Contact customer service for details

Type 1 - Single Unit Heads

1/2" - 2-1/4" I.D. "Series 40"

Single unit heads, components and (ordering numbers)



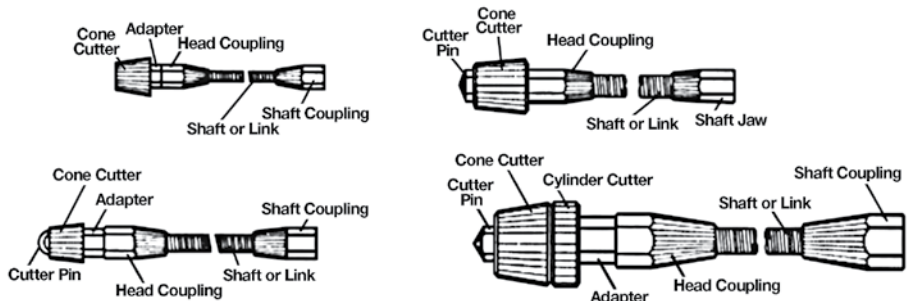
Head Number	Tube I.D.	Universal Joint	Shaft Jaw Tap	Adapter	Cutter Pin	Cone Cutter (qty.)	Cylinder Cutter
2440 (4051800)	1/2"	2451 (4094800)	10-32	2443 (1057000)	-	2487 S (1058400)	-
3040 (4053200)	5/8" 11/16"	PA 3051 (4098200)	1/4" N.F.	2734 (1063300)	-	3037 (10681000)	-
2740 (4052400)	3/4" 13/16"	PA 3051 (4098200)	1/4" N.F.	2734 (1063300)	-	C 3 (1212500)	-
2740 S (4104802PT)	3/4" 13/16"	6451 (4096500)	1/4" N.F.	-	2944 (1065900)	2947 S (2) (1066100PT)	-
X 6440 (4074400)	13/16"	6451 (4096500)	1/4" N.F.	-	2944 (1065900)	2947 (1066000)	-
2940 (4052800)	27/32" 7/8"	2651 (4094900)	3/8" N.F.	2943 (1065800)	2944 (1065900)	2947 (1066000)	-
2640 (4052100)	1"	2651 (4094900)	3/8" N.F.	2643 (1061200)	2644 (1061400)	337 (1025700)	-
X 6140 (4074000PT)	1-1/32"	6151 (4096100PT)	5/16" N.F.	-	2644 (1061400)	337 (1025700)	-
3140 (4053800)	1-1/8"	6651 (4096700)	7/16" N.F.	-	3144 A (1070500)	2837 (1064600)	-
X 6340 (4074200)	1-1/4"	6651 (4096700)	3/8" N.F.	-	2544 S (1059400)	947 (1038700)	-
12240 (4059200)	1-1/4" 1-1/2"	3151 (4095000)	7/16" N.F.	-	2544 S (1059400)	947 (1038700)	-
X 6540 (4074600)	1-3/8"	6651 (4096700)	3/8" N.F.	-	2544 S (1059400)	6547 (1097600)	-
1740 (4050500)	1-1/2"	31551 (4097500)	9/16" N.F.	1743 (1047801)	2844 (1064800)	1097 (1043100)	1088 (1042800)
1940 (4051000)	1-5/8"	4151 (4095600)	5/8" N.C.	1943 (1051400)	1944 (1051500)	797 (1034500)	788 (1034300)
X 6640 (4074800)	1-3/4"	6651 (4096700)	3/8" N.F.	-	2544 S (1059400)	897 B (1038300)	-
4140 (4054900)	1-5/8" 2"	4151 (4095600)	5/8" N.C.	1943 (1051400)	1944 (1051500)	897 B (1038300)	888 B (1037700)
4440 C (4055300)	2-1/4"	4151 (4095600)	5/8" N.C.	1943 (1051400)	1944 (1051500)	897 (1038100)	888 (1037600)

Type 2 Single Unit Heads

Airetool

1/2" - 2-1/8" I.D. "Series 30"

Single unit heads, components and (ordering numbers)



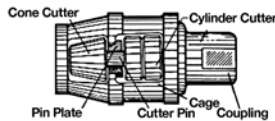
Head Number	Tube I.D.	Flex Connection	Shaft Cpl. Tap	Head Cpl. Tap	Adapter	Cutter Pin	Cone Cutter	Cylinder Cutter	Length	Diameter
2430 (4051700)	1/2"	2461 A (4035500)	10-32	10-32	2443 (1057000)	-	2487 S (1058400)	-	4"	3/16"
3030 (4053100)	5/8"	X 6461 A (4046200)	1/4" N.F.	1/4" N.F.	2734 (1063300)	-	3037 (1068100)	-	4"	3/16"
2730 (4052300)	3/4"	X 6461 A (4046200)	1/4" N.F.	1/4" N.F.	2734 (1063300)	-	C 3 (1212500)	-	4"	3/16"
X 6430 (4074300)	13/16"	X 6461 A (4046200)	1/4" N.F.	1/4" N.F.	-	2944 (1065900)	2947 (1066000)	-	4"	3/16"
2930 (4052700)	7/8"	2961 A (4036500)	3/8" N.F.	3/8" N.F.	2943 (1065800)	2944 (1065900)	2947 (1066000)	-	4-1/2"	1/4"
12130	1"	12161 A (4038300)	5/16" N.F.	5/16" N.F.	-	2644 (1061400)	337 (1025700)	-	4-1/2"	1/4"
2630 (4052000)	1"	2661 A (4036200)	3/8" N.F.	5/16" N.F.	-	2644 (1061400)	337 (1025700)	-	4-1/2"	1/4"
X 6130 (4073900)	1-1/32"	X 6161 A (4045000)	5/16" N.F.	5/16" N.F.	-	2644 (1061400)	337 (1025700)	-	4"	3-16
3130 (4053700)	1-1/8"	X 6361 A (4045600)	7/16" N.F.	3/8" N.F.	-	3144 A (1070500)	2837 (1064600)	-	4-1/2"	1/4"
X 6330 (4074100)	1-1/4"	X 6361 A (4045600)	3/8" N.F.	7/16" N.F.	-	2544 S (1059400)	947 (1038700)	-	4-1/2"	1/4"
X 6530 (4074500)	1-1/2"	X 6661 A (4046800)	3/8" N.F.	7/16" N.F.	-	2544 S (1059400)	6547 (1097600)	-	6-1/2"	3/8"
X 6630 (4074700)	1-3/4"	X 6661 A (4046800)	3/8" N.F.	7/16" N.F.	-	2544 S (1059400)	797 (1034500)	-	6-1/2"	3/8"
4130 (4054800)	1-5/8" 2-1/8"	4161 A (4037100)	5/8" N.C.	5/8" N.C.	1943 (1051400)	1944 (1051500)	897 B (1038300)	888 B (1037700)	7"	1/2"

Type 3 - Single Expansion "P" & "TC" Heads

1-1/2" - 7" I.D. for Straight Tubes and Drill Pipe

Single expansion heads, components and (order numbers)

- "PY" heads developed specifically for the rigorous conditions found in Pipe Yard applications
- "PY" heads have larger diameter front ends and stronger coupling studs that increase durability



Head Number	Tube I.D.	Closed	Expands To	Cage	Pin Plate	Head Coupling	Tap Coupling	Cutter Pin (qty.)	Cone Cutter (qty.)	Cylinder Cutter (qty.)
TC 14 (4072000)	1-1/2"	1-3/8"	1-23/32"	1781 (1048300)	-	1783 (1048500)	9/16"	1584 (1), 1884 (1) (1046600) (1051100PT)	1787 (1) (1048600)	1788 (2) (1048800)
TC 11 (4071500)	1-3/4"	1-5/8"	2"	1881 (1050700)	-	1883 (1051000)	5/8"	1584 (1), 1884 (1) (1046600) (1051100PT)	1587 (1) (1046700)	1588 (2) (1047000)
TC 17 PY (4105583)	1-7/8"	1-11/16"	2"	2281 T C 17 PY (1717018)	-	2383 (1055400)	5/8"	1584 PY (3) (1716989)	2287 (3) (1053400)	2288 (6) (1053500)
TC 16 PY (4105566)	2"	1-13/16"	2-3/16"	2381 PY (1716988)	-	2383 (1055400)	5/8"	1584 PY (3) (1716989)	1787 (3) (1048600)	1788 (6) (1048800)
TC 13 PY (4105569)	2-1/8"	1-5/16"	2-5/16"	2381 A PY (1716995)	-	2383 (1055400)	5/8"	1584 PY (3) (1716989)	1787 (3) (1048600)	1788 (6) (1048800)
P 15 PY (4105570)	2-1/4"	2-1/16"	2-7/16"	P 1591 PY (1716997)	P 1592 (1294400)	183 (1019900)	3/4"	2484 PY (3) (1716998)	2487 (3) (1058200)	2488 (6) (1717384)
P 9 S (4070300)	2-3/8"	2-3/16"	2-11/16"	P 991 S (1292700)	P 992 S (1293400)	183 (1019900)	3/4"	2484 (3) (1057900)	C 52 (3) (1217500PT)	C 76 (6) (1218400)
P 9 PY (4105567)	2-1/2"	2-1/4"	2-13/16"	P 991 PY (1716990)	P 992 (1293300)	183 (1019900)	3/4"	1584 PY (3) (1716989)	1587 (3) (1046700)	1588 (6) (1047000)
P 8 (4069400)	2-5/8"	2-9/16"	2-7/8"	P 891 (1291800)	P 892 (1292300)	21483 (1133700)	7/8"	184 (3) (1020300)	1087 (3) (1042700)	1088 (6) (1042800)
P 7 (4068900)	2-3/4"	2-9/16"	2-15/16"	P 791	P 792	983 S (1039800)	7/8"	184 (3) (1020300)	1087 (3) (1042700)	1088 (6) (1042800)
P 6 A PY (4105591)	3"	2-11/16"	3-1/8"	P 691 A PY (1717032)	P 692 A (1290700)	983 S (1039800)	7/8"	184 PY (3) (1717033)	1087 (3) (1042700)	1088 (6) (1042800)
P 6 (4068900)	3-1/8"	2-13/16"	3-1/4"	P 691 AY	P 692 (1290600)	983 S (1039800)	7/8"	184 (3) (1020300)	1087 (3) (1042700)	1088 (6) (1042800)
P 5 (4067400)	3-1/4"	3-1/16"	3-9/16"	P 591 (1289100)	P 592 (1289600)	983 S (1039800)	7/8"	184 (3) (1020300)	987 (3) (1040000)	988 (6) (1040100PT)
P 4 (4066900PT)	3-1/2"	3-3/16"	3-13/16"	P 491 (1288500PT)	P 492 (1289000)	883 D (1036100)	7/8"	884 (3) (1036700)	787 (3) (1034200)	788 (6) (1034300)
P 3 (4066400)	3-3/4"	3-9/16"	4-3/16"	P 391 (1287900)	P 392 (1288300)	883 F (1036400)	7/8"	884 (3) (1036700)	887 B (3) (1037300)	888 B (6) (1037700)
P 2 (4065900)	4"	3-3/4"	4-1/2"	P 291 (1287100)	P 292 (1287700)	883 F (1036400)	7/8"	884 (3) (1036700)	887 (3) (1037100)	888 (6) (1037600)
P 1	4-1/4"	3-13/16"	4-3/4"	P 191	P 192	883 F (1036400)	1 1/8"	884 P (3) (1036800)	887 (3) (1037100)	888 (6) (1037600)
P 0	4-1/2"	4-1/8"	4-15/16"	P 091 (1286300)	P 092 (1286600)	883 F (1036400)	1 1/8"	884 P (3) (1036800)	887 B (3) (1037300)	888 B (6) (1037700)
P 10 (4070800)	4-3/4"	4-3/8"	4-15/16"	P 1091 (1293500)	P 1092 (1293800)	883 F (1036400)	1 1/8"	884 P (3) (1036800)	887 (3) (1037100)	888 (6) (1037600)
TC 19 H S	5"	4-1/2"	5-9/16"	1991 H S	-	21283	1 3/8"	884 P (3) (1036800)	1287 (3) (1044300)	1288 (9) (1044400)
TC 19 S	5-1/4"	4-7/8"	5-15/16"	1991 S	-	8293 (1111010)	1 3/8"	884 P (4) (1036800)	1287 (4) (1044300)	1288 (12) (1044400)
TC 20 S (4073200)	6"	5-1/2"	6-1/2"	2091 S (1052800)	-	8293 (1111010)	1 3/8"	884 P (4) (1036800)	1287 (4) (1044300)	1288 (12) (1044400)
TC 21 S	6-1/4"	5-3/4"	6-3/4"	2191 S	-	8293 (1111010)	1 3/8"	884 P (4) (1036800)	11887 (4)	11888 (12)
TC 22 S	6-1/2"	6"	7-1/16"	2291 S	-	8293 (1111010)	1 3/8"	884 P (4) (1036800)	11887 (4)	11888 (12)
TC 23 S	6-3/4"	6-1/4"	7-5/16"	2391 S	-	8293 (1111010)	1 3/8"	2484 S (4) (1058100)	8287 (4)	8288 (12)
TC 24 S	7"	6-1/2"	7-9/16"	2491 S	-	8293 (1111010)	1 3/8"	2484 S (4) (1058100)	8287 (4)	8288 (12)

Type 4 - Forward Swing Arm Heads



1-3/4" - 4-3/4" I.D. for Straight Tubes, Bent Tubes and Drill Pipe

Forward swing arm heads, components and (ordering numbers)

Recommended spare parts: cone cutters and cutter pins, cutter arms and arm pins.

