

5TH EDITION

INTRODUCING USA INDUSTRIES' BEST-IN-CLASS  
PIPING ISOLATION & TESTING PLUG

**GRIPSAFE<sup>ST</sup>**

see Section 1 - Page 12

**USA<sup>®</sup>**  
**INDUSTRIES**



SINCE 1982

# PRODUCT CATALOG

Piping Isolation & Testing Products • Tube Plugs • Orifice Plates  
Heat Exchanger Tools & Tooling • Custom Machining



LINE BLANKS & SPACERS, BLIND FLANGES, STORAGE • ISOLATION & TESTING PIPE PLUGS • BLEEDER CLEANERS, BLEED RINGS • ENGINEERED, METAL TAPERED & NON-METAL TYPE TUBE PLUGS  
HEADER/SHOULDER PLUGS & GASKETS • UNIVERSAL, PADDLE & RTJ TYPE ORIFICE PLATES, RESTRICTION ORIFICE UNIONS • HEAT EXCHANGER TOOLS & TOOLING • MUCH MORE!

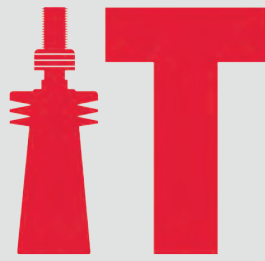
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***THE SAFER, FASTER  
& SMARTER  
CHOICE!***



**SNAP IT™**



**JR & SR**

**ENGINEERED TUBE PLUGS**

Meets ASME PCC-2 2018 standards  
For use in heat exchanger, boiler and condenser tubes.





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## ABOUT US

As an **ISO 9001:2015** certified manufacturer and supplier, we operate facilities in Texas and Louisiana. Our products and services extend to oil and gas refineries, liquefied natural gas (LNG), chemical, petrochemical, pharmaceutical, power generation, pipeline, engineering, procurement, construction (EPC's) and other various industrial process manufacturing facilities globally. We specialize in designing, manufacturing, and supplying critical pipe and tube products that ensure the safety and efficiency of plant Turnarounds, Shutdowns, Maintenance & Repairs, and Capital Projects.

## OUR MISSION

To rapidly deliver essential products & innovative solutions to our customers.

## OUR COMPANY'S CORE VALUES



**TRUST**



**SUPPORT**



**COMMUNICATION**



**COLLABORATION**



**CREATIVE SOLUTIONS**

At USA Industries, we believe an accountable workplace is built upon a foundation of ***trust***. We support one another and value open, honest ***communication***. We meet the needs of each other and our customers through ***collaboration*** and ***creative solutions***. These values are foundational in all of our people and our core processes.

## OUR CUSTOMERS

Our customers include owner-operators, resellers, contractors, and OEMs. We recognize the challenges in maintaining and repairing industrial facilities, and our product specialists and shop staff are available 24/7, 365 days a year to discuss emergency needs and fulfill orders. Understanding the unique requirements of our industrial customers, we also offer custom machining services with quick turnaround times.

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(Patent No. 9,546,889)

**When it comes to isolating or testing piping,  
*Think of USA Industries First!***

We maintain a substantial inventory of blind flanges and isolation and hydrotest thickness paddle blinds, with sizes ranging from 1/2" to 96" and flange ratings spanning 150# to 2500#. Our assortment of pipe plugs includes the exclusive and patented GripSafe®ST models, crafted for high-pressure environments, alongside our standard Double Block & Bleed, Flange Weld Test, Industrial Isolation, Grip Type, plumbers-type Inflatable Balloons, and Wing Nuts. We also manufacture bleed rings, rodout tools, and the cutting-edge EZ Lock Blind Rack® for paddle blind storage solutions.



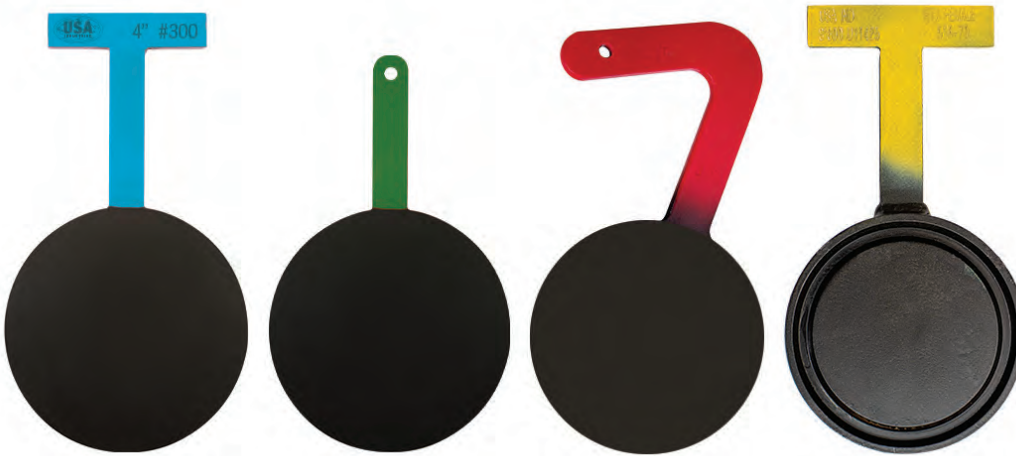
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# PADDLE BLINDS - ISOLATION & HYDROTEST THICKNESSES

See chart on page **PI-7** for our standard thicknesses or specify your own.



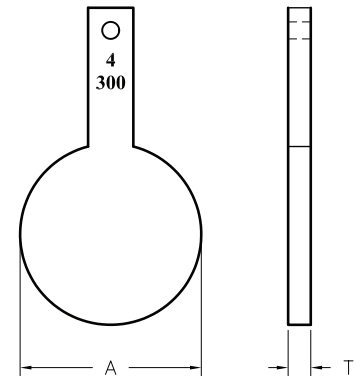
When Ordering Specify:

- Flange Rating
- Line Size
- Mill or Serrated Face
- Thickness (Isolation, Hydro or custom)
- Handle Type
- Material
- Quantity
- Delivery Date

HANDLE COLORS					
150#	RED	300#	BLUE	600#	YELLOW
900#	GREEN	1500#	WHITE	2500#	ORANGE

Inventory consists of 516 - Gr70 Spec Carbon Steel material made to ASME B16.47 & B16.48/ANSI B16.5 & B16.2 standards Available in Raised Face, Mill or Serrated Finish - Ring Type Joint, Oval or Octagonal, Male or Female configurations.

- Line sizes 1/2" — 96"
- Flange ratings 150# — 2500#
- 125-250 RMS Serrated Finishes or Mill Finish available
- Stamped with Size & Rating
- Ground to provide smooth edges
- Ring Type Joint — Male or Female — Oval or Octagonal (Hydro thickness only)
- Q/A & Q/C: manufactured under our strict ISO 9001: 2015 Quality Assurance Program

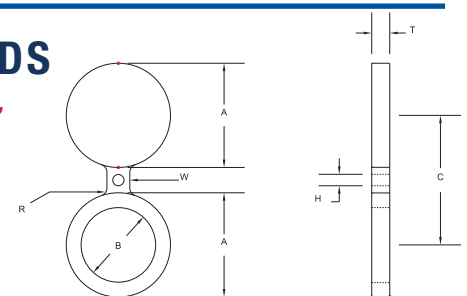


## SPECTACLE / FIGURE-8 BLINDS

See Thickness Chart on page **PI-7**



- Inventory consists of 516 - Gr70 carbon steel, 304 and 316 stainless steel.
- Line sizes 1/2" — 96"
- Flange ratings 150# — 2500#
- 125-250 RMS Serrated Finishes or Mill Finish available
- Ring Type Joint — Male or Female — Oval or Octagonal
- Stamped with Size & Rating
- Ground to provide smooth edges
- Can be made to your customized specifications
- Q/A & Q/C: Manufactured under our strict ISO 9001: 2015 Quality Assurance Program



When Ordering Specify:

- Flange Rating
- Line Size
- Mill or Serrated Face
- Thickness (Isolation, Hydro or custom)
- Material
- Quantity
- Delivery Date

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# PADDLE BLIND & SPACER DIMENSIONS + THICKNESS CHART

LINE SIZE (in.)	ISO.	150#			300#			600#			900#			1500#			2500#		
		THK	O.D.	I.D.	THK	O.D.	I.D.	THK	O.D.	I.D.	THK	O.D.	I.D.	THK	O.D.	I.D.	THK	O.D.	I.D.
1/2	5/16	1-3/4	5/8	5/16	2	5/8	5/16	2	5/8	5/16	2-3/8	5/8	5/16	2-3/8	5/8	5/16	2-5/8	5/8	3/8
3/4	5/16	2-1/8	7/8	5/16	2-1/2	7/8	5/16	2-1/2	7/8	5/16	2-5/8	7/8	5/16	2-5/8	7/8	3/8	2-7/8	7/8	3/8
1	5/16	2-1/2	1-1/8	5/16	2-3/4	1-1/8	5/16	2-3/4	1	5/16	3	1	5/16	3	1	3/8	3-1/4	1	3/8
1-1/4	5/16	2-7/8	1-5/8	5/16	3-1/8	1-5/8	5/16	3-1/8	1-3/8	3/8	3-3/8	1-3/8	3/8	3-3/8	1-3/8	3/8	4	1-3/8	1/2
1-1/2	5/16	3-1/4	1-7/8	5/16	3-5/8	1-7/8	5/16	3-5/8	1-5/8	3/8	3-3/4	1-5/8	3/8	3-3/4	1-5/8	1/2	4-1/2	1-5/8	5/8
2	5/16	4	2-3/8	5/16	4-1/4	2-3/8	3/8	4-1/4	2-1/8	3/8	5-1/2	2-1/8	1/2	5-1/2	2	1/2	5-5/8	2	5/8
2-1/2	5/16	4-3/4	2-7/8	5/16	5	2-7/8	3/8	5	2-5/8	1/2	6-3/8	2-5/8	1/2	6-3/8	2-1/2	5/8	6-1/2	2-3/8	3/4
3	5/16	5-1/4	3-1/2	5/16	5-3/4	3-1/2	3/8	5-3/4	3-1/4	1/2	6-1/2	3-1/4	5/8	6-3/4	3	3/4	7-5/8	3	7/8
3-1/2	5/16	6-1/4	4	3/8	6-3/8	4	3/8	6-1/4	3-3/4	5/8									
4	5/16	6-3/4	4-1/2	3/8	7	4-1/2	1/2	7-1/2	4-1/4	5/8	8	4-1/4	3/4	8-1/8	4	7/8	9-1/8	4	1-1/8
5	5/16	7-5/8	5-1/2	3/8	8-3/8	5-1/2	5/8	9-3/8	5-3/8	3/4	9-5/8	5-1/4	7/8	9-7/8	5	1-1/8	10-7/8	5	1-3/8
6	5/16	8-5/8	6-5/8	1/2	9-3/4	6-5/8	5/8	10-3/8	6-3/8	7/8	11-1/4	6-3/8	1	11	6	1-3/8	12-3/8	6	1-5/8
8	5/16	10-7/8	8-5/8	1/2	12	8-5/8	7/8	12-1/2	8-3/8	1-1/8	14	8-3/8	1-3/8	13-3/4	8	1-5/8	15-1/8	7-7/8	2-1/8
10	5/16	13-1/4	10-3/4	5/8	14-1/8	10-3/4	1	15-5/8	10-3/8	1-3/8	17	10-3/8	1-5/8	17	10	2	18-5/8	9-3/4	2-5/8
12	5/16	16	12-3/4	3/4	16-1/2	12-3/4	1-1/8	17-7/8	12-3/8	1-5/8	19-1/2	12-3/8	1-7/8	20-3/8	12	2-3/8	21-1/2	11-3/8	3-1/8
14	5/16	17-5/8	14	3/4	19	14	1-1/4	19-1/4	13-5/8	1-3/4	20-3/8	13-5/8	2-1/8	22-5/8	13-1/8	2-5/8			
16	5/16	20-1/8	16	7/8	21-1/8	16	1-1/2	22-1/8	15-5/8	2	22-1/2	15-5/8	2-3/8	25-1/8	15	3			
18	5/16	21-1/2	18	1	23-3/8	18	1-5/8	24	17-5/8	2-1/8	25	17-5/8	2-5/8	27-5/8	16-7/8	3-3/8			
20	5/16	23-3/4	20	1-1/8	25-5/8	20	1-3/4	26-3/4	19-1/2	2-1/2	27-3/8	19-1/2	2-7/8	29-5/8	18-7/8	3-3/4			
22	5/16	25-7/8	22	1-1/4	27-5/8	22	1-7/8	28-3/4	21-1/2	2-3/4									
24	5/16	28-1/8	24	1-1/4	30-3/8	24	2	31	23-1/2	2-7/8	32-7/8	23-1/2	3-1/2	35-3/8	22-5/8	4-3/8			
MSS SP-44 SERIES "A" SPECS													METHODOLOGY						
26	5/16	30-3/8	26	1-5/8	32-3/4	26	2-1/2	34	26	3-1/2	34-5/8	26	4-3/8						
28	5/16	32-5/8	28	1-3/4	35-1/4	28	2-3/4	35-7/8	28	3-3/4	37-1/8	28	4-5/8						
30	5/16	34-5/8	30	1-7/8	37-3/8	30	2-7/8	38-1/8	30	4-1/8	39-5/8	30	5						
32	5/16	36-7/8	32	2	39-1/2	32	3-1/8	40-1/8	32	4-3/8	42-1/8	32	5-3/8						
34	5/16	38-7/8	34	2-1/8	41-1/2	34	3-1/4	42-1/8	34	4-5/8	44-5/8	34	5-5/8						
36	5/16	41-1/8	36	2-1/4	43-7/8	36	3-1/2	44-3/8	36	4-7/8	47-1/8	36	6						
38	5/16	43-5/8	38	2-3/8	41-3/8	38	3-5/8	43-3/8	38	5-1/8	47-1/8	38	6-1/4						
40	5/16	45-5/8	40	2-1/2	43-3/4	40	3-7/8	45-3/8	40	5-3/8	49-1/8	40	6-5/8						
42	5/16	47-7/8	42	2-5/8	45-3/4	42	4	47-7/8	42	5-5/8	51-1/8	42	7						
44	5/16	50-1/8	44	2-3/4	47-7/8	44	4-1/4	49-7/8	44	6	53-3/4	44	7-1/4						
46	5/16	52-1/8	46	2-7/8	50	46	4-1/2	52-1/8	46	6-1/4	56-3/8	46	7-5/8						
48	5/16	54-3/8	48	3	52	48	4-5/8	54-5/8	48	6-1/2	58-3/8	48	8						
50	5/16	56-3/8	50	3-1/8	54-1/8	50	4-7/8	56-7/8	50	6-3/4									
52	5/16	58-5/8	52	3-1/4	56-1/8	52	5	58-7/8	52	7									
54	5/16	60-7/8	54	3-1/4	58-5/8	54	5-1/4	61-1/8	54	7-1/4									
56	5/16	63-1/8	56	3-3/8	60-5/8	56	5-3/8	63-3/8	56	7-1/2									
58	5/16	65-3/8	58	3-1/2	62-5/8	58	5-5/8	65-3/8	58	7-7/8									
60	5/16	67-3/8	60	3-5/8	64-5/8	60	5-3/4	68-1/8	60	8-1/8									
API-605 SERIES "B" SPECS																			
26	5/16	28-7/16	26	1-5/8	30-1/4	26	2-1/2	30	26	3-1/2	32-7/8	26	4-3/8						
28	5/16	30-7/16	28	1-3/4	32-3/8	28	2-3/4	32-1/8	28	3-3/4	35-3/8	28	4-5/8						
30	5/16	32-7/16	30	1-7/8	34-3/4	30	2-7/8	34-1/2	30	4-1/8	37-5/8	30	5						
32	5/16	34-9/16	32	2	36-7/8	32	3-1/8	36-5/8	32	4-3/8	39-7/8	32	5-3/8						
34	5/16	36-11/16	34	2-1/8	39	34	3-1/4	39-1/8	34	4-5/8	42-1/8	34	5-5/8						
36	5/16	38-3/4	36	2-1/4	41-1/8	36	3-1/2	41-1/8	36	4-7/8	44-1/8	36	6						
38	5/16	41	38	2-3/8	43-1/8	38	3-5/8												
40	5/16	43	40	2-1/2	45-1/8	40	3-7/8												
42	5/16	45	42	2-5/8	47-1/8	42	4												
44	5/16	47	44	2-3/4	49-1/8	44	4-1/4												
46	5/16	49-5/16	46	2-7/8	51-3/4	46	4-1/2												
48	5/16	51-5/16	48	3	53-3/4	48	4-5/8												
50	5/16	53-5/16	50	3-1/8	55-3/4	50	4-7/8												
52	5/16	55-5/16	52	3-1/4	57-3/4	52	5												
54	5/16	57-1/2	54	3-1/4	60-1/8	54	5-1/4												
56	5/16	59-1/2	56	3-3/8	62-5/8	56	5-3/8												
58	5/16	62-1/16	58	3-1/2	65-1/16	58	5-5/8												
60	5/16	64-1/16	60	3-5/8	67-1/16	60	5-3/4												

Line sizes up to 96" are available. Standard Isolation thickness is 5/16" (+/-1/16). Any thickness rating or alloy is available upon request.

Sizes and thicknesses meet the following specifications ASME 16.48, ASME 16.5, ASME B16.47

Blank thicknesses over 24 NPS were calculated using the equation for blanks in ASME B31.3 as follows:

$$T = d / ((3P) / (16SE))$$

d = I.D. of ring gasket (in.)

T = Blank Thickness (in.)

S = 23,300psi

E = 1.00

P = Design Gauge Pressure psi.

S (Basic Allowable Stress) and E (Quality Factor) values were determined from tables A1 and A1-A from B31.3 for 516-Gr 70 material with the temperature range of -20 to 100° Fahrenheit. This calculation does not take into consideration any required corrosion allowance if needed.



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## EZ VENT® SLIP BLINDS

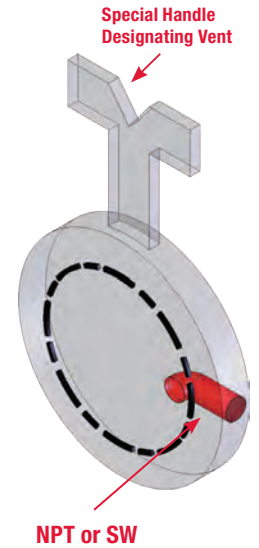


- Multiple ports added at any position, venting one or both sides
- EZ Vent is used to block one side of your flange while allowing access to vent the other side
- Excellent for use when there is not a valve on your piping at that location
- Vent is commonly used to verify there is zero energy in the line; vent off any pressure that has leaked by upstream valve; as an entry point for hydrotesting
- Available in Ring Type Joint
  - NPT or SW ports
  - Color coded handle\*



SW/NPT NPS (in.)	Recommended Min. Blind Thickness For SW (in)	Recommended Min. Blind Thickness For NPT (in)
1/8	3/4	1/2
1/4	7/8	3/4
3/8	1	7/8
1/2	1-1/4	1
3/4	1-1/2	1-1/4
1	1-3/4	1-1/2
1-1/4	2-3/16	1-3/4
1-1/2	2-7/16	2
2	3	2-1/2

Machine Finish may require increased thickness.



### When Ordering Specify:

- Flange Rating
- Line Size
- Thickness (Isolation, Hydro or custom)
- Mill or Serrated Finish
- # of Ports
- Location of NPT or SW ports
- Material
- Quantity
- Delivery Date

## EZ PURGE® SLIP BLINDS



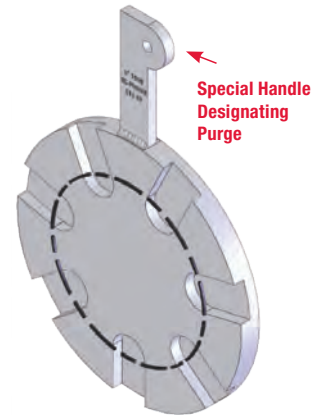
For line purging applications, past practice has been to use a slip blind and a number of spacers sandwiched between the blind and the gapped flange. While this procedure can be effective to create a purging area, several problems exist that can lead to unsafe practices and/or damage to equipment.

USA Industries EZ Purge blinds can help eliminate those problems. Our purge blinds are easily identifiable and can be made to any specification requested. The current standard we use is a 1/2" thick isolation slip blind with a 1/4" deep channel. Custom thicknesses available upon request.



The ratio of gasket area versus purge area is approximately 50% to allow for proper sealing force distribution.

Custom configurations available to suit your specific purge flow requirements.



### When Ordering Specify:

- Flange Rating
- Line Size
- Mill or Serrated Face
- Material
- Quantity
- Delivery Date

- Any flange size & rating
- Unique handle identifies it as a purge blind
- Painted flat black
- Stamped with Size & Rating

- Q/A & Q/C — manufactured under our ISO 9001: 2015 Quality Assurance Program
- Available in Ring Type Joint
- Color coded handle\*

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## EZ VENT-PURGE BLIND®

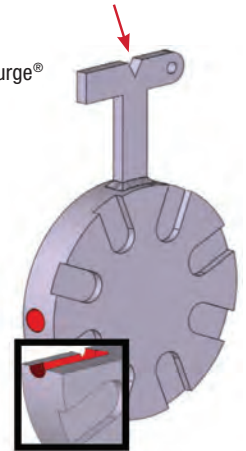


**SALES & RENTALS AVAILABLE!**

Our EZ Vent-Purge Blind combines the benefits of BOTH the EZ Purge® and EZ Vent® slip blinds as noted on page **PI-8**.

- Any flange size & rating
- Unique handle identifies it as a Vent-Purge blind
- Painted flat black
- Color coded handle\*
- Stamped with Size & Rating
- Available in Ring Type Joint
- Q/A & Q/C — Manufactured under our ISO 9001:2015 Quality Assurance Program

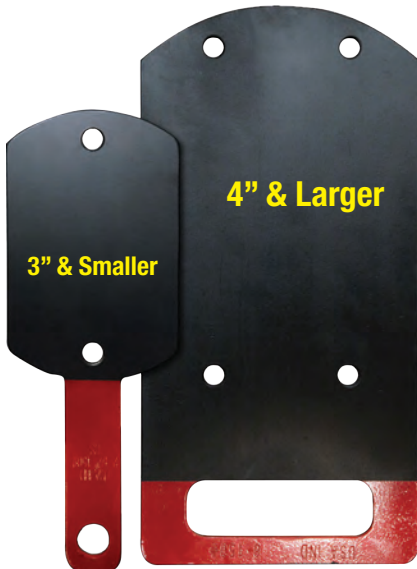
Special Handle Designating Vent-Purge



When Ordering Specify:

- Flange Rating
- Line Size
- Thickness (Isolation, Hydro or custom)
- Mill or Serrated Face
- # of Ports
- NPT or SW Port(s) Location(s)
- Material
- Quantity
- Delivery Date

## EZ GUILLOTINE™ SLIP BLINDS



**SALES & RENTALS AVAILABLE!**

Guillotine Blinds are used to provide an isolation source on the flare header side of a PSV prior to removal of the PSV for repair.

A blind flange is then placed over and bolted using remaining bolt holes to ensure pressure holding capabilities.

Available in Carbon Steel and Stainless Steel or other alloys to meet your specifications

When Ordering Specify:

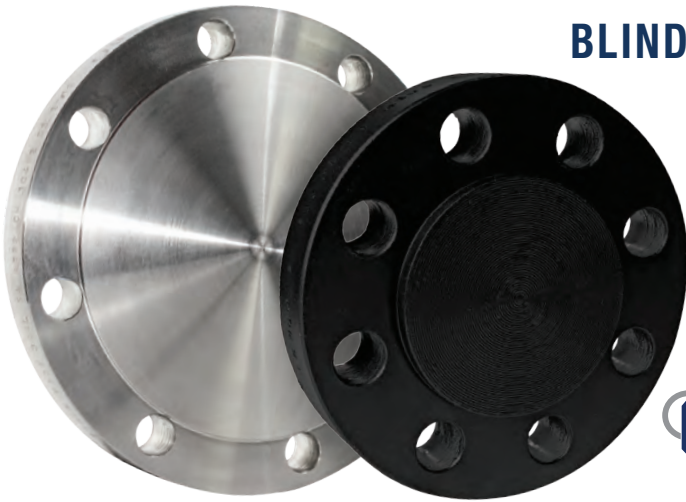
- Flange Rating
- Line Size
- Thickness
- Color coded handle\*
- Material
- Quantity
- Delivery Date

HANDLE COLORS *					
150#	RED	300#	BLUE	600#	YELLOW
900#	GREEN	1500#	WHITE	2500#	ORANGE

**IN-STOCK ITEMS  
SHIP SAME DAY**

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**www.USAIndustries.com**



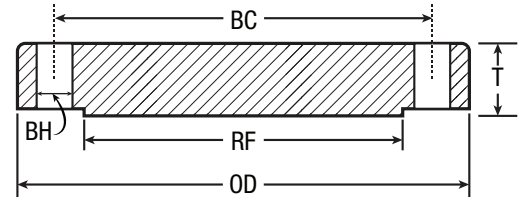


# BLIND FLANGES

Blind Flanges meet SA105 (carbon steel) specifications.

- Line sizes 1/2" — 96"
- Flange ratings 150# — 2500#
- Raised Face or Ring Type Joint Gasket surfaces
- Provided for either Series A (MSS SP44) or Series B (API 605) meeting ASME B16.47 & B16.48 / ANSI B16.5 and B16.2 specifications
- Other blind specifications A182, A350, B160, etc. can be provided upon request for purchase

**SALES & RENTALS AVAILABLE!**



NPS	CLASS 150 ASME B16.5						300 ASME B16.5						600 ASME B16.5						900 ASME B16.5					
	OD OF FLANGE (OD)	DIA. OF BOLT CIRCLE (BC)	DIA. OF RAISED FACE (RF)	NO. OF BOLT HOLES	DIA. OF BOLT HOLE (BH)	BLIND THICKNESS (T)	OD OF FLANGE (OD)	DIA. OF BOLT CIRCLE (BC)	DIA. OF RAISED FACE (RF)	NO. OF BOLT HOLES	DIA. OF BOLT HOLE (BH)	BLIND THICKNESS (T)	OD OF FLANGE (OD)	DIA. OF BOLT CIRCLE (BC)	DIA. OF RAISED FACE (RF)	NO. OF BOLT HOLES	DIA. OF BOLT HOLE (BH)	BLIND THICKNESS (T)	OD OF FLANGE (OD)	DIA. OF BOLT CIRCLE (BC)	DIA. OF RAISED FACE (RF)	NO. OF BOLT HOLES	DIA. OF BOLT HOLE (BH)	BLIND THICKNESS (T)
1/2	3.50	2.38	1.38	4	0.63	0.44	3.75	2.63	1.38	4	0.63	0.56	3.75	2.62	1.38	4	0.62	0.56	4.75	3.25	1.38	4	0.88	0.88
3/4	3.88	2.75	1.69	4	0.63	0.50	4.62	3.25	1.69	4	0.75	0.63	4.62	3.25	1.69	4	0.75	0.63	5.12	3.50	1.69	4	0.88	1.00
1	4.25	3.12	2.00	4	0.63	0.56	4.88	3.50	2.00	4	0.75	0.69	4.88	3.50	2.00	4	0.75	0.69	5.88	4.00	2.00	4	1.00	1.13
1-1/4	4.62	3.50	2.50	4	0.63	0.63	5.25	3.88	2.50	4	0.75	0.75	5.25	3.88	2.50	4	0.75	0.81	6.25	4.38	2.50	4	1.00	1.13
1-1/2	5.00	3.88	2.88	4	0.63	0.69	6.12	4.50	2.88	4	0.88	0.81	6.12	4.50	2.88	4	0.88	0.88	7.00	4.88	2.88	4	1.13	1.25
2	6.00	4.75	3.63	4	0.75	0.75	6.50	5.00	3.63	8	0.75	0.88	6.50	5.00	3.63	8	0.75	1.00	8.50	6.50	3.63	8	1.00	1.50
2-1/2	7.00	5.50	4.13	4	0.75	0.88	7.50	5.88	4.13	8	0.88	1.00	7.50	5.88	4.13	8	0.88	1.13	9.62	7.50	4.13	8	1.13	1.63
3	7.50	6.00	5.00	4	0.75	0.94	8.25	6.63	5.00	8	0.88	1.13	8.25	6.62	5.00	8	0.88	1.25	9.50	7.50	5.00	8	1.00	1.50
3-1/2	8.50	7.00	5.50	8	0.75	0.94	9.00	7.25	5.50	8	0.88	1.19	9.00	7.25	5.50	8	1.00	1.38	-	-	-	-	-	-
4	9.00	7.50	6.19	8	0.75	0.94	10.00	7.88	6.19	8	0.88	1.25	10.75	8.50	6.19	8	1.00	1.50	11.50	9.25	6.19	8	1.25	1.75
5	10.00	8.50	7.31	8	0.88	0.94	11.00	9.25	7.31	8	0.88	1.38	13.00	10.50	7.31	8	1.12	1.75	13.75	11.00	7.31	8	1.38	2.00
6	11.00	9.50	8.50	8	0.88	1.00	12.50	10.63	8.50	12	0.88	1.44	14.00	11.50	8.50	12	1.12	1.88	15.00	12.50	8.50	12	1.25	2.19
8	13.50	11.75	10.63	8	0.88	1.13	15.00	13.00	10.63	12	1.00	1.63	16.50	13.75	10.63	12	1.25	2.19	18.50	15.50	10.63	12	1.50	2.50
10	16.00	14.25	12.75	12	1.00	1.19	17.50	15.25	12.75	16	1.13	1.88	20.00	17.00	12.75	16	1.38	2.50	21.50	18.50	12.75	16	1.50	2.75
12	19.00	17.00	15.00	12	1.00	1.25	20.50	17.75	15.00	16	1.25	2.00	22.00	19.25	15.00	20	1.38	2.63	24.00	21.00	15.00	20	1.50	3.13
14	21.00	18.75	16.25	12	1.13	1.38	23.00	20.25	16.25	20	1.25	2.13	23.75	20.75	16.25	20	1.50	2.75	25.25	22.00	16.25	20	1.63	3.38
16	23.50	21.25	18.50	16	1.13	1.44	25.50	22.50	18.50	20	1.38	2.25	27.00	23.75	18.50	20	1.63	3.00	27.75	24.25	18.50	20	1.75	3.50
18	25.00	22.75	21.00	16	1.25	1.56	28.00	24.75	21.00	24	1.38	2.38	29.25	25.75	21.00	20	1.75	3.25	31.00	27.00	21.00	20	2.00	4.00
20	27.50	25.00	23.00	20	1.25	1.69	30.50	27.00	23.00	24	1.38	2.50	32.00	28.50	23.00	24	1.75	3.50	33.75	29.50	23.00	20	2.13	4.25
22	29.50	27.25	25.25	20	1.38	1.81	33.00	29.25	25.25	24	1.63	2.63	34.25	30.63	25.25	24	1.88	3.75	-	-	-	-	-	-
24	32.00	29.50	27.25	20	1.38	1.88	36.00	32.00	27.25	24	1.63	2.75	37.00	33.00	27.25	24	2.00	4.00	41.00	35.50	27.25	20	2.63	5.50

**SERIES A - ASME 16.47**

26	34.25	31.75	29.50	24	1.38	2.63	38.25	34.50	29.50	28	1.75	3.25	40.00	36.00	29.50	28	2.00	4.94	42.75	37.50	29.50	20	2.88	6.31
28	36.50	34.00	31.50	28	1.38	2.75	40.75	37.00	31.50	28	1.75	3.50	42.25	38.00	31.50	28	2.12	5.19	46.00	40.25	31.50	20	3.12	6.75
30	38.75	36.00	33.75	28	1.38	2.88	43.00	39.25	33.75	28	1.88	3.69	44.50	40.25	33.75	28	2.12	5.50	48.50	42.75	33.75	20	3.12	7.18
32	41.75	38.50	36.00	28	1.62	3.13	45.25	41.50	36.00	28	2.00	3.88	47.00	42.50	36.00	28	2.38	5.81	51.75	45.50	36.00	20	3.38	7.62
34	43.75	40.50	38.00	32	1.62	3.19	47.50	43.50	38.00	28	2.00	4.07	49.00	44.50	38.00	28	2.38	6.06	55.00	48.25	38.00	20	3.62	8.06
36	46.00	42.75	40.25	32	1.62	3.50	50.00	46.00	40.25	32	2.12	4.32	51.75	47.00	40.25	28	2.62	6.38	57.50	50.75	40.25	20	3.62	8.44
38	48.75	45.25	42.25	32	1.62	3.38	46.00	43.00	40.50	32	1.62	4.19	50.00	45.75	41.50	28	2.38	6.12	57.50	50.75	43.25	20	3.62	8.50
40	50.75	47.25	44.25	36	1.62	3.50	48.75	45.50	42.75	32	1.75	4.44	52.00	47.75	43.75	32	2.38	6.38	59.50	52.75	45.75	24	3.62	8.81
42	53.00	49.50	47.00	36	1.62	3.75	50.75	47.50	44.75	32	1.75	4.63	55.25	50.50	46.00	28	2.62	6.75	61.50	54.75	47.75	24	3.62	9.12
44	55.25	51.75	49.00	40	1.62	3.94	53.25	49.75	47.00	32	1.88	4.82	57.25	52.50	48.25	32	2.62	7.00	64.88	57.62	50.00	24	3.88	9.56
46	57.25	53.75	51.00	40	1.62	4.00	55.75	52.00	49.00	28	2.00	5.00	59.50	54.75	50.25	32	2.62	7.31	68.25	60.50	52.50	24	4.12	10.06
48	59.50	56.00	53.50	44	1.62	4.19	57.75	54.00	51.25	32	2.00	5.19	62.75	57.50	52.50	32	2.62	7.69	70.25	62.50	54.50	24	4.12	10.38
50	61.75	58.25	55.50	44	1.88	4.32	60.25	56.25	53.50	32	2.12	5.44	65.75	60.00	54.50	28	3.12	8.00	-	-	-	-	-	-
52	64.00	60.50	57.50	44	1.88	4.50	62.25	58.25	-	32	2.12	5.63	67.75	62.00	-	32	3.12	8.25	-	-	-	-	-	-
54	66.25	62.75	59.50	44	1.88	4.69	65.25	61.00	-	28	2.38	5.94	70.00	64.25	-	32	3.12	8.56	-	-	-	-	-	-
56	68.75	65.00	62.00	48	1.88	4.82	67.25	63.00	-	28	2.38	6.00	73.00	66.75	-	32	3.38	8.88	-	-	-	-	-	-
58	71.00	67.25	64.00	48	1.88	5.00	69.25	65.00	-	32	2.38	6.19	75.00	68.75	-	32	3.38	9.12	-	-	-	-	-	-
60	73.00	69.25	66.00	52	1.88	5.13	71.25	67.00	-	32	2.38	6.38	78.50	71.75	-	28	3.62	9.56	-	-	-	-	-	-

**SERIES B - ASME 16.47**

26	30.94	29.31	28.00	36	0.88	1.75	34.12	31.62	29.00	32	1.38	3.50	35.00	31.75	28.62	28	1.75	4.38	40.25	35.50	30.00	20	2.62	6.06
28	32.94	31.31	30.00	40	0.88	1.88	36.25	33.75	31.00	36	1.38	3.50	37.50	34.00	30.88	28	1.88	4.56	43.50	38.25	32.25	20	2.88	6.56
30	34.94	33.31	32.00	44	0.88	2.00	39.00	36.25	33.25	36	1.50	3.69	40.25	36.50	33.12	28	2.00	5	46.50	40.75	34.50	20	3.12	6.93
32	37.06	35.44	34.00	48	0.88	2.12	41.50	38.50	35.50	32	1.62	4.06	42.75	38.75	35.25	28	2.12	5.31	48.75	43.00	36.50	20	3.12	7.31
34	39.56	37.69	36.25	40	1.00	2.25	43.62	40.62	37.50	36	1.62	4.06	45.75	41.50	37.50	24	2.38	5.68	51.75	45.50	39.00	20	3.38	7.68
36	41.62	39.75	38.25	44	1.00	2.31	46.12	42.88	39.75	32	1.75	4.06	47.75	43.50	39.75	28	2.38	5.94	53.00	47.25	40.50	24	3.12	7.94
38	44.25	42.12	40.25	40	1.12	2.50	48.12	44.88	41.75	36	1.75	4.38	-	-	-	-	-	-	-	-	-	-	-	-
40	46.25	44.12	42.50	44	1.12	2.62	50.12	46.88	43.88	40	1.75	4.56	-	-	-	-	-	-	-	-	-	-	-	-
42	48.25	46.12	44.50	48	1.12	2.69	52.50	49.00	46.00	36	1.88	4.69	-	-	-	-	-	-	-	-	-	-	-	-
44	50.25	48.12	46.50	52	1.12	2.81	54.50	51.00	48.00	40	1.88	5.00	-	-	-	-	-	-	-	-	-	-	-	-
46	52.81	50.56	48.62	40	1.25	2.94	57.50	53.75	50.00	36	2.00	5.12	-	-	-	-	-	-	-	-	-	-	-	-
48	54.81	52.56	50.75	44	1.25	3.06	59.50	55.75	52.25	40	2.00	5.31	-	-	-	-	-	-	-	-	-	-	-	-
50	56.81	54.56	52																					



## EZ LOCK BLIND RACK®

*Patented EZ Lock Blind Rack<sup>[1]</sup> for Storage of Paddle / Hydrotest Blinds*



- Weight accommodation: 12,000 lbs.
- Storage capacity: up to 884 blinds\*
- Accommodates "7" or "T" handles
- Holds blinds up to 24-1/4" OD
- Lockable lid security to reduce theft and blind loss
- Patented Indexing Retainers for safety and blind security
- Easily accessed from both sides of the unit
- Overhead heavy lift crane lugs
- Bottom accessible forklift cavities
- Order fully stocked and receive discount

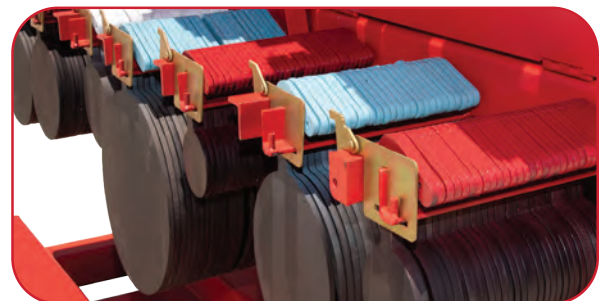
\* = 884 blinds is dependent on blind sizes & thicknesses

**(Patent No. 9,546,889)**

January 17, 2017

***Blinds are secured by our patented, and innovative Indexing Retainers.***

[1] Tracy Sue and Casey Sue, "Lock rack for hydro, isolation or test blinds..."



