



## CROSBY STYLE JQ PRESSURE RELIEF DEVICE

A combination pressure relief device designed with internal parts completely isolated from corrosive fluids and environments



### FEATURES

- Designed in collaboration with the Chlorine Institute, Inc.
- Provides reliability and safety beyond that possible with a conventional pressure relief valve.
- Inlet and outlet diaphragm seals effectively prevent the corrosion of internal working parts and the escape of fugitive emissions.
- Choice of 1½" and 4" (38 and 100 mm) inlet sizes.
- 1½" (38 mm) model equipped with a special Chlorine Institute-approved inlet flange and metal-to-metal seat.
- Optional 1½" 300 lb ANSI raised face flange adapter and elastomer O-ring seat available for exceptional tightness.
- 4" (100 mm) model standard with 4" 300 lb ANSI large tongue-faced inlet flange and metal seat
- Raised-face flange available as an option.
- Association of American Railroad Approval Nos. SRD-989034 and SRD-989035.

### GENERAL APPLICATION

Designed to provide dependable overpressure protection for vessels used for the transportation and storage of chlorine and other dangerous commodities, these unique valves are in use worldwide on railroad tank cars, barges and stationary vessels.

### TECHNICAL DATA

Inlet sizes:	1½" and 4" (DN 40 and DN 100)
Pressure limits:	
1½" (DN 40):	450 psig (31 barg)
4" (DN 100):	375 psig (25.8 barg)
Temperature range:	-20 to +250°F (-29 to +121°C)

# CROSBY STYLE JQ PRESSURE RELIEF DEVICE

---

## OPERATION

---

The Style JQ is a combination pressure relief device comprising a standard spring loaded valve with a breaking pin assembly protected by a diaphragm. The breaking pin assembly is installed as a complete unit in the valve inlet and forms the gasket face for the mounting flange.

The inlet to the breaking pin housing (28) is sealed by the corrosion-resistant diaphragm (30) which is supported by the plunger and columns (24), yoke (22) and breaking pin (23). The pressure load on the diaphragm is carried through the plunger and columns to the yoke and thus to the breaking pin, which is a tensile member designed to break at a predetermined inlet pressure. It is held in place by two U-shaped clips (26).

A positive seal is formed by the diaphragm, which is clamped by the follower (29) and spanner nut (25). This keeps the corrosive fluids away from the seating surface of the valve until, at a specific pressure within the containing vessel, the pin is broken.

For severe corrosive fluids, in addition to the standard lead diaphragm, the following diaphragm materials are available:

- Platinum backed with lead
- Gold backed with lead
- Silver backed with lead
- FEP backed with lead
- Nickel backed with lead (for pressures of 225 psig (15.5 barg) and up)

The internal working parts of the valve are also protected from ambient atmospheric conditions by the upper diaphragm (2) which is clamped in place by the cap (1).

When the pin fractures, the valve instantly pops fully open and the upper diaphragm is broken automatically to permit free discharge from the valve. After an overpressure event and return of inlet pressure to safe working pressure, the valve will reseal with normal blowdown and function as a pressure relief valve until it is convenient to replace the breaking pin and upper/lower diaphragms. This saves valuable fluid and ensures maximum safety to personnel and equipment.

## DESIGN VARIATIONS

---

The JQ is manufactured to ASME Code Section VIII, both as a pressure relief valve alone and as a combination relieving device. As a combination device, it is available with either the breaking pin mechanism or with a rupture disc device (not shown).

For ASME Code applications with a rupture disc installed between the valve and the protected vessel, the stamped capacity of the valve must be multiplied by a factor of .90 or by a combination capacity factor obtained through certification testing.

When the JQ is to be installed in accordance with ASME Boiler and Pressure Vessel applications, the style is designated as JQU. For ASME Code installations when a rupture disc or breaking pin assembly is installed between the vessel and the JQU, it is mandatory that the space between the rupture disc or breaking pin assembly and the JQU valve is provided with a pressure gauge, a try cock, free vent or other suitable 'tell-tale' indicator.