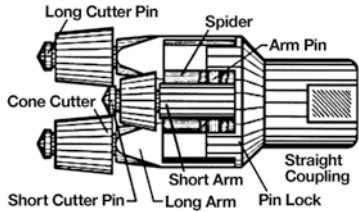


Figure 1 Shown with head coupling for straight tubes.

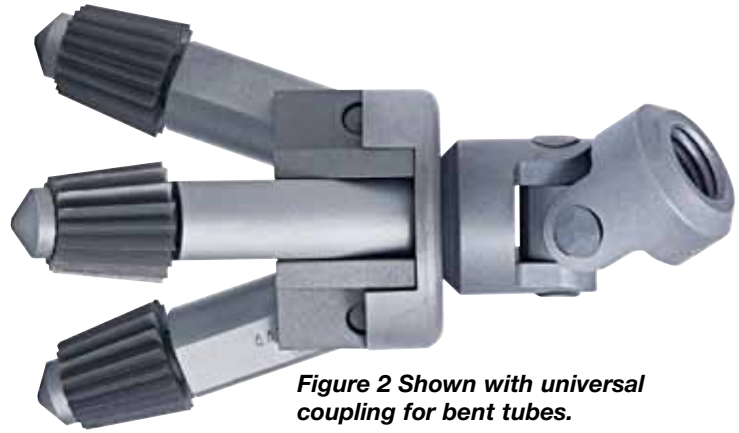


Figure 2 Shown with universal coupling for bent tubes.



Head Number	Tube I.D.	Closed	Expands To	Spider	Figure	Long Arm (qty.)	Short Arm (qty.)	Head Cpl.	Cpl. Tap	Long Cutter Pin (qty.)	Short Cutter Pin (qty.)	Arm Pin (qty.)	Pin Lock (qty.)	Cone Cutter (qty.)	Star Cutter (qty.)	No. of Arms
1840 (4050700)	1-3/4"	1-1/2"	2-1/8"	1841 (1049800)	1	1842 (1) (1049900)	1842 A (1) (1050000)	-	5/8" N.C.	1834 (1) (1049600)	1834 A (1) (1049700)	1845 (2) (1050100PT)	1846 (1050202)	337 (2) (1025700)	338 (3) (1025905)	2
1840 B (4050800)	2-1/4"	1-1/2"	2-1/8"	1841 (1049800)	2	1842 (1) (1049900)	1842 A (1) (1050000)	MM 66 (1279200)	5/8" N.C.	1834 (1) (1049600)	1834 A (1) (1049700)	1845 (2) (1050100PT)	1846 (1050202)	337 (2) (1025700)	338 (3) (1025905)	2
2340 (4051400)	2"	1-7/8"	3"	2341 (1054000)	1	1832 (1) (1049400PT)	1832 A (1) (1049500PT)	-	5/8" N.C.	1834 (1) (1049600)	1834 A (1) (1049700)	2345 (2) (1054300)	2346 (1054400)	337 (2) (1025700)	338 (3) (1025905)	2
4440 (4052000)	2"	1-7/8"	3"	2341 (1054000)	2	1832 (1) (1049400PT)	1832 A (1) (1049500PT)	MM 66 (1279200)	5/8" N.C.	1834 (1) (1049600)	1834 A (1) (1049700)	2345 (2) (1054300)	2346 (1054400)	337 (2) (1025700)	338 (3) (1025905)	2
4470 (4055400)	2-5/16"	2"	3-7/8"	4471 (1082200)	2	4472 (3) (1082300)	-	MM 66 (1279200)	5/8" N.C.	4474 (3) (1082400)	-	4475 (3) (1082500)	4476 (1082600)	C 19 (3) (1214100)	-	3
4470 A (4055500)	2-5/16"	2"	3-7/8"	4471 (1082200)	1	4472 (3) (1082300)	-	2383 B (1055600)	3/4" N.C.	4474 (3) (1082400)	-	4475 (3) (1082500)	4476 (1082600)	C 19 (3) (1214100)	-	3
3370 (4054400)	2-1/4"	2-1/4"	3-5/8"	3371 (1075500)	2	3372 (3) (1075600)	-	3551 (4095400)	3/4" N.C.	3374 (3) (1075700)	-	3375 (3) (1075800)	3376 (1075900)	637 (3) (1028800)	-	3
3370 A (4054500)	2-3/4"	2-1/4"	3-5/8"	3371 (1075500)	1	3372 (3) (1075600)	-	2043 7/8 (1052600)	7/8" N.C.	3374 (3) (1075700)	-	3375 (3) (1075800)	3376 (1075900)	637 (3) (1028800)	-	3
3270 (4054000)	3"	2-1/2"	4"	3271 (1071700)	2	3472 (2) (1076100)	3272 (2) (1071800)	3551 (4095400)	7/8" N.C.	3474 (2) (1076200)	3274 (2) (1071900)	3275 (2) (1072000)	3276 (1072200)	1047 (2) (1041700)	2837 (2) (1064600)	4
3270 A 7/8 (4054100)	3"	2-1/2"	4"	3271 (1071700)	1	3472 (2) (1076100)	3272 (2) (1071800)	2043 7/8 (1052600)	7/8" N.C.	3474 (2) (1076200)	3274 (2) (1071900)	3275 (2) (1072000)	3276 (1072200)	1047 (2) (1041700)	2837 (2) (1064600)	4
970 (4049900)	3-1/4"	2-3/4"	4-7/8"	971 (1039000)	1	972 (2) (1039100)	972 A (2) (1039200)	543 7/8 (1027300)	7/8" N.C.	974 (2) (1039300)	974 A (2) (1039400)	975 (4) (1039500)	976 (4) (1039600)	637 (4) (1028800)	-	4
970 B (4050000)	3-1/4"	2-3/4"	4-7/8"	971 (1039000)	2	972 (2) (1039100)	972 A (2) (1039200)	551 (4094000)	7/8" N.C.	974 (2) (1039300)	974 A (2) (1039400)	975 (4) (1039500)	976 (4) (1039600)	637 (4) (1028800)	-	4
770 (4048700)	3-1/2"	3"	4-3/4"	771 (1033000)	1	772 (2) (1033200)	772 A (2) (1033300)	873 A (1035400)	7/8" N.C.	774 (2) (1033500PT)	774 A (2) (1033600)	775 (4) (1033800)	776 (1033900)	747 (4) (1031700)	-	4
770 B (4048800)	3-1/2"	3"	4-3/4"	771 (1033000)	2	772 (2) (1033200)	772 A (2) (1033300)	1151 (4094400)	7/8" N.C.	774 (2) (1033500PT)	774 A (2) (1033600)	775 (4) (1033800)	776 (1033900)	747 (4) (1031700)	-	4
870 (4049300)	3-1/4 - 4"	3-3/8"	5-1/8"	871	1	772 (2) (1033200)	772 A (2) (1033300)	873 A	7/8" N.C.	774 (2) (1033500PT)	774 A (2) (1033600)	875 (4)	876	747 (4) (1031700)	-	4
870 B (4049400)	3-1/4 - 4"	3-3/8"	5-1/8"	871	2	772 (2) (1033200)	772 A (2) (1033300)	1151 (4094400)	7/8" N.C.	774 (2) (1033500PT)	774 A (2) (1033600)	875 (4)	876	747 (4) (1031700)	-	4
770 SA (4049000)	4-3/4"	2-3/4"	5-1/2"	771 S (1033100)	1	772 S (4) (1033400)	-	543 7/8 (1027300)	7/8" N.C.	774 S (4) (1033700)	-	775 (4) (1033800)	776 S (4) (1034000)	747 (4) (1031700)	-	4
770 S	4-3/4"	2-1/4"	5-1/2"	771 S (1033100)	2	772 S (4) (1033400)	-	551 (4094000)	7/8" N.C.	774 S (4) (1033700)	-	775 (4) (1033800)	776 S (4) (1034000)	747 (4) (1031700)	-	4

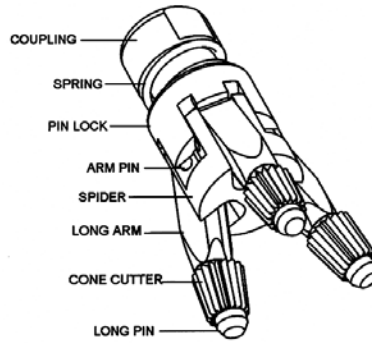
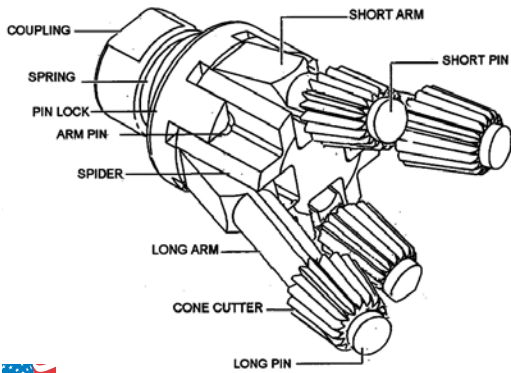
Type 4 - SRA Spring Retracting Arm Heads

1-1/2" - 4-3/4" I.D. for Straight Tubes, Bent Tubes, and Drill Pipe

Forward swing arm heads, components and (ordering numbers)

Recommended spare parts: cone cutters and cutter pins, cutter arms and arm pins.

- Developed specifically for Drill Pipe applications to protect box end threads
- The "SRA" arms are held closed until air is applied which allows for easy insertion into the box end of drill pipe, especially when used with automated cleaning equipment

