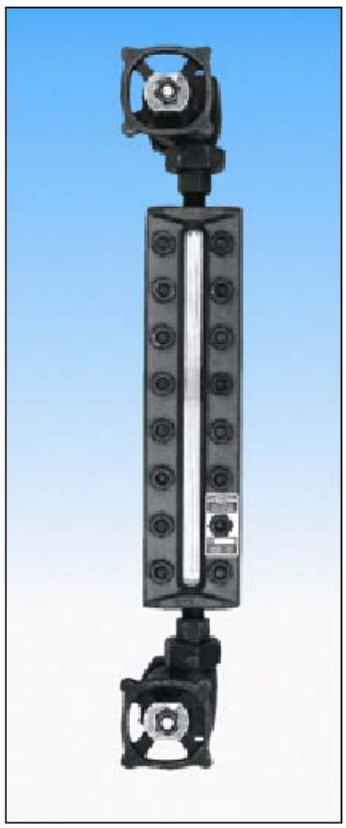
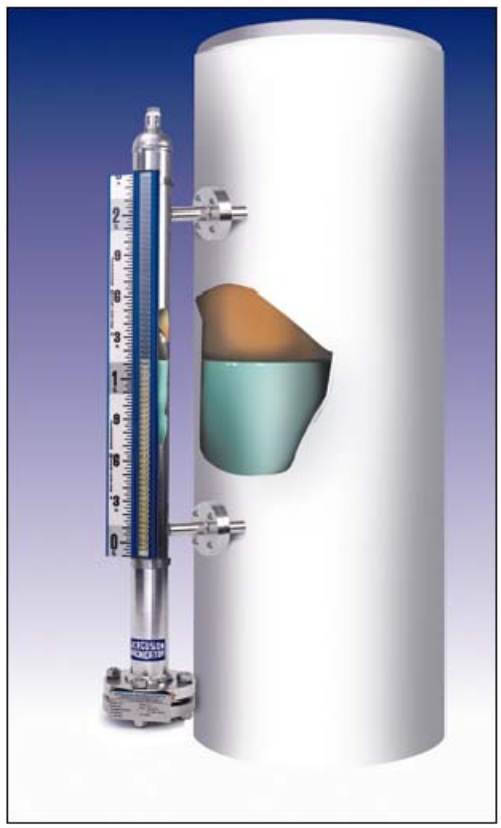
JERGUSON

Liquid Level Gage Specification Guide





"World Leaders in Liquid Level Indication and Control"

Clark·Reliance®

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Phone (440) - 572-1500 Fax (440) 238-8828
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Table Of Contents

INTRODUCTION

Jerguson Gage & Valve Company is the largest producer of Liquid Level Gauges in the world. We are generally the first choice with end users due to our broad range of application capabilities, quality of design and field support of our products.

This engineering guide is based on the ISA standard data sheet, the most common level gauge data sheet in use today. The layout of the guide follows the numbering on the data sheet. It is our intention to provide a basic description of what each item means to the manufacturer, as well as provide some basic information to aid engineers in specifying the correct information for a particular application. This will both ensure that the correct product is specified and expedite the procurement process.

We have recently added a section on magnetic gages, as their use has become increasingly popular. This market is crowded with new manufacturers. Jerguson Gage & Valve is in a position of strength with this type of gage, as we manufacture a *complete* line of level gauge products. This allows us to select the best type of gauge for any particular application. Companies that only manufacture magnetic gages are forced to apply this technology to applications where a glass gage would offer superior service, or a much lower price.

Jerguson Gage & Valve has been manufacturing glass gauges since 1905, and magnetic gages since 1967. We are familiar with most client requirements, and can help contractors and end users compile or compose general specifications to meet their application or client requirements. Jerguson has supplied to virtually all major Petrochemical Processors, and maintains an extensive library of general specifications. If your requirements are not addressed in this guide (such as Shell Internationale requirements), please contact us for additional information.

GAGE GLASSES

1. Gage Column ☐ Valves ☐
   Assembled with Nipples ☐ Unassembled ☐
2. Type: Reflex ☐ Transparent ☐ Tubular ☐
   Large Chamber ☐ Weld Pad ☐
3. Conn.: Size and Type _____
   Top & Bottom ☐ Side/Side ☐ Back ☐
   Vent _____ Drain _____
4. Material: _____
5. Min. Rating: _____ @ _____
6. Options: Illuminator ☐ Mica Shield ☐
   Internal Tube ☐ External Jacket ☐
   Non-Frost ☐ Ext. Length ☐
   Cal. Scale ☐ Other ☐
7. Manufacturer/Model: _____

GAGE VALVES

8. Type: Offset ☐ Straight ☐
9. Conn. Vessel _____ Gage _____ Vent/Drain _____
10. Material Body _____ Trim _____
11. Min. Rating: _____ @ _____
12. Construction: _____
13. Type of Conn.: Vessel _____
    Gage _____
14. Bonnet _____
15. Options: Ball Checks ☐ Renewable Seat ☐
    Other: _____
16. Manufacturer/Model: _____
    Notes: _____

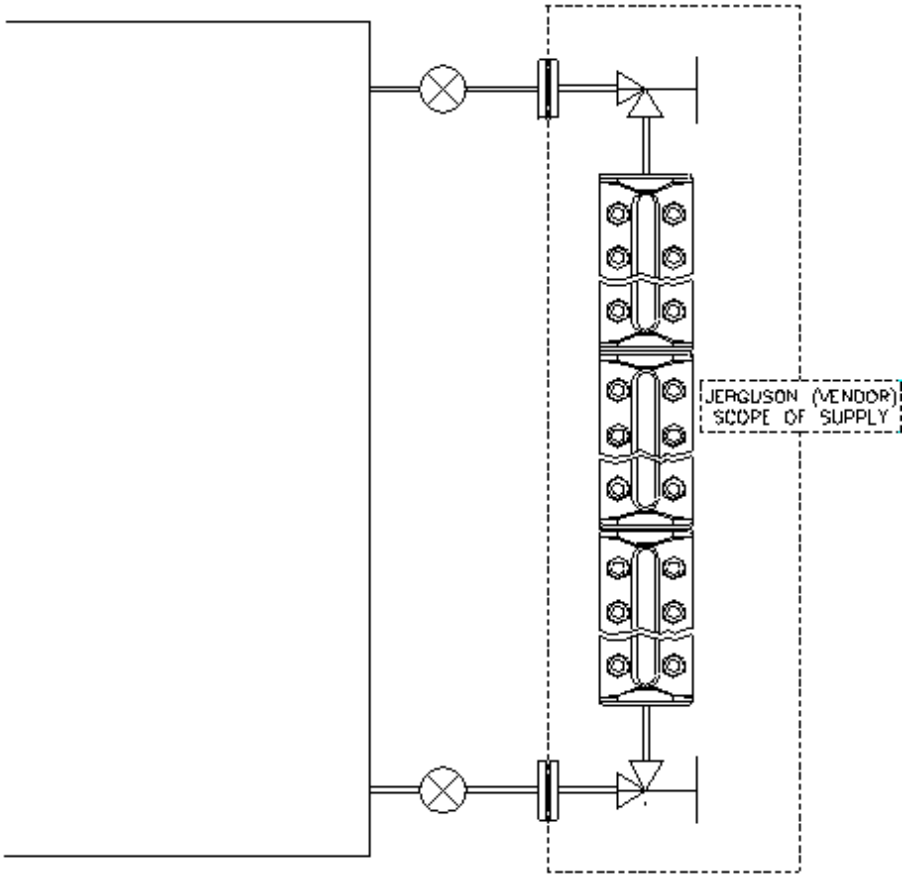
Item	Quan.	Tag. No.	Visible Glass	Valve Centers	Model No.	Operating Press	Operating Temp.	Service	Remarks

Notes:

Jerguson Gage & Valve Company
Division of the Clark-Reliance Corporation
16633 Foltz Industrial Parkway
Strongsville, OH 44136 USA

1. SCOPE OF SUPPLY

Jerguson® Gage & Valve Company will typically supply the level gage and gage valves assembled on centers to customer specifications.



The gage will usually be assembled to the valves **with threaded nipples.**

Jerguson gage valves are used because of several specialized features. These include ball checks, connection angles and vent/drain connections. Additionally, all Jerguson gage valves are built with bodies designed to support the weight of the gage.

Specifying engineers should clearly note on data sheets all **drain, vent, plug, or coating** requirements that are to be supplied by the gage vendor. Additionally, notes pertaining to items such as Hydrostatic pressure test should be noted on data sheets.

2. TYPE

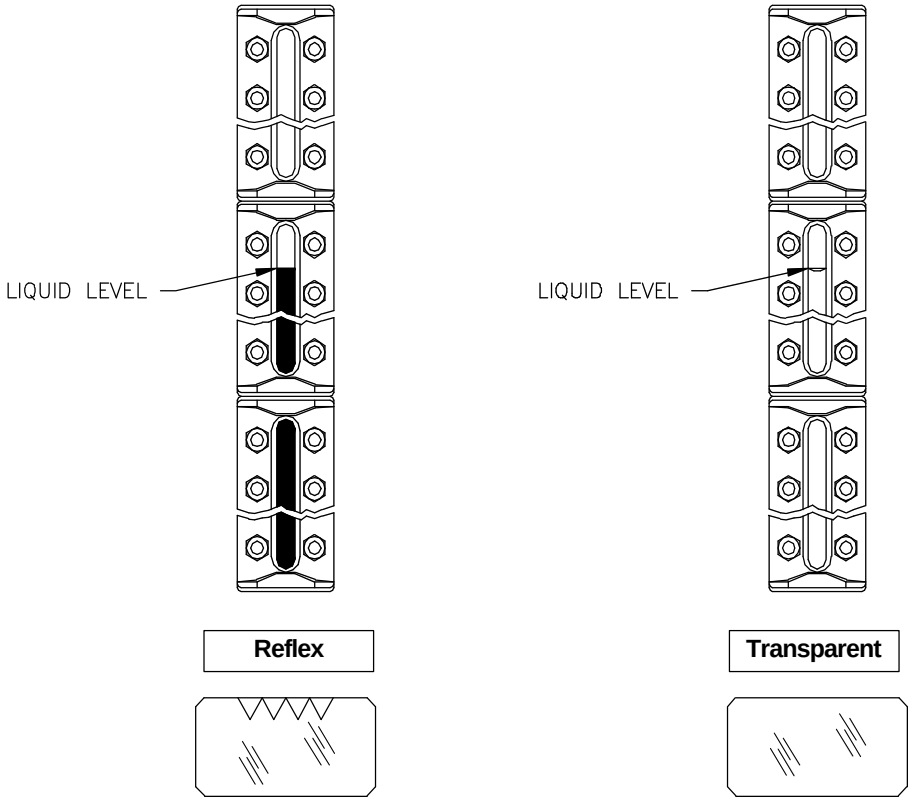
REFLEX

Reflex glass is most common and has prisms molded into the process side. Level indication will show black for liquid and white for gas. Level indication is obvious and illuminators are rarely required. Reflex gages have glass on the viewing side only, and the single cover per section is held in place with U-bolts. **Shields may not be used**, as the shield will prevent liquid from filling the spaces between prisms. ***Reflex gages are less expensive than transparent gages and are suitable for most process conditions***. **DO NOT SPECIFY FOR STEAM ABOVE 300 PSIG (21 Kg/cm^2).** *Cost Saving Tip: Use Reflex for low pressure steam condensate when the flange rating is 150#, Transparent with mica will cost 20-25% more.*

TRANSPARENT

Transparent glass is flat on both sides. Level indication depends on the color of the liquid or meniscus. Transparent gages have glass on both sides of the chamber to allow sufficient light to enhance viewing. Illuminators are usually used to supplement ambient light. Since transparent glass is flat on both sides, the ***glass may be shielded by mica or Kel-F***. **Specify transparent gages where:**

- Liquid-liquid interface must be viewed;
- Shields to protect the glass must be used;
- Steam above 300 PSIG (21 Kg/cm^2) is to be gaged, using mica shields;
- Liquid viscosity higher than 10 cp may foul reflex prisms.