A 1/8" 27 NPT tapped hole is provided in the valve base to meet this requirement.

Users, architect engineers and installers are cautioned to provide for safe disposal of fluid from this vent in the event of diaphragm leakage and/or diaphragm rupture. Additionally, to ensure that the valve and the non-reclosing device will function correctly, the set pressure of the valve must be the same or lower than that of the breaking pin or rupture disc used in combination.

The standard JQ normally relieves to atmosphere with no provision for outlet piping. Other designs are available for venting to a closed exhaust system. The JQ valve is available in an all Monel® construction for applications requiring maximum corrosion resistance of internal parts.

Contact your sales representative for design variations or special material valves.

# CROSBY STYLE JQ PRESSURE RELIEF DEVICE

## CHLORINE TRANSPORTATION SERVICE

Inlet size (inch)	Style	Spring inlet flange	Breaking setting (psi)	Pin set (psi)	Air capacity (SCFM)	Service	Jurisdictional agencies
1½	JQ-225	Chlorine Institute flange <sup>[1]</sup>	213	225	2700 at 225 psi	Tank car	Chlorine Institute, Inc.; AAR
1½	JQ-375	Chlorine Institute flange <sup>[1]</sup>	360	375	4395 at 375 psi	Tank car	Chlorine Institute, Inc.; AAR
4	JQ-300	300 lb ANSI tongue faced	300	300	15,350 at 10% accumulation	Barge tank	Chlorine Institute, Inc.; U.S.C.G.

## GENERAL SERVICE

Inlet size (inch)	Style	Spring inlet flange	Breaking setting (psi)	Pin set (psi)	Air capacity (SCFM)	Service	Jurisdictional agencies
1½	JQU-1	Chlorine Institute flange <sup>[1]</sup>	30 - 225	30 - 225	See page 5	Pressure vessel storage and transportation	ASME
1½	JQU-2	Chlorine Institute flange <sup>[1]</sup>	226 - 375	226 - 375	See page 5	Pressure vessel storage and transportation	ASME
4	JQU	300 lb ANSI tongue faced	30 - 350	30 - 350	See page 5	Pressure vessel storage and transportation	ASME and U.S.C.G.

### NOTE

1. 1½" 300 lb ANSI raised face adapter optional.

