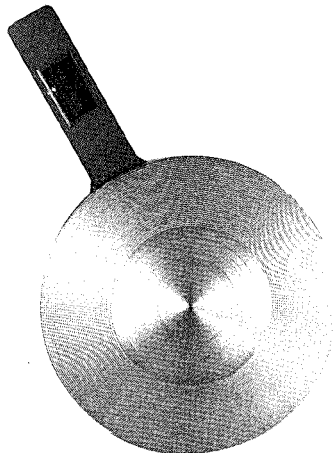


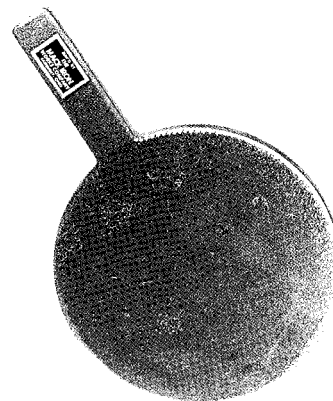
## VARIOUS BLINDS AND RELATED PRODUCTS

### SINGLE/LINE BLINDS OR BLANKS



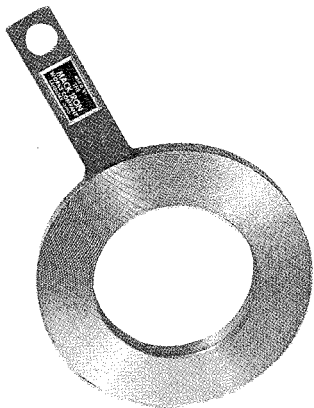
A positive shut-off device normally installed adjacent to, or in conjunction with, a valve. Their purpose is to prevent accidental flow through a pipeline or into a vessel. With the exception of cast iron, plastic, or fiberglass service, they are not drilled with bolt holes, but fit inside the bolt circle of mating flanges. Pipeline blinds or blanks are **NOT** the same as bolting blind flanges shown in ANSI B16.5 and similar specifications. Mack Iron Single Blinds use standard gaskets and do not require special mating flanges or "O" ring gaskets.

### VAPOR BLINDS



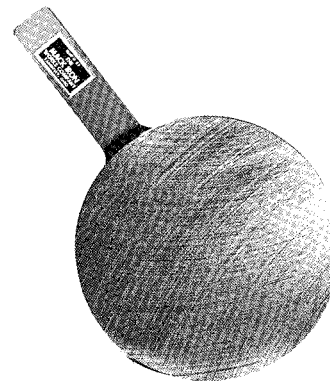
Similar to a Single Blind, but thin, normally 1/8" (3mm) to 5/16" (8mm) thick. These are positive sealing devices intended to prevent accidental flow or leakage of vapor into a pipeline or vessel, usually while the system is evacuated for service. These units are **NOT** designed to be subject to differential pressure.

### RING SPACERS



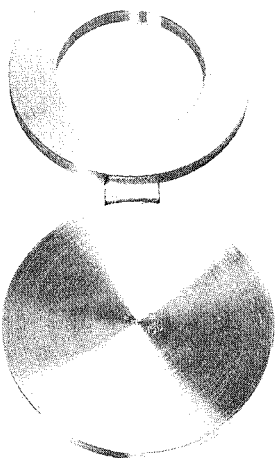
Spacers are bored to the matching pipe I.D. and are of the same thickness as the Single Blind it replaces. When removing a Single Blind, either the flanges and associated piping must be pulled together to seal the line, or a Ring Spacer must be installed to fill the gap. Thick Single Blinds or rigid piping systems normally require Ring Spacers.

### TEST BLANKS



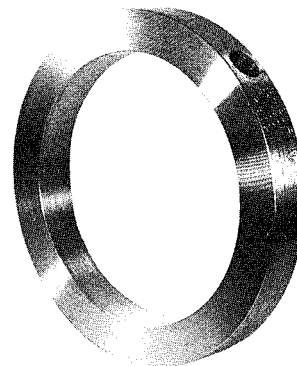
These are specially designed blanks used for hydrostatic or other incompressible fluid testing purposes only. Their advantage is cost and weight savings since higher allowable stress values (or lower safety factors) are used in their design.

### SPECTACLE BLINDS



A combination of a Single Blind and a Ring Spacer fabricated, for field convenience, as a single unit. Weight limitations and the associated difficulty of handling heavy pieces in the field are the primary considerations in specifying a Spectacle or Figure Eight Blind over separate components. When supplied with a bolt hole in the tie bar, Spectacle Blinds can simply be rotated around a bolt to change Blind/Spacer orientation. Tie bars may be integral, single or double, and of material different from the Single Blind and Spacer, unless otherwise specified.

### BLEED RINGS



A ring section with one or more radial piping connections. These are designed to fit between standard flanges, using conventional gasketing materials. They provide a convenient method of draining piping, taking samples, or attaching instrumentation.



*Little tag...  
Big meaning...*



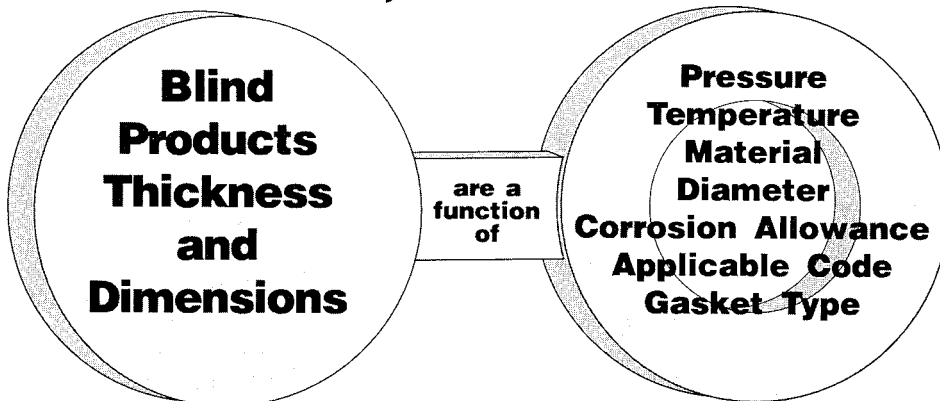


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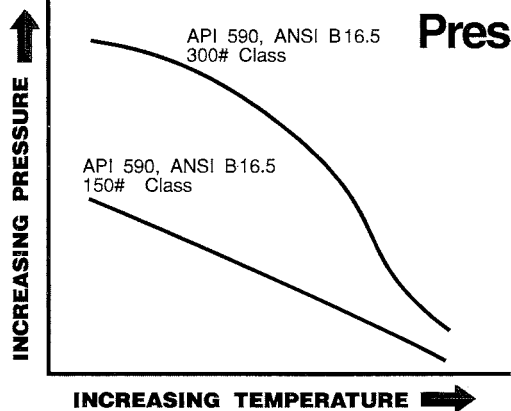
## DESIGN OF SINGLE BLINDS, RING SPACERS, SPECTACLE BLINDS, AND ASSOCIATED PRODUCTS



The American Petroleum Institute (API) Standard 590, entitled **Steel Line Blanks**, is a purchasing specification for single blinds, ring spacers, and spectacle blinds. API 590, together with the series of ASME/ANSI standards / specifications it references, standardizes the design of blind/spacer products by establishing design equations, acceptable materials, pressure/temperature ratings, gasket

surfaces, markings, and other requirements. More specifically, thicknesses of these items result from the use of ASME/ANSI B31.3, design equations and allowable stresses. Other dimensions within API 590 result from a necessary dimensional compatibility with the *bolted* flanges and components with which blind/spacer products are used.