TUBULAR

Tubular gages consist of a piece of glass or plastic tube held between an upper and lower valve. The tube will be held in place with a stuffing box at the valve. Specify tubular gages only in safe, low pressure (below 200 PSIG/14 Kg/cm^2) applications, as they are fragile when compared to armored gages. Visible range is calculated using manufacturers data.

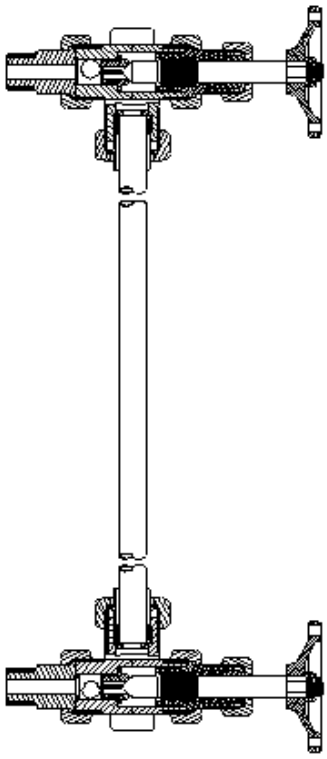
Types of tube commonly available include:

- High Pressure Borosilicate-A heavy wall clear glass tube.
- Red-Line Pyrex-This glass has a red line on the back. Where liquid is present a solid red color will be observed, similar to a household thermometer.
- Polycarbonate-Durable plastic tube.
- Kel-F-chemical resistant plastic tube.

Tubular gages should be protected with either guard rods (minimal protection) or plastic protectors.

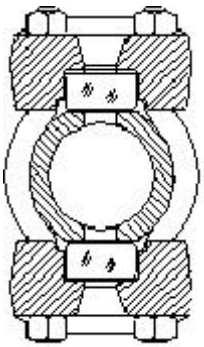
For tubular gage lengths over 72” (1830 mm), Jerguson manufactures a center fitting. This should be specified in either carbon steel or stainless steel. The center fitting allows the use of two pieces of glass to cover longer spans.

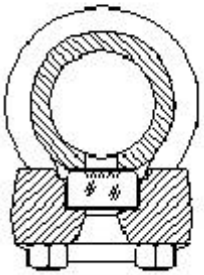
Jerguson Model 56
Tubular Gage



LARGE CHAMBER

Large Chamber gages must be specified as **reflex or transparent.** Chambers are constructed of pipe or tubing instead of bar. The larger ID chamber (2" Nominal should be specified) allows gaging of liquids that boil at ambient temperature such as Liquid Natural Gas. They **should also be used for extremely viscous liquids. Gage connections should be 3/4" (20) NPT at minimum.**

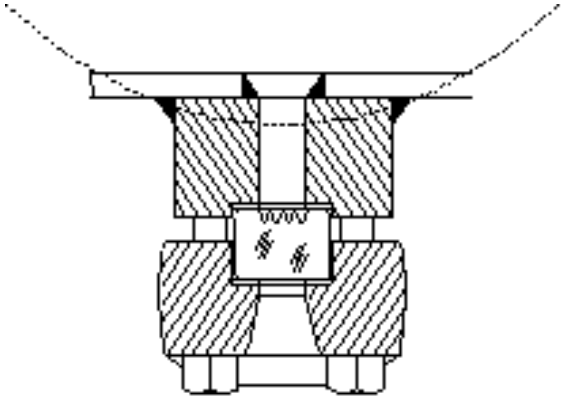




Sizing Note: Large Chamber gages require additional space when calculating Center-to Center dimensions. Check manufacturer's data when sizing.

WELD PAD

Weld Pads must be specified as **reflex or transparent** and are welded directly on the vessel. **Any radius must be noted on the data sheet.** Jerguson offers an isolable weld pad which will allow the gage to be isolated for service. Both reflex and transparent weld pad gages will have one piece of glass per section.



3. CONNECTIONS

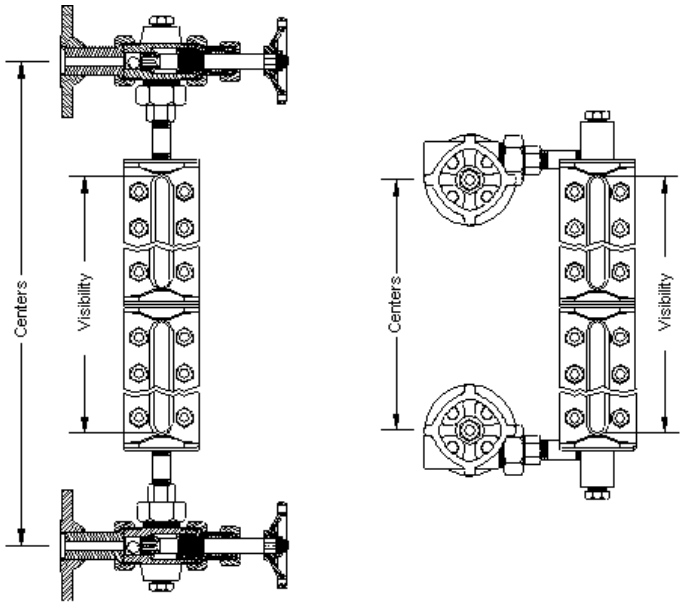
In reference to the process connection between the gage and gage valve, **most gages are specified with 1/2" (15) NPTF**. Normally, there is no additional cost for 3/4" (20) NPTF. **Flanges** may be used for gage to valve connections and required lined gages.

Connection location be specified. Flexibility in field installation is greatest with **Top & Bottom** or End Connections**.** This allows the vessel centerline to be altered by changing nipple lengths. Additionally, they are the least expensive. All drain connections will occur through the valve.

Side/Side connections (Close Hook-Up) are used for minimal vessel centerline connections. Side connected gages will typically cost 10 to 20% more than Top and Bottom connected gages as the chamber is extended to clear the gage cover and tapped on the side to meet the specified valve centers. There is less flexibility in the field with side connected gages as the nipple length does not affect the valve centerline dimension, and the gage cannot be rotated to change the orientation. The gage will have vent and drain connections.

Back connections are rarely used and are **only appropriate for reflex type gages.** Back connections are the same as side connections except that the tapping is opposite the viewing side.

Top / Bottom **Side /Side**



Note that the visible ranges in the drawing above are equal. However, it is possible to have closer centers with Side/Side connections. A good general rule is that the visible range and centerline dimension can be equal for Side/ Side connections with Offset gage valves. Also note that the Vent and Drain

4. MATERIAL

Traditionally, the material specification applies to the gage **chamber** as this is the **only metal wetted part.** Most hydrocarbons are safely gaged using carbon steel chamber stock. For more **corrosive applications**, **specify 316L Stainless Steel. For service below -45.6°C (-50°F), 316L SS should be specified for both chambers and covers.**

GLASS will be tempered borosilicate for temperatures below 317°C (600°F). **Tempered aluminosilicate** is used for temperatures between 317°C and 427°C (800°F).

GASKETS are generally vendor standard non-asbestos. Other materials such as **TFE** or **Graphite must be specified with a note. Shields** should also be specified under the ***Accessories*** heading and may **only be used with transparent type gages.**

Consult the corrosion table for specific compatibility. **Use mica or Kel-F shields where Borosilicate Glass** is not recommended.

COVER material should generally be **carbon steel** as the **cover is not a wetted part. Many users do not allow Ductile Iron so "carbon steel covers" should be noted** since most manufacturers have models with iron covers. **Stainless steel** is used **only in very corrosive atmospheric environments** or cold service.

BOLTS and NUTS are generally acceptable in alloy steel. However, where **special coatings** are to be used (such as for offshore service), it is strongly recommended to **specify Stainless Steel.** This will prevent damage to coating due to regularly scheduled re-torque.

The following page provides material specifications for standard Jerguson® gage models. Optional materials are available and frequently used. However, **specifying standard materials (where possible) will ensure the lowest cost.**

All Jerguson gages have wetted parts fully complying with NACE MR-01-75.

Note: NACE MR-01-75, Paragraph 6.3.1.1 reads: "Bolting that is not directly exposed to sour environments and are not to be buried, insulated, equipped with flange protectors, or otherwise denied direct atmospheric exposure may be furnished to applicable standards such as ASTM A 193 Grade B7." Gage bolting is not in contact with process.

MATERIAL SPECIFICATIONS FOR STANDARD JERGUSON® GAGE MODELS

ITEM	*PART*		*SERIES 300L*		*SERIES 18*		*SERIES 20 OR 32*	
1	**Chamber**	**Wetted Parts**	Carbon Steel A-696 Grade C	316L Stainless Steel A-511	Carbon Steel A-696 Grade C	316L Stainless Steel A-511	Carbon Steel A-696 Grade C	316L Stainless Steel A-511
2	**Gasket**		Garlock 5500 IFG Aramid Fibers Reinforced with Nitrile Rubber Binder					
3	**Glass**		Tempered Borosilicate					
4	Cushion		Garlock 5500 IFG Aramid Fibers Reinforced with Nitrile Rubber Binder					
5	Cover		Carbon Steel A-36		Ductile Iron A636 Grade 90-55-06		Carbon Steel A-105	
6	Bolt / U-Bolt		Chrome-Moly Steel A-193 B7					
7	Nut		Chrome-Moly Steel A-194 2H					

ITEM	*PART*		*SERIES 10L*		*SERIES 40*		*SERIES 51*	
1	**Chamber**	**Wetted Parts**	Carbon Steel AISI C1040	316L Stainless Steel A-269	Carbon Steel AISI C1040	316L Stainless Steel A-240	Carbon Steel A-108	316L Stainless Steel A-240
2	**Gasket**		Garlock 5500 IFG Aramid Fibers Reinforced with Nitrile Rubber Binder				Viton O-Ring	
3	**Glass**		Tempered Borosilicate					
4	Cushion		Garlock 5500 IFG Aramid Fibers Reinforced with Nitrile Rubber Binder					
5	Cover		Carbon Steel A-105		Carbon Steel AISI C1040		Carbon Steel A-696	
6	Bolt / U-Bolt		Chrome-Moly Steel A-193 B7					
7	Nut		Chrome-Moly Steel A-194 2H					

Carbon Steel Note: Jerguson uses A-696 Grade C for most chambers. Material Certs will note that this material meets or exceeds the requirements of A-105.

Stainless Steel Note: Jerguson purchases all 316 SS complying with the maximum carbon content of 316L SS, and the yield and tensile requirements in compliance with 316 SS. Therefore, it will be dual certified for both 316 SS and 316L SS.

