

**HANSEN TECHNOLOGIES
CORPORATION**



**AW301H 3" (80 mm)
Butt Weld Angle Valve**

INTRODUCTION

These low pressure drop refrigerant shut-off valves are designed to be butt-welded directly to steel piping, thereby eliminating potential leaky flanges or threaded joints and simplifying installation. Cast steel bodies are lightweight, yet have substantial wall thickness to overcome corrosion potential. The cast steel body is rigid, reducing the potential for seat leakage due to flexing of the valve body under abnormal conditions. The "heart" of Hansen shut-off valves is the patented no-leak seal-plus-stem-packing design. This seal design is used exclusively on Hansen shut-off valves and virtually eliminates stem seal leakage.

APPLICATIONS

Typical uses include:

Ammonia refrigeration system suction, liquid, discharge, recirculating liquid, hot gas, thermosyphon, and oil lines, using handwheel or seal cap models.

The low friction, no leak stem seal design permits the use of chain actuation for crossover applications without the need to retighten the packing.

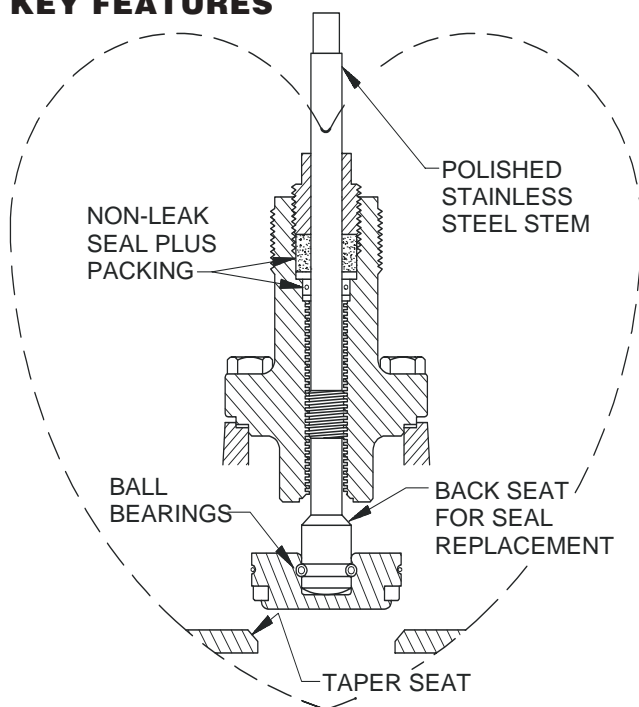
Steel pipe portions of halocarbon, commercial, industrial, and air conditioning systems, using seal cap models.

**Specifications, Applications,
Service Instructions & Parts**

**BUTT WELD
SHUT-OFF VALVES**

**2" through 14"
(50 mm through 350 mm)
Globe & Angle
for refrigerants**

KEY FEATURES



ADDITIONAL FEATURES

Globe and angle valves available.
Interchangeable handwheel or seal cap.
2" thru 10" machined to Schedule 40 pipe, 12" and above Standard Weight pipe.
Teflon seat disc.
Chain actuators available.
Suitable for ammonia, R22, R134a, R507, and other compatible refrigerants.
Suitable for CO₂ systems on request.

MATERIAL SPECIFICATIONS

Body: Cast steel, ASTM A-352, Grade LCB

Bonnet: Ductile iron, 2"-8" A-536;
10", 12", & 14 " ASME SA-395

Stem: Polished stainless steel

Disc Holder: Plated steel

Seat Disc: Retained PTFE Teflon

Ball Bearings: Stainless steel

Packing Nut: Zinc plated steel

Stem Packing: Graphite composite plus
neoprene O-ring in series

Handwheel: Zinc plated iron alloy 2"-4"; cast
aluminum 5"-14"

Seal Cap: Zinc plated steel 2"-4"; cast aluminum
5"-14"

Temperature Range:

-60°F to 240°F (-50°C to 115°C), temperatures
below -60°F (-50°C) at lower pressures

Safe Working Pressure: 400 psig (27 bar), 600 psig
(40bar) upon request.