Mack Iron standard catalog blind and spacer products, sizes 24" and smaller, are in full compliance with **API 590** (pgs. 27, 28, 29). As an alternative, because there are numerous design situations for blind and spacer products in which API 590 is not specified nor required, Mack Iron also offers ASME/ANSI B31.3 designed products (pg. 30) and the capability of designing to our customers' desired criteria. Non-catalog designs require the customer to supply design information (see pg. 26).



### Pressure/Temperature Rating

Line blind/spacer product design, using API 590 or the ANSI bolted flange classifications as design conditions, results in an inversely related pressure/temperature rating. That is, the higher the operating temperature for a particular material, the lower the allowable usable pressure. For example, a 150# A515 Gr 70 flange at 100° F, has an allowable pressure of 285 psig; while at 800° F the allowable pressure is only 80 psig. **Cost effective** line blind design considers *actual design conditions* and *applicable code allowances*.

### ENGINEERED PIPING SPECIALITIES CAN SAVE YOU MONEY

Line blind products can be designed to correspond to full API, ANSI, or other Code rating, or they may be designed to the actual pressure/temperature combination. *By designing to a point which falls below the curve, as illustrated on the graph, required thicknesses can be reduced - saving both money and weight.*

In addition, some Codes allow for a less conservative design in specific applications. *By taking advantage of applicable code allowances, required thicknesses may be reduced - saving both money and weight.*



Consult  
**MACK IRON**  
Engineering  
for your  
**BEST**  
Line Blind Design  
Call  
419 626-MACK



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## REQUIRED BLIND/SPACER SPECIFYING INFORMATION

### 1 Product Name / Description

### 2 Nominal Pipeline Size

### 3 Adjacent Flange Class and Type

e.g. 150#, MSS SP-44  
(if using ANSI B16.47, Specify Series A or B)

### 4 Material

Specification may be general, e.g. carbon steel, stainless steel - or it may be specific, e.g. SA515 Gr 70, A240 Type 304.

Plate material is normally used, but forgings are available with longer deliveries and generally higher prices.

### 5 Design Parameters

API 590

or

- Design Pressure
- Design Temperature
- Design Code  
(e.g. 600 psig, 200° F, ANSI B31.1)

or

Specified Thickness

### 6 Gasket Surface/Finish

See Below

### 7 Special Dimensions

### 8 Corrosion Allowance

### 9 Other Applicable Codes

### 10 Is this a Test Blank Only?

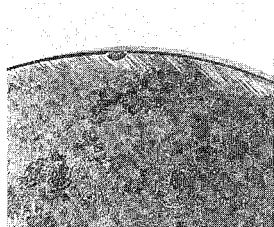
(Applies to Incompressible Fluids Only)

### 11 Special Identity or Tagging Requirements

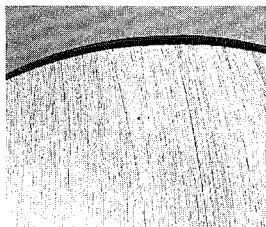
### 12 Special Instructions

Documentation, Testing, NDE, Customer Drawing, Lifting Device, etc.

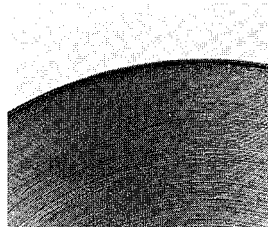
## Gasket Surface Finish



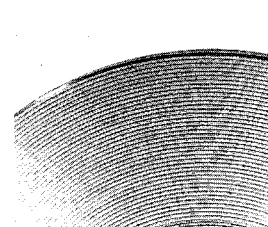
**MILL FINISH** - Some scale & light rust are apparent, surfaces may not be flat or parallel, slag removed.  
**DEBURRED & DESCALED**  
- Improvement to mill, loose scale removed.



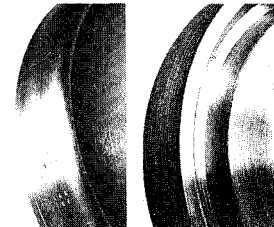
**SURFACE GROUND** - a non-concentric, abrasively machined surface with flat, parallel facings. 63-125 AARH. **Not Available** on API 590 items.



**SMOOTH SPIRAL/ SMOOTH CONCENTRIC MACHINED \*\*** - Lathe finish with shallow depth of cut, visually smooth. 100-150 AARH. **STD. API 590 FINISH.**



**SERRATED SPIRAL/ SERRATED CONCENTRIC MACHINED \*\*** - Coarse lathe cut equivalent to 250-1500 AARH.



**RING JOINT MALE/ FEMALE** - Smooth machined surface is standard. Max roughness is 63 AARH.

\* AARH is the Arithmetic Average Roughness Height measured in micro inches.

\*\* Concentric finishes are more expensive and normally required only for light molecular weight gasses, i.e. helium, hydrogen (see below). Serrated finishes are per MSS SP-6.

API 590 requires raised face surfaces to be a 125-500 AARH lathe machined finish. To maintain compliance with API 590 and acceptable conditions for flexitall gasket use, which requires a 80-125 AARH finish for proper performance, **Mack Iron's standard on API 590 catalog items is a 125 AARH lathe finish.**

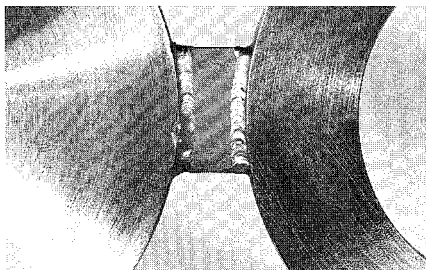
For many liquid services a surface ground 63-125 AARH finish is sufficient to obtain a leak-free seal. This surface is not within the scope of API 590, but offers a cost savings to customers with an appropriate application (see page 30). Light gas services require a rougher surface, 250 AARH or higher, to achieve a leak free seal.