These are Standard Materials, Consult your representative for Optional Materials

JERGUSON®
A Division Of The Clark • Reliance Corporation
Specialists in Liquid Level Indication

MATERIAL COMPATIBILITY

APPLICATIONS

Section: J200
Bulletin: J200.01
Date: 3/1/96
Supersedes: New

This information has been compiled from reliable sources, and may be used as a guide in considering the use of several materials with various process fluids. However, due to differences in specific requirements and operating conditions, the compatibility ratings listed must not be construed as "quarantees".

NOTE: All ratings are fluids at ambient temperatures, except as noted.

A = **Excellent** B = **Good** C = **Fair** D = **Not Recommended** Blank = **No Data Available**

Process Fluid	*CAST IRON*	*CARBON STEEL*	*BRONZE*	*316 SS*	*BOROSILICATE*	*TFE-FEP*	*NEOPRENE*	*VITON*	*GARLOCK IFG*	*POLYSULFONE*
Acetaldehyde	C	C	D	A	A	A	D	D		
Acetate Solvents	B	A	A	A	A	A	D		A	D
Acetic Acid (Aerated)	D	D	D	A	A	A	C	C	D	A
Acetic Acid (Air Free)	D	D	B	A	A	A	C	C	D	A
Acetic Acid (Crude)	C	C	C	A	A	A	D	C	D	A
Acetic Acid (Pure)	C	C	C	A	A	A	D	C	D	
Acetic Acid (10%)	C	C	C	A	A	A	D	C	D	A
Acetic Acid (80%)	C	C	C	A	A	A	D	C	D	A
Acetic Anhydride	D	D	C	B	A	A	C	D		D
Acetone	A	A	A	A	A	A	C	D	A	D
Acetylene	A	A	B	A	A	A	A	A	A	
Acrylonitrile	C	A	A	A	A	A	D	D	A	D
Air	A	A	A	A	A	A	A	A		
Alcohols	C	B	B	B	A	A	A	C	A	
Alcohol - Amyl	C	B	B	A	A	A	A	B	A	A
Alcohol - Butyl	C	B	B	A	A	A	A	A	A	A
Aluminum Chloride (Dry)	B	B	B	A	A	A	B	A	A	A
Aluminum Sulfate (Alums)	C	C	C	A	A	A	A	A	A	A
Alums	C	C	C	A	B	A	A	A	A	
Amines	C	B	A	A	A	A	D			
Ammonia, Anhydrous	B	A	D	A	A	A	B	A	A	
Ammonia, Aqueous	A	A	D	A	A	A	B	A	A	
Ammonia Solutions	B	B	D	A	A	A	B			
Ammonium Bicarbonate	B	C	B	B	A	A	A			
Ammonium Carbonate	B	B	B	B	A	A	A	A	A	
Ammonium Chloride	D	D	D	C	A	A	A	A	A	
Ammonium Hydroxide 28%	C	C	D	B	C	A	A	A	A	
Ammonium Hydroxide Conc.	C	C	D	B	C	A	A	A		A
Ammonium Monophosphate	D	D	D	B	A	A	A			
Ammonium Nitrate	D	D	D	A	A	A	A	B		A
Ammonium Phosphate Dibasic	D	D	C	B	A	A	A			A
Ammonium Phosphate Tribasic	D	D	C	B	A	A	A			
Ammonium Sulfate	C	C	B	B	A	A	A	C	A	
Amyl Acetate	C	C	C	B	A	A	D	D	A	D
Aniline	C	C	C	B	A	A	C	D		D
Aniline Dyes	C	C	C	A	A	A	B	A	A	
Anitomony Trichloride	D	D	D	D	A	A	C			
Apple Juice	D	D	C	B	A	A	A			
Arsenic Acid	D	D	D	B	A	A	A			A
Asphalt Emulsion	B	B	A	A	A	A	B	A	A	
Asphalt Liquid	B	B	A	A	A	A	C		A	
Barium Carbonate	B	B	B	B	A	A	A		A	
Barium Chloride	C	C	B	C	A	A	A	A	A	A
Barium Hydroxide	B	C	B	B	A	A	A	A	A	A
Barium Sulfate	C	C	C	B	A	A	A	A	A	A
Barium Sulfide	C	C	C	B	A	A	A	A	A	

Process Fluid	*CAST IRON*	*CARBON STEEL*	*BRONZE*	*316 SS*	*BOROSILICATE*	*TFE-FEP*	*NEOPRENE*	*VITON*	*GARLOCK IFG*	*POLYSULFONE*
Beer (Alcohol Industry)	D	D	A	A	A	A	A	A	A	
Beer (Beverage Industry)	C	C	B	A	A	A	B	A	A	
Beet Sugar Liquors	B	B	A	A	A	A	A		A	
Benzene (Benzol)	B	B	B	B	A	A	D	A	A	D
Benzaldehyde	B	A	A	A	A	A	D	D	A	D
Benzoic Acid	D	D	B	B	A	A	A	A		D
Black Sulfate Liquor	C	A	B	A	A	A	A			B
Borax Liquors	C	C	A	B	B	A	A		A	
Boric Acid	D	D	B	B	A	A	A		A	A
Brines	C	C	B	B	A	A	A		A	
Bromine (Dry)	D	D	A	D	A	A	D	A		
Bromine (Wet)	D	D	B	D	A	A	D	A		A
Bunker Oils (Fuel Oils)	B	B	B	A	A	A	B	A	A	
Butadiene	B	B	C	A	A	A	C		A	
Butane	B	B	A	B	A	A	B	A	A	
Butylene	A	A	A	A	A	A	D	A	A	
Buttermilk	D	D	D	A	A	A	A			
Butyric Acid	D	D	C	B	A	A	C	A	A	D
Calcium Bisulfite	D	D	B	B	A	A	A		A	A
Calcium Carbonate	D	D	C	B	A	A	A		A	
Calcium Chloride	C	C	B	B	A	A	A	A		A
Calcium Hydroxide	C	C	A	B	A	A	A	A	A	
Calcium Hypochlorite	D	D	D	C	A	A	B		D	A
Calcium Sulfate	C	C	C	B	A	A	A	A	A	A
Carbolic Acid	D	D	B	B	A	A	D			D
Carbon Bisulfide	B	B	C	B	A	A	D		A	
Carbon Dioxide	B	A	A	A	A	A	B	A	A	D
Carbonic Acid	D	D	D	B	A	A	A	A	A	A
Carbon Tetrachloride (Dry)	B	B	C	A	A	A	D	A		D
Carbon Tetrachloride (Wet)	D	D	D	B	A	A	D	A	A	D
Carbonated Water	B	B	B	A	A	A	A	A		
Castor Oil	B	B	A	A	A	A	B	A	A	
China Wood Oil (Tung)	C	C	C	A	A	A	B		A	
Chlorinated Solvents (Dry)	C	C	C	B	A	A	D		D	
Chlorine Gas (Dry)	B	B	C	B	A	A	C	A	A	
Chlorine (Wet)	D	D	D	D	D	A	D	A	D	D
Chloroacetic Acid	D	D	C	D	A	A	C		D	D
Chlorobenzene (Dry)	B	B	B	A	A	A	D	A	A	D
Chloroform (Dry)	B	B	B	A	A	A	D	A	A	D
Chlorosulphonic Acid (Dry)	B	B	B	B	A	A	D	D		D
Chlorosulphonic Acid (Wet)	D	D	D	D	A	A	D	D		
Chrome Alum	B	B	C	A	A	A	B	A		
Chrome Acid	D	D	D	C	A	A	D	A	D	D
Citrus Juices	D	D	B	B	A	A	A	A	A	B
Coconut Oil	C	C	B	B	A	A	B		A	
Coffee Extracts (Hot)	C	C	B	A	A	A				

A = **Excellent** B = **Good** C = **Fair** D = **Not Recommended** Blank = **No Data Available**

Process Fluid	*CAST IRON*	*CARBON STEEL*	*BRONZE*	*316 SS*	*BOROSILICATE*	*TFE-FEP*	*NEOPRENE*	*VITON*	*GARLOCK IFG*	*POLYSULFONE*
Coke Oven Gas	B	B	C	A	A	A	C		A	
Cooking Oil	B	B	B	A	A	A	B			
Copper Acetate	D	D	D	A	A	A			A	
Copper Chloride	D	D	D	C	A	A	A			
Copper Nitrate	D	D	D	B	A	A	A	A		
Copper Sulfate	D	D	D	B	A	A	A	A	A	A
Corn Oil	C	C	B	B	A	A	B		A	
Cottonseed Oil	C	C	B	B	A	A	B	A	A	A
Creosote Oil	B	B	B	B	A	A	D			
Cresylic Acid	D	C	C	B	A	A	D			
Crude Oil, Sweet	B	B	B	A	A	A	B	A	A	D
Crude Oil, Sour	C	B	C	A	A	A	B	A		D
Cutting Oils, Water Emulsions	B	B	A	A	A	A	B			
Cyclohexane	A	A	A	A	A	A	D	A	A	A
Diacetone Alcohol	A	A	A	A	A	A	C		A	
Diesel Fuels	A	A	A	A	A	A	C	A	A	A
Diethylamine	A	A	A	A	A	A	C	D		
Dowtherms	B	B	A	A	A	A	D		A	
Drilling Mud	B	B	B	A	A	A	A	A		
Drip Cocks, Gas	B	B	B	A	A	A	C			
Dry Cleaning Fluids	B	B	C	A	A	A	D			
Drying Oil	B	C	C	B	A	A	B			
Epsom Salt	C	C	B	B	A	A	A		A	
Ethane	B	B	A	B	A	A	B		A	
Ethers	B	A	B	A	A		C	D	A	D
Ethyl Acetate	C	B	C	B	A	A	D	D	A	A
Ethyl Acrylate	C	C	B	A	A	A			A	
Ethyl Alcohol	B	B	B	B	A	A	A	A	A	
Ethyl Chloride (Dry)	B	B	B	A	A	A	C	B		
Ethyl Chloride (Wet)	D	D	C	B	A	A	C	B	A	
Ethylene Glycol	B	B	B	B	A	A	A	A	A	A
Ethylene Oxide	B	B	A	B	A	A	D	D	A	
Fatty Acids	D	D	B	A	A	A	B	A	A	
Ferric Chloride	D	D	D	D	A	A	A	A	D	
Ferric Nitrate	D	D	D	C	A	A	A	A		A
Ferric Sulfate	D	D	D	B	A	A	A	A	A	A
Ferrous Chloride	D	D	B	D	A	A	A		D	A
Ferrous Sulfate	D	D	B	B	A	A	A	A	A	A
Ferrous Sulfate (Sat.)	C	C	C	A	A	A	C			A
Fertilizer Solutions	C	B	C	B	A	A	B			
Fish Oils	B	B	B	A	A	A	B		A	
Fluorine (Dry)	D	D	D	D	A	A		A		
Fluorosilicic Acid	D	D	A	B	A	A	C			A
Food Fluids and Pastes	C	C	B	A	A	A	B			
Formaldehyde (Cold)	B	A	A	A	A	A	B			
Formaldehyde (Hot)	D	D	B	C	A	A	B	A		A
Formic Acid (Cold)	D	D	B	B	A	A	A	D	A	A
Formic Acid (Hot)	D	D	B	B	A	A		D		
Freon (Dry)	B	B	B	A	A	A	C	B	A	D
Fruit Juices	D	D	B	A	A	A	A			
Fuel Oil	B	B	B	A	A	A	B	A	A	D
Furfural	B	A	A	A	A	A	C	D		

