JOHN C. ERNST CO.

ENGINEERED SOLUTIONS FOR PROCESS & STEAM

Sight Glasses
Sight Flow Indicators
Flow Meters
Liquid Level Gauges
Glass & Gaskets
Level & Flow Switches
Ejectors & Eductors

Catalog JCE2008

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Mission Statement

Our goal is to provide our customers with products that meet or exceed their requirements and expectations with competitive prices and timely deliveries, and achieve complete customer satisfaction through our knowledgeable technical sales staff by responding willingly and courteously in the most expeditious manner possible to providing solutions and training for the customers needs. We carefully select qualified venders for materials and equipment to uphold our product quality commitment and strict ethical code.

John C. Ernst Company is not affiliated with any other Ernst Company.

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Low Pressure – Single Window - Threaded

Rotator

Rotator – Paddlewheel indicator used for clear media to enhance flow indication. Any direction. The glass is held in place by a snap ring.

Model	Body Material
118P	Bronze

Features

- **Economical**
- **Sizes 1/4" to 2" NPT**
- **Single Window**

Ratings

- 125 psi @ 200˚F

Materials (Wetted)

- Glass: Temp Soda Lime
- Seals: Buna N
- Rotator: ABS Plastic

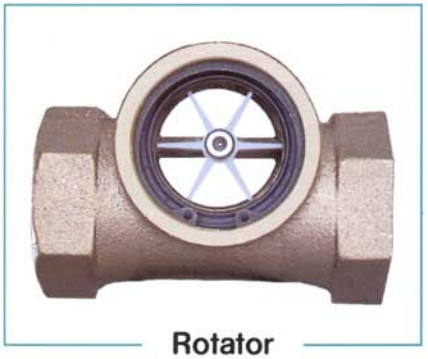
Note: Not applicable for steam service. See page 4 and 5

Low Pressure – Double Window - Threaded

Plain

Plain – No indicator. For direct visual inspection of liquid. Mounts in any direction. The glass is held in place by an internal snap ring.

Model	Body Material
137P	Bronze



Rotator

Rotator – Paddlewheel indicator used for clear media to enhance flow indication. Any direction. The glass is held in place by an internal snap ring.

Model	Body Material
138P	Bronze

Features

- **Economical**
- **Sizes 1/4" to 2" NPT**
- **Double Window**

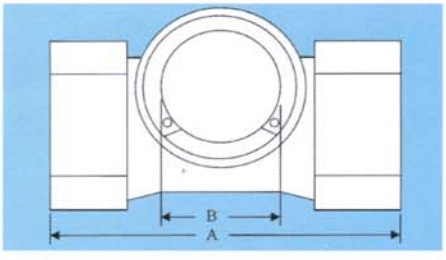
Ratings

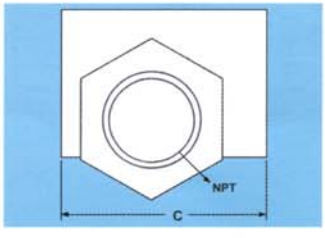
- 125 psi @ 200˚F

Materials (Wetted)

- Glass: Temp Soda Lime
- Seals: Buna N
- Rotator: ABS Plastic

Note: Not applicable for steam service. See page 4 and 5.





Dimensions for Model 118P, 137P, 138P

Unit Size	Dimensions in Inches & (cm)			
	A	B	C	Wt.lbs
1/8,1/4 3/8	3-3/16 (8.1)	1-3/4 (4.5)	2-1/8 (5.4)	2
1/2 3/4	3-3/4 (9.5)	2 (5.1)	2-3/8 (6.0)	2
1, 1-1/4	4-3/8 (11.1)	2 (5.1)	2-7/8 (7.3)	4
1-1/2 2	4-1/2 (11.4)	2 (5.1)	3-3/4 (9.5)	6

Medium Pressure – Double Window - Threaded

Plain

Plain – No indicator. For direct visual inspection of liquid. Mounts in any direction.

Model	Body Material
100	Carbon Steel
140	Bronze
160	316 Stainless
190	Iron

Rotator

Rotator – Paddlewheel indicator used for clear media to enhance flow indication. Any direction.

Model	Body Material
101	Carbon Steel
141	Bronze
161	316 Stainless
191	Iron

Flapper

Flapper – Side flapper to indicate flow in one direction. Not for vertical flows down.

Model	Body Material
102	Carbon Steel
142	Bronze
162	316 Stainless
192	Iron

Drip Tube

Drip Tube – Designed for very low flows so fluid drips off tube insert. Mainly vertical mounts.

Model	Body Material
103	Carbon Steel
143	Bronze
163	316 Stainless
193	Iron

Features

- **Sizes 1/8" to 2" NPT**
- **150# ANSI Bodies**
- **Independent Windows**
- **Single Piece Cast Body**
- **Brass Bezel Retaining Rings**

Ratings*

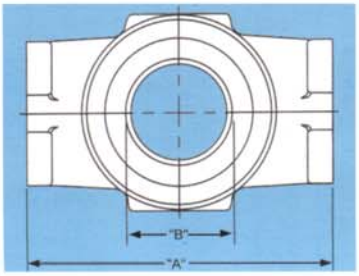
- **With Annealed Glass (Std)**
  150 psi @ 250˚F
- **With Tempered Glass (Opt)**
  Carbon Steel:
  285 psi @ 100˚F
  230 psi @ 300˚F
  Bronze:
  225 psi @ 150˚F
  190 psi @ 300˚F
  Stainless Steel:
  275 psi @ 100˚F
  195 psi @ 400˚F
  Iron:
  175 psi @ 150˚F
  140 psi @ 300˚F

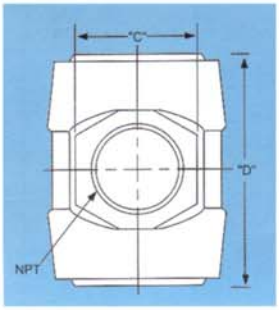
Materials (Wetted)

- Glass: Annealed Borosilicate
  Tempered Optional
- Seals: Neoprene
  Teflon in 316SS
- Rotator: Teflon
- Flapper: 316 Stainless
- Drip Tube : 316SS

*Temperature ratings are dependent on seal material

Note: Steam service requires Mica Shields, Tempered Glass, and suitable gaskets.





Unit Size	Dimensions in Inches & (cm)				
	A	B	C	D	Wt.lbs
1/8, 1/4, 3/8	3 (7.6)	13/16 (2.1)	1 (2.5)	2-1/8 (5.4)	2
1/2, 3/4	3-3/4 (9.5)	1-3/16 (3.0)	1-1/2 (3.8)	3-1/4 (8.3)	3
1	4-5/16 (11.0)	1-7/16 (3.7)	2 (5.1)	3-3/8 (8.6)	5
1-1/4, 1-1/2	5-9/16 (14.1)	2 (5.1)	2-1/2 (6.4)	4-1/2 (11.4)	9
2	6-1/4 (15.9)	2 (5.1)	3-1/4 (8.3)	5-1/8 (13.0)	16

SIGHT FLOW INDICATORS

Medium Pressure – Double Window - Threaded

Plain

Plain – No indicator. For direct visual inspection of liquid. Mounts in any direction.

Model	Body Material
010	Carbon Steel
040	Bronze
060	316 Stainless
090	Iron

Rotator

Rotator – Paddlewheel indicator used for clear media to enhance flow indication. Any direction.

Model	Body Material
011	Carbon Steel
041	Bronze
061	316 Stainless
091	Iron

Flapper

Flapper – Side flapper to indicate flow in one direction. Not for vertical down flows.

Model	Body Material
012	Carbon Steel
042	Bronze
062	316 Stainless
092	Iron

Drip Tube

Drip Tube – Designed for very low flows so fluid drips off tube insert. Mainly vertical mounts.

Model	Body Material
013	Carbon Steel
043	Bronze
063	316 Stainless
093	Iron

Features

- **Sizes 1/4" to 3" NPT**
- **150# ANSI Rated**
- **Single Piece Cast Body**
- **Other Materials Available**
- **Socketweld Connections Available**

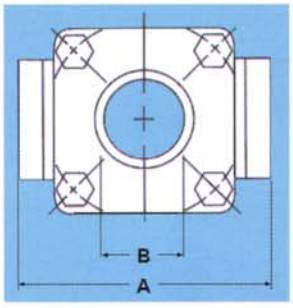
Ratings*

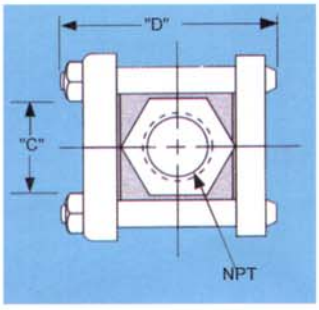
- ***Carbon Steel:***
  285 psi @ 100˚F
  245 psi @ 250˚F
- ***Bronze:***
  225 psi @ 150˚F
  195 psi @ 250˚F
- ***Stainless Steel:***
  275 psi @ 100˚F
  195 psi @ 400˚F
- ***Iron:***
  175 psi @ 150˚F
  150 psi @ 250˚F

Materials (Wetted)

- Glass: Temp Borosilicate
- Seals: Neoprene
  Teflon in Stainless
- Rotator: Teflon
- Flapper: 316 SS
- Drip Tube : 316SS

*Temperature ratings are dependent on seal material

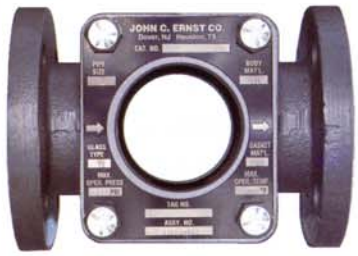




Note: Steam service requires mica shields, graphoil gaskets, and belleville washers.

Unit Size	Dimensions in Inches & (cm) A	B	C	D	Wt lbs
1/4, 3/8	3 (7.6)	7/8 (2.2)	1 (2.5)	2-11/16 (6.8)	2
1/2, 3/4	3-3/4 (9.5)	1-1/4 (3.2)	1-1/2 (3.8)	3-3/16 (8.1)	3
1	4-1/4 (10.8)	1-1/2 (3.8)	2 (5.1)	4-1/4 (10.8)	5
1-1/4, 1-1/2	5-1/2 (14.0)	2-3/8 (6)	2-1/2 (6.4)	5 (12.7)	9
2	6-1/4 (15.9)	2-7/8 (7.3)	3-1/4 (8.3)	6-5/16 (16)	15
2-1/2, 3	8-1/2 (21.6)	3-3/4 (9.5)	4-1/8 (10.5)	8-1/8 (20.6)	30

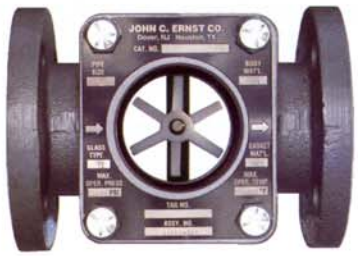
Medium Pressure – Double Window - Flanged



Plain

Plain – No indicator. For direct visual inspection of liquid. Mounts in any direction.

Model	Body Material
200	Carbon Steel
240	Bronze
260	316 Stainless
290	Iron



Rotator

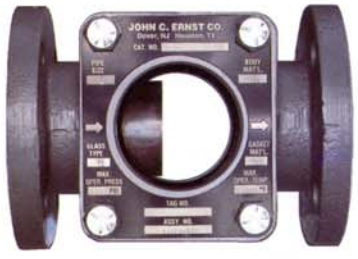
Rotator – Paddlewheel indicator used for clear media to enhance flow indication. Any direction.

Model	Body Material
201	Carbon Steel
241	Bronze
261	316 Stainless
291	Iron

Flapper

Flapper – Side flapper to indicate flow in one direction. Not for vertical down flows.

Model	Body Material
202	Carbon Steel
242	Bronze
262	316 Stainless
292	Iron



Drip Tube

Drip Tube – Designed for very low flows so fluid drips off tube insert. Mainly vertical mounts.

Model	Body Material
203	Carbon Steel
243	Bronze
263	316 Stainless
293	Iron

Features

- **Sizes 1/2" to 16" Flanged**
- **150# ANSI Rated**
- **Single Piece Cast Body**
- **Other Materials Available**
- **Teflon Lining Available**

Ratings*

- ***Carbon Steel:***
  285 psi @ 100˚F
  245 psi @ 250˚F
- ***Bronze:***
  225 psi @ 150˚F
  195 psi @ 250˚F
- ***Stainless Steel:***
  275 psi @ 100˚F
  195 psi @ 400˚F
- ***Iron:***
  175 psi @ 150˚F
  150 psi @ 250˚F

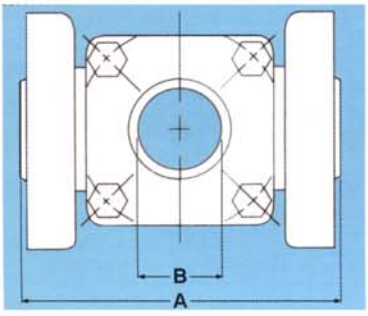
Materials (Wetted)

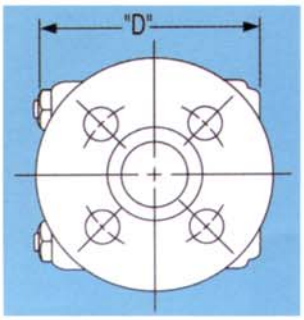
- Glass: Temp Borosilicate
- Seals: Neoprene
  Teflon in Stainless
- Rotator: Teflon
- Flapper: 316 SS
- Drip Tube : 316SS

For Iron and Bronze units subtract 1/8" from "A" due to flat face Flanges.
*Temperature ratings are dependent on Seal material.

Note: Steam service requires mica shields, graphoil gaskets, and belleville washers.

Unit Size	Dimensions in Inches & (cm)			
	A	B	D	Wt.lbs
1/2, 3/4	4-5/8 (11.7)	1-1/4 (3.2)	3-15/16 (10.0)	4
1	5-5/8 (14.3)	1-1/2 (3.8)	4-1/2 (11.4)	7
1-1/4, 1-1/2	6-1/2 (16.5)	2-3/8 (6.0)	5-3/4 (14.6)	15
2	7-7/8 (20.0)	2-7/8 (7.3)	7-3/8 (18.7)	26
2-1/2, 3	9-3/8 (23.9)	3-3/4 (9.5)	8-15/16 (22.7)	52
4	11 (27.9)	4-3/4 (12.1)	9-1/2 (24.1)	70
6	14-1/4 (36.2)	7 (17.8)	13-9/16 (34.5)	125





SIGHT FLOW INDICATORS

Medium Pressure – Double Window - Threaded

Plain

Plain – No indicator. For direct visual inspection of liquid. Mounts in any direction.

Model	Body Material
020	Carbon Steel
130	Bronze
170	316 Stainless
180	Iron

For High Pressure Models add HP to Model Number. Example: 020HP

Rotator

Rotator – Paddlewheel indicator used for clear media to enhance flow indication. Any direction.

Model	Body Material
021	Carbon Steel
131	Bronze
171	316 Stainless
181	Iron

For High Pressure Models add HP to Model Number. Example: 021HP

Mid-Flapper

Mid-Flapper – Mid-flapper to indicate flow in either direction. Not for vertical flows down.

Model	Body Material
022	Carbon Steel
132	Bronze
172	316 Stainless
182	Iron

For High Pressure Models add HP to Model Number. Example: 022HP

Drip Tube

Drip Tube – Designed for very low flows so fluid drips off tube insert. Mainly vertical mounts.

Model	Body Material
023	Carbon Steel
133	Bronze
173	316 Stainless
183	Iron

For High Pressure Models add HP to Model Number. Example: 023HP

Features

- **Sizes 1/4" to 2" NPT**
- **150# ANSI Rated**
- **Bolt-On Body Design**
- **Radial Sealing**
- **Socketweld Available**
- **Shields Available**

Ratings*

- **Medium Pressure Rated**
  200 psi @ 150˚F
  150 psi @ 225˚F
- **Higher Pressure Rated (HP)**
  400 psi @ 100˚F
  200 psi @ 350˚F

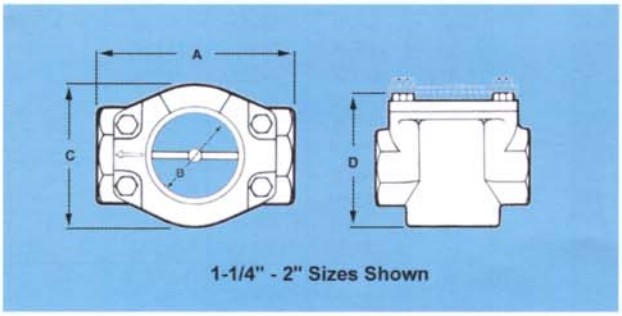
Materials (Wetted)

- **Medium Pressure Rated**
  Glass: Temp Soda Lime
  Seals: Neoprene
  Viton in 316SS
  Rotator/Flapper: Delrin
  Bridge/Pin: 316SS
- **Higher Pressure Rated (HP)**
  Glass: Temp Borosilicate
  Seals: Viton
  Rotator/Flapper: Ryton
  Bridge/Pin: 316SS

*Temperature ratings are dependent upon seal material

Drip Tube material may be either 316SS or Teflon.

Note: Not applicable for steam service.
See page 4 and 5.



1-1/4" - 2" Sizes Shown

Unit Size	Dimensions in Inches & (cm)				
	A	B	C	D	Wt lbs
1/4,3/8 1/2	3-5/8 [1] (9.2)	1-1/8 (2.9)	2 (5.1)	2-3/8 (6.0)	2
3/4 1	4-1/4 (10.8)	1-1/2 (3.8)	2-9/16 (6.5)	3-1/4 (8.3)	3
1-1/4 1-1/2	5-5/8 [2] (14.3)	2 (5.1)	3-5/16 (8.4)	4-5/16 (11.0)	6
2	5-5/8 [3] (14.3)	2 (5.1)	3-5/16 (8.4)	4-5/16 (11.0)	6

Exceptions to "A" above for Bronze: [1] 3-1/4, [2] 5-1/4, [3] 5-1/2

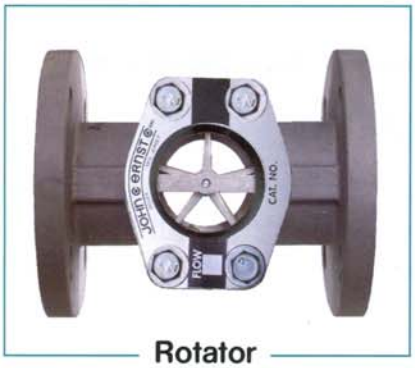
Medium Pressure – Double Window - Flanged

Plain

Plain – No indicator. For direct visual inspection of liquid. Mounts in any direction.

Model	Body Material
050	Carbon Steel
270	316 Stainless
280	Iron (3" and 4" only)

For High Pressure Models add HP to Model Number. Example: 050HP



Rotator

Rotator – Paddlewheel indicator used for clear media to enhance flow indication. Any direction.

Model	Body Material
051	Carbon Steel
271	316 Stainless
281	Iron (3" and 4" only)

For High Pressure Models add HP to Model Number. Example: 051HP

Maximum unit size for Rotator is 4".

Mid-Flapper

Mid-Flapper – Mid-flapper to indicate flow in either direction. Not for vertical flows down.

Model	Body Material
052	Carbon Steel
272	316 Stainless
282	Iron (3" and 4" only)

For High Pressure Models add HP to Model Number. Example: 052HP

Drip Tube

Drip Tube – Designed for very low flows so fluid drip off tube insert. Mainly vertical mounts.

Model	Body Material
053	Carbon Steel
273	316 Stainless
283	Iron (3" and 4" only)

For High Pressure Models add HP to Model Number. Example: 053HP

Features

- Sizes 3/4" to 12" Flanged
- 150# ANSI Rated
- Bolt-On Body Design
- Radial Sealing
- Multiple Lengths on some sizes

Ratings*

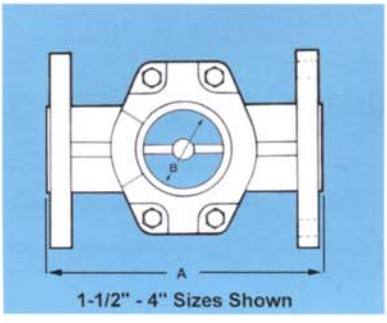
- **Medium Pressure Rated**
  1/2"-4": 200 psi @ 150˚F
  150 psi @ 225˚F
  6"–12": 150 psi @ 150˚F
- **Higher Pressure Rated (HP)**
  All Sizes: 275 psi @ 100˚F
  205 psi @ 350˚F

Materials (Wetted)

- **Medium Pressure Rated**
  Glass: Tempered Soda Lime[1]
  Seals: Neoprene
  Viton in 316SS
  Rotator/Flapper: Delrin
  Bridge/Pin: 316SS
- **Higher Pressure Rated (HP)**
  Glass: Tempered Boro
  Seals: Viton
  Rotator/Flapper: Ryton
  Bridge/Pin: 316SS

[1]Annealed Boro for 3" and 4"
*Temperature ratings are dependent on Seal material.

Note: Not applicable for steam service.
See page 6.



1-1/2" - 4" Sizes Shown

"D" Dimension is the outside viewing depth of the unit.

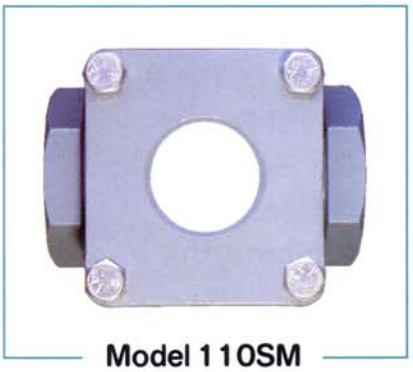
All sizes above 2" do not have a bridge and pin assembly that positions the glass in place.

Unit Size	Dimensions in Inches & (cm)				
	A*		B	D	Wt. lbs
3/4	4-5/8 (11.8)	-	1-1/2 (3.8)	3-1/4 (8.3)	6
1	5 (12.7)	-	1-1/2 (3.8)	3-1/4 (8.3)	7
1-1/2	6-1/2 (16.5)	-	2 (5.1)	4-5/16 (11.0)	12
2	7 (17.8)	7-7/8 (20.0)	2 (5.1)	4-5/16 (11.0)	14
3	8 (20.3)	9-3/8 (23.8)	3 (7.6)	7-9/16 (19.2)	28
4	9 (22.9)	11 (27.9)	3 (7.6)	7-9/16 (19.2)	42
6	14-1/4 (36.2)	-	4 (10.2)	13-1/4 (33.7)	85

*Some sizes have two lengths available

SIGHT FLOW INDICATORS

High Pressure – Double Window - Threaded

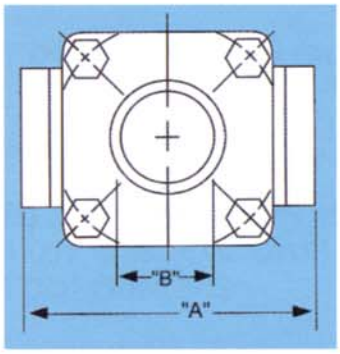


Model 110SM

Model	Carbon Steel
110	Plain
112	Flapper
113	Drip Tube

Model	316 Stainless Steel
150	Plain
152	Flapper
153	Drip Tube

Add pressure suffix to Model Number.
Example: For 600 psi unit, Model 150SM.
Rotator not available



Unit Size	Dimensions in Inches & (cm)		
	A	B	Wt.lbs
1/4 3/8	3-3/4 (9.5)	3/4 (1.9)	6
1/2 3/4	4-1/2 (11.4)	1 (2.5)	8
1	4-7/8 (12.4)	1 (2.5)	9
1-1/4 1-1/2	6 (15.2)	1-1/2 (3.8)	15
2	7-1/4 (18.4)	2 (5.1)	35

Features

- Sizes 1/4" to 2" NPT
- Bolted Covers

Ratings

- SL : 300 psi @ 250˚F
- SM: 600 psi @ 250˚F
- SH: 1000 psi @ 250˚F
- SX: 2000 psi @ 250˚F
- XX: 3000 psi @ 250˚F

Materials (Wetted)

- Glass: Temp Borosilicate
- Seals: Vary with Pressure
- Flapper/Drip Tube: 316SS

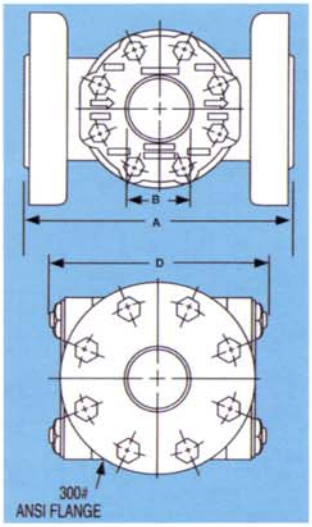
High Pressure – Double Window - Flanged

Model 210SM

Model	Carbon Steel
210	Plain
211	Rotator
212	Flapper
213	Drip Tube

Model	316 Stainless
250	Plain
251	Rotator
252	Flapper
253	Drip Tube

For 300lb unit add SM to Model.
For 600lb unit add SH to Model.
Example: 210SM



300 lb Dimensions (SM)

Unit Size	Dimenisons in Inches			
	A	B	D	Wt lbs
1/2 3/4	5-7/8	1-1/4	4-1/8	11
1	6-7/8	1-3/8	4-7/8	20
1-1/2	7-1/2	2	5-7/8	27
2	8-5/8	2-1/8	7-3/8	38
2-1/2 3	11-3/8	3-3/16	9-5/8	70
4	13-1/4	4-1/4	11-1/2	150
6	21-3/8	6-1/4	17	270
8	23	6-1/4	17	350

Features

- Sizes 1/2" to 8" Flanged
- 300lb & 600lb ANSI

Ratings*

- 300lb ANSI Carbon Steel
  740 psi @ 100˚F
  655 psi @ 300˚F
- 300lb ANSI 316 Stainless
  720 psi @ 100˚F
  515 psi @ 400˚F
- 600lb ANSI Carbon Steel
  1480 psi @ 100˚F
  1315 psi @ 300˚F
- 600lb ANSI 316 Stainless
  1440 psi @ 100˚F
  1030 psi @ 400˚F

Materials (Wetted)

- Glass: Temp Borosilicate
- Seals: Neoprene, Teflon in SS

*Temperature Ratings are dependent upon gasket material.