**Mack Iron Engineering**  
can help you specify the required surface finish for your application.

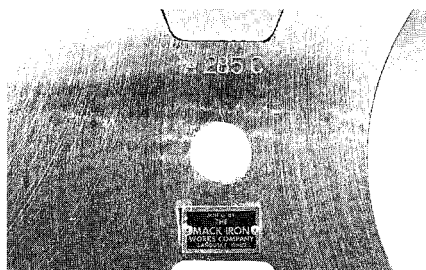


**CALL 419 626-MACK**

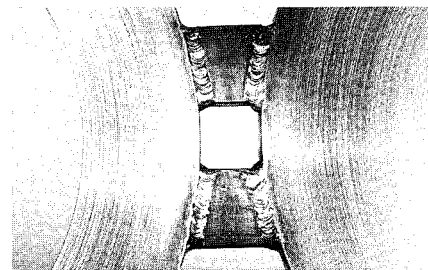
## Tie Bars and Handles



Single



Integral



Double

For single blinds and ring spacers, Mack Iron's standard handle projects 2-1/2" beyond the mating flange outside diameter. For spectacle blinds, tie bars may be single, double or integral at Mack Iron's option. Tie bar material may differ from the spacer/blind it joins. Standard tie bar thickness is the smaller of 1/4" or the thickness of the spacer/blind it joins; for spectacle blinds 3/4" thick and greater, tie bars are 1/2 the thickness of the spacer/blind it joins. Non-integral tie bars are attached by welding on both sides.





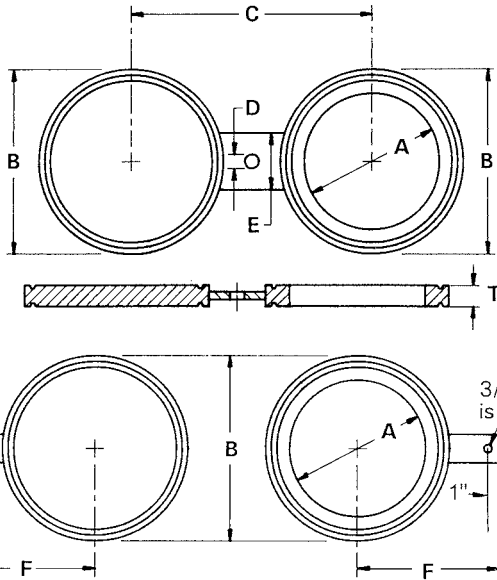
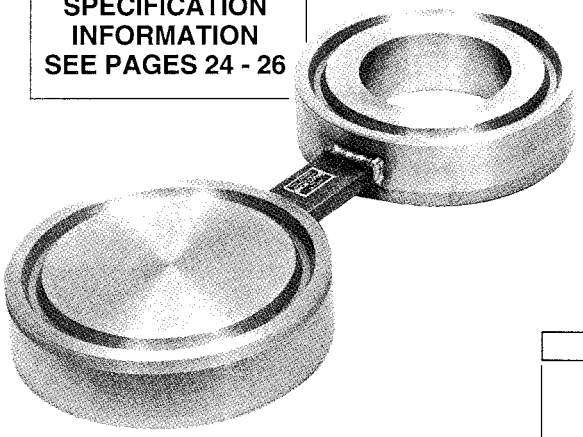
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## API 590 RING JOINT - FEMALE SPECTACLE BLINDS - SINGLE BLINDS - RING SPACERS

FOR ADDITIONAL  
 TECHNICAL AND  
 SPECIFICATION  
 INFORMATION  
 SEE PAGES 24 - 26



Mack Iron female ring joint blind and spacer products listed on this page are manufactured to the requirements of API 590. Pressure/temperature ratings, design, dimensions, materials, markings, etc. are as specified in API 590.

Other code design/compliance or alternate material choices are available. Call Mack Iron for a discussion of your application.

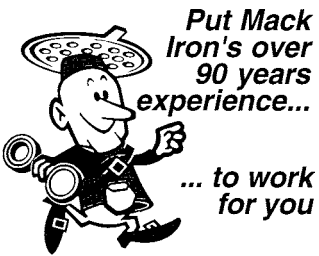
3/4" hole in spacer handle is a Mack Iron standard.  
 Standard handle width sizes ≤ 6" - 1 - 1/4"  
 sizes ≥ 8" - 1 - 1/2"

### 300 LB. - 600 LB. - 900 LB. - 1500 LB. - 2500 LB. FEMALE RING JOINT

Nom. Pipe Size	A					B					C					D					Nom. Pipe Size	
	300	600	900	1500	2500	300	600	900	1500	2500	300	600	900	1500	2500	300	600	900	1500	2500		
1	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	2 3/8	2 3/8	2 1/2	2 1/2	3 1/8	3 1/8	3 1/8	4	4	4 1/4	3/4	3/4	1	1	1	1	1
1 1/2	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	3 1/8	3 1/8	3 1/8	3 1/8	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	5 1/4	7/8	7/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/2
2	2	2	2	2	2	4 1/4	4 1/4	4 1/4	4 1/4	5 1/4	5	5	6 1/2	6 1/2	6 3/4	7/8	7/8	1	1	1 1/8	1 1/8	2
2 1/2	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	5	5	5 1/8	5 1/8	5 1/2	5 1/2	5 1/2	7 1/2	7 1/2	7 3/4	7/8	7/8	1 1/8	1 1/8	1 1/8	1 1/8	2 1/2
3	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	5 3/4	5 3/4	6 1/8	6 1/8	6 3/4	6 3/4	6 3/4	7 1/2	8	9	7/8	7/8	1	1 1/4	1 1/4	1 1/4	3
4	4 1/4	4 1/4	4 1/4	4 1/4	4 1/4	6 3/4	6 3/4	7 1/8	7 1/8	8	7 3/4	8 1/4	9 1/4	9 1/4	10 3/4	7/8	1	1 1/4	1 1/4	1 1/4	1 1/4	4
6	6	6	6	6	6	9 1/2	9 1/2	9 1/8	9 1/8	11	10 3/4	11 1/4	12 1/2	12 1/2	14 1/4	7/8	1 1/8	1 1/4	1 1/4	1 1/4	2 1/2	6
8	8	8	8	8	8	11 1/4	11 1/4	12 1/8	12 1/8	13 3/4	13	13 3/4	15 1/2	15 1/2	17 1/4	1	1 1/4	1 1/2	1 1/2	1 1/2	2 1/2	8
10	10	10	10	10	10	14	14	14 1/4	14 1/4	16 1/4	15 1/2	17	18 1/2	19	21 1/4	1 1/8	1 1/2	1 1/2	2	2 1/2	2 1/2	10
12	12	12	12	12	12	16 1/4	16 1/4	16 1/2	17 1/4	19 1/4	17 3/4	19 1/2	21	22 1/4	24 1/4	1 1/4	1 3/8	1 1/2	2 1/2	2 1/2	2 1/2	12
14	14	14	14	14	—	18	18	18 3/8	19 1/4	—	20 1/4	20 3/4	22	25	—	1 1/4	1 1/2	1 1/2	2 1/2	—	—	14
16	16	16	16	16	—	20	20	20 3/8	21 1/4	—	22 1/4	23 3/4	24 1/4	27 1/4	—	1 1/2	1 3/4	1 1/2	2 1/2	—	—	16
18	18	18	18	18	—	22 3/4	22 3/4	23 3/8	24 1/4	—	24 3/4	25 3/4	27	30 1/4	—	1 1/2	1 3/4	2	2 1/2	—	—	18
20	20	20	20	20	—	25	25	25 3/8	26 1/4	—	27	28 3/4	29 1/4	32 1/4	—	1 1/2	1 3/4	2 1/2	3 1/2	—	—	20