Process Fluid	*CAST IRON*	*CARBON STEEL*	*BRONZE*	*316 SS*	*BOROSILICATE*	*TFE-FEP*	*NEOPRENE*	*VITON*	*GARLOCK IFG*	*POLYSULFONE*
Gallic Acid	D	D	C	B	A	A	A	A	A	
Gas, Manufactured	B	B	B	B	A	A	A	B		
Gas, Natural	B	B	B	A	A	A	A	B		
Gas Odorizers	B	B	A	B	A	A	B			
Gasoline (Leaded)	B	A	A	A	A	A	D	A	A	A
Gasoline (Unleaded)	B	A	A	A	A	A	D	A	A	A
Gasoline (Aviation)	B	A	A	A	A	A	D	A		
Gasoline (Motor)	B	A	A	A	A	A	D	A	A	
Gasoline (Sour)	B	B	B	A	A	A	D	A		
Gelatin	D	D	A	A	A	A	A		A	
Glucose	B	B	A	A	A	A	A	A	A	
Glue	A	A	B	B	A	A	A		A	
Glycerine or Glycerol	B	B	B	A	A	A	A	A	A	A
Glycols	B	B	B	B	A	A	A	A	A	A
Grease	A	A	B	A	A	A	B	A	A	
Heptane	B	B	A	A	A	A	B	A	A	A
Hexane	B	B	B	B	A	A	C	A	A	A
Hexanol, Tertiary	A	A	A	A	A	A			A	
Hydraulic Oil, Petroleum Base	B	A	B	A	A	A	B	A	A	
Hydrobromic Acid	D	D	D	D	A	A	C		D	A
Hydrochloric Acid (Air Free)	D	D	D	D	A	A	C	A	D	A
Hydrocyanic Acid	C	C	D	A	A	A	B			A
Hydrofluoric Acid	D	D	D	D	D		C	B	D	A
Hydrogen Gas (Cold)	B	B	B	A	A	A	B	A	A	
Hydrogen Peroxide (Dilute)	D	D	B	B	A	A	A	B	A	A
Hydrogen Peroxide (Conc.)	D	D	D	B	A	A	D		D	
Hydrogen Sulfide (Dry)	B	B	C	A	A	A	A	D		
Hydrogen Sulfide (Wet)	D	C	D	B	A	A	A	D	A	
Hydrofluosilicic Acid	D	D	A	C	A	A	A	A		
Hypo (Sodium Thiosulfate)	C	D	C	A	A	A	A			
Hypochlorites, Sodium	D	D	D	C	A	A	D	A	D	
Illuminating Gas	A	A	A	A	A	A	B			
Ink	D	D	C	A	A	A	A	A		
Iodine (Wet)	D	D	D	D	A	A	B			
Iodoform	C	B	C	A	A	A			A	
Iso-octane	B	A	A	A	A	A	C		A	A
Isopropyl Alcohol	B	B	B	B	A	A	C		A	
Isopropyl Ether	B	A	A	A	A	A	C		A	
JP-4 Fuel	A	A	A	A	A	A	C	A	A	A
JP-5 Fuel	A	A	A	A	A	A	C	A	A	A
JP-6 Fuel	A	A	A	A	A	A	C	A	A	
Kerosene	B	B	A	A	A	A	C	A	A	C
Ketchup	D	D	D	A	A	A	A			
Ketones	A	A	A	A	A	A	D			
Lacquers (and Solvents)	C	C	A	A	A	A	D		A	
Lactic Acid (Dilute Cold)	D	D	D	A	A	A	A	A	A	A
Lactic Acid (Dilute Hot)	D	D	D	A	A	A	C	A	A	A
Lactic Acid (Conc. Cold)	D	D	D	A	A	A	A	A	A	A
Lactic Acid (Conc. Hot)	D	D	D	B	A	A	C	A	A	A
Lard Oil	C	C	A	B	A	A	B	A	A	
Lead Acetate	D	D	C	B	A	A	A		A	A
Linoleic Acid	B	B	B	A	A	A	B		A	

A = **Excellent** B = **Good** C = **Fair** D = **Not Recommended** Blank = **No Data Available**

Process Fluid	*CAST IRON*	*CARBON STEEL*	*BRONZE*	*316 SS*	*BOROSILICATE*	*TFE-FEP*	*NEOPRENE*	*VITON*	*GARLOCK IFG*	*POLYSULFONE*
Linseed Oil	A	A	B	B	A	A	B		A	A
Liquefied Pet. Gas (LPG)	B	B	A	B	A	A	B	A	A	
Lubricating Oil	A	A	B	A	A	A	B	A	A	A
Magnesium Bisulfate	B	B	B	A	A	A				
Magnesium Chloride	D	C	B	B	A	A	A	A		A
Magnesium Hydroxide	B	B	B	A	A	A	A	A	A	A
Magnesium Hydroxide (Hot)	B	B	D	A	A	A	A	A		A
Magnesium Sulfate	B	B	B	B	A	A	A	A	A	A
Maleic Acid	D	B	B	B	A	A	A		A	
Malic Acid	D	D	B	B	A	A	A	A	A	
Mayonnaise	D	D	D	A	A	A	A			
Mercuric Chloride	D	D	D	C	A	A	A	A		
Mercuric Cyanide	D	D	D	A	A	A				
Mercury	A	A	D	A	A	A	A	A	A	
Methane	B	B	A	B	A	A	B		A	
Methyl Acetate	B	B	A	A	A	A	D		A	
Methyl Acetone	A	A	A	A	A	A	D		A	
Methyl Alcohol	B	B	B	B	A	A	A		A	D
Methylamine	B	B	D	A	A	A				
Methyl Cellosolve	B	B	A	A	A	A			A	
Methyl Chloride	B	B	A	A	A	A	C		A	D
Methyl Ethyl Ketone	A	A	A	A	A	A	D		A	D
Methyl Formate	C	C	A	B	A	A	B			
Methylene Chloride	B	B	A	A	A	A	D		A	D
Milk	D	D	A	A	A	A	A	A	A	
Mine Waters (Acid)	D	D	C	C	A	A	A			
Mineral Oil	B	B	B	A	A	A	B	A	A	A
Mineral Spirits	B	B	B	B	A	A	C		A	
Mixed Acids (Cold)	C	C	D	A	A	A				
Molasses, Edible	C	C	A	A	A	A	A	A		
Molasses, Crude	A	A	A	A	A	A	A	A		
Muriatic Acid	D	D	D	D	A	A	B		D	
Mustard	B	B	A	A	A	A	A			
Naphtha	B	B	B	B	A	A	C	A		
Naphthalene	B	A	B	B	A	A	D	A	A	
Nickel Ammonium Sulfate	D	D	D	A	A	A				
Nickel Chloride	D	D	D	B	A	A	A	A	A	A
Nickel Nitrate	D	D	D	B	A	A	A			
Nickel Sulfate	D	D	D	B	A	A	A	A	A	A
Nicotinic Acid	B	B	A	A	A	A				
Nitric Acid (10%)	D	D	D	A	A	A	B	A	D	C
Nitric Acid (30%)	D	D	D	A	A	A	C	A	D	C
Nitric Acid (80%)	D	D	D	A	A	A	D	A	D	D
Nitric Acid (100%)	A	A	D	A	A	A	D	A	D	D
Nitric Acid Anhydrous	A	A	D	A	A	A	D			D
Nitrobenzene	B	B	D	B	A	A	D	D		D
Nitrogen	A	A	A	A	A	A	A		A	
Nitrous Acid (10%)	D	D	D	B	A	A	A			
Nitrous Gases	C	B	D	A	A	A		A		
Nitrous Oxide	C	B	D	B	A	A	B		A	
Oils, Animal	C	C	B	B	A	A	B	A		A
Oil, Cottonseed	C	C	B	B	A	A	B	A		A

Process Fluid	*CAST IRON*	*CARBON STEEL*	*BRONZE*	*316 SS*	*BOROSILICATE*	*TFE-FEP*	*NEOPRENE*	*VITON*	*GARLOCK IFG*	*POLYSULFONE*
Oils, Fish	B	B	B	A	A	A	B			
Oils, Fuel	B	B	B	A	A	A	B			
Oils, Lube	A	A	B	A	A	A	B	A		
Oils, Mineral	B	B	B	A	A	A	B	A		
Oil, Petroleum (Refined)	B	A	B	A	A	A	B	A	A	
Oil, Petroleum (Sour)	C	B	C	A	A	A	B			
Oil Water Mixtures	B	B	A	A	A	A	B	A		
Oleic Acid	C	C	B	B	A	A	C	A	A	A
Oleum	C	B	B	B	A	A	C	A	D	
Olive Oil	B	B	B	A	A	A	B			
Oxalic Acid	D	D	B	B	C	A	A		D	
Oxygen	B	B	A	A	A	A		A	A	
Ozone (Wet)	C	C	B	A	A	A		C		
Ozone (Dry)	A	A	A	A	A	A		C		
Paints and Solvents	A	A	A	A	A	A	D			A
Palmitic Acid	C	C	B	B	A	A	B		A	
Palm Oil	C	C	B	B	A	A	B			
Paraffin	B	B	A	A	A	A	B		A	
Paraformaldehyde	B	B	B	B	A	A	B			
Pentane	B	B	A	A	A	A	B		A	
Perchlorethylene (Dry)	B	B	C	A	A	A	D		A	D
Petrolatum	C	C	B	B	A	A	B		A	
Phenol	D	D	B	B	A	A	D			
Phosphoric Acid (10%) Cold	D	D	D	B	A	A	A		D	A
Phosphoric Acid (10%) Hot	D	D	D	D	A	A	A		D	A
Phosphoric Acid (50%) Cold	D	D	D	B	A	A	B		D	A
Phosphoric Acid (50%) Hot	D	D	D	D	A	A	B		D	A
Phosphoric Acid (85%) Cold	B	B	D	A	A	A	B		D	A
Phosphoric Acid (85%) Hot	C	C	D	A	A	A	B		D	A
Phthalic Acid	C	C	B	B	A	A	C			
Phthalic Anhydride	C	C	B	B	A	A	C			
Picric Acid	D	D	B	B	A	A	A	A		
Pine Oil	B	B	B	A	A	A	C		A	
Pineapple Juice	C	C	C	A	A	A	A			
Potassium Bisulfite	D	D	C	B	A	A	A		A	
Potassium Bromide	D	D	C	A	A	A	A			A
Potassium Carbonate	B	B	B	B	A	A	A			A
Potassium Chlorate	B	B	B	B	A	A	A			A
Potassium Chloride	B	C	B	C	A	A	A		A	
Potassium Cyanide	B	B	D	B	A	A	A			A
Potassium Dichromate	C	C	D	B	A	A	A	A		A
Potassium Diphosphate	A	A	B	A	A	A	A			
Potassium Ferricyanide	C	C	D	B	A	A	A			
Potassium Ferrocyanide	C	C	B	B	A	A	A			
Potassium Hydroxide Dilute Co	C	C	B	B	A	A	A			
Potassium Hydroxide Dilute Ho	A	A	D	A	A	A	A	B	D	B
Potassium Hydroxide to 70% C	B	A	D	A	A	A	A	B	D	B
Potassium Hydroxide to 70% H	B	A	D	A	A	A	B	B	D	B
Potassium Iodide	C	C	D	B	A	A	A			
Potassium Nitrate	B	B	B	B	A	A	A			A
Potassium Permanganate	B	B	B	B	A	A	A			A
Potassium Sulfate	C	B	B	B	A	A	A		A	A