**IN-STOCK ITEMS  
SHIP SAME DAY**

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**www.USAIndustries.com**

**VISA**

**mastercard**

**AMERICAN EXPRESS**

**RENTALS AVAILABLE!**

INTRODUCING  
**GRIPSAFE<sup>®</sup> ST**

For over sixty years, industries have relied on conventional isolation and testing plug technology despite known incidents of ejections and plug movements. USA Industries now introduces its GripSafe ST line, revolutionizing plug technology with cutting-edge advancements. The GripSafe ST plugs boast a patented independent wedge gripping system, ensuring unparalleled holding strength while minimizing risks to personnel and equipment. This innovative redesign of traditional plug designs positions the GripSafe ST line as the global standard for safety, reliability, and technological sophistication.



**SUPERIOR  
TECHNOLOGY**

**GRIPSAFE<sup>®</sup> ST INNOVATION**

Manufactured Exclusively by USA Industries an ISO 9001:2015 Certified Company

For the latest patent and trademark information, go to:  
<https://www.USAIindustries.com/gripsafe-patents-trademarks>  
or scan QR code to the right with your mobile phone



**WARNING:**

**A SPECIAL WORD OF CAUTION:** Pressure testing can be an extremely hazardous operation and safety precautions should be strictly adhered to.

All connections, valves, flanges and other fittings should be checked for suitability to test pressure. Verify the line ID & Plug Range match. Most importantly — Never stand or pass in front of any test plug or other enclosure while test is in progress. If plug discharges during a test, serious injury or death could occur.

**IN-STOCK ITEMS  
SHIP SAME DAY**

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**www.USAIindustries.com**



# GRIPSAFE<sup>®</sup> ST FAMILY OF ISOLATION & TEST PLUGS

## KEY FEATURES BENEFITS

### 1 WORLDS MOST ADVANCED ENGINEERED PIPE PLUG

#### ■ Patented Technology Supercedes Old Fashioned Design Used For The Past 65+ Years\*

- US & International Patents - 14
- US & International Trademarks - 7
- Other US and Foreign Patents Pending

#### ■ 7 Years of Research & Development With In-House Engineering

- Over 4000 Load & Pressure Tests
- 67 Years of Professional Industrial Design Team Engineering Experience

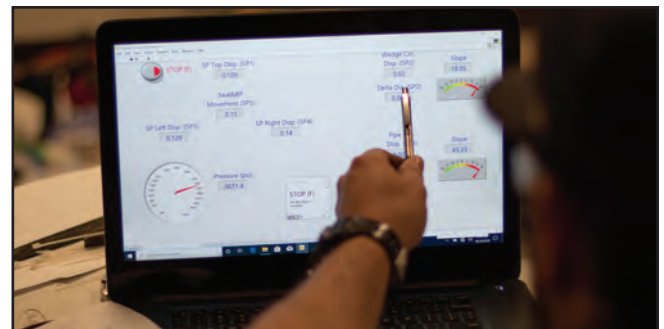
#### ■ Proven Field Success Since 2017

#### ■ Confident GripSafe ST Will Be the New Industry Standard

\*Patent No. 2,855,003 - October 7, 1958; Ellis B. Thaxton

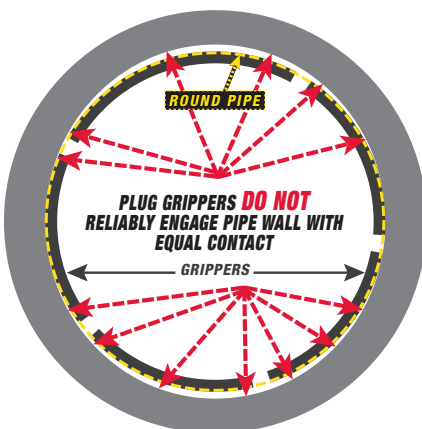
#### ■ Design Validation Testing

- 2017 - present
- 80 unique test plans conducted on various stocked sizes and schedules, equating to 1000's of repeatable tests



### 2 INDEPENDENTLY ACTUATING WEDGE SYSTEM

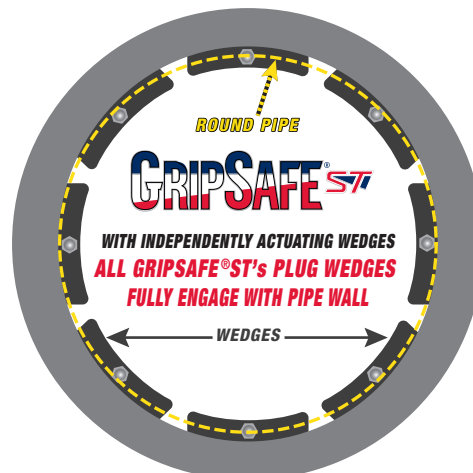
*Competitive Products*



#### ■ Equal Loading Across All Wedges Ensures Optimal Surface Contact & Holding Capabilities

#### ■ Overcomes Ovality (out-of-round pipe)

- Wedges self adjust to find pipe wall



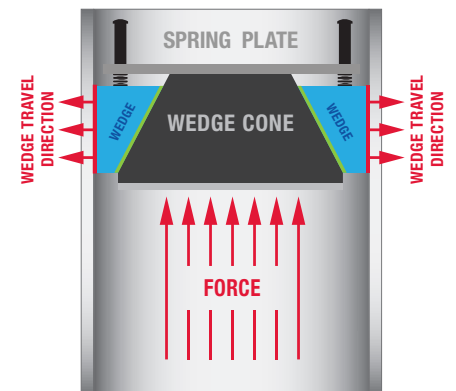
#### ■ Superior Self Gripping

- As force increases, the wedge's hold becomes stronger against the pipe wall

#### ■ No Damaging Pressure Points

- Force is distributed across entire wedge surface

#### ■ Automatic Gripping Upon Insertion On 2-Out-Of-3 Plug Models



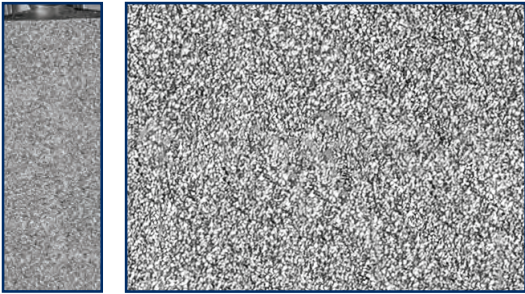
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### 3 GRIPPING WEDGES

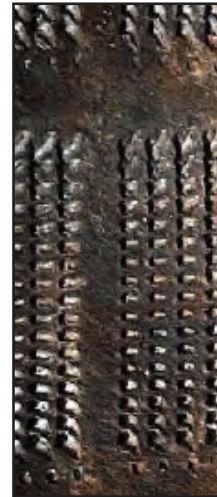


GripSafe ST uses a specially designed wedge system that grips the pipe, and virtually leaves no scarring on the surface.

Competitive products that use serrated jaw-like grippers must bite into the pipe wall in order to hold the load. Feasibly, this degrades the pipe's integrity. Additional costs and time to rework, or to add temporary piping to compensate for damages during testing results.



GripSafe ST



Competitor A



Competitor B

■ **Secure Gripping With Proprietary Gritlock® Technology**

- Thousands of microscopic points of surface contact
- Highly dense and durable material
- At most, micro indentations are left behind
- Perform thousands of full hydro test cycles without diminished performance

■ **Leaves Pipe With Virtually No Surface Damage**

■ **Non-Contaminating Coating**

- Wedges are compatible with any alloy piping\*

\*\*After use in carbon steel pipe, eliminate the chance for carbon remnants being passed on in passivated/clean stainless steel pipe by simply changing wedges or by using another GSST plug not previously introduced to carbon steel pipe.

**COMPETITIVE WEDGE TESTING**

TEST SPECS: SCH 80 PLUGS, ASTM A106 GRADE B STEEL PIPE, PRESSURIZED TO 3,246PSI (FULL HYDROTEST PRESSURE)

### 4 TRI-PLY® SEALS

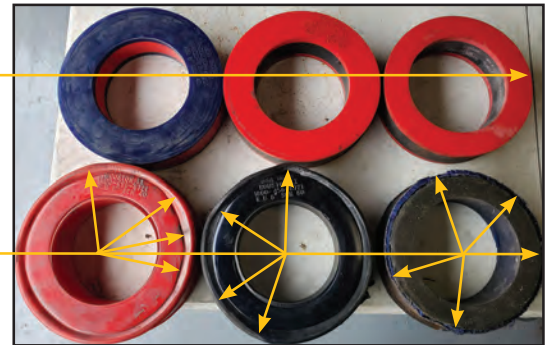


■ **Patented Proprietary Seal Technology**

- Reduces seal creep
- Less torque required to seal
- Proprietary urethane blend maximizes sealing ability
- Wider seal area over competitive designs
- Expansion range up to 3/8" for greater sealing capacity
- Longer seal life

**TRI-PLY VS. TRADITIONAL URETHANE SEAL TESTS**

• *Tri-Ply seals maintain their shape* when pushed beyond testing limits



• *Traditional urethane seals deform and flatten out* when pushed beyond testing limits. The flattening point is when seal expansion seizes, leaving the plug at higher risk for ejection at high pressures

### 5 ALUMINUM & STAINLESS STEEL BODY MATERIALS

■ **Less Weight (10" and larger plugs)**

- On average GripSafe ST plugs weigh less than competitive products. Significant weight differences exist as plug sizes increase, reaching upwards of **50% weight reductions**.



**IN-STOCK ITEMS  
SHIP SAME DAY**

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[www.USAINdustries.com](http://www.USAINdustries.com)



# DOUBLE BLOCK AND BLEED (DBB) 3/4" TO 36"\*

RENTALS  
AVAILABLE!

## GRIPSAFE<sup>®</sup> ST

### SAFETY & RELIABILITY

**Instant Security.** With its exclusive patented design, GripSafe ST features an advanced self-gripping technology that mitigates the chance of plug ejection immediately upon insertion into the pipe, even before nuts are tightened.

**Superior Self-Gripping Performance.** The innovative system distributes equal loading across the gripping wedges ensuring maximum surface contact and holding capabilities. As pressure increases behind the plug, the wedges grip tighter. Even in pipe diameters that are asymmetrical, each wedge independently adapts to variances within the pipe. Coupled with its automatic gripping feature upon installation, GripSafe ST takes "self-gripping" to a new level.

**Lightweight Advantage.** GripSafe ST plugs weigh less on average than competitive products. Significant weight differences exist as plug sizes increase, reaching upwards of 50% weight reductions in larger sizes without sacrificing holding capabilities.

**Leaves Virtually No Surface Damage.** Unlike competitive products which rely on serrated jaws to bite into the pipe for holding purposes, GripSafe ST uses a specially designed wedge system that grips the pipe, while leaving virtually no surface scarring. GripSafe ST eliminates the need for a segment of sacrificial pipe, or the cleanup necessary to remove surface deformations other tools create.

**Non-Contaminating Solution.** GripSafe ST plugs utilize a proprietary texture on the gripping wedges that can be used on any metal type with no carbon contamination. Therefore, in contrast with other plugs, GripSafe ST requires no alternate parts for use in stainless and other alloy pipes where cross contamination is a concern.

### APPLICATIONS

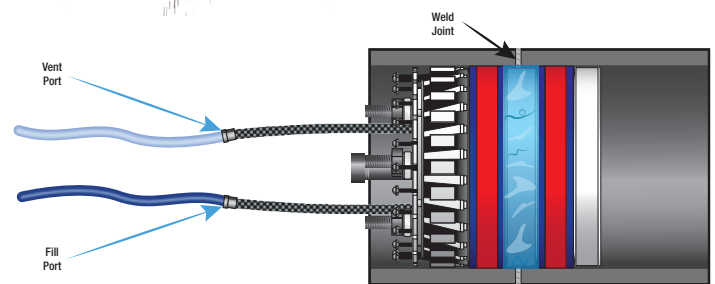
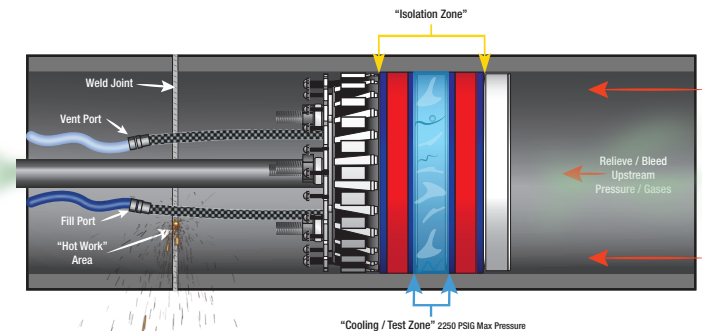
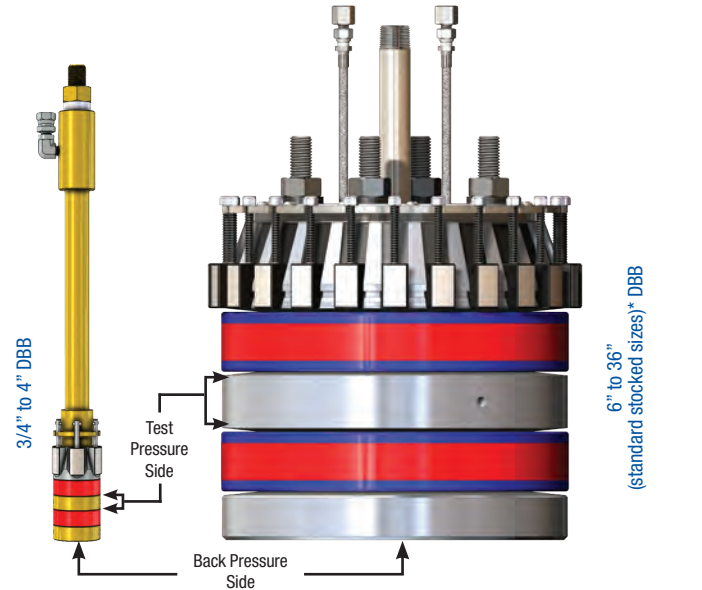
**Flange Weld Testing.** Pressure can be placed between the two seals to test weld-neck flanges by means of hydrostatic pressure, checking for hoop stress failure, weld leaks and/or pinhole leak paths while providing protection from any unexpected pressure discharge.

**Pre/Post Weld Operations.** Dual port design provides enhanced cooling by circulating water between the seals during pre/post weld processes (*on 6"+ models*).

**Isolation.** Increase safety by preventing exposure to hydrocarbon or other process leaks. Mitigate risk of injury to personnel in the event of inadvertent valve openings, valve leaks, or other pressure equipment failures upstream.

**Positive Isolation Monitoring.** Pressure between the two seals verifies seal integrity and ensures the plug's seals are effectively isolating the pipe.

**Line Purging.** Feed inert gases through the vent pipe, into a vessel, for back-purging welds or to remove oxygen for other processes.



**WARNING:**  
(See page PI-12)

\* Larger sizes and custom configurations available upon request

When Ordering Specify:

- GripSafe ST Plug Model Required
- Line Size
- Pipe Schedule
- Quantity
- Delivery Date

Scan QR code to go to GripSafe ST's webpage



IN-STOCK ITEMS  
SHIP SAME DAY

(713) 941-3797 • Toll Free: (800) 456-8721  
[www.USAIndustries.com](http://www.USAIndustries.com)



# OUTBOARD RETRACTION BLOCKING (ORB) 3/4" TO 36"\*



## SAFETY & RELIABILITY

**Instant Security.** With its exclusive patented design, GripSafe ST features an advanced self-gripping technology that mitigates the chance of plug ejection immediately upon insertion into the pipe, even before nuts are tightened.

**Superior Self Gripping Performance.** The innovative system distributes equal loading across the gripping wedges ensuring maximum surface contact and holding capabilities. As pressure increases behind the plug, the wedges grip tighter. Even in pipe diameters that are asymmetrical, each wedge independently adapts to variances within the pipe. Coupled with its automatic gripping feature upon installation, GripSafe ST takes "self-gripping" to a new level.

**Lightweight Advantage.** GripSafe ST plugs weigh less on average than competitive products. Significant weight differences exist as plug sizes increase, reaching upwards of 50% weight reductions in larger sizes without sacrificing holding capabilities.

**Leaves Virtually No Surface Damage.** Unlike competitive products which rely on serrated jaws to bite into the pipe for holding purposes, GripSafe ST uses a specially designed wedge system that grips the pipe, while leaving virtually no surface scarring. GripSafe ST eliminates the need for a segment of sacrificial pipe, or the cleanup necessary to remove surface deformations other tools create.

**Non-Contaminating Solution.** GripSafe ST plugs utilize a proprietary texture on the gripping wedges that can be used on any metal type with no carbon contamination. Therefore, in contrast with other plugs, GripSafe ST requires no alternate parts for use in stainless and other alloy pipes where cross contamination is a concern.

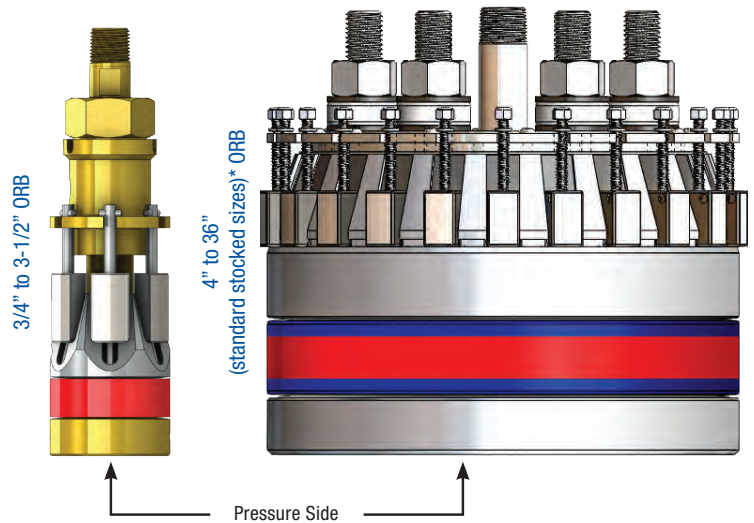
## APPLICATIONS

**Pipe Testing.** Test pipe sections without the need for flanges.

**Pipe Spool Testing.** Perform hydrostatic testing of pipe spools, eliminating the need for end caps and welding.

**Isolation.** Increase safety by preventing exposure to hydrocarbon or other process leaks. Mitigate risk of injury to personnel in the event of inadvertent valve openings, valve leaks, or other pressure equipment failures upstream.

**Line Purging.** Feed inert gases through the vent pipe, into a vessel, for back-purging welds or to remove oxygen for other processes.



Note: For 4" NPS, Pipe Schedules 120, 160, and XX require the smaller plug configuration.

\* Larger sizes and custom configurations available upon request



**WARNING:**  
(See page PI-12)

When Ordering Specify:

- GripSafe ST Plug Model Required
- Line Size
- Pipe Schedule
- Quantity
- Delivery Date

Scan QR code to go to GripSafe ST's webpage



**IN-STOCK ITEMS  
SHIP SAME DAY**

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[www.USAIndustries.com](http://www.USAIndustries.com)





# INBOARD INSERTION BLOCKING (IIB) REVERSE PRESSURE 3/4" TO 24"\*

RENTALS  
AVAILABLE!

## SAFETY & RELIABILITY

**Unmatched Security.** With its exclusive patented design, GripSafe ST features an advanced self-gripping technology that mitigates the risk of plug movement downstream upon installation.

**Superior Self Gripping Performance.** The innovative system distributes equal loading across the gripping wedges ensuring maximum surface contact and holding capabilities. As pressure increases in front of the plug, the wedges grip tighter. Even in pipe diameters that are asymmetrical, each wedge independently adapts to variances within the pipe. GripSafe ST takes "self-gripping" to a new level.

**Leaves Virtually No Surface Damage.** Unlike competitive products which rely on serrated jaws to bite into the pipe for holding purposes, GripSafe ST uses a specially designed wedge system that grips the pipe, while leaving virtually no surface scarring. GripSafe ST eliminates the need for a segment of sacrificial pipe, or the cleanup necessary to remove surface deformations other tools create.

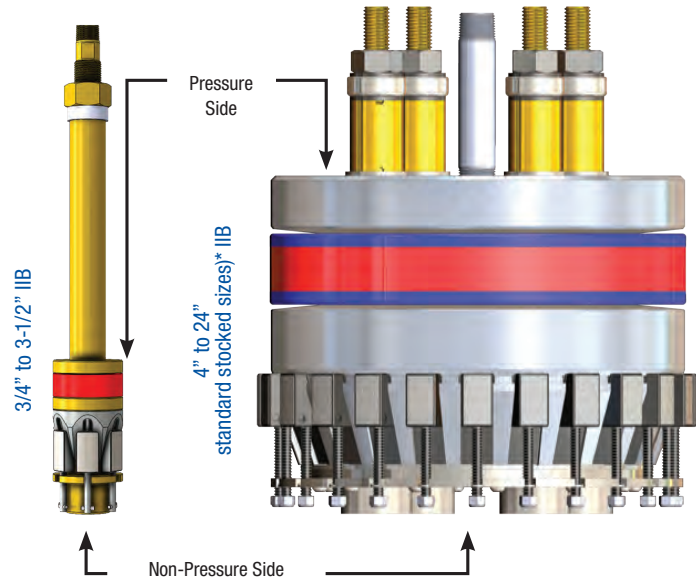
**Non-Contaminating Solution.** GripSafe ST plugs utilize a proprietary texture on the gripping wedges that can be used on any metal type with no carbon contamination. Therefore, in contrast with other plugs, GripSafe ST requires no alternate parts for use in stainless and other alloy pipes where cross contamination is a concern.

**Lightweight Advantage.** GripSafe ST plugs weigh less on average than competitive products. Significant weight differences exist as plug sizes increase, reaching upwards of 50% weight reductions in larger sizes without sacrificing holding capabilities.

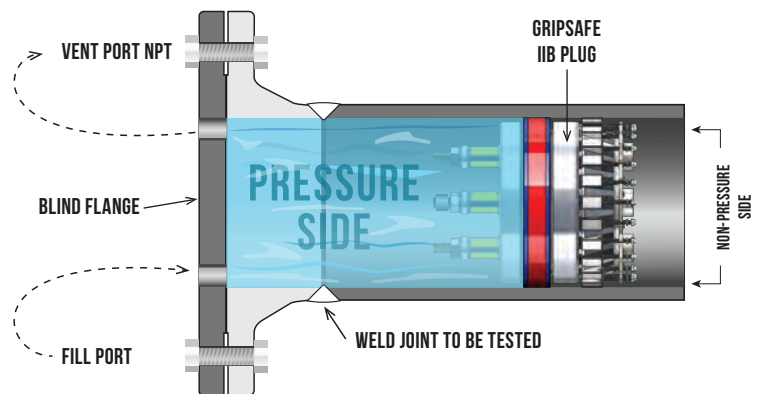
## APPLICATIONS

**Flange Weld Testing.** Used in conjunction with a ported blind flange, GripSafe ST IIB plugs stress the weld joint in longitudinal (axial), circumferential (hoop) and radial pressures identical to the stresses that would be induced when hydro-testing the entire piping system, making them superior to traditional flange test plugs (FTPs) which apply hoop and radial stresses only.

**Pressure Vessels.** Block outlet piping in vessels to pressurize for cleaning or testing purposes.



\* Larger sizes and custom configurations available upon request



**WARNING:**  
(See page PI-12)

When Ordering Specify:

- GripSafe ST Plug Model Required
- Line Size
- Pipe Schedule
- Quantity
- Delivery Date

Scan QR code to go to GripSafe ST's webpage



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SHIP SAME DAY

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[www.USAIndustries.com](http://www.USAIndustries.com)

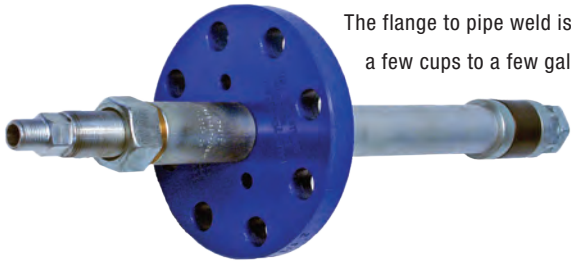


## FLANGE WELD TEST PLUGS

*Clear, Purge, Weld and Test With Our Superior Flange Weld Test Plugs*

**LARGEST RENTAL FLEET AVAILABLE**

Insert the plug into the pipe to be welded, bolt the flanges together and tighten the large compression nut(s) to expand the seal — ***It's that Simple!***



The flange to pipe weld is ready to be tested. A complete test requires a minimum amount of water — from a few cups to a few gallons, depending on the line size — ***virtually eliminating your hazardous waste disposal costs.***



When Ordering Specify:

- Flange Rating
- Line Size
- Pipe Schedule
- Gasket Type
- Quantity
- Rental or Purchase
- Delivery Date

***Waste disposal is reduced to just a few gallons of water at most.***



- Fast, safe and easy installation and testing
- Reduces testing, downtime, and waste disposal costs
- Stocked Line Sizes from 3/4" to 24"
- Flange ratings: 150# - 2500#
- Available in Raised-Face or Ring Type Joint Flanges
- Seals — ***NEW CHEMISTRY*** — easier to seal against Pitted Pipes — color coded for line schedule
- Seal and compression ring sets are easily changed to accommodate different pipe schedules - segmented compression tube allows adjustment of seal installation depth
- Testing pressures meeting ANSI B16.5 requirements
- Rugged, heavy duty construction
- Q/A & Q/C — manufactured under our strict ISO 9001:2015 Quality Assurance Program

### **WARNING:**

**A SPECIAL WORD OF CAUTION:** Pressure testing can be an extremely hazardous operation and safety precautions should be strictly adhered to.

All connections, valves, flanges and other fittings should be checked for suitability to test pressure. Verify the line ID & Plug Range match. **Most importantly** — Never stand or pass in front of any test plug or other enclosure while test is in progress. If plug discharges during a test, serious injury or death could occur.

**IN-STOCK ITEMS  
SHIP SAME DAY**

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**www.USAIndustries.com**

**VISA**



## DOUBLE BLOCK AND BLEED

**SALES & RENTALS AVAILABLE!**

**ONE PLUG,  
TWO FUNCTIONS!**



**Line Sizes 6" & Larger**

**Line Sizes 4" & Smaller**



USA Industries' Double Block & Bleed plug has two separate sealing areas which enable positive isolation of your internal piping, allowing you to safely perform work. The Double Block & Bleed plugs also have a Vent between the seals which enables you to verify the seals' integrity AND can allow you to pressure test welds by positioning the weld between the two seals.

Plugs can be customized to extend further (deeper) into the pipe to meet your needs.

When Ordering Specify:

- Line Size
- Pipe Schedule
- Quantity
- Rental or Purchase
- Delivery Date

### **WARNING:**

**A SPECIAL WORD OF CAUTION:** Pressure testing can be an extremely hazardous operation and safety precautions should be strictly adhered to.

All connections, valves, flanges and other fittings should be checked for suitability to test pressure. Verify the line ID & Plug Range match. Most importantly — Never stand or pass in front of any test plug or other enclosure while test is in progress. If plug discharges during a test, serious injury or death could occur.

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SHIP SAME DAY**

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**www.USAIndustries.com**





# HEAVY DUTY INDUSTRIAL ISOLATION PLUGS

## Provides Rugged, Simple and Safe Isolation

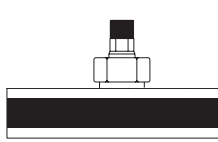


Our unique seals are capable of expansions exceeding 1" with minimal torque. To use, simply install into the open end of the pipe or tube and tighten the compression nut(s) to expand the seal element.

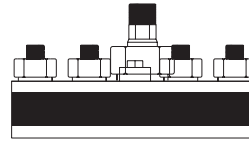
- Available in Standard, Extended Insertion, or Double Block configurations
- Heavy-Duty Construction — corrosion resistant finish — stainless steel parts available
- Maintenance free



Extended Reach



8" & Smaller



10" & Larger



Standard Isolation

When Ordering Specify:

- Line Size
- Pipe Schedule
- Quantity
- Rental or Purchase
- Delivery Date

- Manufactured under our strict ISO 9001:2015 Quality Assurance Program
- Urethane seals — New Chemistry — easier to seal against pitted pipes — color coded for line schedule
- Can be provided for any pipe size
- Large stock

**WARNING:**  
(See page PI-17)

# GRIP TYPE HIGH PRESSURE PLUGS

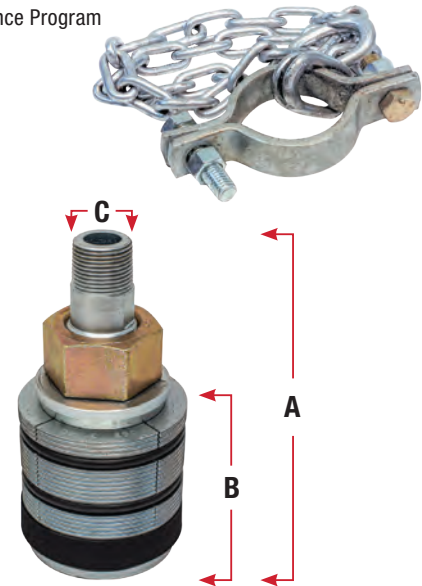


The test plugs are held in place by the steel grips while the neoprene seals - all by tightening one compression nut!

Provided to isolate & test sections of piping without the need for flanges! The standard plugs can be used for test pressures up to 3,000 psig, in line sizes from 1/2" to 24" and Schedules 40 or 80 pipe. Other sizes and test pressures available.

- Flangeless hydro testing of pipe
- Test pressures to 3,000 psig - 5,000 psig available for special orders
- Hardened and plated parts - inhibits corrosion
- Manufactured under our strict Quality Assurance Program

Type	Size Sch. 40&80	"A" DIM	"B" DIM	NPT MALE THREAD "C" DIM	WEIGHT	STEM HOLE SIZE	NUT SIZE
"C"	.466 to .680	3-3/4"	1-1/4"	1/8"*	5 oz.	3/16"	5/8"-18
	.700 to 1"	3-3/4"	1-1/4"	1/4"	5 oz.	1/4"	5/8"-18
"D"	1"	4"	1-1/2"	1/4"	8 oz.	1/4"	5/8"-18
	1-1/4"	4"	1-1/2"	1/4"	12 oz.	3/8"	5/8"-18
	1-1/2"	4-1/2"	1-3/4"	3/8"	1 lb.	3/8"	7/8"-14
	2"	5"	2"	1/2"	2 lb.	3/8"	1"-14
	2-1/2"	5-1/4"	2"	3/4"	4 lb.	5/8"	1-1/4"-12
	3"	5-3/4"	3"	3/4"	6 lb.	5/8"	1-1/4"-12
	4"	5-3/4"	3"	3/4"	10 lb.	3/5"	1-1/4"-12
	5"	6"	3-1/4"	3/4"	14 lb.	8/9"	1-1/4"-12
	6"	6-1/2"	3-1/2"	1"	21 lb.	8/9"	1-1/2"-12
	8"	7"	3-3/4"	1"	40 lb.	1"	1-1/2"-12
	10"	7-1/2"	3-3/4"	1"	70 lb.	1"	1-1/2"-12
	12"	8"	4"	1-1/4"	100 lb.	1"	2"-12
	14"	8"	4"	1-1/4"	132 lb.	1"	
	16"	8-1/2"	4-23/32"	1-1/4"	171 lb.	1"	
	18"	8-1/2"	4-1/2"	1-1/4"	210 lb.	1"	
	20"	9"	5"	1-1/4"	270 lb.	1"	
24"	9"	5"	1-1/4"	450 lb.	1"		



**WARNING:**  
(See page PI-17)

## CANVAS BALLOON PLUGS

When Ordering Specify:

- Line Size
- Quantity
- Rental or Purchase
- Delivery Date

Balloon Plugs are for isolating piping in line sizes from 1.5" through 66." Special plugs can be provided with flow-through vents so upstream back pressure can be vented.

Includes 2 ft hose and pressure gauge.

Custom length hose provided upon request.



**WARNING:**

(See note at bottom of page)

## WING NUT ISOLATION PLUGS

When Ordering Specify:

- Line Size
- Pipe Schedule
- Quantity
- Rental or Purchase
- Delivery Date

Plumber's Type Plugs — These plugs use Neoprene seals with die cast bodies and are available in line up to 24". Available with or without upstream venting capabilities.



**WARNING:**

(See note at bottom of page)

## "FOREMAN" ISOLATION PLUGS

When Ordering Specify:

- Line Size
- Pipe Schedule
- Quantity
- Rental or Purchase
- Delivery Date

Single bolt low pressure Isolation Type Plugs — These plugs use Neoprene seals with aluminum die cast bodies and are available in line sizes from 4" through 48". Available with or without upstream venting capabilities.



**WARNING:**

**A SPECIAL WORD OF CAUTION:** Pressure testing can be an extremely hazardous operation and safety precautions should be strictly adhered to. All connections, valves, flanges and other fittings should be checked for suitability to test pressure. Verify the line ID & Plug Range match. Most importantly — Never stand or pass in front of any test plug or other enclosure while test is in progress. If plug discharges during a test, serious injury or death could occur.

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VISA





## BLEED RINGS | DRIP RINGS | VENT RINGS



Stocked materials include 516-Gr70, A105/LF-2, 304 & 316 Stainless Steel. Available with Threaded or Socket-Weld connections and either Raised-Face (125 — 250 RMS) or Ring Type Joint — Male or Female, Oval or Octagonal - gasket types. Any other material available upon request.

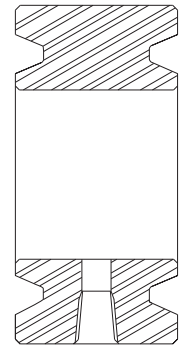
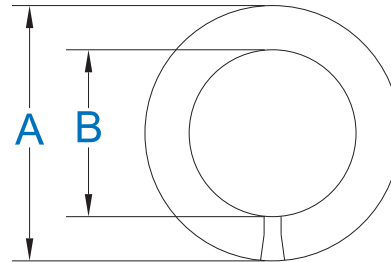
Raised Face and Ring Type Joint dimensions and tolerances are manufactured meeting ASME/ANSI B16.5 and B16.20 specifications. For Ring Joints, Female oval ring grooves are standard, Male joints available. USA Industries provides one 1/2" or 3/4", threaded or socket-weld tap. Multiple taps can be provided, but must be oriented by customer. Thickness of ring may be affected if larger taps are requested.

One coat of Black Lacquer is applied to all carbon steel plate products unless specified differently.

### RTJ Bleed Rings Available

**When Ordering Specify:**

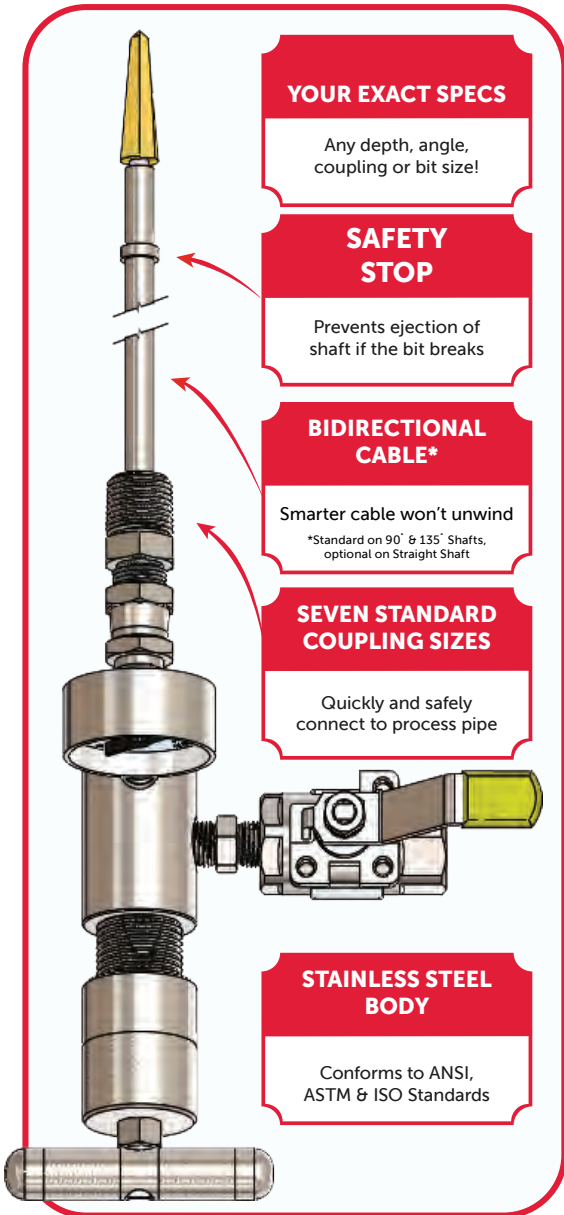
- Flange Rating
- Line Size
- Material
- Gasket Surface Type
- Number, Size, & Type of Bleed Holes - Threaded or Socket-Weld
- Quantity
- Delivery Date



LINE SIZE	"A" CHART DIMENSIONS FOR RAISED FACE RINGS - ALL MEASUREMENTS IN INCHES					"B"	STD THICKNESS
	150#	300#	600#	900#	1500#		
1.00	2.50	2.75	2.75	3.00	3.00	1.32	1-1/2
1.50	3.25	3.625	3.625	3.75	3.75	1.90	
2.00	4.00	4.25	4.25	5.50	5.50	2.375	
2.50	4.75	5.00	5.00	6.375	6.375	2.875	
3.00	5.25	5.75	5.75	6.50	6.75	3.50	
4.00	6.75	7.00	7.50	8.00	8.125	4.50	
6.00	8.625	9.75	10.375	11.25	11.00	6.625	
8.00	10.875	12.00	12.50	14.00	13.75	8.625	
10.00	13.25	14.125	15.625	17.00	17.00	10.75	
12.00	16.00	16.50	17.75	19.375	20.25	12.75	
14.00	17.625	19.00	19.125	20.25	22.50	14.00	
16.00	20.125	21.125	22.00	22.375	25.00	16.00	
18.00	21.50	23.375	23.875	24.875	27.50	18.00	
20.00	23.75	25.625	26.625	27.25	29.50	20.00	
24.00	28.125	30.375	30.875	32.75	35.25	24.00	

# BLEEDER CLEANER

AVAILABLE IN FOUR SHAFT TYPES:



**YOUR EXACT SPECS**

Any depth, angle, coupling or bit size!