FIGURE 1

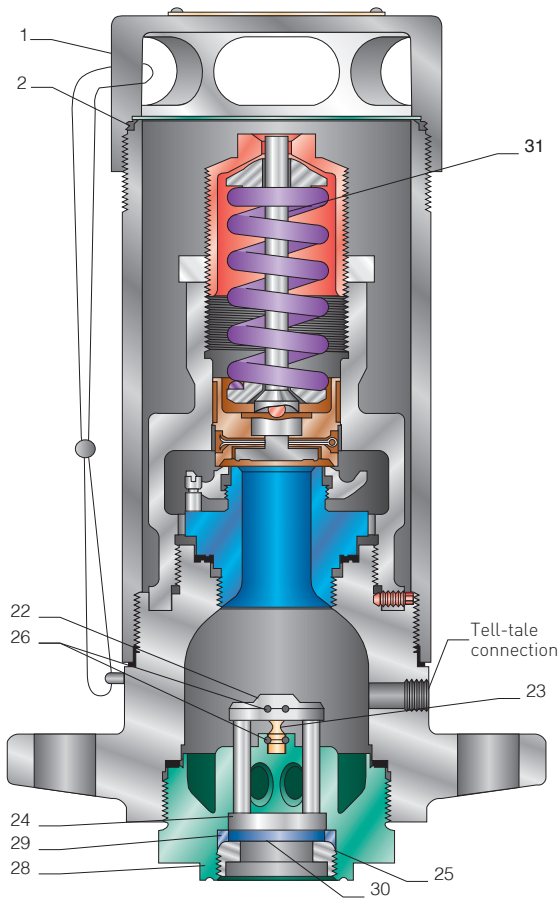
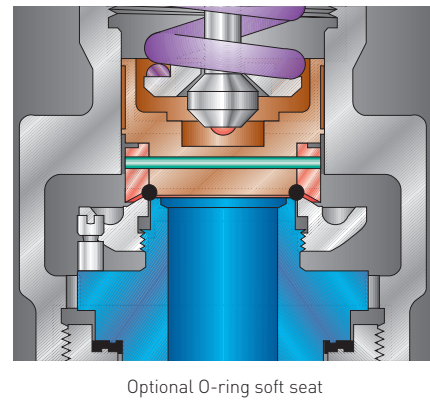
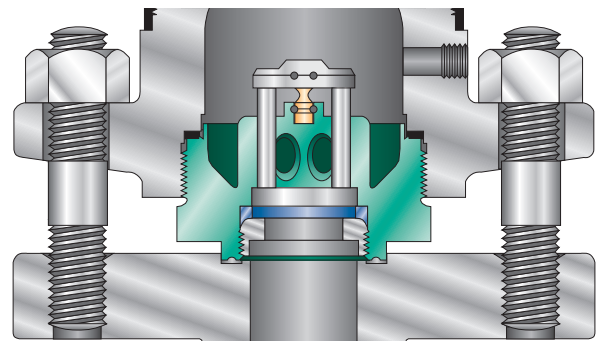


FIGURE 2



Optional O-ring soft seat

FIGURE 3



Optional 1½" 300 lb ANSI flange adapter

# CROSBY STYLE JQ PRESSURE RELIEF DEVICE

## PARTS AND MATERIALS

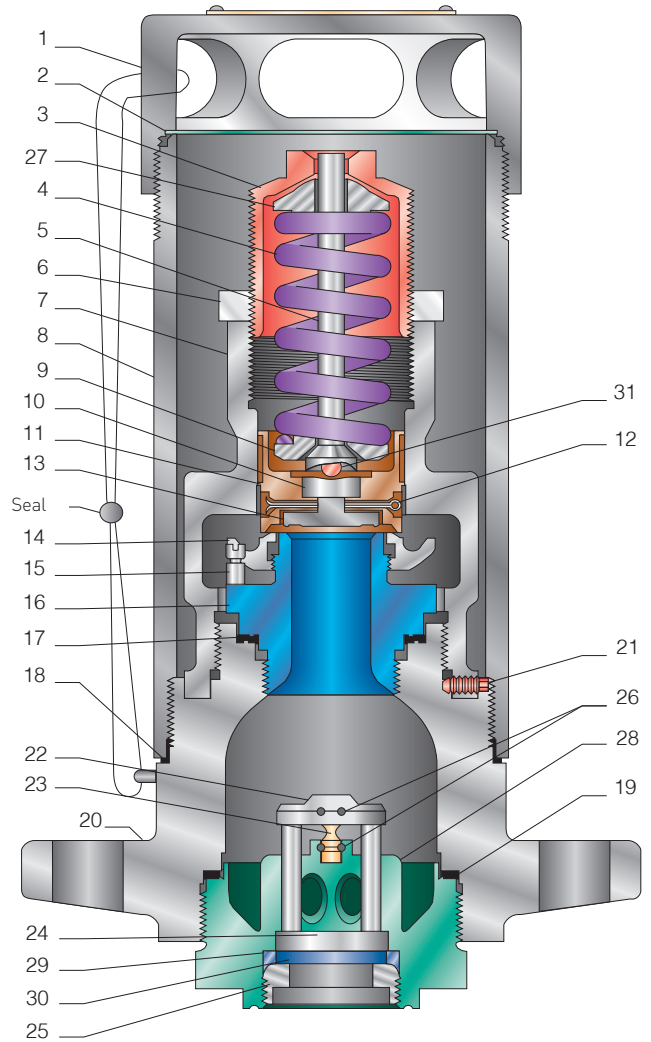
No.	Part	Material
1	Cap - 1½" valve Cap - 4" valve	316 SS Ductile iron
2	Diaphragm (upper) <sup>[1]</sup>	3% antimony lead <sup>[1]</sup>
3	Adjusting bolt	Monel <sup>®</sup>
4	Spring - 1½" valve Spring - 4" valve	Carbon steel <sup>[2]</sup> Carbon steel - cadmium plated
5	Spindle assembly - 1½" valve	Steel - glyptol coated
6	Lock nut	Monel <sup>®</sup>
7	Disc guide - 1½" valve Disc guide - 4" valve	Inconel 600 Cast steel - glyptol coated
8	Casing - 1½" valve Casing - 4" valve	4" stainless steel pipe, sch. 40 6" seamless steel pipe, sch. 40
9	Spring washer (bottom) Disc bushing	Steel - cadmium plated
10	(Assembled to disc ii)	Stainless steel
11	Disc	Monel <sup>®[3]</sup>
12	Cotter pin - 1½" valve	18-8 stainless steel
13	Disc insert - 1½" valve Adjusting ring - 1½" valve	Monel <sup>®[3]</sup> Malleable iron - glyptol coated
14	Adjusting ring - 4" valve	Monel <sup>®[3]</sup>
15	Lock pin	Monel <sup>®</sup>
16	Nozzle	K-Monel <sup>[3]</sup>
17	Nozzle gasket	Garlock 3510
18	Base gasket	3% antimony lead
19	Breaking pin assembly gasket 1½" valve 4" valve	Garlock 3510 3% antimony lead
20	Base	Steel - glyptol coated
21	Lockscrew	Steel
27	Spring washer (top)	Steel - cadmium plated
31	Spindle assembly - 4" valve	Steel with stainless steel ball
32	Cap gaskets	Garlock 7022