A = **Excellent** B = **Good** C = **Fair** D = **Not Recommended** Blank = **No Data Available**

Process Fluid	*CAST IRON*	*CARBON STEEL*	*BRONZE*	*316 SS*	*BOROSILICATE*	*TFE-FEP*	*NEOPRENE*	*VITON*	*GARLOCK IFG*	*POLYSULFONE*
Potassium Sulfide	B	B	B	A	A	A			A	
Potassium Sulfite	B	B	B	A	A	A			A	
Producer Gas	B	B	B	B	A	A	B		A	
Propane	B	B	A	B	A	A	B		A	
Propyl Alchol	B	B	A	A	A	A	C		A	B
Propylene Glycol	B	B	B	B	A	A	A		A	
Pyrogallic Acid	B	B	B	B	A	A	A			
Quench Oil	B	B	B	A	A	A	B			
Resins and Rosins	C	C	A	A	A	A	C			
Road Tar	A	A	A	A	A	A	C			
Roof Pitch	A	A	A	A	A	A	C			
RP-1 Fuel	A	A	A	A	A	A	C			
Rubber Latex Emulsions	B	B	A	A	A	A				
Rubber Solvent	A	A	A	A	A	A	C			
Salad Oil	C	C	B	B	A	A	A			
Salicylic Acid	D	D	C	A	A	A	A		A	
Salt	C	C	B	B	A	A	A		A	
Sea Water	D	D	C	A	A	A	A		A	
Shellac (Bleached)	B	A	A	A	A	A	A			
Shellac (Orange)	B	A	A	A	A	A	A			
Silver Nitrate	D	D	D	B	A	A	C		A	A
Soap Solutions (Stearates)	B	A	A	A	A	A	A	A	A	A
Sodium Acetate	C	C	B	B	A	A	B	D	A	A
Sodium Aluminate	C	C	B	B	A	A	A		A	
Sodium Bicarbonate	C	C	B	B	A	A	A	A		A
Sodium Bisulfate (10%)	D	D	B	A	A	A	A		A	A
Sodium Bisulfite (10%)	D	D	B	A	A	A	A		A	
Sodium Borate	C	C	B	B	A	A	A		A	A
Sodium Bromide (10%)	D	C	B	B		A	A			
Sodium Carbonate	B	B	B	B	C	A	A	A	D	A
Sodium Chlorate	C	C	B	B	A	A	A			A
Sodium Chloride	C	C	B	B	A	A	A	A	A	A
Sodium Chromate	B	B	C	A	A	A	A			A
Sodium Cyanide	B	B	D	B	A	A	A			A
Sodium Fluoride	D	D	C	B	A	A	A			
Sodium Hydroxide (Cold) 20%	A	A	A	A	A	A	A	B	D	A
Sodium Hydroxide (Hot) 20%	B	B	A	A	C	A	B	A	D	C
Sodium Hydroxide (Cold) 50%	A	A	A	A	C	A	A	A	D	A
Sodium Hydroxide (Hot) 50%	B	B	A	A	C	A	B	A	D	C
Sodium Hydroxide (Cold) 70%	A	A	A	A	C	A		A	D	A
Sodium Hydroxide (Hot) 70%	B	B	A	A	C	A		A	D	D
Sodium Hypochloride	D	D	D	D	C	A	D		D	
Sodium Metaphosphate	B	B	C	A	A	A	A		A	
Sodium Metasilicate (Cold)	C	C	B	A	A	A	A			
Sodium Metasilicate (Hot)	D	D	B	A	A	A				
Sodium Nitrate	B	B	B	B	A	A	A			A
Sodium Perborate	B	B	B	B	A	A	A		A	
Sodium Peroxide	C	C	D	B	A	A	A			
Sodium Phosphate (Dibasic)	C	C	C	B	C	A	A		A	
Sodium Phosphate (Tribasic)	C	C	C	B	C	A	B		A	
Sodium Silicate	B	B	B	B	A	A	A	A		A
Sodium Silicate (Hot)	C	C	C	B	A	A		A		A

Process Fluid	*CAST IRON*	*CARBON STEEL*	*BRONZE*	*316 SS*	*BOROSILICATE*	*TFE-FEP*	*NEOPRENE*	*VITON*	*GARLOCK IFG*	*POLYSULFONE*
Sodium Sulfate	B	B	B	A	A	A	A	A	A	
Sodium Sulfide	B	B	D	B	C	A	A	A	A	A
Sodium Sulfide (Hot)	C	C	D	B	A	A		A	A	
Sodium Thiosulfate	B	B	B	A	A	A	A	A	A	A
Soybean Oil	C	C	B	A	A	A	B		A	
Stannic Chloride	D	D	C	D	A	A	A	A		A
Stannous Chloride	D	D	D	C	A	A	A			
Starch	C	C	B	B	A	A	A			
Steam (212°F.)	A	A	A	A	A	A	D	D	A	A
Stearic Acid	C	C	C	B	A	A	C		A	
Stoddard Solvent	B	B	B	B	A	A	C	A	A	
Styrene	B	A	A	A	A	A	D		A	
Sugar Liquids	B	B	A	A	A	A	A			
Sulfate, Black Liquor	C	C	C	B	A	A	A			
Sulfate, Green Liquor	C	C	C	B	A	A	A		A	
Sulfate, White Liquor	C	C	C	B	A	A	A			
Sulphur	C	C	D	B	A	A		A	A	D
Sulphur Dioxide (Dry)	B	B	B	A	A	A	C		A	
Sulphur Trioxide (Dry)	B	B	B	A	A	A	D		A	
Sulfuric Acid (0-7%)	D	D	C	B	A	A	A	A		D
Sulfuric Acid (20%)	D	D	C	D	A	A	B	A		
Sulfuric Acid (50%)	D	D	B	D	A	A	C	A	D	D
Sulfuric Acid (100%)	B	B	A	A	B	A	D	A	D	D
Sulfurous Acid	D	D	C	B	A	A	C			A
Synthesis Gas	B	B	B	B	A	A	B			
Tall Oil	B	B	B	B	A	A	B		A	
Tannic Acid	C	C	B	B	A	A	B	A		A
Tar and Tar Oil	A	A	A	A	A	A	C			
Tartaric Acid	D	D	A	B	A	A	A		A	A
Tetraethyl Lead	C	C	B	B	A	A				
Toluene or Toluol	A	A	A	A	A	A	D		A	D
Tomato Juice	C	C	C	A	A	A	A	A		
Transformer Oil	B	A	B	A	A	A	B		A	
Tributyl Phosphate	A	A	A	A	A	A	C		A	
Trichloroethylene	C	B	B	B	A	A	D	A	A	D
Tung Oil	B	B	B	A	A	A	B		A	
Turpentine	B	B	B	B	A	A	D	A	A	A
Urea	C	C	B	B	A	A			A	D
Varnish	C	C	A	A	A	A	A		A	
Vegetable Oil, Edible	B	B	B	A	A	A	B		A	
Vegetable Oil, Non-Edible	B	B	B	A	A	A	B		A	
Vinegar	D	D	B	A	A	A	D	A	A	A
Water, Distilled (Aerated)	D	D	A	A	A	A	A	A	A	A
Water, Fresh	C	C	A	A	A	A	A	A	A	A
Water, Sea	D	D	B	A	A	A	A	A	A	A
Wax Emulsions	B	A	A	A	A	A	B			
Waxes	A	A	A	A	A	A	B			
Whiskey and Wine	D	D	A	A	A	A	A	A	A	
Xylene (Dry)	B	B	A	A	A	A	D	A	A	D
Zinc Chloride	C	D	D	D	A	A	A	A	A	A
Zinc Hydrosulfite	B	A	C	A	A	A	A			
Zinc Sulfate	D	D	B	B	A	A	A	A	A	A

5. MINIMUM RATING

The rating of gages depends on the glass size and should **always meet or exceed the design pressure of the vessel** and will be the determinant in the selection of the gage model series. Pressure ratings for glass gages are specified to glass size, regardless of the number of sections. For example, *Size 9* glass for the *Series 20* gage is rated 2250 PSIG at 100°F, regardless of the number of sections. Manufacturer's ratings are generally given for temperatures to 600°F. Aluminosilicate should be used for temperatures between 600°F and 800°F.

The table below gives the standard pressure ratings for Jerguson gages at 38°C (100°F) for the largest glass sizes. The longest standard glass size is 9 but Series 12 (low pressure) can go to 20. Consult the Jerguson catalog for smaller glass sizes and higher temperature ratings.

REFLEX GAGES					TRANSPARENT GAGES				
Gage Series	**KPaG**	**PSIG**	**BarG**	**Kg/cm^2**	**Gage Series**	**KPaG**	**PSIG**	**BarG**	**Kg/cm^2**
Series RL-10 Large Chamber	8,274	1,200	82.7	84.3	SeriesTL-10 Large Chamber	3,448	500	34.8	35.2
Series R-300*	5,171	750	51.7	52.7	Series T-300	5,171	750	51.7	52.7
Series R-18	12,41l	1,800	124.1	126.5	Series T-18	3,448	500	34.8	35.2
Series R-20	15,514	2,250	155.1	158.1	Series T-20	6,895	1,000	69.0	70.3
Series R-32	27,580	4,000	275.9	281.1	Series T-32	20,685	3,000	206.9	210.9
Series R-40	34,475	5,000	344.8	351.4	Series T-40	34,475	5,000	344.8	351.4
					Series T-51	68,950	10,000	689.5	702.7

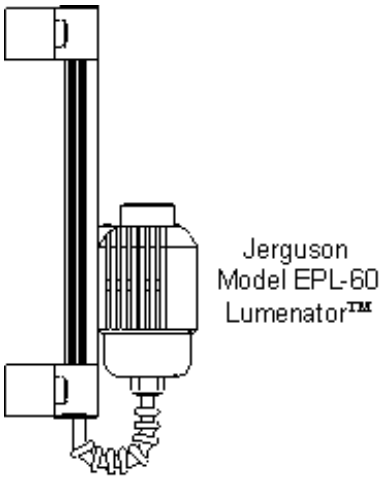
* This Gage is rated in line with ANSI Class 300# tables. This table reflects the Carbon Steel Values, Stainless Steel will be derated slightly.

Steam service requires additional consideration. Please consult the Jerguson catalog for more complete information.

6. ACCESSORIES & OPTIONS

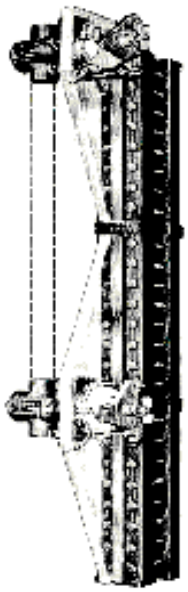
ILLUMINATORS

Generally, **illuminators** are used to improve level indication **for transparent only**.



Jerguson EPL-60 LumenatorÔ Fiber Optic Illuminators utilize a fiber optic woven mat, illuminated by a 4.85 Watt lamp, rated for 15,000 hours at 110 or 220 VAC. These illuminators are UL listed for NEMA 4X (Watertight, Corrosion Resistant), and NEMA 7 (Explosion Proof) for Class 1, Division 1, Groups A, B, C and D, or EEx d IIB + H_2 T6. Power supply is field selectable at 110 or 220 VAC (± 10%).