Electronic – Pulsed Output/Setpoint Switching

Model 123BR-RFI

Model	Body Material
123BR	Brass
123PP	Polypropylene
123SS	Stainless Steel

Add Suffix to Model number if RFO or RFS is required.
Example: 123BR-RFO

RFI Rotor: Orange
RFO Rotor: Black
RFS Rotor: Black

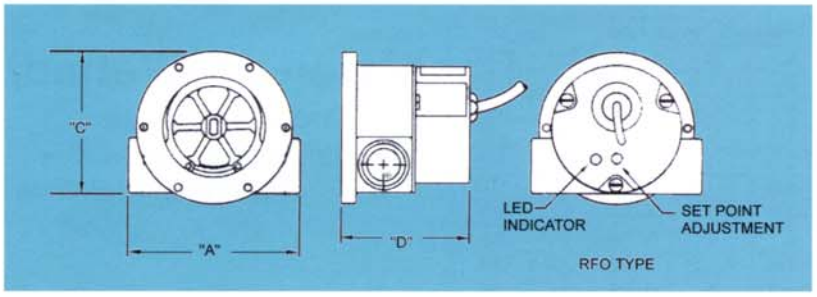
Features

- Sizes 1/4" to 1/2" NPT
- RFI – Visual Only
- RFO – Pulsed DC Voltage Output/Flow Rate
- RFS – Flow Setpoint Switching AC or DC

Ratings

- **Pressure**
  Brass/SS: 200 psi @ 70˚F
  Polypro: 100 psi @ 70˚F
- **Temperature**
  Brass: 180˚F
  Stainless: 212˚F
  Polypro: 180˚F
  Electronics: 150˚F

RFO – Pulsed DC Voltage Output	RFS – Flow Setpoint Switching
Input Power: 4.5VDC to 24VDC	Input Power: 24VDC, 115VAC
Output Signal: 4.5VDC to 24VDC Pulse	Set Point Accuracy: ±5%
Accuracy: ±7% or ±15% (depend. on size)	LED signals when setpoint is reached



Model	NPT	Flow Range GPM Low*	Flow Range GPM Standard	A	C	"D" Depth in Inches RFI	RFO	RFS(AC)	RFS(DC)
123PP	1/4	0.1-1.0	0.5-5.0	3.06	2.37	1.37	2.38	4.50	2.38
	1/2	1.5-12.0	4.0-20.0						
123BR	1/4	0.1-1.0	0.5-5.0	3.01	2.37	1.37	2.32	4.50	2.32
	1/2	1.5-12.0	4.0-20.0						
	3/4	-	6.0-30.0		2.75	1.50	2.50	4.65	2.51
123SS	9/16-18	0.1-1.0	0.5-5.0	3.01	2.37	1.37	2.32	4.50	2.32
	1/2	1.5-12.0	4.0-20.0						

Materials (Wetted)

- Rotor Pin: Ceramic
- Rotor: Nylon or PPS
- Lens: Polysulfone
- O-Ring: Viton in Brass/SS
  Buna-N in Polypro

Dome Type – Agitating Balls - Threaded

Model 145

Model	Body Material
145	Brass

Can be panel mounted.

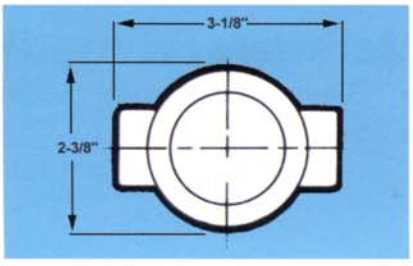
Best Position - Vertical up flow

Features

- Sizes 1/4" to 1" NPT
- Agitating Balls
- Dome Style Lens
- For Clear Liquids
- Not for Air

Ratings

- 150 psi @ 150˚F



Unit Size	GPM	Wt lbs.
1/4	.4 — 4	1
3/8	1.5 — 11	1
1/2	2.5 — 18	1
3/4	3.0 — 40	1.25
1	5.0 — 45	1.50

Materials (Wetted)

- Lens: Polycarbonate
- Seal: Buna-N
- Balls: Green & White Acrylic Plastic

SIGHT FLOW INDICATORS

Cylinder Glass – Full View - Threaded

Model 155

Model	Flange Material
105	Carbon Steel
115	Kynar (PVDF)
155	316 Stainless Steel
165	Polypropylene
175	Iron
176	CPVC
195	PVC

Teflon is not suitable for full vacuum. Pressure ratings listed are for metal units only at the standard lengths indicated.

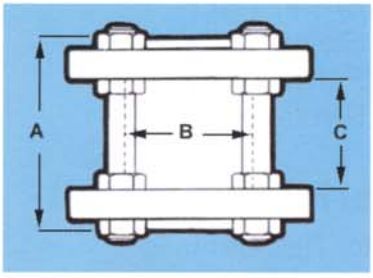
Pressure ratings listed are for a maximum length of 5 times the diameter of the glass.

Features

- Sizes 1/2" to 4" NPT
- Up to 36" Long
- Plastic Cylinders Available
- Socketweld Available

Ratings

- Neoprene: 300˚F
- EPR: 300˚F
- Viton: 400˚F
- Teflon: 400˚F
- See Table for Pressures



Unit Size	Dimension in Inches A	B	C	lbs	PSIG
1/2	5	1-1/4	3-7/8	2	150
3/4	5	1-1/2	3-7/8	3	150
1	5-1/8	2	3-7/8	6	130
1-1/4	5-3/8	2-1/2	3-7/8	7	105
1-1/2	7-5/8	2-1/2	5-7/8	8	105
2	7-3/4	3-1/2	5-7/8	11	65
2-1/2	8	4	5-7/8	16	65
3	8-1/8	4-1/2	5-7/8	23	55
4	8-3/8	6	5-7/8	34	35

Materials (Wetted)

- Glass: Borosilicate
- Seals: Neoprene, Teflon in Stainless and Kynar

Cylinder Glass – Full View - Flanged

Model 255

Model	Flange Material
205	Carbon Steel
255	316 Stainless Steel
206	PVC

PVC has limited pressure. 3" max. Teflon is not suitable for full vacuum

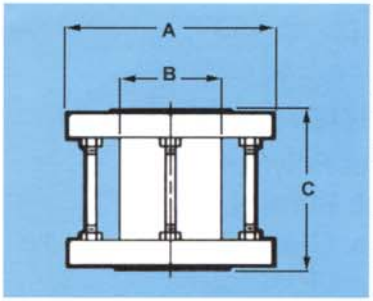
Pressure ratings listed are for a maximum length of 5 times the diameter of the glass.

Features

- Sizes 1/2" to 12" Flanged
- 150# ANSI Flanges
- 360˚ Visibility
- Up to 36" Long
- Plastic Cylinders Available

Ratings

- Neoprene: 300˚F
- EPR: 300˚F
- Viton: 400˚F
- Teflon: 400˚F
- See Table for Pressures



Unit Size	Dimensions in Inches C	B	A	lbs	PSIG
1/2	3-7/8	1-1/4	3-1/2	3	150
3/4	3-7/8	1-1/2	3-7/8	4	150
1	4	1-3/4	4-1/4	5	150
1-1/2	4	2-1/2	5	6	120
2	4-3/4	3	6	12	100
2-1/2	5-3/8	3-1/2	7	15	85
3	5-3/8	4	7-1/2	19	100
4	7-1/2	5	9	22	70
6	10-3/8	7	8-3/8	56	45

Materials (Wetted)

- Glass: Borosilicate
- Seals: Neoprene Teflon in Stainless

Cylinder Glass – Armoured - Threaded

Model 116

Model	End Material
116	Carbon Steel
166	316 Stainless Steel
177	CPVC

Bodies are non-wetted parts.

Glass Reinforced Teflon Ends are also available.

Pressure ratings listed are for metal units.

Bodies are also available in 304SS.

Ratings up to 12" in length are rated for full vacuum.

Features

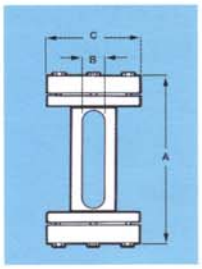
- **Sizes 1/2" to 2" NPT**
- **Up to 36" in Length**
- **Shielded Tubing**
- **O-Ring Seal Around Glass**

Ratings

- Neoprene: 200˚F
- EPR: 300˚F
- Viton: 400˚F
- See Table for Pressures

Materials

- Glass: Borosilicate
- Seals: Neoprene
  Viton in Stainless
- Body: Carbon Steel Epoxy
- End Inserts: Teflon



Unit Size	Dimensions in Inches				PSIG
	A	B	C	lbs	
1/2	7	5/8	2-1/2	4	150
3/4	7	7/8	3	4	150
1	7	1	3	5	150
1-1/4	7-5/8	1-1/4	3	9	150
1-1/2	7-5/8	1-1/4	4	9	150
2	7-5/8	1-1/4	4-1/2	14	120

Cylinder Glass – Armoured - Flanged

Model 217

Model	Body Material
217	Carbon Steel
265	304 Stainless
266	316 Stainless

Bodies are non-wetted parts.

Flanges are 150# ANSI

Features

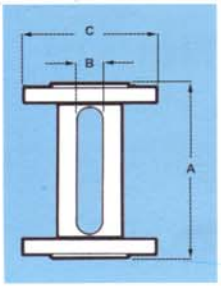
- **Sizes 1/2" to 4" Flanged**
- **Up to 36" in Length**
- **No Metal Wetted Parts**
- **O-Ring Seal Around Glass**

Ratings

- Neoprene: 200˚F
- EPR: 300˚F
- Viton: 400˚F
- See Table for Pressures

Materials

- Glass: Borosilicate
- Seals: Neoprene
  Viton in Stainless
- Body: Carbon Steel Epoxy
  Coat
- End Inserts: Teflon



Unit Size	Dimensions are in Inches				PSIG
	A	B	C	lbs	
1/2	6-1/8	5/8	3-1/2	10	150
3/4	6-3/8	7/8	3-7/8	10	150
1	6-3/8	1	4-1/4	11	150
1-1/2	6-3/4	1-1/4	5	16	150
2	7-5/8	1-1/4	6	23	120
2-1/2	7-7/8	1-1/2	7	31	100
3	8-1/8	1-3/4	7-1/2	33	85
4	8-1/8	1-3/4	9	38	90

Glass Pipe Indicator – Threaded/Flanged

Model 199

Model 298

Model	End Flanges
194	Iron
198	Carbon Steel
199	316 Stainless Steel

End flanges are wetted only. The Iron inner flanges are positioning flanges for the tie rods only and are non-wetted.

Model	End Flanges
298	(None)

Mounts directly to existing flanges.

Glass and Teflon are the only wetted parts.

Dimensions in Inches

Pipe Size (ID)	Pipe (OD)	Wall	PSIG
1	1.313	.156	100
1-1/2	1.844	.172	60
2	2.344	.172	50
3	3.406	.203	40
4	4.530	.265	35
6	6.656	.328	20

Features

- **Sizes 1" to 6" Glass Pipe**
- **Glass ID Matches Pipe ID**
- **Conical Footed Glass Pipe**
- **Multiple Lengths Available**
- **125/150 lb ANSI Mating**

Ratings

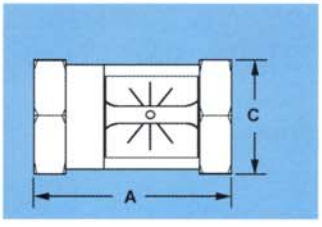
- Temperature: -50˚F to 400˚F
- Sudden Thermal Differential:
  Sizes 1"-3": 180˚F
  Size 4": 140˚F
  Size 6": 122˚F
- See Table For Pressure

Materials

- Glass: Borosilicate
- Seals: Teflon Envelope
- Positioning Flanges: Iron
- Rods: Zinc Plated Steel

Self Cleaning Glass with Wipers

Model 700



Model	Body Material
700	Nickel Plated Brass
716	316 Stainless Steel

These units include two stationary internal wipers which clean the viewing area to allow clear observation of the impeller.

Just rotate the high strength borosilicate glass tube to restore full 360˚ visibility in seconds without disrupting flow.

This process can be repeated as often as desired.

Quick responding 8 blade impeller is sensitive to even very low flows.

Unit Size	Dimension in Inches		Wt lbs
	A	C	
1/4 3/8	2-3/4	1-1/2	1
1/2 3/4	3-11/16	2-1/4	3
1-1/4 1-1/2	4-7/8	2-3/4	6

Features

- **Sizes 1/4" to 1-1/2" NPT**
- **Glass Rotates for Wipers**
- **Cleaning During Operation**
- **Impeller Indication**
- **360˚ Visibility**

Ratings

- Pressure (max): 230 psig
- Temperature (max): 212˚F

Materials (Wetted)

- Glass: Borosilicate
- Seals: Viton
- Impeller: Delrin
- Wipers: Polyolefin, Viton in SS
- Spindle: 303SS

Cylinder Glass – Plastic - Threaded

Model 120

Model	End Material
120	Polypropylene
121	PVC
122	Teflon (1" Max)

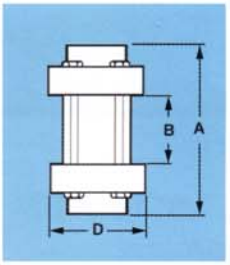
These units utilize a double wall construction and are used to indicate flow or clarity of highly corrosive or ultra-pure liquids (with Teflon seals) compatible with Pyrex Glass.

Features

- Sizes 1/2" to 3" NPT
- Double Wall Cylinders
- No Metal Wetted Parts

Ratings

- Polypropylene: 50 psi @ 185˚F
- PVC: Varies up to 140˚F
- Teflon: Varies up to 225˚F



Unit Size	Dimensions in Inches			Wt. Lbs
	B	A	D	
1/2 3/4	2-1/4	4-3/4	2-1/2	1
1	2-1/4	5-1/4	3	1
1-1/4 1-1/2	2-1/2	5-7/8	3-1/2	2
2	3-1/8	7-3/8	4	3
3	3-3/8	8-3/8	5-1/2	5

Materials

- Inner Glass: Borosilicate
- Outer Glass: Acrylic Plastic
- Seals: Viton O-Rings

Cylinder Glass – Plastic - Flanged

Model 220

Model	End Material
220	Polypropylene
221	PVC
222	Teflon
223	CPVC
224	Kynar (PVDF)

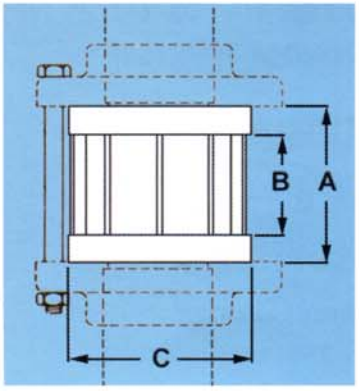
These units utilize a double wall construction and are used to indicate flow or clarity of highly corrosive or ultra-pure liquids (with Teflon seals) compatible with Pyrex Glass.

Features

- Sizes 1-1/2" to 8" Flanged
- To Fit 150lb ANSI & DIN
- Double Wall Cylinders
- No Metal Wetted Parts

Ratings

- Polypropylene: Varies to 185˚F
- PVC: Varies up to 140˚F
- Teflon: Varies up to 225˚F
- CPVC: Varies up to 180˚F
- Kynar: Varies up to 293˚F

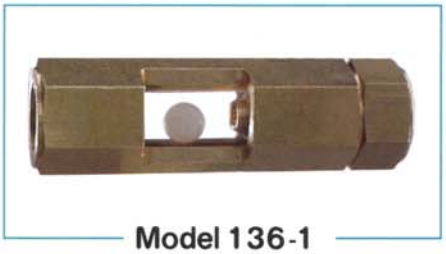


Unit Size	Dimensions in Inches			Wt lbs.
	A	B	C	
1-1/2	4-1/2	2-1/2	3-3/8	2
2	5	3	4-1/8	2
3	5-1/4	3-1/4	5-7/16	3
4	5-5/8	3-5/8	6-7/8	5
6	6-1/8	4-5/16	8-11/16	7
8	6-1/4	4-5/16	10-7/8	10

Materials

- Inner Glass: Borosilicate
- Outer Glass: Acrylic Plastic
- Seals: Viton O-Rings

Cylinder – Ball Action - Threaded



Model 136-1

Model	Brass Body
136-1	Female Ends
136-3	Male/Female Ends

Can be supplied without the ball.

Sizes 3/8" to 1" can be rated to 300ºF with Viton Seals.

Features

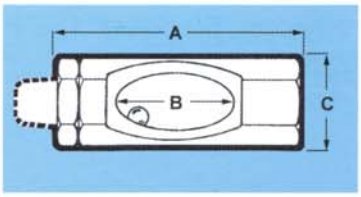
- Sizes 1/8" to 1" NPT
- Agitating Ball Indicator
- Double Window

Ratings

- Temperature: 180˚F

Materials

- Body: Brass
- Glass: Borosilicate
- Seals: Buna-N
- Ball: White Nylon



Unit Size	Dimensions In Inches			PSIG @ 150°F	Wt lbs
	A	B	C		
1/8	3-5/16	1-1/16	7/8	435	.5
1/4	3-9/16	1-1/16	7/8	435	.5
3/8	4-1/4	1-3/8	1-1/16	425	1
1/2	4-5/8	1-7/16	1-1/4	380	1
3/4	5-1/4	1-1/2	1-3/8	345	2
1	6-5/16	1-1/2	1-5/8	270	3

Cylinder – Shielded - Threaded

Model 149-1

Model	Brass Body
149-1	Female Ends
149-2	Male Ends
149-3	Male/Female Ends

Features

- Sizes 1/8" to 1-1/2" NPT
- Economical

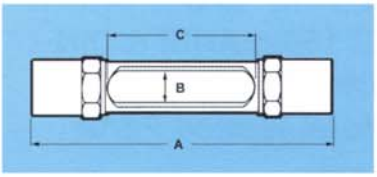
Ratings

- 100 psig @ 250˚F

Materials

- Body: Brass
- Glass: Borosilicate
- Seals: Neoprene

Sizes 1/8 to 1/2 are single window.
Sizes 3/4 to 1-1/2 are double window.



Unit Size	Dimensions In Inches			Wt lbs.
	A	B	C	
1/8	2-7/16	5/8	1-3/16	.25
1/4	3	5/8	1-3/16	.25
3/8	3	5/8	1-3/16	.25
1/2	4-7/16	5/8	2-1/4	.50
3/4	4-9/16	7/8	2	.50
1	5-1/16	1	2-3/8	1.0
1-1/4	5-5/16	1-1/4	2-3/8	1.5
1-1/2	5-3/8	1-1/2	2-3/8	2.0

Cylinder – Armoured - Threaded

Model 158

Model	Ends (Wetted)
108	Carbon Steel
128	Bronze
158	316 Stainless Steel

The body is a non-wetted part.
Only the ends are wetted metal.

Features

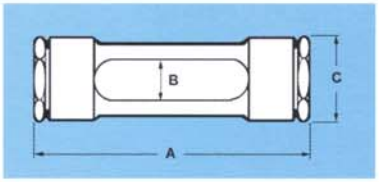
- Sizes 1/4" to 1-1/2" NPT
- Double Window

Ratings

- 150 psig @ 300˚F

Materials

- Body: Bronze
- Glass: Borosilicate
- Seals: Neoprene



Unit Size	Dimensions In Inches			Wt lbs.
	A	B	C	
1/4	4-7/8	5/8	1-1/2	1
3/8	4-7/8	5/8	1-1/2	1
1/2	6	3/4	1-3/4	2
3/4	6-5/8	1	2	3
1	6-5/8	1	2	3
1-1/4	8-7/8	1-3/8	2-7/8	6
1-1/2	8-7/8	1-3/8	2-7/8	6

Sanitary Sight Gauge – Tri-Clamp

Model 6260

Model	Body Material
6260	316 Stainless Steel

Compact sanitary construction. Designed to provide quick disassembly.

Complies with Construction Criteria of Grade A Pasturized Milk Ordinance.

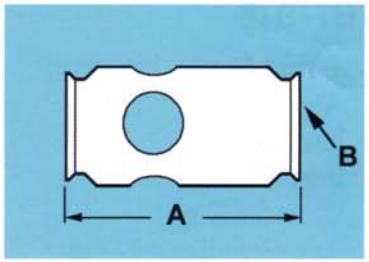
Optional Seal materials include Silicone, EPDM, and Viton

Features

- Sizes 1/2" to 4" Tri-Clamp
- Crevice Free
- CIP, SIP, COP
- Mechanical Finish–180 Grit

Ratings

- 100 psi @ 250˚F
- 150 psi @ 70˚F
- Vacuum: 29 Inches Hg.



Unit Size	Dimensions in Inches	
	A	B
1/2	3.000	.50
3/4	3.500	.75
1	3.750	1.00
1-1/2	3.465	1.50
2	3.645	2.00
2-1/2	3.645	2.50
3	3.580	3.00
4	3.650	4.00

Materials

- Glass: Borosilicate
  Polysulfone (Optional)
- Seals: Buna

Flanged Teflon Sight Gauge

Model 6270

Model	End Material
6270	304 Stainless Steel Uncaged
6280	304 Stainless Steel Caged

150 lb Flanges are standard.
300 lb Flanges available.
Flanges also available in Carbon Steel and 316 Stainless Steel.

Sturdy, favorable in high stress applications. Smooth, non-stick surface cleans easily.

High and low temperature rated.

Not vacuum rated.

Features

- Sizes 3/4" to 4" Flanged
- Translucent Teflon
- Flare Thru Ends
- Crevice Free
- Up to 20 Feet Long
- Will Not Discolor
- UV and Sunlight Resistant
- Sanitary Connections Available
- No Flow Restriction
- No Entrapment Areas

Model 6280

Unit Size	PSI @ Amb.	Min Burst PSI @ 68˚F
3/4	200	600
1	150	450
1-1/2	150	450
2	150	450
2-1/2	150	450
3	100	300
4	100	300

Ratings

- See Table (Ratings at Ambient)
  73 psi @ 248˚F Max

Materials (Wetted)

- Translucent Teflon (FEP)

SIGHT FLOW INDICATORS

Vane & Piston – Variable Area

Model 335SN

Model	Body Material
335	Varies upon Application

These meters operate by the variable-orifice principle. The liquid pushes against a spring-loaded swinging vane or piston. They can handle shocks or overflows up to 1-1/2 times rated capacities. Available with Switches, 4-20mA Transmitter outputs, Voltage Transmitters, Potentiometer outputs, and Intrinsically Safe outputs.

