

Check Valve

Product Bulletin 50-30

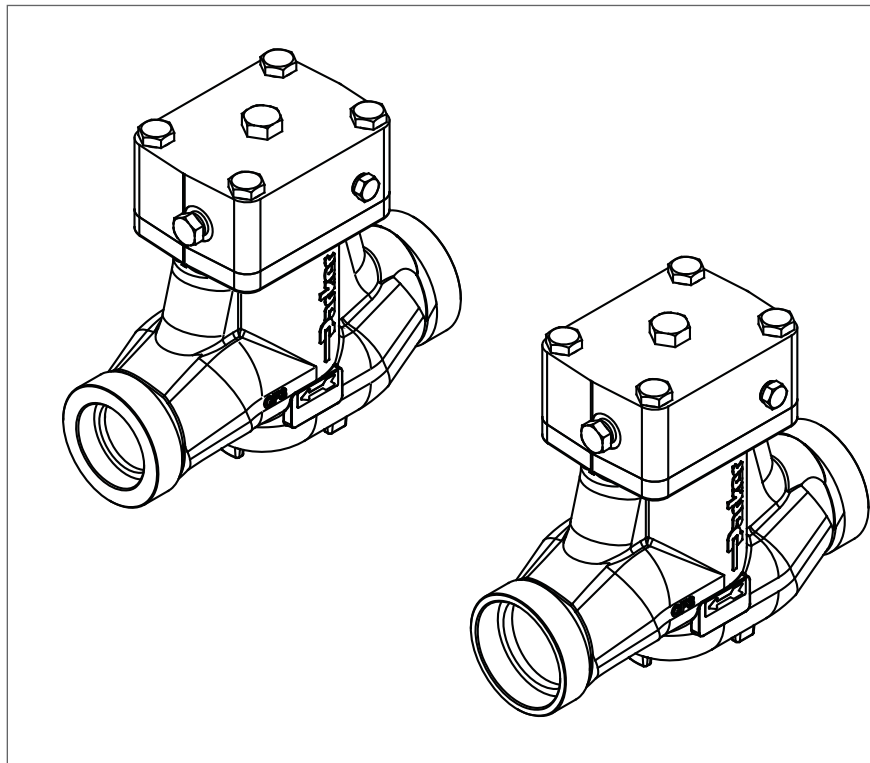
Type: CK-1W

Size: 50 mm (2")

Design Pressure Rating: 32 bar (464 psig)

Purpose:

The CK-1W, gravity closed, check valves are valves which prevents backward flow of fluid in refrigerant suction, hot gas, liquid, or compressor discharge lines. This valves improved design has a higher working pressure, greater working temperature range, and minimizes the effects of system impurities for a more durable operation. The CK-1Ws most beneficial features are its stainless steel and aluminum construction, which allows it to withstand corrosive environments and its overall light weight minimizes installation costs.



Contact Information: Product Features:

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- Suitable for Ammonia, CO₂, R-22, R-404a, and other common refrigerants
- Designed with corrosion resistant material – 304 stainless steel and aluminum
- No body wearing surfaces
- Stainless steel components are resistant to wire drawing
- Gravity closed
- Design drastically reduces foreign material
- Light weight
- Can only be mounted in a horizontal pipe line
- Fluid temperature rating: -60°C to 116°C (-76°F to 240°F)
- Ambient temperature rating: -40°C to 60°C (-40°F to 140°F)
- Complies with Pressure Equipment Directive 97/23/EC



Patent Pending

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Description

The CK-1W check valves are an integrated assembly of two modules:

1. A body, which contains the modulating plug, but is ordered to suit a particular connection size. The port size defines the size of the body;
2. A port plate, which contains the manual bypass feature.

The CK-1W is a gravity closed valve furnished with socket weld and weld neck options only. This piston type check valve opens by the pressure difference between valve inlet and outlet.