This illuminator is available for lighting up to three sections. For longer gages, multiple illuminators must be used.



Jerguson EPL-56 Illuminators consist of an incandescent bulb, housing, and plastic wedge. The wedge will be held against the glass opposite the viewing face. Standard specifications include:

- Class-Exp. Proof for **Class I, Groups C & D and Class I, Group B; Div. 2**
- Power Supply - 110 VAC or 220 VAC, 58 watts (Hz does not apply)
- Lamp is rated for 3000 hours
- 1” (25) NPT Conduit hub

Illuminators are shipped tagged, but separate from the gages intended for use, as the plastic wedge will be broken if the load within the package shifts.

These are built with reflectors for single section or double section coverage. For example, a five section gage will use three illuminators--two double section and one single section. Power consumption is 58 watts per illuminator and may be calculated in Amperage with the following formula:

Amps = Total Wattage/Power Supply Voltage

MICA SHIELDS

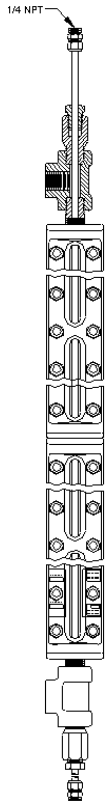
Mica Shields are used with process media that will corrode glass. The most common is steam above 2069 KPaG (300 PSIG) Working Steam Pressure (WSP). **Transparent glass must be used** to provide a flat surface to back the shield. Jerguson recommends **specifying .009-.012" thickness** to ensure long lasting mica. Mica is a laminate type, naturally occurring material resistant to alkaline and can be used in high temperatures. Reliability is determined by total thickness and relative freedom from air pockets. As a layer of mica degrades in service, a new layer is exposed. Thickness is usually achieved by two sheets of mica. When a shield is used, the glass is no longer considered a wetted part.

KEL-F SHIELDS

Kel-F Shields are a common alternative to mica shields and extremely resistant to chemical corrosion, but ineffective in protection from steam. **Kel-F should be specified with a 0.062" thickness where a gasket will not be used.** On the data sheet, Kel-F is listed as **"Other"**.

The corrosion chart following the "Materials" page lists chemical compatibility of Borosilicate glass. Wherever a process is rated "C" or "D", a shield should be used.

INTERNAL TUBE



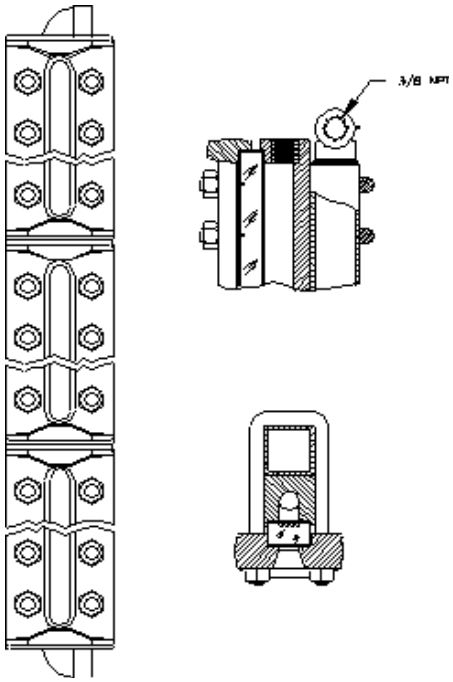
For steam tracing or cooling gage contents, the internal tube (consisting of carbon or stainless steel) runs through the chamber. Connections are at the vent and drain connections of the offset type valve on top and bottom connected gages, or the gage vent and drain connections of close hook-up (side-to-side) assemblies. This method of tracing is **much less expensive than external jacketing. However, should the tube rupture, steam will be introduced into the process.**

When writing specifications, take care to note:

- Carbon steel or stainless steel tube.
- **Offset valves, or side connections, must be used for top and bottom connected assemblies to allow the tube to pass through. (If Offset valves are used at the top and bottom, the vent and drain ports will be used for the tube. It will not be possible to drain or vent the gage through the gage valves.)**

EXTERNAL JACKET

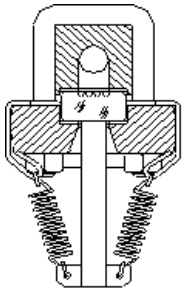
External jacket can mean either a heating/cooling tube mounted alongside the gage chamber or a flexible insulation jacket. Specifications should clearly note which type is actually required. Additionally, it should be noted when an external tube is required on **both** sides of a transparent chamber.



NON-FROST EXTENSION AND EXTENSION LENGTH

For process temperatures below -18° C (0° F), it is likely that frost will build up around a gage due to contact with the ambient temperature. When this is likely, a non-frost extension should be specified. Jerguson recommends using the following table to determine extension length.

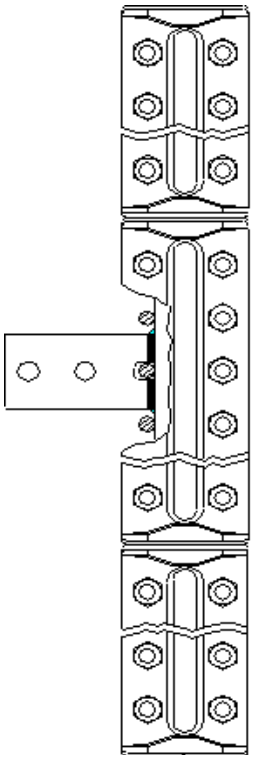
Process Temperature		Extension Length	
°C	°F	mm	inches
-18	0	76	3
-73	-100	102	4
-170	-275	127	5



Support Plates

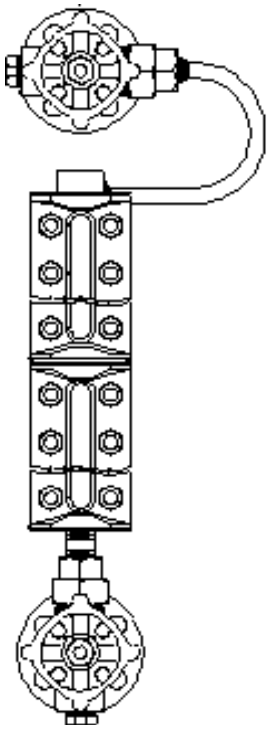
Gages with more than five sections **will require additional support** due to weight considerations. **Jerguson can supply support plates welded to the gage chamber.**

As the addition of another critical installation dimension results, most users establish policy against gages longer than five sections.



Expansion Coil

All steam applications above 5171 KPaG (750 PSIG) should have expansion coils specified between the top valve and the gage. This will allow expansion and contraction of the gage assembly without damaging the integrity of gage connections.



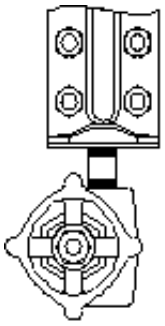
7. Manufacturer & Model Number: *Jerguson, No Equal And Here's Why...*

Features	**Benefits**
Recessed Gasket Seat in Chamber and Cover	♦ **The Jerguson® Recessed Gasket is a superior sealing system** that makes maintenance trouble-free. Result - **Less Downtime.** ♦ A positive seal is ensured by encapsulation of thegasket. ♦ Facilitates assembly and allows assembly of the gage installed in line.
Highest Quality Materials	♦ **Jerguson® builds a more "robust" gage**, using 1 9/16" Square Bar compared to competitive 1 3/8" bar material. **Jerguson® increases the safety factor** by offering more material in pressure containing parts of the gage. ♦ **Jerguson® meets NACE MR-01-75 and ANSI B31.1 - B31.3 material requirements.** The materials are uniform and compatible with the pressure vessel.
100% Hydrostatic Test	♦ **Jerguson® gages are 100% hydrostatically Pressure Tested tested per the requirements of ANSI B31.1 - B31.3, to ensure proper operation of the gage.**
Superior Paint & Coating	♦ **Jerguson® provides a quality product through assembly.** Individual components are painted and coated to specification before assembly, ensuring complete coverage and long life.
ISO 9001 Certification	♦ **Jerguson® is committed to quality and all manufacturing is certified ISO 9001,** with a documented quality system. Jerguson® has been manufacturing since 1905 and offers the widest selection of liquid level gages in the world.
Customer Service	♦ **Jerguson® is committed to meeting customer needs before, during, and after the sale. Our local Sales & Service Office is in Johor Bahru, Malaysia.**

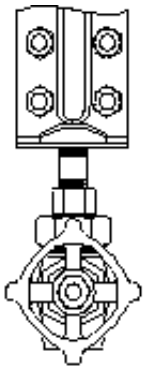
8. VALVE TYPE

Gage valves are normally angle type valves with several specialized features. All top and bottom connected gages should be used with **offset** valve bodies. This will allow the user to clean the gage by using a bottle brush through the vent or drain connection as the stem-vessel axis passes alongside the vent/ drain-gage connection axis. Most valves sold are offset where the stem intersects at an angle.

Offset Valve

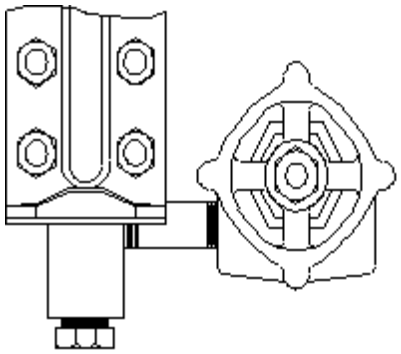


Straight Valve

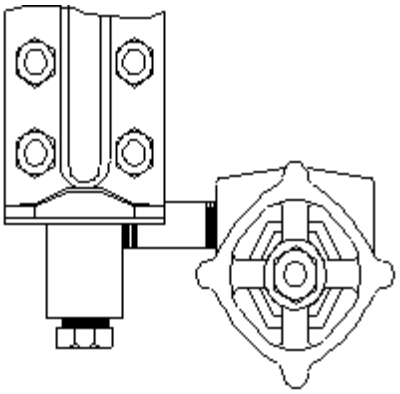


On side connected gages, **offset** valves offer the closest vessel centers as the offset can be used to make the vessel center dimension smaller than the gage centers. With **straight** pattern valve bodies, the gage centers are equal to the valve vessel centers.

Offset Inside/Close Hook-up



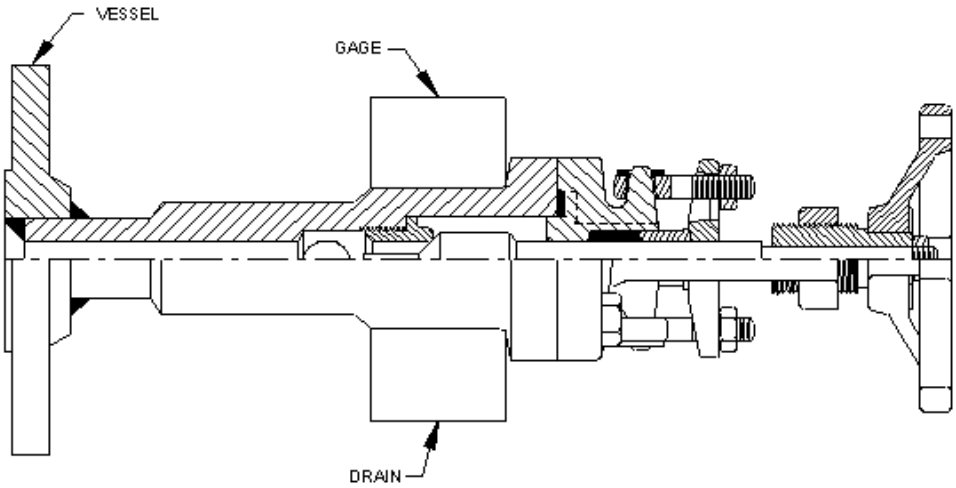
Offset Outside



Note: The Vessel Connection is on the same plane as the handwheel/stem assembly.