Standard Mack Iron markings on API 590 products include:  
 · API 590  
 · Nominal pipe size  
 · Material specification and grade  
 · Mack Iron name/logo

Nom. Pipe Size	E					F					T					Nom. Pipe Size
	300	600	900	1500	2500	300	600	900	1500	2500	300	600	900	1500	2500	
1	2	2	2	2 1/2	2 1/2	4 1/8	4 1/8	5 1/8	5 1/8	5 1/2	3/4	3/4	3/4	1	1 1/8	1
1 1/2	2 1/4	2 1/4	2 1/2	2 1/2	2 1/2	5 1/8	5 1/8	6	6	6 3/4	7/8	7/8	1	1 1/4	1 1/4	1 1/2
2	2 1/2	2 1/2	2	2 1/2	2 1/2	5 3/4	5 3/4	6 3/4	6 3/4	7 1/4	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/2
2 1/2	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	6 1/4	6 1/4	7 1/8	7 1/8	7 3/4	1 1/8	1 1/4	1 1/4	1 1/4	1 1/4	1 3/4
3	2 3/4	2 3/4	2 3/4	2 3/4	3	6 3/4	6 3/4	7 1/4	7 1/4	8 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2
4	2 3/4	2 3/4	2 3/4	3	3 3/4	7 1/4	7 1/4	8 1/4	8 1/4	9 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2 1/2
6	3 1/4	3 1/4	2 3/4	3 1/4	3 3/4	8 3/4	9 1/4	10	10 1/4	12	1 1/2	1 3/4	1 1/2	2 1/4	2 1/4	3 1/4
8	3 3/4	3 3/4	3 1/4	3 3/4	3 3/4	10	10 3/4	11 1/4	12	13 3/4	1 1/2	2	2 1/4	2 1/4	2 1/4	3 3/4
10	4	4	4 1/4	5 1/4	3 3/4	11 1/4	12 1/4	13 1/4	14	15 3/4	1 1/2	2 1/4	2 1/4	3 1/4	4 1/4	10
12	4 1/4	4 1/4	4 1/4	5 1/4	6	12 1/4	13 1/4	14 1/4	15 3/4	17 1/4	2	2 1/4	2 1/4	4	5 1/4	12
14	5	5	4 3/4	5 1/2	—	14	14 3/4	15 3/4	17 1/4	—	2 1/4	2 1/4	3 1/4	4 1/4	—	14
16	5	5	5	5 1/4	—	15 1/4	16	16 3/4	18 1/4	—	2 1/4	2 1/4	3 1/4	4 1/4	—	16
18	5	5	5 1/4	6	—	16 1/4	17 1/4	18	20 1/4	—	2 1/4	3 1/4	4	5 1/4	—	18
20	5	5	5	6 1/4	—	17 1/4	18 1/4	19 1/4	21 1/4	—	2 1/4	3 1/4	4 1/4	5 1/4	—	20





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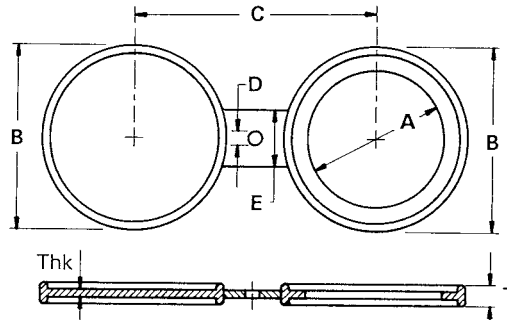
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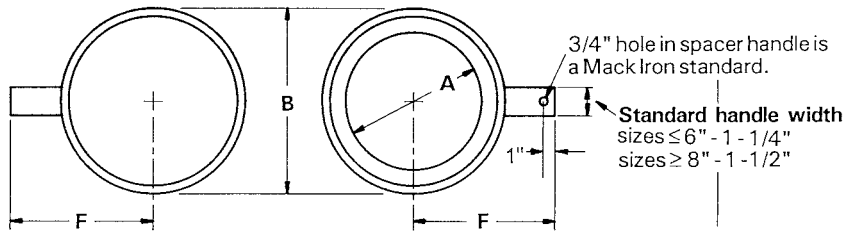


## API 590 RING JOINT - MALE SPECTACLE BLINDS - SINGLE BLINDS - RING SPACERS

Mack Iron's male ring joint blind and spacer products are designed in accordance with ANSI B31.3, B16.5, and B16.20, latest editions, as prescribed by API 590. Standard materials include A515 70, A516 70, as well as various grades of A387 and A240. Other materials choices and alternate code design/compliance is available upon request.