Features

- Sizes 1/8" to 8"
- Piston & Vane Type
- 5 GPH to 1500 GPM
- Viscosity's to 3000 SSU
- Various Remote Options

Ratings

- Temperature: 200˚F
  400˚F (Opt.)

Materials

- Available Meter Housings:
  Aluminum
  Brass
  Iron
  Carbon Steel
  316 Stainless Steel
  Nylon
  PVC
  Polysulfone

LIQUIDS & GASES – Water, Coolant, Oil, Paint, Air, Gas				
Type	**Design**	**Max Flows Sized from**	**Max. Pressure**	**Available Sizes**
SN	Vane	0.5 – 10 GPM	2000 PSIG	1/4" – 1" NPT/Flanged
LL	Piston	5 GPH – 20 GPM	1500 PSIG	1/8" – 3/4" NPT
MN	Vane	10 – 160 GPM	2000 PSIG	1/2" – 2" NPT/Flanged
LN	Vane	80 – 500 GPM	1000 PSIG	1-1/2" – 4" NPT/Flngd
XHF	Vane	500 – 1500GPM	300 PSIG	4" – 8" Flanged
CORROSIVES – Seawater, Deionized Water, Acids, Caustics				
Type	**Design**	**Max Flows Sized from**	**Max. Pressure**	**Available Sizes**
SX	Vane	0.5 – 10 GPM	200 PSIG	1/4" – 1" NPT
MX	Vane	15 – 100 GPM	200 PSIG	1" & 1-1/2" NPT
MX	Vane	15 – 160 GPM	200 PSIG	1" – 3" Flanged (PVC)

Shuttle Type – In-Line - Threaded

Model 370BR

Model	End Material
370A	Aluminum
370BR	Brass
371SS	316 Stainless Steel
378PV	PVC
378PD	PVDF

Features

- Sizes 1/2" to 1-1/2" NPT
- For Liquids or Air
- Easy to Read
- Fluid Always Visible
- Low Pressure Drop
- Ultra-Pure Applications
- Electric Switches Avail

Ratings

- Temperature: 150˚F Max

  PVDF: 100˚F
- Accuracy: ±5% (up to 1-1/2")

Materials

- Wetted: PVC and 316SS
- Seals: Viton

Example of How to Order: Model 370BR-0.50-10GPM (for 1/2"NPT)

Unit Size	Flow Range GPM	Length Inches	Hex End Inches	PSIG @ 70˚F
1/2	3, 5, 10, 15	7	2	200
3/4	3, 5, 10, 15	7	2	200
3/4	20, 30	7	3	200
1	3, 5, 10, 15	7	2	200
1	20, 30, 40, 50	7	3	200
1-1/2	20, 30, 40, 50	7	3	200

Digital Totalizer – Water Meter

Model 318 01 N100

Model	Material
318 01 N100	Nylon

This meter easily installs in-line or at the end of a hose. The large, easy to read display and compact, lightweight design please any user. A rugged nylon housing and sealed electronic circuitry provides years of durable use in almost any condition. Two AAA batteries power the small microprocessor for a year and are very easy to replace.

Features

- Size 1" NPT and ISO
- Batch & Cumulative Total
- Battery Operated
- For Water Only
- 4 Digit Display
- Economical
- Turbine Type
- Auto ON/OFF

Ratings

- 150 psig @ 131˚F

Materials (Wetted)

- Body/Rotor: Nylon
- Bearings: Ceramic
- Shaft: Tungsten Carbide
- Signal Generator: Ferrite
- Retaining Ring: 316SS
- Shaft Support: Nylon

Model	318 01 N100	318 01 N100LM
Display in	Gallons	Liters
Range	3 to 30 GPM	10 to 100 LPM
Pressure	150 psig	10.3 bars
Temperature	+14˚F to 131˚F	– 10˚C to 55˚C
Totals Maximum	9,999	9,999
Weight	0.4 lbs.	190 grams
Dimensions	4" W x 2"H x 3" D	10W x 5H x 7.6D cm
Connections	1" NPT	1" NPT
Pressure Drop	1 psig full capacity	1 psig full capacity
Accuracy*	Typically ±2.5%	Typically ±2.5%

*Accuracy can vary to ±5% at ends of range.

Digital Totalizer – Fuel Meter

Model 317 01 A100

Model	Material
317 01 A100	Aluminum

The large, easy to read display and compact, lightweight design please any user. Fittings provided for adaptation to 3/4" system. The meter can attach at a nozzle for easy viewing. Two AAA batteries power the small microprocessor for a year and are very easy to replace.

- ❑ For gasoline, diesel fuel, or kerosene only.
- ❑ For pump or gravity feed systems.

Features

- Size 1" NPT, ISO, BSPP
- Batch & Cumulative Total
- Battery Operated
- 4 Digit Display
- Economical
- Turbine Type
- Auto ON/OFF

Ratings

- 300 psig @ 130˚F

Materials (Wetted)

- Body: Aluminum
- Rotor: Nylon
- Bearings: Ceramic
- Shaft: Tungsten Carbide
- Signal Generator: Ferrite
- Retaining Ring: 316SS
- Shaft Support: Nylon

Model	317 01 A100	317 01 A100LM
Display in	Gallons	Liters
Range	3 to 30 GPM	10 to 100 LPM
Pressure	300 psig	20.7 bars
Temperature	+14˚ to 130˚F	-10˚ to 54˚C
Totals Maximum	9,999	9,999
Weight	1 lbs.	450 grams
Dimensions	4" W x 2"H x 2.5" D	10W x 5H x 6.4D cm
Connections	1" NPT	1" NPT
Pressure Drop	1 psig full capacity	1 psig full capacity
Accuracy	±5%	±5%

Digital Flow Meter & Totalizer – Aluminum

Model 317 04 A100

Model 317 04 A200

These meters offer durable, compact, high precision fluid measurement systems at a fraction of the price you would expect to pay for flow meters with similar features and benefits.

Two body sizes are available as shown. Batteries are easy to replace in the field.

The CMOS, microprocessor-based electronics have extremely low power requirements and data retention capabilities in both RAM and ROM. Information is clearly displayed on a large 6-digit liquid crystal display with two-point floating decimal for totals from .01 to 999,999. All operations are accessed with two buttons which simplify operations.

Output Module Accessories available are FM Approved Remote Kit, Standard Remote Kit, Conditioned Signal Output.

Features

- **Sizes 1" and 2" NPT**
- **FM Approved Class I Div I**
- **Battery Operated**
- **Up to 3 Totals**
- **Batch & Cumulative Totals**
- **Rate of Flow**
- **Field Calibratable**
- **6 Digits - Floating Decimal**
- **Auto & Manual ON/OFF**
- **Output Module Accessories Available. See Page 22.**

Ratings

- Temperature:
  140˚F with Display
  250˚F without Display
- Pressure: 300 PSIG

Materials (Wetted)

- Body: Aluminum
- Rotor/Support: Nylon
- Bearings: Ceramic
- Shaft: Tungsten Carbide
- Retaining Rings: 316SS

Not recommended for water

Power Source—is two lithium batteries which provide at least 4000 hours of actual use. (Batteries included).

Cumulative Total 1—is the non-resettable total of all liquid metered since the battery were connected.

Batch Total 2 or 3—is the resettable total of liquid metered since the last manual clearing of this total.

Calibration A—is a factory-preset calibration for water like material and cannot be changed.

Calibration B or C—is set and changed by the user.

Model Selection Table			
Computer Type	**1" NPT (Low Flow)**	**1" NPT**	**2" NPT**
03 - 2 Totals, 2 Calibrations	**317 03 A025**	**317 03 A100**	**317 03 A200**
04 - 2 Totals, 2 Calibrations, Rate	**317 04 A025**	**317 04 A100**	**317 04 A200**
05 - 3 Totals, 3 Calibrations	**317 05 A025**	**317 05 A100**	**317 05 A200**
06 - 2 Totals, 1 Calibrations	**317 06 A025**	**317 06 A100**	**317 06 A200**
07 - 3 Totals, 3 Cals., Rate	**317 07 A025**	**317 07 A100**	**317 07 A200**
08 - Rate Only, 2 Calibrations	**317 08 A025**	**317 08 A100**	**317 08 A200**

Specifications	1" NPT (Low Flow)	1" NPT	2" NPT
Flow Range (GPM)	0.3—3	3—50	30—300
Internal Diameter	0.25"	1"	2"
Design Type	Paddlewheel	Turbine	Turbine
Accuracy —Factory Calibration	±1.5%	±1.5%	±1.5%
Accuracy —Field Calibration	±1.0%	±1.0%	±1.0%
Max Press Drop-Max Flow Rate(PSIG)	2	5	7
Weight (lbs)	1	1	2.5
Length x Height x Width (Inches)	4 x 2.5 x 2	4 x 2.5 x 2	6 x 4.25 x 3

Digital Flow Meter & Totalizer – Nylon

Model 318 04 N100

These meters offer durable, compact, high precision fluid measurement systems at a fraction of the price you would expect to pay for flow meters with similar features and benefits.

Batteries are easy to replace in the field.

All operations are accessed with two buttons which simplify operations.

Features

- **Size 1" NPT Only**
- **FM Approved Class I Div I**
- **Battery Operated**
- **Up to 3 Totals**
- **Batch & Cumulative Totals**
- **Rate of Flow**
- **Field Calibratable**
- **6 Digits - Floating Decimal**
- **Auto & Manual ON/OFF**
- **Output Module Access. Available. See Page 22**

The CMOS, microprocessor-based electronics have extremely low power requirements and data retention capabilities in both RAM and ROM. Information is clearly displayed on a large 6-digit liquid crystal display with two-point floating decimal for totals from .01 to 999,999.

Power Source—is two lithium batteries which provide at least 4000 hours of actual use. (Batteries Included).

Cumulative Total 1—is the non-resettable total of all liquid metered since the batteries were connected.

Batch Total 2 or 3—is the resettable total of liquid metered since the last manual clearing of this total.

Calibration A—is a factory-preset calibration for water and cannot be changed.

Calibration B or C—is set and changed by the user.

Output Module Accessories – FM Remote Kit, Std Remote Kit, Conditioned Signal Output. See Page 22 for these accessories.

Ratings

- Temperature:
  140˚F with Display
  250˚F without Display
- Pressure: 150 PSIG

Materials (Wetted)

- Body: Nylon
- Rotor/Support: Nylon
- Bearings: Ceramic
- Shaft: Tungsten Carbide
- Retaining Rings: 316SS

Model Selection Table		
Computer Type	**1" NPT (Low Flow)**	**1" NPT**
03 - 2 Totals, 2 Calibrations	**318 03 N025**	**318 03 N100**
04 - 2 Totals, 2 Calibrations, Rate	**318 04 N025**	**318 04 N100**
05 - 3 Totals, 3 Calibrations	**318 05 N025**	**318 05 N100**
06 - 2 Totals, 1 Calibrations	**318 06 N025**	**318 06 N100**
07 - 3 Totals, 3 Calibrations, Rate	**318 07 N025**	**318 07 N100**
08 - Rate Only, 2 Calibrations	**318 08 N025**	**318 08 N100**

Specifications	1" Low Flow	1"
Flow Range (GPM)	0.3—3	3—50
Internal Diameter	0.25"	1"
Design Type	Paddlewheel	Turbine
Accuracy —Factory Calibration	±1.5%	±1.5%
Accuracy —Field Calibration	±1.0%	±1.0%
Max. Press. Drop - Max Flow Rate (PSIG)	2	5
Weight (lbs)	0.5	0.5
Length x Height x Width (Inches)	4 x 2.5 x 2	4 x 2.5 x 2

Digital Flow Meter & Totalizer – Stainless Steel

Model 319 04 S100

Model 319 04 S150

These meters offer durable, compact, high precision fluid measurement systems at a fraction of the price you would expect to pay for flow meters with similar features and benefits.

The CMOS, microprocessor-based electronics have extremely low power requirements and data retention capabilities in both RAM and ROM. Information is clearly displayed on a large 6-digit liquid crystal display with two-point floating decimal for totals from .01 to 999,999. All operations are accessed with two buttons which simplify operations.

The top picture represents sizes 1/2", 3/4", and 1". The bottom picture represents sizes 1-1/2", and 2".

Batteries are easy to replace in the field.

Available Output Modules are listed on Page 22.

Features

- **Sizes to 2" NPT & Flanged**
- **FM Approved Class I Div I**
- **Battery Operated**
- **Up to 3 Totals**
- **Batch & Cumulative Totals**
- **Rate of Flow**
- **Turbine Type**
- **6 Digits - Floating Decimal**
- **Auto & Manual ON/OFF**
- **Output Module Accessories Available. See Page 22.**

Ratings

- Temperature:
  140˚F with Display
  250˚F without Display
- Pressure: 1500 PSIG*
- Repeatability: ±0.1%

*3000 PSIG Models available

Materials (Wetted)

- Body: 316 Stainless Steel
- Rotor/Support: PVDF
- Bearings: Ceramic
- Shaft: Tungsten Carbide
- Retaining Rings: 316SS

Power Source —is two lithium batteries which provide at least 4000 hours of actual use. (Batteries Included)

Cumulative Total 1 —is the non-resettable total of all liquid metered since the batteries were connected.

Batch Total 2 or 3 —is the resettable total of liquid metered since the last manual clearing of this total.

Calibration A —is a factory-preset calibration for water and cannot be changed.

Calibration B or C —is set and changed by the user.

Model Selection Table

Computer Type	1/2"	3/4"	1"	1-1/2"	2"
03 - 2 Totals, 2 Calibrations	**319 03 S050**	**319 03 S075**	**319 03 S100**	**319 03 S150**	**319 03 S200**
04 - 2 Tot, 2 Cal., Rate	**319 04 S050**	**319 04 S075**	**319 04 S100**	**319 04 S150**	**319 04 S200**
05 - 3 Tot, 3 Cal.	**319 05 S050**	**319 05 S075**	**319 05 S100**	**319 05 S150**	**319 05 S200**
06 - 2 Tot 1 Cal,	**319 06 S050**	**319 06 S075**	**319 06 S100**	**319 06 S150**	**319 06 S200**
07 - 3 Tot 3 Cal., Rate	**319 07 S050**	**319 07 S075**	**319 07 S100**	**319 07 S150**	**319 07 S200**
08 - Rate Only, 2 Cal.	**319 08 S050**	**319 08 S075**	**319 08 S100**	**319 08 S150**	**319 08 S200**

Specifications	1/2"	3/4"	1"	1-1/2"	2"
Flow Range —Linear (GPM)	1 - 10	2 - 20	5 - 50	10 - 100	20—200
Flow Range —Extended (GPM)	.5 - 15	1 - 30	2.5 - 75	5 - 150	10—300
Accuracy —Linear Range 10:1	±2.0%	±1.5%	±1.5%	±1.0%	±1.0%
Accuracy —Extended Range 20:1	±5.0%	±5.0%	±5.0%	±5.0%	±5.0%
Max. Press. Drop- Linear Range	8 psig	7.5 psig	5 psig	4 psig	4 psig
Frequency Range in Linear Range	45—450 Hz	37—370 Hz	45—475 Hz	35—350 Hz	33—330 Hz
Weight	2.2 lbs.	2.4 lbs.	2.8 lbs.	4.6 lbs.	7.0 lbs.
Height (Inches)	1.8	2.0	2.2	2.8	3.2
Width (Inches)	2.0	2.0	2.0	2.7	3.3
Length (Inches)	4.2	4.3	4.5	5.3	6.3

Output Modules for Digital Flow Meters

Conditioned Signal

Part Number P317 113435-1

This module provides an unscaled, amplified, digital signal from the turbine housing. This module's digital output eliminates the need for additional signal conditioning equipment. This module would replace the local digital display. 212°F max or limitation of turbine body.

Features

- Open Collector or 6-volt Square Wave Output
- Signal up to 5000 ft

FM Remote Kit

Part Number P317 113275-1

This module allows remote mounting of the computer electronics for specialized situations such as remote readings or high and low fluid temperature applications while maintaining the FM Approval and self powered design. This module replaces the local digital display. Increases rating to 250°F.

- Low Level Sine Wave Output
- LCD can be located up to 100 ft. away from Turbine

Std Remote Kit

Part Number P317 113265-1

This module allows remote mounting of the computer electronics for specialized situations such as remote readings or high and low fluid temperature applications. This module replaces the local digital display. For the 2" Aluminum Turbine only the Part Number is P317 113265-2.

- Low Level Sine Wave Output
- LCD can be lo to 300 ft. away from Turbine

4-20mA Output

Part Number P319 125100-1

This module provides two industry standard analog signals by converting the digital output of the on-board computer readout to an analog signal which is proportional to flow. This module is for the Stainless Steel, Brass, or Aluminum models only and mounts to the back of the turbine housing. 140°F max.

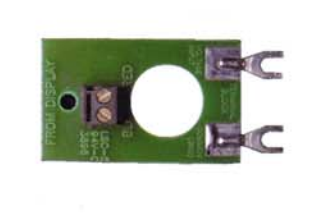
- 4-20mA or 0-5 Volt Analog Signal Output
- Weatherproof Enclosure

Pulse Access

Part Number P319 125060-1

This module provides an unscaled, digital signal from the flow meter by accessing circuitry from the on-board computer readout. This module is for Stainless Steel models only and mounts to the back of the turbine housing.

- Digital Open Collector Output
- Signal up to 5000 ft



External Power

Part Number P319 125070-1

This module provides an external power option for the Pulse Access Module. Internal batteries can be used as an auxiliary power source. This module is for Stainless Steel models only and mounts to the back of the turbine housing. It must be purchased along with the Pulse Access Module. 140°F max.

- 9-30 Volt External Power
- Installs on Pulse Access Module Plate

FLOW METERS

Mechanical & Digital Flow Meter - Threaded

FLOW METERS

Model 300

Model 302
With Option R

The Flow Meter measures flow based on a pressure differential created across a built-in calibrated nozzle. The meter is self-contained and complete.

Model	Body Material
300	Bronze
301	Monel
302	316 Stainless Steel

The meters are unaffected by over ranging.
Standard Flow Direction of Horizontal, Left to Right will be supplied if not stated when ordering.

Options

A	Viton seals
B	EPR seals
B2	Teflon TFE seals
C	Specific grav. calibration
D	Gasketed case
E	Non-standard flow rate
ES	Low flow rate (< 2 gpm)
G	Custom scales and dials
H	400 psig service
I	Compressed gas service
J	Peak flow indicator
K	Saturated steam service
N	Ammonia service
O2	Oxygen Cleaning
P	Panel mount
R	LCD-Total & Rate Display
T	350˚F temp. range
V	High viscosity 5-500 cps
W	4-20mA DC linear
W2	4-20mA DC non-linear
W3	Same as W2 no indicator
X	Hi/Lo setpoint relays
Y	0-1000 Hz frequency
Z	Options W,X,Y combined
1S2	1 Reed switch SPDT
2S2	2 Reed switches SPDT

Features

- Sizes 1/4" to 3" NPT
- For Liquids & Gases
- 3.5" Dial Type Standard
- Flow Rates to 500 GPM
- Mounts In Any Position
- No Wetted Mech. Parts
- Specific Gravity Calibrations Available
- Units in GPM, GPH, SCFM, SCFH, LPM, LPH, CCPM
- Low Pressure Drop
- Differential Pressure Operation
- Alarms & Outputs Available

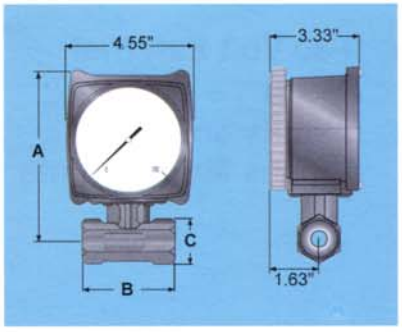
Ratings

- Pressure:
  10 to 180 psig Standard
  10 to 400 psig Optional
- Temperature:
  -30˚ to 212˚F Standard
  -80˚ to 350˚F Optional
- Accuracy: ±3% Full Scale
- Repeatability: ±1% Full Scale

Materials

- Meter Housing: Polycarbonate
- Bellows: Bronze (Std)
  Monel, 316SS (Opt)
- Seals: Buna-N (see Options)
- Crystal: Polycarbonate
- Gear Movement: Bronze (Std)
  316SS (Opt)

- ❑ Piping should be rigidly supported and free of vibration.
- ❑ Do not subject meter to water hammer.
- ❑ Protect meter from freezing liquids.
- ❑ Provide at least 10 pipe diameters of straight approach at meter inlet.



How to Order Example: Model 300 0.50 10GPM (for a 1/2" NPT)

Unit Size	Available GPM Ranges	Dimensions in Inches A	B	C	Wt. lbs.
1/4	2, 3, 4	5.20	3.06	1.06	4
1/2	2, 3, 4, 6, 10	5.20	3.06	1.06	4
3/4	6, 10, 15, 20	5.95	3.06	1.50	4
1	15, 20, 30, 40	6.07	3.06	1.75	4
1-1/2	30, 40, 60, 100	6.39	3.06	2.50	5
2	40, 60, 100, 150, 200	6.80	3.19	3.19	7
3	200, 300, 400, 500	7.48	4.19	4.62	12

Mechanical & Digital Flow Meter - Wafer

Model 300W (w/Option G)

Model 302W

The operating principal is the same as the Model 300 on page 23.

Model	Body Material
300W	Bronze
301W	Monel
302W	316 Stainless Steel

Model 301W Monel is available up to 3" only. The meters are unaffected by overranging.