9. CONNECTIONS-SIZE

Gage valves normally have three connections: **vessel, gage, and vent/drain.**



On the data sheet, this line should be limited to specifying the connection size.

Virtually all gage valves have a 3/4" vessel connection tailpiece. When a 2" flange is specified for the vessel connection, the manufacturer will use a reducing flange to mate with the vessel tailpiece.

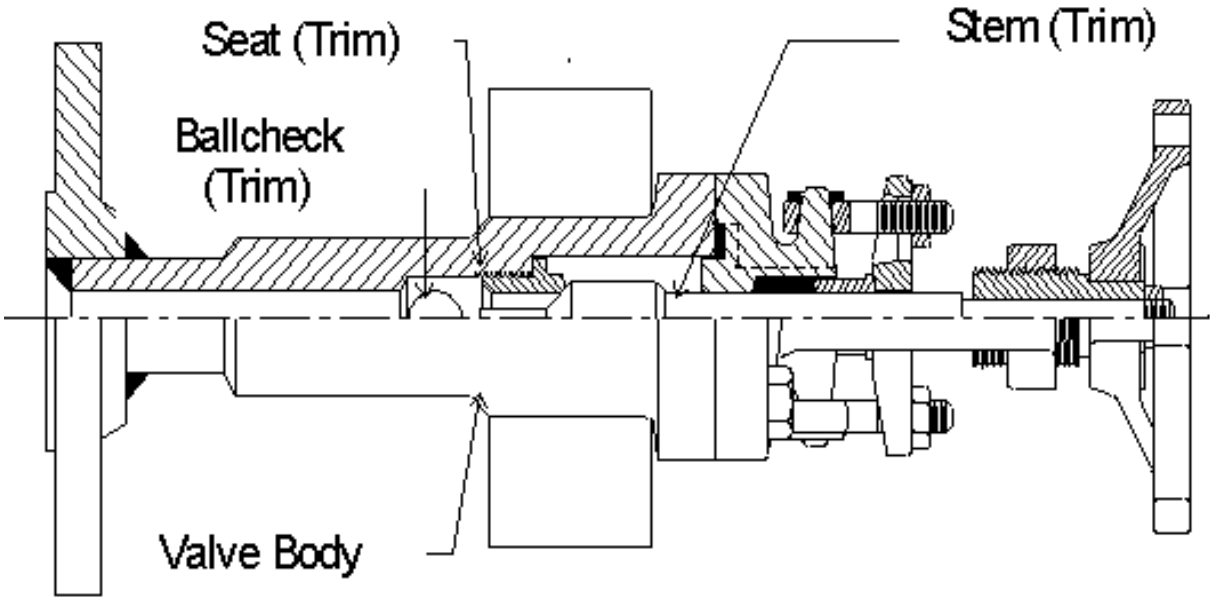
The gage connection will usually be coupled onto the gage by using a male threaded pipe nipple. This will be 1/2" or 3/4" depending on what was specified under Item 3 on the gage. **Regardless of the size or type, it is important that the specification here is compatible with the specification on the gage size, Item 3.**

The vent/drain connection will usually be 1/2" NPT female. **Should the vent/drain connections require flanges, it is important to make a clear note on each data sheet. At minimum, the vent/drain connection should be supplied "plugged".** Gage manufacturers do not plug this connection unless it is noted on the data sheet.

10. MATERIAL

The valve body material should be consistent with the gage chamber. The primary difference will be that the **valve bodies are usually forged and the gage chambers are usually certified bar.** The exact specifications may differ. For example, ASTM A-696 is Normalized Carbon Steel certified bar for gage chambers and ASTM A-105 Normalized Carbon Steel forged material for valve bodies.

Trim parts consist of the valve stem, seat (if renewable), and ball check. At minimum, these **should be specified "12 CR",** this will be 416 SS Stem and Seat and 440 SS Ball. These materials are excellent to prevent galling of the threads. ***Do not specify "316 SS" unless required or a NACE application as there will be a premium added to the valve price. Stellite Facing is not necessary, as these valves are not designed for throttling or controlling flow. Stellite Facing will add 25-30% to the cost of the gage valve.***



Wetted gage valve parts typically consist of the body, trim and all tailpieces. Where NACE MR-01-75 is to be invoked, care must be taken to ensure all wetted parts are in compliance. All standard Jerguson gage valve wetted parts will comply to NACE if 316 SS trim is specified.

11. MINIMUM RATING

Jerguson valve bodies are built to support the weight of the gage. Therefore, the valve rating will usually exceed the service. ***Jerguson gage valves will be stamped and tested to the rating of any flanges attached to the vessel or gage connections.***

Valve Series	ANSI Class	KPaG	PSIG	BarG	Kg/cm^2
Series 70L Outside Screw Bolted Bonnet	600#	20,685 (CS) 14,480 (SS)	3,000 (CS) 2,100 (SS)	206.8 (CS) 144.8 (SS)	210.8 (CS) 147.6 (SS)
Series 60 Inside Screw Union Bonnet	900#	27,580	4,000	275.8	281.1
Series 140 Inside Screw Integral Bonnet	600#	16,548	2,400	165.5	168.7
Series 70 Outside Screw Bolted Bonnet	900#	27,580	4,000	275.8	281.1
Series 80 Outside Screw Bolted Bonnet	1500#	41,370 (CS) 35,440 (SS)	6,000 (CS) 5,140 (SS)	413.7 (CS) 354.4 (SS)	421.6 (CS) 361.2 (SS)
Series 90 Inside Screw Union Bonnet Jacketed	900#	27,580	4,000	275.8	281.1

Note: All Jerguson Outside Screw and Yoke valves are designed specifically for an ANSI Class. Therefore, all must be derated for stainless steel.

12. CONSTRUCTION

On the data sheet, this line should address the thread characteristics--plain closing or quick closing. The most common problem during start-up is too quick opening of the valve, allowing the ball check to engage. This can be prevented by specifying "Plain Closing with Handwheel". Quick closing threads should be reserved for steam service, where ball checks are usually deleted.

- **Plain Closing/Handwheel** Two and 1/4 turns will close the valve.
- **Quick Closing/Lever** 1/2 turn will close the valve.

13. TYPE OF CONNECTIONS

VESSEL CONNECTIONS

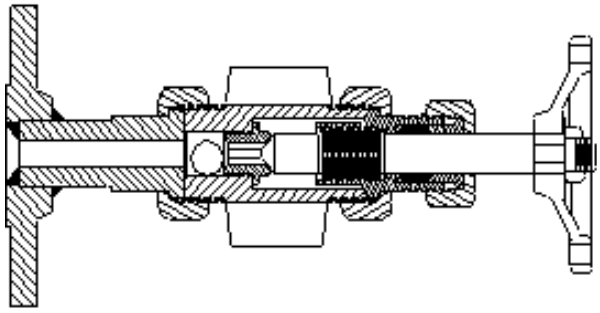
Most gage valves will be equipped with flanges for connection to the vessel nozzles. Most gage manufacturers consider 3/4" NPT male to be the **"*standard*"** vessel connection. This is in an effort to simplify ordering and pricing structures. The flange will be added to the basic valve.

In addition to specifying flange size and rating, it is important to **clarify whether union or non-union vessel connections** are needed. **Jerguson recommends avoiding the unions at the vessel connection** as this is not isolable in the event of a leak. Solid shank works best with most flanges. Either way, **"union" or "solid shank" should be clearly stated on the data sheet. Additionally, it is wise to state any welding requirements--the primary types are:**

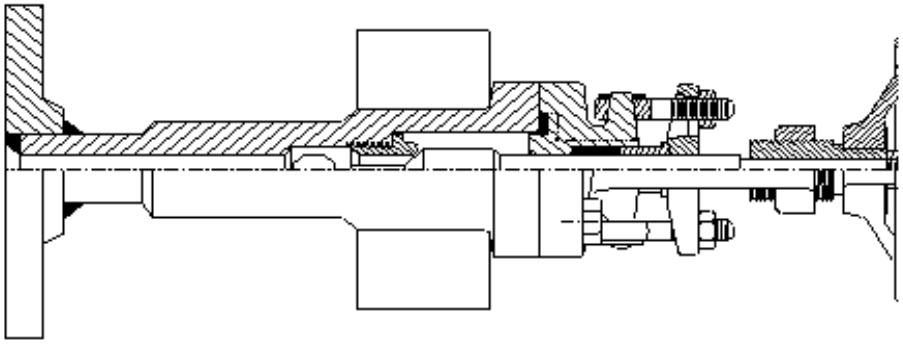
- Slip-on Flanges (Fillet weld on both sides of the flange)
- Socket Weld (Fillet weld on one side of the flange)
- Full Penetration Butt Weld (Using a weld neck flange)

Threaded flanges should be avoided wherever possible.

Union Vessel Connection



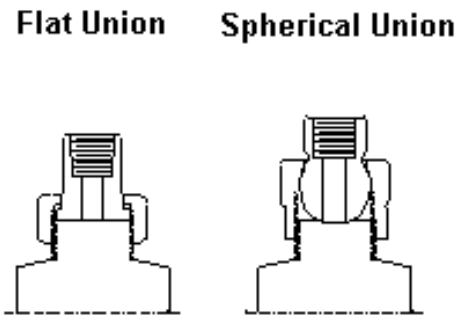
Solid Shank Vessel Connection



GAGE CONNECTION

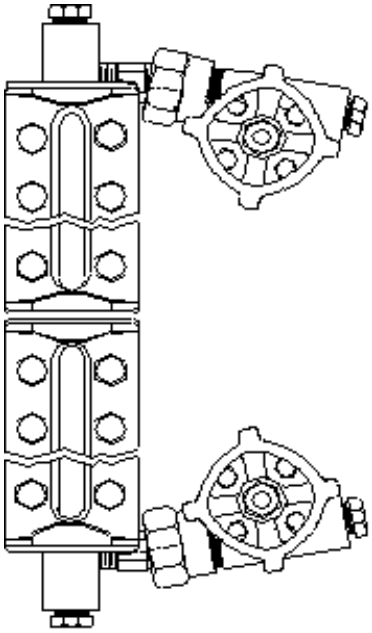
Union Gage Connections are strongly recommended as this allows the installation crew the option of adjusting the orientation of a top and bottom connected gage by rotating the viewing face as required. Additionally, any maintenance is simplified by the ease in which the gage can be removed for servicing.

Union connections may be **flat or spherical**. A flat union will offer the best sealing surface. A spherical union will allow the installation crew to overcome slight errors in vessel tapping. However, the seal is not as positive as with a flat union.