This unique design allows the check valve to be welded into the line without disassembly, yet provides full access for cleaning and servicing from the top only.

Principle of Operation

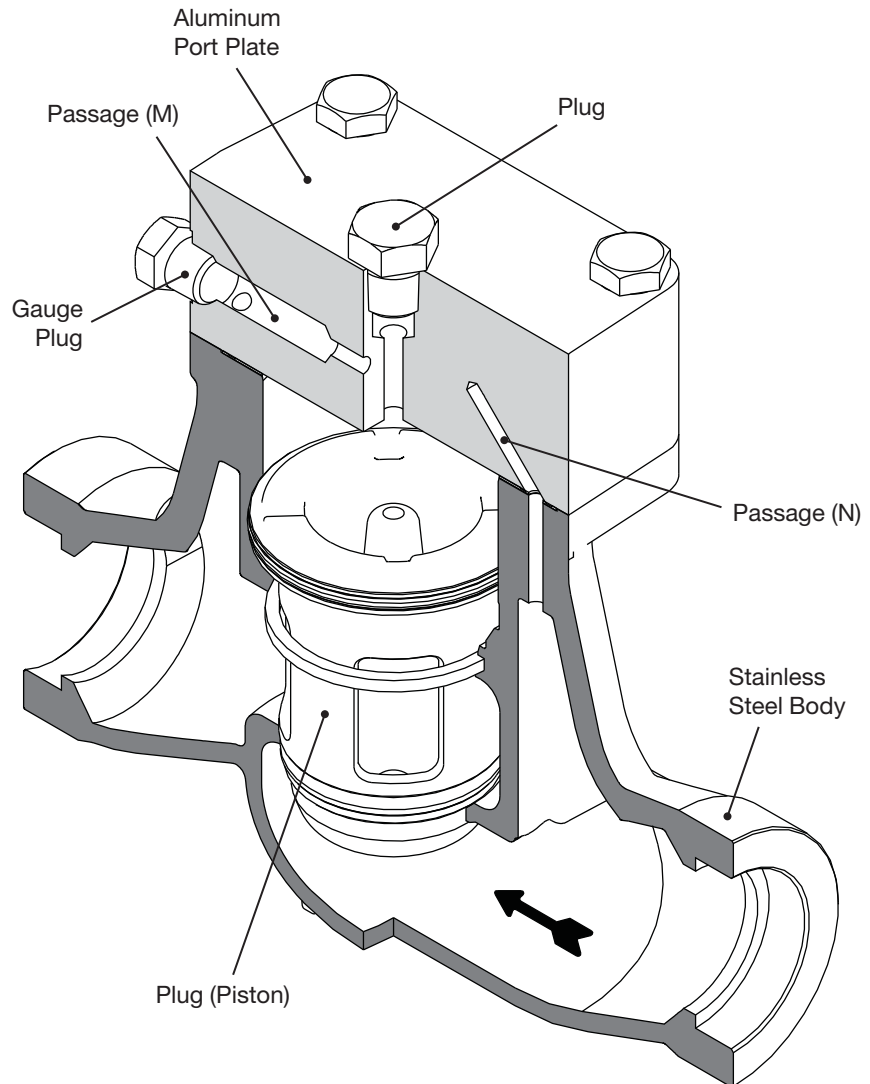
When upstream pressure exceeds the downstream pressure, the pressure on the bottom side of the piston will lift the assembly and allow flow through the valve. A minimum pressure difference of the 0.03 bar (0.5 psi) is required to open the valve. On opening, pressure above the piston assembly will be relieved through the piston bleed hole, permitting the piston to travel its full vertical distance and open the valve to its full open position.

When upstream and downstream pressures are equalized, the weight of the piston will cause it to drop tight against its seat bead and stop flow as shown in the CK-1W principle of operation cross-section diagram. Should the downstream pressure rise, the additional pressure acting on the top of the valve seat, bleeding through the bleed hole, will further assist in seating the valve closed.