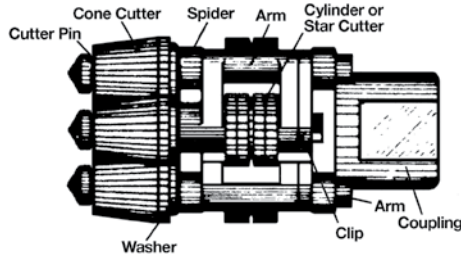


Head Number	Tube I.D.	Closed	Expands To	Spider	Fig.	Long Arm (qty.)	Short Arm (qty.)	Head Coupling	Coupling Tap	Long Cutter Pin (qty.)	Short Cutter Pin (qty.)	Arm Pin (qty.)	Pin Lock (qty.)	Cone Cutter (qty.)	Star Cutter (qty.)	Spring	Universal Joint	No. of Arms
SRA 1470 9/16 (4105691PT)	1-1/2"	1-3/8"	2-3/8"	1471 (1717450PT)	1	1472 (3) (1717451PT)	-	SRA 1473 9/16 (1717452PT)	9/16"	1474 (3) (1717453PT)	-	1475 (3) (1717454PT)	SRA 1476 (1717455PT)	2947 (3) (1066000)	-	SRA 1479 (1717449PT)	-	3
SRA 1870 5/8 (4105684PT)	2"	1-7/8"	2-7/8"	1871 (1050300PT)	1	4472 (3) (1082300)	-	SRA 1873 (1717447PT)	5/8"	4474 (3) (1082400)	-	4475 (3) (1082500)	SRA 1876 (1717448PT)	C 19 (3) (1214100)	-	SRA 1879 (1717448PT)	-	3
SRA 4470 3/4 (4105679)	2-5/16"	2"	3-1/2"	4471 (1082200)	1	4472 (3) (1082300)	-	SRA 4473 3/4 (1717435)	3/4"	4474 (3) (1082400)	-	4475 (3) (1082500)	SRA 4476 (1717434)	C 19 (3) (1214100)	-	SRA 4479 (1717436)	-	3
SRA 3370 7/8 (4105678)	2-3/4"	2-1/4"	3-7/8"	3371 (1075500)	1	3372 (3) (1075600)	-	SRA 3373 7/8 (1717432)	7/8"	3374 (3) (1075700)	-	3375 (3) (1075800)	SRA 3376 (1717431)	637 (3) (1028800)	-	SRA 3379 (171433)	-	3
SRA 3270 7/8 (4105681)	3"	2-1/2"	4"	3271 (1071700)	1	3472 (2) (1076100)	3272 (2) (1071800)	SRA 3373 7/8 (1717432)	7/8"	3474 (2) (1076200)	3274 (2) (1071900)	3275 (4) (1072000)	SRA 3276 (1717444)	1047 (2) (1041700)	2837 (2) (1064600)	SRA 3379 (171433)	-	4
SRA 3270 UJK (4105694PT)	3"	2-1/2"	4"	3271 (1071700)	2	3472 (2) (1076100)	3272 (2) (1071800)	SRA 3273U (1717456PT)	7/8"	3474 (2) (1076200)	3274 (2) (1071900)	3275 (4) (1072000)	SRA 3276 (1717444)	1047 (2) (1041700)	2837 (2) (1064600)	SRA 3379 (171433)	651 KNF (4094150PT)	4
SRA 970 7/8 (4105680)	3-1/4"	2-3/4"	4-1/4"	971 (1039000)	1	972 (2) (1039100)	972 A (2) (1039200)	SRA 973 7/8 (1717442)	7/8"	974 (2) (1039300)	974 A (2) (1039400)	975 (4) (1039500)	SRA 976 (1717441)	637 (4) (1028800)	-	SRA 3379 (1717433)	-	4
SRA 770 7/8 (4105677PT)	3-1/2"	3"	4-7/8"	771 (1033000)	1	772 (2) (1033200)	772 A (2) (1033300)	SRA 773 7/8 (1717429)	7/8"	774 (2) (1033500)	774 A (2) (1033600)	775 (4) (1033800)	SRA 776 (1717428)	747 (4) (1031700)	-	SRA 779 (1717430)	-	4
SRA 5770 7/8 (4105683PT)	4-3/4"	2-3/4"	5-1/2"	771 (1033000)	1	772 S (4) (1033400)	-	SRA 773 7/8 (1717429)	7/8"	774 S (4) (1033700)	-	775 (4) (1033800)	SRA 776 (1717428)	747 (4) (1031700)	-	SRA 779 (1717430)	-	4

Type 5 - "Self Feed" Clip Type Wing Arm Heads



1-3/4" - 8-3/4" I.D. for Straight Tubes and Pipe Wing arm heads, components and (ordering numbers)

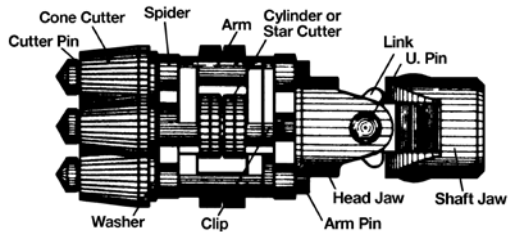


Head Number	Tube I.D.	Closed	Expands To	Spider	Arm (Qty.)	Coupling	Coupling Plate	Coupling Tap	Cutter Pin (qty.)	Arm Pin (qty.)	Clip (qty.)	Cone Cutter (qty.)	Cylinder Cutter (qty.)	Washer (qty.)
11740 (4058900)	1-3/4"	1-1/2"	2-1/8"	11741 (1113900)	11742 (2) (1114000)	11743 B (1114400)	-	5/8" N.C.	11744 (2) (1114700)	11745 (2) (1114800)	-	11747 (2) (1114900)	11748 (8) (1115000)	-
3060 5/8 (4053400)	2-3/8"	1-15/16"	2-5/8"	3061 (1069100)	3062 S (3) (1069300)	3043 (1068500)	-	5/8" N.C.	3364 (3) (1075200)	3365 (3) (1075300)	3068 (3) (1069400)	3047 (3) (1068900)	3048 (3) (1069000)	-
3060 3/4 (4053401)	2-3/8"	1-15/16"	2-5/8"	3061 (1069100)	3062 S (3) (1069300)	3043 3/4 (1068700)	-	3/4" N.C.	3364 (3) (1075200)	3365 (3) (1075300)	3068 (3) (1069400)	3047 (3) (1068900)	3048 (3) (1069000)	-
2060 3/4 (4051300)	2-1/2"	2-1/4"	3"	3361 (1074900)	3362 S (3) (1075100)	2043 3/4 (1052400)	-	3/4" N.C.	3364 (3) (1075200)	3365 (3) (1075300)	3368 (3) (1075400)	337 (3) (1025700)	338 (15) (1025905)	339 (3) (1026000)
2060 7/8 (4051301)	2-1/2"	2-1/4"	3"	3361 (1074900)	3362 S (3) (1075100)	2043 7/8 (1052600)	-	7/8" N.C.	3364 (3) (1075200)	3365 (3) (1075300)	3368 (3) (1075400)	337 (3) (1025700)	338 (15) (1025905)	339 (3) (1026000)
1060 3/4NC (4010201)	3"	2-5/8"	3-3/4"	1061 (1042000)	1062 S (3) (1042200)	1033 3/4 (1041000)	-	3/4" N.C.	1064 (3) (1042300)	1065 (3) (1042400)	1068 (3) (1042500)	1047 (3) (1041700)	1048 (15) (1041800)	-
1060 7/8THD (4105640)	3"	2-5/8"	3-3/4"	1061 (1042000)	1062 S (3) (1042200)	1033 7/8 (1041100)	-	7/8" N.C.	1064 (3) (1042300)	1065 (3) (1042400)	1068 (3) (1042500)	1047 (3) (1041700)	1048 (15) (1041800)	-
1060 1NF (4050202)	3"	2-5/8"	3-3/4"	1061 (1042000)	1062 S (3) (1042200)	1033 1 (1040900PT)	-	1" N.C.	1064 (3) (1042300)	1065 (3) (1042400)	1068 (3) (1042500)	1047 (3) (1041700)	1048 (15) (1041800)	-
960 (4049700)	3-1/4"	3-1/8"	4-1/8"	961 (1038900)	762 S (3) (1032800)	543 7/8 (1027300)	-	7/8" N.C.	35264 (3) (1154900)	765 (3) (1032900)	35268 (3) (1155100)	947 (3) (1038700)	948 (27) (1038800)	749 (3) (1031900PT)
760 1 (4048500)	3-1/2"	3-1/4"	4-1/2"	761 (1032600)	762 S (3) (1032800)	743 1 (1031200)	-	1" N.F.	35264 (3) (1154900)	765 (3) (1032900)	35268 (3) (1155100)	747 (3) (1031700)	748 (24) (1031802)	749 (3) (1031900PT)
760 1 1/8 (4048501)	3-1/2"	3-1/4"	4-1/2"	761 (1032600)	762 S (3) (1032800)	743 1 1/8 (1716210)	-	1-1/8" N.F.	35264 (3) (1154900)	765 (3) (1032900)	35268 (3) (1155100)	747 (3) (1031700)	748 (24) (1031802)	749 (3) (1031900PT)
5060 AS (4056400)	4-1/2"	3-7/8"	5-5/8"	5061 A (1086900)	562 S (3) (1027900)	843 (1034900)	5043 A	1-1/8" N.F.	564 (3) (1028000)	565 (3) (1028100)	568 (3) (1028200)	747 (3) (1031700)	748 (24) (1031802)	749 (3) (1031900PT)
35260	5-1/4"	4-1/2"	6"	35261	35262 S (4) (1158200)	35243	35243 A	1-3/8" N.F.	35264 (4) (1154900)	35265 (4) (1155000)	35268 (4) (1155100)	271 (4) (1025400)	C 79 (12) (1218700)	749 (4) (1031900PT)
36060 1-1/8	6"	5-3/8"	7-1/8"	36041 (1156200)	36562 S (4) (1158200)	36043	-	1-1/8" N.F.	36564 (4) (1158300)	36545 (4) (1157900)	36546 (4) (1158000)	37297 (4) (1159200)	37688 (12) (1160100)	36549 (4) (1158100)
36060 1-3/8	6"	5-3/8"	7-1/8"	36041 (1156200)	36562 S (4) (1158200)	36043	-	1-3/8" N.F.	36564 (4) (1158300)	36545 (4) (1157900)	36546 (4) (1158000)	37297 (4) (1159200)	37688 (12) (1160100)	36549 (4) (1158100)
36560 1 1/8 (4061701)	6-1/2"	5-7/8"	7-5/8"	36541 C (1157200)	36562 S (4) (1158200)	35243 B (1154200)	36543 AC (1157500)	1-1/8" N.F.	36564 (4) (1158300)	36545 (4) (1157900)	36546 (4) (1158000)	37297 (4) (1159200)	37288 (12) (1159100)	36549 (4) (1158100)
37260	7-1/4"	6-1/4"	8"	37241	36562 S (4) (1158200)	8293 (1111010)	37243 A	1-3/8" N.F.	36564 (4) (1158300)	36545 (4) (1157900)	36546 (4) (1158000)	37297 (4) (1159200)	37288 (12) (1159100)	36549 (4) (1158100)
37660	7-5/8"	6-1/2"	8-1/2"	37641	36562 S (4) (1158200)	8293 (1111010)	37643 A	1-3/8" N.F.	36564 (5) (1158300)	36545 (5) (1157900)	36546 (5) (1158000)	37697 (5) (1160200)	37288 (15) (1159100)	36549 (5) (1158100)
38760 (4062500)	8-3/4"	7-1/2"	9-1/2"	38741 (1160500)	36562 S (4) (1158200)	8293 (1111010)	38743 A (1160600)	1-3/8" N.F.	36564 (5) (1158300)	36545 (5) (1157900)	36546 (5) (1158000)	37697 (5) (1160200)	37688 (15) (1160100)	36549 (5) (1158100)

Type 5 - "Self Feed" Clip Type Wing Arm Heads

1-3/4" - 9" I.D. for Curved Tubes and Pipe

Wing arm heads, components and (ordering numbers)