Maximum particle size is 5000 ppm

How to Order Example:
Model 300W-3.00-200GPM-B

Options

A	Viton seals
B	EPR seals
B2	Teflon TFE seals
C	Specific grav. calibration
D	Gasketed case
E	Non-standard flow rate
ES	Low flow rate (< 2 gpm)
G	Custom scales and dials
H	400 psig service
I	Compressed gas service
J	Peak flow indicator
K	Saturated steam service
N	Ammonia service
O2	Oxygen Cleaning
P	Panel mount
R	LCD-Total & Rate Display
T	350˚F temp. range
V	High viscosity 5-500 cps
W	4-20mA DC linear
W2	4-20mA DC non-linear
W3	same as W2 no indicator
X	Hi/Lo setpoint relays
Y	0-1000 Hz frequency
Z	Options W,X,Y combined
1S2	1 Reed switch SPDT
2S2	2 Reed switches SPDT

Features

- **Sizes 1/2" to 8"**
- **For Liquids & Gases**
- **Mounts between 2 Flanges**
- **3.5" Dial Type Standard**
- **Flow Rates to 3000 GPM**
- **Mounts In Any Position**
- **For 150# Flanges Only**
- **Factory Calibrated**
- **Units in GPM, GPH, SCFM, SCFH, LPM, LPH, CCPM**
- **Low Pressure Drop**
- **Differential Pressure Oper.**
- **Alarms & Outputs Available**

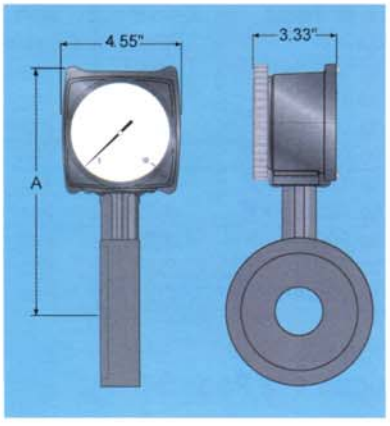
Ratings

- Pressure:
  10 to 180 psig Standard
  10 to 400 psig Optional
- Temperature:
  -30˚ to 212˚F Standard
  -80˚ to 350˚F Optional
- Accuracy: ±3% Full Scale
- Repeatability: ±1% Full Scale

Materials

- Meter Housing: Polycarbonate
- Bellows: Bronze (Std)
  Monel, 316SS (Opt)
- Seals: Buna-N (see Options)
- Crystal: Polycarbonate
- Gear Movement: Bronze (Std)
  316SS (Opt)

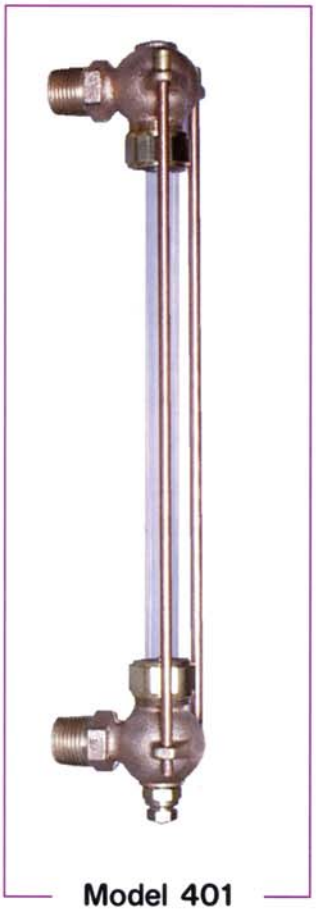
- ❑ Piping should be rigidly supported and free of vibration.
- ❑ Do not subject meter to water hammer.
- ❑ Protect meter from freezing liquids.
- ❑ Provide at least 10 pipe diameters of straight approach at the meter



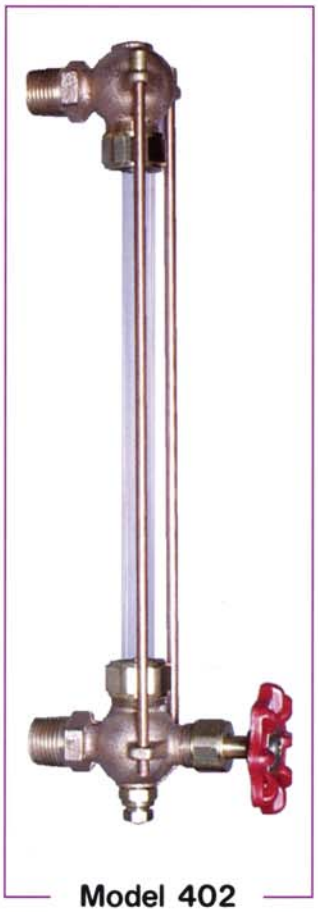
B= Diameter of Wafer, Wafer is 1-1/8" thick

Unit Size	Available GPM Ranges	Dim. in Inches A	Dim. in Inches B	Weight lbs.
1/2	2, 3, 4, 6, 10	6.62	1.69	4
3/4	6, 10, 15, 20	7.06	2.00	5
1	15, 20, 30, 40	7.25	2.38	5
1-1/2	30, 40, 60, 100	7.81	3.12	6
2	40, 60, 100, 150, 200	8.00	3.75	7
2-1/2	60, 100, 150, 200	8.54	4.25	8
3	200, 300, 400, 500	8.87	5.00	9
4	300, 400, 600, 800	9.95	6.13	12
6	600, 800, 1000, 2000	11.05	8.38	16
8	600, 1000, 2000, 3000	12.30	10.38	24

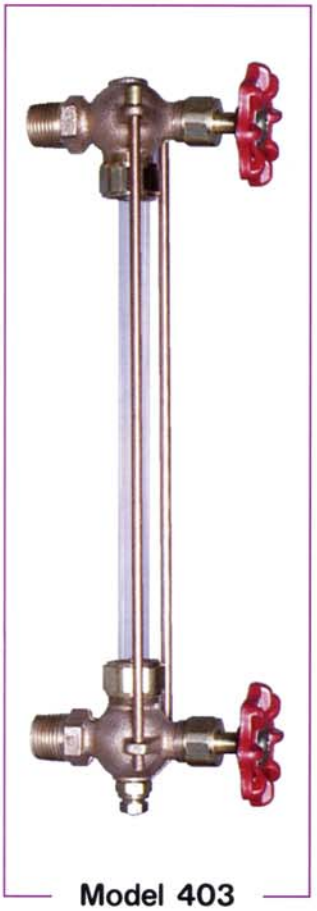
Tubular Gauge Valves - Brass



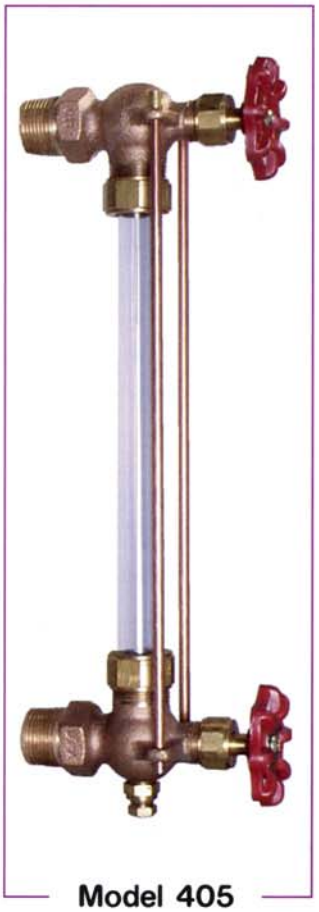
Model 401



Model 402



Model 403



Model 405

Features

- **Vessel Connection Sizes: 3/8" to 3/4" NPT**
- **Auto Ball Checks Available**
- **For Glass Tube or Shielded Gauges**

Ratings

- **Pressure Ratings** are subject to the limitations of the gauge glass (Page 42)
- **Temperature Ratings** are subject to the limitations of the packing (Page 45).

Materials

- Body: Brass
- Glass Packing: EPDM
- Stem Packing: Teflon

A Special Note about Corrosion:

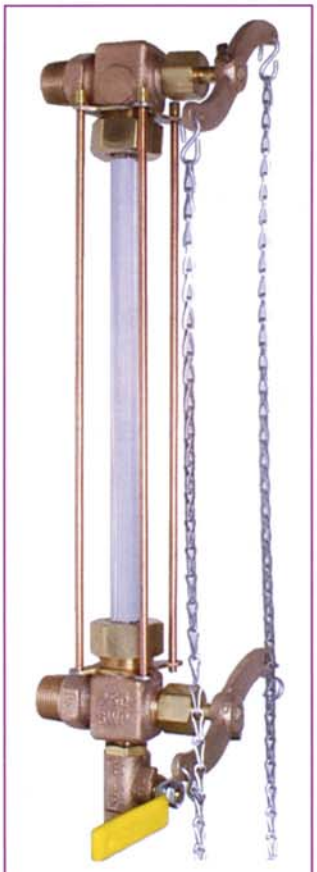
- Excessive corrosion may result in leakage, glass breakage, and premature valve failure.
- Be sure all wetted components of the gauge are constructed with materials compatible with the service medium. John C. Ernst Co. does not make chemical compatibility recommendations.
- See the "*Compass Corrosion Guide*" or equivalent for material compatibility.

Model	Size NPT	Glass OD	Glass Length from Centers	Rod Length from Centers
401-03	3/8"	5/8"	- 1-1/4"	+ 3/4"
401-04	1/2"	5/8"	- 1-1/4"	+ 3/4"
401-05	3/4"	3/4"	- 1-1/4"	+ 3/4"
402-04	1/2"	5/8"	- 1-1/4"	+ 3/4"
403-03	3/8"	5/8"	- 1-1/4"	+ 3/4"
403-04	1/2"	5/8"	- 1-1/4"	+ 3/4"
405-03	3/8"	5/8"	- 1-1/2"	+ 3/4"
405-04	1/2"	5/8"	- 1-1/4"	+ 3/4"
405-05	3/4"	3/4"	- 1-1/4"	+ 3/4"

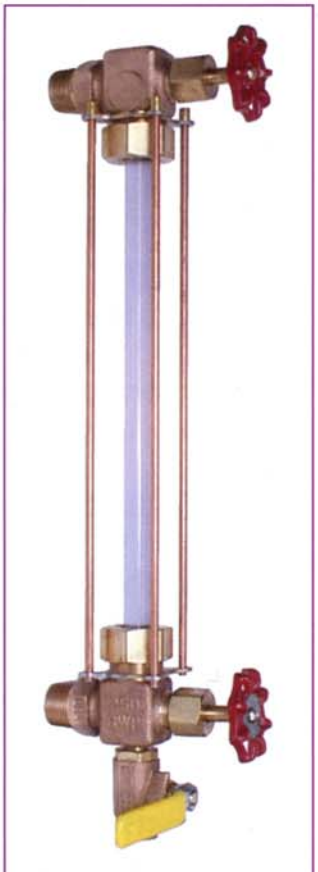
Model	Maximum Liquid Pressure @ Temp PSIG / °F	Steam Service PSIG	Auto Ball Checks
401-03	300/100°F to 125/350°F	N/A	No
401-04	300/100°F to 125/350°F	N/A	No
401-05	100/100°F to 50/300°F	N/A	No
402-04	400/100°F to 200/400°F	N/A	Yes
403-03	300/100°F to 125/350°F	125	No
403-04	300/100°F to 125/350°F	125	No
405-03	200/100°F to 100/300°F	100	Yes
405-04	400/100°F to 200/400°F	200	Yes
405-05	400/100°F to 200/400°F	200	Yes

For Glass see Page 42.
For Shielded Gauges see Page 34.

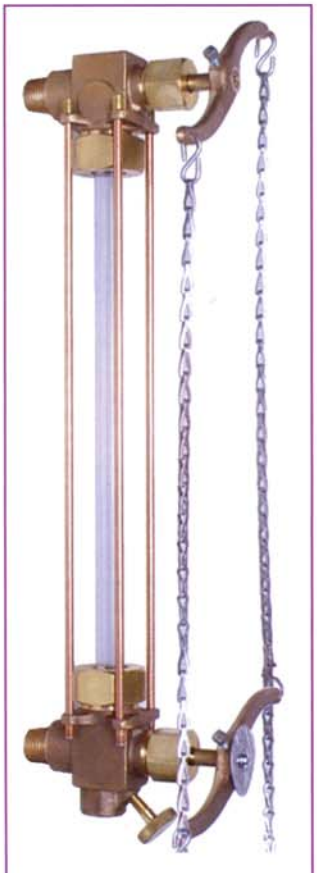
Tubular Gauge Valves – Bronze



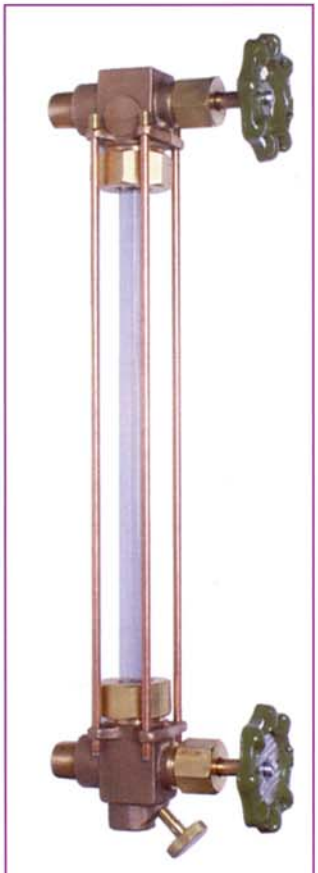
Model 408



Model 409



Model 414



Model 415

Features

- **Sizes 1/2" NPT up to 1" Flanged**
- **Auto Ball Checks (ASME)**
- **For Glass Tube or Shielded Gauges**

Ratings

- **Pressure Ratings** are subject to the limitations of the gauge glass (Page 42).
- **Temperature Ratings** are subject to the limitations of the packing (Page 45).

Materials

- Body: Bronze
- Glass Packing: EPDM
- Stem Packing for 408/409: Teflon
- Stem Packing for 414/415: Graphite

A Special Note about Corrosion:

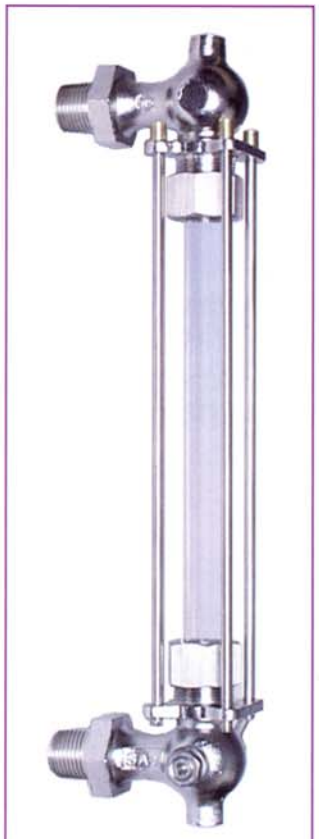
- Excessive corrosion may result in leakage, glass breakage, and premature valve failure.
- Be sure all wetted components of the gauge are constructed with materials compatible with the service medium. John C. Ernst Co. does not make chemical compatibility recommendations.
- See the "*Compass Corrosion Guide*" or equivalent for material compatibility.

Model	Size NPT	Glass OD	Glass Length from Centers	Rod Length from Centers
408-04	1/2"	5/8"	- 2"	- 1"
408-05	3/4"	3/4"	- 2"	- 1"
409-04	1/2"	5/8"	- 2"	- 1"
409-05	3/4"	3/4"	- 2"	- 1"
414-04	1/2"	5/8"	- 2"	- 1"
414-05	3/4"	3/4"	- 2"	- 1"
415-04	1/2"	5/8"	- 2"	- 1"
415-05	3/4"	3/4"	- 2"	- 1"

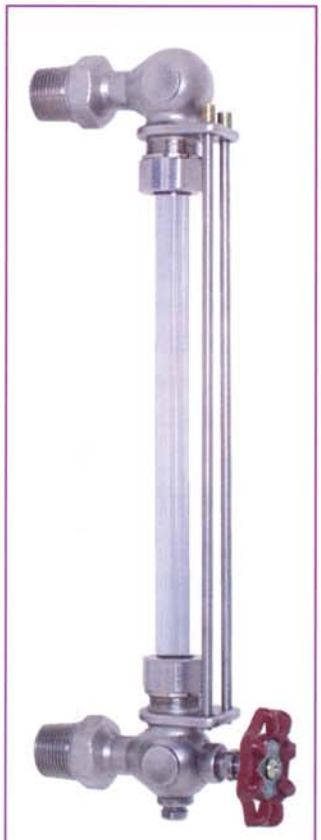
Model	Maximum Liquid Pressure @ Temp PSIG / °F	Steam Service PSIG	Auto Ball Checks
408-04	500/100°F to 250/400°F	250	ASME
408-05	500/100°F to 250/400°F	250	ASME
409-04	500/100°F to 250/400°F	250	ASME
409-05	500/100°F to 250/400°F	250	ASME
414-04	200/100°F to 125/400°F	125	ASME
414-05	400/100°F to 250/400°F	250	ASME
415-04	200/100°F to 125/400°F	125	ASME
415-05	400/100°F to 250/400°F	250	ASME

For Glass see Page 42.
For Shielded Gauges, See Page 34.

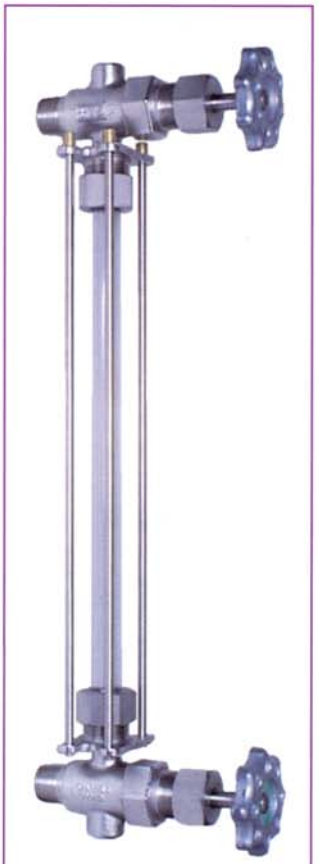
Tubular Gauge Valves – Stainless Steel



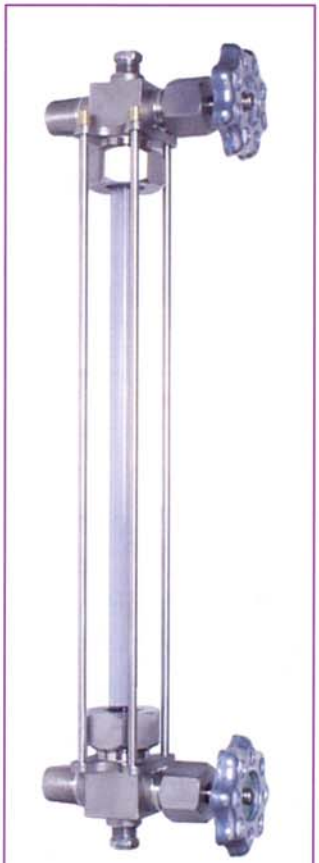
Model 440



Model 448



Model 447



Model 416

Features

- **Vessel Connection Sizes: 1/4" NPT up to 1" Flanged**
- **Auto Ball Checks**
- **For Glass Tube or Shielded Gauges**

Ratings

- **Pressure Ratings** are subject to the limitations of the gauge glass (Page 42)
- **Temperature Ratings** are subject to the limitations of the packing (Page 45)

Materials

- Body: 316 Stainless Steel
- Glass Packing: Viton
- Stem Packing: Teflon

A Special Note about Corrosion:

- Excessive corrosion may result in leakage, glass breakage, and premature valve failure.
- Be sure all wetted components of the gauge are constructed with materials compatible with the service medium. John C. Ernst Co. does not make chemical compatibility recommendations.
- See the "*Compass Corrosion Guide*" or equivalent for material compatibility.

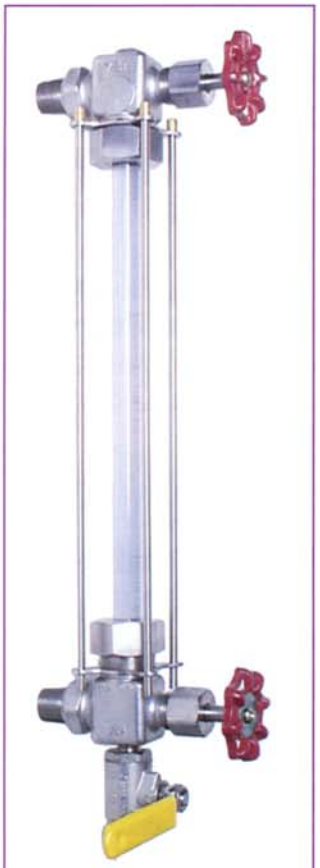
Model 416 has a Viton O-Ring for the glass packing , ball check and retainer are 18-8SS. Drain valves are optional.

Model	Size NPT	Glass OD	Glass Length from Centers	Rod Length from Centers
416-04	1/2"	5/8"	- 2"	- 1-1/4"
416-05	3/4"	3/4"	- 2"	- 1-1/4"
440-02	1/4"	5/8"	- 2-1/4"	- 1-1/4"
440-03	3/8"	5/8"	- 2-1/4"	- 1-1/4"
440-04	1/2"	5/8"	- 2-1/4"	- 1-1/4"
440-05	3/4"	5/8"	- 2-1/4"	- 1-1/4"
447-04	1/2"	5/8"	- 2-3/4"	- 1-1/2"
447-05	3/4"	5/8"	- 2-3/4"	- 1-1/2"
448-04	1/2"	5/8"	- 2	- 1-1/4"
448-05	3/4"	5/8"	- 2	- 1-1/4"

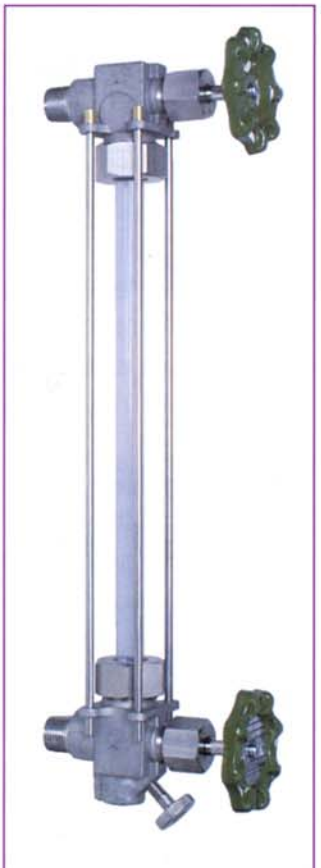
Model	Maximum Liquid Pressure @ Temp PSIG / °F	Steam Service PSIG	Auto Ball Checks
416	500/100°F to 500/425°F	N/A	Yes
440	150/100°F to 150/300°F	N/A	No
447	300/100°F to 300/300°F	N/A	Optional
448	250/100°F to 250/400°F	N/A	No

For Glass, see Page 42.
For Shielded Gauges, see Page 34.

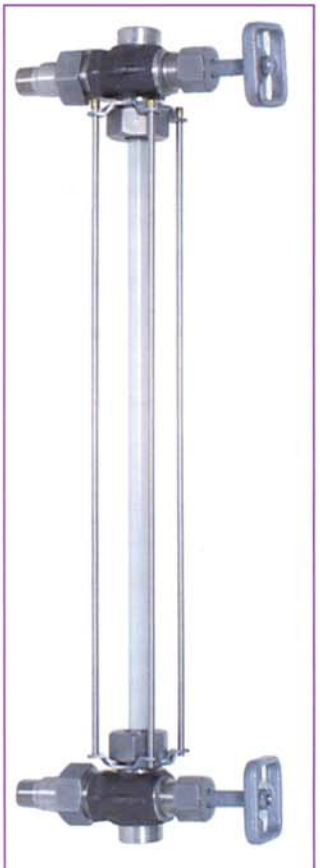
Tubular Gauge Valves – Stainless Steel



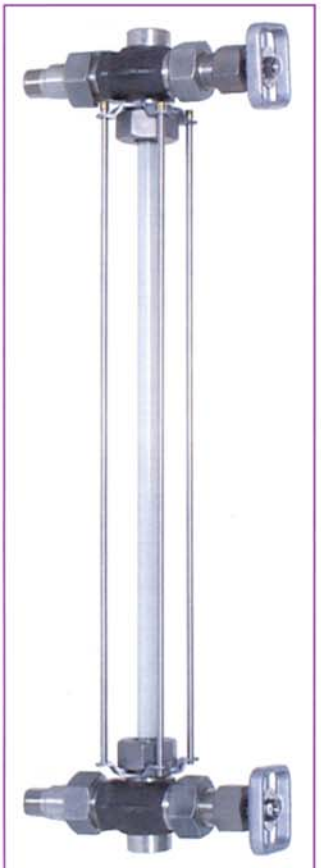
Model 436



Model 446



Model 455



Model 457

Features

- **Sizes 1/2" NPT up to 2" Flanged**
- **Auto Ball Checks**
- **For Glass Tube or Shielded Gauges**

Ratings

- **Pressure Ratings** are subject to the limitations of the gauge glass (Page 42).
- **Temperature Ratings** are subject to the limitations of the packing (Page 45).

Materials

- Body: 316 Stainless Steel
- Glass Packing: Teflon
- Stem Packing : Graphite Composite
- Stem Packing for 436: Teflon/Hypolon

A Special Note about Corrosion:

- Excessive corrosion may result in leakage, glass breakage, and premature valve failure.
- Be sure all wetted components of the gauge are constructed with materials compatible with the service medium. John C. Ernst Co. does not make chemical compatibility recommendations.
- See the "*Compass Corrosion Guide*" or equivalent for material compatibility.

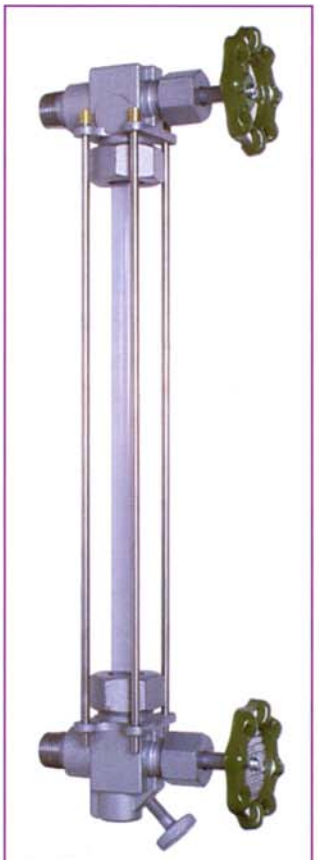
Model 454 has an integral bonnet and stem seat.
Model 456 has a union bonnet for stem seat replacement.