**SAFETY STOP**

Prevents ejection of shaft if the bit breaks

**BIDIRECTIONAL CABLE\***

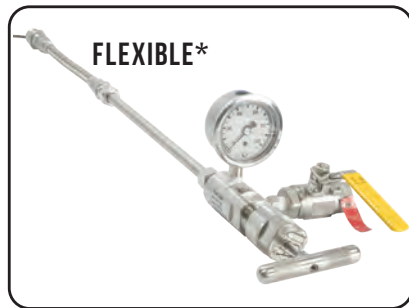
Smarter cable won't unwind  
\*Standard on 90° & 135° Shafts, optional on Straight Shaft

**SEVEN STANDARD COUPLING SIZES**

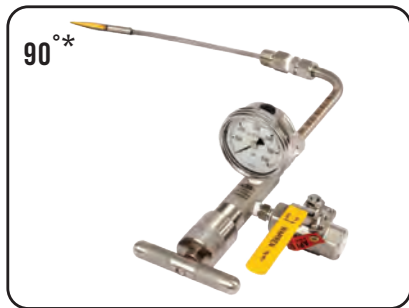
Quickly and safely connect to process pipe

**STAINLESS STEEL BODY**

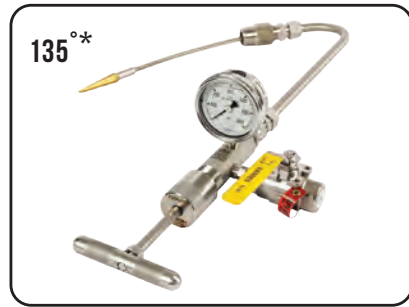
Conforms to ANSI, ASTM & ISO Standards



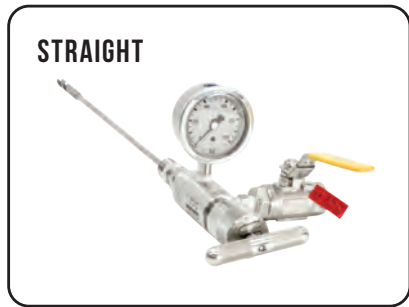
FLEXIBLE\*



90°\*



135°\*



STRAIGHT

*\* USA Industries' Bleeder Cleaners are the only ones on the market with a bi-directional cable that will not unwind if turned counter-clockwise.*

Bleeder Cleaners (aka rod-out device, orifice tap cleaner or tap reamer) allow clogged bleed, drain, vent and instrument tap valves to be cleaned during normal operations **SAFELY** and **EFFICIENTLY** while completely containing the product. Properly using our tool eliminates the possibility of dangerous product releases which can result in your personnel and others being exposed to unsafe and hazardous conditions. Our Bleeder Cleaners are rated up to 1,000° F and 1,000 PSIG and are available in four model types. If required, can be made to hold higher pressure.

**Simple to use:** 1. Screw the end connector onto the item needing cleaning. 2. Close the bleed valve. 3. Open the process valve. 4. Insert the shaft while rotating the handle. 5. After the line has been fully cleared, back out the shaft. 6. Close the process valve. 7. Open the bleed valve and disconnect the tool... **SAFELY CLEANED LINE!**

- When Ordering Specify:
- Length of Shaft (standard length is 14")
  - Shaft Type (Straight , 90, 135 or Flexible shaft)
  - Drill Bit Size
  - Coupling Size
  - Quantity
  - Delivery Date

**Available Bit Types**



Everlast Drill Bit



Twist Drill Bit

*All components supplied conform to ANSI, ASME, ASTM Standards for Dimensions. Manufactured under our ISO 9001:2015 Quality Assurance Program.*

**IN-STOCK ITEMS SHIP SAME DAY**

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## BEVELING MACHINES

### USA MINI

The USA MINI machine is a lightweight yet powerful pipe beveller. A favorite in areas such as power station and Petrochemical plant shut-down work, due to its ease of set-up and speed of operation. This unit is available with the unique “auto-lock” function, to set the jaws, just flip the switch — it’s that simple!

Range: .78” — 1.65” ID Standard (reduced shaft option from .49’ to .82” ID)

Functions: Weld Removal, Beveling, Facing, Counter-boring, Tube or Pipe Prep

Materials: Any kind of steel

Power: Pneumatic or Electric

Available Bits for Internal and External Beveling (37<sup>1</sup>/<sub>2</sub>°) or Flat Facing.

Others available upon request.



### USA BOILER 1” - 4”

A very popular versatile machine that is robust and extremely powerful. Used in many industries, but commonly found in tough Petrochemical plant environments. Electric version available or a conversion kit easily changes pneumatic to electric.

Range: 0.9” - 4.25” ID

Functions: Weld Removal, Beveling, Facing, Counter-boring, Tube or Pipe Prep

Materials: Any kind of steel

Power: Pneumatic or Electric

Available Bits for Internal and External Beveling (37<sup>1</sup>/<sub>2</sub>°) or Flat Facing.

Others available upon request.



### USA SUPERBOILER T5

A powerful machine able to produce fast accurate weld preps on any schedule and material of pipe effortlessly. Optional extras include, flange facing attachment.

Range: 2” - 8” ID

Functions: Weld Removal, Beveling, Facing, Counter-boring, Pipe Prep

Materials: Any kind of steel

Power: Pneumatic or Electric

Available Bits for Internal and External Beveling (37<sup>1</sup>/<sub>2</sub>°) or Flat Facing.

Others available upon request.



All units are supplied with all gripping segments to cover the full range of the machine as well as service tools, drawings, instruction manual and warranty certificate. Each machine is supplied with a protective metal carrying case.





# USA Industries PIPE SCHEDULE CHART

Pipe Size	OD	ID	Schedules	Wall	Est Wt LBS per Ft	Pipe Size	OD	ID	Schedules	Wall	Est Wt LBS per Ft	Pipe Size	OD	ID	Schedules	Wall	Est Wt LBS per Ft
1/8"	.405	.307	10, 10S	.049	.1863	4 1/2"	5.000	4.506	STD, 40S	.247	12.54	16"	16.000	15.624	10S	.188	31.75
		.269	40, STD, 40S	.068	.2447			4.290	XS, 80S	.355	17.61			15.500	10	.250	42.05
		.215	80, XS, 80S	.095	.3145			5.295	10, 10S	.134	7.770			15.375	20	.312	52.27
1/4"	.540	.410	10, 10S	.065	.3297	5"	5.563	5.047	40, STD, 40S	.258	14.62			15.250	30, STD, 40S	.375	62.58
		.364	40, STD, 40S	.088	.4248			4.813	80, XS, 80S	.375	20.78			15.000	40, XS, 80S	.500	82.77
		.302	80, XS, 80S	.119	.5351			4.563	120	.500	27.04			14.688	60	.656	107.5
3/8"	.675	.545	10, 10S	.065	.4235			4.313	160	.625	32.96			14.314	80	.844	136.6
		.493	40, STD, 40S	.091	.5676			4.063	XX	.750	38.55			13.938	100	1.031	164.8
		.423	80, XS, 80S	.126	.7388			6.357	10, 10S	.134	9.290			13.564	120	1.22	192.4
1/2"	.840	.674	10, 10S	.083	.6710	6"	6.625	6.065	40, STD, 40S	.280	18.97			13.124	140	1.438	223.6
		.622	40, STD, 40S	.109	.8510			5.761	80, XS, 80S	.432	28.57			12.814	160	1.594	245.3
		.546	80, XS, 80S	.147	1.088			5.501	120	.562	35.39			17.624	10S	.188	35.76
		.466	160	.187	1.304			5.189	160	.719	43.35	17.500	10	.250	47.99		
3/4"	1.050	.252	XX	.294	1.714	8"	8.625	4.897	XX	.864	53.16	17.375	20	.312	58.94		
		.884	10, 10S	.083	.8572			8.329	10, 10S	.148	13.40	17.250	STD, 40S	.375	70.59		
		.824	40, STD, 40S	.113	1.131			8.125	20	.250	22.36	17.124	30	.438	82.15		
		.742	80, XS, 80S	.154	1.474			8.071	30	.277	24.70	17.000	XS, 80S	.500	93.45		
		.614	160	.218	1.937			7.981	40, STD, 40S	.322	28.55	16.876	40	.562	104.7		
1"	1.315	.434	XX	.308	2.441			7.813	60	.406	35.64	16.500	60	.750	138.2		
		1.097	10, 10S	.109	1.404			7.625	80, XS, 80S	.500	43.39	16.126	80	.938	170.9		
		1.049	40, STD, 40S	.133	1.679			7.439	100	.594	50.95	15.688	100	1.156	208.00		
		.957	80, XS, 80S	.179	2.172			7.189	120	.719	61.71	15.250	120	1.38	244.10		
1 1/4"	1.660	.815	160	.250	2.844			7.001	140	.812	67.76	14.876	140	1.562	274.20		
		.599	XX	.358	3.659	6.813	160	.906	74.79	14.438	160	1.781	308.5				
		1.442	10, 10S	.109	1.806	6.875	XX	.875	72.42	19.564	10S	.218	48.05				
		1.380	40, STD, 40S	.140	2.273	10.420	10, 10S	.165	18.65	19.500	10	.250	52.73				
		1.278	80, XS, 80S	.191	2.997	10.250	20	.250	28.04	19.250	20, STD, 40S	.375	78.6				
1 1/2"	1.900	1.160	160	.250	3.765	10.136	30	.307	34.24	19.000	30, XS, 80S	.500	104.10				
		.896	XX	.382	5.214	10.020	40, STD, 40S	.365	40.48	18.812	40	.594	123.10				
		1.682	10, 10S	.109	2.085	9.750	60, XS, 80S	.500	54.74	18.376	60	.812	155.40				
		1.610	40, STD, 40S	.145	2.718	9.564	80	.594	64.43	17.938	80	1.031	208.90				
2"	2.375	1.500	80, XS, 80S	.200	3.631	9.314	100	.719	77.03	17.438	100	1.281	256.10				
		1.337	160	.281	4.859	9.064	120	.844	82.29	17.000	120	1.500	296.40				
		1.100	XX	.400	6.408	8.750	140, XX	1.000	104.1	16.500	140	1.750	341.10				
		2.157	10, 10S	.109	2.638	8.500	160	1.125	115.6	16.064	160	1.969	379.20				
2 1/2"	2.875	2.067	40, STD, 40S	.154	3.853	12.390	10, 10S	.180	24.16	23.500	10, 10S	.250	63.41				
		1.939	80, XS, 80S	.218	5.022	12.250	20	.250	33.38	23.250	20, STD, 40S	.375	96.42				
		1.689	160	.344	7.462	12.090	30	.330	43.77	23.000	XS, 80S	.500	125.50				
		1.503	XX	.436	9.029	12.000	STD, 40S	.375	49.56	22.876	30	.562	140.70				
		2.635	10, 10S	.120	3.531	11.938	40	.406	53.52	22.626	40	.688	171.30				
3"	3.500	2.469	40, STD, 40S	.203	5.793	11.750	XS, 80S	.500	65.42	22.064	60	.969	238.40				
		2.323	80, XS, 80S	.276	7.651	11.626	60	.562	73.15	21.564	80	1.219	296.80				
		2.125	160	.375	10.01	11.376	80	.688	88.63	20.938	100	1.531	357.40				
		1.771	XX	.552	13.70	11.064	100	.844	107.9	20.376	120	1.812	429.40				
3 1/2"	4.000	3.260	10, 10S	.120	4.332	10.750	120, XX	1.000	125.5	19.876	140	2.062	483.10				
		3.068	40, STD, 40S	.216	7.576	10.500	140	1.125	136.7	19.314	160	2.344	542.10				
		2.900	80, XS, 80S	.300	10.25	10.126	160	1.312	150.3	29.376	10, 10S	.312	98.93				
		2.624	160	.438	14.32	13.624	10S	.188	27.73	29.250	STD, 40S	.375	118.65				
		2.300	XX	.600	18.58	13.500	10	.250	36.71	29.000	20, XS, 80S	.500	157.53				
4"	4.500	3.760	10, 10S	.120	4.937	13.375	20	.312	45.61	28.750	30	.625	196.06				
		3.548	40, STD, 40S	.226	9.109	13.250	30, STD, 40S	.375	54.57	35.376	10	.312	118.92				
		3.364	80, XS, 80S	.318	12.51	13.124	40	.438	63.44	35.250	STD, 40S	.375	142.68				
		2.728	XX	.636	22.85	13.000	XS, 80S	.500	72.09	35.000	XS, 80S	.500	189.57				
		4.260	10, 10S	.120	5.613	12.814	60	.594	85.05	34.750	30	.625	235.13				
		4.026	40, STD, 40S	.237	10.790	12.500	80	.750	106.1	47.250	STD, 40S	.375	190.74				
3.826	80, XS, 80S	.337	14.98	12.124	100	.938	130.9	47.000	XS, 80S	.500	253.65						
3.624	120	.438	19	11.814	120	1.09	150.8										
3.438	160	.531	22.51	11.500	140	1.250	170.2										
3.152	XX	.674	27.54	11.188	160	1.406	189.1										

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days of the year availability!***





## ORIFICE PLATES

*We specialize in Orifice Plates*

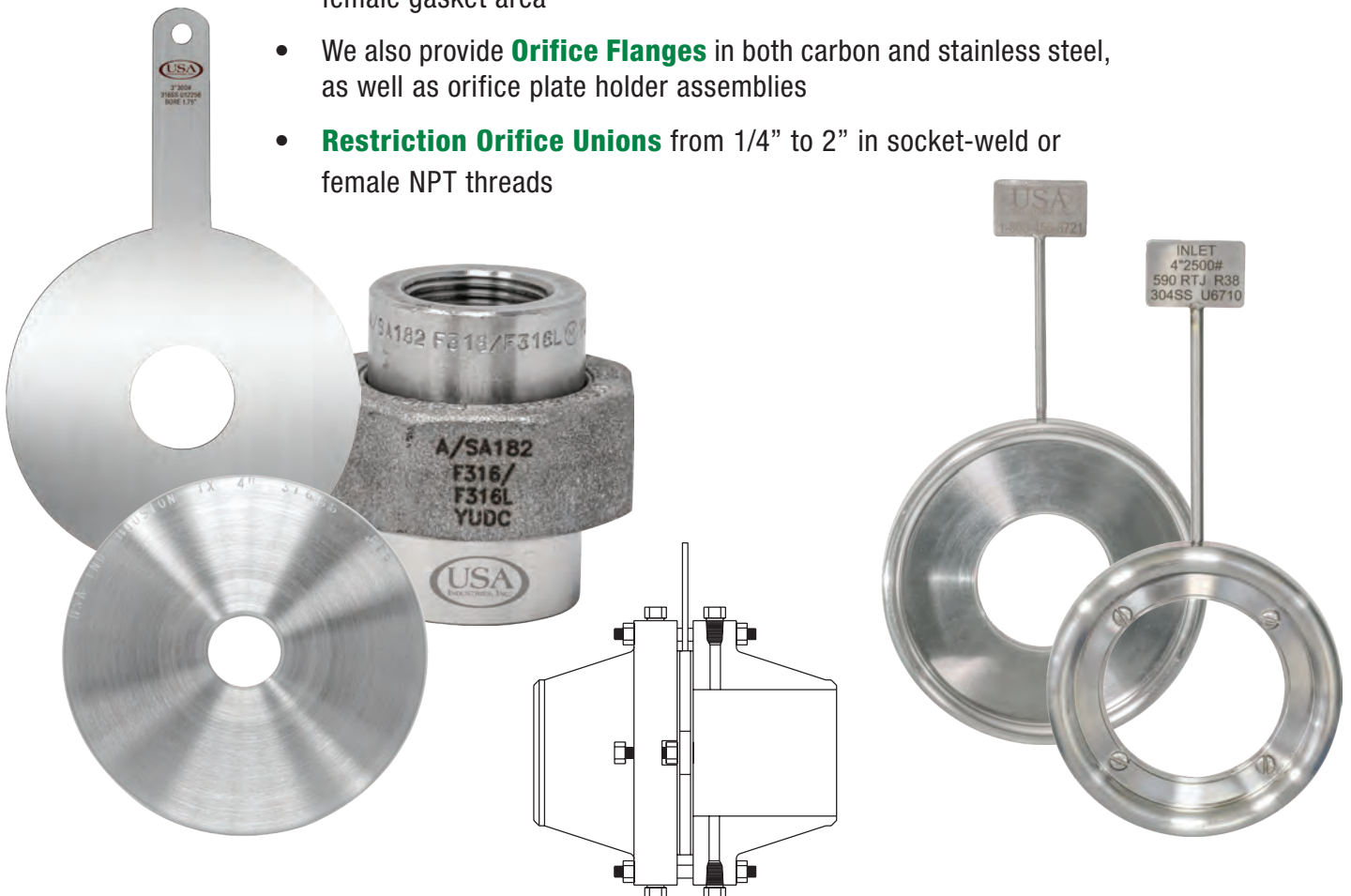
**ANY SIZE - ANY MATERIAL - ANY THICKNESS**

USA Industries manufactures each plate to meet or exceed *A.G.A., I.S.A., A.N.S.I., A.S.M.E.* and *A.P.I.* standards and recommendations.

Stocked plates include 304 & 316 stainless steel in 1/8" and 1/4" thicknesses. Other materials and / or thicknesses are available upon request.

We typically bore plates to the customer's supplied sizing calculation, however, for an additional fee we can provide sizing calculation services to you.

- **Series 500 Universal Plates** - for orifice fittings
- **Series 520 Paddle Plates** - for raised face flanges
- **Series 560 & 590 Plates** - Ring Type Joint Plates with male or female gasket area
- We also provide **Orifice Flanges** in both carbon and stainless steel, as well as orifice plate holder assemblies
- **Restriction Orifice Unions** from 1/4" to 2" in socket-weld or female NPT threads

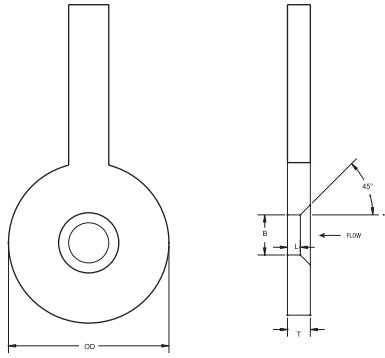


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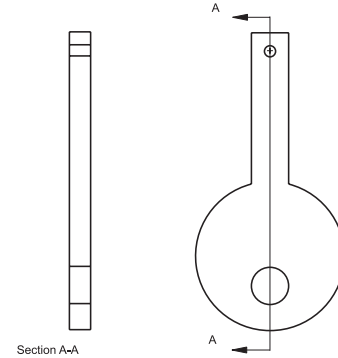






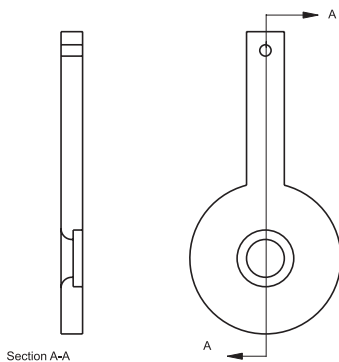
## \*Concentric Bore

Used primarily for clean liquids, gases, or vapors that are relatively non-viscous. When necessary, a bevel is machined at a 45 degree angle to attain the proper edge thickness. Accuracy range at +.6% for beta ratio between 0.2 to 0.75.



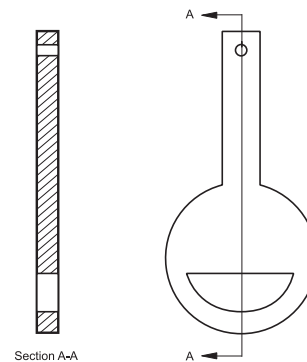
## Eccentric Bore

Primarily used for measurement of entrained solids or slurries of vapors and gases where condensation is present. The eccentric bore is offset so where the bore edge is inscribed in a circle that is 98% of line I.D. Accuracy range at +1.5% to +2% for beta ratio between 0.3 to 0.75.



## Quadrant Bore

This type of orifice bore is used primarily in the measurement of high viscosity flow, such as heavy crude, syrups, and slurries. The radius on the inlet side is equal to the plate thickness. The quadrant is always recommended where the Reynolds number factor is less than 100,000. Accuracy range is +2% for beta ratio between 0.24 to 0.6.



## Segmental Bore

The segmental bore is located in the same way that the eccentric bore is. These bores are used primarily for slurries or extremely dirty gases where the flow may contain impurities heavier than fluid. Accuracy range at +2% for beta ratio between 0.35 to 0.75.

*\*Plate Bevel determined per Instrument Engineers Handbook, Edition 3: Bela Lipták. All plates thicker than 1/8" should be beveled 45 degrees on the downstream side to a 1/8" edge thickness. Any orifice bore less than 1" to be beveled to 1/16" if plate thickness is 1/8".*

### Orifice Plate Installation

1. Install orifice plate and new gaskets between flanges.
2. Release the flanges by turning the two jack bolts counterclockwise.
3. Replace studs and tighten to spec.

### Orifice Plate Removal

1. Loosen all studs and remove the top half of the studs.
2. Spread flanges apart by turning the jack bolts clockwise.
3. Remove orifice plate for inspection or replacement.

### When Installing Orifice Plates

1. Orifice Bore must be centered within 3% of inside pipe diameter.

#### Note: Writing on the Orifice Plate

#### ALWAYS faces upstream

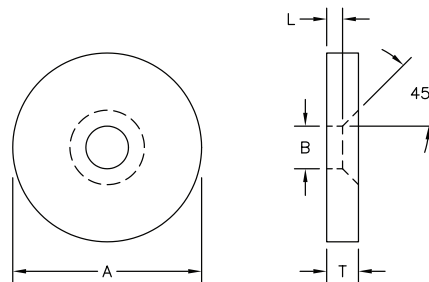
2. Inside diameter of gaskets must not protrude beyond inside surface of pipe.\*
3. Tighten flange bolts evenly to prevent plate buckling.

\*Gaskets should be replaced at each orifice plate inspection.

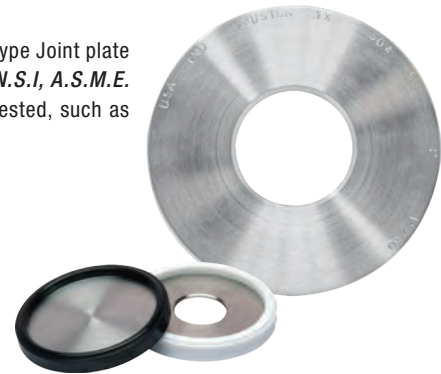
## SERIES 500 UNIVERSAL ORIFICE PLATES

Universal Orifice Plates are Manufactured for use in ALL standard orifice fitting assemblies or Ring Type Joint plate holders. Each plate is carefully manufactured to meet or exceed standards set by *A.G.A., I.S.A., A.N.S.I., A.S.M.E. & A.P.I.* recommendations. Stocked in 304 & 316 stainless steel and available in any material requested, such as monel, hastelloy, copper-nickel, etc. Coatings can also be provided.

Nominal Pipe Size (in.)	"A" (in.)	"L" (in.)	"T" (in.)
1	1.312	0.02	0.125
1.5	2	0.03	0.125
2	2.437	0.03	0.125
2.5	2.812	0.03	0.125
3	3.437	0.03	0.125
4	4.406	0.06	0.125
5	6	0.06	0.125
6	6.437	0.06	0.125
8	8.437	0.125	0.25
10	10.687	0.125	0.25
12	12.593	0.25	0.25
14	14	0.25	0.25
16	16	0.25	0.375
18	18	0.25	0.375
20	20	0.375	0.375
24	24	0.375	0.375



**Notes:**  
 Dimension "A" does not include seal ring.  
 L = Thickness for Restriction Applications



We offer Hycar® and Teflon® seal rings / o-rings that fit our universal orifice plates. Request with your next order to have them shipped together.

- When Ordering Specify:**
- Line Size
  - Seal Type (Hycar® or Teflon®)
  - Plate Thickness
  - Bore Size
  - Bevel / No Bevel
  - Material
  - Quantity
  - Delivery Date

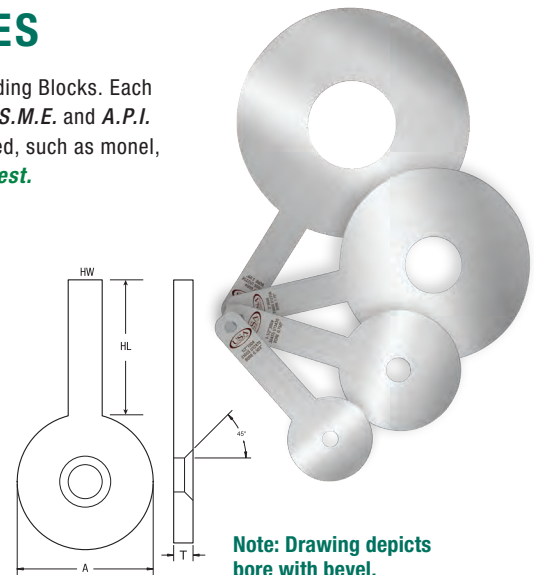
Hycar® is a registered Trademark of Lubrizol Advanced Materials. Teflon® is a registered Trademark of DuPont.

## SERIES 520 PADDLE-TYPE PLATES

Paddle-Type orifice plates are manufactured for use with Raised Face Orifice Flanges and Holding Blocks. Each plate is carefully manufactured to meet or exceed standards set by *A.G.A., I.S.A., A.N.S.I., A.S.M.E.* and *A.P.I.* recommendations. Stocked in 304 & 316 stainless steel and available in any material requested, such as monel, hastelloy, copper-nickel, etc. Coatings can also be provided. **Vent or drain available on request.**

Line Size (in.)	Flange Rating A							HL (in.)	HW (in.)	T (in.)
	150#	300#	400#	600#	900#	1500#	2500#			
0.5	1.875	2.125	2.125	2.125	2.5	2.5	2.75	4	1	.125
0.75	2.25	2.625	2.625	2.625	2.75	2.75	3			
1	2.625	2.875	2.875	2.875	3.125	3.125	3.375			
1.25	3	3.25	3.25	3.25	3.5	3.5	4.125			
1.5	3.375	3.75	3.75	3.75	3.875	3.875	4.625			
2	4.125	4.375	4.375	4.375	5.625	5.625	5.75			
2.5	4.875	5.125	5.125	5.125	6.5	6.5	6.625			
3	5.375	5.875	5.875	5.875	6.625	6.875	7.75			
4	6.875	7.125	7	7.625	8.125	8.25	9.25			
5	7.75	8.5	8.375	9.5	9.75	10	11			
6	8.75	9.875	9.75	10.5	11.375	11.125	12.125	6	1.5	.25
8	11	12.125	12	12.625	14.125	13.875	15.25			
10	13.375	14.25	14.125	15.75	17.125	17.125	18.75			
12	16.125	16.625	16.5	18	19.625	20.5	21.625			
14	17.75	19.125	19	19.375	20.5	22.75	-			
16	20.25	21.25	21.125	22.25	22.625	25.25	-			
18	21.5	23.375	23.25	24	25	27.625	-			
20	23.75	25.625	25.375	26.75	27.375	29.625	-			
22	26	27.75	27.5	28.875	-	-	-			
24	28.125	30.735	30.125	31	32.875	35.5	-			
30	34.625	37.375	37.25	38.125	-	-	-	.5		
36	41.125	43.875	43.875	44.375	-	-	-			

All dimensions are in inches. Additional sizes Available.



**Note:** Drawing depicts bore with bevel.

- When Ordering Specify:**
- Line Size
  - Plate Thickness
  - Bore Size
  - Bevel / No Bevel
  - Material
  - Quantity
  - Delivery Date

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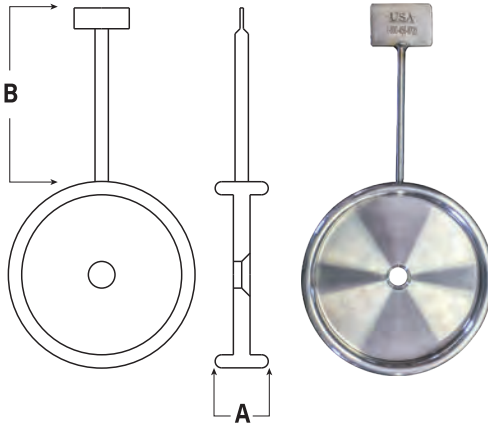
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## RING TYPE JOINT PLATES

Choose from Either Style of Plate to Suit your Particular Needs.

### SERIES 560

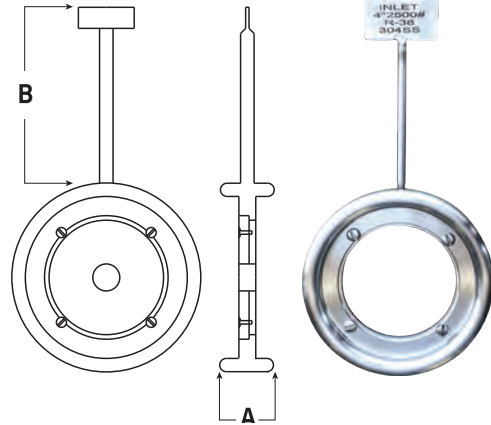


Series 560 plates are of a one-piece construction. Manufactured in any material requested such as 304 or 316 SS, monel, hastelloy, copper-nickel, etc.

**When Ordering Specify:**

- Line Size
- Plate Thickness
- Flange Rating
- Material
- Quantity
- Delivery Date

### SERIES 590



Series 590 plates are manufactured with hold-down screws and use Universal plates for the orifice bore. The 590 Series should be used where frequent replacement or sizing changes are expected. Manufactured in any material requested such as 304 or 316 SS, monel, hastelloy, copper-nickel, etc.

**When Ordering Specify:**

- Line Size
- Flange Rating
- API Rating
- Material
- Quantity
- Delivery Date

**If Needed:**

- Series 500 plate thickness
- Bore Size
- Quantity

**Note: 560 Plate Holders 2" - 8" have a standard plate thickness of 1/4"**

Line Size (in.)	FLANGE RATING													
	300# - 600#			900#			1500#			2500#				
	RING SIZE	A	B	RING SIZE	A	B	RING SIZE	A	B	RING SIZE	A	B		
1/2	R-11	29/32	4-1/4	R-12	1	4-1/4	R-12	1	6-1/2	R-13	1	6-1/2		
3/4	R-13	1		R-14			R-14			R-16			R-16	R-18
1	R-16			R-20			R-20			R-23			R-23	R-26
1-1/2	R-20			R-24			R-24			R-26			R-26	R-28
2	R-23	1-1/16	5-1/4	R-27	1-1/16	5-1/4	R-27	1-1/16	6-1/2	R-28	1-1/16	6-1/2		
2-1/2	R-26			R-31			R-31			R-32			R-32	
3	R-31			-			-			R-38			R-38	
3-1/2	R-34			R-37			R-37			R-42			R-42	
4	R-37	1-1/16	6-1/4	R-41	1-1/16	6-1/4	R-44	1-3/16	6-1/2	R-47	1-7/16	7-1/2		
5	R-41			R-45			R-45			R-51			R-51	
6	R-45			R-49			R-49			R-55			R-55	
8	R-49			6-1/2			6-1/2			R-60			R-60	
10	R-53	1-3/16	7-1/2	R-53	1-3/16	7-1/2	R-54	1-7/16	7-1/2	R-55	2	8-1/2		
12	R-57			R-57			R-58			R-58				
14	R-61			R-62			R-63			R-63				
16	R-65			R-66			R-67			R-67				
18	R-69	1-1/4	7-1/2	R-70	1-9/16	7-1/2	R-71	2	9-1/2	R-75	2-1/8	10-1/2		
20	R-73			R-74			R-74			R-75				
24	R-77			R-78			R-78			R-79			R-79	
				1-7/16			1-7/8			9-1/2			2-5/16	11-1/2

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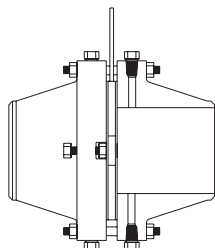
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# FLANGES & HOLDING BLOCKS

## ORIFICE FLANGES

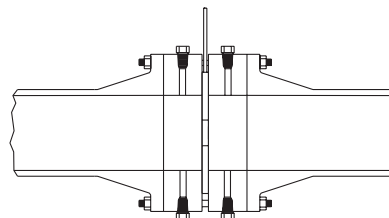


Available in carbon or stainless steel and manufactured to meet *A.G.A.*, *A.P.I.*, *A.S.M.E.*, *I.S.A.* standards. In addition, available for all flange ratings and line sizes.

**When Ordering Specify:**

- Line Size
- Gasket Type
- Material
- Pipe Schedule
- Flange Rating
- Quantity
- Delivery Date

## ORIFICE HOLDING BLOCKS



Meets *A.G.A./A.S.M.E./I.S.A.* flange tap location requirements. Available in 150# *A.N.S.I.* rating in all line sizes, ideal for "lined piping" in caustic service. More economical than using orifice flanges in particular applications. Available in carbon, stainless steel, monel, brass, nickel as well as many other alloys. Coated with Teflon® or Kynar®.