Manual Opening Stem

These valves are equipped with a pressure driven manual opening system versus the mechanical screw thread mechanism. A small valve is opened that allows the inlet pressure, passage (N), to escape via passage (M) and out through passage (T), the

Port Size	Connection Size (SW, BW)	Body Size	Kv	Cv
50 mm (2")	1-1/2", 2"	2"	49.7	58

CK-1W Port, Connection, and Flow Coefficient Table**CK-1W Cross Section**

valve outlet. Using a screw driver, turn the CCW to manually open the valve. Turn the stem CW to put the valve back into automatic operation. If the downstream pressure is more than 0.03 bar (0.5psi) higher than the inlet pressure the valve will not open. There is still a leak path between the valve inlet and outlet through the manual opening valve for pump down purposes.

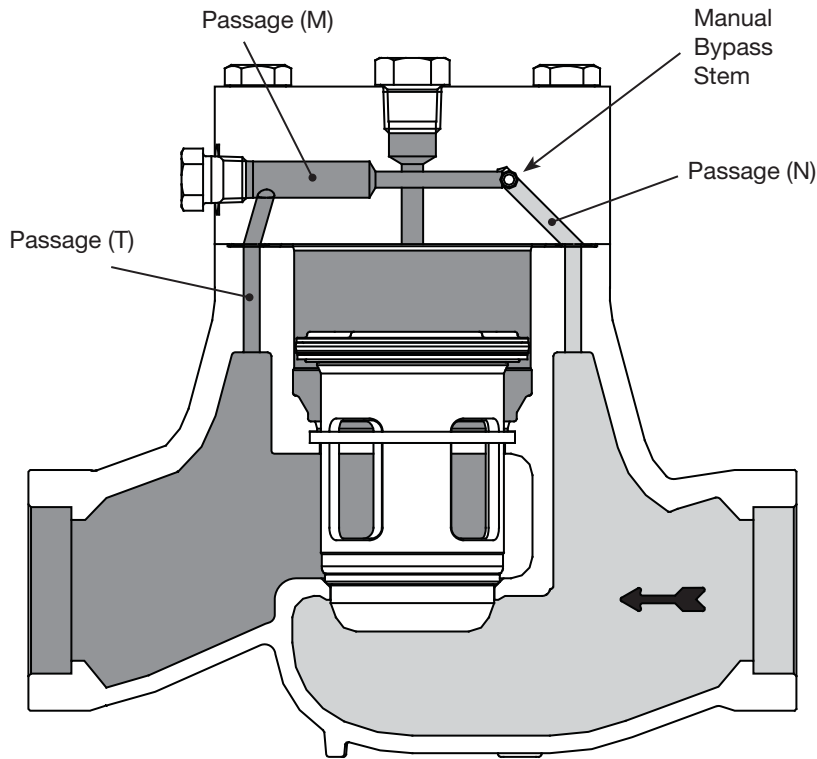
Installation

All check valves are packed for a maximum protection. Unpack carefully. Check the carton to make sure all items are unpacked. Save the