FOR ADDITIONAL TECHNICAL AND SPECIFICATION INFORMATION SEE PAGES 24 - 26



### 300 LB. - 600 LB. - 900 LB. - 1500 LB. - 2500 LB. MALE RING JOINT

Nom. Pipe Size	A					B					C					D					Nom. Pipe Size
	300	600	900	1500	2500	300	600	900	1500	2500	300	600	900	1500	2500	300	600	900	1500	2500	
1	1 1/16	1 1/16	1 1/16	1 1/16	1 1/16	2 1/16	2 1/16	2 1/16	2 1/16	2 1/16	3 1/2	3 1/2	4	4	4 1/4	3/4	3/4	1	1	1	1
1 1/2	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	3	3	3	3	3 1/8	4 1/2	4 1/2	4 1/2	4 1/2	5 1/4	7/8	7/8	1 1/8	1 1/8	1 1/4	1 1/2
2	2 1/8	2 1/8	2 1/8	2 1/8	2 1/8	3 1/8	3 1/8	4 1/8	4 1/8	4 1/8	5	5	6 1/8	6 1/8	6 3/4	3/4	3/4	1	1	1 1/8	2
2 1/2	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	4 1/8	4 1/8	4 1/4	4 1/4	4 1/4	5 1/8	5 1/8	7 1/8	7 1/8	7 3/4	7/8	7/8	1 1/8	1 1/8	1 1/4	2 1/2
3	3 1/8	3 1/8	3 1/8	3 1/8	3 1/8	5 1/8	5 1/8	5 1/4	5 1/4	5 1/4	6 3/8	6 3/8	7 1/8	8	9	7/8	7/8	1 1/8	1 1/8	1 1/4	3
4	4 1/8	4 1/8	4 1/8	4 1/8	4 1/8	6 3/8	6 3/8	6 3/4	6 3/4	6 3/4	7 3/8	7 3/8	8 1/8	9 1/8	10 1/4	7/8	1	1 1/8	1 1/8	1 1/4	4
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8	8 3/8	8 3/8	8 3/8	8 3/8	8 3/8	11 1/8	11 1/8	11 1/4	11 1/4	11 1/4	13	13 3/8	15 1/8	15 1/4	17 1/4	1	1 1/8	1 1/2	1 1/2	2 1/8	8
10	10 3/8	10 3/8	10 3/8	10 3/8	10 3/8	13 3/8	13 3/8	13 1/2	13 1/2	14 1/8	15 1/2	17	18 1/2	19	21 1/4	1 1/8	1 3/8	1 1/2	2	2 3/8	10
12	12 3/8	12 3/8	12 3/8	12 3/8	12 3/8	15 3/8	15 3/8	15 1/2	15 1/2	17 1/8	17 3/4	19 1/2	21	22 1/4	24 3/8	1 1/4	1 3/8	1 1/2	2 1/8	2 3/8	12
14	14 3/8	14 3/8	14 3/8	14 3/8	—	16 3/8	16 3/8	17 1/8	17 1/8	—	20 1/4	20 3/4	22	25	—	1 1/4	1 3/8	1 1/2	2 1/8	—	14
16	16 3/8	16 3/8	16 3/8	16 3/8	—	18 3/8	18 3/8	19 1/8	19 1/8	—	22 1/4	23 3/4	24 1/2	27 1/4	—	1 1/4	1 3/8	1 1/2	2 1/8	—	16
18	18 3/8	18 3/8	18 3/8	18 3/8	—	21 3/8	21 3/8	21 1/2	22 1/8	—	24 1/4	25 3/4	27	30 1/4	—	1 1/4	1 3/8	2	2 1/8	—	18
20	20 3/8	20 3/8	20 3/8	20 3/8	—	23 3/8	23 3/8	23 1/2	24 1/8	—	27	28 3/4	29 1/2	32 1/4	—	1 1/4	1 3/8	2 1/2	3 1/8	—	20

Nom. Pipe Size	E					F					T					Thk.					Nom. Pipe Size
	300	600	900	1500	2500	300	600	900	1500	2500	300	600	900	1500	2500	300	600	900	1500	2500	
1	2	2	2	2 1/8	2 1/8	4 1/16	4 1/16	5 1/16	5 1/16	5 1/8	1 1/16	1 1/16	1 1/16	1 1/8	1 1/8	3/8	3/8	3/8	1/2	5/8	1
1 1/2	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	5 1/16	5 1/16	6	6	6 1/2	1 1/8	1 1/8	1 1/8	1 1/4	1 1/4	3/8	3/8	3/8	1/2	7/8	1 1/2
2	2 1/2	2	2	2 1/4	2 1/4	5 3/8	5 3/8	6 3/8	6 3/8	7 1/8	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1/2	1/2	3/4	3/4	1	2
2 1/2	2 3/4	2 1/2	2 1/2	2 1/2	2 1/2	6 1/8	6 1/8	7 1/8	7 1/8	7 3/4	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	3/4	3/4	3/4	1 1/8	1 1/4	2 1/2
3	2 3/4	2 3/4	2 3/4	2 3/4	3	6 3/8	6 3/8	7 3/8	7 3/8	8 1/4	1 1/4	1 1/4	1 1/4	1 3/4	2	3/4	3/4	3/4	1 1/8	1 1/4	3
4	2 3/4	2 3/4	2 3/4	3	3 3/4	7 1/8	7 1/8	8 1/8	8 1/8	9 1/4	1 1/4	1 1/4	1 1/4	1 3/4	2 1/4	3/4	3/4	1	1 1/4	1 1/2	4
6	3 1/4	2 3/4	2 3/4	3 1/4	3 3/4	8 3/8	9 1/8	10	10 1/4	12	1 1/4	1 1/4	1 1/4	2 1/4	3 1/4	7/8	1 1/8	1 1/4	1 1/4	2 1/4	6
8	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	10	10 3/8	11 3/8	12	13 3/8	1 1/4	2 1/8	2 1/8	2 1/4	3 1/8	1	1 1/8	1 1/2	2	2 3/4	8
10	4	4 1/4	4 1/4	5 1/4	3 3/4	11 1/4	12 1/4	13 1/4	14	15 1/4	1 1/4	2 1/8	2 1/8	3 1/4	4 1/8	1 1/4	1 3/8	1 1/2	2 1/4	3 1/4	10
12	4 1/4	4 1/4	4 1/4	5 1/4	6	12 1/4	13 1/4	14 1/4	15 1/4	17 1/4	2 1/8	2 1/8	2 1/8	4	5 1/8	1 1/4	1 3/8	2 1/4	2 1/4	3 1/4	12
14	5	4 3/4	4 3/4	5 1/4	—	14	14 1/4	15 1/4	17 1/4	—	2 1/8	2 1/8	3 1/4	4 3/8	—	1 1/2	2	2 1/4	3 1/4	—	14
16	5 1/4	5	5	5 1/4	—	15 1/4	16	16 1/4	18 1/4	—	2 1/8	2 1/8	3 1/4	4 1/8	—	1 1/2	2 1/4	2 1/4	3 1/4	—	16
18	5 3/4	5 1/4	5 1/4	6	—	16 1/4	17 1/4	18	20 1/4	—	2 1/8	3 1/8	4	5 1/8	—	1 1/2	2 1/4	3	3 1/4	—	18
20	5 3/4	5	5	6 1/4	—	17 1/4	18 1/4	19 1/4	21 1/4	—	2 1/8	3 1/8	4 1/4	5 3/8	—	2	2 1/4	3 1/4	4 1/4	—	20