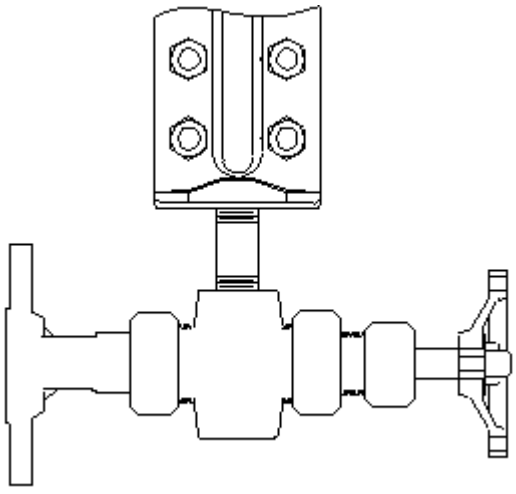


Note: Spherical unions require more space than flat unions. The minimum centers for flat unions must be increased by at least 40 mm. ¾" Spherical Unions are only available with a male tailpiece.

Effect of Spherical Union



Female NPT Connections are <u>rigid</u>. This requires the vessel tapping to be perfect with regards to dimension and orientation. The gage cannot be turned or removed unless the complete assembly is removed from the vessel.

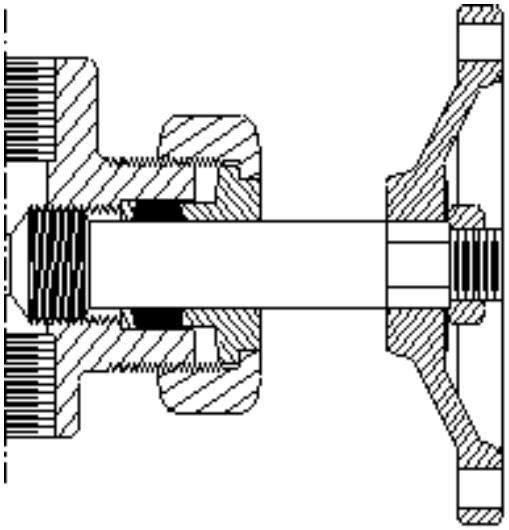


Flanged Gage Connections are not used very often and will require coordination with the manufacturer for minimum assembled centers, as published literature will generally address threaded connections.

14. BONNETS

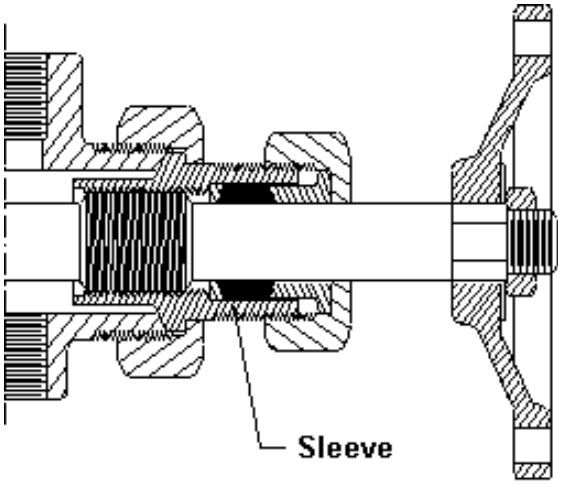
INTEGRAL BONNET

Bonnets hold the packing against the valve stem. The **integral or screwed bonnet** is the lowest cost type of valve but does not allow sufficient access to the interior of the valve body for a renewable seat. **This valve is not recommended except for very non-critical applications.** Stem Threads are in direct contact with the process, and integral to the valve body.



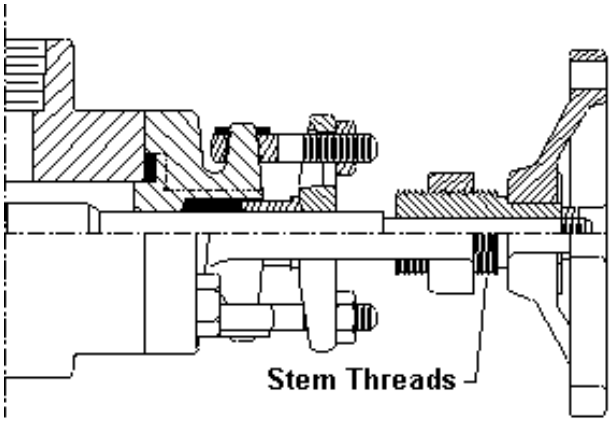
UNION BONNET

The **union** bonnet is held in place with a union nut and allows the valve packing to be removed from the body with the sleeve for ease of service. Most importantly, the **valve seat is renewable** and will be constructed of stainless steel (at minimum) regardless of the body material. Stem threads are in direct contact with process, but are part of a removable sleeve.



BOLTED BONNET, OUTSIDE SCREW & YOKE

This valve is strongly recommended and standard features include a backseating stem (a low-cost option to save money and packings), renewable seat, and outside stem threads.



15. OPTIONS

BALL CHECKS

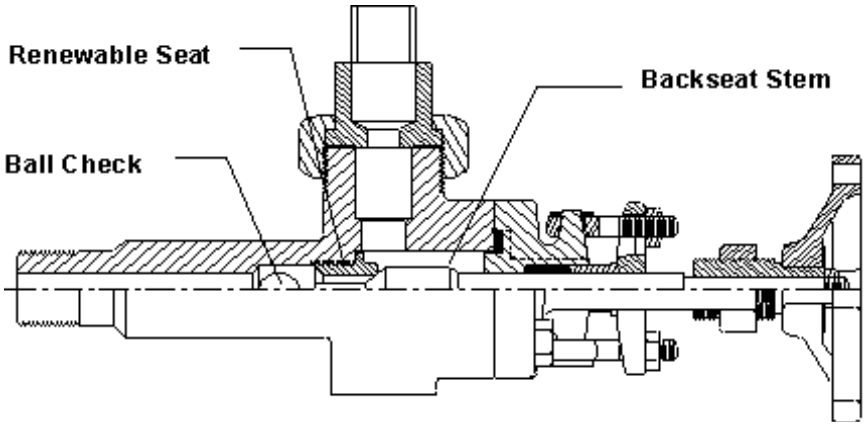
All Jerguson Process Gage Valves have ball checks as standard equipment. The ball check will prevent loss of tank contents in the event of gage failure. ***Ball checks should not be specified or used in Vacuum Service or Steam.*** (Steam gages will require periodic blowdown, the ballcheck will prevent steam from passing through the gage.)

RENEWABLE SEAT

Renewable seats are **standard with Union Bonnet or Outside Screw & Yoke valves.** Although the renewability is desirable, it is generally more important that the material can be specified as part of the valve trim. **Integral (or Screwed) Bonnet valves are not available with renewable seats. NOTE: Renewable Seat is an ambiguous term. Care should be taken by engineers evaluating technical proposals that valve seats are removable. This specification is not intended to include integral seats as available with integral bonnet valves.**

BACKSEAT STEM

This option is available with Union Bonnet valves, and is standard for Outside Screw and Yoke, Bolted Bonnet valves. The backseat will relieve pressure against the packings in the fully open position. This will reduce the incidence of nuisance leakage and extend the life of packings.



VERTICAL RISING BALL CHECKS

Per ASME Section 1, ball checks are not required for boiler drums. Where ball checks are used for boiler drum applications, they should be vertical rising and on the lower (water) valve only. If ball checks are used on the upper (steam) valves, the gage cannot be blown down as the ball check will engage.

STEAM JACKETS

Jerguson manufactures a true jacketed valve for use with jacketed gages. This is available in **straight pattern, union bonnet** configuration only.

Jerguson Series 18, 20, and 32 Reflex or Transparent Gages

Minimum Valve Centers for Gage to Valve Assemblies

Model	Visible Glass Length	Overall Length NPT Conn	Minimum Valve Centers with Jerguson Valve Models Top & Bottom Connected												Side-Side Connections			
			Screrwed or Union Bonnet Valves						600# O, S & Y Valves						All Straight Pattern		All Offset Pattern	
			NPT Rigid Conn. 143/146/63/66		Flat Union Conn 144/147/64/67		Spher. Union Conn 144/147/64/67		NPT Rigid Conn. 73BL, 76BL		Flat Union Conn 74BL, 77BL		Spher. Union Conn 74BL, 77BL		143, 144, 63, 64 73BL, 74 BL		146, 147, 66, 67 76BL, 77 BL	
			1/2"	3/4"	1/2"	3/4"	1/2"	3/4"	1/2"	3/4"	1/2"	3/4"	1/2"	3/4"	1/2"	3/4"	1/2"	3/4"
SINGLE SECTION GAGES																		
11	95	159	222	232	283	293	318	328	248	258	308	318	343	353	133	143	89	99
12	121	159	248	258	308	318	343	353	263	273	333	343	368	378	159	169	114	124
13	146	184	273	283	333	343	368	378	299	309	359	369	394	404	184	194	140	150
14	171	210	298	308	359	369	394	404	324	334	384	394	419	429	210	220	165	175
15	200	238	327	337	387	397	422	432	353	363	413	423	448	458	238	248	194	204
16	232	270	359	369	419	429	454	464	385	395	445	455	480	490	270	280	225	235
17	260	298	387	397	448	458	483	493	413	423	473	483	508	518	298	308	254	264
18	302	340	429	439	489	499	524	534	454	464	514	524	549	559	340	350	295	305
19	321	359	448	458	508	518	543	553	473	483	533	543	568	578	359	369	314	324
TWO-SECTION GAGES																		
23	330	368	457	467	518	528	553	563	483	493	543	553	578	588	368	378	324	334
24	381	419	508	518	568	578	603	613	534	544	594	604	629	639	419	429	375	385
25	438	476	565	575	625	635	660	670	591	601	651	661	686	696	476	486	432	442
26	502	540	629	639	689	699	724	734	654	664	714	724	749	759	540	550	495	505
27	559	597	686	696	746	756	781	791	712	722	772	782	807	817	597	607	552	562
28	641	679	768	778	829	839	864	874	794	804	854	864	889	899	679	689	635	645
29	679	717	806	816	867	877	902	912	832	842	892	902	927	937	718	728	673	683
THREE-SECTION GAGES																		
36	772	810	899	909	959	969	994	1004	924	934	984	994	1019	1029	810	820	765	775
37	857	895	984	994	1045	1055	1080	1090	1010	1020	1070	1080	1105	1115	895	905	851	861
38	981	1019	1108	1118	1168	1178	1203	1213	1134	1144	1194	1204	1229	1239	1019	1029	975	985
39	1038	1076	1165	1175	1226	1236	1261	1271	1191	1201	1251	1261	1286	1296	1076	1086	1032	1042
FOUR-SECTION GAGES																		
47	1156	1194	1283	1293	1343	1353	1378	1388	1308	1318	1368	1378	1403	1413	1194	1204	1149	1159
48	1321	1359	1448	1458	1508	1518	1543	1553	1474	1484	1534	1544	1569	1579	1359	1369	1314	1324
49	1397	1435	1524	1534	1584	1594	1619	1629	1550	1560	1610	1620	1645	1655	1435	1445	1391	1401
FIVE-SECTION GAGES																		
57	1454	1492	1581	1591	1641	1651	1676	1686	1607	1617	1667	1677	1702	1712	1492	1502	1448	1458
58	1661	1699	1788	1798	1848	1858	1883	1893	1813	1823	1873	1883	1908	1918	1699	1709	1654	1664
59	1756	1794	1883	1893	1943	1953	1978	1988	1939	1949	1969	1979	2004	2014	1794	1804	1749	1759

Longer gages available on request.

Overall lengths of side connected gages normally 152 mm

For Large Chamber, Series L-10, add 32 mm to Top and Bottom Assemblies

Jerguson Srongly recommends adding at least 10 mm to all Top & Bottom Assemblies to allow installation flexibility.