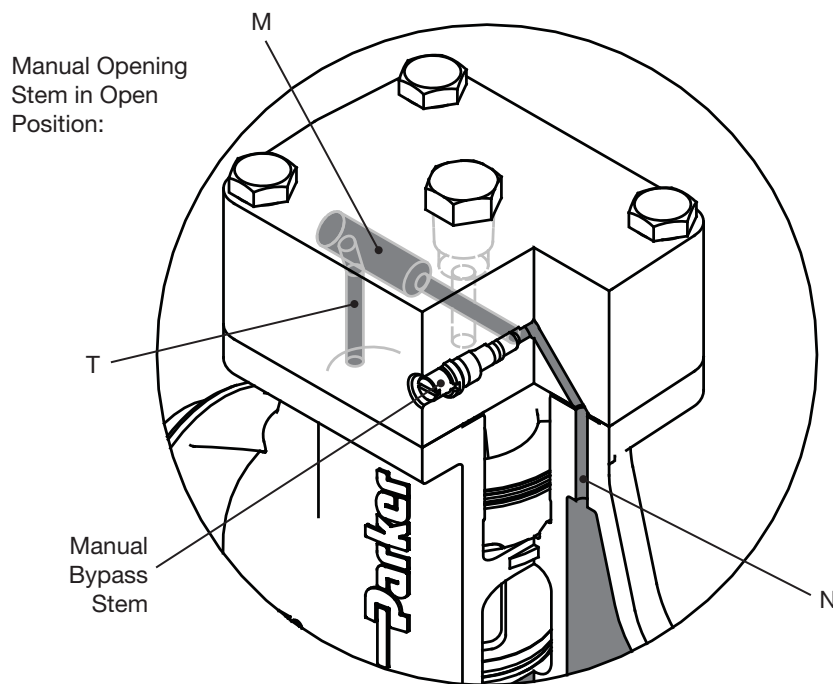
enclosed instruction for the installer and eventual user.

Do not remove the protective coverings from the inlet and outlet of the regulator until the stop valve is ready to be installed. Protect the inside of the regulator from dirt and chips before and during installation.

The valves should not be disassembled before welding. This grade of stainless steel is a poor conductor of heat and conventional weld processes (stick, MIG, and TIG) do not create enough heat that transfers to the valve's internal parts that could be affected.



CK-1W Principle of Operation Cross Section (Higher Upstream Pressure - Valve Closed)



CK-1W Manual Opening Stem Cross Section

Passage	Description
M	Manual Opening Stem
N	Inlet Pressure
T	Outlet Pressure

CK-1W Port Plate Passage Table

Contractors need to follow a WPS (Welding Procedure Specification) for all welding. The procedure must be qualified and welder doing the weld qualified to perform that procedure. For welding the stainless steel 304L body to carbon steel pipe, E309L and ER309L-15, -16, or -17 filler metal is a common choice. Contractors can develop their own standards and have them qualified based on the equipment they use and the environment they may encounter.

The codes applicable to the welding of socket weld valves require that the pipe be inserted into the socket until bottomed against the stop. The pipe is then to be backed out approximately 1/16 of an inch before welding. Use of welding rings is optional, but recommended for butt weld valves. They help alignment, control gap for full penetration welding, and reduce welding debris entry.