# THE MACK IRON WORKS COMPANY

124 WARREN ST. P.O. BOX 5931 SANDUSKY, OHIO 44871-5931  
PHONE 419 626-6225 FAX 419 626-3362

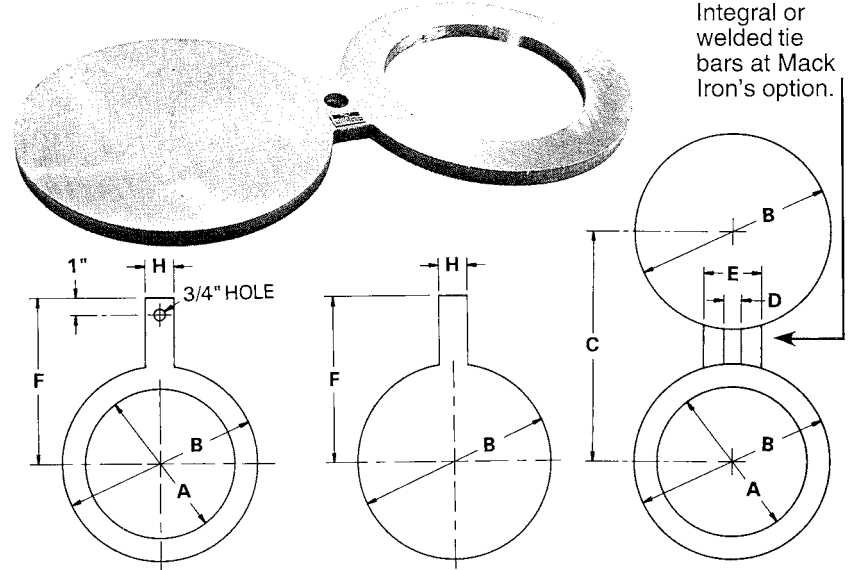


## ASME/ANSI B31.3 DESIGNED SPECTACLE BLINDS - SINGLE BLINDS - RING SPACERS

The Mack Iron blind/spacer products found on this page are designed per ASME/ANSI B31.3, B16.5 and B16.47, current editions. They are designed for full ASME/ANSI flange rating, include NO corrosion allowance and offer economy and flexibility where API 590 is not specified.

Standard material is A285 C for thicknesses less than 2" and A515 70 for 2" or thicker (below, A515 70 is denoted by \*). Standard finish for these items is 63-125 AARH surface ground. Alternate code compliance, surface finish and material is available.

Mack Iron's experience in manufacturing blind/spacer products includes the use of carbon, stainless, chrome-moly, titanium, aluminum, teflon, monel, nickel, hastelloy, carpenter 20, incoloy, inconel, and more - we can assist with your application.



Integral or welded tie bars at Mack Iron's option.

**FOR FURTHER TECHNICAL AND REQUIRED SPECIFICATION INFORMATION SEE PAGES 24-26**

RING SPACER      SINGLE BLIND      SPECTACLE BLIND

### USED WITH 150 LB. - 300 LB. - 600 LB. - 900 LB. RAISED OR FLAT FACE FLANGES

Pipe Size	150 LB. FLANGES								300 LB. FLANGES								600 LB. FLANGES								900 LB. FLANGES							
	A	B	C	D	E	F	H	Thk.	A	B	C	D	E	F	H	Thk.	A	B	C	D	E	F	H	Thk.	A	B	C	D	E	F	H	Thk.
1/2	3/8	1 1/8	2 1/8	—	1	4 1/4	1	1/4	5/8	2 1/8	—	1	4 1/4	1	1/4	5/8	2 1/8	—	1	4 1/4	1	1/4	5/8	2 1/8	—	1	4 1/4	1	1/4	5/8	2 1/8	
3/4	1/2	2 1/8	3 1/8	—	1	4 7/8	1	1/4	1 3/8	2 3/8	—	1	4 1/2	1	1/4	1 3/8	2 3/8	—	1	4 1/2	1	1/4	1 3/8	2 3/8	—	1	4 1/2	1	1/4	1 3/8	2 3/8	
1	1 1/8	2 3/8	3 3/8	—	1	4 3/4	1	1/4	1 1/2	2 3/8	—	1	4 5/8	1	1/4	1 1/2	2 3/8	—	1	4 5/8	1	1/4	1 1/2	2 3/8	—	1	4 5/8	1	1/4	1 1/2	2 3/8	
1 1/4	1 3/8	2 7/8	3 7/8	—	1	4 11/16	1	1/4	1 3/4	3 3/8	—	1	5 1/8	1	1/4	1 3/4	3 3/8	—	1	5 1/8	1	1/4	1 3/4	3 3/8	—	1	5 1/8	1	1/4	1 3/4	3 3/8	
1 1/2	1 5/8	3 1/8	3 7/8	—	1	5	1	1/4	1 7/8	3 7/8	—	1	5 1/4	1	1/4	1 7/8	3 7/8	—	1	5 1/4	1	1/4	1 7/8	3 7/8	—	1	5 1/4	1	1/4	1 7/8	3 7/8	
2	2 1/8	4	4 1/8	—	1	5 1/2	1	1/4	2 1/8	4 1/8	—	1	5 3/4	1	1/4	2 1/8	4 1/8	—	1	5 3/4	1	1/4	2 1/8	4 1/8	—	1	5 3/4	1	1/4	2 1/8	4 1/8	
2 1/2	2 3/8	4 1/2	5	—	1	6	1	1/4	2 1/2	5	—	1	6 1/4	1	1/4	2 1/2	5	—	1	6 1/4	1	1/4	2 1/2	5	—	1	6 1/4	1	1/4	2 1/2	5	
3	2 7/8	5 1/8	6	—	1 1/2	6 1/4	1	1/4	3 1/8	5 3/8	—	1 1/2	6 3/4	1	1/4	3 1/8	5 3/8	—	1 1/2	6 3/4	1	1/4	3 1/8	5 3/8	—	1 1/2	6 3/4	1	1/4	3 1/8	5 3/8	
3 1/2	3 1/8	6 1/8	7	—	1 1/2	6 3/4	1	1/4	3 3/8	6 3/8	—	1 1/2	7 1/4	1	1/4	3 3/8	6 3/8	—	1 1/2	7 1/4	1	1/4	3 3/8	6 3/8	—	1 1/2	7 1/4	1	1/4	3 3/8	6 3/8	
4	4	6 3/8	7 1/8	3/4	3 3/4	7	1 1/2	1/4	4	7	7 1/4	3/4	3 3/4	7 1/2	1 1/2	1/4	4	7	7 1/4	3/4	3 3/4	7 1/2	1 1/2	1/4	4	7	7 1/4	3/4	3 3/4	7 1/2	1 1/2	1/4
5	5 1/8	7 1/8	8 1/8	7/8	4 1/4	7 1/2	1 1/2	3/8	5 1/8	8 1/8	9 1/4	7/8	4 1/2	8 1/2	1 1/2	3/8	5 1/8	8 1/8	9 1/4	7/8	4 1/2	8 1/2	1 1/2	3/8	5 1/8	8 1/8	9 1/4	7/8	4 1/2	8 1/2	1 1/2	3/8
6	6 1/8	8 3/8	9 1/8	7/8	4 3/4	8	1 1/2	1/4	5 3/8	9 1/8	10 3/4	7/8	4 3/4	8 3/4	1 1/2	1/4	5 3/8	9 1/8	10 3/4	7/8	4 3/4	8 3/4	1 1/2	1/4	5 3/8	9 1/8	10 3/4	7/8	4 3/4	8 3/4	1 1/2	1/4
8	8	10 3/8	11 3/8	7/8	4 3/4	9 1/2	1 1/2	1/4	8	12	13 1/4	1	5	10 1/2	1 1/2	1/4	8	12	13 1/4	1	5	10 1/2	1 1/2	1/4	8	12	13 1/4	1	5	10 1/2	1 1/2	1/4
10	10	13 1/8	14 1/8	1	5	10 1/2	1 1/2	1/4	10	14 1/8	15 1/4	1 1/2	4 1/2	11 1/4	1 1/2	1	10	15 1/8	17 1/4	1 1/2	4 1/2	12 1/8	1 1/2	1 1/2	13	17 1/8	18 1/4	1 1/2	4 1/2	13 1/8	1 1/2	1 1/2
12	12	16 1/8	17 1/8	1	5	12 1/2	1 1/2	1/4	12	16 1/2	17 1/2	1 1/2	5 1/2	12 1/2	1 1/2	1 1/2	12	17 1/8	19 1/4	1 1/2	4 1/2	13 1/8	1 1/2	1 1/2	14 1/8	19 1/2	21 1/4	1 1/2	4 1/2	14 1/8	1 1/2	1 1/2
14	13 1/2	17 3/8	18 3/8	1 1/8	5 1/2	13 1/4	1 1/2	1/4	13 1/4	18 3/4	20 1/4	1 1/2	4 1/4	14 1/4	1 1/2	1 1/2	13 1/2	19 1/4	20 1/4	1 1/2	4 1/4	14 1/4	1 1/2	1 1/2	15 1/8	20 1/2	22 1/4	1 1/2	4 1/4	15 1/8	1 1/2	1 1/2
16	15 1/2	19 1/8	21 1/8	1 1/8	5 1/2	14 1/4	1 1/2	1/4	15 1/2	20 1/4	22 1/4	1 1/2	5 1/2	15 1/2	1 1/2	1 1/2	15 1/2	21 1/8	23 1/4	1 1/2	5 1/2	16 1/4	1 1/2	1 1/2	17 1/8	22 1/4	24 1/4	1 1/2	4 1/2	16 1/4	1 1/2	2 1/2
18	17 1/2	21 1/8	22 3/8	1 1/8	5 1/2	15	1 1/2	1	17 1/2	23 1/4	24 1/4	1 1/2	4 1/2	16 1/2	1 1/2	1 1/2	17 1/2	23 1/4	25 1/4	1 1/2	5 1/2	17 1/2	1 1/2	1 1/2	19 1/8	24 1/4	27 1/4	2	6	18 1/2	1 1/2	2 1/2
20	19 1/2	23 1/8	25 1/8	1 1/8	5 1/2	16 1/4	1 1/2	1 1/2	19 1/2	25 1/4	27 1/4	1 1/2	5 1/2	17 1/2	1 1/2	1 1/2	19 1/2	26 1/4	28 1/4	1 1/2	4 1/2	18 1/2	1 1/2	1 1/2	20 1/8	27 1/4	29 1/4	2 1/2	6 1/2	19 1/2	1 1/2	2 1/2
24	23 1/2	27 1/8	29 1/8	1 1/8	5 1/2	18 1/4	1 1/2	1 1/2	23 1/2	30 1/4	32 1/4	1 1/2	5 1/2	20 1/2	1 1/2	2	23 1/2	30 3/4	33 1/4	2	6	21 1/2	1 1/2	2 1/2	23 1/2	32 1/4	35 1/4	2 1/2	6 1/2	23 1/2	1 1/2	3 1/2