	NOMINAL PIPE SIZE	DIAMETER OF FLANGE	MIN FLANGE THICKNESS	DIAMETER OF RAISED FACE	LENGTH THROUGH HUB	PRESSURE TAP HOLE SIZE	DIAMETER BOLT CIRCLE	# OF HOLES	SIZE OF HOLES	SIZE & LENGTH OF STUDS	SIZE & LENGTH OF JACK SCREW	APPROX WT PER UNION (LBS)
	SIZE	0	T	R	L	P	BC	#□	□	S	J	W
CLASS 300, DIMENSIONAL DATA (in.)	*0.5	3.75	1.5	1.38	3	0.12	2.62	4	0.56	0.5 X 4.75	0.5 X 3	10
	*0.75	4.62	1.5	1.69	3.12	0.12	3.25	4	0.69	0.625 X 5	0.5 X 3	11
	1	4.88	1.5	2	3.25	0.25	3.5	4	0.69	0.625 X 5	0.625 X 3	18
	*1.25	5.25	1.5	2.5	3.31	0.25	3.88	4	0.69	0.625 X 5	0.625 X 3	21
	1.5	6.12	1.5	2.88	3.38	0.25	4.5	4	0.81	0.75 X 5.25	0.625 X 3	28
	2	6.5	1.5	3.62	3.38	0.25	5	8	0.69	0.625 X 5	0.625 X 3	33
	2.5	7.5	1.5	4.12	3.5	0.25	5.88	8	0.81	0.75 X 5.25	0.625 X 3	43
	3	8.25	1.5	5	3.5	0.375	6.62	8	0.81	0.75 X 5.25	0.75 X 3	48
	4	10	1.5	6.19	3.62	0.5	7.88	8	0.81	0.75 X 5.25	0.75 X 3	68
	6	12.5	1.5	8.5	3.94	0.5	10.62	12	0.88	0.75 X 5.25	0.75 X 3	100
	8	15	1.62	10.62	4.38	0.5	13	12	1	0.875 X 5.75	0.75 X 3	155
	10	17.5	1.88	12.75	4.62	0.5	15.25	16	1.12	1 X 6.5	1 X 4.5	220
	12	20.5	2	15	5.12	0.5	17.75	16	1.25	1.125 X 7	1 X 4.5	330
	14	23	2.12	16.25	5.62	0.5	20.25	20	1.25	1.125 X 7.25	1 X 4.5	425
	16	25.5	2.25	18.5	5.75	0.5	22.25	20	1.38	1.25 X 7.75	1 X 4.5	590
	18	28	2.38	21	6.25	0.5	24.75	24	1.38	1.25 X 8	1 X 4.5	750
	20	30.5	2.5	23	6.38	0.5	27	24	1.38	1.25 X 8.5	1 X 4.5	910
	22	33	2.69	25.25	6.5	0.5	29.25	24	1.62	1.5 X 9.25	1 X 5.5	1125
24	36	2.75	27.25	6.62	0.5	32	24	1.62	1.5 X 9.5	1 X 5.5	1350	
36	50	4.18	40.25	9.5	0.5	46	32	2.12	2 X 13.25	1 X 6.5	3200	
CLASS 600, DIMENSIONAL DATA (in.)	1	4.88	1.5	2	3.25	0.25	3.5	4	0.75	0.625 X 5	0.625 X 3	19
	1.5	6.12	1.5	2.88	3.375	0.25	4.5	4	0.875	0.75 X 5.25	0.625 X 3	23
	2	6.5	1.5	3.625	3.375	0.25	5	8	0.75	0.625 X 5	0.625 X 3	25
	2.5	7.5	1.5	4.125	3.5	0.25	5.875	8	0.875	0.75 X 5.25	0.625 X 3	33
	3	8.25	1.5	5	3.5	0.375	6.625	8	0.875	0.75 X 5.25	0.75 X 3	45
	4	10.75	1.5	6.19	4	0.5	8.5	8	1	0.875 X 6	0.75 X 4	97
	6	14	1.88	8.5	4.62	0.5	11.5	12	1.12	1 X 7	0.75 X 4	195
	8	16.5	2.19	10.62	5.25	0.5	13.75	12	1.25	1.125 X 7.75	0.75 X 4.5	285
	10	20	2.5	12.75	6	0.5	17	16	1.38	1.25 X 8.75	1 X 5.5	450
	12	22	2.62	15	6.12	0.5	19.25	20	1.38	1.25 X 9	1 X 5.5	540
	14	23.75	2.75	16.25	6.5	0.5	20.75	20	1.5	1.375 X 9.5	1 X 4.5	820
	16	27	3	18.5	7	0.5	23.75	20	1.625	1.5 X 10.25	1 X 5.5	1110
	18	29.25	3.25	21	7.25	0.5	25.75	20	1.75	1.625 X 11	1 X 5.5	1305
	20	32	3.5	23	7.5	0.5	28.5	24	1.75	1.625 X 11.75	1 X 5.5	1624
24	37	4	27.25	8	0.5	33	24	2	1.875 X 13.25	1 X 6.5	2322	

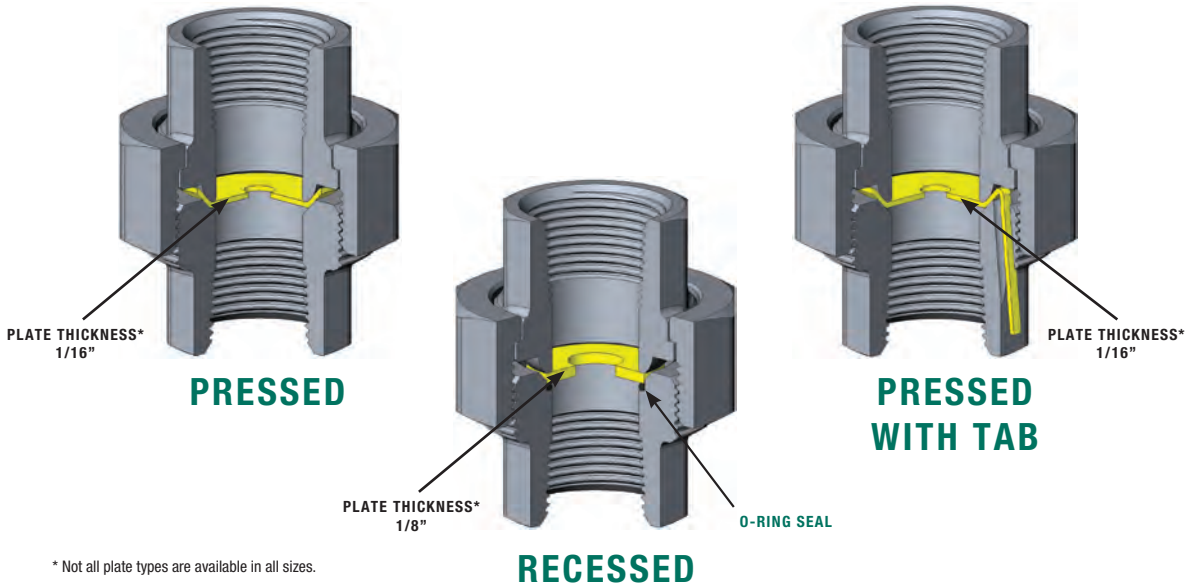
If requested, each orifice flange assembly comes complete with (2) Jackscrews & (2) 1/2" Plugs

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## RESTRICTION ORIFICE UNIONS



\* Not all plate types are available in all sizes.

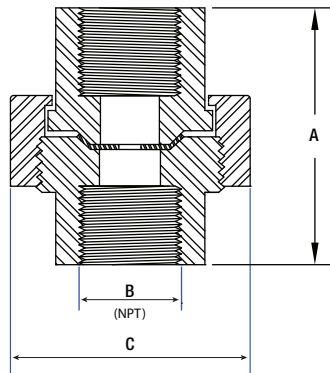


Carbon & stainless steel bodies stocked in pressure ratings of 3,000 psig. Available in line sizes from 1/4" through 2" in both female NPT and Socket-Weld connections. Other sizes and materials available.

Orifices bored to your specifications. All plates are stainless steel and can be ordered separately.

- Available with or without tabbed plate
- Female NPT or Socket-weld Connections
- From 1/4" through 2"
- All recessed plates sealed with a Rubber O-Ring
- Pressed plates are metal to metal sealing

Line Size (in.)	A OAL (in.)	B NPT or SW (in.)	C Hex Size (in.)
1/4	1-3/4	1/4	1-3/8
3/8	1-7/8	3/8	1-5/8
1/2	2	1/2	1-3/4
3/4	2-1/4	3/4	2-3/16
1	2-9/16	1	2-9/16
1-1/4	2-7/8	1-1/4	3-1/6
1-1/2	3-1/8	1-1/2	3-7/16
2	3-1/2	2	4



### When Ordering Specify:

- Line Size
- NPT Thread Size OR Socket Weld Connection
- Plate Type - Recessed (1), Pressed (2), or Pressed with Tab (3)
- Material
- Orifice Bore
- Quantity
- Delivery Date

USA Industries, based in Houston, TX since 1982, is a leading manufacturer of Heat Exchanger Tools & Tooling in the Southern United States. Our extensive inventory includes products for building, repairing, replacing, testing, cleaning, or plugging heat exchangers, condensers, boilers, and air-cooled exchangers. We prioritize both product quality and exceptional customer service, offering quick shipping, typically within 2 hours of a phone call, for stocked items. Since most of our customers work 24/7, we do too. Moreover, we provide cost-effective solutions with our extensive rental fleet, indicated by the RENTAL AVAILABLE symbol in our catalog or by contacting our Rental Department.

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**TUBE & HEADER PLUGS**

Tube Plug Section 4



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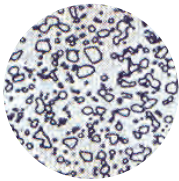


## HEAT EXCHANGER, CONDENSER AND BOILER TOOLS

Whether rolling 1/4" copper tube or 5" boiler tubes, we have a complete line to suit your every need.

*Improvements in the design and manufacture of our tube expanders have been implemented recently.*

Recent advancements have been made in the design and production of our tube expanders. Our expanders offer unparalleled value, combining exceptional tool longevity with competitive pricing. We use top-quality tool steel to craft the Mandrels and Roll Sets, subjecting them to heat treatment followed by cryogenic processing to significantly enhance durability and lifespan.



Before



After

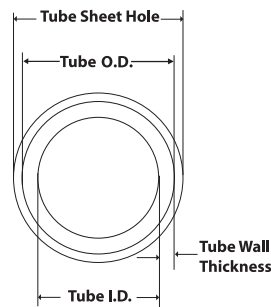
Our Mandrels and Roll Sets undergo state-of-the-art cryogenic and heat treatment procedures, setting them apart as the most robust options on the market. The cryogenic process involves deep chilling for an extended duration, prompting alloy carbides in the steel to precipitate, resulting in a remarkably resilient martensite matrix.

This process ensures increased toughness, making the tools highly resistant to unexpected shocks, while fine carbide precipitates minimize wear. Research indicates a potential doubling in the tool's lifespan, making cryogenic treatment the ultimate choice for tool steels.

## HEAT EXCHANGER, CONDENSER AND BOILER EXPANDERS

### TUBE EXPANDERS - *Tube Expanding Basics*

Tube expanding involves compressing the outer diameter (O.D.) of a tube against a tube sheet or boiler drums to reduce the tube wall. To ensure an effective seal, the tube wall must be reduced by a specified percentage. For precise guidance on Tube Wall Reduction, refer to the chart below.



#### TUBE WALL REDUCTION SET-UP GUIDE

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 Total Tube Wall Thickness (B-D)	
Step F	Calculate 7% Wall Reduction (.07 X E)	
Step G	Calculate Finished Rolled Tube ID (C+D+F)	

Note: Example is for a 7% tube reduction

Some important factors to consider when rolling certain alloys: When rolling 3003 or 4004 Aluminum you should not reduce the walls over 5%. When rolling 6061-T Aluminum, you can reduce the wall 10% to 12%.

**Admiralty Brass** - Tube Wall Reduction is approximately 7-8% and should be well lubricated. Reduction in excess of 15% may cause leaking, splits or flaked tubes.

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VISA



### Carbon Steel

Tube wall reduction should be approximately 4% to 5%, use a lot of lubrication. It is possible to roll tubes up to 150 Brinell (90 - 120 optimal hardness) with flaking and cracking more likely to occur as the tube hardness increases.

### Copper and Cupro Nickel

Approximately 8% - 10% wall reduction. Copper is easily rolled; however, use plenty of lubrication as it has an abrasive action on tube expanders.

### Stainless Steel and Titanium

Approximately 7% to 8% wall reduction in a serrated hole using 4 or 5 Roll Expanders. When rolling these alloys, the entire wall reduction should be done quickly as materials have a greater tendency to work harden.

### Major Causes of Tube Leaks

Tube joint leakage is usually caused by under-rolling, over-rolling or improper preparation of tube sheets. It is very important to have a clean tube sheet.

#### Under-Rolling

Not enough wall reduction (the tube is not expanded to fill the tube sheet hole). However, it is better to under-roll than to over-roll.

#### Over-Rolling

Too much wall reduction. Over-rolling can do considerable damage to a vessel and causes distortion of tube sheet ligaments and decreases the strength of adjacent tubes, creating premature leaks.

#### Improper Preparation of Tube Holes

The smoother the tube sheet, the easier it is to roll an optimum tube joint. The ligaments and light tube walls make it more important that the finish of the tube hole be in the low micro finish range. Reaming and sizing or burnishing is recommended to get the micro finish desired for tube holes.

#### Preparation of Tube Holes

Preparation of tube holes in heat exchangers and condensers is as follows:

1. Drill and ream tube sheet holes to .006" to .010" over the outside diameter of the tube to be used:  
5/8" = .006  
3/4" = .008  
1" = .010
2. Be certain the ligaments are sufficient to guarantee a safe and permanent tube joint.
3. When conditions permit, utilize a sizing or burnishing tool to further assure a high quality finish in the tube hole. This will also increase the tensile strength of the ligament.
4. The serrations (grooves) to be used will determine the holding power of the tube.
5. It is extremely important when re-tubing that the grooves be clean.

## Quality, Care, Maintenance and Storage of Tube Expanders

### Quality

The tube expanders from USA Industries are crafted from special alloy tool steels, meticulously heat-treated to endure rigorous operating conditions. These tools are manufactured by a highly skilled workforce using cutting-edge machinery and state-of-the-art manufacturing technology.

### Care

Tube expanders are precision tools. After rolling several tubes, immerse the tools in solvent for cleaning and cooling, then dip them in lightweight oil for lubrication. For optimal tube rolling, it's recommended to use two or more tube expanders interchangeably. Replace any worn or chipped mandrels and rolls promptly. For storage, meticulously clean the tools in solvent, replace any worn components, and apply a rust preventive coating or keep them submerged in lightweight oil.

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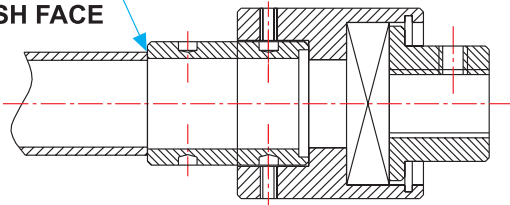
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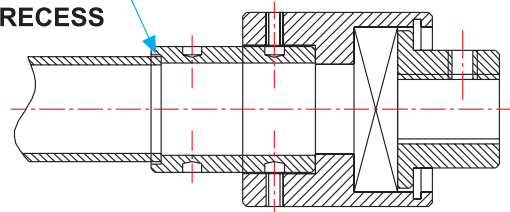
# HEAT EXCHANGER, CONDENSER AND BOILER EXPANDERS

**Reversible Thrust Collar Assembly Provided Standard and in All Tube Expanders**

**COLLAR WITH  
FLUSH FACE**



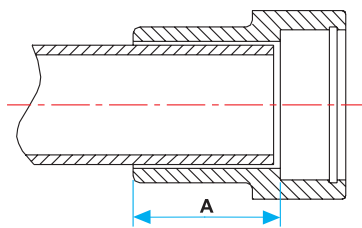
**COLLAR WITH  
FIX RECESS**



Nose portion can be 'reversed' to expand tubes flush with tube sheet and also tubes that are projecting 1/8" from tube sheet. This collar is supplied standard on all tube expanders.

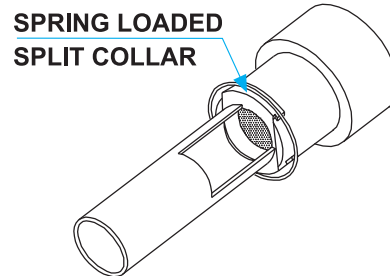
## Thin Wall Thrust Collars

**FULL RECESS THRUST COLLAR**



Used when tubes project varying distances from the tube sheet.

**SPRING LOADED SPLIT COLLAR**



Has an expandable front nose that expands along with the rolls and eliminates the tube from being sucked into the collar.

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8012 Series  
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## “800” SERIES 3-ROLL TUBE EXPANDER



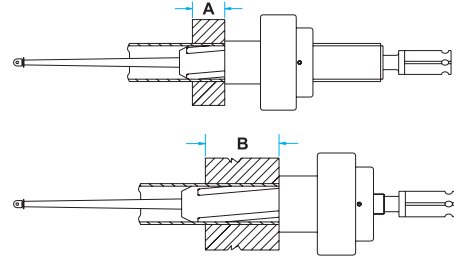
### Features

The most economical Tool for Heat Exchangers and Condensers. The 800 series 3-roll expanders are the most popular worldwide. For tube sizes 1/2” 14 Gauge to 1 1/2” 20 Gauge, Roll Sets 1 1/2” or 2 1/4” and Roll Depths adjustable from 1/2” to 1 1/2” or 1 1/4” to 2 1/4”.

Note: Model 797-856 expanders come with 3/8” square mandrel drives and Model 857-900 expanders come with 1/2” square mandrel drives.

Tube I.D. Sizes	
.334” - 1.43” (8.4mm - 36.3mm)	

Roller Length	Roll Depth	
	min “A”	max “B”
1-1/2” (38.1mm)	1/2” (12.7mm)	1-1/2” (38.1mm)
2-1/4” (57.1mm)	1/4” (31.7mm)	2-1/4” (57.1mm)



Tube O.D.	BWG	Tube I.D.		Expander with 1-1/2” (38.1mm) Long Rollers			Expander with 2-1/4” (57.1mm) Long Rollers			Minimum I.D. Tool Enters		Maximum Expansion of Tool	
		(in)	(mm)	Complete Tool	Mandrel	Roll Set	Complete Tool	Mandrel	Roll Set	(in)	(mm)	(in)	(mm)
1/2” 12.70mm	14	.334	8.4	797	M-797	R-797	-	-	-	.324	8.2	.374	9.5
	15	.356	9.0	799	M-799	R-1	-	-	-	.348	8.8	.398	10.1
	16	.370	9.4	801	M-1	R-1	-	-	-	.360	9.1	.410	10.4
	17	.384	9.7	803	M-1	R-2	-	-	-	.374	9.5	.424	10.7
	18	.402	10.2	805	M-2	R-3	-	-	-	.392	9.9	.447	11.3
5/8” 15.88mm	20	.430	10.9	805 S	M-3	R-3	-	-	-	.406	10.3	.461	11.7
	12	.407	10.3	805	M-2	R-3	-	-	-	.392	9.9	.447	11.3
	13	.435	11.0	807	M-3	R-4	-	-	-	.425	10.8	.480	12.1
	14	.459	11.6	809	M-4	R-4	810	M-4	R-4-A	.449	11.4	.509	12.9
	15	.481	12.2	811	M-5	R-5	812	M-5	R-5-A	.471	11.9	.536	13.6
	16	.495	12.5	813	M-5	R-6	814	M-5	R-6-A	.485	12.3	.550	13.9
	17	.509	12.9	815	M-6	R-6	816	M-6	R-6-A	.499	12.6	.564	14.3
	18	.527	13.3	817	M-7	R-7	818	M-7	R-7-A	.517	13.1	.572	14.5
	19	.541	13.7	819	M-6	R-7	820	M-6	R-7-A	.522	13.2	.582	14.7
	20	.555	14.1	819 S	M-8	R-7	820 S	M-8	R-7-A	.536	13.6	.596	15.1
3/4” 19.05mm	21	.561	14.2	819 S	M-8	R-7	820 S	M-8	R-7-A	.536	13.6	.596	15.1
	22	.569	14.4	819 S	M-8	R-7	820 S	M-8	R-7-A	.536	13.6	.596	15.1
	10	.482	12.2	811	M-5	R-5	812	M-5	R-5-A	.471	11.9	.536	13.6
	11	.510	12.9	815	M-6	R-6	816	M-6	R-6-A	.499	12.6	.564	14.3
	12	.532	13.5	819	M-6	R-7	820	M-6	R-7-A	.522	13.2	.582	14.7
	13	.560	14.2	821	M-8	R-8	822	M-8	R-8-A	.550	13.9	.615	15.6
	14	.584	14.8	823	M-8	R-9	824	M-8	R-9-A	.574	14.5	.639	16.2
	15	.606	15.3	825	M-8	R-10	826	M-8	R-10-A	.596	15.1	.661	16.7
	16	.620	15.7	827	M-9	R-10	828	M-9	R-10-A	.605	15.3	.685	17.4
	17	.634	16.1	829	M-9	R-11	830	M-9	R-11-A	.619	15.7	.699	17.7
	18	.652	16.5	829	M-9	R-11	830	M-9	R-11-A	.619	15.7	.699	17.7
	19	.666	16.9	831	M-9	R-12	832	M-9	R-12-A	.642	16.3	.722	18.3
7/8” 22.22mm	20	.680	17.2	831	M-9	R-12	832	M-9	R-12-A	.642	16.3	.722	18.3
	21	.686	17.4	831	M-9	R-12	832	M-9	R-12-A	.642	16.3	.722	18.3
	22	.694	17.6	831	M-9	R-12	832	M-9	R-12-A	.642	16.3	.722	18.3
	10	.607	15.4	825	M-8	R-10	826	M-8	R-10-A	.596	15.1	.661	16.7
	11	.635	16.1	829	M-9	R-11	830	M-9	R-11-A	.619	15.7	.699	17.7
	12	.657	16.6	831	M-9	R-12	832	M-9	R-12-A	.642	16.3	.722	18.3
	13	.685	17.4	833	M-10	R-13	834	M-10	R-13-A	.670	17.0	.750	19.0
	14	.709	18.0	835	M-11	R-14	836	M-11	R-14-A	.685	17.4	.774	19.6
	15	.731	18.5	837	M-11	R-15	838	M-11	R-15-1	.712	18.0	.801	20.3
16	.745	18.9	839	M-12	R-15	840	M-12	R-15-A	.726	18.4	.815	20.7	
17	.759	19.2	843	M-12	R-16	844	M-12	R-16-A	.740	18.8	.829	21.0	
18	.777	19.7	843	M-12	R-16	844	M-12	R-16-A	.740	18.8	.829	21.0	

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## “800” SERIES 3-ROLL TUBE EXPANDER

Tube O.D.  (in) (mm)	BWG	Tube I.D.		Expander with 1-1/2" (38.1mm) Long Rollers			Expander with 2-1/4" (57.1mm) Long Rollers			Minimum I.D. Tool Enters		Maximum Expansion of Tool	
		(in)	(mm)	Complete Tool	Mandrel	Roll Set	Complete Tool	Mandrel	Roll Set	(in)	(mm)	(in)	(mm)
1" 25.40mm	8	.670	17.0	841	M-9	R-13	842	M-9	R-13-A	.655	16.6	.735	18.6
	9	.704	17.8	835	M-11	R-14	836	M-11	R-14-A	.685	17.4	.774	19.6
	10	.732	18.5	837	M-11	R-15	838	M-11	R-15-A	.712	18.0	.801	20.3
	11	.760	19.3	843	M-12	R-16	844	M-12	R-16-A	.740	18.8	.829	21.1
	12	.782	19.8	845	M-12	R-17	846	M-12	R-17-A	.763	19.3	.852	21.6
	13	.810	20.5	847	M-12	R-18	848	M-12	R-18-A	.791	20.0	.880	22.3
	14	.834	21.1	849	M-13	R-18	850	M-13	R-18-A	.810	20.5	.909	23.1
	15	.856	21.7	851	M-13	R-19	852	M-13	R-19-A	.837	21.2	.936	23.7
	16	.870	22.1	851	M-13	R-19	852	M-13	R-19-A	.837	21.2	.936	23.7
	17	.884	22.4	855	M-13	R-21	856	M-13	R-21-A	.865	21.9	.964	24.4
	18	.902	22.9	855	M-13	R-21	856	M-13	R-21-A	.865	21.9	.964	24.4
	19	.916	23.2	855	M-13	R-21	856	M-13	R-21-A	.865	21.9	.964	24.4
20	.930	23.6	855	M-13	R-21	856	M-13	R-21-A	.865	21.9	.964	24.4	
1-1/8" 28.58mm	8	.795	20.1	853	M-13	R-20	854	M-13	R-20-A	.776	19.7	.875	22.2
	9	.829	21.0	849	M-13	R-18	850	M-13	R-18-A	.810	20.5	.909	23.1
	10	.857	21.7	851	M-13	R-19	852	M-13	R-19-A	.837	21.2	.936	23.7
	11	.885	22.4	855	M-13	R-21	856	M-13	R-21-A	.865	21.9	.964	24.4
	12	.907	23.0	857	M-14	R-21	858	M-14	R-21-A	.883	22.4	.982	24.9
	13	.935	23.7	859	M-14	R-22	860	M-14	R-22-A	.916	23.2	1.015	25.7
	14	.959	24.3	861	M-15	R-23	862	M-15	R-23-A	.935	23.7	1.044	26.5
	15	.981	24.9	863	M-15	R-24	864	M-15	R-24-A	.962	24.4	1.071	27.2
	16	.995	25.2	863	M-15	R-24	864	M-15	R-24-A	.962	24.4	1.071	27.2
	17	1.010	25.6	867	M-16	R-26	868	M-16	R-26-A	.990	25.1	1.009	27.9
18	1.027	26.0	867	M-16	R-26	868	M-16	R-26-A	.990	25.1	1.009	27.9	
1-1/4" 31.75mm	8	.920	23.3	865	M-15	R-25	866	M-15	R-25-A	.901	22.8	1.010	25.6
	9	.954	24.2	861	M-15	R-23	862	M-15	R-23-A	.935	23.7	1.044	26.5
	10	.982	24.9	863	M-15	R-24	864	M-15	R-24-A	.962	24.4	1.071	27.2
	11	1.010	25.6	867	M-16	R-26	868	M-16	R-26-A	.990	25.1	1.099	27.9
	12	1.032	26.2	869	M-16	R-27	870	M-16	R-27-A	1.013	25.7	1.122	28.5
	13	1.060	26.9	871	M-17	R-28	872	M-17	R-28-A	1.039	26.4	1.150	29.2
	14	1.084	27.5	873	M-17	R-29	874	M-17	R-29-A	1.060	26.9	1.169	29.6
	15	1.106	28.0	875	M-17	R-30	876	M-17	R-30-A	1.087	27.6	1.196	30.3
	16	1.120	28.4	875	M-17	R-30	876	M-17	R-30-A	1.087	27.6	1.196	30.3
	17	1.134	28.8	879	M-18	R-30	880	M-18	R-30-A	1.115	28.3	1.224	31.0
18	1.152	29.2	879	M-18	R-30	880	M-18	R-30-A	1.115	28.3	1.224	31.0	
1-3/8" 34.92mm	8	1.045	26.5	877	M-17	R-31	878	M-17	R-31-A	1.026	26.0	1.135	28.8
	9	1.079	27.4	873	M-17	R-29	874	M-17	R-29-A	1.060	26.9	1.169	29.6
	10	1.107	28.1	875	M-17	R-30	876	M-17	R-30-A	1.087	27.6	1.196	30.3
	11	1.135	28.8	879	M-18	R-30	880	M-18	R-30-A	1.115	28.3	1.224	31.0
	12	1.157	29.3	881	M-18	R-32	882	M-18	R-32-A	1.133	28.7	1.242	31.5
	13	1.185	30.1	883	M-19	R-33	884	M-19	R-33-A	1.160	29.4	1.275	32.3
	14	1.209	30.7	885	M-20	R-34	886	M-20	R-34-A	1.179	29.9	1.294	32.8
	15	1.231	31.2	887	M-20	R-35	888	M-20	R-35-A	1.206	30.6	1.321	33.5
1-1/2" 38.1mm	8	1.245	31.6	887	M-20	R-25	888	M-20	R-25-A	1.206	30.6	1.321	33.5
	8	1.170	29.7	889	M-19	R-34	890	M-19	R-34-A	1.145	29.0	1.260	32.0
	9	1.204	30.5	885	M-20	R-34	886	M-20	R-34-A	1.177	29.9	1.294	32.8
	10	1.232	31.2	887	M-20	R-35	888	M-20	R-35-A	1.206	30.6	1.321	33.5
	11	1.260	32.0	891	M-20	R-36	892	M-20	R-36-A	1.235	31.3	1.350	34.2
	12	1.282	32.5	893	M-20	R-37	894	M-20	R-37-A	1.257	31.9	1.372	34.8
	13	1.310	33.2	895	M-21	R-37	896	M-21	R-37-A	1.285	32.6	1.400	35.5
	14	1.334	33.8	895	M-21	R-37	896	M-21	R-37-A	1.285	32.6	1.400	35.5
	15	1.356	34.4	897	M-21	R-38	898	M-21	R-38-A	1.331	33.8	1.446	36.7
	16	1.370	34.8	897	M-21	R-38	898	M-21	R-38-A	1.331	33.8	1.446	36.7
	17	1.384	35.1	899	M-22	R-38	900	M-22	R-38-A	1.331	33.8	1.472	37.3
	18	1.402	35.6	899	M-22	R-38	900	M-22	R-38-A	1.331	33.8	1.472	37.3
19	1.416	35.9	899	M-22	R-38	900	M-22	R-38-A	1.331	33.8	1.472	37.3	
20	1.430	36.3	899	M-22	R-38	900	M-22	R-38-A	1.331	33.8	1.472	37.3	

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## "800" SERIES 5-ROLL TUBE EXPANDER



**Features**

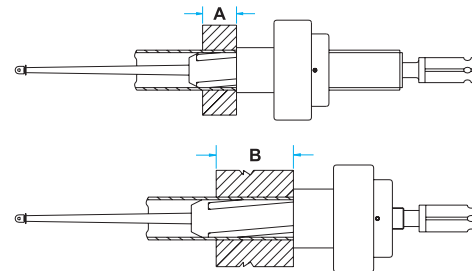
800 series 5-roll expanders are ideally suited to expand thin wall tubes (19 through 24 gauge walls) of Titanium, Stainless Steel, Incoloy and other exotic metals.

For tube sizes 5/8" 17 Gauge to 1 1/2" 24 Gauge, with Roll Depths adjustable from 1/2" to 1 1/2" for 1 1/2" Rollers and 1/4" to 2 1/4" for 2 1/4" Rollers.

*Note: Model 815-5 to 858-5 come with 3/8" square mandrel drives and Model 859-5 to 900-5 come with 1/2" square mandrel drives.*

Tube I.D. Sizes
.509" - 1.44" (12.9mm - 37.0mm)

Roller Length	Roll Depth	
	min "A"	max "B"
1-1/2" (38.1mm)	1/2" (12.7mm)	1-1/2" (38.1mm)
2-1/4" (57.1mm)	1/4" (31.7mm)	2-1/4" (57.1mm)



Tube O.D.	BWG	Tube I.D.		Expander with 1-1/2" (38.10mm) Long Rollers			Expander with 2-1/4" (57.15mm) Long Rollers			Minimum I.D. Tool Enters		Maximum Expansion of Tool	
		(in)	(mm)	Complete Tool	Mandrel	Roll Set	Complete Tool	Mandrel	Roll Set	(in)	(mm)	(in)	(mm)
5/8" 15.88mm	17	.509	12.9	815-5	M-816-5	R-4-5	816-5	M-816-5	R-4-A-5	.499	12.6	.564	14.3
	18	.527	13.3	817-5	M9	R-4-5	-	-	-	.517	13.1	.576	14.6
	19	.541	13.7	819-5	M-820-5	R-4-5	820-5	M-820-5	R-4-A-5	.522	13.2	.582	14.8
	20	.555	14.1	819-5 S	M-820-5 S	R-4-5	820-5 S	M-820-5 S	R-4-A-5	.536	13.6	.596	15.1
	21	.561	14.2	819-5 S	M-820-5 S	R-4-5	820-5 S	M-820-5 S	R-4-A-5	.536	13.6	.596	15.1
	22	.569	14.4	819-5 S	M-820-5 S	R-4-5	820-5 S	M-820-5 S	R-4-A-5	.536	13.6	.596	15.1
3/4" 19.65mm	13	.560	14.2	821-5	M-822-5	R-5-5	822-5	M-822-5	R-5-A-5	.550	13.9	.615	15.6
	14	.584	14.8	823-5	M-824-5	R-6-5	824-5	M-824-5	R-6-A-5	.574	14.5	.629	15.9
	15	.606	15.3	825-5	M-826-5	R-7-5	826-5	M-826-5	R-7-A-5	.590	14.9	.661	16.8
	16	.620	15.7	827-5	M-13	R-7-5	828-5	M-13	R-7-A-5	.605	15.3	.680	17.2
	17	.634	16.1	829-5	M-830-5	R-7-5	830-5	M-830-5	R-7-A-5	.619	15.7	.699	17.8
	18	.652	16.5	829-5	M-830-5	R-7-5	830-5	M-830-5	R-7-A-5	.619	15.7	.699	17.8
	19	.666	16.9	831-5	M-13	R-9-5	832-5	M-13	R-9-A-5	.642	16.3	.729	18.5
	20	.680	17.2	831-5	M-13	R-9-5	832-5	M-13	R-9-A-5	.642	16.3	.729	18.5
	21	.686	17.4	831-5	M-13	R-9-5	832-5	M-13	R-9-A-5	.642	16.3	.729	18.5
	22	.694	17.6	831-5	M-13	R-9-5	832-5	M-13	R-9-A-5	.642	16.3	.729	18.5
	23	.700	17.8	833-5	M-14-3/8	R-9-5	834-5	M-14-3/8	R-9-A-5	.670	17.0	.747	18.9
24	.706	17.9	833-5	M-14-3/8	R-9-5	834-5	M-14-3/8	R-9-A-5	.670	17.0	.747	18.9	
25	.710	18.0	833-5	M-840-5	R-10-5	836-5	M-840-5	R-10-A-5	.685	17.4	.750	19.0	
7/8" 22.22mm	13	.685	17.4	833-5	M-14-3/8	R-9-5	834-5	M-14-3/8	R-9-A-5	.670	17.0	.747	18.9
	14	.709	18.0	835-5	M-15-3/8	R-10-5	836-5	M-15-3/8	R-10-A-5	.685	17.4	.750	19.0
	16	.745	18.9	839-5	M-840-5	R-11-5	840-5	M-840-5	R-11-A-5	.726	18.4	.800	20.3
	17	.759	19.2	843-5	M-17-3/8	R-11-5	844-5	M-17-3/8	R-11-A-5	.740	18.8	.824	20.9
	18	.777	19.7	843-5	M-17-3/8	R-11-5	844-5	M-17-3/8	R-11-A-5	.740	18.8	.824	20.9
	19	.791	20.1	845-5	M-18-3/8	R-11-5	846-5	M-18-3/8	R-11-A-5	.763	19.4	.851	21.6
	20	.805	20.4	845-5	M-18-3/8	R-11-5	846-5	M-18-3/8	R-11-A-5	.763	19.4	.851	21.6
	21	.811	20.6	845-5	M-18-3/8	R-11-5	846-5	M-18-3/8	R-11-A-5	.763	19.4	.851	21.6
	22	.819	20.8	845-5	M-18-3/8	R-11-5	846-5	M-18-3/8	R-11-A-5	.763	19.4	.851	21.6
	23	.825	20.9	847-5	M-18-3/8	R-13-5	848-5	M-18-3/8	R-13-A-5	.791	20.1	.880	22.4
24	.831	21.1	847-5	M-18-3/8	R-13-5	848-5	M-18-3/8	R-13-A-5	.791	20.1	.880	22.4	

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## “800” SERIES 5-ROLL TUBE EXPANDER

Tube O.D. (in) (mm)	BWG	Tube I.D.		Expander with 1-1/2" (38.10mm) Long Rollers			Expander with 2-1/4" (57.15mm) Long Rollers			Minimum I.D. Tool Enters		Maximum Expansion of Tool	
		(in)	(mm)	Complete Tool	Mandrel	Roll Set	Complete Tool	Mandrel	Roll Set	(in)	(mm)	(in)	(mm)
1" 25.40mm	12	.782	19.8	845-5	M-18-3/8	R-11-5	846-5	M-18-3/8	R-11-A-5	.763	19.3	.852	21.6
	13	.810	20.5	847-5	M-18-3/8	R-13-5	848-5	M-18-3/8	R-13-A-5	.791	20.0	.880	22.4
	14	.834	21.2	849-5	M-850-5	R-12-5	850-5	M-18-3/8	R-12-A-5	.810	20.5	.909	23.2
	15	.856	21.7	851-5	M-852-5	R-13-5	852-5	M-852-5	R-13-A-5	.837	21.2	.936	23.8
	16	.870	22.1	851-5	M-852-5	R-13-5	852-5	M-852-5	R-13-A-5	.837	21.2	.936	23.8
	17	.884	22.4	855-5	M-856-5	R-13-5	856-5	M-856-5	R-13-A-5	.865	21.9	.965	24.5
	18	.902	22.9	855-5	M-856-5	R-13-5	856-5	M-856-5	R-13-A-5	.865	21.9	.965	24.5
	19	.916	23.2	855-5	M-856-5	R-13-5	856-5	M-856-5	R-13-A-5	.865	21.9	.965	24.5
	20	.930	23.6	855-5	M-856-5	R-13-5	856-5	M-856-5	R-13-A-5	.865	21.9	.965	24.5
	21	.936	23.8	857-5	M-21-3/8	R-15-5	858-5	M-21-3/8	R-15-A-5	.883	22.4	.997	25.3
	22	.944	24.0	857-5	M-21-3/8	R-15-5	858-5	M-21-3/8	R-15-A-5	.883	22.4	.997	25.3
	23	.950	24.1	857-5	M-21-3/8	R-15-5	858-5	M-21-3/8	R-15-A-5	.883	22.4	.997	25.3
1-1/8" 28.58mm	24	.956	24.3	857-5	M-21-3/8	R-15-5	858-5	M-21-3/8	R-15-A-5	.883	22.4	.997	25.3
	25	.960	24.4	857-5	M-21-3/8	R-15-5	858-5	M-21-3/8	R-15-A-5	.883	22.4	.997	25.3
	12	.907	23.0	857-5	M-21-3/8	R-15-5	858-5	M-21-3/8	R-15-A-5	.883	22.4	.997	25.3
	13	.935	23.7	859-5	M-860-5	R-16-5	860-5	M-860-5	R-16-A-5	.916	23.2	1.000	25.4
1-1/4" 31.75mm	14	.959	24.3	861-5	M-862-5	R-17-5	862-5	M-862-5	R-17-A-5	.935	23.7	1.039	26.4
	22	1.069	27.2	871-5	M-872-5	R-19-5	872-5	M-872-5	R-19-A-5	1.039	26.4	1.157	29.4
	24	1.081	27.5	871-5	M-872-5	R-19-5	872-5	M-872-5	R-19-A-5	1.039	26.4	1.157	29.4
	15	1.106	28.1	875-5	M-876-5	R-21-5	876-5	M-876-5	R-21-A-5	1.087	27.6	1.196	30.4
	16	1.120	28.4	875-5	M-876-5	R-21-5	876-5	M-876-5	R-21-A-5	1.087	27.6	1.196	30.4
	17	1.134	28.8	879-5	M-880-5	R-21-5	880-5	M-880-5	R-21-A-5	1.115	28.3	1.231	31.3
	18	1.152	29.3	879-5	M-880-5	R-21-5	880-5	M-880-5	R-21-A-5	1.115	28.3	1.231	31.3
	19	1.166	29.6	879-5	M-880-5	R-21-5	880-5	M-880-5	R-21-A-5	1.115	28.3	1.231	31.3
1-3/8" 34.92mm	20	1.180	30.0	879-5	M-880-5	R-21-5	880-5	M-880-5	R-21-A-5	1.115	28.3	1.231	31.3
	21	1.186	30.1	879-5	M-880-5	R-21-5	880-5	M-880-5	R-21-A-5	1.115	28.3	1.231	31.3
	22	1.194	30.3	879-5	M-880-5	R-21-5	880-5	M-880-5	R-21-A-5	1.115	28.3	1.231	31.3
	23	1.200	30.5	881-5	M-882-5	R-21-5	882-5	M-882-5	R-21-A-5	1.133	28.8	1.242	31.5
	24	1.206	30.6	881-5	M-882-5	R-21-5	882-5	M-882-5	R-21-A-5	1.133	28.8	1.242	31.5
1-1/2" 38.10mm	12	1.154	29.3	881-5	M-882-5	R-21-5	880-5	M-880-5	R-21-A-5	1.133	28.8	1.242	31.5
	14	1.209	30.7	885-5	M-882-5	R-23-5	886-5	M-882-5	R-23-A-5	1.179	29.9	1.296	32.9
	20	1.305	33.2	893-5	M-894-5	R-26-5	894-5	M-894-5	R-26-A-5	1.257	31.9	1.385	35.2
	22	1.319	33.5	895-5	M-896-5	R-26-5	896-5	M-896-5	R-26-A-5	1.285	32.6	1.417	36.0
1-1/2" 38.10mm	24	1.331	33.8	895-5	M-896-5	R-26-5	896-5	M-896-5	R-26-A-5	1.285	32.6	1.417	36.0
	17	1.384	35.1	899-5	M-900-5	R-29-5	900-5	M-900-5	R-29-A-5	1.331	33.8	1.489	37.8
	18	1.402	35.6	899-5	M-900-5	R-29-5	900-5	M-900-5	R-29-A-5	1.331	33.8	1.489	37.8
	19	1.416	36.0	899-5	M-900-5	R-29-5	900-5	M-900-5	R-29-A-5	1.331	33.8	1.489	37.8
	20	1.430	36.3	899-5	M-900-5	R-29-5	900-5	M-900-5	R-29-A-5	1.331	33.8	1.489	37.8
	21	1.436	36.5	899-5	M-900-5	R-29-5	900-5	M-900-5	R-29-A-5	1.331	33.8	1.489	37.8
	22	1.444	36.7	899-5	M-900-5	R-29-5	900-5	M-900-5	R-29-A-5	1.331	33.8	1.489	37.8
23	1.450	36.8	899-5	M-900-5	R-29-5	900-5	M-900-5	R-29-A-5	1.331	33.8	1.489	37.8	
24	1.456	37.0	899-5	M-900-5	R-29-5	900-5	M-900-5	R-29-A-5	1.331	33.8	1.489	37.8	

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# "1200" SERIES 3-ROLL TUBE EXPANDER

## Features

1200 series 3-roll expanders are the most versatile for thick tubesheets, available in 4 different lengths to best suit your needs and can be provided in Lengths up to 60" (& longer) upon special request.