### Breaking pin assembly

22	Yoke Breaking pin - 1½" valve <sup>[4][5]</sup>	Steel Bronze
23	Breaking pin - 4" valve <sup>[4]</sup>	Bronze
24	Plunger assembly - 1½" valve Plunger assembly - 4" valve	Type 304 stainless steel Steel
25	Spanner nut	Monel <sup>®[3]</sup>
26	Clip Housing - 1½" valve	Hardened steel (piano wire) Inconel <sup>®</sup> 600
28	Housing - 4" valve	Steel
29	Follower	Monel <sup>®[3]</sup>
30	Diaphragm (lower)	3% antimony lead
33	Vacuum grill - 4" valve	Monel <sup>®</sup>

## NOTES

- For general service applications, the upper diaphragm is PTFE FEP. If other than 3% antimony lead is specified, two cap gaskets (32) are used to complete the seal.
- The carbon steel spring [4] for 1½" chlorine service valves is colored red for 225 psi setting and colored yellow for 375 psi setting. For general service spring material is carbon steel - cadmium plated.
- Optional materials available for fluids other than chlorine.
- Aluminum for pressures under 100 psig.
- The breaking pin [23] for 1½" chlorine service valves is colored blue for 225 setting and colored green for 375 psi setting.
- Not shown (used to protect lower diaphragm [30] against vacuum damage).