Model	Size NPT	Glass OD	Glass Length from Centers	Rod Length from Centers
436-04	1/2"	5/8"	- 2"	- 1"
436-05	3/4"	3/4"	- 2"	- 1"
446-04	1/2"	5/8"	- 2"	- 1"
446-05	3/4"	3/4"	- 2"	- 1"
455-04	1/2"	5/8"	- 1-3/4"	- 2-1/4"
455-05	3/4"	3/4"	- 1-3/4"	- 2-1/4"
455-06	1"	3/4"	- 1-3/4"	- 2-1/4"
457-04	1/2"	5/8"	- 1-3/4"	- 2-1/4"
457-05	3/4"	3/4"	- 1-3/4"	- 2-1/4"
457-06	1"	3/4"	- 1-3/4"	- 2-1/4"

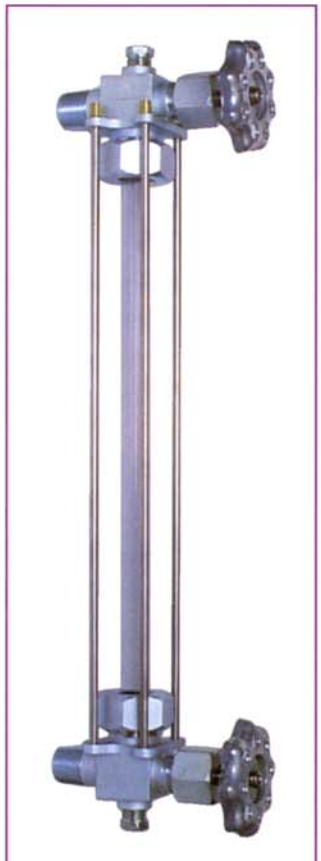
Model	Maximum Liquid Pressure @ Temp PSIG / °F	Steam Service PSIG	Auto Ball Checks
436	500/100°F to 500/425°F	500	ASME
446	500/100°F to 500/425°F	500	Yes
455	600/100°F to 345/400°F	345	Yes
457	600/100°F to 345/400°F	345	Yes

For Glass, see Page 42.
For Shielded Gauges, see Page 34.

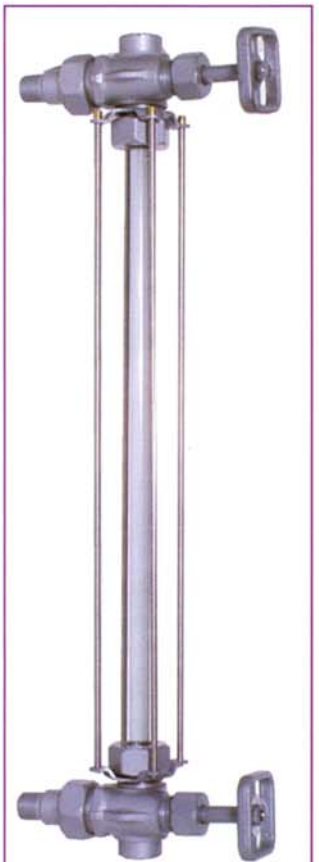
Tubular Gauge Valves – Carbon Steel



Model 412



Model 442



Model 454

Model 456

Features

- **Sizes 1/2" NPT up to 2" Flanged**
- **Auto Ball Checks**
- **For Glass Tube or Shielded Gauges**

Ratings

- **Pressure Ratings** are subject to the limitations of the gauge glass (Page 42).
- **Temperature Ratings** are subject to the limitations of the packing (Page 45).

Materials

- Body: Carbon Steel
- Glass Packing on 454/456: Graphite
- Glass Packing on 442: Viton O-Ring
- Glass Packing on 412: Neoprene
- Stem Packing : Graphite Composite
- Stem Packing for 442: Teflon

A Special Note about Corrosion:

- ❑ Excessive corrosion may result in leakage, glass breakage, and premature valve failure.
- ❑ Be sure all wetted components of the gauge are constructed with materials compatible with the service medium. John C. Ernst Co. does not make chemical compatibility recommendations.
- ❑ See the "*Compass Corrosion Guide*" or equivalent for material compatibility.

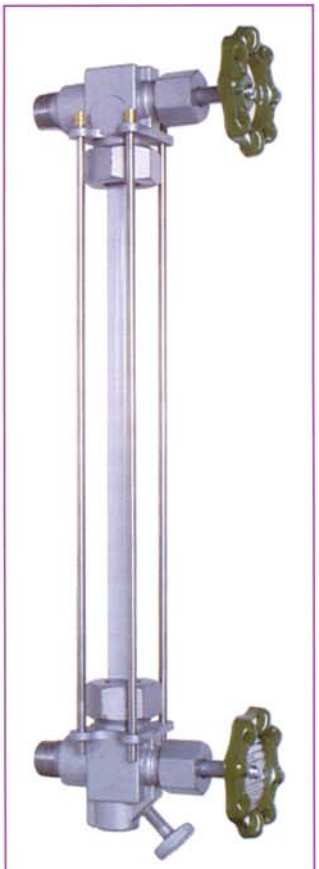
Model 454 has an integral bonnet and stem seat.
Model 456 has a union bonnet for stem seat replacement.
Model 442 can have a drain valve as an option.

Model	Size NPT	Glass OD	Glass Length from Centers	Rod Length from Centers
412-04	1/2"	5/8"	- 2"	- 1"
412-05	3/4"	3/4"	- 2"	- 1"
442-04	1/2"	5/8"	- 2"	-1/2"
442-05	3/4"	3/4"	- 2"	-1/2"
454-04	1/2"	5/8"	- 1-3/4"	- 2-1/4"
454-05	3/4"	3/4"	- 1-3/4"	- 2-1/4"
454-06	1"	3/4"	- 1-3/4"	- 2-1/4"
456-04	1/2"	5/8"	- 1-3/4"	- 2-1/4"
456-05	3/4"	3/4"	- 1-3/4"	- 2-1/4"
456-06	1"	3/4"	- 1-3/4"	- 2-1/4"

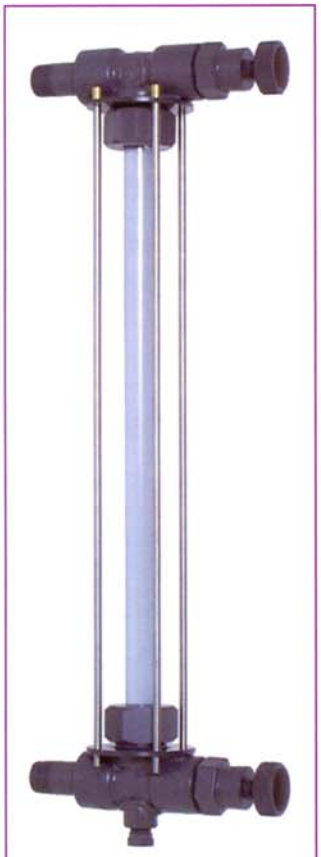
Model	Maximum Liquid Pressure @ Temp PSIG / °F	Steam Service PSIG	Auto Ball Checks
412	500/100°F to 500/425°F	500	Yes
442	500/100°F to 500/425°F	N/A	Yes
454	600/100°F to 345/400°F	345	Yes
456	600/100°F to 345/400°F	345	Yes

For Glass, see Page 42.
For Shielded Gauges See Page 34.

Tubular Gauge Valves – IRN/PVC/AL/BRS



Model 426



Model 465

Model 473

Model 475

Features

- **Sizes 1/4" NPT up to 1" Flanged**
- **Auto Ball Checks Available**
- **For Glass Tube or Shielded Gauges**

Ratings

- **Pressure Ratings** are subject to the limitations of the gauge glass (Page 42).
- **Temperature Ratings** are subject to the limitations of the packing (Page 45).

Materials (Body)

- 426: Iron, Neoprene Glass Packing
- 465: PVC, Viton Glass Packing
- 473: Brass
- 474: Carbon Steel
- 475: Aluminum

A Special Note about Corrosion:

- Excessive corrosion may result in leakage, glass breakage, and premature valve failure.
- Be sure all wetted components of the gauge are constructed with materials compatible with the service medium. John C. Ernst Co. does not make chemical compatibility recommendations.
- See the "*Compass Corrosion Guide*" or equivalent for material compatibility.

If Model 465 PVC valves are used with a shielded gauge, the gauge must be supported so no weight is on valves.

Model	Size NPT	Glass OD	Glass Length from Centers	Rod Length from Centers
426-04	1/2"	5/8"	- 2"	- 1"
426-05	3/4"	3/4"	- 2"	- 1"
465-04	1/2"	3/4"	- 2"	- 1"
465-05	3/4"	3/4"	- 2"	- 1"
465-06	1"	3/4"	- 2"	- 1"

Model	Maximum Liquid Pressure @ Temp PSIG / °F	Steam Service PSIG	Auto Ball Checks
426-04	185/100°F to 160/425°F	165	Yes
426-05	490/100°F to 415/425°F	415	Yes
465	120/75°F to 75/100°F	N/A	Opt

The Models 473, 474, 475 all come in sizes from 1/4" NPT to 3/4" NPT. They also come in a Flush Mount design with a 1/2-20NF straight thread with nuts.

For Glass, see Page 42.
For Shielded Gauges, see Page 34.

Tubular Gauge Valve – Protectors

Model 840

Model 843

Model 846

Model 847

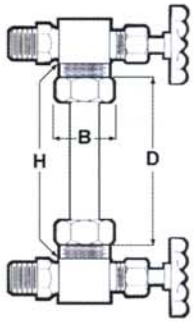
Features

- **Protects Gauge Glass from Accidental Breakage**

Ratings

- Temperature Ratings are subject to the limitations of the materials.

Model	Type	Material
840	Round	Acrylic
842	3 Sided U-shaped	316SS Expanded Metal
843	Round	Stainless
845	2 Sided V-shaped	Acrylic
846	2 Sided V-shaped	Wire Glass
847	3 Sided U-shaped	Acrylic
848	3 Sided U-shaped	Wire Glass



To Order Specify:

D = Inside of Nuts

B = Across Hex of Nuts

H = Maximum Space between Bodies

Tubular Gauge Valve – Proximity Switches

Model 324A

Model 324D

Features

- **Capacitive Switch for Hi/Lo Level Alarms and Level Detection**
- **LED Indication on Switch**
- **2 wire AC/DC (3 Wire Available)**

Ratings

- Temperature Range: -13 to 176˚F

Materials

- Housing: Polybutyleneterephthalate

Model	Output Function	Type of Gauge	Adjust. Range	Switch Diameter
324A	NO	Rods	3 —15mm	30mm
324B	NC	Rods	3 —15mm	30mm
324C	NO/NC	Rods	3 —15mm	30mm
324D	NO	Shielded	2.5 —8mm	18mm
324E	NC	Shielded	2.5 —8mm	18mm
324F	NO/NC	Shielded	2.5 —8mm	18mm

For Rod mounting bracket use Model 324MB

For Shielded Gauge mounting bracket use Model 324MB-834

Top Vented Gauges - Brass


Model 325


Model 327


Model 328


Model 381


Model 382


Model 383


Model 384


Model 385


Model 386


Model 387

Features

- **Sizes 1/8" to 3/4" NPT**
- **For Vented Reservoir Use**
- **Rotating Shields**

Ratings

- Atmospheric @ 250˚F

Materials

- Body: Brass
- Glass: Borosilicate
- Seals: Buna-N
  Neoprene in 325, 327, 328

Model	Connection Type
325	Elbow & Drain
327	Long Elbow
328	Straight
381	Elbow, Shutoff, & Drain
382	Female Elbow
383	Short Elbow
384	Long Elbow
385	Union Elbow
386	Elbow & Drain
387	Straight

Size NPT	Models			Visibility Length
1/8	325-0	327-0	328-0	1-1/16
1/8	325-1	327-1	328-1	1-9/16
1/4	325-2	327-2	328-2	1-9/16
1/4	325-3	327-3	328-3	2-5/16
1/4	325-4	327-4	328-4	3-1/4
3/8	325-5	327-5	328-5	4-1/2
1/2	325-6	327-6	328-6	4-1/2

Example of How to Order:

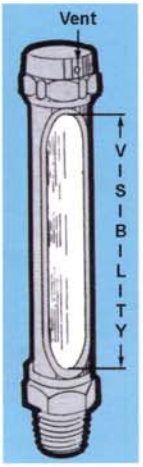
Model 382 – 3 – 14

*381
382
383
384
385
386
387

Size NPT
1 = 1/8"
2 = 1/4"
3 = 3/8"
4 = 1/2"
5 = 3/4"

Visibility
10 = 1-5/16
11 = 1-13/16
12 = 2-5/16
13 = 2-13/16
14 = 3-5/16
25 = 4-5/16
26 = 5-9/16
27 = 7-9/16
28 = 9-9/16
29 = 12-9/16

* Only Model available in 3/4".
Not available in 1/8" or 1/4".



LIQUID LEVEL GAUGES

Tubular Level Gauges - Shielded

Model 819

Model 849

These Shielded Gauges provide you with safe viewing of fluid levels in your tank and a wide option of scales.

This design is simple to install and provides additional gauge glass protection. Glass protection is assured by a metal housing with a Lexan face which protects the glass tube.

The standard tube is 5/8"OD Clear Glass (borosilicate) and can be furnished as Redline Glass, Lexan, PVC, or Acrylic tubing.

Both gauges can be mounted with **Model 324 Proximity Switches** for High and Low Level Alarms. (See Pages 31)

Multiple sections of gauge glass are spliced together to meet the higher-pressure ratings up to 300 PSIG. (See Page 42 for glass pressure ratings). Some applications can be rated to 400˚F with reduced pressures.

Connection Sizes:

- Threaded 1/2 - 3/4" NPT
- Flanged 1/2" - 2" 150#

Scales Available:

- Height Scale in Inches
- Rate Scale ML/M & Qts/24 Hrs. 1/4" increm.
- Metric Rate Scale ML/M & Liters/24 Hrs. cm increments
- Custom Scales

Model 819 is designed with Integral Shutoff Valves with Automatic Ball Checks. The valves are offset for easy cleaning of the glass tubing through 1/4" vent or drain.

Model 849 is designed for applications where Valves are not required. This model is also available with PVC wetted Parts with either Carbon Steel or 304 Stainless Steel Frames. A 1/4" vent and drain port are provided for easy cleaning of the glass.

Features

- **Sizes: 1/2" NPT to 2" Flanged**
- **Easy Installation of One Piece**
- **Full Glass Protection**
- **3-Sided Metal Frame with Clear Polycarbonate (Lexan) Shield**
- **Gauge Lengths up to 15 Feet**
- **With or Without Valves**
- **Vent & Drain for Easy Glass Cleaning**
- **Made to Customer Specifications**

Ratings

- Pressures up to 300 PSIG
- Temperatures up to 400˚F

Materials

- Frame: 304 Stainless Steel or Zinc Plated Carbon Steel
- Wetted Metal: 316 Stainless Steel or Zinc Plated Carbon Steel
- Seals: Viton O-Rings (Std.)
- Tubing: 5/8"OD Borosilicate
- Valve Stem Packing: Teflon

A Special Note about Corrosion:

- ❑ Excessive corrosion may result in leakage, glass breakage, and premature valve failure.
- ❑ Be sure all wetted components of the gauge are constructed with materials compatible with the service medium. John C. Ernst Co. does not make chemical compatibility recommendations.
- ❑ See the "*Compass Corrosion Guide*" or equivalent for material compatibility.

Example of How to Order:

819 - .50 – TH – 48.00 – A T H – 150 - 300

- **819** / **849**
- 1/2" = **.50**, 3/4" = **.75**, 1" = **1.0**
- Threaded = **TH**, Flanged = **FL**
- **Centers in Inches**
- All Stainless Steel = **A**, All Carbon Steel = **C**
- **V** = Viton, **T** = Teflon, **EP** = Ethylene Propylene, **B** = Buna N
- **L** = Clear Lexan Shield, **H** = Height Scale in Inches, **M** = Expanded Metal, **R** = Rate Scale Shield, **RH** = Rate & Height Scale
- Pressure in **PSIG**
- Temperature in **°F**

Tubular Level Gauges - Shielded

Model 834

These Shielded Gauges provide you with safe viewing of fluid levels in your tank and a wide option of scales.

This design is simple to install and provides additional gauge glass protection. Glass protection is assured by a metal housing with a Polycarbonate face that protects the glass tube.

The standard tube is Clear Glass (borosilicate) and can be furnished as Redline Glass, Polycarbonate, PVC, or Acrylic tubing.

Both gauges can be mounted with **Model 324 Proximity Switches** for High and Low Level Alarms. (See Pages 31)

Multiple sections of gauge glass are spliced together to meet the higher-pressure ratings up to 300 PSIG. (See Page 42 for glass pressure ratings). Some applications can be rated to 400˚F with reduced pressures.

Model 833

Scales Available:

- Height Scale in Inches
- Rate Scale ML/M & Qts/24 Hrs. 1/4" increments.
- Metric Rate Scale ML/M & Liters/24 Hrs. cm increments
- Custom Scales

Model 834 is designed for use with tubular gauge valves. The valve stuffing box packing tightens around the nozzles to avoid glass breakage from overtightening. (For valve selection, See Pages 26 through 30). If this gauge is replacing a tubular glass, the gauge will be the same length as the glass being replaced. The glass diameter is 5/8"OD.

Model 833 is designed in two connection sizes. The Model with 1/2" NPT Male ends has a 5/8"OD borosilicate glass. It has a plastic vent cap on the top connection that can be removed. This Model can be made up to 25 feet. The Model with 1" NPT Male ends has a 1"OD borosilicate glass. This Model can be made up to 100".

Features

- **Gauge Lengths up to 25 Feet**
- **Easy Installation of One Piece**
- **Full Glass Protection**
- **3-Sided Metal Frame with Clear Polycarbonate (Lexan) Shield**
- **Made to Customer Specifications**

Ratings

- Pressures up to 300 PSIG
- Temperatures up to 400˚F

Materials (Body)

- Frame: 304 Stainless Steel or Zinc Plated Carbon Steel
- Wetted Metal: 316 Stainless Steel, Zinc Plated Carbon Steel PVC
- Seals: Viton O-Rings (Std.)

For Notes about Corrosion:(See Page 33)

Example of How to Order:

834 – .62 – NZ – 48.00 – A T H – 150 - 300

- 5/8"OD Nozzle = .62
- 3/4"OD Nozzle = .75
- Overall Length-Inches
- All Stainless Steel = A
- All Carbon Steel = C
- 316SS Wetted Parts = W
- Carbon Steel Frame
- L = Clear Lexan Shield
- H = Height Scale in Inches
- M = Expanded Metal
- R = Rate Scale Shield
- RH = Rate & Height Scale
- V = Viton
- T = Teflon
- EP = Ethylene Propylene
- B = Buna N
- Pressure in PSIG
- Temperature in °F

Example of How to Order:

833 - .50 – TH – 48.00 – A T H – 150 - 300

- 1/2" = .50
- 1" = 1.0
- Threaded = TH
- Flanged = FL
- Overall Length-Inches
- All Stainless Steel = A
- All Carbon Steel = C
- 316SS Wetted Parts = W
- Carbon Steel Frame
- PVC Wetted Parts = PS
- 304SS Frame
- L = Clear Lexan Shield
- H = Height Scale in Inches
- M = Expanded Metal
- R = Rate Scale Shield
- RH = Rate & Height Scale
- V = Viton
- T = Teflon
- EP = Ethylene Propylene
- B = Buna N
- Pressure in PSIG
- Temperature in °F

LIQUID LEVEL GAUGES

Magnetic Level Gauge - Flag Type

Model 048 Mini

Model 048 Mini – is an economical gauge with an 1-1/4" diameter tubing.

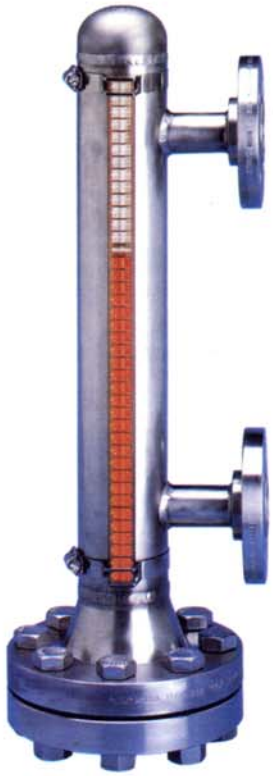
Model	Housing
048S6	316SS
048HC	Hastelloy C

Connections:
- 1/2" NPT or Flanged
- 3/4" NPT or Flanged
- Sanitary Fittings

Mounting Types:
- Top and Bottom
- Side and Side
- Top and Side
- Side and Bottom
- Top of Tank Mount

Ratings:
- Pressures up to 400 PSIG
- Temperatures up to 400˚F

Available Options are:
Indicating Scales, Frost Proof Extensions, High Temp Switch Modules, Transmitters, Receivers, and Heat Tracing.



Model 049

Model 049 – features a 2-1/2" diameter tube design for the Alloy gauges and a 2" diameter Sch. 80 Pipe for the Plastic gauges.

Model	Housing
049S6	316SS
049HC	Hastelloy C
098KY	PVDF (Kynar)
098PV	PVC
098CP	CPVC

Connections:
- 1/2" NPT to 2" Flanged
- Sanitary Fittings

Mounting Types:
- Same as Model 048

Ratings:
- Pressures up to 4200 PSIG
- Temperatures up to 750˚F

Available Options are:
Indicating Scales, Frost Proof Extensions, High Temp and Explosion-proof Switch Modules, Transmitters, Receivers, Heat Tracing, Crevice Free Designs, Electro-Polished Designs.

Features

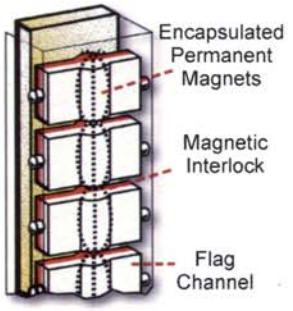
- No Glass
- Up to 20 Foot Centers
- Flag System Visual Indication
- High Visibility
- Electronic Outputs
- Environmentally Safe
- For Steam Service
- ASME, ASTM, ANSI Ratings
- Various Materials Available
- Tri-Clover Sanitary Fittings, CIP

Ratings

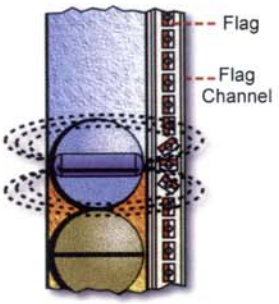
- Pressures up to 4200 PSIG
- Temperatures up to 750˚F

For Notes about Corrosion: (See Page 33)

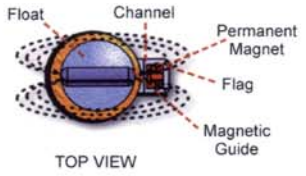
OPERATING PRINCIPAL



❑ A permanent magnet enclosed in each flag forms secure magnetic interlock with surrounding flags resulting in proper alignment. This alignment is unaffected by shock, vibration, surges, or rapid level changes.



❑ A powerful permanent bar magnet lies in a horizontal position within the float. This positioning directs the flux density of the magnetic field toward the flags. Flag rotation is positive and reliable.



❑ Float capabilities to handle liquid specific gravity range as low as 0.39.

Flat Glass Gauge Valves – Carbon Steel

Gauge is for illustration only.

Shown as Union Gauge Connections

Model 450

Gauge is for illustration only.

Shown as Rigid Gauge Connections

Model 460

We offer offset and straight pattern valves that isolate the gage chamber from the liquid contents of the vessel.

Offset valves have an advantage of permitting the inside of the gage glass to be cleaned easily with a minimum of disassembly. By removing the 1/2" vent and drain plug, a straight passage through the gage chamber is opened. A brush can be inserted through the valve vent and drain for glass cleaning.

Both upper and lower valves in each set are equipped with horizontal ball checks. Balls are located on the vessel side of the valve seat.

Valves with ball checks omitted meet ASME boiler requirements, the lower valve is available with an optional vertical rising ball check located in the offset portion of the valve body, and the upper valve has a leaky seat.

Valves shown are offset.

The offset distance from valve stem center to gage center is 3/4".

Model 498 which has an Outside Screw & Yoke bonnet (OS&Y) is not shown.

Features

- **Sizes 1/2" NPT up to 1" Flanged**
- **Offset Pattern, Straight Avail.**
- **Union Vessel Connections**
- **Rigid or Union Gauge Connections**
- **Conforms to AISI / ASTM Specs**
- **ASME Boiler Code Acceptable**
- **Auto Ball Check Shutoffs**
- **For Steam/Water Service**

See Page 39

Ratings

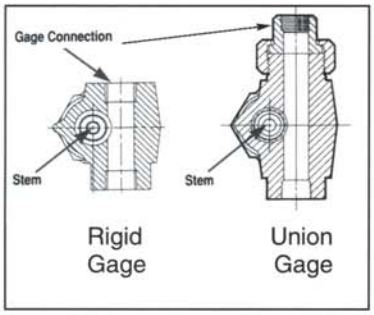
- 4000 psi @ 100˚F / 2620 psi @ 750˚F

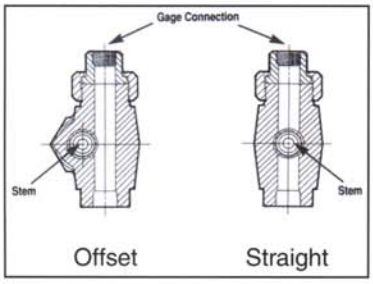
Materials

- Body: Carbon Steel (316SS is Opt.)
- Stem Packing: Grafoil
- Trim: Stainless Steel

A Special Note about Corrosion:

- Excessive corrosion may result in leakage, glass breakage, and premature valve failure.
- Be sure all wetted components of the gauge are constructed with materials compatible with the service medium. John C. Ernst Co. does not make chemical compatibility recommendations.
- See the "*Compass Corrosion Guide*" or equivalent for material compatibility.