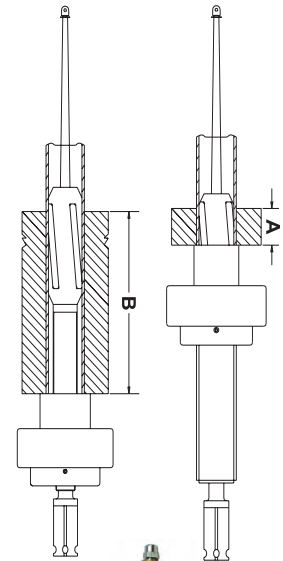
For tube sizes 1/2" 14 Gauge to 1 1/2" 20 Gauge, Roll Sets 1 1/2" or 2 1/4" and Roll Depths adjustable from: STD Reach 1 1/2" to 6" - A Reach from 1 1/2" to 8" - B Reach from 1 1/2" to 10" - C Reach from 1 1/2" to 12" for 1 1/2" Roller Lengths; STD Reach from 2 1/4" to 6 3/4" - A Reach from 2 1/4" to 8 3/4" - B Reach from 2 1/4" to 10 3/4" - C Reach from 2 1/4" to 12 3/4" for 2 1/4" Roller Lengths.

Note: Model 1197-1256 expanders come with 3/8" mandrel drives and Model 1257-1300 expanders come with 1/2" square mandrel drives.

Tube I.D. Sizes	
.334" - 1.43" (8.4mm - 36.3mm)	

Roller Length		Roll Depth	
		min "A"	max "B"
1-1/2" (38.1mm)	STD Reach	1-1/2" (38.1mm)	6" (152.4mm)
	A Reach	1-1/2" (38.1mm)	8" (203.2mm)
	B Reach	1-1/2" (38.1mm)	10" (253.8mm)
	C Reach	1-1/2" (38.1mm)	12" (304.6mm)
2-1/4" (57.1mm)	STD Reach	2-1/4" (57.1mm)	6-3/4" (171.4mm)
	A Reach	2-1/4" (57.1mm)	8-3/4" (221.1mm)
	B Reach	2-1/4" (57.1mm)	10-3/4" (272.8mm)
	C Reach	2-1/4" (57.1mm)	12-3/4" (323.6mm)

Tube O.D. (in) (mm)	BWG	Tube I.D.		Expander with 1-1/2" (38.1mm) Long Rollers			Expander with 2-1/4" (57.1mm) Long Rollers			Minimum I.D. Tool Enters		Maximum Expansion of Tool	
		(in)	(mm)	Complete Tool	Mandrel	Roll Set	Complete Tool	Mandrel	Roll Set	(in)	(mm)	(in)	(mm)
1/2" 12.70mm	14	.334	8.4	1197	M-1197	R-797	-	-	-	.324	8.2	.374	9.5
	15	.356	9.0	1199	M-1199	R-1	-	-	-	.348	8.8	.398	10.1
	16	.370	9.4	1201	M-51	R-1	-	-	-	.360	9.1	.410	10.4
	17	.384	9.7	1203	M-51	R-2	-	-	-	.374	9.5	.424	10.7
	18	.402	10.2	1205	M-52	R-3	-	-	-	.392	9.9	.447	11.3
	20	.430	10.9	1205 S	M-53	R-3	-	-	-	.406	10.3	.461	11.7
5/8" 15.88mm	12	.407	10.3	1205	M-52	R-3	-	-	-	.392	9.9	.447	11.3
	13	.435	11.0	1207	M-53	R-4	-	-	-	.425	10.8	.480	12.1
	14	.459	11.6	1209	M-54	R-4	1210	M-54	R-4-A	.449	11.4	.509	12.9
	15	.481	12.2	1211	M-55	R-5	1212	M-55	R-5-A	.471	11.9	.536	13.6
	16	.495	12.5	1213	M-55	R-6	1214	M-55	R-6-A	.485	12.3	.550	13.9
	17	.509	12.9	1215	M-56	R-6	1216	M-56	R-6-A	.499	12.6	.564	14.3
	18	.527	13.3	1217	M-57	R-7	1218	M-57	R-7-A	.517	13.1	.572	14.5
	19	.541	13.7	1219	M-56	R-7	1220	M-56	R-7-A	.522	13.2	.582	14.7
	20	.555	14.1	1219 S	M-58	R-7	1220 S	M-58	R-7-A	.536	13.6	.596	15.1
	21	.561	14.2	1219 S	M-58	R-7	1220 S	M-58	R-7-A	.536	13.6	.596	15.1
3/4" 19.05mm	10	.482	12.2	1211	M-55	R-5	1212	M-55	R-5-A	.471	11.9	.536	13.6
	11	.510	12.9	1215	M-56	R-6	1216	M-56	R-6-A	.499	12.6	.564	14.3
	12	.532	13.5	1219	M-56	R-7	1220	M-56	R-7-A	.522	13.2	.582	14.7
	13	.560	14.2	1221	M-58	R-8	1222	M-58	R-8-A	.550	13.9	.615	15.6
	14	.584	14.8	1223	M-58	R-9	1224	M-58	R-9-A	.574	14.5	.639	16.2
	15	.606	15.3	1225	M-58	R-10	1226	M-58	R-10-A	.596	15.1	.661	16.7
	16	.620	15.7	1227	M-59	R-10	1228	M-59	R-10-A	.605	15.3	.685	17.4
	17	.634	16.1	1229	M-59	R-11	1230	M-59	R-11-A	.619	15.7	.699	17.7
	18	.652	16.5	1229	M-59	R-11	1230	M-59	R-11-A	.619	15.7	.699	17.7
	19	.666	16.9	1231	M-59	R-12	1232	M-59	R-12-A	.642	16.3	.722	18.3
7/8" 22.22mm	10	.680	17.2	1231	M-59	R-12	1232	M-59	R-12-A	.642	16.3	.722	18.3
	11	.686	17.4	1231	M-59	R-12	1232	M-59	R-12-A	.642	16.3	.722	18.3
	12	.694	17.6	1231	M-59	R-12	1232	M-59	R-12-A	.642	16.3	.722	18.3
	13	.685	17.4	1233	M-60	R-13	1234	M-60	R-13-A	.670	17.0	.750	19.0
	14	.709	18.0	1235	M-61	R-14	1236	M-61	R-14-A	.685	17.4	.774	19.6
	15	.731	18.5	1237	M-61	R-15	1238	M-61	R-15-1	.712	18.0	.801	20.3
	16	.745	18.9	1239	M-62	R-15	1240	M-62	R-15-A	.726	18.4	.815	20.7
	17	.759	19.2	1243	M-62	R-16	1244	M-62	R-16-A	.740	18.8	.829	21.0
	18	.777	19.7	1243	M-62	R-16	1244	M-62	R-16-A	.740	18.8	.829	21.0



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## "1200" SERIES 3-ROLL TUBE EXPANDER

Tube O.D.	BWG	Tube I.D.		Expander with 1-1/2" (38.1mm) Long Rollers			Expander with 2-1/4" (57.1mm) Long Rollers			Minimum I.D. Tool Enters		Maximum Expansion of Tool	
		(in)	(mm)	Complete Tool	Mandrel	Roll Set	Complete Tool	Mandrel	Roll Set	(in)	(mm)	(in)	(mm)
1" 25.40mm	8	.670	17.0	1241	M-59	R-13	1242	M-59	R-13-A	.655	16.6	.735	18.6
	9	.704	17.8	1235	M-61	R-14	1236	M-61	R-14-A	.685	17.4	.774	19.6
	10	.732	18.5	1237	M-61	R-15	1238	M-61	R-15-A	.712	18.0	.801	20.3
	11	.760	19.3	1243	M-62	R-16	1244	M-62	R-16-A	.740	18.8	.829	21.1
	12	.782	19.8	1245	M-62	R-17	1246	M-62	R-17-A	.763	19.3	.852	21.6
	13	.810	20.5	1247	M-62	R-18	1248	M-62	R-18-A	.791	20.0	.880	22.3
	14	.834	21.1	1249	M-63	R-18	1250	M-63	R-18-A	.810	20.5	.909	23.1
	15	.856	21.7	1251	M-63	R-19	1252	M-63	R-19-A	.837	21.2	.936	23.7
	16	.870	22.1	1251	M-63	R-19	1252	M-63	R-19-A	.837	21.2	.936	23.7
	17	.884	22.4	1255	M-63	R-21	1256	M-63	R-21-A	.865	21.9	.964	24.4
	18	.902	22.9	1255	M-63	R-21	1256	M-63	R-21-A	.865	21.9	.964	24.4
19	.916	23.2	1255	M-63	R-21	1256	M-63	R-21-A	.865	21.9	.964	24.4	
20	.930	23.6	1255	M-63	R-21	1256	M-63	R-21-A	.865	21.9	.964	24.4	
1-1/8" 28.58mm	8	.795	20.1	1253	M-63	R-20	1254	M-63	R-20-A	.776	19.7	.875	22.2
	9	.829	21.0	1249	M-63	R-18	1250	M-63	R-18-A	.810	20.5	.909	23.1
	10	.857	21.7	1251	M-63	R-19	1252	M-63	R-19-A	.837	21.2	.936	23.7
	11	.885	22.4	1255	M-63	R-21	1256	M-63	R-21-A	.865	21.9	.964	24.4
	12	.907	23.0	1257	M-64	R-21	1258	M-64	R-21-A	.883	22.4	.982	24.9
	13	.935	23.7	1259	M-64	R-22	1260	M-64	R-22-A	.916	23.2	1.015	25.7
	14	.959	24.3	1261	M-65	R-23	1262	M-65	R-23-A	.935	23.7	1.044	26.5
	15	.981	24.9	1263	M-65	R-24	1264	M-65	R-24-A	.962	24.4	1.071	27.2
	16	.995	25.2	1263	M-65	R-24	1264	M-65	R-24-A	.962	24.4	1.071	27.2
	17	1.010	25.6	1267	M-66	R-26	1268	M-66	R-26-A	.990	25.1	1.009	27.9
	18	1.027	26.0	1267	M-66	R-26	1268	M-66	R-26-A	.990	25.1	1.009	27.9
1-1/4" 31.75mm	8	.920	23.3	1265	M-65	R-25	1266	M-65	R-25-A	.901	22.8	1.010	25.6
	9	.954	24.2	1261	M-65	R-23	1262	M-65	R-23-A	.935	23.7	1.044	26.5
	10	.982	24.9	1263	M-65	R-24	1264	M-65	R-24-A	.962	24.4	1.071	27.2
	11	1.010	25.6	1267	M-66	R-26	1268	M-66	R-26-A	.990	25.1	1.099	27.9
	12	1.032	26.2	1269	M-66	R-27	1270	M-66	R-27-A	1.013	25.7	1.122	28.5
	13	1.060	26.9	1271	M-67	R-28	1272	M-67	R-28-A	1.039	26.4	1.150	29.2
	14	1.084	27.5	1273	M-67	R-29	1274	M-67	R-29-A	1.060	26.9	1.169	29.6
	15	1.106	28.0	1275	M-67	R-30	1276	M-67	R-30-A	1.087	27.6	1.196	30.3
	16	1.120	28.4	1275	M-67	R-30	1276	M-67	R-30-A	1.087	27.6	1.196	30.3
	17	1.134	28.8	1279	M-68	R-30	1280	M-68	R-30-A	1.115	28.3	1.224	31.0
	18	1.152	29.2	1279	M-68	R-30	1280	M-68	R-30-A	1.115	28.3	1.224	31.0
1-3/8" 34.92mm	8	1.045	26.5	1277	M-67	R-31	1278	M-67	R-31-A	1.026	26.0	1.135	28.8
	9	1.079	27.4	1273	M-67	R-29	1274	M-67	R-29-A	1.060	26.9	1.169	29.6
	10	1.107	28.1	1275	M-67	R-30	1276	M-67	R-30-A	1.087	27.6	1.196	30.3
	11	1.135	28.8	1279	M-68	R-30	1280	M-68	R-30-A	1.115	28.3	1.224	31.0
	12	1.157	29.3	1281	M-68	R-32	1282	M-68	R-32-A	1.133	28.7	1.242	31.5
	13	1.185	30.1	1283	M-69	R-33	1284	M-69	R-33-A	1.160	29.4	1.275	32.3
	14	1.209	30.7	1285	M-70	R-34	1286	M-70	R-34-A	1.179	29.9	1.294	32.8
	15	1.231	31.2	1287	M-70	R-35	1288	M-70	R-35-A	1.206	30.6	1.321	33.5
1-1/2" 38.1mm	8	1.170	29.7	1289	M-69	R-34	1290	M-69	R-34-A	1.145	29.0	1.260	32.0
	9	1.204	30.5	1285	M-70	R-34	1286	M-70	R-34-A	1.177	29.9	1.294	32.8
	10	1.232	31.2	1287	M-70	R-35	1288	M-70	R-35-A	1.206	30.6	1.321	33.5
	11	1.260	32.0	1291	M-70	R-36	1292	M-70	R-36-A	1.235	31.3	1.350	34.2
	12	1.282	32.5	1293	M-70	R-37	1294	M-70	R-37-A	1.257	31.9	1.372	34.8
	13	1.310	33.2	1295	M-71	R-37	1296	M-71	R-37-A	1.285	32.6	1.400	35.5
	14	1.334	33.8	1295	M-71	R-37	1296	M-71	R-37-A	1.285	32.6	1.400	35.5
	15	1.356	34.4	1297	M-71	R-38	1298	M-71	R-38-A	1.331	33.8	1.446	36.7
	16	1.370	34.8	1297	M-71	R-38	1298	M-71	R-38-A	1.331	33.8	1.446	36.7
	17	1.384	35.1	1299	M-72	R-38	1300	M-72	R-38-A	1.331	33.8	1.472	37.3
	18	1.402	35.6	1299	M-72	R-38	1300	M-72	R-38-A	1.331	33.8	1.472	37.3
19	1.416	35.9	1299	M-72	R-38	1300	M-72	R-38-A	1.331	33.8	1.472	37.3	
20	1.430	36.3	1299	M-72	R-38	1300	M-72	R-38-A	1.331	33.8	1.472	37.3	

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## "1200" SERIES 5-ROLL TUBE EXPANDER



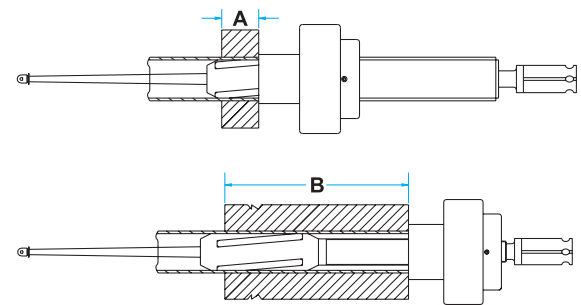
### Features

1200 series 5-roll expanders are ideally suited to expand thin wall tubes of Titanium, Stainless Steel, Incoloy and other exotic metals with thick tube sheets. Gives a more concentric and even expansion when expanding thin wall tubes vs. conventional 3-roll expander

For tube sizes 3/4" 14 Gauge to 1 1/2" 20 Gauge, Roll Sets 1 1/2" or 2 1/4" and Roll Depths adjustable from: STD Reach 1 1/2" to 6" - A Reach from 1 1/2" to 8" - B Reach from 1 1/2" to 10" - C Reach from 1 1/2" to 12" for 1 1/2" Roller Lengths; STD Reach from 2 1/4" to 6 3/4" - A Reach from 2 1/4" to 8 3/4" - B Reach from 2 1/4" to 10 3/4" - C Reach from 2 1/4" to 12 3/4" for 2 1/4" Roller Lengths.

Note: Model 1223-5 to 1258-5 expanders come with 3/8" square mandrel drives and Model 1263-5 to 1300-5 expanders come with 1/2" square mandrel drives.

Tube I.D. Sizes
.584" - 1.43" (14.8mm - 36.3mm)



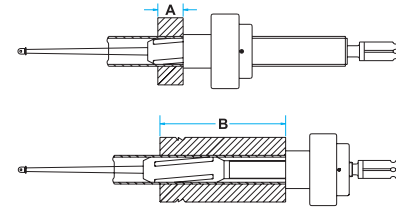
Tube O.D.	BWG	Tube I.D.		Expander with 1-1/2" (38.1mm) Long Rollers			Expander with 2-1/4" (57.1mm) Long Rollers			Minimum I.D. Tool Enters		Maximum Expansion of Tool	
		(in)	(mm)	Complete Tool	Mandrel	Roll Set	Complete Tool	Mandrel	Roll Set	(in)	(mm)	(in)	(mm)
3/4" 19.05mm	14	.584	14.8	1223-5	M-1224-5	R-6-5	1224-5	M-1224-5	R-6-A-5	.574	14.5	.639	16.2
	15	.606	15.3	1225-5	M-1226-5	R-7-5	1226-5	M-1226-5	R-7-A-5	.596	15.1	.661	16.7
	16	.620	15.7	1227-5	M-63	R-7-5	1228-5	M-63	R-7-A-5	.605	15.3	.685	17.4
	17	.634	16.1	1229-5	M-1230-5	R-7-5	1230-5	M-1230-5	R-7-A-5	.619	15.7	.699	17.7
	18	.652	16.5	1229-5	M-1230-5	R-7-5	1230-5	M-1230-5	R-7-A-5	.619	15.7	.699	17.7
	19	.666	16.9	1231-5	M-63	R-9-5	1232-5	M-63	R-9-A-5	.642	16.3	.722	18.3
	20	.680	17.2	1231-5	M-63	R-9-5	1232-5	M-63	R-9-A-5	.642	16.3	.722	18.3
	21	.686	17.4	1231-5	M-63	R-9-5	1232-5	M-63	R-9-A-5	.642	16.3	.722	18.3
1" 25.40mm	22	.694	17.6	1231-5	M-63	R-9-5	1232-5	M-63	R-9-A-5	.642	16.3	.722	18.3
	14	.834	21.1	1249-5	M-1250-5	R-12-5	1250-5	M-1250-5	R-12-A-5	.810	20.5	.909	23.1
	15	.856	21.7	1251-5	M-1251-5	R-13-5	1252-5	M-1251-5	R-13-A-5	.837	21.2	.936	23.7
	16	.870	22.1	1251-5	M-1251-5	R-13-5	1252-5	M-1251-5	R-13-A-5	.837	21.2	.936	23.7
	17	.884	22.4	1255-5	M-1256-5	R-13-5	1256-5	M-1256-5	R-13-A-5	.865	21.9	.964	24.4
	18	.902	22.9	1255-5	M-1256-5	R-13-5	1256-5	M-1256-5	R-13-A-5	.865	21.9	.964	24.4
	19	.916	23.2	1255-5	M-1256-5	R-13-5	1256-5	M-1256-5	R-13-A-5	.865	21.9	.964	24.4
	20	.930	23.6	1255-5	M-1256-5	R-13-5	1256-5	M-1256-5	R-13-A-5	.865	21.9	.964	24.4
1-1/8" 28.58mm	21	.936	23.8	1257-5	M-71-3/8	R-15-5	1258-5	M-71-3/8	R-15-A-5	.833	22.4	.982	24.9
	22	.944	24.0	1257-5	M-71-3/8	R-15-5	1258-5	M-71-3/8	R-15-A-5	.833	22.4	.982	24.9
	12	.907	23.0	1257-5	M-71-3/8	R-15-5	1258-5	M-71-3/8	R-15-A-5	.883	22.4	.982	24.9
1-1/2" 38.10mm	15	.981	24.9	1263-5	M-1263-5	R-18-5	-	-	-	.962	24.4	1.071	27.2
	16	.995	25.2	1263-5	M-1263-5	R-18-5	-	-	-	.962	24.4	1.071	27.2
	17	1.384	35.1	1299-5	M-1299-5	R-29-5	M-1300-5	M-1299-5	R-29-A-5	1.331	33.8	1.472	37.3
	18	1.402	35.6	1299-5	M-1299-5	R-29-5	M-1300-5	M-1299-5	R-29-A-5	1.331	33.8	1.472	37.3
1-1/2" 38.10mm	19	1.416	36.0	1299-5	M-1299-5	R-29-5	M-1300-5	M-1299-5	R-29-A-5	1.331	33.8	1.472	37.3
	20	1.430	36.3	1299-5	M-1299-5	R-29-5	M-1300-5	M-1299-5	R-29-A-5	1.331	33.8	1.472	37.3

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# “8012” SERIES TUBE EXPANDER



## Features

A great choice for larger diameter tubes and thick tube sheets. To expand tubes in Air Heaters, Boilers and Refinery Tubes. Can be used to expand thick tube sheets (up to 8”).

Tube sizes 1 3/4” 8 Gauge to 5” 16 Gauge and Roll Depth Adjustable: STD Reach from 1/2” to 4”; 6” Reach from 1/2” to 6”; 8” Reach from 1/2” to 8”.

TUBE I.D. SIZES:
1.420” - 4.870” (36.1mm - 123.7 mm)

ROLLER LENGTH:		ROLL DEPTH:	
		MINIMUM	MAXIMUM
2-1/4” (57.1mm)	STD. REACH	1/2 “ (12.7mm)	4” (101.4mm)
	- 6” REACH	1/2 “ (12.7mm)	6” (152.4mm)
	- 8” REACH	1/2 “ (12.7mm)	8” (203.2mm)

\*For Mandrels in 6” & 8” reach - ADD suffix 6 or 8 to Mandrel Model No.

Tube O.D.	BWG	Tube I.D.		Expander with 2 1/4” (57.15 mm) Long Rollers			Minimum I.D.Tool Enters		Maximum Expansion of Tool	
		(in)	(mm)	Complete Tool	Mandrel	Roll Set	(in)	(mm)	(in)	(mm)
1 3/4” (44.45mm)	8	1.420	(36.1)	8012-1.3/4-8	M-90	R-33-A	1.368	(34.7)	1.550	(39.3)
	10	1.482	(37.6)	8012-1.3/4-10	M-90	R-37-A	1.420	(36.0)	1.607	(40.8)
	11	1.510	(38.3)	8012-1.3/4-11	M-90	R-42	1.454	(36.9)	1.635	(41.5)
	12	1.532	(38.9)	8012-1.3/4-12	M-90	R-44	1.482	(37.6)	1.657	(42.0)
	13	1.560	(39.6)	8012-1.3/4-13	M-90	R-46	1.510	(38.3)	1.685	(42.7)
	14	1.584	(40.2)	8012-1.3/4-14	M-90	R-48	1.532	(38.9)	1.709	(43.4)
2” (50.80mm)	7	1.640	(41.6)	8012-2-7	M-91	R-46	1.570	(39.8)	1.770	(45.0)
	8	1.670	(42.4)	8012-2-8	M-91	R-48	1.595	(40.5)	1.795	(45.6)
	10	1.732	(43.9)	8012-2-10	M-91	R-50	1.640	(41.6)	1.857	(47.1)
	11	1.760	(44.7)	8012-2-11	M-91	R-52	1.670	(42.4)	1.885	(47.8)
	12	1.782	(45.2)	8012-2-12	M-91	R-54	1.704	(43.2)	1.907	(48.4)
	13	1.810	(45.9)	8012-2-13-18	M-91	R-56	1.732	(43.9)	1.956	(49.6)
	14	1.834	(46.5)	8012-2-13-18	M-91	R-56	1.732	(43.9)	1.956	(49.6)
	15	1.856	(47.1)	8012-2-13-18	M-91	R-56	1.732	(43.9)	1.956	(49.6)
	16	1.870	(47.4)	8012-2-13-18	M-91	R-56	1.732	(43.9)	1.956	(49.6)
	17	1.884	(47.9)	8012-2-13-18	M-91	R-56	1.732	(43.9)	1.956	(49.6)
2 1/4” (57.15mm)	10	1.982	(50.3)	8012-2.1/4-10	M-92	R-56	1.890	(48.0)	2.107	(53.5)
	11	2.010	(51.0)	8012-2.1/4-11	M-92	R-58	1.920	(48.7)	2.135	(54.2)
	12	2.032	(51.6)	8012-2.1/4-12	M-92	R-60	1.954	(49.6)	2.157	(54.7)
	13	2.060	(52.3)	8012-2.1/4-13-16	M-92	R-62	1.982	(50.3)	2.185	(55.4)
	14	2.084	(52.9)	8012-2.1/4-13-16	M-92	R-62	1.982	(50.3)	2.185	(55.4)
	15	2.106	(53.4)	8012-2.1/4-13-16	M-92	R-62	1.982	(50.3)	2.185	(55.4)
2 1/2” (63.50mm)	16	2.120	(53.8)	8012-2.1/4-13-16	M-92	R-62	1.982	(50.3)	2.185	(55.4)
	7-8	2.146	(54.5)	8012-2.1/2-7-8	M-92	R-45-A	2.050	(52.0)	2.335	(59.3)
	9	2.204	(56.0)	8012-2.1/2-9	M-93	R-46-A	2.106	(53.5)	2.380	(60.4)
	10	2.232	(56.6)	8012-2.1/2-10-12	M-93	R-64	2.140	(54.3)	2.407	(61.1)
	11	2.260	(57.4)	8012-2.1/2-10-12	M-93	R-64	2.140	(54.3)	2.407	(61.1)
	12	2.282	(57.9)	8012-2.1/2-10-12	M-93	R-64	2.140	(54.3)	2.407	(61.1)
	13	2.310	(58.6)	8012-2.1/2-13-18	M-94	R-64	2.232	(56.6)	2.450	(62.2)
	14	2.334	(59.2)	8012-2.1/2-13-18	M-94	R-64	2.232	(56.6)	2.450	(62.2)
	15	2.356	(59.8)	8012-2.1/2-13-18	M-94	R-64	2.232	(56.6)	2.450	(62.2)
	16	2.370	(60.1)	8012-2.1/2-13-18	M-94	R-64	2.232	(56.6)	2.450	(62.2)
2 3/4” (69.85mm)	17	2.384	(60.6)	8012-2.1/2-13-18	M-94	R-64	2.232	(56.6)	2.450	(62.2)
	18	2.402	(61.0)	8012-2.1/2-13-18	M-94	R-64	2.232	(56.6)	2.450	(62.2)
	10	2.482	(63.0)	8012-2.3/4-10-16	M-96	R-66	2.390	(60.7)	2.702	(68.6)
	11	2.510	(63.7)	8012-2.3/4-10-16	M-96	R-66	2.390	(60.7)	2.702	(68.6)
	12	2.532	(64.3)	8012-2.3/4-10-16	M-96	R-66	2.390	(60.7)	2.702	(68.6)
	13	2.560	(65.0)	8012-2.3/4-10-16	M-96	R-66	2.390	(60.7)	2.702	(68.6)
14	2.584	(65.6)	8012-2.3/4-10-16	M-96	R-66	2.390	(60.7)	2.702	(68.6)	
15	2.606	(66.1)	8012-2.3/4-10-16	M-96	R-66	2.390	(60.7)	2.702	(68.6)	
16	2.620	(66.5)	8012-2.3/4-10-16	M-96	R-66	2.390	(60.7)	2.702	(68.6)	

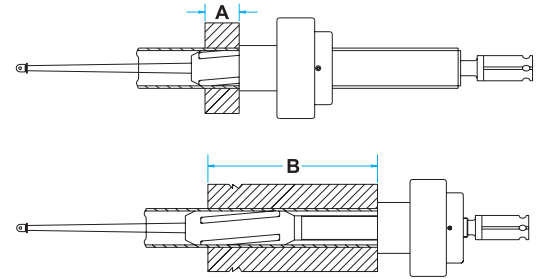
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# "8012" SERIES TUBE EXPANDER



Note: Model 8012-1.3/4-8 to 8012-2.1/2-13-18 expanders come with 3/4" square mandrel drives. Model 8012-2.3/4-10-16 to 8012-5-10-18 expanders come with 1" square mandrel drives.

Tube O.D.	BWG	Tube I.D.		Expander with 2 1/4" (57.15 mm) Long Rollers			Minimum I.D. Tool Enters		Maximum Expansion of Tool	
		inch	mm	Complete Tool	Mandrel	Roll Set	inch	mm	inch	mm
3" (76.20mm)	8	2.670	(67.8)	8012-3-8-9	M-97	R-67	2.560	(65.0)	2.829	(71.8)
	9	2.704	(68.6)	8012-3-8-9	M-97	R-67	2.560	(65.0)	2.829	(71.8)
	10	2.732	(69.3)	8012-3-10-18	M-96	R-67	2.640	(67.0)	2.952	(74.9)
	11	2.760	(70.1)	8012-3-10-18	M-96	R-67	2.640	(67.0)	2.952	(74.9)
	12	2.782	(70.6)	8012-3-10-18	M-96	R-67	2.640	(67.0)	2.952	(74.9)
	13	2.810	(71.3)	8012-3-10-18	M-96	R-67	2.640	(67.0)	2.952	(74.9)
	14	2.834	(71.9)	8012-3-10-18	M-96	R-67	2.640	(67.0)	2.952	(74.9)
	15	2.856	(72.5)	8012-3-10-18	M-96	R-67	2.640	(67.0)	2.952	(74.9)
	16	2.870	(72.8)	8012-3-10-18	M-96	R-67	2.640	(67.0)	2.952	(74.9)
3 1/2" (88.9mm)	17	2.884	(73.3)	8012-3-10-18	M-96	R-67	2.640	(67.0)	2.952	(74.9)
	18	2.902	(73.7)	8012-3-10-18	M-96	R-67	2.640	(67.0)	2.952	(74.9)
	13	3.311	(84.1)	8012-3.1/2-10-18	M-99	R-70	3.190	(81.0)	3.464	(88.0)
	14	3.334	(84.7)	8012-3.1/2-10-18	M-99	R-70	3.190	(81.0)	3.464	(88.0)
	15	3.354	(85.2)	8012-3.1/2-10-18	M-99	R-70	3.190	(81.0)	3.464	(88.0)
4" (101.6mm)	16	3.370	(85.6)	8012-3.1/2-10-18	M-99	R-70	3.190	(81.0)	3.464	(88.0)
	17	3.385	(86.0)	8012-3.1/2-10-18	M-99	R-70	3.190	(81.0)	3.464	(88.0)
	18	3.401	(86.4)	8012-3.1/2-10-18	M-99	R-70	3.190	(81.0)	3.464	(88.0)
	3	3.480	(88.4)	8012-4-3-4	M-100	R-71	3.425	(87.0)	3.780	(96.0)
	4	3.527	(89.6)	8012-4-3-4	M-100	R-71	3.425	(87.0)	3.780	(96.0)
	8	3.670	(93.2)	8012-4-8-9	M-101	R-71	3.582	(91.0)	3.940	(100.0)
	9	3.704	(94.1)	8012-4-8-9	M-101	R-71	3.582	(91.0)	3.940	(100.0)
	10	3.732	(94.8)	8012-4-10-18	M-101	R-72	3.661	(93.0)	3.960	(100.6)
	11	3.760	(95.5)	8012-4-10-18	M-101	R-72	3.661	(93.0)	3.960	(100.6)
4 1/2" (114.3mm)	12	3.783	(96.1)	8012-4-10-18	M-101	R-72	3.661	(93.0)	3.960	(100.6)
	13	3.811	(96.8)	8012-4-10-18	M-101	R-72	3.661	(93.0)	3.960	(100.6)
	14	3.834	(97.4)	8012-4-10-18	M-101	R-72	3.661	(93.0)	3.960	(100.6)
	16	3.870	(98.3)	8012-4-10-18	M-101	R-72	3.661	(93.0)	3.960	(100.6)
	3	3.980	(101.1)	8012-4.1/2-3-4	M-102	R-73	3.940	(100.0)	4.291	(109.0)
	4	4.030	(102.3)	8012-4.1/2-3-4	M-102	R-73	3.940	(100.0)	4.291	(109.0)
	8	4.170	(105.9)	8012-4.1/2-8-9	M-102	R-74	4.020	(102.0)	4.370	(111.0)
	9	4.204	(106.8)	8012-4.1/2-8-9	M-102	R-74	4.020	(102.0)	4.370	(111.0)
5" (127.0mm)	10	4.232	(107.5)	8012-4.1/2-10-18	M-103	R-74	4.100	(104.0)	4.450	(113.0)
	12	4.283	(108.8)	8012-4.1/2-10-18	M-103	R-74	4.100	(104.0)	4.450	(113.0)
	16	4.370	(111.0)	8012-4.1/2-10-18	M-103	R-74	4.100	(104.0)	4.450	(113.0)
	3	4.480	(113.8)	8012-5-3-4	M-105	R-76	4.410	(112.0)	4.763	(121.0)
	4	4.527	(115.0)	8012-5-3-4	M-105	R-76	4.410	(112.0)	4.763	(121.0)
	8	4.670	(118.6)	8012-5-8-9	M-105	R-77	4.566	(116.0)	4.921	(125.0)
5" (127.0mm)	9	4.704	(119.5)	8012-5-8-9	M-105	R-77	4.566	(116.0)	4.921	(125.0)
	10	4.732	(120.2)	8012-5-10-18	M-105	R-78	4.606	(117.0)	4.960	(126.0)
	11	4.763	(121.0)	8012-5-10-18	M-105	R-78	4.606	(117.0)	4.960	(126.0)
	12	4.783	(121.5)	8012-5-10-18	M-105	R-78	4.606	(117.0)	4.960	(126.0)
	14	4.834	(122.8)	8012-5-10-18	M-105	R-78	4.606	(117.0)	4.960	(126.0)
	16	4.870	(123.7)	8012-5-10-18	M-105	R-78	4.606	(117.0)	4.960	(126.0)

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## TUBE END FACERS

Tube O.D.		Tube Thickness BWG	Complete Tool	Spare Tool Bits
Inch	(mm)			
3/8	(9.53)	16-22	TEF-375	TEF-375-BIT
1/2	(12.70)	15-20	TEF-500	TEF-500-BIT
5/8	(15.87)	14-18	TEF-625	TEF-625-BIT
3/4	(19.05)	10-18	TEF-750	TEF-750-BIT
7/8	(22.22)	13-18	TEF-875	TEF-875-BIT
1	(25.40)	11-18	TEF-1000	TEF-1000-BIT
1 1/8	(28.57)	11-18	TEF-1125	TEF-1125-BIT
1 1/4	(31.75)	11-18	TEF-1250	TEF-1250-BIT
1 3/8	(34.92)	11-18	TEF-1375	TEF-1375-BIT
1 1/2	(38.10)	11-18	TEF-1500	TEF-1500-BIT
1 5/8	(41.27)	11-18	TEF-1625	TEF-1625-BIT
1 3/4	(44.45)	11-18	TEF-1750	TEF-1750-BIT
1 7/8	(47.62)	11-18	TEF-1875	TEF-1875-BIT
2	(50.80)	11-18	TEF-2000	TEF-2000-BIT
2 1/4	(57.15)	11-18	TEF-2250	TEF-2250-BIT
2 1/2	(63.50)	11-18	TEF-2500	TEF-2500-BIT

*\*Specify gauge on 3/8" End Facers*

**NOTE: Tube End Facers include pilots, except 3/8"**



Different Pilots for each I.D.