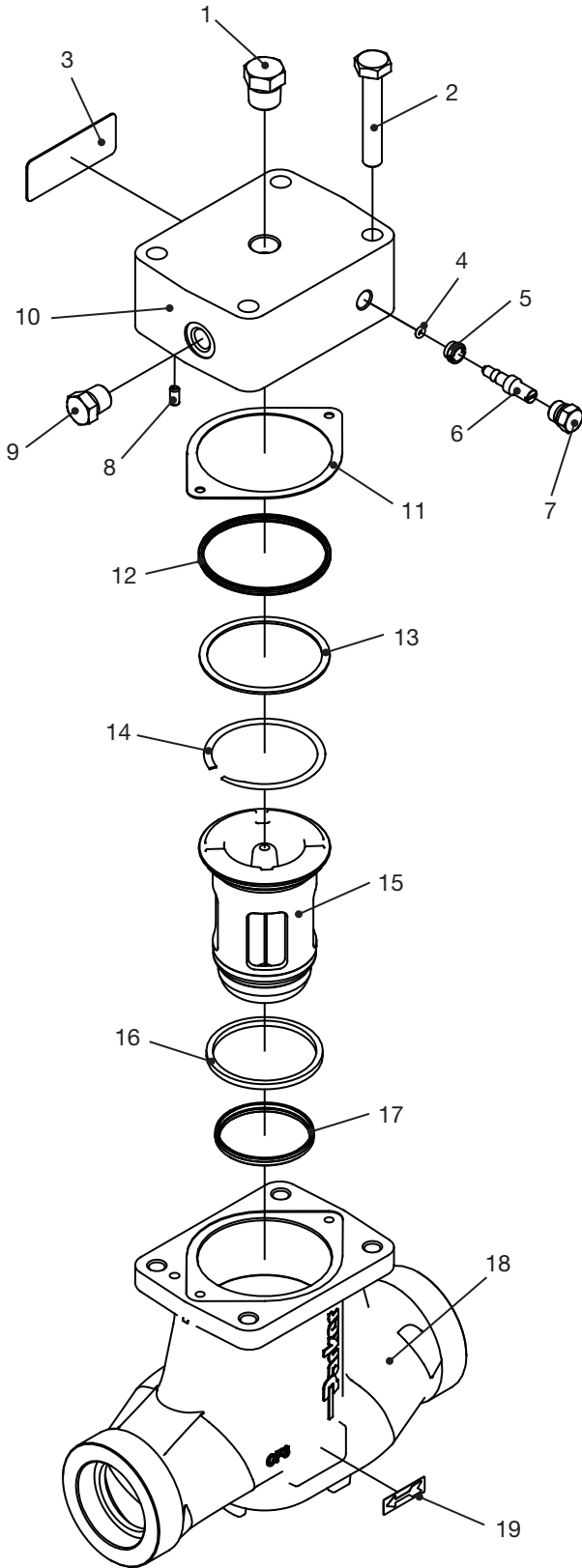
Note: When welding carbon steel and stainless steel the welded joint should be painted to prevent galvanic corrosion.

Socket welding where allowed is the preferred connection. This connection does help to reduce the amount of welding debris in the piping system.

⚠ Caution

Do not install the check valve at the inlet of a solenoid valve or a regulator with an electric shut-off feature.

Do not install at the inlet of an outlet pressure regulator in a system where liquid may be trapped between two valves



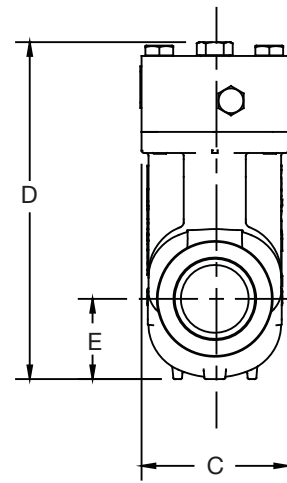
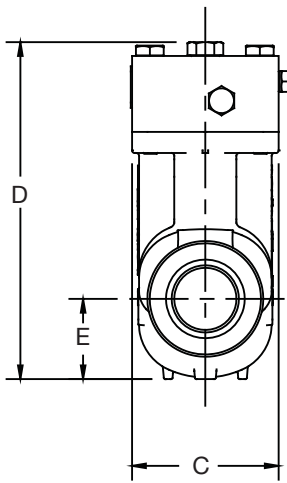
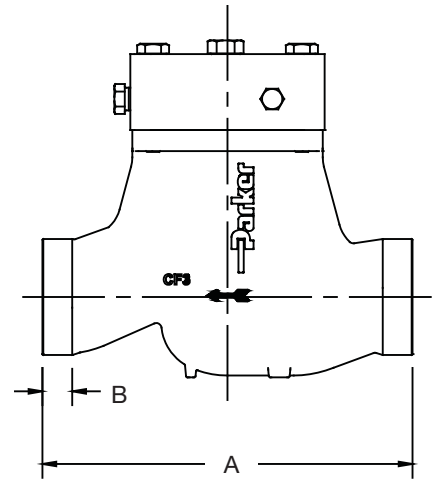
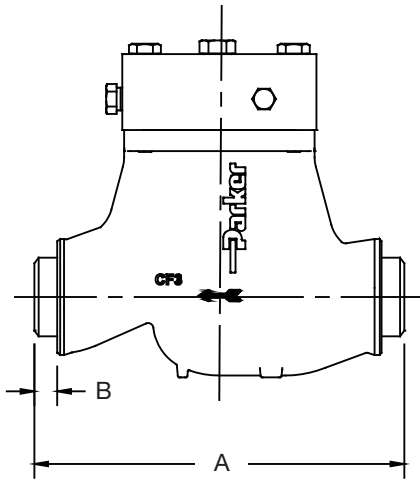
CK-1W Exploded Parts View