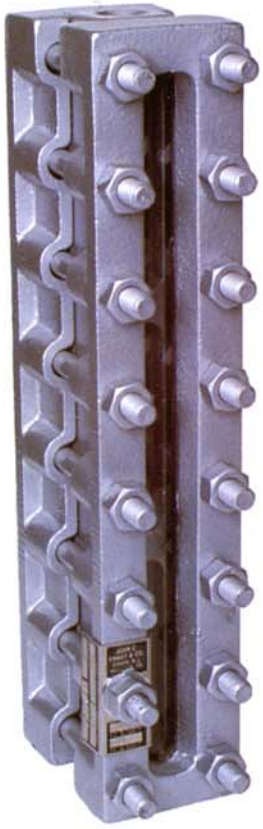
Select Gauges from Pages 37 & 38.

Valve Model	Vessel Conn. Size NPT	Gage Conn. Type	Bonnet Type
450-04 CSR	1/2"	Rigid	Integral
450-04 CSU	1/2"	Union	Integral
450-05 CSR	3/4"	Rigid	Integral
450-05 CSU	3/4"	Union	Integral
450-06 CSR	1"	Rigid	Integral
450-06 CSU	1"	Union	Integral
460-04 CSR	1/2"	Rigid	Union
460-04 CSU	1/2"	Union	Union
460-05 CSR	3/4"	Rigid	Union
460-05 CSU	3/4"	Union	Union
460-06 CSR	1"	Rigid	Union
460-06 CSU	1"	Union	Union
498-04 CSR	1/2"	Rigid	OS&Y
498-04 CSU	1/2"	Union	OS&Y
498-05 CSR	3/4"	Rigid	OS&Y
498-05 CSU	3/4"	Union	OS&Y
498-06 CSR	1"	Rigid	OS&Y
498-06 CSU	1"	Union	OS&Y

LIQUID LEVEL GAUGES

Flat Glass Gauges – Low Pressure

Model 479



Model 489

These gauges are designed for less demanding process conditions that maximize the mechanical and economical advantages of ductile iron covers.

These gauges are not recommended for Steam/Water applications. (See Page 39).

Model 479 Reflex - has a single vision slot on one side of the chamber in which light can enter to determine liquid level. Above the liquid level, glass prisms reflect the surrounding light giving typically a silvery appearance. Below the level, the liquid fills the prisms causing the glass to become relatively transparent giving a typically dark appearance.

Model 489 Transparent - has a vision slot on both sides of the chamber allowing light to enter the gauge opposite the observer so that the level or the liquid and its characteristics can be seen.

Features

- **Armored Design**
- **Reflex & Transparent Design**
- **Maximum Protection**
- **Conforms to AISI/ASTM Specs**
- **Up to 12 Feet Long**
- **10 Section Maximum**
- **1/2"NPT Female Ends (std)**

Ratings

- Pressures up to 2400 PSIG
- Temperatures up to 650˚F

Materials

- Chamber: Carbon Steel
  316LSS (Opt.)
- Covers: Ductile Iron
- Glass: Tempered Borosilicate
- Gaskets/Cushions: Grafoil GHP

For Notes about Corrosion: (See Page 33)

Pressure/Temperture Ratings are for Non-Steam Service

Model	Temp	Pressure Range for Glass Sizes in PSIG with Std. Gaskets								
		1	2	3	4	5	6	7	8	9
479	100˚F	2400	2325	2250	2175	2100	2025	1950	1875	1800
479	600˚F	1780	1720	1670	1600	1550	1500	1440	1390	1340
489	100˚F	2000	1815	1630	1440	1250	1065	875	690	500
489	600˚F	1480	1340	1210	1060	920	790	645	510	370

Temperatures up to 650˚F with Aluminosilicate Glass.
For Valve Selection, See Page 36.

For End Connected Gauges Only

Models		Glass Size	Overall Length	Length Of Visible Glass	Minimum Centers if using the following Valve				# of Sectns
					Rigid Gauge		Union Gauge		
Reflex	Trans-parent				450 460	498	450 460	498	
479R11	489T11	1	5-1/4	3-3/4	8-1/8	9-7/8	11-1/8	11-7/8	
479R12	489T12	2	6-1/4	4-3/4	9-1/8	10-7/8	12-1/8	12-7/8	
479R13	489T13	3	7-1/4	5-3/4	10-1/8	11-7/8	13-1/8	13-7/8	
479R14	489T14	4	8-1/4	6-3/4	11-1/8	12-7/8	14-1/8	14-7/8	
479R15	489T15	5	9-3/8	7-7/8	12-1/4	14	15-1/4	16	1
479R16	489T16	6	10-5/8	9-1/8	13-1/2	15-1/4	16-1/2	17-1/4	
479R17	489T17	7	11-3/4	10-1/4	14-5/8	16-3/8	17-5/8	18-3/8	
479R18	489T18	8	13-3/8	11-7/8	16-1/4	18	19-1/4	20	
479R19	489T19	9	14-1/8	12-5/8	17	18-3/4	20	20-3/4	
479R24	489T24	4	16-1/2	15	19-3/8	21-1/8	22-3/8	23-1/8	
479R25	489T25	5	18-3/4	17-1/4	21-5/8	23-3/8	24-5/8	25-3/8	
479R26	489T26	6	21-1/4	19-3/4	24-1/8	25-7/8	27-1/8	25-7/8	2
479R27	489T27	7	23-1/2	22	26-3/8	28-1/8	29-3/8	30-1/8	
479R28	489T28	8	26-3/4	25-1/4	29-5/8	31-3/8	32-5/8	33-3/8	
479R29	489T29	9	28-1/4	26-3/4	31-1/8	32-7/8	34-1/8	34-7/8	
479R36	489T36	6	31-7/8	30-3/8	34-3/4	36-1/2	37-3/4	38-1/2	
479R37	489T37	7	35-1/4	33-3/4	38-1/8	39-7/8	41-1/8	41-7/8	3
479R38	489T38	8	40-1/8	38-5/8	43	44-3/4	46-1/8	46-3/4	
479R39	489T39	9	42-3/8	40-7/8	45-1/4	47	48-1/4	49	
479R47	489T47	7	47	45-1/2	49-7/8	51-5/8	52-7/8	53-5/8	
479R48	489T48	8	53-1/2	52	56-3/8	58-1/8	59-3/8	60-1/8	4
479R49	489T49	9	56-1/2	55	59-3/8	61-1/8	62-3/8	63-1/8	

For Gauges of 5 to 10 Sections consult Sales Office

Flat Glass Gauges – Medium Pressure

Model 480

These gauges are designed for the most common process conditions and can be used for Steam/Water applications. (See Page 39).

High pressure gauges are available in Model 481 Reflex and Model 491 Transparent. Illuminators and Frost Proof Extentions are also available.

Model 480 Reflex - has a single vision slot on one side of the chamber in which light can enter to determine liquid level. Above the liquid level, glass prisms reflect the surrounding light giving typically a silvery appearance. Below the level, the liquid fills the prisms causing the glass to become relatively transparent giving a typically dark appearance.

Model 490 Transparent - has a vision slot on both sides of the chamber allowing light to enter the gauge opposite the observer so that the level or the liquid and its characteristics can be seen.

Features

- **Armored Design**
- **Reflex & Transparent Design**
- **Maximum Protection**
- **Conforms to AISI / ASTM Specs**
- **Up to 12 Feet Long**
- **10 Section Maximum**
- **1/2"NPT Female Ends (std)**

Ratings

- Pressures up to 3000 PSIG
- Temperatures up to 800˚F

Materials

- Chamber: Carbon Steel
  316LSS (Opt.)
- Covers: Carbon Steel
- Glass: Tempered Borosilicate
- Gaskets/Cushions: Grafoil GHP (std)

For Notes about Corrosion: (See Page 33)

Model 490

Pressure/Temperture Ratings are for Non-Steam Service

Model	Temp	Pressure Range for Glass Sizes in PSIG with Std. Gaskets								
		1	2	3	4	5	6	7	8	9
480	100˚F	3000	2910	2820	2725	2630	2535	2440	2345	2250
480	600˚F	2220	2150	2080	2040	1950	1875	1805	1740	1660
490	100˚F	2500	2315	2130	1940	1750	1565	1375	1190	1000
490	600˚F	1850	1720	1575	1435	1295	1160	1015	880	740

Temperatures up to 800˚F with Aluminosilicate Glass.
For Valve Selection, See Page 36.

For End Connected Gauges Only

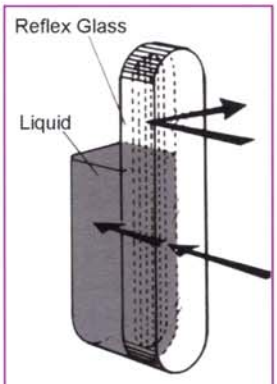
Models		Glass Size	Overall Length	Length Of Visible Glass	Minimum Centers if using the following Valve				Number of Sections
					Rigid Gauge		Union Gauge		
Reflex	Trans-parent				450 460	498	450 460	498	
480R11	490T11	1	5-1/4	3-3/4	8-1/8	9-7/8	11-1/8	11-7/8	1
480R12	490T12	2	6-1/4	4-3/4	9-1/8	10-7/8	12-1/8	12-7/8	
480R13	490T13	3	7-1/4	5-3/4	10-1/8	11-7/8	13-1/8	13-7/8	
480R14	490T14	4	8-1/4	6-3/4	11-1/8	12-7/8	14-1/8	14-7/8	
480R15	490T15	5	9-3/8	7-7/8	12-1/4	14	15-1/4	16	
480R16	490T16	6	10-5/8	9-1/8	13-1/2	15-1/4	16-1/2	17-1/4	
480R17	490T17	7	11-3/4	10-1/4	14-5/8	16-3/8	17-5/8	18-3/8	
480R18	490T18	8	13-3/8	11-7/8	16-1/4	18	19-1/4	20	
480R19	490T19	9	14-1/8	12-5/8	17	18-3/4	20	20-3/4	
480R24	490T24	4	16-1/2	15	19-3/8	21-1/8	22-3/8	23-1/8	2
480R25	490T25	5	18-3/4	17-1/4	21-5/8	23-3/8	24-5/8	25-3/8	
480R26	490T26	6	21-1/4	19-3/4	24-1/8	25-7/8	27-1/8	25-7/8	
480R27	490T27	7	23-1/2	22	26-3/8	28-1/8	29-3/8	30-1/8	
480R28	490T28	8	26-3/4	25-1/4	29-5/8	31-3/8	32-5/8	33-3/8	
480R29	490T29	9	28-1/4	26-3/4	31-1/8	32-7/8	34-1/8	34-7/8	
480R36	490T36	6	31-7/8	30-3/8	34-3/4	36-1/2	37-3/4	38-1/2	3
480R37	490T37	7	35-1/4	33-3/4	38-1/8	39-7/8	41-1/8	41-7/8	
480R38	490T38	8	40-1/8	38-5/8	43	44-3/4	46-1/8	46-3/4	
480R39	490T39	9	42-3/8	40-7/8	45-1/4	47	48-1/4	49	
480R47	490T47	7	47	45-1/2	49-7/8	51-5/8	52-7/8	53-5/8	4
480R48	490T48	8	53-1/2	52	56-3/8	58-1/8	59-3/8	60-1/8	
480R49	490T49	9	56-1/2	55	59-3/8	61-1/8	62-3/8	63-1/8	

For Gauges of 5 to 10 Sections consult Sales Office

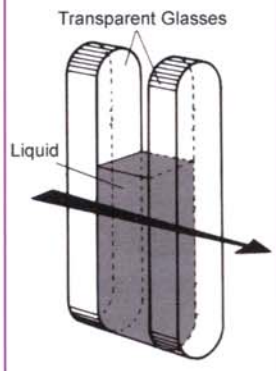
LIQUID LEVEL GAUGES

Flat Glass Gauge – Information

3 Section Reflex Gauge



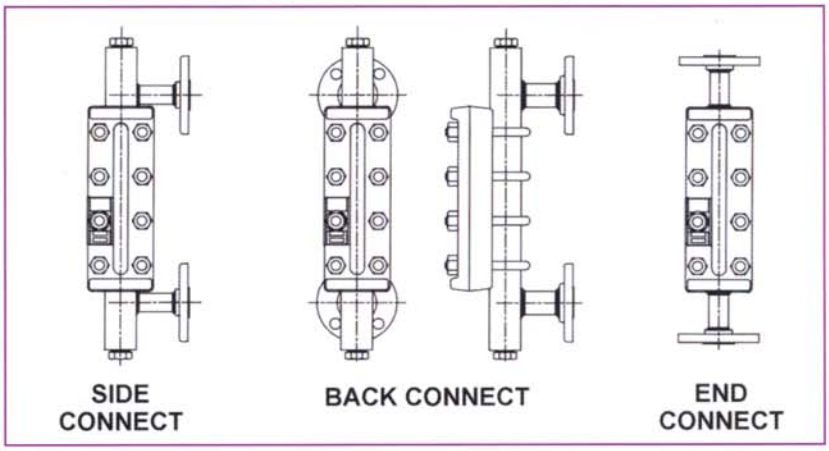
Reflex Glass

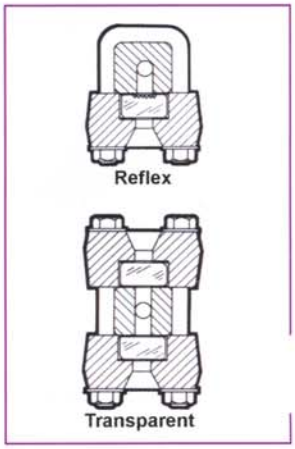


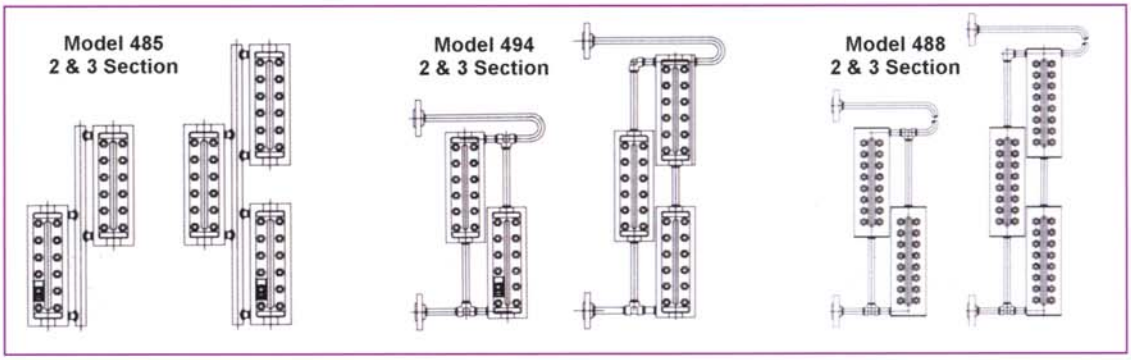
Transparent Glass

Reflex Glass – allows light striking the area of the glass covered by liquid to pass to the interior of the gauge so the area appears dark. Light striking the open space above the liquid level is reflected back to the observer, so that area appears silvery similar to a mirror.

Transparent Glass – is used to see both the level of a liquid and its characteristics. Clear glass is mounted on the front and back of the gauge. This permits direct observation of such characteristics as color or the interface between two unmixable liquids in the same system.







STEAM/WATER GAUGE SELECTION GUIDE

Pressure @ Saturated Steam	Recommended Gauge Models[1,2]	Recommended Valve Models	Type of Valve/ Gauge Connection[3]
350 psi @ 431˚F	480[4] or 490[4]	450 or 460	Rigid or Union
450 psi @ 456˚F	490[4]	454 or 456	Stuffing Box[7]
650 psi @ 494˚F	485 494[6]	498 498	Stuffing Box[7] Expansion Loop
1500 psi @ 596˚F	488[6]	498	Expansion Loop

[1] Fire Box Quality steel plate chamber material is used on gauge Models 485, 494, and 488.
[2] Mica shields are standard on all transparent models to protect the glass from condensate which causes leaching of the glass except Model 490 and must be added at extra cost.
[3] Expansion loops or stuffing box nipples are used to allow expansion caused by temperature variances.
[4] Belleville washers are highly recommended at additional cost to reduce thermal effects on clamping pressures.
[5] Belleville washers are required at extra cost to reduce thermal effects
[6] Flange to flange assembly, which includes cranite gaskets, are required at extra cost.
[7] Stuffing Box Nipples required at extra cost. The Model 498 valve must be ordered with a stuffing box.

Flat Glass Gauges – Weld Pad Type

Model 482

Designed for direct mounting to vessel wall. For applications involving high vibration, highly viscous liquids or liquids with considerable amounts of solids.

The weld pads can be flat or radius. Welding inserts can be provided in place of the glass when welding to prevent warpage.

Integral valves can be added to allow the gauge to be isolated for maintenance without lowering the liquid level below the gauge.

Model 482 Reflex - designed with Carbon Steel Pad & Cover.

Model 487 Reflex – designed with 316LSS Pad & Carbon Steel Cover.

Model 492 Transparent – designed with Carbon Steel Pad & Cover.

Model 497 Transparent - designed with 316LSS Pad & Carbon Steel Cover.

Features

- **Armored Design**
- **Reflex & Transparent Design**
- **Maximum Protection**
- **Conforms to AISI / ASTM Specs**
- **Up to 12 Feet Long**
- **10 Section Maximum**

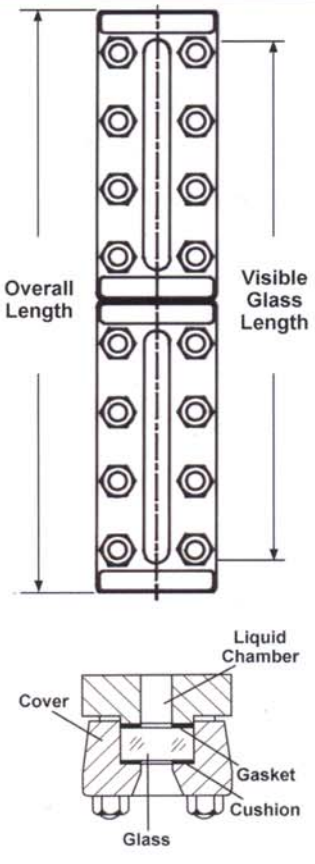
Ratings

- Pressures up to 2000 PSIG
- Temperatures up to 600˚F

Materials

- Pad: Carbon Steel or 316LSS
- Covers: Carbon Steel (std.)
- Glass: Tempered Borosilicate
- Gaskets/Cushions: Grafoil GHP (std)
  Other Gasket Material Available

For Notes about Corrosion: (See Page 33)



Model	Temp	Pressure Range for Glass Sizes in PSIG with Std. Gaskets								
		1	2	3	4	5	6	7	8	9
All	100˚F	2000	1850	1700	1550	1400	1250	1100	950	800
	600˚F	1480	1375	1260	1145	1035	925	810	700	590

Models				Glass Size	Overall Length	Visible Glass	Weight Lbs.	Number of Sections
Reflex		Transparent						
Steel	316LSS	Steel	316LSS					
482R11	487R11	492T11	497T11	1	5-1/4	3-3/4	6	
482R12	487R12	492T12	497T12	2	6-1/4	4-3/4	8	
482R13	487R13	492T13	497T13	3	7-1/4	5-3/4	10	
482R14	487R14	492T14	497T14	4	8-1/4	6-3/4	11	
482R15	487R15	492T15	497T15	5	9-3/8	7-7/8	12	1
482R16	487R16	492T16	497T16	6	10-5/8	9-1/8	14	
482R17	487R17	492T17	497T17	7	11-3/4	10-1/4	15	
482R18	487R18	492T18	497T18	8	13-3/8	11-7/8	17	
482R19	487R19	492T19	497T19	9	14-1/8	12-5/8	18	
482R24	487R24	492T24	497T24	4	16-1/2	15	22	
482R25	487R25	492T25	497T25	5	18-3/4	17-1/4	24	
482R26	487R26	492T26	497T26	6	21-1/4	19-3/4	28	2
482R27	487R27	492T27	497T27	7	23-1/2	22	30	
482R28	487R28	492T28	497T28	8	26-3/4	25-1/4	34	
482R29	487R29	492T29	497T29	9	28-1/4	26-3/4	36	
482R36	487R36	492T36	497T36	6	31-7/8	30-3/8	42	
482R37	487R37	492T37	497T37	7	35-1/4	33-3/4	45	3
482R38	487R38	492T38	497T38	8	40-1/8	38-5/8	51	
482R39	487R39	492T39	497T39	9	42-3/8	40-7/8	54	
482R47	487R47	492T47	497T47	7	47	45-1/2	60	
482R48	487R48	492T48	497T48	8	53-1/2	52	68	4
482R49	487R49	492T49	497T49	9	56-1/2	55	72	
482R57	487R57	492T57	497T57	7	58-3/4	57-1/4	75	
482R58	487R58	492T58	497T58	8	66-7/8	65-3/8	85	5
482R59	487R59	492T59	497T59	9	70-5/8	69-1/8	90	

For Gauges of 6 to 10 Sections consult Sales Office

LIQUID LEVEL GAUGES

Try Cocks & Drain Cocks

Model 701

Model 703

Model 704

Model 726

Model 728

Model 731

Model 733

Model 735

Model 719

Model 720

Drain Cocks – Polished Bronze
Rated for 300 psi Working Steam Pressure.
Rated for 500 psi @ 100°F Gas/Liquid Pressure.

Size NPT	Model	Connection Type
1/8	701-01	Single Male
1/4	701-02	
3/8	701-03	
1/8	702-01	Male/Female
1/4	702-02	
1/8	703-01	Female/Female
1/4	703-02	
1/8	704-01	Male/Male
1/4	704-02	

Try Cocks – Bronze
Rated for 250 PSIG

Size NPT	Model	Seat	Finish
3/8	726-03	Soft Metal	Polished
1/2	726-04	Insert	Bronze
1/2	728-04	Metal Seat No	Rough
3/4	728-05	Insert	Bronze

Try Cocks

Size NPT	Models	Type	Material	PSIG
1/2	731-04	Weighted	Bronze	250
3/4	731-05			
1/2	733-04	Spring	Bronze	250
3/4	733-05	Action		
1/2	735-04	Lever/	Bronze	450
3/4	735-05	Chain		
1/2	740-04	Lever/	Stainless	1500
3/4	740-05	Chain		

Sampling Cock – 316 Stainless Steel
Precision cast electro polished bodies
Tapered Teflon Sleeve, (adjustable)

Size NPT	Model	PSIG
1/8	719-01	150
1/4	719-02	
3/8	719-03	
1/2	719-04	

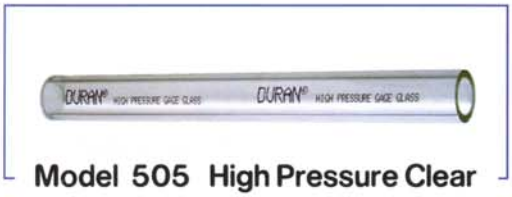
Pet Cocks – 316 Stainless Steel
Precision cast electro polished bodies
Tapered Teflon Sleeve, (adjustable)

Size NPT	Model	PSIG
1/8	720-01	150
1/4	720-02	
3/8	720-03	
1/2	720-04	

Glass & Tubing for Level Gauges

Model 503 Standard Clear

Model 503 – Standard Clear Duran Borosilicate.
Lengths up to 72". Wall ±1/64"
5/8"OD:+0 -3/64", 5/64" wall
3/4"OD:+0 -3/64", 3/32" wall
Standard Low Pressure Apps



Model 505 High Pressure Clear

Model 505 – High Pressure Clear Duran Borosilicate.
Lengths up to 144". Wall ±1/64"
5/8"OD:+0 -1/32", 3/32" wall
3/4"OD:+0 -1/32", 7/64" wall
Other OD's: 1/2", 7/8", 1",
1-1/8", 1-1/4", 1-1/2".