### Features

- Ideal for quick facing of tube ends with the bits easily replaced
- One Tool for each tube OD with pilots provided for the different gauges
- Tool bits coated with Titanium Nitride to give 3 times the life of uncoated HSS bits

## TUBE GUIDES

### Features

Tube Guides are designed to protect the tube ends from damage while guiding them thru the tube sheet and baffles. They are lightweight and fit easily into the tube end with a replaceable nylon brush which also cleans the inside of the tube prior to expanding.

- Available for 1/2" thru 3" OD tubes and all Gauges



#### When Ordering Specify:

- Tube O.D.
- Tube Gauge
- Quantity
- Delivery Date

## TUBE SHEET HOLE BRUSH POWER 200 SERIES

### Features

- Used to clean tube sheet holes to provide a clean surface prior to expanding the tube
- For Tube O.D.'s 1/4" thru 3"
- Available in Carbon or Stainless Steel



#### When Ordering Specify:

- Tube O.D.
- Brush Material Type
- Quantity
- Delivery Date

## TUBE END FLARING

### Features

- Used to flare tube ends after expanding
- Available for tube sizes from 1/4" - 5" OD



#### When Ordering Specify:

- Tube O.D.
- Shank Type - 01 or 06 Shank
- Quantity
- Delivery Date

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## TUBE ROLLING SYSTEMS PNEUMATIC ROLL MOTORS



### Model 720 Series



**Features**

Torque controlled expansion

Available in the following sizes:

- 550 RPM - Torque 2 to 75 in-lbs - 1/4" Sq Drive  
Recommended Max Tube Size - 1/2"
- 1,800 RPM - Torque 2 to 27 in-lbs - 1/4" Sq Drive  
Recommended Max Tube Size - 3/8"
- 2,500 RPM - Torque 2 to 75 in-lbs - 1/4" Sq Drive  
Recommended Max Tube Size - 1/4"

### Model 850 Push/Pull Series



**Features**

Torque controlled expansion

Available in the following sizes:

- 1,250 RPM - Torque 9.6 to 126 in-lbs - 3/8" Sq Drive  
Recommended Tube Size - 3/4"
- 600 RPM - Torque 14.4 to 230 in-lbs - 3/8" Sq Drive  
Recommended Tube Size - 1"

### Model 1050 Series



**Features**

Torque controlled expansion

Available in the following sizes:

- 400 RPM - Torque 3.3 to 26.4 ft-lbs - 1/2" Sq Drive  
Recommended Tube Size - 1 1/4"

### Model 1550 Series



**Features**

Torque controlled expansion

Available in the following sizes:

- 900 RPM - Torque 4.7 to 30.7 ft-lbs - 1/2" Sq Drive  
Recommended Tube Size - 1 1/2"
- 250 RPM - Torque 14.3 to 109.9 ft-lbs - 1/2" Sq Drive  
Recommended Tube Size - 2 1/2"

### Right Angle Drive Roll Motor



**Features**

Designed for expanding boiler tubes in steam, mud drums, fire tube & related equipment.

- 190 RPM - Torque 70 to 140 ft-lbs - 5/8" Sq Drive  
Recommended Tube Size - 2 1/2"
- 90 RPM - Torque 150 to 305 ft-lbs - 3/4" Sq Drive  
Recommended Tube Size - 4"

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## ELECTRIC DRIVE ROLL MOTORS

All our Electric Drive Roll Motors are built by "Milwaukee" to provide maximum life and double insulated for safety.

**Model MPB-0**



**Model MPB-1**



**Model MPB-2**



**Model MPB-3**



Supply Voltage Single Phase	Drive Model	Speed I/II	No Load R.P.M.	Expansion Range				Drive Weight lbs
				Steel Tube O.D.		Copper Tube O.D.		
				inch	mm	inch	mm	
230 V	MPB-0N	I	2200	1/4" - 3/8"	6 - 10	1/4" - 1/2"	6 - 12	4.5
	MPB-1N	I	1000	3/8" - 5/8"	10 - 16	3/8" - 3/4"	13 - 20	5.5
		II	1900	5/16" - 3/8"	8 - 13	5/16" - 1/2"	8 - 13	
	MPG-2N	I	480	5/8" - 1 3/4"	16 - 45	5/8" - 2"	16 - 50	16.5
		II	1080	5/8" - 1 1/4"	16 - 32	5/8" - 1 1/2"	16 - 38	
	MPG-3N	I	130	1" - 3"	25 - 76	1" - 4"	25 - 102	19
II		430	1" - 2"	25 - 50	1" - 3"	25 - 76		
110 V	MPB-0L	I	2200	1/4" - 3/8"	6 - 10	1/4" - 1/2"	6 - 12	4.5
	MPB-1L	I	1000	3/8" - 5/8"	10 - 16	3/8" - 3/4"	13 - 20	5.5
		II	1900	5/16" - 3/8"	8 - 13	5/16" - 1/2"	8 - 13	
	MPG-2L	I	480	5/8" - 1 3/4"	16 - 45	5/8" - 2"	16 - 50	16.5
		II	1080	5/8" - 1 1/4"	16 - 32	5/8" - 1 1/2"	16 - 38	
	MPG-3L	I	130	1" - 3"	25 - 76	1" - 4"	25 - 102	19
II		430	1" - 2"	25 - 50	1" - 3"	25 - 76		

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## TESTING EQUIPMENT



### VLD 2500 VACUUM LEAK DETECTOR

*Pin points leaks in tubes 3/16" to 3" OD*



The **Vacuum Leak Detector VLD-2500** sets the industry standard for locating leaking tubes with its attributes of being Quick, Reliable, Durable, and featuring a Proven Design. Crafted with the end user in mind, it offers virtually foolproof operation and exceptional durability. To utilize, seal off one end of the suspect tube(s) using either a rubber tube plug (available in our Tube Plug section) or the T-Handle equipped with an attached nozzle. Then, insert the Vacuum Leak Detector into the tube to be tested and depress the trigger; any loss of vacuum indicates a leaking tube. The VLD-2500 incorporates a filter system to prevent debris from clogging the tool while in use.

- Easy to operate
- Detects leaks in tubes ranging from 1/4" to 3" OD within seconds
- Optional pads enable testing of tubes up to 6" OD
- Kit comprises VLD-2500 detector gun, 2 nozzles, T-handle, rubber plugs, and carrying case
- Uses standard plant air supplies ranging from 70 psi to 100 psi
- Nozzles are highly flexible for effortless seating onto tubes



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## TESTING EQUIPMENT

### VLD 2500 VACUUM LEAK DETECTOR

*Pin points leaks in tubes 3/16" to 3" OD*



**Complete VLD-2500 consists of:**

- VLD-2500 Vacuum Leak Detector w/Carrying Case
- Nozzle - for 3/16" - 1 1/8" ID Tubes (other sizes Available)
- Extension Tube - 12"
- T-Handle
- Rubber Tube Plugs (Qty 4) - to fit 5/8" 13-24 gauge tubes
- Rubber Tube Plugs (Qty 4) - to fit 3/4" 14-24 gauge tubes
- Rubber Tube Plugs (Qty 4) - to fit 1" 11-24 gauge tubes



Spare Nozzles/Disks		
For Tube ID's	Size	
3/16" - 1 1/8"	1	Nozzle
1 1/8" - 2"	2	
2 - 3"	3	

VLD-2500 VACUUM LEAK DETECTOR ACCESSORIES		
<p><b>Rubber Plugs</b> used to plug opposite end of tube being tested. See Chart Sec. 4, page TP-93.</p>	<p><b>VLD Nozzles</b> - works with VLD and T-Handle for tube sizes:</p> <ul style="list-style-type: none"> <li>• Nozzle for 3/16" to 1-1/8" ID</li> <li>• Nozzle for 1-1/8" to 2" ID</li> <li>• Nozzle for 2" to 3" ID</li> </ul>	<p><b>T-Handle</b> - for use with Nozzles to plug tube end being tested.</p>

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## TLD-2500 USA TUBE LEAK DETECTOR PRESSURE GUNS



### Features

Detect leaks by pressurizing the tube with air while sealing the other end. Insert the guns into the tube to be tested. Activate the pressurizing gun by depressing the trigger; the plugging gun automatically seals the supply when pressurizing. Once the supply pressure is reached, or 100 PSIG (whichever is less), release the trigger. If the pressure holds, the tube is fine; if it drops, the tube is leaking - it's that simple.

- Achieve quick and safe pressure testing of 7 to 8 tubes per minute
- Interchangeable seal sets enable testing of tube IDs from .310" (7.75mm) to 1.2" (30.63mm)
- Utilizes standard plant air supplies from 70 psi to 100 psi
- Operates silently and features an ergonomic design for effortless testing.
- Each Kit packed in easy to carry case & includes:
  - 1 - Pressure & Plugging Gun
  - 1 - Set of Compression Tube / Nozzle for All Tube Sizes
  - 3 - Tube Seal sizes of your choice



**Additional Tube Seals purchased separately must be used with proper compression tube / nozzle.**

## JLD-6500 USA VACUUM JOINT LEAK DETECTOR



### Features

Tests rolled or welded tube sheet joints by vacuum pressure.

Insert nozzle into the tube and press face of the gun into the clean tube sheet joint being tested. Actuate gun to generate the vacuum, if pressure fails to hold...there is a leak.

- Simple, Quick and Reliable testing of up to 7 to 8 tube joints per minute
- Interchangeable seal sets allow testing of tube ID's from .310" (7.75mm) to 1.21" (30.63mm)
- Uses standard plant air supplies from 70 psi to 100 psi
- Silent during use and Ergonomic design makes testing effortless
- Each Kit packed in easy to carry case & includes:
  - 1 - Joint Leak Detector Gun
  - 1 - Set of Compression Collars for All Tube Sizes
  - 3 - Tube Seal sizes of your choice



**Additional Tube Seals purchased separately must be used with proper compression tube / nozzle.**

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## USA TUBE LEAK DETECTOR



Part Number	TUBE I.D. RANGE				Seal O.D.		Washer O.D.		Compression Tube/Nozzle
	Begin		End						
	in	mm	inch	mm	in	mm	in	mm	
TLD-C-SK-0300	0.300	(7.62)	0.405	(10.287)	0.295	(7.493)	0.287	(7.290)	1
TLD-C-SK-0375	0.375	(9.525)	0.475	(12.065)	0.354	(8.992)	0.346	(8.788)	
TLD-C-SK-0480	0.480	(12.192)	0.540	(13.716)	0.457	(11.608)	0.449	(11.405)	
TLD-C-SK-0445	0.445	(11.303)	0.515	(13.081)	0.425	(10.795)	0.417	(10.592)	2
TLD-C-SK-0500	0.500	(12.7)	0.570	(14.478)	0.480	(12.192)	0.472	(11.989)	
TLD-C-SK-0563	0.563	(14.3)	0.630	(16.002)	0.543	(13.792)	0.535	(13.589)	
TLD-C-SK-0626	0.626	(15.9)	0.685	(17.399)	0.606	(15.392)	0.598	(15.189)	
TLD-C-SK-0670	0.670	(17.018)	0.735	(18.669)	0.649	(16.485)	0.642	(16.307)	
TLD-C-SK-0728	0.728	(18.491)	0.795	(20.193)	0.708	(17.983)	0.701	(17.805)	
TLD-C-SK-0795	0.795	(20.193)	0.845	(21.463)	0.775	(19.695)	0.768	(19.507)	
TLD-C-SK-0815	0.815	(20.701)	0.866	(21.996)	0.791	(20.091)	0.783	(19.888)	
TLD-C-SK-0690	0.690	(17.526)	0.755	(19.177)	0.669	(16.993)	0.611	(16.789)	3
TLD-C-SK-0752	0.752	(19.101)	0.810	(20.574)	0.732	(18.593)	0.724	(18.390)	
TLD-C-SK-0874	0.874	(22.200)	0.935	(23.749)	0.854	(21.692)	0.846	(21.488)	
TLD-C-SK-0922	0.922	(23.419)	0.980	(24.872)	0.901	(22.885)	0.894	(22.708)	
TLD-C-SK-0937	0.937	(23.8)	1.001	(25.425)	0.917	(23.292)	0.909	(23.089)	
TLD-C-SK-1010	1.010	(25.654)	1.070	(27.178)	0.992	(25.197)	0.984	(24.994)	
TLD-C-SK-1065	1.065	(27.051)	1.120	(28.448)	1.055	(26.797)	1.047	(26.594)	
TLD-C-SK-1100	1.100	(27.94)	1.160	(29.464)	1.082	(27.483)	1.075	(27.305)	
TLD-C-SK-1160	1.160	(29.464)	1.206	(30.632)	1.149	(29.185)	1.142	(29.007)	

Set comprises 2 seals and 2 washers

*Please call our factory for more information on our Vacuum Joint Leak Detector.*

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## RHINO JR. HYDRAULIC SPEAR TUBE PULLER CAPTAIN AMERICA PULLER — HTPS 1000

### Features

This is really a GREAT Puller and is a fully self-contained Workhorse Designed & Proven to provide years of trouble free service.

- Our “Captain America” puller - Fast, Easy, Dependable pulling unit used to pull stubs or entire tubes with 10 tons of “Power”
- Single person operation and full self-contained system
- Ideally suited for removing 1/4” to 1” OD tubes of all gauges in up to 4” thick tube sheets
- Unit comes complete with Pulling Gun and Hydraulic pump
- Hydraulic Power Unit operates off of 110VAC
- Spring Balancer for “weightless” support of the Pulling Gun (*optional*)

RENTALS AVAILABLE!



### Consumables include the following:



Tube O.D.	BWG	Spears	Nose Piece	Nose Piece Holder	Spearllock	Spearllock Removal Tool	Releasing Tool	Square Drive Connector
1/4"	20-21	HTPS-0250-20/21	HTPS-NP-0250	HTPS-NPH-0250	HTPS-SL-0250	HTPS-SRT	HTPS-RT	HTPS-DS
	22-24	HTPS-0250-22/24						
	28-29	HTPS-0250-28/29						
3/8"	20-21	HTPS-0375-20/21	HTPS-NP-0375	HTPS-NPH-0375	HTPS-SL-0375			
	22-23	HTPS-0375-22/24						
1/2"	16-17	HTPS-0500-16/17	HTPS-NP-0500	HTPS-NPH-0500	HTPS-SL-0500			
	18-19	HTPS-0500-18/19						
	20-21	HTPS-0500-20/21						
5/8"	14-15	HTPS-0625-14/15	HTPS-NP-0625	HTPS-NPH-0625	HTPS-SL-0625			
	16-17	HTPS-0625-16/17						
	18-19	HTPS-0625-18/19						
	20-21	HTPS-0625-20/21						
3/4"	12-13	HTPS-0750-12/13	HTPS-NP-0750	HTPS-NPH-0750	HTPS-SL-0750			
	14-15	HTPS-0750-14/15						
	16-17	HTPS-0750-16/17						
	18-19	HTPS-0750-18/19						
	20-21	HTPS-0750-20/21						
1"	12-13	HTPS-1000-12/13	HTPS-NP-1000	HTPS-NPH-1000	HTPS-SL-1000			
	14-15	HTPS-1000-14/15						
	16-17	HTPS-1000-16/17						
	18-19	HTPS-1000-18/19						
	20-21	HTPS-1000-20/21						

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## RHINO JR. PINE JENNY HOLLOW CORE RAM PULLER

### Features

- One of the most commonly used style of pullers around, used to pull stubs or entire tubes with 30 tons of "Power"
- 6" of pull in single stroke, when used with the "Double Horseshoe Adaptor" can pull up to 12" without resetting
- Proven in performance and usefulness
- Can be used to pull tubes from 1/2" up to 3" of all gauges and tube sheet up to 8" thick
- Foolproof construction and simple to operate



### PINE JENNY HOLLOW CORE RAM, STUB TUGGER ACCESSORIES

#### SPECIAL NOTE

These items will REPLACE & INTERCHANGE with the "Stub Tugger" OR "Pine Jenny" Pullers from other companies

## PINE JENNY STYLE TUBE PULLER SPEARS

### Features

- Compatible with other manufacturers same style (Pine Jenny, Hollow Core Ram, etc...)
- Manufactured to enhance performance & increase longevity
- Available for 1/2" thru 3" tubes of all gauges



**IN-STOCK ITEMS  
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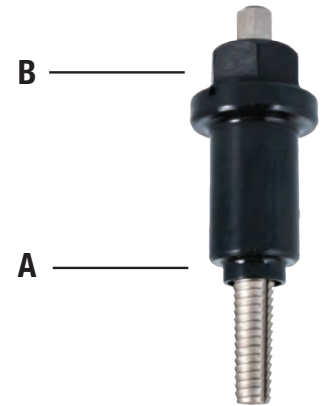
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## RHINO JR. MANUAL TUBE PULLER

### Features

- Used for small, light duty pulling jobs
- Using a wrench screw, screw the spear "A" into the tube then begin pulling by turning nut "B". After tube is free from the tube sheet, remove by unscrewing the spear "A" while holding the tube with channellocks or a pipe wrench.
- Available for 1/4" thru 1 3/8" tubes of all Gauges.



**Order PN's by the following: Example is for 1/2" 16 gauge tube**

**For Complete Tool: MTP-(Tube O.D.)-(Tube Gauge) = MTP-1/2"-16**  
**For Spare Spears: MTPS-(Tube O.D.)-(Tube Gauge) = MTPS-1/2"-16**

## ONE REV INTERNAL TUBE CUTTER & REPLACEMENT BITS

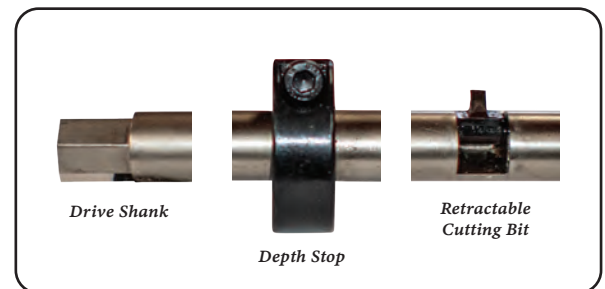


One Revolution Internal Tube Cutters are used for the following applications:

1. The "Piercing" of tubes prior to inserting tube plugs
2. The "Complete Cutting" of ferrous or copper tubes on one end prior to tube removal - can include nonferrous light wall tubes. Used with a wrench, simply adjust the depth collar stop so the cutter bit is past the tube sheet, then rotate in a clockwise direction. After the bit starts cutting, make 1/4 revolution to puncture or one full revolution to cut

### PRODUCT FEATURES:

- Available for 1/2" thru 2-1/2" tubes of all gauges
- Standard reach of 10", longer reaches available
- Bits are made from high quality tool steel and hardened to provide the maximum cutting edge retention
- Available for 1/2" thru 2-1/2" tube cutters
- Directly interchangeable with Airetool Bits



### Order product number by the following:

For Complete Cutter Tool: OR-T-(Tube O.D.)-(Tube Gauge) = OR-T-1/2"-16  
 For Cutter Bits: OR-C-(Tube O.D.)-BIT = OR-C-1/2"-BIT

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## PUSH CUTTER INTERNAL TUBE CUTTER AND REPLACEMENTS



### Features

The Push Type cutter is used to quickly cut tubes in large numbers, they are especially suited for toughest tube cutting applications such as Stainless Steel, Inconel, Monel, Titanium, etc.

The unit can be used with any drill or one of our driving units with the cutting speed regulated for your particular tube material to maximize the cutters life.

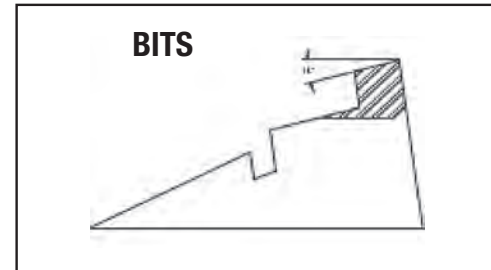
To operate, adjust the collar depth, insert it into the tube, apply power, press inward and the tube will be cut in a few seconds.

- Available for 5/8" thru 1-1/2" tubes of all Gauges
- Bits are easily removed
- Adjustable reaches available: "STD" = 4",  
"A" = 6", "B" = 8", "C" = 10"

Our bits are made from high quality tool steel, hardened, and Titanium Nitrate coated to provide the maximum cutting edge retention.

**Longer reach available upon request.**

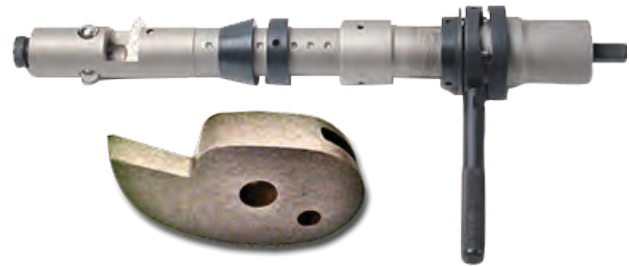
Tube O.D.	Tube Gauge (BWG)	Tube Cutter Model No. (Std. Reach)	Spare Cutting Bit Model No.
5/8"	14 - 22	ATP-625	ATP-625-BIT
3/4"	14 - 22	ATP-750	ATP-750-BIT
7/8"	14 - 22	ATP-875	ATP-875-BIT
1"	12 - 22	ATP-1000	ATP-1000-BIT
1 1/4 "	12 - 22	ATP-1250	ATP-1250-BIT
1 1/2"	12 - 22	ATP-1500	ATP-1500-BIT



## BOILER TUBE CUTTER AND REPLACEMENT BITS

### Features

- PR-68 tube cutters are ideal for cutting thick walled boiler tubes of 2" O.D. and higher
- The unit can be operated with any drill
- For Boiler tube sizes 2" thru 4-1/2" all Gauges
- Available in standard reach of 4", Additionally reaches in increments of 4" are available up to 16"



Tube I.D. Range		Part Number (Reach = 4" 8" 12" or 16") Example: 4" Reach BTC-T-04-1.181-1.378	Tool Model Number	Spare Bit Part Number	Spare Bit Model Number	Max. Tube O.D.		Body Diameter		Drive Square Male
in	mm					in	mm	in	mm	
1.181 - 1.378	(30 - 35)	BTC-T-(REACH)-1.181-1.378	0682901	BTC-C-BIT-1	1682901	1.693	-43	1.142	-29	1/2"
1.378 - 1.575	(35 - 40)	BTC-T-(REACH)-1.378-1.575	0683301			1.890	(48)	1.299	(33)	
1.575 - 1.969	(40 - 50)	BTC-T-(REACH)-1.575-1.969	0683801			2.126	(58)	1.496	(38)	
1.969 - 2.362	(50 - 60)	BTC-T-(REACH)-1.969-2.362	0684801	BTC-C-BIT-2	1684801	2.677	(68)	1.890	(48)	3/4"
2.165 - 2.559	(55 - 65)	BTC-T-(REACH)-2.165-2.559	0685301			2.874	(73)	2.087	(53)	
2.559 - 2.953	(65 - 75)	BTC-T-(REACH)-2.559-2.953	0686301			3.268	(83)	2.480	(63)	
2.953 - 3.346	(75 - 85)	BTC-T-(REACH)-2.953-3.346	0687301	BTC-C-BIT-3	1687301	3.661	(93)	2.874	(73)	
3.346 - 3.740	(85 - 95)	BTC-T-(REACH)-3.346-3.740	0688301			4.055	(103)	3.268	(83)	
3.740 - 4.134	(95 - 105)	BTC-T-(REACH)-3.740-4.134	0689301			4.449	(113)	3.661	(93)	

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## COLLAPSING/KNOCKOUT TOOLS



### CHIPPING HAMMER

**Features**

Chipping Hammer (15 lb. Gun) for use with Tube Drifts/  
Collapsing Tools using the 01 or 06 Shank Style.



### JUMBO RIVET BUSTER

**Features**

Jumbo Rivet Buster (30 lb. Gun) for use with Tube Drifts/Knockout  
Punches using the 15 Shank Style.



### COLLAPSING TOOL



Order PN's by the following: Example is for 3/4" tube with a 06 Shank			
CT-	(Tube OD)-	(Shank)	
CT-	3/4"	06	

**Features**

Collapsing Tools are designed to collapse tubes for removal from the tube sheet using a Chipping Hammer. Manufactured using the highest quality metal and heat treatment available.

- Available in 01 or 06 type shanks
- Stocked sizes from 3/8" thru 2" tube OD's
- Use Reamers for reducing the tube thickness when collapsing heavy gauge tubes.

**When Ordering Specify:**

- Tube O.D.
- Quantity
- Shank Style — 01 or 06
- Delivery Date

### TUBE DRIFTS / KNOCKOUT PUNCHES



Order PN's by the following: Example is for 1" 14 Gauge tube with a 15 Shank			
TD-	(Tube OD)-	(Tube Gauge)-	(Shank)
TD-	1"-	14-	15

**Features**

Tube Drifts/Knockout Punches are designed to knockout tubes from tube sheets using either a Chipping Hammer or Jumbo Rivet Buster. Our Drifts are manufactured using the highest quality metal and heat treatment available, PERIOD!

- Available in 01 or 06 or 15 Shank tool holders
- Stocked sizes from 1/2" thru 2-1/2" tube OD's and all gauges.

**When Ordering Specify:**

- Tube O.D.
- Quantity
- Shank Style — 01, 06 or 15
- Delivery Date
- Gauge

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## BEVELING MACHINES



Portable and easy to use.

### USA Mini

The USA MINI machine is a lightweight yet powerful pipe beveller. A favorite in areas such as power station and Petrochemical plant shut-down work, due to its ease of set-up and speed of operation. This unit is available with the unique “**auto-lock**” function, to set the jaws, just flip the switch — it’s that simple!

**Range:** .78” — 1.65” ID Standard (reduced shaft option from .49’ to .82” ID)

**Functions:** Weld Removal, Beveling, Facing, Counter-boring, Tube or Pipe Prep

**Materials:** Any kind of steel

**Power:** Pneumatic or Electric

Available Bits for Internal and External Beveling (37-1/2 degrees) or Flat Facing.  
Others available upon request.



Portable and easy to use.

### USA Boiler Standard

A very popular versatile machine that is robust and extremely powerful. Used in many industries, but commonly found in tough Petrochemical plant environments. Electric version available or a conversion kit easily changes pneumatic to electric.

**Range:** 0.9” - 4.25” ID

**Functions:** Weld Removal, Beveling, Facing, Counter-boring, Tube or Pipe Prep

**Materials:** Any kind of steel

**Power:** Pneumatic or Electric

Available Bits for Internal and External Beveling (37<sup>1</sup>/<sub>2</sub> degrees) or Flat Facing.  
Others available upon request.



Portable and easy to use.

### USA Superboiler T5

A powerful machine able to produce fast accurate weld preps on any schedule and material of pipe effortlessly. Optional extras include, flange facing attachment.

**Range:** 2” - 8” ID

**Functions:** Weld Removal, Beveling, Facing, Counter-boring, Pipe Prep

**Materials:** Any kind of steel

**Power:** Pneumatic or Electric

Available Bits for Internal and External Beveling (37<sup>1</sup>/<sub>2</sub> degrees) or Flat Facing.  
Others available upon request.

All units are supplied with all gripping segments to cover the full range of the machine as well as service tools, drawings, instruction manual and warranty certificate. Each machine is supplied with a protective metal carrying case.

## Cutting Blades (Bits) For Beveling Machines

Internal Bevel   Flat Facing   External Bevel

**When Ordering Specify:**

- Bit Type(s)
- Quantity
- Delivery Date



Our bits are made of the highest quality tool steel and provide exceptional wear resistance and designed for Internal or External Beveling, Facing, or Weld Removal.

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## CLEANING EQUIPMENT



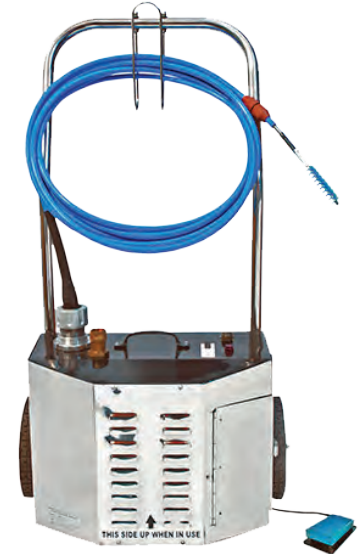
### FSC SERIES PORTABLE ELECTRIC TUBE CLEANERS

#### Features

- Water flushes through the shaft and helps remove deposits from tube, flow rate regulated as needed
- “Hands Free” controls provided via a foot switch
- Stainless steel cover for use in the harshest environments
- Shafts, bits, & brushes quickly & easily replaced
- Large wheels for easy transportation
- Water consumption can be regulated as needed

Electric Tube Cleaners are compact, powerful, reliable, and easily maneuverable units used to clean straight and curved tubes in heat exchangers, condensers, or boilers. They work by attaching a cleaning tool, such as a brush or boring bit onto a flexible shaft. The motor spins the shaft which is enclosed in a non-rotating casing. If needed water is connected to the cleaner and passes through the flexible shaft to flush out deposits from the tube.

All Cleaners are supplied with a foot switch for control.



#### Following models are available:

**MODEL FSC-4 Chiller Tube Cleaning System** — Most commonly used for cleaning up to 5/8” I.D. tubes of chiller units such as Trane, Blue Star, Thermax, Carrier, York and others. 1/2 HP motor @ 890 RPM.

**MODEL FSC-5 Chiller Tube Cleaning System** — Similar to the FSC-4 but has a more powerful 3/4 HP motor @ 890 RPM for removing tougher deposits and comes standard with a dual direction foot switch.

**MODEL FSC-4X Tube Cleaning System** — A Heavy Duty system for tube I.D.’s 1” and larger. This unit is provided with a powerful 1 HP motor @ 1780 RPM.

**MODEL FSC-4X-2A Tube Cleaning System** — Our Heaviest Duty system for the toughest jobs for 1” and larger tubes. This unit is provided with a workhorse 2 HP motor @ 1780 RPM.

Tube I.D. inch	Tube I.D. (mm)	Tube Cleaner	Motor Power hp	Motor Speed RPM	Weight lbs	Dimension		
						High	Wide	Deep
1/4-1	(6.4-25.4)	FSC-4	1/2	890	62	38"(975mm)	21" (535mm)	18" (457mm)
1/4-1	(6.4-25.4)	FSC-5	3/4	890	66	38"(975mm)	21" (535mm)	18" (457mm)
1 & Up	(25.4 & Up)	FSC-4X	1	1780	70	38"(975mm)	21" (535mm)	18" (457mm)
1 & Up	(25.4 & Up)	FSC-4X-2A	2	1780	84	40"(1015mm)	22" (560mm)	19" (482mm)

#### ALL CLEANERS CAN BE ORDERED INDIVIDUALLY OR AS A KIT

#### Each Kit is provided with the following:

- 1 ea - Tube Cleaner
- 1 ea - Foot Control Switch
- 2 ea - Flexible Shafts
- 20 ea - Nylon Brushes of your size choice
- 2 ea - Buffing Tools of your size choice
- 1 ea - Flexible Shaft repair kit

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## CLEANING EQUIPMENT ACCESSORIES

Since the inner core of the shafts are the heart of the system and take most of the strain, we use the highest quality material in our shafts available, ensuring the longest life. When ordering specify tube ID and length required.

Tube I.D. Range inch (mm)	Flexible Shaft	Flexible Shaft Length feet (mtrs)	Shaft Core O.D. inch (mm)	Shaft Casing O.D. inch (mm)	Tool End Thread
7/16 - 1/2 (11.1-12.7)	FS-2	12 (3.7)	1/4 (6.4)	3/8 (9.5)	1/4 - 28 F
		17 (5.2)			
		25 (7.6)			
		35 (10.7)			
		45 (13.7)			
9/16 - 1 (14.3-25.4)	FS-3	12 (3.7)	5/16 (7.9)	1/2 (12.7)	1/4 - 28 F
		17 (5.2)			
		25 (7.6)			
		35 (10.7)			
		45 (13.7)			
		60 (18.3)			
		75 (22.9)			

- Tube sizes 1/4" & 3/8" have 8-32 thread female tooling connectors
- Tube sizes 7/16" thru 1" have 1/4"-28 thread female tooling connectors
- Tube Sizes 1" & larger have 1/4"-28 thread female tooling connectors

## BRUSHES

### USED WITH EITHER THE FLEX-SHAFT CLEANERS OR THE CG 625/1250



#### Nylon Brushes — "N"

Used for removing soft deposits in any tube material, especially useful for final 'finishing' of tubes.



#### Spin Grit — "SN"

Used for removing soft and light scale deposits in any tube material. The Nylon Brushes are impregnated with a Silicon Abrasive Grit to clean and polish.



#### Stainless Steel Brushes — "SS"

Used for removing soft and light scale deposits in carbon steel, stainless steel, monel, titanium, etc.



#### Brass Brushes — "B"

Used for removing soft and light scale deposits in copper, brass, and their alloyed tubes.



#### Flue - Carbon Steel & Nylon Brushes

Carbon Steel is recommended for removing soft and light scale deposits in ferrous tubes and Nylon for final polishing. Flue Brushes 4" & Larger sized in increments.

**SPECIAL NOTE:** Brushes larger than 1" are provided in 1/4" increments up to 8" OD.

#### When ordering, specify:

- Tube ID
- Quantity
- Use <= by 1/16" Increments
- Delivery Date
- Brush type

#### SPIN GRIT SIZES

Tube I.D. inch (mm)	Brush Size
.250-.375 (6.35-9.525)	0500
.375-.500 (9.525-12.7)	0625
.500-.625 (12.7-15.875)	0750
.625-.812 (15.875-20.624)	1000
.812-1.000 (20.624-25.4)	1125

#### NYLON, BRASS, SS SIZES

Tube I.D. inch (mm)	Brush Size
.281-.342 (7.137-8.687)	0250
.343-.405 (8.712-10.287)	0312
.406-.436 (10.312-11.074)	0375
.437-.499 (11.099-12.674)	0437
.500-.561 (12.7-14.249)	0500
.562-.624 (14.274-15.849)	0562
.625-.686 (15.875-17.424)	0625
.687-.749 (17.449-19.024)	0687
.750-.811 (19.05-20.599)	0750
.812-.874 (20.624-22.199)	0812
.875-.936 (22.225-23.774)	0875
.937-.999 (23.799-25.374)	0937
1.000-1.061 (25.4-26.949)	1000

#### NOTE:

1" & smaller tube brush sizes should be equal to or 1/16" smaller than Tube I.D.

Order PN's by the following: Example is for .625 Tube I.D., Nylon Brush  
BRU- (Bristle Type)- (Brush Size)

BRU-	N	0625
------	---	------

Nylon = N Stainless Steel = SS Brass = B Spin Grit = SN

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## CG625/1250 PNEUMATIC TUBE CLEANING GUN

***Cleans plugged tubes or piping safer, faster and cheaper than any other method.***

The Tube Cleaning Gun turns a special brush or drill coupled to a hollow rigid shaft while supplying a stream of water to flush out deposits and increase drilling speed. The water flow is adjustable as needed.

Moderately plugged tubes can be cleaned with our Metal or Nylon brushes. Severely plugged tubes are first drilled out using either an Arrow or Carbide tip drill then followed up with a brush to remove the remaining deposits and "Polish" the tube. The hollow shaft extension tubes can be provided in 2' length increments up to 8', extensions are added to provide the total length needed. Adding extensions is fast and easy.



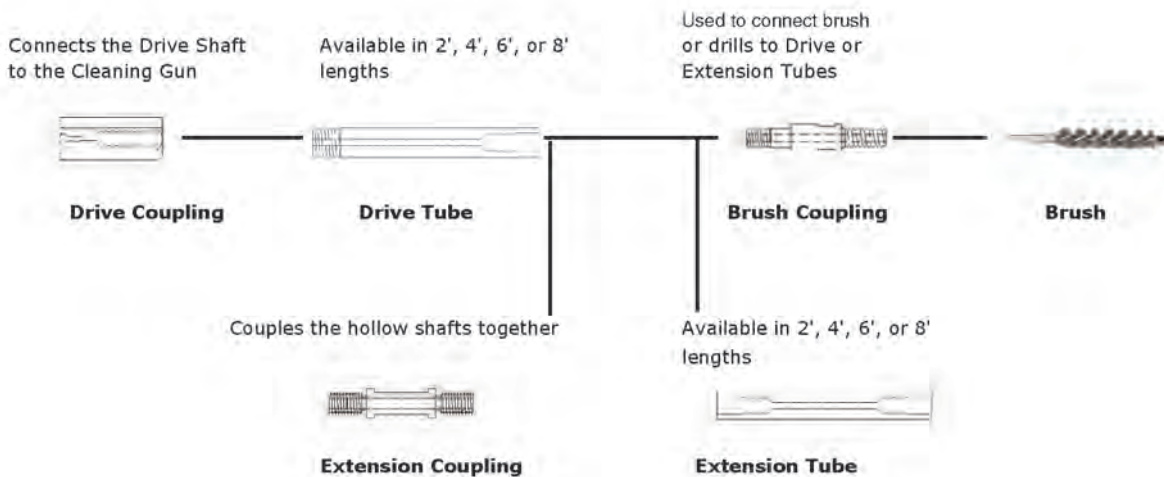
**RENTALS AVAILABLE!**

**Each Kit is provided with the following:**

- 1 ea — Cleaning Gun
- 1 ea — Storage Case
- 2 ea — 10' hoses for air and water connections
- 1 ea — Drive Coupling
- 1 ea — Arrow drill & Brush of your size choice

**When ordering, specify:**

- Tube Size
- Length of Tubing
- Brush or Drill type
- Quantity
- Delivery Date



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## CLEANING GUN TOOLS

Used with either the Flex-Shaft cleaner or the CG 625/1250

- Best suited to remove medium buildup in tubes
- Drills available in 1/16" increments — starting at 1/4" through 1 1/2" Tube I.D.