Item No.	Description	Material	Qty
1	Plug, Pipe 3/8 NPT	6061-T6 Al	1
2	Bolt, M10 x 45MM	DIN-ISO Standard 3506-1	4
3	Nameplate, Sticker	-----	1
4	O-Ring, 0.125 ID x 0.25 OD x 0.062	Neoprene	1
5	Nut, Retainer	416 S.S.	1
6	Stem, Manual Opening	303 S.S.	1
7	Plug Cap, Manual Opening 7/16-20	6061-T6 Al	1
8	Pin, Roll	420 S.S.	1
9	Plug, Gauge 1/4 NPT	6061-T6 Al	1
10	Port Plate	6061-T6 Al	1
11	Gasket, Port Plate	MP 15	1
12	Ring, Seal 2.528 ID x 2.706 OD	PTFE S.S.	1
13	Ring, Backing	302/304 S.S.	1
14	Ring, Retaining 2.174 Internal	302 S.S.	1
15	Piston	303 S.S.	1
16	Ring, Wear	PTFE EMS-103	1
17	Ring, Seal	Teflon (PTFE)	1
18	Body	304L S.S.	1
19	Flow Direction, Sticker	-----	2

CK-1W Parts List

Item No.	Kit Description	Port Size
		50 mm (2")
1, 9	Plugs	208769
1, 3 - 10	Port Plate	208771
4 - 7	Manual Opening Stem	208809
11 - 17	Piston	208772
11 - 14, 16 - 17	Wear Seal, Piston	208821
4, 11 - 14, 16 - 17	Gasket / O-Ring	208822
2	Bolt, Port Plate	208801
-----	S.S. Gauge Valve	208938
-----	Plated Gauge Valve	208939

CK-1W Repair Kits



Dimension	Port Size
	50 mm (2")
A	227.1 mm (8.94")
B	16.0 mm (0.63")
C	90.0 mm (3.54")
D	211.1 mm (8.31")
E	49.3 mm (1.94")

CK-1W Butt Weld (BW) Dimensions

Dimension	Port Size
	50 mm (2")
A	227.1 mm (8.94")
B	16.0 mm (0.63")
C	90.0 mm (3.54")
D	211.1 mm (8.31")
E	49.3 mm (1.94")

CK-1W Socket Weld (SW) Dimensions

Welded valves may be installed only in a horizontal pipeline in an upright position, with the cover facing upward. It is important that the valves are installed in the correct direction of flow. Check valves should always be installed at the outlet of the valves.

Before putting valves into service, all pipe connections, valve seats, and stem seals should be tested for leaks at pressure levels called for in appropriate codes.

⚠ Caution

All personnel working on valves must be qualified to work on refrigeration systems. If there are any question, contact Refrigerating Specialties before proceeding with the work.

Before doing any service work, always be sure to disconnect the power and isolate the valve. Failure to do so will result in venting of ammonia.

Disassembly (See also Bulletin RSBCV)

All CK-1W can be disassembled, serviced and moving parts replaced without disturbing the piping, but of course, disassembly will cause exposure of some section of piping to atmosphere, which should be addressed before disassembly by evacuation and reclaim of the refrigerant.

For the CK-1W series check valve, the port plate can be removed by unbolting the four bolts (#2). Removal of the port plate may require a sharp tap on their sides to unseat the parts from their sealed position, for which a rubber or rawhide hammer is recommended so as to avoid damage to the sealing surfaces. Removal of the port plate will expose the top of the piston. The piston (#15) should be removed and inspected. Continue to inspect the wear ring (#16), metal rings, and gaskets.