# CROSBY STYLE JQ PRESSURE RELIEF DEVICE

## Air capacities (valve with breaking pin mechanism - SCFM)

### 1½" JQU-1 AND JQU-2, 10% accumulation

Set pressure psig	Air capacity SCFM
30	440
40	541
60	744
80	946
100	1150
120	1352
140	1555
160	1758
180	1960
200	2164
220	2367
240	2570
260	2772
280	2975
300	3178
320	3381
340	3584
360	3787
375	3939

### 4" JQU, 10% accumulation

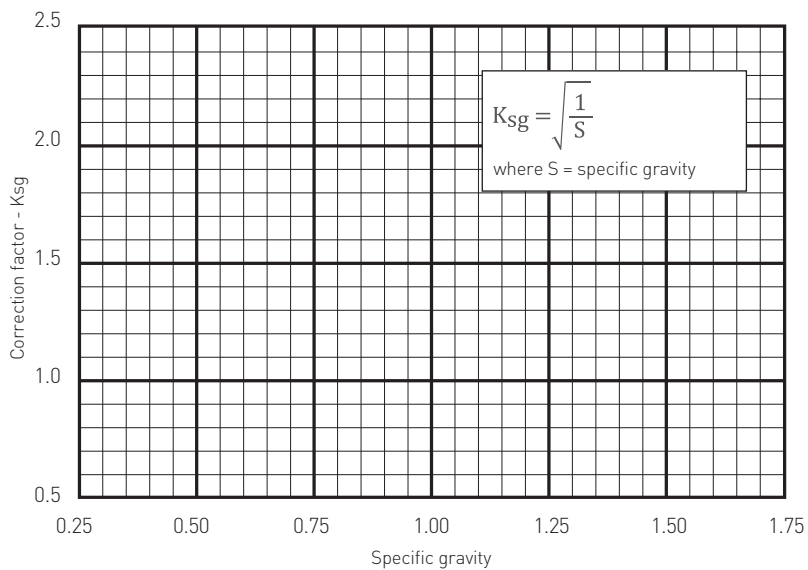
Set pressure psig	Air capacity SCFM
50	2773
100	4991
150	7154
200	9345
250	11508
300	13727
375	17025

### NOTES

1. Contact your sales representative for capacities of valve alone or valve with rupture disc.
2. Temperature range: 20°F to 250°F.
3. ASME Section VIII breaking pressure tolerances are:  
 30 - 150 psi: ± 5 psi  
 151 - 275 psi: ± 10 psi  
 276 - 376 psi: ± 15 psi
4. For inlet temperatures other than 60°F, multiply above capacities by correction factor Kt. For gases of specific gravity other than 1.0 (air = 1), multiply above capacities by correction factor Ksg (see page 6).

# CROSBY STYLE JQ PRESSURE RELIEF DEVICE

SPECIFIC GRAVITY CORRECTION FACTOR  $K_{sg}$



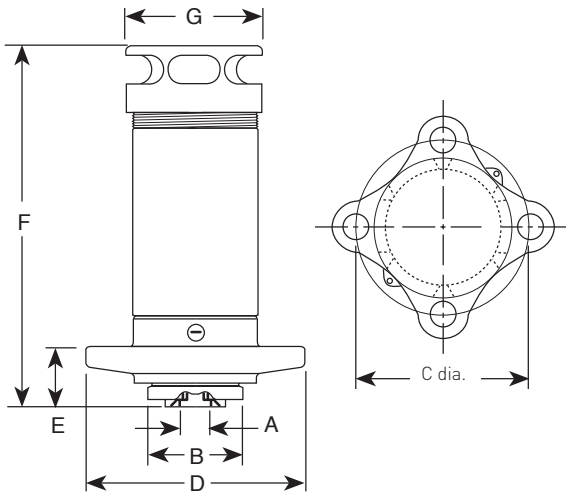
TEMPERATURE CORRECTION FACTOR -  $K_t$

Degrees Fahrenheit	$K_t$
-20	1.0870
-10	1.0750
0	1.0630
10	1.0520
20	1.0410
30	1.0310
40	1.0200
50	1.0100
60	1.0000
70	0.9905
80	0.9813
90	0.9723
100	0.9636
110	0.9552
120	0.9469
130	0.9388
140	0.9310
150	0.9233
160	0.9158
170	0.9085
180	0.9014
190	0.8944
200	0.8876
210	0.8811
220	0.8746
230	0.8682
240	0.8619
250	0.8558