Head Number	Tube I.D.	Closed	Expand To	Spider	Arm (qty.)	Universal Coupling	Coupling Plate	Coupling Tap	Cutter Pin (qty.)	Arm Pin (qty.)	Clip (qty.)	Cone Cutter	Cylinder Cutter (qty.)	Washer (qty.)
11740 C (4058910)	2"	1-1/2"	2-1/8"	11741 (1113900)	11742 (2) (1114000)	4151 W (4095700)	-	5/8" N.C.	11744 (2) (1114700)	11745 (2) (1114800)	-	11747 (2) (1114900)	11748 (8) (1115000)	-
3060 C	2-1/4"	1-15/16"	2-5/8"	3061	3062 S (3)	4151 (4095600)	-	5/8" N.C.	3364 (3) (1075200)	3365 (3) (1075300)	3068 (3)	3047 (3)	3048 (3)	-
3360 (4054300)	2-5/8"	2-1/4"	3"	3361 (1074900)	3362 S (3) (1075100)	3333 (4095100PT)	-	3/4" N.C.	3364 (3) (1075200)	3365 (3) (1075300)	3368 (3) (1075400)	337 (3) (1025700)	338 (15) (1025905)	339 (3) (1026000)
3560 3/4 (4105128)	2-7/8"	2-5/8"	3-3/4"	1061 (1042000)	1062 S (3) (1042200)	3532 3/4 (4095300)	-	3/4" N.C.	1064 (3) (1042300)	1065 (3) (1042400)	1068 (3) (1042500)	1047 (3) (1041700)	1048 (15) (1041800)	-
3560 7/8 (4054700)	3-3/8"	2-5/8"	3-3/4"	1061 (1042000)	1062 S (3) (1042200)	3531 7/8 (4095200)	-	7/8" N.C.	1064 (3) (1042300)	1065 (3) (1042400)	1068 (3) (1042500)	1047 (3) (1041700)	1048 (15) (1041800)	-
960 C (4049800)	3-1/2"	3-1/8"	4-1/4"	961 (1038900)	762 S (3) (1032800PT)	551 (4094000)	-	7/8" N.C.	35264 (3) (1154900)	765 (3) (1032900)	35268 (3) (1155100)	947 (3) (1038700)	948 (27) (1038800)	749 (3) (1031900PT)
760 C (4048600)	3-3/4"	3-1/4"	4-1/2"	761 (1032600)	762 S (3) (1032800PT)	1151 (4094400)	-	7/8" N.C.	35264 (3) (1154900)	765 (3) (1032900)	35268 (3) (1155100)	747 (3) (1031700)	748 (24) (1031802)	749 (3) (1031900PT)
760 C 1-1/8 (4048620PT)	3-3/4"	3-1/4"	4-1/2"	761 (1032600)	762 S (3) (1032800PT)	5051 E (4104884)	-	1-1/8" N.F.	35264 (3) (1154900)	765 (3) (1032900)	35268 (3) (1155100)	747 (3) (1031700)	748 (24) (1031802)	749 (3) (1031900PT)
5060 A (4056300)	4-13/16"	3-7/8"	5-5/8"	5061 A (1086900)	562 S (3) (1027900)	5051 E (4104884)	5043 A (1085400)	1-1/8" N.F.	564 (3) (1028000)	565 (3) (1028100)	568 (3) (1028200)	747 (3) (1031700)	748 (24) (1031802)	749 (3) (1031900PT)
35260 C	5-1/4"	4-1/2"	6"	35261	35262 S (4) (1154800)	5051 H (4096000)	35243 A	1-1/8" N.F.	35264 (4) (1154900)	35265 (4) (1155000)	35268 (4) (1155100)	271 (4) (1025400)	C 79 (12) (1218700)	749 (4) (1031900PT)
36060 C (4061600)	6"	5-3/8"	7-1/8"	36041 (1156200)	36562 S (4) (1158200)	5051 H (4096000)	36043 A (1156400)	1-1/8" N.F.	36564 (4) (1158300)	36545 (4) (1157900)	36546 (4) (1158000)	37697 (4) (1160200)	37688 (12) (1160100)	36549 (4) (1158100)
36560 C (4061800)	6-1/2"	5-7/8"	7-5/8"	36541 C (1157200)	36562 S (4) (1158200)	5051 H (4096000)	36543 AC (1157500)	1-1/8" N.F.	36564 (4) (1158300)	36545 (4) (1157900)	36546 (4) (1158000)	37697 (4) (1160200)	37288 (12) (1160100)	36549 (4) (1158100)
37260 C	7-1/4"	6-1/4"	8"	37241	36562 S (4) (1158200)	21251 A (4097200)	37243 A	1-3/8" N.F.	36564 (4) (1158300)	36545 (4) (1157900)	36546 (4) (1158000)	37697 (4) (1160200)	37288 (12) (1160100)	36549 (4) (1158100)
37660 C	7-5/8"	6-1/2"	8-1/2"	37641	36562 S (5) (1158200)	21251 A (4097200)	37643 A	1-3/8" N.F.	36564 (5) (1158300)	36545 (5) (1157900)	36546 (5) (1158000)	37697 (5) (1160200)	37288 (15) (1160100)	36549 (5) (1158100)
38760 C	8-1/4"	7-1/2"	9-1/2"	38741	36562 S (5) (1158200)	21251 A (4097200)	38743 A	1-3/8" N.F.	36564 (5) (1158300)	36545 (5) (1157900)	36546 (5) (1158000)	37697 (5) (1160200)	37288 (15) (1160100)	36549 (5) (1158100)

Drill Heads

Tube I.D. range 1/2" thru 3-1/4"

- Airetool drill heads are made from alloy steel For strength and durability
- Drills can be used with extensions (below) for larger tube I.D.'s as required

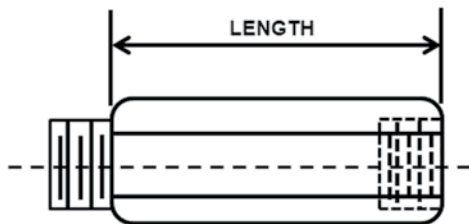


Universal coupling ordered separately



Tube I.D.	Drill Number	Order Number	Hard Surfaced	Hard Surfaced Order Number	Drill O.D.	Stud Thread Size	Number of Flutes	Weight (Lbs.)
1/2"	MD-1	1267500	-NA	-	7/16"	10-32	3	0.01
5/8"	MD-2	1267600	-NA	-	1/2"	1/4" N.F.	3	0.02
11/16" - 13/16"	MD-3	1267700	-NA	-	5/8"	1/4" N.F.	3	0.03
7/8" - 1 1/8"	MD-4	1267800	-NA	-	5/8"	5/16" N.F.	3	0.05
1 1/8" - 1 1/4"	MD-5	1267900	-NA	-	13/16"	7/16" N.F.	3	0.06
1 3/8" - 1 3/4"	00	1000500	00-S		1 1/16"	7/16" N.F.	4	0.20
1 1/2"	0	1000300	0-S		1 5/16"	1/2" N.C.	4	0.25
1 5/8" - 2 1/4"	1	1003100	1-S	1004800	1 3/8"	5/8" N.C.	4	0.30
2 1/4" - 2 3/4"	4	1007400	4-S	1007900	1 3/4"	5/8" N.C.	4	0.50
2 1/4" - 2 3/4"	16		16-S	1011702	1 11/16"	5/8" N.C.	5	0.60
2 1/4" - 3 1/4"	5	1008000	5-S	1008500	2 3/8"	3/4" N.C.	5	1.06
3 1/4" - 4"	6-3/4	1716299	6-3/4-S		2 5/8"	3/4" N.C.	5	1.60
3 1/4" - 4"	6	1008700	6-S	1009100	2 5/8"	7/8" N.C.	5	1.60
4" - 4 1/2"	7	1009500	7-S	1009500	2 3/4"	7/8" N.C.	5	2.00
4 1/2" - 9"	8	1009600	8-S	1009901	3 5/16"	1" N.F.	6	2.60
*9" - 11"	21	1012900	21-S	1013100	4 5/8"	1 1/8" N.F.	6	5.50
11" - 12"	13	1010902	13-S	1011013	5 3/4"	1 1/8" N.F.	6	7.00

Drill Extensions - Male to Female



Thread Description	7/8" N.C. Male x 7/8" N.C. Female		1" N.C. Male x 1" N.C. Female		1-1/8" N.C. Male x 1-1/8" N.C. Female	
	Model No.	Order No.	Model No.	Order No.	Model No.	Order No.
1.50	756					
2.00	756 A	1032100PT	5056	1086100	21256	1129300
2.50	756 B	1032201PT				
3.00	756 C	1032300PT	5056 A	1086200	21256 A	1129400
4.00	756 D	1032400PT	5056 B	1086300	21256 B	1129500
5.00			5056 C	1086400	21256 C	1129600
6.00			5056 D	1086500	21256 D	1129700
7.00			5056 E	1086600	21256 E	1129800
8.00	756 H	1032500PT	5056 F	1086700	21256 F	1129900

Expanding Blade Type Head

Expanding Blade Type Head

Tube I.D. range 1/2" thru 4-1/2"

When ordering specify the motor number and the motors shaft thread size.



Head Number	Tube I.D.	Minimum Diameter	Maximum Diameter	Stud Size	Blade Body	Rear Retainer	Blade Set	Blade (qty.)	Coupling	Coupling Tap
2840	1/2"	29/64"	37/64"	10-32	2481 (1057700)	2483 (1057800)	2487 (4000250)	2487 (4) (1058300)	FF 1010 (1249800)	10-32
3080 (4053600)	5/8"	9/16"	11/16"	1/4" N.F.	3081 (1069500)	3083 (1069600)	3087 (4000290PT)	3087 (3) (1069700)	FF 22 (1245700)	1/4" N.F.
2780 (4052500)	3/4"	11/16"	13/16"	1/4" N.F.	2781 (1063800)	2783 (1063900)	2787 (4000270)	27878 (3) (1064000)	FF 22 (1245700)	1/4" N.F.
6480 (4057200)	13/16"	3/4"	7/8"	5/16" N.C.	2981 (1066400)	2983 (1066500)	6487 (4000330)	6487 (3) (1095800)	FF 312 (1248600)	1/4" N.F.
2980 (4052900)	7/8"	25/32"	29/32"	5/16" N.C.	2981 (1066400)	2983 (1066500)	2987 (4000280)	2987 (3) (1066600)	FF 3137 (1250500)	3/8" N.F.
6180 (4056700)	1"	7/8"	1-3/32"	5/16" N.C.	6181 (1089900)	6183 (1090000)	6187 (4000310PT)	6187 (4) (1090100)	FF3137 (1250500)	3/8" N.F.
2680 (4052200)	1"	15/16"	1-5/32"	5/16" N.C.	6181 (1089900)	6183 (1090000)	2687 (4000260PT)	2687 (4) (1062500)	FF3137 (1250500)	3/8" N.F.
3180 7/16 NF (4053900PT)	1-1/8"	1-1/32"	1-1/4"	5/16" N.C.	3181 (1070700)	3183 (1070800)	3187 (4000300)	3187 (4) (1070900)	FF 314 (1248700PT)	7/16" N.F.
6380 3/8 (4057000)	1-1/4"	1-5/32"	1-3/8"	5/16" N.C.	3181 (1070700)	3183 (1070800)	6387 (4000320PT)	6387 (4) (1092400)	FF3137 (1250500)	3/8" N.F.
6580 3/8 NF (4057400PT)	1-3/8"	1-9/32"	1-1/2"	5/16" N.C.	3181 (1070700)	3183 (1070800)	6587 (4000340)	6587 (4) (1098100PT)	FF3137 (1250500)	3/8" N.F.
6580 7/16 NF (4057401PT)	1-3/8"	1-9/32"	1-1/2"	5/16" N.C.	3181 (1070700)	3183 (1070800)	6587 (4000340)	6587 (4) (1098100PT)	FF314 (1250500)	7/16" N.F.
1780 (4050600PT)	1-1/2"	1-3/8"	1-11/16"	9/16" N.C.	1781 (1048200PT)	1783 (1048400PT)	1787 (4000200)	1787 (4) (1048700)	FF 5656 (1250900PT)	9/16" N.C.
1880 (4050900PT)	1-5/8"	1-1/2"	1-13/16"	5/8" N.C.	1881 (1050600PT)	1883 (1050900PT)	1887 (4000210PT)	1887 (4) (1051200PT)	FF 66 (1247000)	5/8" N.C.
1980 (4051100PT)	1-3/4"	1-5/8"	1-15/16"	5/8" N.C.	1881 (1050600PT)	1883 (1050900PT)	1987 (4000250PT)	1987 (4) (1051700PT)	FF 66 (1247000)	5/8" N.C.
2380 C (4051600PT)	1-7/8"	1-3/4"	2-1/16"	5/8" N.C.	1881 (1050600PT)	1883 (1050900PT)	2387 C (4000240PT)	2387 C (4) (1055900PT)	FF 66 (1247000)	5/8" N.C.
2380 (4051500PT)	2"	1-7/8"	2-3/16"	5/8" N.C.	2381 (1054700PT)	2383 (1055750PT)	2387 (4000230)	2387 (4) (1055800PT)	FF 66 (1247000)	5/8" N.C.
21680 S (4061000PT)	2-1/8"	1-3/4"	2-1/4"	5/8" N.C.	21681 S (1136100PT)	21683 S (1136200PT)	21587 (4000400)	21587 (4) (1135100PT)	FF 66 (1247000)	5/8" N.C.
21580	2-1/4"	1-7/8"	2-3/8"	3/4" N.C.	21581	21583	21587 (4000400)	21587 (4) (1135100PT)	FF 77 (1247500)	3/4" N.C.
21480 (4060800)	2-1/2"	2-1/8"	2-5/8"	3/4" N.C.	21481 (1133500)	21483 (1133600)	21587 (4000400)	21587 (4) (1135100PT)	FF 78 (1247700)	7/8" N.C.
21380	2-3/4"	2-3/8"	2-15/16"	7/8" N.C.	21381	21383	21087 (4000390)	21087 (6) (1123300PT)	FF 88	7/8" N.C.
21080 (4059700PT)	3"	2-5/8"	3-5/16"	1" N.F.	21081 (1122000PT)	21083 (1122900PT)	21087 (4000390)	21087 (6) (1123300PT)	FF 11 (1245300PT)	1" N.F.
20980	3-1/4"	2-7/8"	3-3/8"	1" N.F.	20781 (1116600)	20783 (1116700)	20987	20987 (6)	FF 11 (1245300PT)	1" N.F.
20780	3-1/2"	3-1/8"	3-5/8"	1" N.F.	20781 (1116600)	20783 (1116700)	20787 (4000350)	20787 (6) (1116800)	FF 111 (1248200)	1-1/8" N.F.
20880	4"	3-5/8"	4-1/8"	1" N.F.	20781 (1116600)	20783 (1116700)	20887 (4000360)	20887 (6) (1118100)	FF 111 (1248200)	1-1/8" N.F.
20880 H	4-1/2"	4-1/8"	4-5/8"	1" N.F.	20781 (1116600)	20783 (1116700)	20887 H	20887 H (6)	FF 111 (1248200)	1-1/8" N.F.