Model 506 Redline

Model 506 – Redline Duran Borosilicate.
Lengths up to 144". Wall ±1/64"
5/8"OD:+0 -1/32", 3/32" wall
3/4"OD:+0 -1/32", 7/64" wall
Other OD's: 1/2", 7/8", 1",
Magnifies clear liquids as red.

Model 507 Heavy Wall Clear

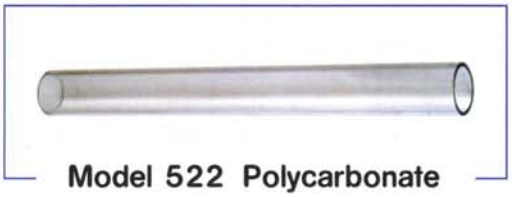
Model 507 – Heavy Wall Duran Borosilicate.
Lengths up to 48".
5/8"OD:+1/64"-3/64", 3/16" wall
3/4"OD:+1/64"-3/64", 7/32" wall
Other OD's: 7/8", 1"
Recommended for Steam.

Model 508 Heavy Wall Redline

Model 508 – Heavy Wall Redline Duran Borosilicate.
Lengths up to 48".
5/8"OD:+1/64" -3/64", 3/16" wall
3/4"OD:+1/64" -3/64", 7/32" wall
Magnifies clear liquids as red.
Recommended for Steam .

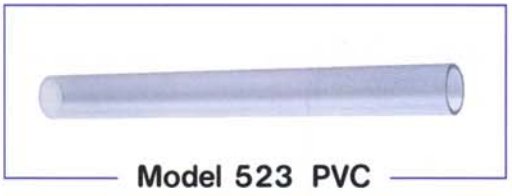
Model 521 Acrylic

Model 521 – Acrylic Tubing.
Lengths up to 72". 140˚F max.
OD: 1/2", 5/8", 3/4", 1",
Wall: 1/8"



Model 522 Polycarbonate

Model 522 – Polycarbonate (Lexan) Tubing. 200˚F max.
Lengths up to 96".
OD: 1/2", 5/8", 3/4", 1",
Wall: 1/16", (1/8" on 1" OD)
Model 524 HW Lexan: 3/4"OD only with 7/64"wall, 48" length



Model 523 PVC

Model 523 – PVC Clear Rigid Tubing. 120˚F max.
Lengths up to 72".
OD: 1/2", 5/8", 1-1/8", 2", 2-1/2"
Wall: 1/16", FDA Tubing
Excelon R-2000

Model 514 Heavy Wall Glass

Model 514 – Heavy Wall Borosilicate Tubing. 425˚F max.
Lengths up to 48".
OD with 5/32"wall: 1-3/4"
OD with 3/16"wall: 2", 2-1/4",
2-1/2", 2-3/4", 3", 3-1/4", 3-1/2"
OD with 1/4" wall: 4", 4-1/2", 5",
5-1/2",
OD with 5/16"wall: 6", 6-1/2"
OD with 3/8"wall: 7"

Pressure & Temperatures

503 – Standard Clear (PSIG)

Glass	5/8" OD		3/4"OD	
Length Inches	Non-Steam to 150˚F	Steam to 425˚F	Non-Steam to 150˚F	Steam to 425˚F
12	205	100	205	100
14	200	100	200	100
16	195	100	195	100
18	190	100	190	100
20	185	100	185	100
24	180	100	180	100
30	175	NR	175	NR
36	165	NR	165	NR
48	140	NR	140	NR

505 – High Pressure Clear (PSIG)

Glass	5/8" OD		3/4"OD	
Length Inches	Non-Steam to 150˚F	Steam to 425˚F	Non-Steam to 150˚F	Steam to 425˚F
12	410	305	400	300
14	390	295	385	290
16	375	285	370	280
18	360	280	355	275
20	350	270	345	265
24	320	255	315	250
30	280	NR	275	NR
36	245	NR	240	NR
48	195	NR	190	NR

506 – Redline (PSIG)

Glass	5/8" OD		3/4"OD	
Length Inches	Non-Steam to 150˚F	Steam to 425˚F	Non-Steam to 150˚F	Steam to 425˚F
12	335	280	330	275
14	325	275	320	270
16	315	270	310	265
18	305	265	300	260
20	290	265	285	260
24	265	255	260	250
30	235	NR	230	NR
36	205	NR	200	NR
48	165	NR	160	NR

507 – Heavy Wall Clear (PSIG)

Glass	5/8" OD		3/4"OD	
Length Inches	Non-Steam to 150˚F	Steam to 425˚F	Non-Steam to 150˚F	Steam to 425˚F
12	600	340	600	340
14	600	335	600	335
16	600	325	600	325
18	600	320	600	320
20	600	315	600	315
24	580	300	580	300
30	550	NR	550	NR
36	500	NR	500	NR
48	340	NR	340	NR

508 –Heavy Wall Redline (PSIG)

Glass	5/8" OD		3/4"OD	
Length Inches	Non-Steam to 150˚F	Steam to 425˚F	Non-Steam to 150˚F	Steam to 425˚F
12	600	340	600	340
14	600	325	600	325
16	600	325	600	325
18	600	315	600	315
20	600	315	600	315
24	580	300	580	300
30	550	NR	550	NR
36	500	NR	500	NR
48	340	NR	340	NR

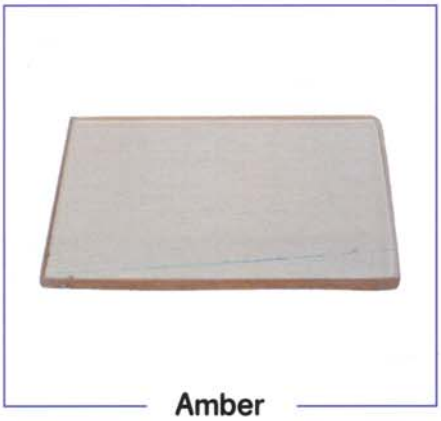
NR = Not Recommended for Steam Service
All Glass and Tubing can be cut to any length.

GLASS & GASKETS

Flat Plate Glass – Circles & Rectangles

Clear

Blue



Amber

Annealed Borosilicate – Clear
Good for normal service where one surface is heated to a maximum temperature of 446˚F (230˚C), using 1/4" or thicker glass. The temperature difference between ambient and process should not exceed 150˚F.

Tempered Borosilicate – Clear
Recommended for use where higher pressures are required than can be obtained with Annealed Borosilicate. Maximum service temperature is 500˚F (260˚C). No corrosion to surface, nor severe chill can be tolerated.

Cobalt Blue Furnace – Blue
Used to reduce glare when observing flame, smoke, and ash intensity in power plants and marine boilers. Thickness up to 1/4".

Vycor – Clear
Can be used continuously at 1652˚F (900˚C). The temperature difference between ambient and process surfaces should not exceed 600˚F. Thickness up to 1/2". Excellent optical properties.

Fused Quartz – Clear
For industrial and laboratory applications. Can be used continuously at 1742˚F (950˚C). Commercial Grade is standard. Optical Grade is available.

Pyroceram – Amber Tint
This transparent glass-ceramic material will not delaminate at elevated temperatures. Available in 5mm thickness only. Mainly used in furnaces.

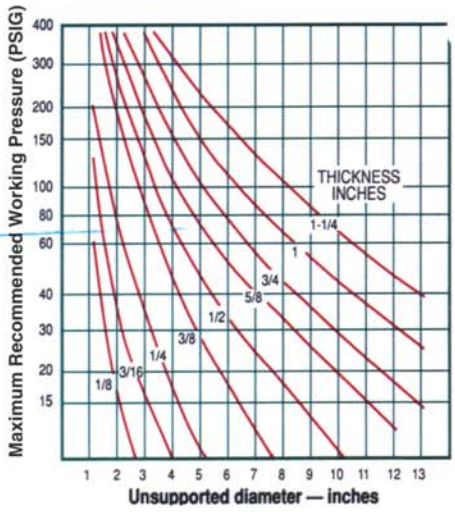
Glass For:

- Furnaces, Ovens
- Observation Equipment
- Flow Indicators
- Pressure Vessels/Tanks

Tempering

Tempering greatly increases the strength of glass and helps it overcome the damaging effect of scratches and other surface defects. Glass is heated to a specified point above its annealing temperature, then quickly quenched causing the surface to shrink and harden. While the interior cools more slowly it tries to shrink, putting itself in tension and creating a compressive stress on the surface. When completed, the surface compression must be overcome and a tensile stress introduced before the glass can be harmed. Thus, the mechanical and impact strength as well as the thermal shock resistance are improved greatly.

Pressure Chart for Circles



Note: All Glass should be protected from thermal shock, and shielding is recommended.

Model Selection Table

Model	Type	Color	Shape	Normal Service Rating ˚F	Adjust above Pressures by the following:
530	Annealed Borosilicate	Clear	Circle	446	100%
531	Annealed Borosilicate	Clear	Rectangle	446	-
532	Cobalt Blue Furnace	Blue	Circle	446	100%
533	Cobalt Blue Furnace	Blue	Rectangle	446	-
534	Vycor	Clear	Circle	1652	75%
535	Vycor	Clear	Rectangle	1652	-
536	Quartz	Clear	Circle	1742	60%
537	Quartz	Clear	Rectangle	1742	-
538	Tempered Borosilicate	Clear	Circle	500	300%
539	Tempered Borosilicate	Clear	Rectangle	500	-
528	Pyroceram	Amber Tint	Circle	1292	-
529	Pyroceram	Amber Tint	Rectangle	1292	-

Molded Annular Edge Glass Circles

Model 540M

Maxos Molded Annular Edge replacement glass has outstanding Quality and Clarity characteristics. It has a standard thickness of 3/4" and is made of borosilicate.

Model 540M —Annealed
This glass is used for the lower pressure applications

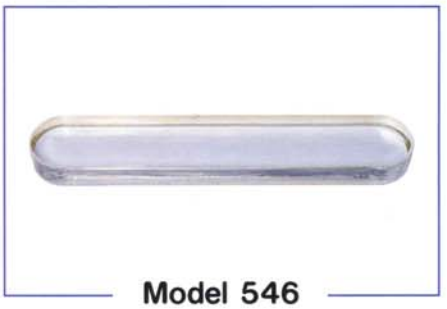
Model 541M —Tempered
This tempered glass is used for higher pressure applications.

Model	Diameter	PSIG
540M-1	4"	150
540M-2	5"	100
540M-3	6"	60
540M-4	6-3/4"	45
540M-5	8-3/8"	30
541M-1	4"	450
541M-2	5"	300
541M-3	6"	180
541M-4	6-3/4"	135
541M-5	8-3/8"	90

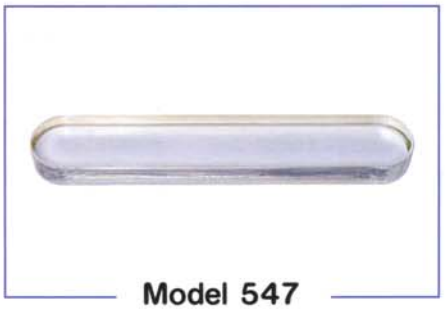
Model 540M is rated for 400˚F
Model 541M is rated for 500˚F

Flat Gauge Glass – Reflex & Transparent

Model 545



Model 546



Model 547

Model 545 – Reflex
Width: 1.300-1.339"
Thickness: .661"-.689"
Flatness: .005"

Model 546 – Transparent
Width: 1.300-1.339"
Thickness: .661"-.689"
Flatness: .005"

Model 547 HP Transparent.
Same as 546 except Flatness: .002"

Maxos Flat Gauge Glass is manufactured from a special 8488 formulated borosilicate glass, characterized by low coefficient of expansion, high chemical durability, and exceptional homogeneity.

These glasses are used in armored gauges as shown on page 37 and 38.

Model	Glass Size	Length Inches	Pressure and Temperature Ratings		
			Steam Boiler, No Mica, Max Pressure at **470˚F**	Steam Boiler, Mica Protected Max Pressure at **608˚F**	Non-Steam Service Max Max Pressure at **100˚F**
545-1	1	4-1/2			
545-2	2	5-1/2			
545-3	3	6-1/2		Mica Not	
545-4	4	7-1/2		used with	
545-5	5	8-5/8	500	Reflex	4000
545-6	6	9-7/8	PSIG	Gauge Glass	PSIG
545-7	7	11			
545-8	8	12-5/8			
545-9	9	13-3/8			
546-1	1	4-1/2			
546-2	2	5-1/2			
546-3	3	6-1/2			
546-4	4	7-1/2			
546-5	5	8-5/8	500	1000	4000
546-6	6	9-7/8	PSIG	PSIG	PSIG
546-7	7	11			
546-8	8	12-5/8			
546-9	9	13-3/8			
547-1	1	4-1/2			
547-2	2	5-1/2			
547-3	3	6-1/2			
547-4	4	7-1/2			
547-5	5	8-5/8	500	1500	5000
547-6	6	9-7/8	PSIG	PSIG	PSIG
547-7	7	11			
547-8	8	12-5/8			
547-9	9	13-3/8			

For Shields see Page 45.
For Gaskets see Page 45.

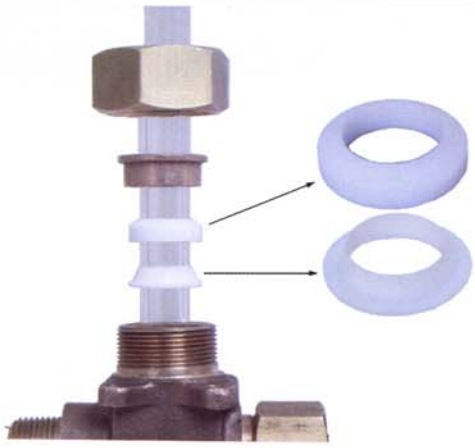
Also available is 30mm wide Reflex and Transparent Gauge Glass and Almax II Aluminosilicate.

Gaskets & Washers

Tubular Gauge Glass Gaskets

How to Order : Specify "A" (ID) x "B" (OD) x "C" Thickness
Example: 9/16" x 7/8" x 3/8"
For 5/8"OD Glass: A = 9/16" for Rubber Gaskets
For 3/4" OD Glass: A = 23/32" for Rubber Gaskets

Model	Material	Temp. Rating °F
550	Buna-S	200
551	EPDM	300
552	Neoprene	200
553	Grafoil	600
554	Solid Teflon	400
556	Teflon / Hypolon	400
576	Viton	400
577	Ethylene Propylene	300 (350 for steam)



Model 584

Model 584 - Butler Bevel Seal
Our PREMIUM Gasket for **STEAM/WATER** Service. Prevents cloudiness and erosion of gauge glass OD due to steam leakage. Each Model number consists of a pair for the upper valve and a pair lower valve. Each pair consists of an upper and lower Teflon piece.

Model	ID or Glass Size	OD in Inches	John C. Ernst Valve Sets used with each size:
584-1	5/8"	0.860	None
584-2	5/8"	0.900	408-04, 409-04,436-04
584-3	5/8"	0.960	414-04, 415-04, 426-04,446-04
584-5	5/8"	1.080	454-04, 456-04
584-6	3/4"	0.960	414-05, 415-05, 426-05, 446-05
584-7	3/4"	0.900	408-05, 409-05, 436-05
584-9	3/4"	1.130	454-05, 454-06, 456-05, 456-06

Armored Gauge Gaskets & Shields

Armored Gaskets/Shields		Non-Steam/ Water		Steam/Water	
Model	Material	Max °F	PSIG @ 100°F	Max °F	PSIG @ 100°F
585-1 to 9	Grafoil	750	4000	456	450
588-1 to 9	Non Asb	750	400	NA	NA
595-1 to 9	Teflon	400	300	NA	NA
592-1 to 9	Mica	NA	NA	456	450
597-1 to 9	Kel-F	300	300	NA	NA

Flat Gaskets

How to order: Specify ID x OD x thickness

Model	Material	Temp °F	Available Thickness
558	Viton	400	1/16, 3/32, 1/8
561	Solid Teflon	400	1/16, 3/32, 1/8
564	Neoprene	250	1/16, 3/32, 1/8, 1/4
565	Buna-N	225	1/16, 3/32, 1/8
573	Teflon	400	1/8
577	Ethylene Propylene	300	1/16, 3/32
583	Non-Asbestos C4401	750	1/16, 3/32

Brass Washers

Model	Available ID's	Available OD's
591	1/2	3/4, 7/8, 1
	5/8	13/16, 7/8, 15/16, 1, 1-1/16, 1-1/8, 1-3/16, 1-1/4
	3/4	7/8, 15/16, 1, 1-1/16, 1-1/8, 1-5/32, 1-3/16, 1-1/4, 1-5/16, 1-3/8, 1-1/2,1-3/4

Glass Cutters & Accessories

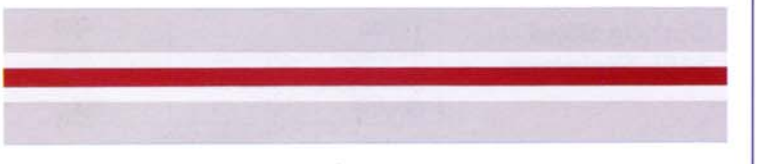
Model 852

Model 850

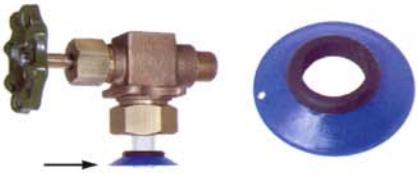
Model 853

Model 854 Glass Brush

Model 736C Gasket Cutter



Model 867 Redline Tape



Model 800

Model 850 Squeeze & Pop Glass Cutter
This glass cutter will cut tubular glass up to 1" OD. The cutter chain is wrapped around the tubing right at the point where cut is to be made. Any length from 1/2" to several feet may be cut off. This is our most popular glass cutter.

Model 852 Table Top Glass Cutter
This cutter is made so it can be clamped to a table. It will cut tubing up to 1-1/2" in diameter. The cutting blades can be replaced.

Model 853 Economical Glass Cutter
This inexpensive glass cutter will cut tubing up to 1-1/2" diameter on outer surface of the glass, to the length required.

Model 854 Tubular Glass Brush
Designed for cleaning the inside of gauge glass. For Model 507, 508 Heavy Wall Glass, use 1/4" diameter brush.

Model	Available Diameters	Available Lengths in Inches
854	1/4"	48
	3/8"	21
	1/2"	21, 36, 48, 72
	5/8"	21, 36, 48, 72
	3/4"	21, 36, 48, 72
	1"	21, 36, 48, 72

Gasket Cutters – are supplied as a **Basic** kit which includes gasket cutter, blade, thin blade, ferrule, disk pins, pivot pins, post wrench, pin handle, bolt hole locator, dove-tail designer. **Complete** kits consist of the Basic kit plus cutting workboard, material box, and applicable extension arms for larger cuts.

Model	Maximum Dia. Cut	Type of Kit
747C	13"	Basic
748C	13"	Complete
749C	24"	Complete
736C	36"	Complete

Model 867 Redline Polyester Stripe
This self-adhesive strip changes clear gauge glass into redline magnifying gauge glass so clear liquids can easily be detected by appearing red. It also can be attached around the circumference of larger cylinder glasses as level markers.

Model 800 Visi-Shield
Designed as a collar to fit snugly around gauge glass to deflect and collect escaping steam condensation which can cloud up the outside of the gauge glass.

Sight Windows – Standard & ANSI Rated

SIGHT WINDOWS

Model 058

Flat Pad – This window mounts directly to the tank wall and is welded in place.

Model	Pad Material
028	Carbon Steel
058	316L Stainless

Model 058 and 059 are shown with a Stainless Steel Cover which is optional.

Model 059

Radius Pad – This window has a radius pad to conform to a pipe or curved vessel diameter and welded in place. The radius can be cylindrical or spherical.

Model	Pad Material
029	Carbon Steel
059	316L Stainless

Model 030

Bolt-On – This window mounts directly to an existing 150# ANSI flange. Consult sales office for other flange configurations.

Model	Pad Material
030	Carbon Steel
036	316 Stainless

Model 311

Weld Neck – This window is designed to butt weld to the end of a pipe or weld directly to a tank port.

Model	Pad Material
311	Carbon Steel
351	316L Stainless

Blue covers indicate Carbon Steel Pad.

Features

- **Sizes 1" to 8" Conn.**
- **For Process Observation**
- **Standard 150 PSI Rated or ANSI Rated**
- **150# & 300# Flanges Avail.**
- **Various Mountings**
- **Illuminators & Wipers Available**

Ratings*

- ***Standard Rated (ST)***
  150 PSI Maximum
- ***ANSI Rated (AN)***
  275 PSI @ 100˚F and
  195 PSI @ 400˚F

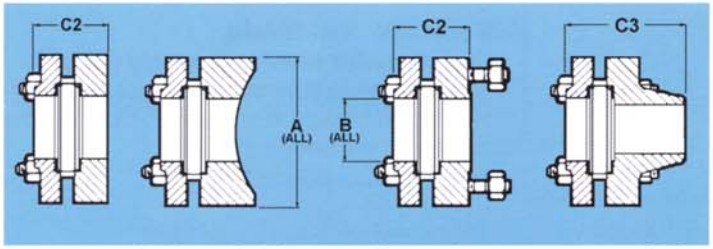
Materials

- Pad: Carbon Steel or 316SS
- Cover: Carbon Steel
- Glass: Borosilicate

*Temperature ratings are dependent on seal material. See seal material below.

How to Order:
For Standard Rated units add "ST" to the Model Number. Ex: 310ST
For ANSI Rated units add "AN" to the Model Number. Ex: 310AN

Gasket Material	Temp ˚F
Viton	400
Neoprene	200
Buna-N	250
Teflon	400
Ethylene Propylene	300
Non-Asbestos C4401	500
Grafoil	500



Flg Size	A	B	C2	C3
1	4-1/4	1-3/8	1-3/4	3
1½	5	1-15/16	2	3-1/2
2	6	2-7/16	2-1/2	3-7/8
3	7-1/2	3-9/16	2-3/4	4-3/8
4	9	4-9/16	2-7/8	4-3/4
6	11	6-3/4	3-7/8	6
8	13-1/2	8-11/16	4-3/8	7

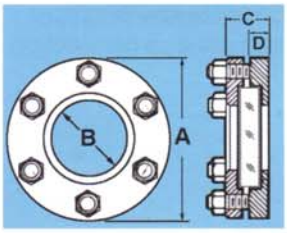
Weld Pad Windows

Model 312

Flat Weld Pad – Designed to be welded directly to tank and vessel sides or covers. They are available with flat, cylindrical, or spherical pad shapes.

Model	Pad Material
312	Carbon Steel
352	316L Stainless

How to Order Example:
Model 312-3



Size No.	Dimensions in Inches				Wt Lbs
	B	A	C	D	
2	1-1/4	3-5/16	1-3/4	5/8	2
3	2	4-7/16	1-13/16	11/16	4
4	2-9/16	5-9/16	2-1/8	3/4	7
5	3-3/16	6-9/16	2-1/8	3/4	9
6	4-1/4	7-9/16	2-1/8	3/4	12
7	5-1/4	8-11/16	2-1/2	4/8	18
8	6-7/8	10-5/16	2-1/2	7/8	22

Features

- **Large Weld Pad Window**
- **Non-ANSI Rated**

Ratings

- Pressure: 150 PSI
- Temperature Ratings are subject to the limitations of the gaskets. See Page 45.

Materials

- Glass: Borosilicate
- Covers: Carbon Steel
- Seals: Neoprene in CS
  Teflon in SS

Metaglas®

Model 501

Metaglas® Sight Glass has proven to be the solution for standard sight glass problems. These mechanically prestressed glasses, fused with a dimensionally adapted metal frame ring are an alternative to conventionally annealed and tempered glass discs. The advantage for these glasses is the glass will not be subject to sudden unexpected rupture. At worst any crack that may develop may only slightly affect visibility.

Rupture tests have demonstrated that mechanically prestressed glass even after formation of a large number of cracks remains leak tight at pressures far exceeding the design pressure due to the homogeneous compressive stress constant throughout the entire cross section so the equipment can be kept operational.

Advise of Diameter and Pressure Requirements.