See CG625/1250 Accessories chart, Page HE-50

**When ordering, specify:**

- Tube I.D.
- Quantity
- Type of Drill
- Delivery Date

### ARROW POINT ALLOY METAL



- Best suited to remove Heavy buildup in plugged tubes
- Drills available in 1/16" increments — starting at 1/4" through 1 1/2" Tube I.D.

See CG625/1250 Accessories chart, Page 50H

**When ordering, specify:**

- Tube I.D.
- Quantity
- Type of Drill
- Delivery Date

### CARBIDE TWIST DRILL



## BUFFING TOOLS

Used with either the Flex-Shaft cleaners or the CG 625/1250

**Buffing Tools** are used for final polishing or removal of light and soft deposits from ferrous and non-ferrous tubes that have been previously cleaned. Used in straight or very large radius tubes in a clockwise direction only.

Tube I.D. inch (mm)	Buffing Tool	With Drill Tip	Replacement Blades	Adjusting Jig
5/16 - 3/8 (7.9 - 9.5)	PTC-203	PTC-203DT	PTC-207	PTC-209
3/8 - 1/2 (9.5 - 12.7)	PTC-204	PTC-204DT	PTC-207	PTC-209
1/2 - 9/16 (12.7 - 14.3)	PTC-205	PTC-205DT	PTC-208A	-
5/8 - 1 (15.9 - 25.4)	PTC-206	PTC-206DT	PTC-208B	-

### Buffing Tool



## TRIANGULAR WIRE SCRAPERS

Used with either the Flex-Shaft cleaners or CG625/1250



Adjustable scrapers for 1" thru 3" ID tubes. Used to remove tough and hard scale deposits.

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## ACCESSORIES FOR CG 625/1250

**TO ORDER  
SELECT THE  
OUTSIDE  
DIAMETER  
AND GAUGE  
WALL OF THE  
TUBE(S)**

**TO ORDER  
SELECT THE  
INSIDE DIAMETER  
OF THE TUBE(S)  
IN THE TUBE I.D.  
SECTION BELOW**

TUBE O.D. (BWG)	TUBE I.D.	DRIVING COUPLING	DRIVING TUBE	TUBE COUPLING	EXTENSION TUBE	BRUSH COUPLING	ARROW POINT		CARBIDE TWIST	BRUSHES
							AP-DRILLS	CTD-DRILLS		
1/4" (23-24)	3/8" (14)	.212-.227	DC-187	DT-187	N/A	N/A	N/A	N/A	CTD-187	S E E
3/8" (14-15)		.228-.243	DC-187	DT-187	N/A	N/A	N/A	N/A	CTD-218	
3/8" (15-16)	1/2" (10)	.244-.259	DC-218	DT-218	TC-218	ET-218	N/A	AP-234	CTD-234	
3/8" (17)	1/2" (11)	.260-.275	DC-218	DT-218	TC-218	ET-218	N/A	AP-250	CTD-250	
3/8" (18)	1/2" (11)	.275-.290	DC-218	DT-218	TC-218	ET-218	N/A	AP-265	CTD-265	
3/8" (19)		.291-.301	DC-250	DT-250	TC-250	ET-250	N/A	AP-281	CTD-281	
3/8" (20-22)	1/2" (13)	.306-.321	DC-250	DT-250	TC-250	ET-250	N/A	AP-296	CTD-296	
1/2" (14)	5/8" (9)	.322-.337	DC-250	DT-250	TC-250	ET-250	N/A	AP-312	CTD-312	
1/2" (14)		.338-.353	DC-250	DT-250	TC-250	ET-250	N/A	AP-328	CTD-328	
1/2" (15-17)	5/8" (10-11)	.359-.389	DC-312	DT-312	TC-312	ET-312	BC-312	AP-343	CTD-343	
1/2" (18)	5/8" (12)	.390-.420	DC-312	DT-312	TC-312	ET-312	BC-312	AP-375	CTD-375	
5/8" (13)		.421-.452	DC-375	DT-375	TC-375	ET-375	BC-375	AP-406	CTD-406	
5/8" (14-15)	3/4" (9-10)	.453-.483	DC-375	DT-375	TC-375	ET-375	BC-375	AP-437	CTD-437	
5/8" (16-17)	3/4" (11)	.484-.514	DC-437	DT-437	TC-437	ET-437	BC-437	AP-468	CTD-437	
5/8" (18)	3/4" (12)	.515-.545	DC-437	DT-437	TC-437	ET-437	BC-437	AP-500	CTD-500	
3/4" (13)		.546-.577	DC-437	DT-437	TC-437	ET-437	BC-437	AP-531	CTD-531	
3/4" (14-15)		.578-.608	DC-437	DT-437	TC-437	ET-437	BC-437	AP-562	CTD-562	
3/4" (14-15)		.578-.608	DC-500	DT-500	TC-500	ET-500	BC-500	AP-562	CTD-562	
3/4" (16-17)	7/8" (11)	.609-.639	DC-500	DT-500	TC-500	ET-500	BC-500	AP-593	CTD-593	
3/4" (18)	7/8" (12)	.640-.675	DC-500	DT-500	TC-500	ET-500	BC-500	AP-625	CTD-625	
7/8" (13)		.676-.706	DC-500	DT-500	TC-500	ET-500	BC-500	AP-656	CTD-656	
7/8" (14-15)	1" (9)	.707-.737	DC-500	DT-500	TC-500	ET-500	BC-500	AP-687	CTD-687	
7/8" (16-17)	1" (10-11)	.738-.769	DC-562	DT-562	TC-562	ET-562	BC-562	AP-718	CTD-718	
7/8" (18)	1" (12)	.770-.800	DC-562	DT-562	TC-562	ET-562	BC-562	AP-750	CTD-750	
1" (13)	1 1/4" (5)	.801-.831	DC-562	DT-562	TC-562	ET-562	BC-562	AP-781	CTD-781	
1" (14-15)	1 1/4" (6)	.832-.862	DC-625	DT-625	TC-625	ET-625	BC-625	AP-812	CTD-812	
1" (16-17)		.863-.894	DC-625	DT-625	TC-625	ET-625	BC-625	AP-843	CTD-843	
1" (18)	1 1/4" (7-8)	.895-.925	DC-625	DT-625	TC-625	ET-625	BC-625	AP-875	CTD-875	
1 1/2" (2)		.926-.956	DC-625	DT-625	TC-625	ET-625	BC-625	AP-906	CTD-906	
1 1/4" (9-10)		.957-.987	DC-625	DT-625	TC-625	ET-625	BC-625	AP-937	CTD-937	
1 1/4" (11)	1 1/2" (3)	.988-1.024	DC-625	DT-625	TC-625	ET-625	BC-625	AP-968	CTD-968	
1 1/4" (12)	1 1/2" (4)	1.025-1.055	DC-625	DT-625	TC-625	ET-625	BC-625	AP-1000	CTD-1000	
1 1/4" (13)	1 1/2" (5)	1.025-1.086	DC-750	DT-750	TC-750	ET-750	BC-750	AP-1031	CTD-1031	
1 1/4" (14-15)	1 1/2" (6)	1.087-1.117	DC-750	DT-750	TC-750	ET-750	BC-750	AP-1062	CTD-1062	
1 1/4" (16-17)	1 1/2" (7)	1.118-1.149	DC-750	DT-750	TC-750	ET-750	BC-750	AP-1093	CTD-1093	
1 1/4" (18)	1 1/2" (8)	1.150-1.180	DC-750	DT-750	TC-750	ET-750	BC-750	AP-1125	CTD-1125	
1 1/2" (9)	1 3/4" (2)	1.181-1.211	DC-750	DT-750	TC-750	ET-750	BC-750	AP-1156	CTD-1156	
1 1/2" (10)	1 3/4" (3)	1.212-1.242	DC-750	DT-750	TC-750	ET-750	BC-750	AP-1187	CTD-1187	
1 1/2" (11)		1.243-1.280	DC-750	DT-750	TC-750	ET-750	BC-750	AP-1218	CTD-1218	
1 1/2" (12)	1 3/4" (4)	1.281-1.311	DC-750	DT-750	TC-750	ET-750	BC-750	AP-1250	CTD-1250	
1 1/2" (13-14)	1 3/4" (5)	1.312-1.342	DC-750	DT-750	TC-750	ET-750	BC-750	AP-1281	CTD-1281	
1 1/2" (15-16)	1 3/4" (6)	1.343-1.374	DC-750	DT-750	TC-750	ET-750	BC-750	AP-1312	CTD-1312	
1 1/2" (17-18)	1 3/4" (7)	1.375-1.405	DC-750	DT-750	TC-750	ET-750	BC-750	AP-1343	CTD-1343	
1 3/4" (8)	2" (1)	1.406-1.436	DC-750	DT-750	TC-750	ET-750	BC-750	AP-1375	CTD-1375	
1 3/4" (9)	2" (2)	1.437-1.467	DC-750	DT-750	TC-750	ET-750	BC-750	AP-1406	CTD-1406	
1 3/4" (10)	2" (3)	1.468-1.499	DC-750	DT-750	TC-750	ET-750	BC-750	AP-1437	CTD-1437	
1 3/4" (11)	2" (4)	1.500-1.530	DC-750	DT-750	TC-750	ET-750	BC-750	AP-1468	CTD-1468	
1 3/4" (12)		1.531-1.561	DC-750	DT-750	TC-750	ET-750	BC-750	AP-1500	CTD-1500	
1 3/4" (13)	2" (5)	1.562-1.592	DC-1000	DT-1000	TC-1000	ET-1000	BC-1000	AP-1531		
1 3/4" (14-15)	2" (6)	1.562-1.592		DT-1000	TC-1000	ET-1000	BC-1000	AP-1562		
1 3/4" (16-17)	2" (7)	1.625-1.655		DT-1000	TC-1000	ET-1000	BC-1000	AP-1593		
1 3/4" (18-19)	2" (8)	1.656-1.686		DT-1000	TC-1000	ET-1000	BC-1000	AP-1625		
1 3/4" (20-21)	2" (9)	1.687-1.717		DT-1000	TC-1000	ET-1000	BC-1000	AP-1656		
2" (10)		1.718-1.749		DT-1000	TC-1000	ET-1000	BC-1000	AP-1687		
2" (11)	2 1/4" (3)	1.750-1.780		DT-1000	TC-1000	ET-1000	BC-1000	AP-1718		
2" (12)	2 1/4" (4)	1.781-1.811		DT-1000	TC-1000	ET-1000	BC-1000	AP-1750		
2" (13-14)	2 1/4" (5)	1.812-1.842		DT-1000	TC-1000	ET-1000	BC-1000	AP-1781		
2" (15-16)	2 1/4" (6)	1.843-1.874		DT-1000	TC-1000	ET-1000	BC-1000	AP-1812		
2" (17-18)	2 1/4" (7)	1.875-1.905		DT-1000	TC-1000	ET-1000	BC-1000	AP-1843		
2" (19-20)	2 1/4" (8)	1.906-1.936		DT-1000	TC-1000	ET-1000	BC-1000	AP-1875		
2" (21-22)	2 1/4" (9)	1.937-1.967		DT-1000	TC-1000	ET-1000	BC-1000	AP-1906		

Note: Larger sizes available, consult factory

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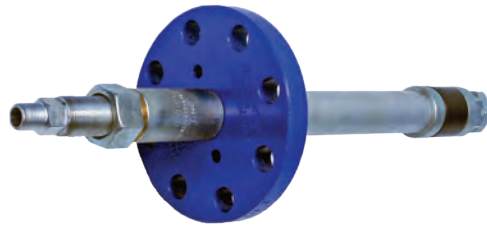
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**Blind Flanges**



**Flange Weld Test Plugs**



**Paddle Blinds**



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**EZ Lock Blind Rack®**  
(PATENT NO. 9,546,889)



**Roll Motors**



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***THE SAFER, FASTER  
& SMARTER  
CHOICE!***



**SNAP  IT™**  
**JR & SR**  
**ENGINEERED TUBE PLUGS**

Meets ASME PCC-2 2018 standards  
For use in heat exchanger, boiler and condenser tubes.



# TUBE PLUGS

*“Plugs from the Tube Plug Pros”*

We offer an extensive range of tube plugs, including our premium **Snap It® Engineered Tube Plugs** designed for superior performance with pressure ratings of up to 7,000 psid and through-the-tube plugging capabilities. Additionally, our metal tapered plugs are available in over 20 stocked metals. Explore our selection of cork, wood, fiber, rubber tapered, and expandable rubber plugs in stock, or let us custom manufacture plugs to match your material and size requirements precisely.

<b>Snap It Jr.</b>		<b>TP-69</b>	<b>Shoulder / Header</b>		<b>TP-79</b>
<b>Snap It Sr.</b>		<b>TP-72</b>	<b>EZ Torque® Gasket</b>		<b>TP-80</b>
<b>Metal Tapered</b>		<b>TP-75</b>	<b>Low &amp; High Pressure Expandable Rubber</b>		<b>TP-81</b>
<b>Two-Piece</b>		<b>TP-76</b>	<b>Threaded Tapered</b>		<b>TP-82</b>
<b>Non-Metal Tapered</b>		<b>TP-77</b>	<b>Zinc Anode</b>		<b>TP-82</b>
<b>Cork</b>		<b>TP-77</b>			
<b>Rubber Tapered</b>		<b>TP-78</b>	<b>Boiler &amp; Condenser Tube Size Charts</b>		<b>TP-83</b>

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# SNAP IT™

**JR & SR**  
ENGINEERED TUBE PLUGS



## SNAP IT® JR - Simply “Snap It” in Place

### THE FASTEST, LEAST EXPENSIVE, AND VERY SAFE WAY TO PLUG TUBES IN REFINERIES, PETRO-CHEMICAL AND POWER PLANTS.

#### “CONSISTENT, CONTROLLED INSTALLATION” & “THROUGH-THE-TUBE PLUGGING CAPABILITIES”

Tube Plugging has never been easier - simply brush the tube end to prepare the surface, insert the plug and “Snap It” in place. The entire procedure takes less than 1 minute per tube.

Snap It Jr. plugs are proven with rated holding pressures of 1,000 psid. When installed properly, these plugs remove all the guess work related to installation. **NO WELDING, NO TUBE SHEET DAMAGE, NO LEAKS, NO WORRY.** Use our complete line of plugging equipment, including tube preparation and installation tools to properly install near or far end applications. “Through-the-tube plugging” saves an enormous amount of time, as neither the channel or floating head covers must be removed.

#### Features and Benefits:

- All tooling is fully compatible with competitor systems
- Safety -
  - High safety factor with blowout pressures exceeding 15,000 PSID (dependent on the tube plug size)
  - Requires no welding, thus eliminating sparks or open flames
  - Design greatly reduces the chance of plugs turning into dangerous projectiles, especially during removal
- Savings, time & expense -
  - No need to remove the rear head cover when through-the-tube plugging is performed
  - Ease, and quickness of installation time per plug takes just a few minutes resulting in a labor cost savings of up to 80+% while greatly reducing downtime
  - Eliminates the possibility of damage to tube sheets and tube sheet ligaments from welding or overdriving a tapered pin
- Guaranteed to provide a leak-free helium seal to  $1 \times 10^{-9}$  c/sec
- When used to plug tubular reactors, due to the plugs design and ability to not hinder the catalyst loading systems it significantly decreases reloading times
- **Ideally suited to plug Fin-Fan® headers** quickly & reliably
- Cost of installation and removal equipment is inexpensive and can be purchased or rented
- Each plug fits multiple tube sizes and is available in numerous materials (see chart).



*Environmentally Superior  
Due to POSITIVE SEALING\*  
with Superior Design!*



*View our video online.*

**WARNING:** Never stand in front of an installed plug under pressure.  
Plugs ejected under pressure can cause serious bodily injury.

## SNAP IT® JR continued

Plug #	Plug Range - Tube ID IN. (mm)	Pin Length IN. (mm)	Brush Kit	Positioner	Pull Rod	Channel Head Pull Rod
JR - 471 - "<>"	0.472 - 0.515 (11.99 - 13.08)	1.63 (41.4)	JRA - 471 - "[ ]"	PP-471	I	CHPRA - "{ }" - I
JR - 491 - "<>"	0.492 - 0.540 (12.50 - 13.72)	1.67 (42.4)	JRA - 491 - "[ ]"	PP-491		
JR - 512 - "<>"	0.513 - 0.562 (13.03 - 14.27)	1.59 (40.3)	JRA - 512 - "[ ]"	PP-512		
JR - 524 - "<>"	0.525 - 0.585 (13.34 - 14.86)	1.28 (32.5)	JRA - 524 - "[ ]"	PP-524		
JR - 555 - "<>"	0.556 - 0.616 (14.12 - 15.65)	1.40 (35.6)	JRA - 555 - "[ ]"	PP-555		
JR - 584 - "<>"	0.585 - 0.649 (14.86 - 16.48)	1.32 (35.5)	JRA - 584 - "[ ]"	PP-584	II	CHPRA - "{ }" - II
JR - 621 - "<>"	0.622 - 0.689 (15.80 - 17.50)	1.57 (39.9)	JRA - 621 - "[ ]"	PP-621		
JR - 649 - "<>"	0.650 - 0.713 (16.51 - 18.11)	1.32 (35.5)	JRA - 649 - "[ ]"	PP-649		
JR - 670 - "<>"	0.671 - 0.740 (17.04 - 18.80)	1.66 (42.2)	JRA - 670 - "[ ]"	PP-670		
JR - 712 - "<>"	0.713 - 0.777 (18.11 - 19.74)	1.32 (35.5)	JRA - 712 - "[ ]"	PP-712		
JR - 735 - "<>"	0.736 - 0.810 (18.69 - 20.57)	1.68 (42.7)	JRA - 735 - "[ ]"	PP-735	III	CHPRA - "{ }" - III
JR - 774 - "<>"	0.775 - 0.838 (19.69 - 21.29)	1.32 (35.5)	JRA - 774 - "[ ]"	PP-774		
JR - 804 - "<>"	0.805 - 0.890 (20.45 - 22.61)	1.7 (43.2)	JRA - 804 - "[ ]"	PP-804		
JR - 837 - "<>"	0.838 - 0.902 (21.29 - 22.91)	1.32 (35.5)	JRA - 837 - "[ ]"	PP-837		
JR - 853 - "<>"	0.854 - 0.949 (21.69 - 24.10)	1.72 (43.7)	JRA - 853 - "[ ]"	PP-853		
JR - 899 - "<>"	0.900 - 0.963 (22.86 - 24.46)	1.32 (35.5)	JRA - 899 - "[ ]"	PP-899		
JR - 919 - "<>"	0.920 - 1.019 (23.37 - 25.88)	1.76 (44.7)	JRA - 919 - "[ ]"	PP-919		
JR - 962 - "<>"	0.963 - 1.027 (24.46 - 26.09)	1.32 (35.5)	JRA - 962 - "[ ]"	PP-962		
JR - 979 - "<>"	0.980 - 1.079 (24.89 - 27.41)	1.82 (46.2)	JRA - 979 - "[ ]"	PP-979		
JR - 1024 - "<>"	1.025 - 1.088 (26.04 - 27.64)	1.32 (35.5)	JRA - 1024 - "[ ]"	PP-1024		
JR - 1054 - "<>"	1.055 - 1.156 (26.80 - 29.31)	1.90 (48.3)	JRA - 1054 - "[ ]"	PP-1054		
JR - 1087 - "<>"	1.088 - 1.152 (27.65 - 29.26)	1.32 (35.5)	JRA - 1087 - "[ ]"	PP-1087		
JR - 1103 - "<>"	1.104 - 1.203 (28.04 - 30.56)	1.90 (48.3)	JRA - 1103 - "[ ]"	PP-1103		
JR - 1149 - "<>"	1.150 - 1.213 (29.21 - 30.81)	1.32 (35.5)	JRA - 1149 - "[ ]"	PP-1149		
JR - 1171 - "<>"	1.172 - 1.270 (29.77 - 32.26)	2.00 (50.8)	JRA - 1171 - "[ ]"	PP-1171		
JR - 1212 - "<>"	1.213 - 1.336 (30.81 - 33.93)	2.00 (50.8)	JRA - 1212 - "[ ]"	PP-1212		

### "<>"

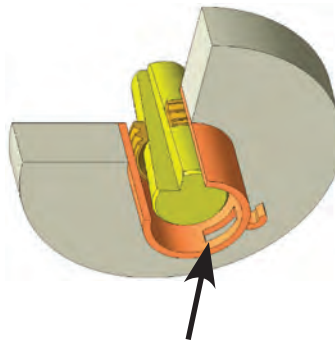
Substitute the suffix "<>" with the following material code: **C** - carbon steel, **S** - 316 stainless steel, **B** - brass, **Y** - Cr/Moly, **M** - monel, **K** - 90/10 CuNi, **J** - 70/30 CuNi. Other materials available.

### "[ ]"

For brass, copper, or copper-nickel tubes add the suffix - **LD** to the Brush Kit Tube Preparation Brushes

### "{ }"

Channel Head Pull Rod Assemblies are available in 2', 4', or 6' lengths. Insert the appropriate # for the length required.



Vent tube using our One Rev tool (see page HE-43)

### WHEN ORDERING, SPECIFY:

- Tube ID or OD and bwg/wall thickness
- Material
- Maximum temperature and pressure
- The type of tube or tube sheet joint (rolled, welded, etc.)
- # of Brush Kits required
- If Pull Rod, Channel Head Pull Rod or Plug Positioner is needed
- Quantity
- Delivery Date

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**VISA**





## SNAP IT® JR PLUG ROLLED TUBE SIZING CHART

	TUBE GAUGE		TUBE O.D. (in.)						
	BWG	WALL THICKNESS	5/8	3/4	7/8	1	1-1/4	1-1/2	
ROLLED I.D.	8	-	-	-	.578	.703	.953	1.203	A V A I L A B L E  U P O N  R E Q U E S T
NEAR END	8	-	-	-	555- "<>"	670- "<>"	919- "<>"	1171- "<>"	
FAR END	8	-	-	-	524- "<>"	649- "<>"	899- "<>"	1171- "<>"	
ROLLED I.D.	9	0.148	-	.484	.609	.734	.984	1.234	
NEAR END	9	0.148	-	471- "<>"	584- "<>"	712- "<>"	979- "<>"	1212- "<>"	
FAR END	9	0.148	-	471- "<>"	555- "<>"	670- "<>"	919- "<>"	1171- "<>"	
ROLLED I.D.	10	0.134	-	.509	.634	.759	1.009	1.259	
NEAR END	10	0.134	-	491- "<>"	621- "<>"	735- "<>"	979- "<>"	1212- "<>"	
FAR END	10	0.134	-	471- "<>"	584- "<>"	712- "<>"	962- "<>"	1171- "<>"	
ROLLED I.D.	11	0.12	-	.534	.659	.784	1.034	1.284	
NEAR END	11	0.12	-	524- "<>"	649- "<>"	774- "<>"	1024- "<>"	1212- "<>"	
FAR END	11	0.12	-	491- "<>"	621- "<>"	735- "<>"	979- "<>"	1212- "<>"	
ROLLED I.D.	12	0.109	-	.554	.679	.804	1.054	1.304	
NEAR END	12	0.109	-	524- "<>"	670- "<>"	774- "<>"	1024- "<>"	1212- "<>"	
FAR END	12	0.109	-	512- "<>"	621- "<>"	735- "<>"	979- "<>"	1212- "<>"	
ROLLED I.D.	13	0.095	-	.579	.704	.829	1.079	1.329	
NEAR END	13	0.095	-	555- "<>"	670- "<>"	804- "<>"	1054- "<>"	1212- "<>"	
FAR END	13	0.095	-	524- "<>"	649- "<>"	774- "<>"	1024- "<>"	1212- "<>"	
ROLLED I.D.	14	0.083	.476	.601	.726	.851	1.101		
NEAR END	14	0.083	471- "<>"	584- "<>"	712- "<>"	837- "<>"	1087- "<>"		
FAR END	14	0.083	-	555- "<>"	670- "<>"	804- "<>"	1054- "<>"		
ROLLED I.D.	15	0.072	.495	.620	.745	.870	1.120		
NEAR END	15	0.072	491- "<>"	584- "<>"	735- "<>"	853- "<>"	1103- "<>"		
FAR END	15	0.072	471- "<>"	584- "<>"	712- "<>"	837- "<>"	1054- "<>"		
ROLLED I.D.	16	0.065	.508	.633	.758	.883	1.133		
NEAR END	16	0.065	491- "<>"	621- "<>"	735- "<>"	853- "<>"	1103- "<>"		
FAR END	16	0.065	471- "<>"	584- "<>"	712- "<>"	837- "<>"	1054- "<>"		
ROLLED I.D.	17	0.058	.521	.646	.771	.896	1.146		
NEAR END	17	0.058	512- "<>"	621- "<>"	735- "<>"	853- "<>"	1103- "<>"		
FAR END	17	0.058	491- "<>"	584- "<>"	735- "<>"	853- "<>"	1103- "<>"		
ROLLED I.D.	18	0.049	.537	.662	.770	.912	1.162		
NEAR END	18	0.049	524- "<>"	649- "<>"	774- "<>"	899- "<>"	1149- "<>"		
FAR END	18	0.049	491- "<>"	621- "<>"	735- "<>"	853- "<>"	1103- "<>"		
ROLLED I.D.	19	0.042	.549	.674	.799	.924	1.174		
NEAR END	19	0.042	524- "<>"	649- "<>"	774- "<>"	899- "<>"	1149- "<>"		
FAR END	19	0.042	512- "<>"	621- "<>"	735- "<>"	853- "<>"	1149- "<>"		
ROLLED I.D.	20	0.035	.562	.687	.812	.937	1.187		
NEAR END	20	0.035	524- "<>"	649- "<>"	774- "<>"	899- "<>"	1149- "<>"		
FAR END	20	0.035	524- "<>"	649- "<>"	774- "<>"	853- "<>"	1149- "<>"		
ROLLED I.D.	21	0.032	.567	.692	.817	.942	1.192		
NEAR END	21	0.032	555- "<>"	670- "<>"	804- "<>"	919- "<>"	1171- "<>"		
FAR END	21	0.032	524- "<>"	649- "<>"	774- "<>"	853- "<>"	1149- "<>"		
ROLLED I.D.	22	0.028	.575	.700	.825	.950	1.200		
NEAR END	22	0.028	555- "<>"	670- "<>"	804- "<>"	919- "<>"	1171- "<>"		
FAR END	22	0.028	524- "<>"	649- "<>"	774- "<>"	919- "<>"	1171- "<>"		
ROLLED I.D.	23	0.025	.580	.705	.830	.955	1.205		
NEAR END	23	0.025	555- "<>"	670- "<>"	804- "<>"	919- "<>"	1171- "<>"		
FAR END	23	0.025	555- "<>"	670- "<>"	804- "<>"	919- "<>"	1171- "<>"		
ROLLED I.D.	24	0.022	.585	.710	.835	.960	1.210		
NEAR END	24	0.022	555- "<>"	670- "<>"	804- "<>"	919- "<>"	1171- "<>"		
FAR END	24	0.022	555- "<>"	670- "<>"	804- "<>"	899- "<>"	1171- "<>"		

All tube inner diameters listed are based upon a 10% wall reduction

NOTES:

- 1) Tube ID's often vary between inlet & outlet due to corrosion and/or erosion, this chart used as Reference only.
- 2) Tube Preparation Brushes are required for use with all Jr Plugs.

Substitute the suffix "<>" with the following material code:

- |                  |                 |                |
|------------------|-----------------|----------------|
| C = Carbon Steel | K = 90/10 CuNi  | N = Nickel 200 |
| B = Brass        | Y = Chrome/Moly | T = Titanium   |
| S = 316 SS       | M = Monel       | H = Hastelloy  |
| J = 70/30 CuNi   | I = Inconel     | Z = Zirconium  |

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# SNAP IT™

**JR & SR**  
ENGINEERED TUBE PLUGS

## SNAP IT® SR - Simply “Snap It” in Place

**FOR SUPER CRITICAL PRESSURE APPLICATIONS**  
“CONSISTENT, CONTROLLED INSTALLATION”

Our Snap It Sr. plugs are rated with holding pressure up to **7,000 PSID**, dependent on plug size. When properly installed, these plugs remove all the guess work related to installation. **NO WELDING, NO TUBE SHEET DAMAGE, NO LEAKS, NO WORRY.** Use our complete line of plugging equipment to properly install.

Tube Plugging has never been easier - simply brush the tube end to prepare the surface, insert the plug and “Snap It” in place. The entire procedure takes less than 1 minute per tube.

### Features and Benefits:

- All tooling is fully compatible with competitor systems
- Safety -
  - High safety factor with blowout pressures exceeding 28,000 PSID (dependent on the tube plug size)
  - Requires no welding, thus eliminating sparks or open flames
  - Design greatly reduces the chance of plugs turning into dangerous projectiles, especially during removal
- Savings, time & expense -
  - Ease, and quickness of installation time per plug takes just a few minutes resulting in a labor cost savings of up to 80+% while greatly reducing downtime
  - Eliminates the possibility of damage to tube sheets and tube sheet ligaments from welding or overdriving a tapered pin
- Guaranteed to provide a leak-free helium seal to  $1 \times 10^{-9}$  c/sec
- Ideally suited to plug Fin-Fan® headers quickly & reliably
- Cost of installation and removal equipment is inexpensive and can be purchased or rented



*Environmentally Superior  
Due to POSITIVE SEALING\*  
with Superior Design!*

PLUG SIZES			PRESSURE RATING	
0.400	→	0.680	=	7000 PSID
0.700	→	0.960	=	4500 PSID
0.980	→	2.000	=	2000 PSID

**WARNING:** Never stand in front of an installed plug under pressure.  
Plugs ejected under pressure can cause serious bodily injury.

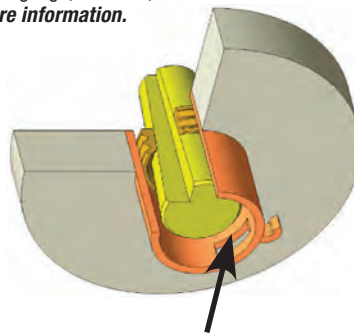


## SNAP IT® SR continued

SR KIT PART NO.	PLUG RANGE - TUBE ID IN. (MM)	BRUSH KIT	POSITIONER	PLUG POSITIONER	PULL ROD ASSEMBLY	CHANNEL HEAD PULL ROD
SR - 400 - "<>"	0.401 - 0.420 (10.16 - 10.68)	SRA - 400 - "[ ]"	PP - 400	PP 400 - 440	I	CHPRA - "{ }" - I
SR - 420 - "<>"	0.421 - 0.440 (10.69 - 11.19)	SRA - 420 - "[ ]"	PP - 420			
SR - 440 - "<>"	0.441 - 0.460 (11.20 - 11.70)	SRA - 440 - "[ ]"	PP - 440			
SR - 460 - "<>"	0.461 - 0.480 (11.71 - 12.21)	SRA - 460 - "[ ]"	PP - 460	PP 460 - 500		
SR - 480 - "<>"	0.481 - 0.500 (12.22 - 12.72)	SRA - 480 - "[ ]"	PP - 480			
SR - 500 - "<>"	0.501 - 0.520 (12.73 - 13.22)	SRA - 500 - "[ ]"	PP - 500			
SR - 520 - "<>"	0.521 - 0.540 (13.23 - 13.73)	SRA - 520 - "[ ]"	PP - 520	PP 520 - 580		
SR - 540 - "<>"	0.541 - 0.560 (13.74 - 14.24)	SRA - 540 - "[ ]"	PP - 540			
SR - 560 - "<>"	0.561 - 0.580 (14.25 - 14.75)	SRA - 560 - "[ ]"	PP - 560			
SR - 580 - "<>"	0.581 - 0.600 (14.76 - 15.26)	SRA - 580 - "[ ]"	PP - 580	II		
SR - 600 - "<>"	0.601 - 0.620 (15.27 - 15.76)	SRA - 600 - "[ ]"	PP - 600		PP 600 - 680	
SR - 620 - "<>"	0.621 - 0.640 (15.77 - 16.27)	SRA - 620 - "[ ]"	PP - 620			
SR - 640 - "<>"	0.641 - 0.660 (16.28 - 16.78)	SRA - 640 - "[ ]"	PP - 640			
SR - 660 - "<>"	0.661 - 0.680 (16.79 - 17.27)	SRA - 660 - "[ ]"	PP - 660		PP 680 - 780	
SR - 680 - "<>"	0.681 - 0.700 (17.28 - 17.79)	SRA - 680 - "[ ]"	PP - 680			
SR - 700 - "<>"	0.701 - 0.720 (17.80 - 18.30)	SRA - 700 - "[ ]"	PP - 700			
SR - 720 - "<>"	0.721 - 0.740 (18.31 - 18.81)	SRA - 720 - "[ ]"	PP - 720		PP 780 - 860	
SR - 740 - "<>"	0.741 - 0.760 (18.82 - 19.32)	SRA - 740 - "[ ]"	PP - 740			
SR - 760 - "<>"	0.761 - 0.780 (19.33 - 19.83)	SRA - 760 - "[ ]"	PP - 760			
SR - 780 - "<>"	0.781 - 0.800 (19.84 - 20.34)	SRA - 780 - "[ ]"	PP - 780	III	CHPRA - "{ }" - III	
SR - 800 - "<>"	0.801 - 0.820 (20.35 - 20.84)	SRA - 800 - "[ ]"	PP - 800			PP 880 - 960
SR - 820 - "<>"	0.821 - 0.840 (20.85 - 21.35)	SRA - 820 - "[ ]"	PP - 820			
SR - 840 - "<>"	0.841 - 0.860 (21.36 - 21.86)	SRA - 840 - "[ ]"	PP - 840			
SR - 860 - "<>"	0.861 - 0.880 (21.87 - 22.37)	SRA - 860 - "[ ]"	PP - 860			PP 980 - 1060
SR - 880 - "<>"	0.881 - 0.900 (22.38 - 22.87)	SRA - 880 - "[ ]"	PP - 880			
SR - 900 - "<>"	0.901 - 0.920 (22.88 - 23.38)	SRA - 900 - "[ ]"	PP - 900			
SR - 920 - "<>"	0.921 - 0.940 (23.39 - 23.87)	SRA - 920 - "[ ]"	PP - 920			PP 1080 - 1160
SR - 940 - "<>"	0.941 - 0.960 (23.88 - 24.40)	SRA - 940 - "[ ]"	PP - 940			
SR - 960 - "<>"	0.961 - 0.980 (24.41 - 24.89)	SRA - 960 - "[ ]"	PP - 960			
SR - 980 - "<>"	0.981 - 1.000 (24.90 - 25.40)	SRA - 980 - "[ ]"	PP - 980	PP 1080 - 1160		
SR - 1000 - "<>"	1.001 - 1.020 (25.41 - 25.91)	SRA - 1000 - "[ ]"	PP - 1000			
SR - 1020 - "<>"	1.021 - 1.040 (25.92 - 26.42)	SRA - 1020 - "[ ]"	PP - 1020			
SR - 1040 - "<>"	1.041 - 1.060 (26.43 - 26.92)	SRA - 1040 - "[ ]"	PP - 1040	PP 1080 - 1160		
SR - 1060 - "<>"	1.061 - 1.080 (26.93 - 27.43)	SRA - 1060 - "[ ]"	PP - 1060			
SR - 1080 - "<>"	1.081 - 1.100 (27.44 - 27.94)	SRA - 1080 - "[ ]"	PP - 1080			
SR - 1100 - "<>"	1.101 - 1.120 (27.95 - 28.45)	SRA - 1100 - "[ ]"	PP - 1100	PP 1080 - 1160		
SR - 1120 - "<>"	1.121 - 1.140 (28.46 - 28.96)	SRA - 1120 - "[ ]"	PP - 1120			
SR - 1140 - "<>"	1.141 - 1.160 (28.97 - 29.46)	SRA - 1140 - "[ ]"	PP - 1140			
SR - 1160 - "<>"	1.161 - 1.180 (29.47 - 29.97)	SRA - 1160 - "[ ]"	PP - 1160			

NOTES: Standard Sr. Kit includes 10 plugs, 1 Brush and 1 "GO/NO GO" gauge; however, plugs and items can be ordered individually. **Consult factory for more information.**

<b>"&lt;&gt;"</b>
Substitute the suffix "<>" with the following material code: <b>C</b> - carbon steel, <b>S</b> - 316 stainless steel, <b>B</b> - brass, <b>Y</b> - Cr/Moly, <b>M</b> - monel, <b>K</b> - 90/10 CuNi, <b>J</b> - 70/30 CuNi. Other materials available.
<b>"[ ]"</b>
For brass, copper, or copper-nickel tubes add the suffix - <b>LD</b> to the Brush Kit Tube Preparation Brushes
<b>"{ }"</b>
Channel Head Pull Rod Assemblies are available in 2', 4', or 6' lengths. Insert the appropriate # for the length required.



Vent tube using our One Rev tool (see page HE-43)

WHEN ORDERING, SPECIFY:

- Tube ID
- Material
- Maximum temperature and pressure
- The type of tube or tube sheet joint (rolled, welded, etc.)
- If Pull Rod, Channel Head Pull Rod or Plug Positioner is needed
- Quantity
- Delivery Date

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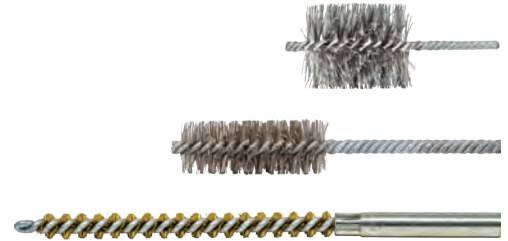


# SNAP IT® JR & SR TOOLS

## TUBE PREPARATION

Use our special **brushes** to properly prep the tube for optimum sealing & holding forces — see Plug Size charts.