#### ANSI B16.47 SERIES A (MSS SP-44) FLANGES

26	25 1/2	30	31 1/2	1 1/8	5 1/2	19 1/4	1 1/2	1 1/2	25 1/2	32 1/4	34 1/4	1 1/2	5 1/2	21 1/2	1 1/2	2 1/2	25 1/2	33 1/4	37 1/4	2	6	22 1/2	1 1/2	3	25	34 1/4	37 1/2	2 1/2	6 1/2	23 1/4	1 1/2	3 1/2
30	29 1/2	34 1/2	36	1 1/8	5 1/2	21 1/4	1 1/2	1 1/2	29 1/2	37	39 1/4	1 1/2	5 1/2	24 1/2	1 1/2	2 1/2	29 1/2	37 1/4	40 1/4	2 1/2	6 1/2	24 1/2	1 1/2	3 1/2	29	39 1/4	42 1/4	3 1/2	7 1/2	26 1/4	1 1/2	4 1/2
34	33 1/2	38 1/2	40 1/2	1 1/8	5 1/2	24 1/4	1 1/2	1 1/2	33 1/2	41 1/4	43 1/4	2	6	26 1/2	1 1/2	2 1/2	33 1/2	41 1/4	44 1/4	2 1/2	6 1/2	27 1/2	1 1/2	3 1/2	33	44 1/4	48 1/4	3 1/2	7 1/2	30 1/4	1 1/2	4 1/2
36	35 1/2	40 1/2	42 1/2	1 1/8	5 1/2	25 1/4	1 1/2	1 1/2	35 1/2	43 1/4	46	2 1/2	6 1/2	27 1/2	1 1/2	3	35 1/2	44	47	2 1/2	6 1/2	28 1/2	1 1/2	4 1/2	35	46 1/4	50 1/4	3 1/2	7 1/2	31 1/4	1 1/2	5

#### ANSI B16.47 SERIES B (API 605) FLANGES

26	25 1/2	28 1/2	29 1/2	7/8	3 3/4	18	1 1/2	1 1/2	25 1/2	29 1/4	31 1/4	1 1/2	4 1/2	19 1/4	1 1/2	2 1/2	25 1/2	29 1/4	31 1/4	1 1/2	4 1/2	20	1 1/2	3	25	32 1/4	35 1/4	2 1/2	6 1/2	22 1/4	1 1/2	3 1/2
30	29 1/2	32 1/2	33 1/2	7/8	3 3/4	20	1 1/2	1 1/2	29 1/2	34 1/4	36 1/4	1 1/2	4 1/2	22	1 1/2	2 1/2	29 1/2	34 1/4	36 1/4	2	6	22 1/2	1 1/2	3 1/2	29	37 1/4	40 1/4	3 1/2	7 1/2	25 1/4	1 1/2	4 1/2
34	33 1/2	36 1/2	37 1/2	1	4	22 1/2	1 1/2	1 1/2	33 1/2	38 1/4	40 1/4	1 1/2	4 1/2	24 1/2	1 1/2	2 1/2	33 1/2	38 1/4	41 1/4	2 1/2	6 1/2	25 1/2	1 1/2	3 1/2	33	41 1/4	45 1/4	3 1/2	7 1/2	28 1/4	1 1/2	4 1/2
36	35 1/2	38 1/2	39 1/2	1	4	23 1/2	1 1/2	1 1/2	35 1/2	40 1/4	42 1/4	1 1/2	5 1/2	25 1/2	1 1/2	3	35 1/2	40 1/4	43 1/4	2 1/2	6 1/2	26 1/2	1 1/2	4 1/2	35	43 1/4	47 1/4	3 1/2	7 1/2	29 1/4	1 1/2	5

\*A515 Gr 70 material.