Features

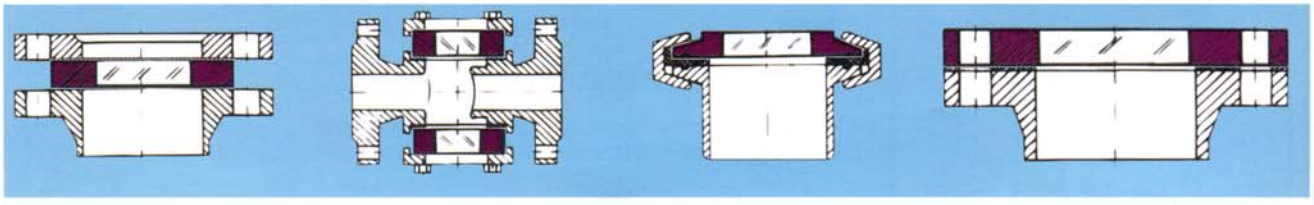
- **Glass Fused to Metal Ring**
- **Very Resistant**
- **Greater Safety**
- **Extremely Long Service**
- **For Many Applications**
- **Reliable**
- **Reusable**

Ratings

- High Pressure Ratings based upon size.

Materials

- Glass: Borosilicate DIN7080
- Metal Ring: Duplex SS, Carbon Steel, Hastelloy C



Illuminators & Wipers

Model 809

Model 809 – Illuminator for Sight Flow Indicators

The Illuminator is spring held to the back of a double window sight flow indicator. It lights up the fluid flowing through the flow indicator. Unit includes standard receptacle 3 prong plug. For flow indicator sizes up to 1-1/2".

Model	Body	Explosion -proof	Visible Diameter Inches	Box Size Inches	Volts	Watts
809	Aluminum	No	1-1/16	4-5/8 x 3 x 2-3/8	120	6

Model 813

Model 813 – Illuminator for Liquid Level Gauges

The illuminator gives light for your tubular glass with a strong beam of light at the underside of the liquid level. It is designed for low pressure boilers and tank gauges. Unit has a 1/2" NPT female conduit connection on top of unit. The bulb is incandescent.

Model	Body	Explosion -proof	Visible Length Inches	Unit Size Inches	Volts	Watts
813	Aluminum	No	9	12 x 3-3/16 dia	120	60

Model 810

Model 810 & 811 – Illuminators for Sight Windows

Designed for Hazardous and Non-Hazardous locations to illuminate the internals of through flow indicators, pipelines, laboratory mixers, and other vessels and reactors, which are normally closed. Some of the units are suitable for food processing.

Model	Mounting	Explosion -proof	Size Diameter	Volts	Watts
810-03	2 bolt to cover	No	2-1/4	24	20/50
810-05	2 bolt to cover	No	2-3/4	24 120	20/50 50
810-05EX	2 bolt to cover	PTB	2-3/4	24 120	20 5
810-06	2 bolt to cover	No	3-3/4	24 120	20/50/100 35/50
810-06EX	2 bolt to cover	PTB	3-3/4	24	20/50
810-07	2 bolt to cover	No	4-1/2	24 120	50/100 35/50/100
810-07EX	2 bolt to cover	PTB	4-1/2	24	50/75
810-08EX	2 bolt to cover	UL	4-1/2	120	35/50/100
811	4 bolt flush fit to cover (glare free)	No	Fits in window	24/120	20/50/75/100

Model 811 & 822

Model 823

Models 822 & 823 - Wipers for Sight Windows

Model 822 is designed for low-pressure applications for manually cleaning the inside of the glass surface of sight windows.
Model 823 is designed for higher-pressure applications for manually cleaning the inside of the glass surface of sight windows requiring test certification for explosion or non-explosion hazardous operations.

Model	Wiper Mounting	Max Pressure PSIG	Max Temp
822	Through center hole in glass	88	428
823	Through flange cover and pad	235	392

Note: Pressures and temperature ratings may vary depending upon size and type of glass. Advise pressure and temperature of application when inquiring.

Threaded Male Sight Windows

Model 341

Model 341 - Low Pressure

- Glass: Annealed Boro
- Retaining Ring: Brass
- Seals: Viton
- Temp: 200˚F

Model	Material
341	Brass

Reflectors are optional

Model 341 Dimensions in Inches

Size	A	B	C	PSIG	Wt oz.
1/4	5/8	17/32	3/4	50	2
3/8	7/8	15/32	7/8	50	2
1/2	1	19/32	7/8	50	2
3/4	1-1/8	11/16	1	50	3
1	1-3/8	15/16	1-1/8	50	4
1-1/4	1-7/8	1-1/4	1-1/4	32	6
1-1/2	2-1/8	1-1/2	1-1/4	24	8
2	2-3/8	1-1/2	1-1/4	23	20

Model 304

Model 304 - Medium Pressure

- Glass: Annealed Boro
- Retaining Ring: Brass
- Seals: Viton
- Temp: 400˚F

Model	Material
304	303 Stainless
316	316 Stainless
320	Carbon Steel

Model 304 Dimensions in Inches

Size	A	B	C	PSIG	Wt. Oz.
3/8	7/8	15/32	1	300	2
1/2	1	19/32	1	275	2
3/4	1-1/8	11/16	1-1/8	250	3
1	1-3/8	15/16	1-1/4	200	4
1-1/4	1-7/8	1-1/4	1-3/8	150	8
1-1/2	2-1/8	1-9/16	1-3/8	100	12
2	2-1/2	1-1/4	1-1/2	100	1.3#
3	3-1/2	2-3/16	2-1/2	150	3.5#

Note: Model 316 and 320 are the same dimensions
Model 304 does not come in 3".
Reflectors are optional

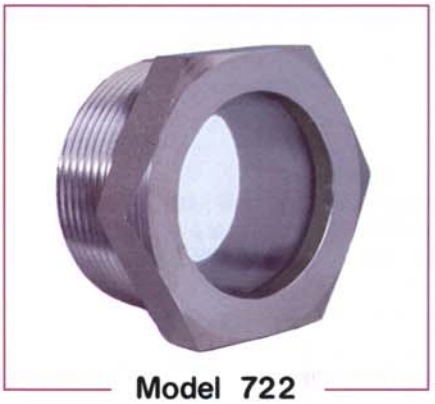
Model 322

Model 322 - Medium Pressure – Fused Glass
There is no glass-retaining ring or gasket due to the glass being fused to ID bore of the steel body. Glass is flush with hex face.

Model	Material
322	Plated Steel

Model 322 Dimensions in Inches

Size	A	B	C	PSIG @ 250F	Wt Oz
1/4	5/8	11/32	5/8	125	1
3/8	3/4	7/16	23/32	125	1
1/2	15/16	9/16	25/32	125	2
3/4	1-1/16	3/4	1-1/16	125	2
1	1-3/8	15/16	1-1/16	125	3
1-1/4	1-3/4	1-3/16	1-7/32	125	6
1-1/2	2	1-7/16	1-7/32	125	7
2	2-3/4	1-7/8	1-9/32	125	10



Model 722

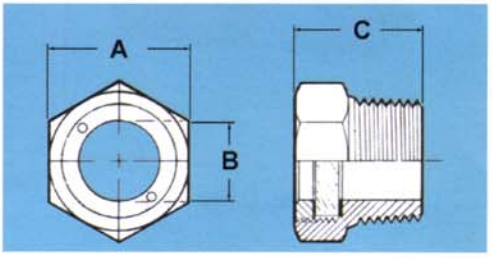
Model 722 – High Pressure Fused Glass
There is no glass-retaining ring or gasket due to the glass being fused to ID bore of the steel body. Glass is flush with hex face.

Model	Material
722	Plated Steel

Model 722 Dimensions in Inches

Size	A	B	C	PSIG @ 69˚F	Wt oz
1/4	5/8	5/16	5/8	2000	1
3/8	3/4	7/16	3/4	1850	1
1/2	15/16	19/32	7/8	1750	2
3/4	1-1/16	3/4	15/16	1500	2
1	1-3/8	15/16	1-1/16	1250	3
1-1/4	1-3/4	1-3/16	1-1/4	1000	6
1-1/2	2	1-7/16	1-1/4	750	7
2	2-3/4	1-7/8	1-3/8	500	10

Models 304, 316, and 320 can have higher pressure and temperature ratings as an option with tempered borosilicate glass and stainless steel retaining rings.



SIGHT WINDOWS

Flow Switches & Sensors

Model 345

Model 345 Electric Flow Switch

This Model is designed with a pointer for visual flow indication and an adjustable SPDT Reed Switch to be set for desired flow settings. A spring-loaded vane adjusts with the flow for indication. Dial, pointer, switch are in separate housing.

- Body: Bronze
- Seals: Viton O-Rings
- Window: Acrylic

Model	Size NPT	Case Height	Case Width	Overall Width	Rating	Switch Rating
345	1/2 3/4 1 1-1/2 2	3-5/8 3-5/8 3-5/8 3-5/8 4-1/2	3-5/8 3-3/4 3-3/4 4-3/4 6-1/2	3-5/8 3-3/4 3-3/4 4-3/4 6-1/2	125 PSIG @ 200˚F	15A @ 125V 7A @ 250V

Model 357

Model 357 & 373 Paddle Type Flow Switch

This Model is mounted in a vertical position from a tee-mounted in-line in a horizontal pipe system. The system pipe size can be between 1" and 4". The paddle is trimmed to the appropriate mark with tin snips. Line flow moves the paddle and actuates the switch. The unit comes with No. 18 AWG 24" long polymeric lead wires. The unit is bi-directional.

- Max Voltage is 240V.
- Max Pressure Drop: 3 PSIG

Model	Housing	Paddle	Other Wetted	Max PSIG	Max. Temp˚F	Rating
357	Brass	302SS	316SS Ceramic Teflon	2000	300	20VA SPDT
373	316SS					

Note: Consult sales office for actuation and de-actuation set points.

Model 334

Model 334, 364, & 045 Shuttle Type Flow Switch

As liquid flow increases to the actuation setting, a magnet-equipped shuttle is displaced. When displaced by fluid flow, this shuttle actuates a hermetically sealed, SPDT 20VA reed switch within the unit stem. A compression spring provides shuttle return when flow decreases. Maximum temperature range for Model 045 is 200˚Fand 300˚F for Model 334 & 364. Seals are Viton.

Model	Sizes NPT	Housing	Setting	Range GPM	Operating Pressure Rating
045	1" only	Bronze	Adjustable	1 to 15	400 PSIG @ 100˚F
334	1" to 2"	Bronze	Fixed	0.5 to 100	
364	1" to 2"	316SS	Fixed	0.5 to 50	

Note: For Models 334 & 364 a switch setting must be specified.

Model 376

Model 376 & 377 Piston Type Flow Switch

These Models have fixed and adjustable flow set points for liquids, air and gases. The repeatability is 1% maximum deviation. Seals are Viton. Maximum operating pressure is 1000 psig. Maximum operating temperature is 300˚F.

Model	NPT Size	Housing & Piston	Setting	Range
376A	1/2	Brass	Adjustable	0.5 to 20 GPM
376B		316SS		
376C		Brass		1 to 75 SCFM or 3 to 160 SCFM
376D		316SS		
377A	1/4	Brass	Fixed	0.1, 0.25, 0.50, 0.75, 1.00, 1.50 GPM
377B		316SS		

Note: for other Models available consult sales office.

Level Switches & Sensors

Model 347

Side Mounted Float Level Switches

These switches have a 2-1/2" Male tank connection. Designed for horizontal mounting on the side of a vessel. The float rod allows for 1-1/2" to 5" field adjustment differential range that can be increased with the use of a longer float rod. Standard switch ratings are SPDT and 250˚F. A 400˚F switch is available. Nema 4 housing is standard. Explosionproof housings are also available.

Model	Body	Float	Trim	Pressure	Rating
347-1	Bronze	Copper	Brass	30	10A
347-2	Bronze	Stainless	Brass	300	@
349-1	Bronze	Stainless	Stainless	30	125/250VAC
349-2	Bronze	Stainless	Stainless	300	or
367-1	Stainless	Stainless	Stainless	30	0.5 A
367-2	Stainless	Stainless	Stainless	300	@
367-3	Stainless	Stainless	Stainless	500	125 VDC

Model 346

Side Mounted Float Level Switches

These level switches are mounted into the vessel side at the level where the sensor is desired. They use a low wattage reed switch actuated by a moving magnetic field. The vessel connection is 1" NPT male. The conduit connection for the wire leads is 1/2"NPT male. Explosionproof versions are available. The electrical termination is No.18 AWG polymeric lead wires 24" long.

Model	Stem & Mounting	Float	Float Type	Pressure @ 70˚F	Temperature Rating
346	Brass	BunaN	Cylinder	150	Water: 180˚F Oil: 250˚F
348	316SS	316SS	Cylinder	500	300˚F
356	316SS	304SS	Ball (2")	900	300˚F

Models 333 & 363

Vertically Mounted Float Level Switches

The Models shown below us a 20VA Reed switch which is actuated by a moving magnet field as the level changes. Some switches are available in 100VA.

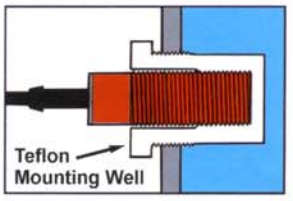
Model	Stem & Mounting	Float	Float Dia.	PSIG @ 70˚F	Max Temp ˚F	Conn. Size NPT
333-1	Brass	BunaN	1	150	180	1/8
391-1	316SS	Teflon	1	1000	250	1/8
362-1	316SS	316SS	1-1/2	100	300	1/8
363-1	316SS	316SS	2-1/16	750	300	1/4
339-1	Polysulfone	Polysulfone	1	50	225	1/8
372	CPVC	CPVC	1-1/2	15	180	1/4
388	Teflon	Teflon	2-1/8	30	300	1/4
395-1	Polyprop.	Polyprop.	1	150	150	1/8

Model 324A & 324D

Model 324 Proximity Switches

Capacitive proximity switches have the ability to detect both conductive and nonconductive objects such as water and other liquids, plastics, wood, glass, and other materials. These switches include a 15 or 20 turn potentiometer to adjust the sensitivity of the switch. It also includes an LED to visually show switching. Switches can be mounted to vessels with a Teflon mounting well.

Model	Output Function	Adjustable Range	Switch Diameter
324A	NO	3 – 15mm	30mm
324B	NC	3 – 15mm	30mm
324C	NO/NC	3 – 15mm	30mm
324D	NO	2.5 – 8mm	18mm
324E	NC	2.5 – 8mm	18mm
324F	NO/NC	2.5 – 8mm	18mm
324G	NO/NC	15 – 60mm	80 x 120mm



SWITCHES

Ejectors – In-Line Jet Pumps

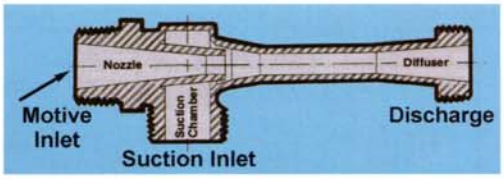
Model 930 Ejector

Applications

- Pumping Liquids in Line
- Pumping Gases in Line
- Heating Liquids in Line

Application	Available Bulletins
General Guide	E91000
Pumping Liquids	E91001
Pumping Gases	E91002
Heating Liquids	E91003

Model	Material	Available Sizes
901	Carbon Steel —Fabricated	4" – 12" Flanged
910	PVC	1/2" – 3" NPT
930	Bronze	1/2" – 3" NPT, 4" Flanged
950	316 Stainless Steel	1/2" – 3" NPT, 4" —12" Flanged
980	Iron Body/CS Nozzle	1/2" – 3" NPT, 4" Flanged



Pumping Liquids – Liquid as operating Medium

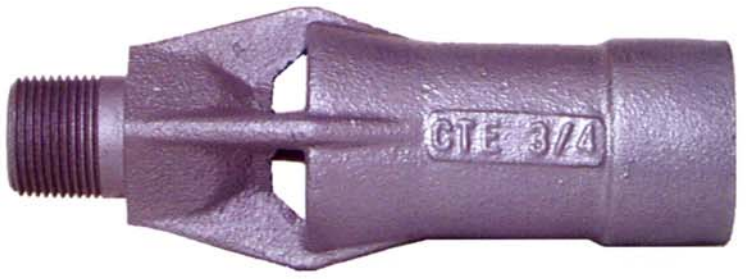
Nozzle Type / (Head) >	LL (Low)	LM (Medium)	LH (High)
Operating Medium Pressure Range	15-200 PSIG	15-200 PSIG	15-200 PSIG
Minimum Operating Medium Pressure per foot of discharge head	2 PSIG/ft	1.5 PSIG /ft	1.0 PSIG /ft
Discharge Head Pressure Range	To 50 ft.	40 to 80 ft.	80 ft or more
Suction Lift	To 27 ft.	To 27 ft.	To 27 ft.

Pumping Liquids – Steam as operating Medium

Nozzle Type / (Head) >	GL (Low)	GH (High)
Operating Medium Pressure Range	60-150 PSIG	35-150 PSIG
Operating Medium Pressure to Elevate Liquid 50 ft.	150 PSIG	75 PSIG
Suction Lift (with water temp to 120˚F)	To 20 ft.	To 20 ft.

Contact Sales Office for other applications. Sanitary Ejectors are also available.

Eductors – In-Tank CTE's



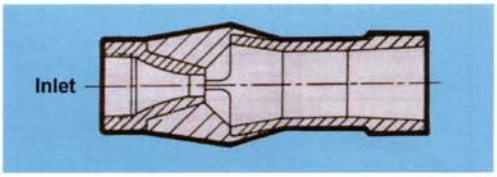
Model 990 Eductor

Applications

- Mixing Liquids in Tank
- Heating Liquids in Tank

Application	Available Bulletins
General Guide	E91000
Mixing Liquids	E92000
Heating Liquids	E91003

Model	Material	Available Sizes
920	PVC	3/8" – 3" NPT
940	Bronze	3/8" – 3" NPT
960	316 Stainless Steel	3/8" – 3" NPT, 4" - 8" Fabricated
990	Iron – Cast	3/8" – 3" NPT
991	Carbon Steel - Fabricated	4" – 8" Fabricated



Mixing Liquids

Pressure differential of inlet to tank pressure	10-100 PSIG
Maximum capacity of total liquid mixed per unit	12,730 GPM

For other applications, contact the sales office.

Terms and Conditions of Sale

1. ERRORS: Clerical or stenographic errors in quotations, orders, acknowledgements, invoices or other documents are subject to correction. Telephone quotations are subject to correction prior to acceptance.

2. ACCEPTANCE: All agreements, contracts and orders are subject to approval at our offices in Sparta, NJ.

3. FORCE MAJEURE.

4. RETURNS: Products may not be returned for credit until our authorization has been obtained, and must be in new, unused, and resalable condition. Standard stock off-the-shelf items are returnable without a restocking charge. Any other items will be subject to a restocking charge that will vary depending upon the item. Custom fabricated and customer specified items are non-returnable. All transportation costs must be prepaid.

5. CLAIMS: Claims for corrections or deductions must be made within 10 days after receipt of goods.

6. LIMITED WARRANTY: We warrant to the original purchaser for a period of one year from the date of invoice, or for such lesser period which equals the inherently shorter life of certain products, that products of our manufacture will be free from defects in material and workmanship, and will, at our option, repair or replace any product free of charge following satisfactory proof of defect. This warranty shall be the extent of our liability with respect to our products. We do not guarantee glass products against breakage, clouding or the corrosive or erosive effects of any material or substance, as any glass product can break when subjected to thermal or mechanical stress. THE FOREGOING IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE WILL NOT BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY NATURE.

7. PROPERTIES: Physical, chemical and mechanical properties are derived from data believed to be reliable, but these data do not imply fitness for a particular purpose.

8. DAMAGE IN TRANSIT: Claims for loss or damage must be made by the consignee, as title passes to the consignee upon delivery to the carrier.

9. TAXES: Where the company is required to collect sales, use or excise taxes, such taxes will be added to invoice.

10. PRODUCT CHANGES: Product designs, specifications, and continued availability are subject to change without notice.

11. PRICE CHANGES: Changes in prices and/or discounts may be made at time of shipment after prior notification to the purchaser.

12. TERMS: Net 30 days, FOB Sparta, NJ.

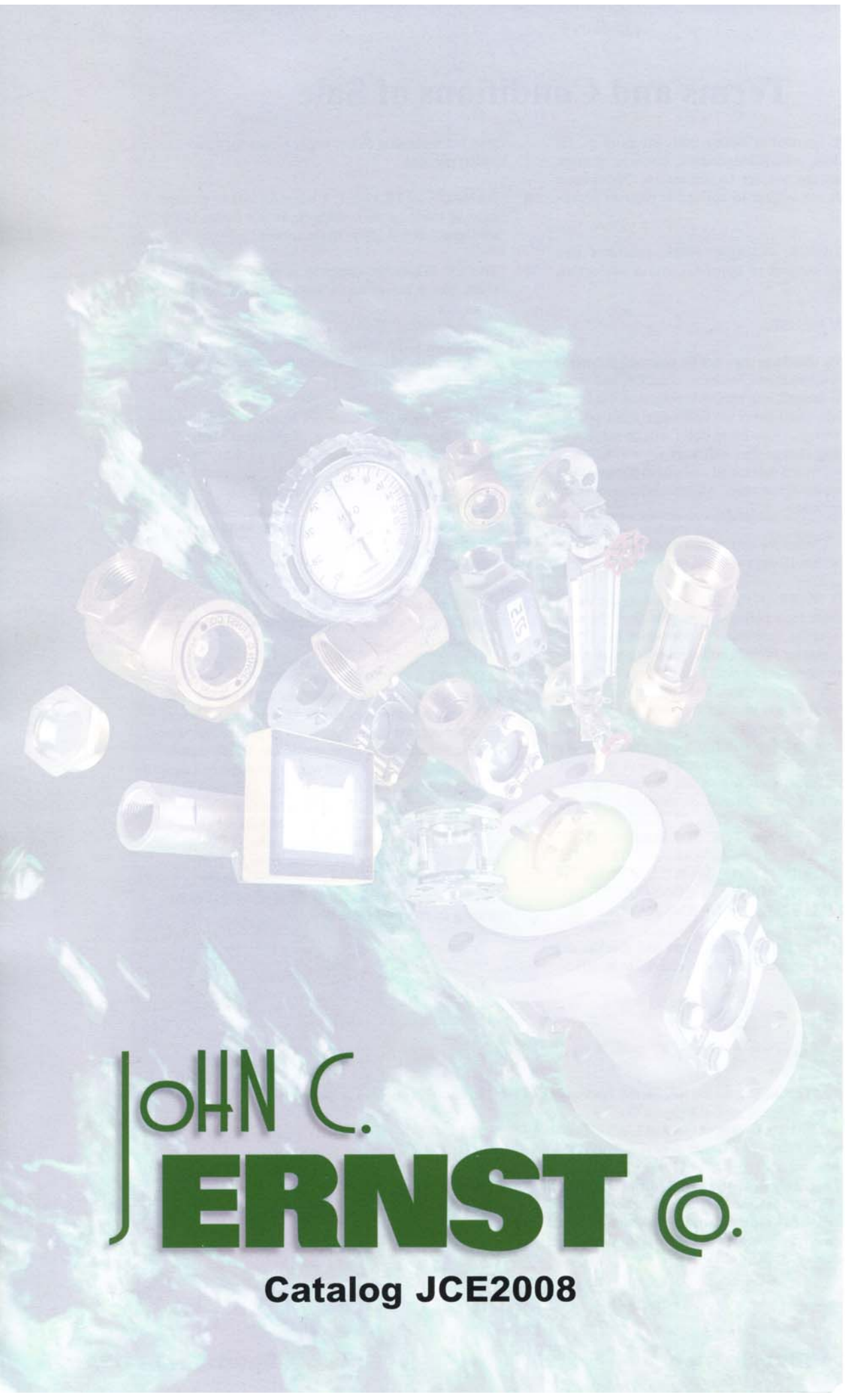
13. SHIPMENT: Shipments will be made from Sparta, NJ.

14. MINIMUM INVOICE: $30.00

15. DEBIT MEMOS: John C. Ernst Company will not accept a debit memo as notification of any discrepant material.

16. CANCELLATION CHARGES: May apply to any items that are on order with John C. Ernst Co. Inc. This amount may vary depending on the length of time the ordered items have been in production. For standard stock items there would not be any cancellation charges. For special manufactured items cancellation charges can be up to 100%.

17. CHEMICAL COMPATIBILITY: We do not make chemical compatibility recommendations. Please review all materials of the quoted items for compatibility with the fluids in conjunction with the temperatures and pressures of the application before placing an order for these items.



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