10-32 thru 7/8" N.C. thread combinations

- For adapting cleaning heads to cleaning motors
- U-joints, components and ordering numbers



Universal Jont No.	Shaft Jaw	Head Jaw	Link	Pin (2 req.)	U-Joint O.D. (in.)	Overall Length (in.)	Thread Size	Cleaner Kits Used On
2451 (4094800)	2452 (1057100)	2452 (1057100)	2454 (1057200)	2455 (1057300)	0.312	1.25	10-32 x 10-32	24
PA 3051 (4098200)	PA 3052 (1294500)	PA 3052 (1294500)	PA 3054 (1294600)	PA 3055 (1294700)	.437 (.375 Hex)	1.375	1/4" x 1/4" N.F. N.F.	27, 27 A, 30, 30 A
6451 (4096500)	6453 V (1094800)	6453 V (1094800)	6454 V (1095100)	6455 V (1095200)	0.500	1.687	1/4" x 1/4" N.F. N.F.	X 64
6451 B	6453 V (1094800)	6457 V (1095300)	6454 V (1095100)	6455 V (1095200)			1/4" x 5/16" N.F. N.C.	X 64
6151 C (4096300)	6452 V (1094600)	6453 V (1094800)	6454 V (1095100)	6455 V (1095200)			5/16" x 1/4" N.F. N.F.	X 60, X 61
6151 (4096100PT)	6452 V (1094600)	6452 V (1094600)	6454 V (1095100)	6455 V (1095200)			5/16" x 5/16" N.F. N.F.	X 61
6151 B (4096200)	6452 V (1094600)	6457 V (1095300)	6454 V (1095100)	6455 V (1095200)			5/16" x 5/16" N.F. N.C.	X 61
2651 (4094900)	2652 (1061700PT)	2652 (1061700PT)	2654 (1061900)	2655 (1062000)	0.625	1.593	3/8" x 3/8" N.F. N.F.	26, 29
6351 B (4096400)	6652 (1100100)	6657	6654 (1100300)	6655 (1100400)	0.750	2.125	3/8" x 5/16" N.F. N.C.	X 63
6651 B (4096800)	6652 (1100100)	6658 (1100700)	6654 (1100300)	6655 (1100400)			3/8" x 7/16" N.F. N.C.	X 65, X 66
6651 (4096700)	6652 (1100100)	6653 (1100200)	6654 (1100300)	6655 (1100400)			3/8" x 7/16" N.F. N.F.	31, X 63, X 65, X 66
3151 (4095000)	6653 (1100200)	6653 (1100200)	6654 (1100300)	6655 (1100400)			7/16" x 7/16" N.F. N.F.	31
31551 (4097500)	4153 (1079700)	4157 (1080200)	4154 (1079900)	4155 (1080100)	1.125	2.062	9/16" x 1/2" N.C. N.C.	3150
4151 W (4095700)	4152 (1079600)	4153 (1079700)	4154 (1079900)	4155 (1080100)			5/8" x 1/2" N.C. N.C.	11740 C
4151 (4095600)	4152 (1079600)	4152 (1079600)	4154 (1079900)	4155 (1080100)			5/8" x 5/8" N.C. N.C.	3162, 3175, 3187, 3200, 3212 4200, 4225, 4237, 4250, 4275
3333 (4095100PT)	3552 (1076800)	3332 (1074000)	3554 (1077500)	3555 (1077700)	1.500	2.75	3/4" x 3/4" N.C. N.C.	3360 Head
3532 (4095300)	3552 (1076800)	3533 (1076500)	3554 (1077500)	3555 (1077700)	1.593		3/4" x 3/4" N.C. N.C.	3540, 3560 Head 3/4 N.C. Rotor Thread
3531 (4095200)	3557 (1077800)	3533 (1076500)	3554 (1077500)	3555 (1077700)			7/8" x 3/4" N.C. N.C.	3540, 3560 Head 7/8 N.C. Rotor Thread

U-Joints

5/8" N.C. thru 1-38" N.F. thread combinations

■ For adapting cleaning heads to cleaning motors

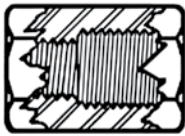
U-joints, components and ordering numbers



Universal Jont No.	Shaft Jaw	Head Jaw	Link	Pin (2 req.)	U-Joint O.D. (in.)	Overall Length (in.)	Thread Size	Cleaner Kits Used On
2251 (4094700)	3553 (1077400)	3553 (1077400)	3554 (1077500)	3555 (1077700)	1.500	2.750	5/8" x 5/8" N.C. N.C.	
2151 (4094600)	3552 (1076800)	3553 (1077400)	3554 (1077500)	3555 (1077700)			3/4" x 5/8" N.C. N.C.	3225, 3237
3551 (4095400)	3552 (1076800)	3552 (1076800)	3554 (1077500)	3555 (1077700)			3/4" x 3/4" N.C. N.C.	4300, 4300 A, 4325
3551 A	3552 (1076800)	3552 (1076800)	3554 A	3555 (1077700)		2.625	3/4" x 3/4" N.C. N.C.	15 Deg. Restricterd
1551	253	1553 (1046500)	654 (1029900)	255 (1025310PT)	1.625	3.437	3/4 x 5/8" N.C. N.C.	
251	253	253	654 (1029900)	255 (1025310PT)			3/4" x 3/4" N.C. N.C.	
21451 (4097400)	21452 (1133400)	1553 (1046500)	654 (1029900)	255 (1025310PT)			7/8" x 5/8" N.C. N.C.	3250, 3262
651 H (4094300)	653 (1029600PT)	653 (1029600PT)	654 (1029900)	655 (1030200)	1.750	3.218	3/4" x 3/4" N.C. N.C.	
651 (4094100)	652 (1029400)	653 (1029600PT)	654 (1029900)	655 (1030200)			7/8" x 3/4" N.C. N.C.	3275, 3287, 4350
651 A	652 (1029400)	653 (1029600PT)	654 A	655 (1030200)			7/8" x 3/4" N.C. N.C.	15 Deg. Restricterd
551 (4094000)	652 (1029400)	652 (1029400)	654 (1029900)	655 (1030200)			3.437	7/8" x 7/8" N.C. N.C.
21051 (4097000)	1152 (1043600)	21053 (1121900)	1154 (1044100)	1155 (1044200)	1.937	3.687	1" x 3/4" N.F. N.C.	3300, 3306
1151 (4094400)	1152 (1043600)	1153 (1044000)	1154 (1044100)	1155 (1044200)			1" x 7/8" N.F. N.C.	3312, 3318, 3325, 3337
20751 (4096900)	5052 (1085600PT)	1153 (1044000)	1154 (1044100)	5055 (1086000) 1155 (1044200)	2.250	4.062	1-1/8" x 7/8" N.F. N.C.	3350 through 3475
5051 (4095800)	5052 (1085600PT)	5057 (1086800)	1154 (1044100)	5055 (1086000)			1-1/8" x 7/8" N.F. N.C.	4481, 4500, 4537
5051 E	5052 (1085600PT)	5053	1154 (1044100)	5055 (1086000)			1-1/8" x 1" N.F. N.F.	4575, 4600, 4650, 4712, 4762
5051 H (4096000)	5052 (1085600PT)	5052 (1085600PT)	1154 (1044100)	5055 (1086000)			1-1/8" x 1-1/8" N.F. N.F.	
21251 H (4097300)	21252 (1128500)	21257 (1130100)	21254 (1128800)	21255 (1129000)	2.437	5.312	1-3/8" x 1" N.F. N.F.	3500 through 3900
21251 (4097100)	21252 (1128500)	21253 (1128700)	21254 (1128800)	21255 (1129000)			1-3/8" x 1-1/8" N.F. N.F.	3975 through 31325
21251 A (4097200)	21252 (1128500)	21252 (1128500)	21254 (1128800)	21255 (1129000)			1-3/8" x 1-3/8" N.F. N.F.	

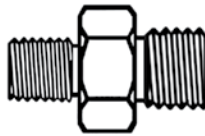
These adapters are used to configure motors and heads in special applications where the standard Airetool offering does not match up on thread sizes.

Female X Female



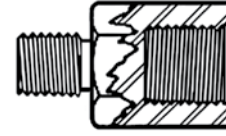
Part Number	Female X Female
FF 1 0	10-32 X 10-32
FF 1031	10-32 X 5/16 N.C.
FF 22	1/4 N.F. X 1/4 N.F.
FF 231	1/4 N.F. X 5/16 N.F.
FF 237	1/4 N.F. X 3/8 N.F.
FF 312	5/16 N.C. X 1/4 N.F.
FF 3131	5/16 N.C. X 5/16 N.F.
FF3137	5/16 N.C. X 3/8 N.F.
FF314	5/16 N.C. X 7/16 N.F.
FF 374	3/8 N.F. X 7/16 N.C.
FF 374 F	3/8 N.F. X 7/16 N.F.
FF 376	3/8 N.C. X 5/8 N.C.
FF 437	7/16 N.C. X 3/8 N.C.
FF 45	7/16 N.F. X 1/2 N.C.
FF 456	7/16 N.F. X 9/16 N.C.
FF 46	7/16 N.F. X 5/8 N.C.
FF 47	7/16 N.C. X 3/4 N.C.
FF 54	1/2 N.F. X 7/16 N.C.
FF 56	1/2 N.F. X 5/8 N.C.
FF 56 F	1/2 N.F. X 5/8 N.F.
FF 564	9/16 N.C. X 7/16 N.C.
FF 5656	9/16 N.C. X 9/16 N.C.
FF 566	9/16 N.C. X 5/8 N.C.
FF 567	9/16 N.C. X 3/4 N.C.
FF 637	5/8 N.C. X 3/8 N.F.
FF 64	5/8 N.C. X 7/16 N.C.
FF 65	5/8 N.C. X 1/2 N.C.
FF 66	5/8 N.C. X 5/8 N.C.
FF 66 F	5/8 N.C. X 5/8 N.F.
FF 67	5/8 N.C. X 3/4 N.C.
FF 68	5/8 N.C. X 7/8 N.C.
FF 77	3/4 N.C. X 3/4 N.C.
FF 78	3/4 N.C. X 7/8 N.C.
FF 856	7/8 N.C. X 9/16 N.C.
FF 86	7/8 N.C. X 5/8 N.F.
FF 88	7/8 N.C. X 7/8 N.C.
FF 81	7/8 N.C. X 1 N.F.
FF 16	1 N.F. X 5/8 N.C.
FF 17	1 N.F. X 3/4 N.C.
FF 11	1 N.F. X 1 N.F.
FF 111	1 N.F. X 1-1/8 N.F.
FF 118	1-1/8 N.F. X 7/8 N.C.
FF 1111	1-1/8 N.F. X 1-1/8 N.F.