Before re-assembly, all parts must be cleaned with a suitable solvent, permitted to dry, and lubricated with

a light film of refrigerant oil, simply wiped on with the fingers, All gaskets and o-rings should be renewed, and insertion and sealing will be facilitated if a similar film of oil is applied to them as well.

Re-assembly is exactly the reverse of disassembly, with the precaution that the reliefs cut into each module of the valve assembly and the corresponding gaskets be aligned with the appropriate location. Ensure that all access fittings, solenoid features, and bypass plug are sealed when re-installing the corresponding parts. Prior to installing the port plate inspect the piston, using your hand, by pulling up and pushing down. The piston should move freely, without dragging or hesitation. Adjust all torques to the values indicated by torque requirement table.

Tighten all bolts equally to draw the assembly together evenly, to ensure properly sealing of all joints.

Symptom	Probable Cause	Correction
Failure to close	Stuck piston due to dirt or chips	Disassemble valve and clean thoroughly
Failure to open	Pilot pressure source is not high enough	0.03 bar (0.5 psi) of upstream pressure required to
	Pressure between remote pressure source and main valve upstream pressures are not equalizing	Check for leakage or backward installation of the CK-1W
Leakage through valve when closed	There are dirt or chips under the piston	Disassemble valve and clean thoroughly
	Wear ring may be worn	Disassemble valve and replace wear ring

CK-1W Service Pointers

Location	Description (SAE)	Torque mkg (Ft-Lbs)
Port Plate Screws	M10 x 45 MM	4.84 (35)
Pipe Plug	3/8 NPT	Snug
Pilot Plug	3/4-16 UNF	Snug

CK-1W Torque Requirement Table

Valve	Port Size
	50 mm (2")
CK-1W	3.6 kg (8.0 lbs)

Socket Weld (SW) and Butt Weld (BW) Valve Weights

Safe Operation (See Bulletin RSBCV)

People doing any work on a refrigeration system must be qualified and completely familiar with the system and the Refrigerating Specialties Division valves involved, or all other precautions will be meaningless. This includes reading and understanding pertinent Refrigerating Specialties Division Product Bulletins and Safety Bulletin RSB prior to installation or servicing work.

Where cold refrigerant liquid lines are used, it is necessary that certain precautions be taken to avoid damage which could result from liquid expansion. Temperature increase in a piping section full of solid liquid will cause high pressure due to the expanding liquid which can possibly rupture a gasket, pipe or valve. All hand valves isolating such sections should be marked, warning against accidental closing, and must not be closed until the liquid is removed. Check valves must never be installed upstream of solenoid valves, or regulators with electric shut-off, nor should hand valves upstream of solenoid valves or downstream of check valves be closed until the liquid has been removed.

It is advisable to properly install relief devices in any section where liquid expansion could take place. Avoid all piping or control arrangements which might produce thermal or pressure shock.

For the protection of people and products, all refrigerant must be removed from the section to be worked on before a valve, strainer, or other device is opened or removed. Flanges with ODS connections are not suitable for ammonia service.

Warranty

All Refrigerating Specialties products are under warranty against defects in workmanship and materials for a period of one year from date of shipment from factory. This warranty is in force only when products are properly installed, field assembled, maintained, and operated in use and service as specifically stated in Refrigerating Specialties Catalogs or Bulletins for normal refrigeration applications, unless otherwise approved in writing by the Refrigerating Specialties Division. Defective products, or parts thereof returned to the factory with transportation charges prepaid and found to be

defective by factory inspection, will be replaced or repaired at Refrigerating Specialties option, free of charge, F.O.B. factory. Warranty does not cover products which have been altered, or repaired in the field, damaged in transit, or have suffered accidents, misuse, or abuse. Products disabled by dirt or other foreign substances will not be considered defective.

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