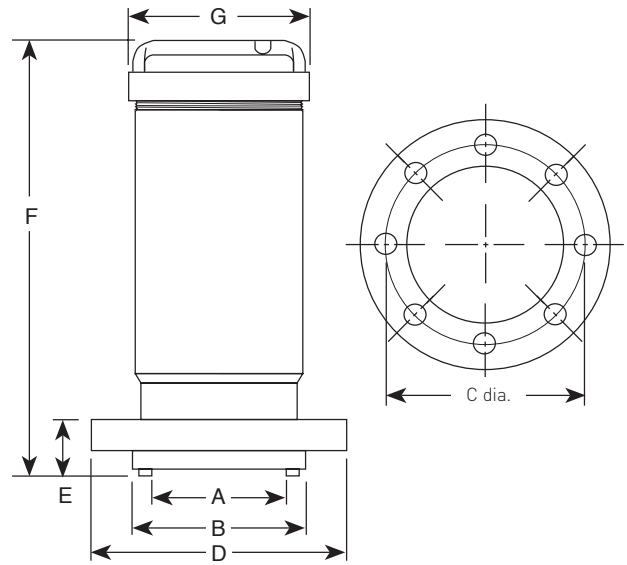
# CROSBY STYLE JQ PRESSURE RELIEF DEVICE

## DIMENSIONS AND WEIGHTS

1½" VALVE



4" VALVE



### DIMENSIONS AND WEIGHTS

Size (inches)	Style	A	B	C	D	E	F	G	No. bolts	Size bolt holes dia.	Approximate net weight (lb)
1½	JQ	1.505	2.245	6¼	8	2 <sup>5</sup> / <sub>32</sub>	12¾	4 <sup>7</sup> / <sub>8</sub>	4	- 7/8"	35
4	JQ	5 <sup>3</sup> / <sub>16</sub>	6 <sup>3</sup> / <sub>16</sub>	7 <sup>7</sup> / <sub>8</sub>	9½	2 <sup>3</sup> / <sub>16</sub>	17¾	7¼	8	- 7/8"	95

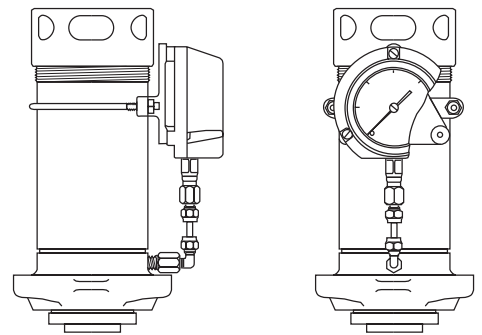
### Maintenance instructions

Chlorine Institute, Inc. Pamphlet 39 (1½")

Chlorine Institute, Inc. Pamphlet 41 (4")

Each pamphlet contains maintenance procedures as well as a listing of tools and test equipment.

### OPTIONAL PRESSURE GAUGE ASSEMBLY



Neither Emerson, Emerson Automation Solutions, nor any of their affiliated entities assumes responsibility for the selection, use or maintenance of any product. Responsibility for proper selection, use, and maintenance of any product remains solely with the purchaser and end user.

Crosby is a mark owned by one of the companies in the Emerson Automation Solutions business unit of Emerson Electric Co. Emerson Automation Solutions, Emerson and the Emerson logo are trademarks and service marks of Emerson Electric Co. All other marks are the property of their respective owners.

The contents of this publication are presented for informational purposes only, and while every effort has been made to ensure their accuracy, they are not to be construed as warranties or guarantees, express or implied, regarding the products or services described herein or their use or applicability. All sales are governed by our terms and conditions, which are available upon request. We reserve the right to modify or improve the designs or specifications of such products at any time without notice.

[Emerson.com/FinalControl](http://Emerson.com/FinalControl)