Male X Male



Part Number	Male X Male
2443	10-32 X 10-32
MM 1031	10-32 X 5/16 N.F.
MM 250	1/4 N.F. X 1/4 N.F.
2734	1/4 N.F. X 5/16 N.C.
MM 24	1/4 N.F. X 7/16 N.F.
MM 3034	5/16 N.F. X 1/4 N.F.
MM 3131	5/16 N.C. X 5/16 N.C.
MM 3131 F	5/16 N.C. X 5/16 N.F.
MM 3137	5/16 N.F. X 3/8 N.F.
MM 3737	3/8 N.C. X 3/8 N.C.
MM 3737 F	3/8 N.F. X 3/8 N.F.
MM 374	3/8 N.C. X 7/16 N.C.
MM 374 F	3/8 N.F. X 7/16 N.F.
MM 437	7/16 N.C. X 3/8 N.F.
MM 44	7/16 N.F. X 7/16 N.F.
MM 456	7/16 N.F. X 9/16 N.C.
MM 46	7/16 N.F. X 5/8 N.C.
MM 5056	1/2 N.C. X 9/16 N.C.
MM 56	1/2 N.C. X 5/8 N.C.
MM 564	9/16 N.C. X 7/16 N.C.
MM 5650	9/16 N.C. X 1/2 N.F.
MM 5656	9/16 N.C. X 9/16 N.C.
MM 566	9/16 N.C. X 5/8 N.C.
MM 567	9/16 N.C. X 3/4 N.C.
MM 568	9/16 N.C. X 7/8 N.C.
MM 561	9/16 N.C. X 1 N.F.
MM 66	5/8 N.C. X 5/8 N.C.
MM 67	5/8 N.C. X 3/4 N.C.
MM 68	5/8 N.C. X 7/8 N.C.
MM 77	3/4 N.C. X 3/4 N.C.
MM 78	3/4 N.C. X 7/8 N.C.
MM 88	7/8 N.C. X 7/8 N.C.
MM 81	7/8 N.C. X 1 N.C.
MM 11	1 N.F. X 1 N.F.
MM 112	1 N.F. X 1-1/8 N.F.
MM 1111	1-1/8 N.F. X 1-1/8 N.F.
MM 1313	1-3/8 N.F. X 1-3/8 N.F.

Male X Female



Part Number	Male X Female
MF 22	1/4 N.C. X 1/4 N.F.
MF 231	1/4 N.F. X 5/16 N.C.
MF 231	F 1/4 N.F. X 5/16 N.F.
MF 312	5/16 N.C. X 1/4 N.F.
MF 312 F	5/16 N.F. X 1/4 N.F.
MF 3131	5/16 N.C. X 5/16 N.F.
MF 3131 F	5/16 N.F. X 5/16 N.C.
MF 314	5/16 N.C. X 7/16 N.F.
MF 314 F	5/16 N.F. X 7/16 N.F.
2943	3/8 N.F. X 1/4 N.F.
MF 3731	3/8 N.F. X 5/16 N.C.
MF 3731 F	3/8 N.F. X 5/16 N.F.
2643	3/8 N.F. X 5/16 N.F.
MF 3737	3/8 N.C. X 3/8 N.F.
MF 374	3/8 N.C. X 7/16 N.C.
MF 374 F	3/8 N.F. X 7/16 N.F.
MF 431	7/16 N.C. X 5/16 N.C.
MF 431 F	7/16 N.F. X 5/16 N.F.
MF 433	7/16 N.C. X 3/8 N.C.
MF 4343	7/16 N.C. X 7/16 N.F.
MF 435	7/16 N.C. X 1/2 N.C.
MF 435 F	7/16 N.F. X 1/2 N.C.
MF 436	7/16 N.C. X 5/8 N.C.
MF 436 F	7/16 N.F. X 5/8 N.C.
MF 531	1/2 N.F. X 5/16 N.F.
1743	1/2 N.C. X 3/8 N.C.
MF 543	1/2 N.C. X 7/16 N.C.
MF 543 F	1/2 N.F. X 7/16 N.C.
MF 56	1/2 N.C. X 5/8 N.C.
MF 56 F	1/2 N.F. X 5/8 N.C.
MF 57	1/2 N.C. X 3/4 N.C.
MF 563	9/16 N.C. X 3/8 N.C.
MF 565	9/16 N.C. X 1/2 N.C.
MF 566	9/16 N.C. X 5/8 N.C.
MF 567	9/16 N.C. X 3/4 N.C.
MF 568	9/16 N.C. X 7/8 N.C.
MF 561	9/16 N.C. X 1 N.F.
MF 631	5/8 N.C. X 5/16 N.C.
MF 637	5/8 N.C. X 3/8 N.C.
1943	5/8 N.C. X 7/16 N.F.
MF 65	5/8 N.C. X 1/2 N.F.
MF 656	5/8 N.C. X 9/16 N.C.
MF 68	5/8 N.C. X 7/8 N.C.
MF 743	3/4 N.C. X 7/16 N.F.
MF 743 F	3/4 N.F. X 7/16 N.C.
MF 76	3/4 N.C. X 5/8 N.C.
MF 71	3/4 N.C. X 1 N.C.
MF 711	3/4 N.C. X 1-1/8 N.F.
MF 86	7/8 N.C. X 5/8 N.C.
MF 86	F 7/8 N.C. X 5/8 N.F.
MF 87	7/8 N.C. X 3/4 N.C.
MF 81	7/8 N.C. X 1 N.F.
MF 811	7/8 N.C. X 1-1/8 N.F.
MF 813	7/8 N.C. X 1-3/8 N.F.
MF 16	1 N.F. X 5/8 N.F.
MF 18	1 N.F. X 7/8 N.C.
MF 1111	1 N.F. X 1-1/8 N.F.
MF 1113	1-1/8 N.F. X 1-3/8 N.F.
MF 138	1-3/8 N.F. X 7/8 N.C.
MF 1311	1-3/8 N.F. X 1-3/8 N.F.

Flexible Connections

Flexible Connections

Use for connecting cleaning head to motor when cleaning tubes with short radius bends. Flexible connectors come complete with female/Female couplings in lengths from 4 - 14 inches (102 - 356mm)



"A" length



"C" length

Part Number	Order Number	Thread Size	Core Diameter	Cleaner Motor Options	Type "A"		Type "C"	
					Approx. Length (in.)	Wt.	Approx. Length (in.)	Wt.
2461 A	4035500	10-32 X 10-32	3/16"	24	4.00		13.00	.20#
2461 C	4035700	10-32 X 10-32		24				
X 6461 C	4046400	1/4 N.F. X 1/4 N.F.		30,27, X64				
X 6462		1/4 N.F. X 5/16 N.C.		27, X64				
X 6161 A	4045000	5/16 N.F. X 5/16 N.F.		X61				
X 6161 C	4045200	5/16 N.F. X 5/16 N.F.		X61				
2661 A	4036200	3/8 N.F. X 5/16 N.F.	1/4"	26	4.50			.40#
2961 A	4036500	3/8 N.F. X 3/8 N.F.		29				
X 6361 A	4045600	3/8 N.F. X 7/16 N.F.		X63,31				
3161 C	4037000	7/16 N.F. X 5/16 N.C.		31				
X 6661 A	4046800	3/8 N.F. X 7/16 N.F.	3/8"	X65, X66				.45#
X 6662 A	4047200	3/8 N.F. X 7/16 N.C.		X65, X66				
2561 A	4035800	7/16 N.F. X 7/16 N.F.						
4161 A	4037100	5/8 N.C. X 5/8 N.C.	1/2"	3175, 4225	6.50			1.0#
4162 A	4037500	5/8 N.C. X 9/16 N.C. Male		4200, 4225, 4250				
4163 C	4038200	5/8 N.C. X 7/16 N.C.		4200				
31561		9/16 N.C. X 1/2 N.C.		3150				
43061 C	4042800	3/4 N.C. X 3/4 N.C.	5/8"	4300, 4325				1.5#
43062 C	4043100	3/4 N.C. X 9/16 N.C. Male		3225, 4300, 4325				
32261 C	4039500	3/4 N.C. X 5/8 N.C.		3225				
42562		5/8 N.C. X 9/16 N.C. Male		3200, 4250				
43561 C	4043400	7/8 N.C. X 3/4 N.C.	3/4"	4350, 3250				2.6#
44061		7/8 N.C. X 7/8 N.C.		4350, 4450				
44062 C	4044300	7/8 N.C. X 7/8 N.C. Male		4450				
43562		7/8 N.C. X 9/16 N.C. Male		3250, 4350				
33063 C	4040400	1 N.F. X 7/8 N.C.	1"	3300	Not Available			3.1#
33561 C	4040700	1-1/8 N.F. X 1-1/8 N.F.		3350, 3400, 4600				
33562		1-1/8 N.F. X 1 N.F.		3350, 3400, 4600				
44861 C	4044600	1-1/8 N.F. X 7/8 N.C.		3350, 3400, 4600				
44862		1-1/8 N.F. X 7/8 N.C. Male		3350, 3400, 4600				
35061		1-3/8 N.F. X 1 N.F.		3500 and up				
35062	4041400	1-3/8 N.F. X 1- 1/8 N.F.		3500 and up				
35063		1-3/8 N.F. X 1-3/8 N.F. Male		3500 and up				

Overhead Catalyst Cleaners

Overhead catalyst cleaner systems are specifically designed for the safe removal of spent catalyst from the top of the reactor tower. The system collects the catalyst carried by the exhaust air and discharges the spent catalyst into any suitable container.

- Helps eliminate the danger of catalyst contacting the operator
- Uses high-powered, high-performance air motor to remove catalyst quickly and efficiently
- Cleaner systems are available for tubes from 1-3/16" up to 5" diameter (I.D.)
- Specify tube size and gauge when ordering



Cleaner Complete example (See picture at right)

Model Number	Ordering Number	Description	Quantity
OHC-250 2000 3162	4104981	Cleaner Complete* (~85 lbs.)	1
1806	1049100	SPARE MOTOR BLADES	4
OHC 2501	1284700	MAIN CLEANER BODY	1
FC 200 1 7/8	1245180	FC TYPE DRILL BIT - 1-7/8" DIA.	1
OHC 2507	1285300	DUST SEAL ASSEMBLY	1
OHC 2509 1 3/4	1285800	OHC TYPE DRILL BIT - 1-3/4" DIA.	2
OHC 2510	1286100	DUST SEAL GASKET	3
OHC 2511	1286200	RENEWABLE PILOT	1
WRENCH 5/8	14-0810	SHAFT WRENCH - 5/8"	1
3162	4075800	AIR MOTOR	1
OHC 2508 3/4	4105113	OPERATING HOSE & COUPLINGS - 50FT	1
OHC 2502	4105368	DISPOSAL TUBE ASSEMBLY	1

* Cleaner Complete includes three drill bits, three extra dust seal gaskets, a spare set of motor blades, and motor shaft wrench(s)

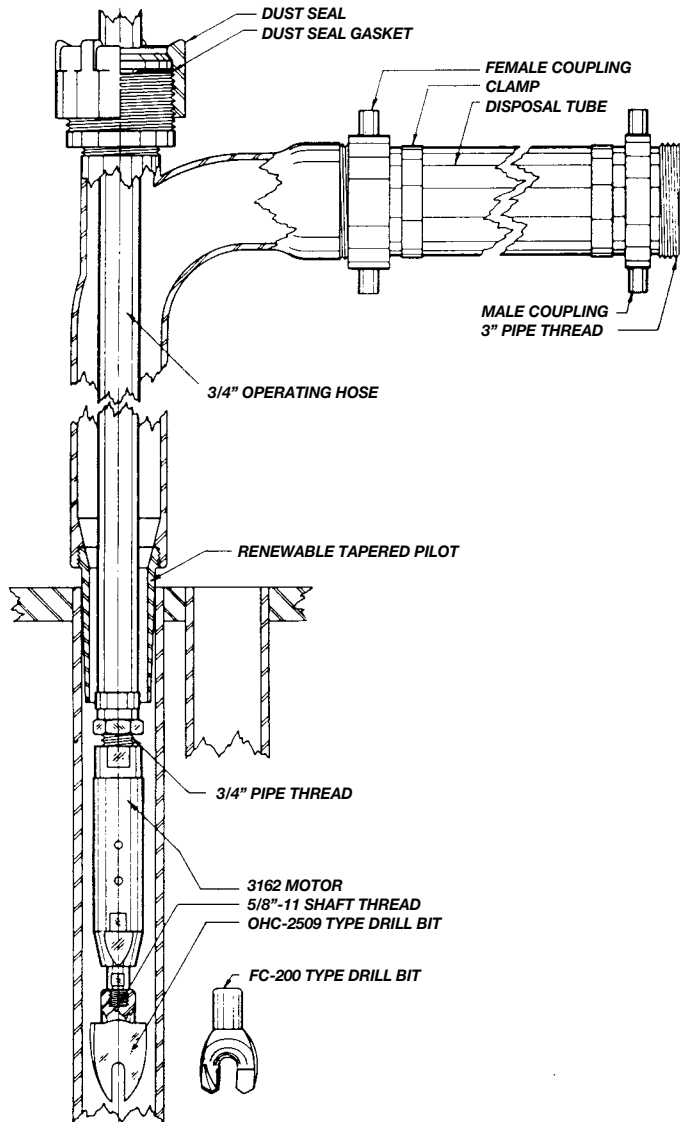


Catalyst Cleaner Bits

Model Number	Order Number	Description
FC-200-1 1/4 5/8NC	1716980PT	Drill Bit - 1-1/4" Diameter
FC-200-1 3/8	1245160	Drill Bit - 1-3/8" Diameter
FC-200-1 1/2 9/16NC	1245153	Drill Bit - 1-1/2" Diameter
FC-200-1 5/8 9/16NC	1245175	Drill Bit - 1-5/8" Diameter
FC-200-1 5/8 5/8NC	1716622	Drill Bit - 1-5/8" Diameter
FC-200-1 3/4 5/8NC	1245155	Drill Bit - 1-3/4" Diameter
FC-200-1 7/8 5/8NC	1245180	Drill Bit - 1-7/8" Diameter
FC 200 1 15/16 5/8NC	1716521	Drill Bit - 1-15/16" Diameter
FC 200 1 23/32 5/8NC	1716542	Drill Bit - 1-23/32" Diameter
FC 200 2 1/2 7/8NC	1715100	Drill Bit - 2-1/2" Diameter
OHC-2509-1 5/8	1285900	Drill Bit - 1-5/8" Diameter
OHC-2509-1 3/4	1285800	Drill Bit - 1-3/4" Diameter
OHC-2509-1 7/8	1286000	Drill Bit - 1-7/8" Diameter

FC-2000-3162

Shown below (1 5/8-2)



Accessories

Model FV-100 Foot Valve

For quick control of air when cleaning tubes. Has LOCK ON-EASY OFF feature. Easily secured to working platform or most convenient location.