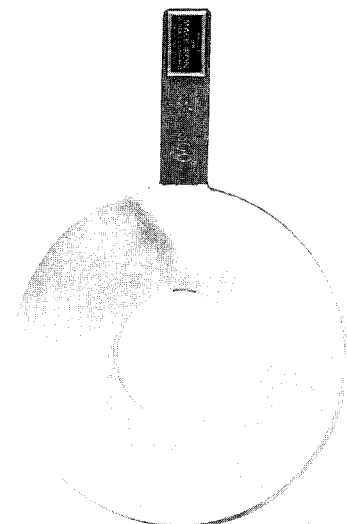
(Larger sizes and heavier flange rating available upon request.)

Dimensions - Inches

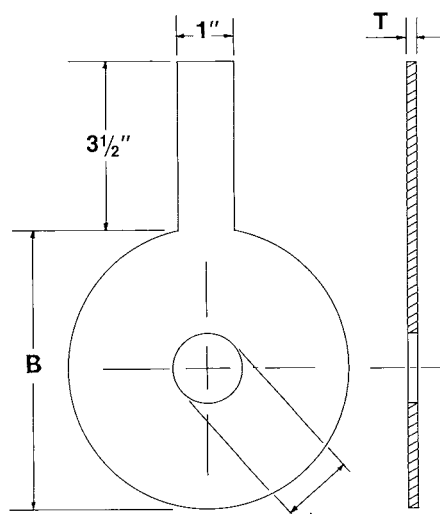
### JUST IN TIME DELIVERY

At Mack Iron, we believe in teamwork, and we know service is an important part of our role as a member of your team; accordingly, we can ship the following Mack Iron B31.3 designed spectacle blinds to you within 24 hours of your order:  
Carbon Steel (A285 C)-150# and 300#-sizes 1", 1-1/2", 2", 3", 4", 6", 8", 10", 12" (Furnished with 100-125 AARH surface ground finish)  
Stainless Steel (A240 304) - 150# - sizes 1-1/2", 2", 3", 4", 6", 8", 10", 12" (Furnished with 125-250 AARH lathe finish)

## MICROFINISHED ORIFICE PLATES



3" 300#, Carbon Steel  
 Specified bore, Standard Finish



Diameter of bore to be specified by purchaser

### Required Specification Information

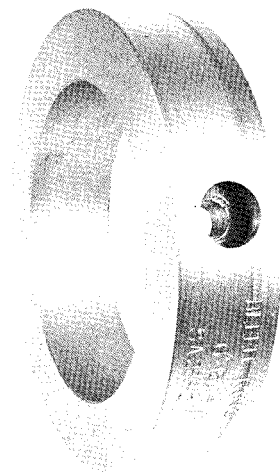
1. Material
2. Diameter of Bore
3. Surface Finish (100-125 standard, see pg. 26)
4. Mating Flange Class

Dimensions - Inches.

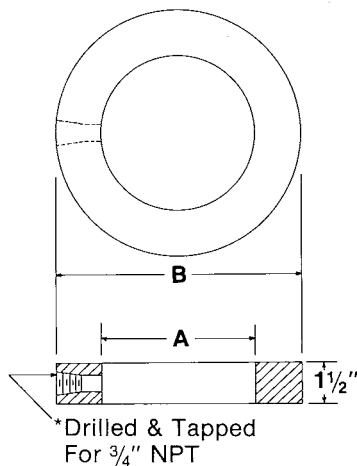
Pipe Size	B					T
	150#	300#	600#	900#	1500#	
1	2½	2¾	2¾	3	3	¼
1¼	2¾	3¼	3¼	3¾	3¾	¼
1½	3¼	3¾	3¾	3¾	3¾	¼
2	4	4¼	4¼	5½	5½	¼
2½	4¾	5	5	6¾	6¾	¼
3	5¼	5¾	5¾	6¾	6¾	¼
4	6¾	7	7½	8	8½	¼
5	7¾	8¾	9¾	9¾	9¾	¼
6	8¾	9¾	10¾	11¼	11	¼
8	10¾	12	12½	14	13¾	¼
10	13¾	14¾	15¾	17	17	¾
12	16	16½	17¾	19½	20¾	¾
14	17¾	19	19¾	20¾	22¾	¼
16	20¾	21¾	22¾	22¾	25¾	¼
18	21¾	23¾	24	25	27¾	¼
20	23¾	25¾	26¾	27¾	29¾	¼



## BLEED RINGS



6" 150#, Carbon Steel (A285 C)  
 3/4" Socket Weld, Standard Finish



\* Drilled & Tapped For ¾" NPT

\* Drilled for socket weld connection upon request

### JUST IN TIME DELIVERY

Mack Iron is able to fill your critical fluid metering requirements; *we can ship the following Mack Iron orifice plates within 24 hours of your order:*  
 304 Stainless Steel - 150# and 300# - sizes 3/4", 1-1/2", 2", 3", 4", 6", 8"  
 (furnished with 100-125 AARH standard finish and your required bore)

### Required Specification Information

1. Material
2. Surface Finish (100-150 AARH standard, see pg. 26)
3. Mating Flange Class
4. Connection Type and Size (e.g. 3/4" tapped, 1/2" socket weld, etc.)

Dimensions - Inches

Pipe Size	A	B			
		150#	300#	600#	900#
1	1½	2½	2¾	2¾	3
1¼	1½	2¾	3¼	3¾	3¾
1½	1¾	3¼	3¾	3¾	3¾
2	2½	4	4¼	4¼	5½
2½	2½	4¾	5	5	6¾
3	3¾	5¾	5¾	5¾	6¾
3½	3¾	6¾	6¾	6¾	—
4	4¾	6¾	7	7½	8
5	5¾	7¾	8¾	9¾	9¾
6	6¾	8¾	9¾	10¾	11¼
8	8	10¾	12	12½	14
10	10¾	13¾	14¾	15¾	17
12	12	16	16½	17¾	19½
14	13¾	17¾	19	19¾	20¾
16	15¾	20¾	21¾	22¾	22¾
18	17¾	21¾	23¾	24	25
20	19¾	23¾	25¾	26¾	27¾

Larger sizes and heavier ratings available upon request.

### JUST IN TIME DELIVERY

Sensitive to the importance of **your** time, we make good use of **our** time; *Mack Iron can ship the following Bleed Rings to you within 24 hours of your order:* Carbon Steel (A285 Gr. C) - 150# and 300# - sizes 1-1/2", 2", 3", 4", 6"  
 (Furnished with 125-200 AARH standard finish)