- Jr. Brush Kits come with 3 or 4 brushes per kit, dependent on plug size. Use the smallest brush in the kit that effectively cleans and preps the tube.
- Sr. brushes are provided for the specific tube size ordered.



## INSTALLATION TOOLS

**Hydraulic Tool** — THE SIMPLEST, SAFEST AND EASIEST WAY TO INSTALL SNAP IT SR. OR JR. PLUGS! The Snap It Installation Kit is compact and lightweight (ram weighs just 7 lbs) yet has plenty of power to easily install all of our plugs. The pump is air driven and requires 80 to 120 lbs. of supply air @ 20 CFM during the few seconds it is operated and comes in a durable storage case on wheels. When ordering the complete kit - it comes with everything needed for installing Jr. or Sr. plugs for near end applications.

Through-the-tube plugging is performed with this tool by adding the appropriate number of extension assemblies with a Channel Head Pull Rod Assembly and following the “through-the-tube” instructions. Peace of mind — when you order this complete kit.

**Pull Rod Assembly** — used with the Hydraulic RAM, this installs the plug(s) in place. Our assemblies are fully interchangeable with competitor systems and have been designed to minimize your costs by utilizing multiple plug positioners with each pull rod size — See Plug Size Chart.

**Channel Head Pull Rod Assemblies & Extension Sets** — Used to operate the system and easily install plugs where Channel Heads are present. Also these are used in conjunction with the extension sets for "through-the-tube" plugging — See Plug Size chart.



## REMOVAL TOOL

**Plug Removal Tool** — designed to easily and quickly remove installed plugs. The Plug Removal Tool removes both the pin and ring in seconds without damage to the tube it was installed in. Simply screw the Spear Stud into the installed pin, dislodge the pin with the slide hammer, screw the spear into the ring, then use the slide hammer to pull out all the pieces.

If required, a new plug can then be reinstalled in the same place!

**NOTE:** Contact Factory for Sizing Details.



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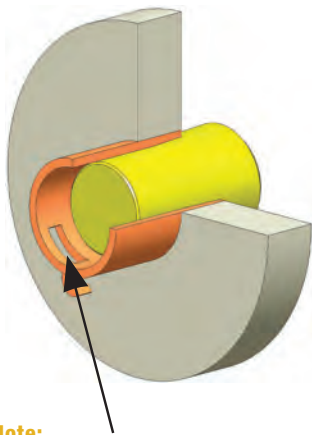
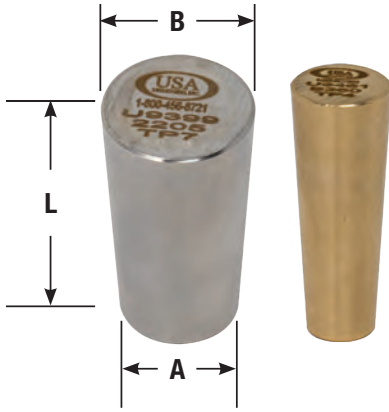
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## METAL TAPERED TUBE PLUGS

*"Any Metal, Any Size" The Mother of All Plugs*



**Note:**

Always puncture the tube before installing any plug to ensure that pressure cannot build up in the tube and cause the plugs to loosen or blow out.

For puncturing tubes, see our One Rev Cutters on page HE-73.

**WHEN ORDERING, SPECIFY:**

- TP# based on size of your plug (see chart)
- Material of construction
- For custom plugs, provide "A" "B" & "L" dimensions
- Quantity
- Delivery Date

ALUMINUM BRONZE	ALLOY 20	2205 DUPLEX
Carbon Steel: A-36, A-105, LF2, 1018, 1200	Chrome / Moly: F-5, F-9, F-22	Stainless Steel: 204, 316, 321, 416, 17-4
Brass: 360, Naval, Admiralty	Copper-Nickel: 90 / 10, 70 / 30	Monel: 400, 405, 500
Inconel: 600, 625, 800	Hastelloy: B2, C276	Titanium
Special materials available such as: Ferrallium, Nitronic, Tantalum, Waspalloy, Zircalloy, Zirconium and many more.		

PART NO.	TUBE O.D. (in.)	GAUGE	DIMENSION (in.) + / - .005		
			"A" Small End	"B" Large End	"L" Length
TP - 1 - "<>"	1/4	18 - 24	0.141	0.235	1-1/4
	3/8	12 - 14			
TP - 2 - "<>"	3/8	15 - 24	0.213	0.371	1-3/4
	1/2	13 - 15			
TP - 3 - "<>"	1/2	15 - 24	0.337	0.495	
	5/8	12 - 14			
TP - 4 - "<>"	5/8	14 - 24	0.449	0.625	
	3/4	10 - 14			
TP - 5 - "<>"	3/4	14 - 24	0.564	0.750	
	7/8	10 - 13			
TP - 6 - "<>"	1	8 - 9	0.706	0.875	
	7/8	15 - 24			
TP - 7 - "<>"	1	10 - 15	0.776	0.934	
	1	13 - 18			
TP - 8 - "<>"	1	18 - 24	0.892	1.050	
	1-1/8	13 - 17			
TP - 9 - "<>"	1-1/8	15 - 24	0.949	1.125	2
	1-1/4	10 - 14			
TP - 10 - "<>"	1-1/4	13 - 19	1.010	1.186	
TP - 11 - "<>"	1-1/4	19 - 24	1.147	1.323	
TP - 12 - "<>"	1-1/2	10 - 24	1.200	1.495	
TP - 13 - "<>"	1-1/2	14 - 24	1.305	1.600	
	1-3/4	6 - 13			
TP - 14 - "<>"	1-3/4	14 - 22	1.575	1.870	3
	2	6 - 13			
TP - 15 - "<>"	2	12 - 22	1.700	1.995	
TP - 16 - "<>"	2-1/4	6 - 13	1.805	2.100	
TP - 17 - "<>"	2-1/2	5 - 18	2.000	2.375	
TP - 18 - "<>"	2-3/4	4 - 10	2.232	2.500	
TP - 19 - "<>"	3	5 - 12	2.524	2.834	4
	3	10 - 23			
TP - 20 - "<>"	3	10 - 23	2.625	3.000	
TP - 21 - "<>"	3-1/4	7 - 14	2.875	3.125	
TP - 22 - "<>"	3-1/4	13 - 23	3.010	3.250	
TP - 23 - "<>"	3-1/2	7 - 12	3.125	3.375	
TP - 24 - "<>"	3-1/2	13 - 23	3.260	3.500	
TP - 25 - "<>"	3-3/4	5 - 12	3.274	3.567	
TP - 26 - "<>"	3-3/4	13 - 23	3.510	3.750	
TP - 27 - "<>"	4	5 - 12	3.524	3.817	
TP - 28 - "<>"	4	13 - 23	3.782	4.000	

"<>" = replace "<>" with material of construction required - see Chart above.

**WARNING:** Never stand in front of an installed plug under pressure. Plugs ejected under pressure can cause serious bodily injury.

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## METAL TAPERED TWO-PIECE TUBE PLUGS



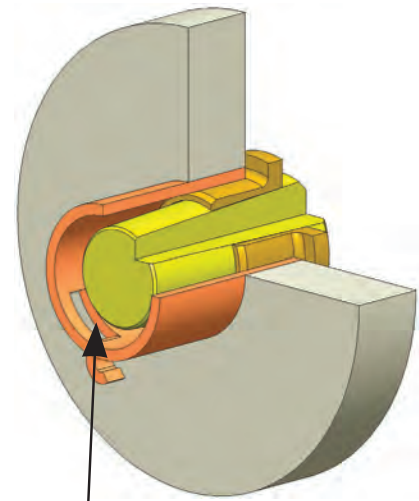
Designed to minimize damage to the tube sheet while sealing off leaky condenser and exchanger tubes - **Installation is Simple!** Insert ring into the tube, insert pin into the ring, hammer until properly sealed. Like the Metal Tapered plugs, these can be removed with a pipe wrench.

**For more consistent & controlled installation, see our "Snap It" line of plugs on page TP-2**

Available in sizes from 3/8" to 2" tubes

- Stocked materials: brass, carbon steel and stainless steel
- Custom sizes and materials available upon request

TUBE O.D. (in.)	TUBE I.D. RANGE	PIN SIZE	RING SIZE
3/8	0.283 - 0.377	TP - 1	TPR - 0375
1/2	0.283 - 0.377	TP - 1	TPR - 0500 - 1
	0.384 - 0.503	TP - 2	TPR - 0500 - 2
5/8	0.384 - 0.503	TP - 2	TPR - 0625 - 2
	0.480 - 0.635	TP - 3	TPR - 0625 - 3
3/4	0.480 - 0.635	TP - 3	TPR - 0750 - 3
	0.616 - 0.759	TP - 4	TPR - 0750 - 4
1	0.616 - 0.759	TP - 4	TPR - 1000 - 4
	0.730 - 0.840	TP - 5	TPR - 1000 - 5
	0.830 - 1.008	TP - 6	TPR - 1000 - 6
1-1/8	0.730 - 0.840	TP - 5	TPR - 1125 - 5
	0.830 - 1.008	TP - 6	TPR - 1125 - 6
	0.930 - 1.130	TP - 7	TPR - 1125 - 7
1-1/4	0.930 - 1.130	TP - 7	TPR - 1250 - 7
	0.992 - 1.261	TP - 8	TPR - 1250 - 8
1-1/2	1.180 - 1.240	TP - 9	TPR - 1500 - 9
	1.242 - 1.342	TP - 10	TPR - 1500 - 10
	1.344 - 1.495	TP - 11	TPR - 1500 - 11
	1.380 - 1.510	TP - 12	TPR - 1500 - 12
2	1.680 - 1.856	TP - 13	TPR - 2000 - 13
	1.742 - 2.020	TP - 14	TPR - 2000 - 14



**Note:**

Always puncture the tube before installing any plug to ensure that pressure cannot build up in the tube and cause the plugs to loosen or blow out.

For puncturing tubes, see our One Rev Cutters on page HE-73.

### LOC-TITE

**Loc-Tite is used to help set and keep plugs in place!**



WHEN ORDERING, SPECIFY:

- Tube O.D.
- Tube I.D. (tube wall gauge thickness if unable to use a micrometer (mic))
- Material
- Quantity
- Delivery Date

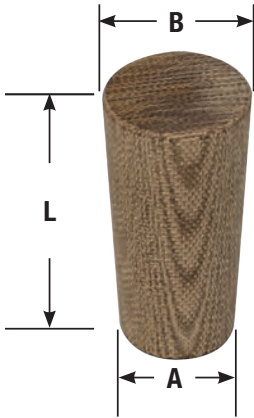
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## NON-METAL TAPERED TUBE PLUGS

**\*SEE DIMENSIONS ON PAGE TP-8 CHART**  
(Metal Tapered Tube Plug chart)



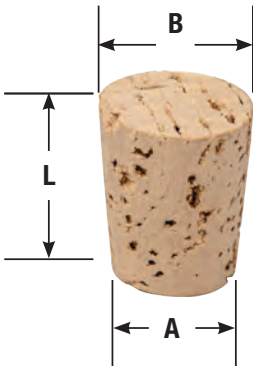
Available in fiber (Phenolic or Micarta) or wood. These plugs are safe, easy to use, corrosion resistant, and easily removed. Slightly hammer the plug into the tube, it will expand by hyroscopic action to make an excellent seal and will not damage the tube sheet.

- Rated up to 230° F
- Order by Tube Size and Gauge
- Use our standard sizes or Yours

**WHEN ORDERING, SPECIFY:**

- TP# based on size of your plug (see chart)
- Material of construction
- For custom plugs, provide "A" "B" & "L" dimensions
- Quantity
- Delivery Date

## CORK TUBE PLUGS



**WHEN ORDERING, SPECIFY:**

- TP# based on size of your plug (see chart)
- Material of construction
- For custom plugs, provide "A" "B" & "L" dimensions
- Quantity
- Delivery Date

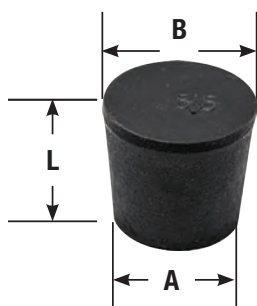
PART NO.	A	B	L
	DIMENSIONS (in.)		
TP - 0000 - C	0.094	0.187	0.500
TP - 000 - C	0.156	0.250	
TP - 00 - C	0.219	0.313	
TP - 0 - C	0.281	0.375	
TP - 1 - C	0.328	0.438	0.625
TP - 2 - C	0.375	0.500	0.688
TP - 3 - C	0.422	0.563	0.750
TP - 4 - C	0.468	0.625	0.813
TP - 5 - C	0.531	0.687	0.875
TP - 6 - C	0.578	0.750	0.938
TP - 7 - C	0.625	0.813	1.00
TP - 8 - C	0.672	0.875	1.063
TP - 9 - C	0.734	0.938	1.125
TP - 10 - C	0.766	1.000	1.250
TP - 11 - C	0.828	1.063	
TP - 12 - C	0.891	1.125	
TP - 13 - C	0.953	1.188	
TP - 14 - C	1.016	1.250	
TP - 15 - C	1.078	1.313	

**IN-STOCK ITEMS  
SHIP SAME DAY**

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## RUBBER TAPERED TUBE PLUGS



Used for low pressure isolation or vacuum testing applications *(especially with our Vacuum Leak Detector VLD-2500 - see Section 3, page HE-32).*

Stocked sizes range from 5/16" tube I.D. through 4-3/4" tube I.D. The plugs are made of neoprene and are reusable.

Temperature range: -25°F to +180°F (-31°C to 82°C).

WHEN ORDERING, SPECIFY:

- TP# based on size of your plug (see chart)
- Quantity
- Delivery Date

PART NO.	TUBE O.D. (in.)	GAUGE	DIMENSION (in.) + / - .005			DIMENSION (mm.) + / - .127		
			"A" SMALL	"B" LARGE	"L" LENGTH	"A" SMALL	"B" LARGE	"L" LENGTH
TP - 000 - R	1/2	14 - 24	0.313	0.500	0.875	7.950	12.700	22.225
TP - 00 - R	5/8	13 - 24	0.406	0.594	1.000	10.312	15.088	25.400
TP - 0 - R	3/4	11 - 17	0.500	0.656		12.700	16.662	
TP - 1 - R	3/4	14 - 24	0.563	0.750		14.300	19.050	
TP - 2 - R	7/8	11 - 17	0.625	0.781		15.875	19.837	
TP - 3 - R	7/8	15 - 24	0.719	0.938		18.263	23.825	
	1	10 - 19						
TP - 4 - R	1	11 - 24	0.750	1.000		19.050	25.400	
	1-1/8	7 - 14						
TP - 5 - R	1-1/8	13 - 19	0.906	1.063		23.012	27.000	
TP - 5 - 1/2 - R	1-1/8	16 - 24	0.969	1.109		24.613	28.169	
	1-1/4	10 - 13						
TP - 6 - R	1-1/4	13 - 24	1.031	1.250		26.187	31.750	
TP - 6 - 1/2 - R	1-3/8	7 - 16	1.063	1.344		27.000	34.138	
TP - 7 - R	1-3/8	14 - 24	1.188	1.438		30.175	36.525	
TP - 7 - 1/2 - R	1-1/2	7 - 20	1.125	1.500		28.575	38.100	
TP - 8 - R	1-1/2	14 - 24	1.312	1.625		33.325	41.275	
	1-5/8	10 - 20						
TP - 8 - 1/2 - R	1-5/8	16 - 24	1.406	1.688		35.712	42.875	
TP - 9 - R	1-3/4	10 - 20	1.469	1.750		37.313	44.450	
TP - 9 - 1/2 - R	1-3/4	12 - 24	1.500	1.813		38.100	46.050	
TP - 10 - R	2	7 - 15	1.625	1.969	41.275	50.013		
TP - 10 - 1/2 - R	2	12 - 20	1.750	2.078	44.450	52.781		
TP - 11 - R	2	18 - 24	1.875	2.203	47.625	55.956		
	2-1/4	8 - 18						
TP - 11 - 1/2 - R	2-1/2	8 - 14	2.000	2.469	50.800	62.713		
TP - 12 - R	2-1/2	12 - 18	2.125	2.500	53.975	63.500		
TP - 13 - R	2-3/4	6 - 13	2.281	2.688	57.937	68.275		
TP - 13 - 1/2 - R	2-3/4	12 - 18	2.438	2.969	61.925	75.413		
	3	6 - 16					34.925	
TP - 14 - R	3	12 - 18	3.000	3.500	76.200	88.900	25.400	
TP - 15 - R	3-1/2	13 - 18	3.250	4.000	82.550	101.600	38.100	
TP - 16 - R	4	7 - 18	3.500	5.000	88.900	127.000	25.400	

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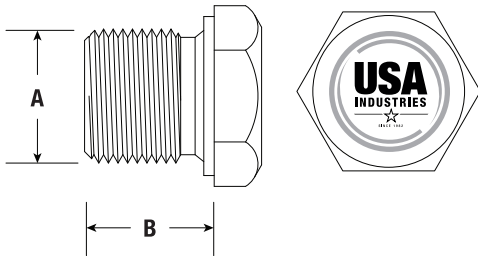
## SHOULDER / HEADER PLUGS

Made for Fin-Fan® header boxes and available in carbon steel (coated or uncoated), stainless steel, brass and other materials.

- Sizes available for 5/8" through 2" tube
- When ordering, specify the plug diameter & length (verify the thread and hex sizes are correct)
- Custom sizes & material available upon request
- Length under head available 3/4" - 3"
- Specify your needs for custom orders



**Environmentally Superior Due to POSITIVE SEALING\* with Superior Design!**



**WHEN ORDERING PLUGS, SPECIFY:**

- Plug Threaded Hole Size (Plug Diameter)
- UNF Size (threads per inch)
- Length under Head
- Material of Construction
- Quantity
- Delivery Date

**WHEN ORDERING GASKETS, SPECIFY:**

- Flat Gasket or EZ Torque
- Plug Threaded Hole Size
- Material of Construction
- Quantity
- Delivery Date

**\* MINIMUM TORQUE VALUES FOR AISI 1008 MATERIAL - CONSULT FACTORY FOR OTHER MATERIAL VALUES**

TYPICAL O.D. (in.)	"A" PLUG DIAMETER (in.)	TYPICAL U.N.F. THREAD	"B" LENGTH UNDER **HEAD	HEX SIZE	FLAT GASKET		EZ TORQUE® GASKET	
					STOCK #	TORQUE FT/LBS	STOCK #	TORQUE FT/LBS
5/8	3/4	16	3/4 - 1-1/2	1	SP - G - 0750 - "<>"	200	SP - G - EZ - 0750 - "<>"	*90 - 130
3/4	7/8	14		1-1/8	SP - G - 0875 - "<>"	265	SP - G - EZ - 0875 - "<>"	*130 - 180
7/8	1	12		1-1/4	SP - G - 1000 - "<>"	300	SP - G - EZ - 1000 - "<>"	*150 - 200
1	1-1/8			1-3/8	SP - G - 1125 - "<>"	395	SP - G - EZ - 1125 - "<>"	*160 - 210
1-1/8	1-1/4			1-1/2	SP - G - 1250 - "<>"	490	SP - G - EZ - 1250 - "<>"	*230 - 310
1-1/4	1-3/8			1-5/8	SP - G - 1375 - "<>"	580	SP - G - EZ - 1375 - "<>"	*290 - 380
1-3/8	1-1/2			1-3/4	SP - G - 1500 - "<>"	690	SP - G - EZ - 1500 - "<>"	*330 - 450
1-1/2	1-5/8			1-7/8	SP - G - 1625 - "<>"	800	SP - G - EZ - 1625 - "<>"	*400 - 530
1-5/8	1-3/4			2	SP - G - 1750 - "<>"	900	SP - G - EZ - 1750 - "<>"	*450 - 600
1-3/4	1-7/8			2-1/8	SP - G - 1875 - "<>"	1000	SP - G - EZ - 1875 - "<>"	*540 - 700
1-7/8	2			2-1/4	SP - G - 2000 - "<>"	1100	SP - G - EZ - 2000 - "<>"	*610 - 810
2	2-1/8			2-3/8	SP - G - 2125 - "<>"	1200	SP - G - EZ - 2125 - "<>"	*680 - 910

\* Torque values based on proper installation. \*\* Typically stocked lengths

**Substitute the suffix "<>" with the following material code:**

- |                  |                 |                          |
|------------------|-----------------|--------------------------|
| C = Carbon Steel | Y = Chrome/Moly | H = Hastelloy            |
| B = Brass        | M = Monel       | Z = Zirconium            |
| S = 316 SS       | I = Inconel     |                          |
| J = 70/30 CuNi   | N = Nickel 200  | *Other alloys available. |
| K = 90/10 CuNi   | T = Titanium    |                          |

Note 1: All values listed in Ft / lbs are recommended minimum torque values

Note 2: The Recommended Minimum Torque Values for the Flat Gaskets are based on ideal sealing surface conditions, meeting ASME Specs. Typically encountered surface area imperfections do not affect the values given for EZ Torque® Gaskets.

Note 3: The Minimum Recommended Torque Values given for EZ Torque® Gaskets are higher than the Theoretical Torque Values to ensure Thread Locking.

Available Coatings: Cadmium, Electroless Nickel, Galvanized, Nickel, Zinc or Uncoated. Other coatings available.

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**WARNING:** Never stand in front of an installed plug under pressure. Plugs ejected under pressure can cause serious bodily injury.

**IN-STOCK ITEMS  
SHIP SAME DAY**

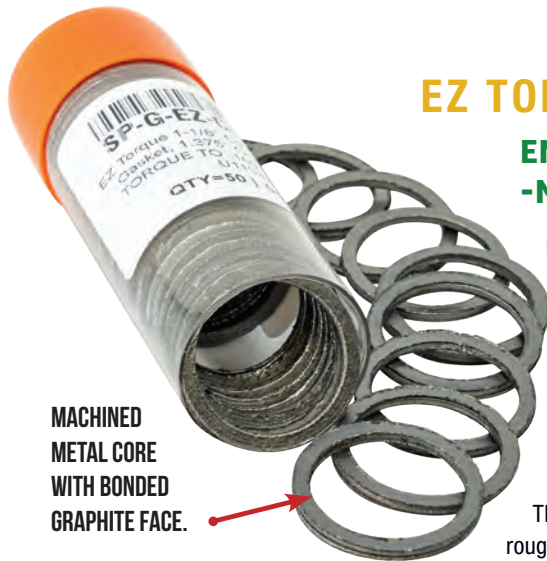
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# EZ TORQUE® SURE SEAL GASKETS

**ENVIRONMENTALLY SUPERIOR  
-NO LEAKS | POSITIVE SEALING\***



**MACHINED METAL CORE WITH BONDED GRAPHITE FACE.**

USA Industries' EZ Torque Sure Seal Gaskets are designed to provide a positive seal and require less than half the installation torque required for typical soft iron gaskets. Lower torque means no more stripping of threads which prevents the gasket from sealing.

Our innovative design incorporates a graphite outer shell over a special machined metal inner core. The labyrinth design allows the graphite to be compressed and held in place, sealing against imperfections on the surface area. Due to the compressive load stored in the gasket's design, leaks due to typical thermal cycling are eliminated.

The graphite outer shell virtually eliminates the need to remachine the gasket surface areas due to roughness, nicks or scratches typically found in the field.

Nominal Size (in)	EZ Torque Gasket ID (in)	Gasket OD (in)	AISI 1008		304 Stainless		316 Stainless		Nickel 200		Monel 400		2205 Duplex	
			Recommended Torque (lbs-ft)											
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
5/8	0.641	0.875	50	70	50	70	50	70	30	40	40	60	90	130
3/4	0.766	1.000	90	130	100	140	110	150	60	80	80	110	190	270
7/8	0.891	1.125	130	180	140	190	150	200	90	120	110	150	260	350
1	1.016	1.250	150	200	170	230	180	240	110	150	140	190	310	420
1 1/8	1.141	1.375	160	210	180	240	190	250	110	150	140	190	330	440
1 1/4	1.266	1.500	230	310	260	350	270	360	160	220	210	280	480	650
1 3/8	1.391	1.625	290	380	320	420	340	450	200	260	260	340	590	770
1 1/2	1.516	1.750	330	450	370	500	390	530	230	310	300	410	680	920
1 5/8	1.641	1.875	400	530	440	580	460	610	280	370	350	460	810	1070
1 3/4	1.766	2.000	450	600	500	670	530	710	310	420	400	540	930	1250
1 7/8"	1.891	2.125	540	700	600	780	630	820	370	480	480	620	1110	1440
2"	2.016	2.250	610	810	680	900	710	940	430	570	540	710	1260	1670
2 1/8"	2.141	2.375	680	910	750	1000	790	1050	470	630	600	800	1390	1850

**NOTE:** The minimum recommended torque values given for EZ Torque Gaskets are higher than the theoretical torque values to ensure thread locking.

## BENEFITS

- Low torque design
- Eliminates stripping the threads by over-torquing to seal
- No environmental leaks
- Virtually eliminates field remachining
- Cost effective. Low cost of ownership.
- Saves time. During removal, graphite prevents gasket from seizing to header or plug.
- Graphite eliminates atmospheric corrosion
- Metal core available in any material type - 316SS, Inconel, Hastelloy, Nickel, etc.
- Can be used with existing plugs in the field
- Self-aligning when used with USA Industries, Inc.'s manufactured plugs
- Quick delivery - Available 24/7-365

**See Chart on page TP-79 for size and part number**

### When Ordering Gaskets Specify:

Plug Threaded Hole Size • Material of Construction  
Quantity • Delivery Date

#### Material codes:

C = Carbon	K = 90/10 CuNi	N = Nickel
B = Brass	Y = Chrome/Moly	T = Titanium
S = 316SS	M = Monel	H = Hastelloy
J = 70/30 CuNi	I = Inconel	Z = Zirconium

Other alloys available.

\* Based on proper installation.

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SHIP SAME DAY**

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# LOW & HIGH PRESSURE INTERNAL AND FLANGED TUBE PLUGS

The tube condenser plug that gives you **“Performance Under Pressure”** - up to 150 psi. Standard sizes listed in stock, giving you same day shipping on most plugs. Special sizes and plugs trimmed to your requirements are available upon request. The plugs are inserted into the tubing (*if flanged, mate flange up to the tube*) finger-tighten and then secure with the appropriate socket wrench unit the proper seal is made.

- Made of neoprene
- Grade K-2247-CF, ASTM-BC 412 45+/-5 Durometer hardness
- Resistant to oil and gasoline
- Temperature range: -45°F to +300°F (-43°C to 149°C)
- Easy to use and reusable
- Rated to 150 psi when installed properly
- Safety lanyards can be installed (*at an additional cost*) to assure operator’s protection
- Specify hardware: carbon steel, stainless steel, brass



WHEN ORDERING, SPECIFY:

- TP# based on size of your plug (see chart)
- Specify Internal or Flanged
- Specify Single or Double Seal
- Hardware (CS, SS, BRASS)
- Quantity
- Delivery Date

**Note:**  
Always puncture the tube before installing any plug to ensure that pressure cannot build up in the tube and cause the plugs to loosen or blow out.

For puncturing tubes, see our One Rev Cutters on page HE-43.

FOR TUBE I.D.'S		PRESSURE RATING			
		120	150	120	150
(in.)	(mm)	INTERNAL SINGLE SEAL	INTERNAL DOUBLE SEAL	FLANGED SINGLE SEAL	FLANGED DOUBLE SEAL
1/2 - 5/8	12 - 16	EP-IS-0500	EP-ID-0500	EP-FS-0500	EP-FD-0500
5/8 - 3/4	16 - 19	EP-IS-0625	EP-ID-0625	EP-FS-0625	EP-FD-0625
3/4 - 7/8	19 - 22	EP-IS-0750	EP-ID-0750	EP-FS-0750	EP-FD-0750
7/8 - 1	22 - 25	EP-IS-0875	EP-ID-0875	EP-FS-0875	EP-FD-0875
1 - 1-1/8	25 - 29	EP-IS-1000	EP-ID-1000	EP-FS-1000	EP-FD-1000
1-1/8 - 1-1/4	29 - 32	EP-IS-1125	EP-ID-1125	EP-FS-1125	EP-FD-1125
1-1/4 - 1-3/8	32 - 35	EP-IS-1250	EP-ID-1250	EP-FS-1250	EP-FD-1250
1-3/8 - 1-1/2	35 - 38	EP-IS-1375	EP-ID-1375	EP-FS-1375	EP-FD-1375
1-1/2 - 1-5/8	38 - 41	EP-IS-1500	EP-ID-1500	EP-FS-1500	EP-FD-1500
1-5/8 - 1-3/4	41 - 45	EP-IS-1625	EP-ID-1625	EP-FS-1625	EP-FD-1625
1-3/4 - 1-7/8	45 - 48	EP-IS-1750	EP-ID-1750	EP-FS-1750	EP-FD-1750
1-7/8 - 2	48 - 51	EP-IS-1875	EP-ID-1875	EP-FS-1875	EP-FD-1875
2 - 2-1/8	51 - 54	EP-IS-2000	EP-ID-2000	EP-FS-2000	EP-FD-2000
2-1/8 - 2-1/4	54 - 57	EP-IS-2125	EP-ID-2125	EP-FS-2125	EP-FD-2125
2-1/4 - 2-3/8	57 - 60	EP-IS-2250	EP-ID-2250	EP-FS-2250	EP-FD-2250

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## THREADED TAPERED TUBE PLUGS

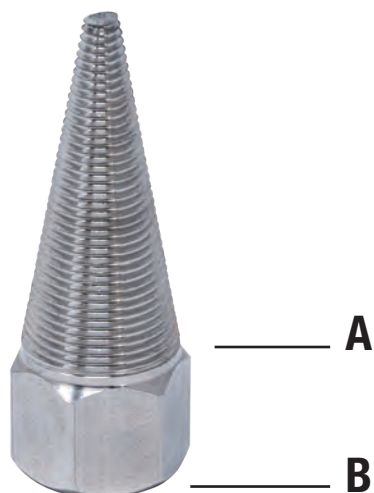
### Plugs Holes Through Sides or Ends of Piping, Tubing, or Vessels

A fast and simple way to stop leaks in tanks, pipes, etc. Threaded plugs are manufactured using heat treated alloy steel or stainless steel. To install, use a standard Hex wrench or socket.

- Self tapping
- Stocked in: alloy steel and stainless steel

#### WHEN ORDERING, SPECIFY:

- TP# Based on size of your plug (see chart)
- Material of Construction
- Quantity
- Delivery Date



FOR HOLE SIZES UP TO	PART NO.	"A" LARGE END	"B" HEX SIZE (in.)
0.350	TTP-0375	.365	3/8
0.450	TTP-0500	.480	1/2
0.580	TTP-0625	.615	5/8
0.710	TTP-0750	.730	3/4
0.835	TTP-0875	.855	7/8
0.950	TTP-1000	.975	1
1.150	TTP-1125	1.100	1-1/8
1.200	TTP-1250	1.220	1-1/4
1.320	TTP-1375	1.345	1-3/8
1.450	TTP-1500	1.470	1-1/2

## ANODE PLUGS

### Zinc Corrosion Plugs

USA INDUSTRIES' zinc plugs help protect heat exchangers, pipelines, tanks, pumps and many other pieces of equipment from corrosion. The zinc rod is consumed by any electrolytic action that would otherwise attack and corrode equipment.

NOTE: For sizes larger than 1" NPT use 1" part numbers and install in a reducing bushing.

#### WHEN ORDERING, SPECIFY:

- Length of Anode
- Size of plug (see chart)
- Quantity
- Delivery Date



SIZE NPT (in.)	ROD DIAMETER (in.)	ROD LENGTH (in.)	PART NO.
1/4	1/4	1	AP-0250-1
1/4	1/4	2	AP-0250-2
1/4	1/4	3	AP-0250-3
1/4	1/4	6	AP-0250-6
3/8	3/8	2	AP-0375-2
3/8	3/8	3	AP-0375-3
3/8	3/8	6	AP-0375-6
1/2	1/2	3	AP-0500-3
1/2	1/2	6	AP-0500-6
1/2	1/2	8	AP-0500-8
3/4	3/4	4	AP-0750-4
3/4	3/4	6	AP-0750-6
3/4	3/4	8	AP-0750-8
1	1	4	AP-1000-4
1	1	6	AP-1000-6
1	1	10	AP-1000-10
1	1	14	AP-1000-14

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# TUBE SERIES (B.W.G.)

## All Dimensions Shown in Inches

TUBE O.D. (in.)	TUBE GAUGE																								TURF ID.		
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24	
	WALL THICKNESS (in.)																										
0.380	0.340	0.300	0.284	0.259	0.238	0.220	0.203	0.180	0.165	0.148	0.134	0.120	0.109	0.095	0.083	0.072	0.065	0.058	0.049	0.042	0.035	0.032	0.028	0.025	0.022		
1/4											0.010	0.032	0.060	0.084	0.106	0.120	0.134	0.152	0.166	0.180	0.186	0.194	0.200	0.206			
3/8								0.015	0.045	0.079	0.107	0.135	0.157	0.185	0.209	0.231	0.245	0.259	0.277	0.291	0.305	0.311	0.319	0.325	0.331		
1/2					0.024	0.060	0.094	0.140	0.170	0.204	0.232	0.260	0.282	0.310	0.334	0.356	0.370	0.384	0.402	0.416	0.430	0.436	0.444	0.450	0.456		
5/8		0.025	0.057	0.107	0.149	0.185	0.219	0.265	0.295	0.329	0.357	0.385	0.407	0.435	0.459	0.481	0.495	0.509	0.527	0.541	0.555	0.561	0.569	0.575	0.581		
3/4	0.070	0.150	0.182	0.232	0.274	0.310	0.344	0.390	0.420	0.454	0.482	0.510	0.532	0.560	0.584	0.606	0.620	0.634	0.652	0.666	0.680	0.686	0.694	0.700	0.706		
7/8	0.115	0.195	0.307	0.357	0.399	0.435	0.469	0.515	0.545	0.579	0.607	0.635	0.657	0.685	0.709	0.731	0.745	0.759	0.777	0.791	0.805	0.811	0.819	0.825	0.831		
1	0.240	0.320	0.400	0.432	0.524	0.560	0.594	0.640	0.670	0.704	0.732	0.760	0.782	0.810	0.834	0.856	0.870	0.884	0.902	0.916	0.930	0.936	0.944	0.950	0.956		
1-1/8	0.365	0.445	0.525	0.557	0.607	0.649	0.685	0.719	0.765	0.795	0.829	0.857	0.885	0.907	0.935	0.959	0.981	0.995	1.009	1.027	1.041	1.055	1.061	1.069	1.075	1.081	
1-1/4	0.490	0.570	0.650	0.682	0.774	0.810	0.844	0.890	0.920	0.954	0.982	1.010	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	0.740	0.820	0.900	0.932	1.024	1.060	1.094	1.140	1.170	1.204	1.232	1.260	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	0.990	1.070	1.150	1.182	1.274	1.310	1.344	1.390	1.420	1.454	1.482	1.510	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	1.240	1.320	1.400	1.432	1.524	1.560	1.594	1.640	1.670	1.704	1.732	1.760	1.782	1.810	1.834	1.856	1.870	1.884	1.902	1.916	1.930	1.936	1.944	1.950	1.956		
2-1/4	1.490	1.570	1.650	1.682	1.774	1.810	1.844	1.890	1.920	1.954	1.982	2.010	2.032	2.060	2.084	2.106	2.120	2.134	2.152	2.166	2.180	2.186	2.194	2.200	2.206		
2-1/2	1.740	1.820	1.900	1.932	1.982	2.024	2.058	2.104	2.134	2.168	2.198	2.228	2.258	2.288	2.318	2.348	2.378	2.384	2.402	2.416	2.430	2.436	2.444	2.450	2.456		
2-3/4	1.990	2.070	2.150	2.182	2.232	2.274	2.308	2.354	2.384	2.418	2.448	2.478	2.508	2.538	2.568	2.598	2.628	2.634	2.652	2.666	2.680	2.686	2.694	2.700	2.706		
3	2.240	2.320	2.400	2.432	2.482	2.524	2.558	2.604	2.634	2.668	2.698	2.728	2.758	2.788	2.818	2.848	2.878	2.884	2.902	2.916	2.930	2.936	2.944	2.950	2.956		
3-1/4	2.490	2.570	2.650	2.682	2.732	2.774	2.808	2.854	2.884	2.918	2.948	2.978	3.008	3.038	3.068	3.098	3.128	3.134	3.152	3.166	3.180	3.186	3.194	3.200	3.206		
3-1/2	2.740	2.820	2.900	2.932	2.982	3.024	3.058	3.104	3.134	3.168	3.198	3.228	3.258	3.288	3.318	3.348	3.378	3.384	3.402	3.416	3.430	3.436	3.444	3.450	3.456		
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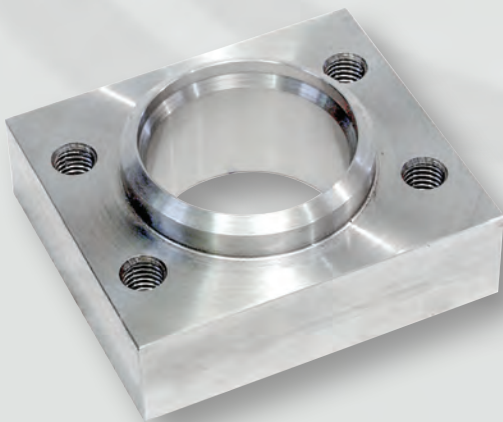
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