Model Number	Order Number	Length		Width		Height		NPT	Weight	
		in.	mm	in.	mm	in.	mm		in.	Lbs.
FV-100	4035310	10	254	6.5	165.1	4	101.6	1	12	5.45



In-Line Lubricator

Lubricator stays connected to the tool. Internal adjustment of lubrication rate.



Ordering Number	Hose Size	Lubricator	Bowl Capacity
3067800	1/2 NPT	#0	1/6 pt (7 cl)
3067900	3/4 NPT	#1	1/3 pt (15 cl)
3068000	3/4 NPT	#2	1/2 pt (23 cl)
3068100	1 NPT	#3	1 pt (47 cl)

Air Hose Selection Guide

Note: Standard "WB-LHWW" braid hose has one layer wire braid and a left hand wire wound outside hose protector.

Hose Size (in.)	Working Pressure PSI	Length ft.		Model Number	Order Number	Air Coupling Pipe Tap Size (in.)	Wire Wound (W/W) Not Wire Wound (N/WW)	Hose OD (over wire)		
		ft.	M					in.	mm	
Air Motor – 25										
3/16	250	25	7.62	3/16" -25 ft.-250	4105071	18-20	N/WW	0.437	11.11	
3/16	250	50	15.24	3/16" -50 ft.-250	4105072	18-20	N/WW	0.437	11.11	
Air Motors – 27, 27A, 30, 30A										
1/4	225	25	7.62	1/4" -25 ft.-225	4105075	1/8	N/WW	0.531	13.49	
1/4	225	50	15.24	1/4" -50 ft.-225	4105076	1/8	N/WW	0.531	13.49	
Air Motors – X-64, X-61										
1/4	225	25	7.62	1/4" -25 ft.-225	4105073	1/4	N/WW	0.531	13.49	
1/4	225	50	15.24	1/4" -50 ft.-225	4105074	1/4	N/WW	0.531	13.49	
Air Motor – 29										
3/8	205	25	7.62	3/8" -25 ft.-205	4105083	1/4	N/WW	0.687	17.46	
3/8	205	50	15.24	3/8" -50 ft.-205	4105084	1/4	N/WW	0.687	17.46	
Air Motors – 26, 31										
3/8	205	25	7.62	3/8" -25 ft.	4105088	3/8	N/WW	0.687	17.46	
3/8	205	50	15.24	3/8" -50 ft.	4105089	3/8	N/WW	0.687	17.46	
Air Motors – X-63, X-63A, X-65, X-65A, X-66										
3/8	625	25	7.62	3/8" -25 ft.-WB-LHWW	1717371	3/8	Left hand W/W	0.875	22.22	
3/8	625	50	15.24	3/8" -50 ft.-WB-LHWW	1717372	3/8	Left hand W/W	0.875	22.22	
Air Motors – 3150, 3175, 4200, 4225, 4250										
1/2	625	25	7.62	1/2" -25 ft.-WB-LHWW	1717373	1/2	Left hand W/W	1.000	25.4	
1/2	625	50	15.24	1/2" -50 ft.-WB-LHWW	1717374	1/2	Left hand W/W	1.000	25.4	
Air Motors – 3162, 3187, 3200, 3225, 3212, 4300, 4325										
3/4	625	25	7.62	3/4" -25 ft.-WB-LHWW	1717375	3/4	Left hand W/W	1.250	31.75	
3/4	625	50	15.24	3/4" -50 ft.-WB-LHWW	1717376	3/4	Left hand W/W	1.250	31.75	
All other air motors										
1	625	25	7.62	1" -25 ft.-WB-LHWW	1717377	1	Left hand W/W	1.625	41.28	
1	625	50	15.24	1" -50 ft.-WB-LHWW	1717378	1	Left hand W/W	1.625	41.28	



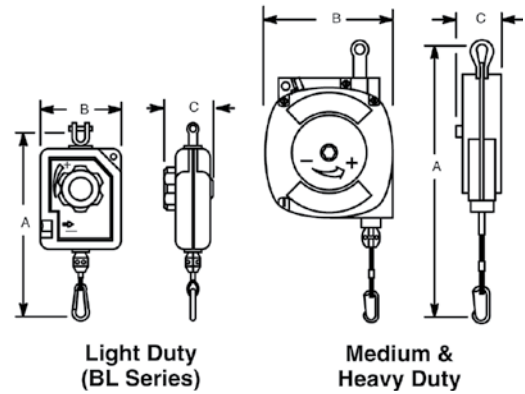
Ergonomic Tool Balancers

Capacity

1 - 45 lbs.

0.5 - 20.5 kg

- External tension adjustment
- 360° Swivel
- Retracting in-line cable



Model Number	Lock Feature	Capacity		"A"		"B"		"C"		Weight	
		lbs.	kg	in.	mm	in.	mm	in.	mm	lbs.	kg

Light Duty – 5.2 ft. (1.6m) Cable Travel

BL-2A	–	2.0-1.0	0.9-0.5	10.4	263	4.0	102	2.2	56	1.1	0.5
BL-4A	–	4.0-2.0	1.8-0.9	10.4	263	4.0	102	2.2	56	1.1	0.5

Light Duty – 6.7 ft. (2.0m) Cable Travel

BL-6A	–	6.0-4.0	2.7-1.8	12.9	327	5.5	140	3.1	79	3.3	1.5
BLL-6A	Ratchet	6.0-4.0	2.7-1.8	12.9	327	5.5	140	3.1	79	3.3	1.5
BL-8A	–	8.0-6.0	3.6-2.7	12.9	327	5.5	140	3.1	79	3.3	1.5
BLL-8A	Ratchet	8.0-6.0	3.6-2.7	12.9	327	5.5	140	3.1	79	3.3	1.5

Medium Duty – 6.6ft. (2.0m) Cable Travel

BM-13A	Non-Locking	13-9.0	5.9-4.1	13.8	350	6.9	175	4.5	114	9.0	4.1
BM-13A	Lock/Release	13-9.0	5.9-4.1	13.8	350	6.9	175	4.5	114	9.0	4.1
BM-18A	Non-Locking	18-13	8.2-5.9	13.8	350	6.9	175	4.5	114	9.0	4.1

Medium Duty – 6.0ft. (1.8m) Cable Travel

BM-25A	Automatic	25-18	11.4-8.2	20.7	527	7.8	197	6.6	169	19.0	8.6
BM-35A	Automatic	35-25	15.9-11.4	20.7	527	7.8	197	6.6	169	19.0	8.6
BM-45A	Automatic	45-35	20.5-15.9	20.7	527	7.8	197	6.6	169	19.0	8.6

Speed, Feed & Power

Please use the chart below as a guide only. Many variables contribute to the optimum parameters for each application. These variables include: particular material characteristics, cutter design, cutter sharpness, airline pressure and flow capacity and cutter lubrication.

All portable drilling tools have limited power and thrust. In most cases, holes over 1/2 inch diameter cannot be produced at machine tool rates. Feed rates and/or speeds are reduced. Consult Apex Tool Group for advise on particular applications.

For best results with your drilling system:

1. Maintain lubricated air to the tool with pressure of 90 psig *while the tool is running.*
2. Use high quality cutters.
3. Replace cutters when point dulls – hole diameter generally increases, cycle times lengthen (*except positive feed*) and hole finish worsens.
4. Whenever possible, provide lubricant mist to the drill point.
5. Insure there is an adequate flow path for drill chips (*swarf*).
6. Utilize fixtures that are secure and rigid.
7. Assure that accessory items are sized correctly and working properly.
8. Train operating personnel in the proper use of the tool.
9. **Please consult the machinery handbook for optimum cutting feeds and speeds.**

Material	Function	Drill Diameter						
		1/8	3/16	1/4	5/16	3/8	7/16	1/2
		.125	.188	.250	.313	.375	.437	.500
Aluminum (300 SFM)	Speed (RPM)	9000	6000	4600	3600	3000	2600	2300
	Feed Rate (IPR)	.002	.003	.004	.004	.004	.004	.004
	Power (HP)	.2	.3	.6	1.0	1.5	1.8	2.0
Mild Steel (90 SFM)	Speed (RPM)	2700	1800	1300	1100	900	750	650
	Feed Rate (IPR)	.005	.005	.005	.006	.006	.006	.006
	Power (HP)	.2	.3	.6	1.0	1.5	1.8	2.0
High Strength Steel Stainless Steel (30 SFM)	Speed (RPM)	900	600	450	375	300	250	220
	Feed Rate (IPR)	.001	.001	.001	.001	.001	.001	.001
	Power (HP)	.2	.3	.6	1.0	1.5	1.8	2.0
Titanium/Inconel (20 SFM)	Speed (RPM)	600	400	300	250	200	175	150
	Feed Rate (IPR)	.002	.003	.003	.003	.004	.004	.005
	Power (HP)	.2	.3	.6	1.0	1.5	1.8	2.0

Composites

Graphite, kevlar, fiberglass, and other composite materials vary widely. Fiber, resin, processing method and type of cutting tool all affect the optimum drilling speed and feedrate. Little power or thrust is normally required, but controlled feedrates at the proper speed is mandatory. Carbide or diamond cutting tools are required. Contact your material supplier or experiment with an NC Drilling Machine.

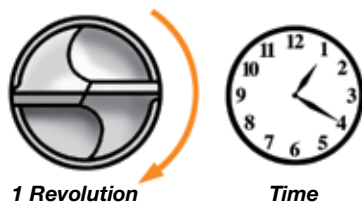
Stacks of Various Materials Use the lowest speed and feedrate of the materials in the stack. Peck feed drilling is best.

A. Peck Drilling permits higher drilling speeds B. Carbide cutting tools (when applicable) permits higher drilling speeds C. Oil hole cutting tools permit higher drilling speeds.

Speed (RPM)

Describes the number of revolutions of the spindle per unit of time.

Example: Revolutions per minute=RPM

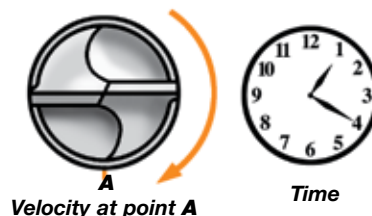


$$\text{Speed} = \text{Revolution} \div \text{Time}$$

Surface Speed (SFM)

Describes the velocity (*speed*) of the **outside** of the drill bit.

Example: 30 surface feet per minute (30 SFM)

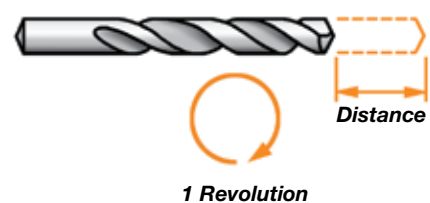


$$\text{Surface Speed} = \text{Distance} \div \text{Time (rotational)}$$

Feed Rate (IPR)

Describes the distance the spindle travels during each revolution.

Example: 0.002 inches per revolution = .002 IPR



$$\text{Feed Rate} = \text{Distance} \div \text{Revolution}$$

Recommended Cutting Speeds for Tube Cutters and Tube Facers

The recommended cutting speeds in this chart are based on published speeds and feeds. A slower RPM may be necessary depending on tube material analysis and hardness. Proper lubrication must be used.

Tube Material	Tube O.D.									
	1/4"	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1-1/4"	1-1/2"	2"
Aluminum (500 FPM)	7500 rpm	5000 rpm	3800 rpm	3000 rpm	2500 rpm	2200 rpm	1900 rpm	1500 rpm	1275 rpm	950 rpm
Brass (300 FPM)	4600 rpm	3050 rpm	2300 rpm	1825 rpm	1625 rpm	1300 rpm	1150 rpm	925 rpm	750 rpm	575 rpm
Copper (250 FPM)	3825 rpm	2550 rpm	1900 rpm	1525 rpm	1275 rpm	1100 rpm	950 rpm	750 rpm	625 rpm	500 rpm
Carbon Steel (FPM)	2150 rpm	1425 rpm	1075 rpm	850 rpm	700 rpm	625 rpm	525 rpm	425 rpm	350 rpm	275 rpm
Stainless Steel (65 FPM)	1000 rpm	660 rpm	500 rpm	400 rpm	330 rpm	285 rpm	250 rpm	200 rpm	165 rpm	125 rpm
Titanium (30 FPM)	450 rpm	300 rpm	230 rpm	185 rpm	155 rpm	130 rpm	115 rpm	95 rpm	75 rpm	60 rpm
Inconel (20 FPM)	305 rpm	205 rpm	155 rpm	125 rpm	100 rpm	90 rpm	75 rpm	60 rpm	50 rpm	40 rpm

Special Tables

Airetool Boiler Cleaner Motor Air Consumption Chart

Proper air supply and lubrication are imperative for proper operation of the Airetool boiler tube cleaner motors. 90 psi should be maintained at motor during operation for best cleaning results. Motor requires 20 to 30 drops of oil per minute.

Boiler Cleaner Motor – Air Consumption C.F.M.

Motor Number	Pressure		
	60 Lbs.	80 Lbs.	100 Lbs.
3500	176	196	255
3450	174	194	248
3400	174	194	248
3350	155	178	207
3318	137	159	203
3312	129	149	200
3300	129	149	200
3275	127	147	172
3262	95	109	132
3250	93	106	127
3225	86	95	115
3212	79	87	103
3187	65	72	90
3175	57	69	86
3150	51	60	74
X-65-A	20	23	27
X-63-A	18	21	23
31	21	23	26
26	21	27	30
29	21	27	30

Motor Number	Pressure		
	60 Lbs.	80 Lbs.	100 Lbs.
27A	09	10	11
27	09	10	11
30A	09	10	11
30	09	10	11
24	08	09	10
4600	119	134	149
4481	119	134	149
4450	76	85	93
4400	61	66	74
4350	61	66	74
4325	58	64	72
4300	57	63	71
4250	55	61	69
4225	33	37	41
4200	33	37	41
X-66	22	25	29
X-65	20	23	27
X-63	18	21	23
X-61	12	14	16
X-64	10	11	12

Decimal Equivalents

Decimal Equivalents															
in.	Dec.	in.	Dec.	in.	Dec.	in.	Dec.	in.	Dec.	in.	Dec.	in.	Dec.	in.	Dec.
1/64	.016	9/64	.141	17/64	.266	25/64	.391	33/64	.516	41/64	.641	49/64	.766	57/64	.891
1/32	.031	5/32	.156	9/32	.281	13/32	.406	17/32	.531	21/32	.656	25/32	.781	29/32	.906
3/64	.047	11/64	.172	19/64	.297	27/64	.422	35/64	.547	43/64	.672	51/64	.797	59/64	.922
1/16	.063	3/16	.188	5/16	.313	7/16	.438	9/16	.563	11/16	.688	13/16	.813	15/16	.938
5/64	.078	13/64	.203	21/64	.328	29/64	.453	37/64	.578	45/64	.703	53/64	.828	61/64	.953
3/32	.094	7/32	.219	11/32	.344	15/32	.469	19/32	.594	23/32	.719	27/32	.844	31/32	.969
7/64	.109	15/64	.234	23/64	.359	31/64	.484	39/64	.609	47/64	.734	55/64	.859	63/64	.984
1/8	.125	1/4	.250	3/8	.375	1/2	.500	5/8	.625	3/4	.750	7/8	.875	1	1.000

Special Tables

Tube Sizes – Birmingham Wire Gauges

OD of Tube (in.)	Birmingham Wire Gauge												
	00-.380	0-.340	1-.300	2-.284	3-.259	4-.238	5-.220	6-.203	7-.180	8-.165	9-.148	10-.134	11-.120
1/4													
3/8													
5/8													
3/4												.482	.510
7/8												.607	.635
1										.670	.704	.732	.760
1-1/4										.920	.954	.982	1.010
1-1/2										1.170	1.204	1.232	1.260
1-3/4							1.310	1.344	1.390	1.420	1.454	1.482	1.510
2						1.524	1.560	1.594	1.640	1.670	1.704	1.732	1.760
2-1/4	1.490	1.570	1.650	1.682	1.732	1.774	1.810	1.844	1.890	1.920	1.954	1.982	2.010
2-1/2	1.740	1.820	1.900	1.932	1.982	2.024	2.050	2.094	2.140	2.170	2.204	2.232	2.260
2-3/4	1.990	2.070	2.150	2.182	2.232	2.274	2.310	2.344	2.390	2.420	2.454	2.842	2.510
3	2.240	2.320	2.400	2.432	2.482	2.524	2.560	2.594	2.640	2.570	2.704	2.732	2.760
3-1/4	2.490	2.570	2.650	2.682	2.732	2.774	2.810	2.844	2.890	2.920	2.854	2.982	3.010
3-1/2	2.740	2.820	2.900	2.932	2.982	3.024	3.060	3.094	3.140	3.170	3.204	3.232	3.260
3-3/4	2.990	3.070	3.150	3.182	3.232	3.274	3.310	3.344	3.390	3.420	3.454	3.482	3/510
4	3.240	3.320	3.400	3.432	3.482	3.524	3.560	3.594	3.640	3.670	3.704	3.732	3.760
4-1/4	3.490	3.570	3.650	3.682	3.732	3.774	3.810	3.844	3.890	3.920	3.954	3.982	4.010
4-1/2	3.740	3.820	3.900	3.932	3.982	4.024	4.060	4.094	4.140	4.170	4.204	2.232	4.260
4-3/4	3.990	4.070	4.150	4.182	4.232	4.274	4.310	4.344	4.390	4.420	4.454	4.482	4.510
5	4.240	4.320	4.400	4.432	4.482	4.524	4.560	4.594	4.640	4.670	4.704	4.732	4.760
5-1/4	4.490	4.570	4.650	4.682	4.732	4.774	4.810	4.844	4.890	4.920	4.954	4.982	5.010

OD of Tube (in.)	Birmingham Wire Gauge												
	12-.109	13-.095	14-.083	15-.072	16-.065	17-.058	18-.049	19-.042	20-.035	21-.032	22-.028	23-.025	24-.022
1/4							.152	.166	.180	.186	.194	.200	.206
3/8			.209	.231	.245	.259	.277	.291	.305	.311	.319	.325	.331
1/2		.310	.334	.356	.370	.384	.402	.416	.430	.436	.444	.450	.456
5/8	.407	.435	.459	.481	.495	.509	.527	.541	.555	.561	.569	.575	.581
3/4	.532	.560	.584	.606	.620	.634	.652	.666	.680	.686	.694	.700	.706
7/8	.657	.685	.709	.731	.745	.759	.777	.791	.805	.811	.819	.825	.831
1	.782	.810	.834	.856	.870	.884	.902	.916	.930	.936	.944	.950	.956
1-1/4	1.032	1.060	1.084	1.106	1.120	1.134	1.152	1.166	1.180	1.186	1.194	1.200	1.206
1-1/2	1.282	1.310	1.334	1.356	1.370	1.384	1.402	1.416	1.430	1.436	1.444	1.450	1.456
1-3/4	1.532	1.560	1.584	1.606	1.620	1.634	1.652	1.666	1.680	1.686	1.694	1.700	1.706
2	1.782	1.810	1.834	1.856	1.870	1.884	1.902	1.916	1.930	1.935	1.944	1.950	1.956
2-1/4	2.032	2.060	2.084	2.106	2.120	2.134	2.151						
2-1/2	2.282	2.310	2.334	2.356	2.370	2.384	2.402						
2-3/4	2.532	2.560	2.584	2.606	2.620	2.634	2.652						
3	2.782	2.810	2.834	2.856	2.870	2.884	2.902						
3-1/4	3.032	3.060	3.084	3.106	3.120	3.134	3.151						
3-1/2	3.282	3.310	3.334	3.356	3.370	3.384	3.401						
3-3/4	3.532	3.560	3.584	3.606	3.620	3.634	3.652						
4	3.782	3.810	3.834	3.856	3.870	3.884	3.902						
4-1/4	4.032	4.060	4.084	4.106	4.120	4.134	4.152						
4-1/2	4.282	4.310	4.334	4.356	4.370	4.384	4.402						
4-3/4	4.532	4.560	4.584	4.606	4.620	4.634	4.652						
5	4.782	4.810	4.834	4.856	4.870	4.884	4.902						
5-1/4	5.032	5.060	5.084	5.106	5.120	5.134	5.152						

Nominal Pipe Size (in.)	Outside Diameter (in.)	Schedule Number							
		Nominal Wall Thickness Inches / Nominal Inside Diameter Inches (ID)							
		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	11.378	1.000	10.750	1.312	10.126

Thread Designations

Size		NC	NF
in.	mm		
10 -32	4.8	-	10-32 UNF
1/4	6.4	1/4-20 UNC	1/4-28 UNF
5/16	7.9	5/16-18 UNC	5/16-24 UNF
3/8	9.5	3/8-16 UNC	3/8-24 UNF
7/16	11.1	7/16-14 UNC	7/16-20 UNF
1/2	12.7	1/2-13 UNC	1/2-20 UNF
9/16	14.3	9/16-12 UNC	9/16-18 UNF
5/8	15.9	5/8-11 UNC	5/8-18 UNF
3/4	19.1	3/4-10 UNC	3/4-16 UNF
7/8	22.2	7/8-9 UNC	7/8-14 UNF
1	25.4	1-8 UNC	1-14 UNS
1-1/8	28.6	1-1/8-7 UNC	1-1/8-12 UNF
1-3/8	34.9	1-3/8-16 UNC	1-3/8-12 UNF

Metric Table Conversions

Fractional Inch	Decimal Inch	Millimeter	Fractional Inch	Decimal Inch	Millimeter	Fractional Inch	Decimal Inch	Millimeter
1/64	.016	0.40	23/64	.359	9.13	45/64	.703	17.86
1/32	.031	0.79	3/8	.375	9.53	23/32	.719	18.26
3/64	.047	1.19	25/64	.391	9.92	47/64	.734	18.65
1/16	.063	1.59	13/32	.406	10.32	3/4	.750	19.05
5/64	.078	1.98	27/64	.422	10.72	49/64	.766	19.45
3/32	.094	2.38	7/16	.438	11.11	25/32	.781	19.84
7/64	.109	2.78	29/64	.453	11.51	51/64	.797	20.24
1/8	.125	3.18	15/32	.469	11.10	13/16	.813	20.64
9/64	.141	3.57	31/64	.484	12.30	53/64	.828	21.03
5/32	.156	3.97	1/2	.500	12.70	27/32	.844	21.43
11/64	.172	4.36	33/64	.516	13.10	55/64	.860	21.83
3/16	.188	4.76	17/32	.531	13.50	7/8	.875	22.23
13/64	.203	5.16	35/64	.547	13.89	57/64	.891	22.62
7/32	.219	5.56	9/16	.563	14.29	29/32	.906	23.02
15/64	.234	5.95	37/64	.578	14.68	59/64	.922	23.42
1/4	.250	6.35	19/32	.594	15.08	61/64	.953	24.21
17/64	.266	6.75	39/64	.609	15.48	31/32	.969	24.61
9/32	.282	7.14	5/8	.625	15.88	63/64	.984	25.00
19/64	.297	7.54	41/64	.641	16.27	1	1.000	25.40
5/16	.313	7.94	21/32	.656	16.67	2	2.000	50.80
21/64	.328	8.33	43/64	.672	17.07	3	3.000	76.20
11/32	.344	8.73	11/16	.688	17.46			

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