Connection Dimensions: 2"-10" Match Schedule 40
pipe, 12" & Up Match Standard Weight Pipe

ADVANTAGES

Compared to conventional stem seal designs, Hansen's patented no leak seal-plus-stem-packing virtually eliminates stem seal leakage. In addition, the stem is polished to avoid packing wear, the precision stem threads avoid stem wobble and the packing nut is close fitting to remove dirt particles and frost from the stem. This results in infrequent maintenance or tightening and almost no refrigerant loss.

Compared to threaded valves, Hansen welding valves eliminate the chance of future leaks at pipe threads. In addition, a butt weld pipe-to-valve body joint eliminates the inherent weakness and corrosion vulnerability of the threaded portion of pipe immediately adjacent to a screwed valve body or flange.

Compared to flanged valves, Hansen welding valves eliminate the gasket joint leakage potential at the flange joint. This gasket can leak due to pipe and bolt-nut movement as the result of temperature and pressure fluctuations. The pressure drop of Hansen valves is lower than conventional flanged cast valve bodies. In addition, nearly all other refrigeration flanged valves are made of cast iron or "semi-steel." The cast steel bodies of Hansen valves have much greater tensile strength, ductility, and impact resistance than cast iron or "semi-steel."

Compared to pressed-sheet-steel welding valves, Hansen valves have thicker walls for greater rigidity and corrosion resistance.

Compared to ball valves, Hansen welding valves have no threaded or flanged-gasket pipe joints. Hansen valves also will not open or close so rapidly as to cause severe pipe shock due to sudden change in liquid velocity. In addition, ball valve stem packing typically cannot be replaced while the valve is in a pressurized line. The stem packing on these Hansen valves can be replaced while the valve is in a pressurized line. Also, dirt or damage to ball valve Teflon seats cannot be overcome by greater stem closing forces, an advantage of Hansen valves.

INSTALLATION

All Hansen weld valves can be installed in horizontal or vertical pipe lines. Stems are normally installed horizontally, but, depending on the application, stems may be installed vertically. Inlet pressure or direction of flow for all valve sizes should normally be under valve seat disc. However, to avoid installing an angle valve with the stem down, it is better to install the valve with the normal flow opposite the direction of the arrow.

Care must be taken when handling and installing large valves. Proper lifting devices and safety precautions must be observed.

A valve should have its bonnet assembly removed before welding. This reduces weight during welding, protects the Teflon seat disc from welding sparks, and facilitates cleaning of welding debris from the body interior prior to valve operation. The valve stem should be several turns open when removing and replacing the bonnet assembly. The Teflon seat disc should be protected when outside of the valve. Do not allow the Teflon seat to bump the valve body when removing it or stand the bonnet on the seat disc. Where it is necessary or standard practice to weld a valve into the line without bonnet removal, the stem should be opened several turns to prevent heat damage to the seat disc. Extra care should be taken when welding angle valves without disassembly to avoid welding sparks striking the seat from the outlet weld connection.

Use of welding rings is recommended. They help alignment, control the gap for full penetration welding, and reduce the potential of welding debris entering the system. Welds should be annealed as necessary in accordance with good practice. Painting of valves and welds is recommended for corrosion protection. Pipe covering, where applied, should have a proper moisture barrier.

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

Shut-off valves leading to the atmosphere must not be left unsupervised and must be plugged or capped to prevent corrosion inside the valve as well as leakage due to seat expansion, vibration, pressure shock, or improper opening. The valve seat should be cracked open to prevent hydrostatic expansion between the valve and the cap. Valves should never directly feed a water tank because of potential internal corrosion or seat opening caused by vibration.

INSULATION

Conventional valve-shaped block insulation can occasionally be used for both angle and globe valves. However, fabricated insulation shapes are recommended. If not available locally, Hansen can recommend a source of high quality, economical valve insulation. See page 5 of this bulletin for exterior valve dimensions.

FLOW CAPACITIES PIPING AND VALVE SIZING GUIDE FOR AMMONIA

SERVICE	CONDITIONS				CAPACITIES									
	TEMPERATURE		PRESSURE		2" (50 MM)		2½" (65 MM)		3" (80 MM)		4" (100 MM)		5" (125MM)	
	°F	°C	PSIG	BAR	TONS	kW	TONS	kW	TONS	kW	TONS	kW	TONS	kW
Suction Lines Single Stage Compressor	+20	-7	33.5	2.3	35.7	126	51.1	180	81.5	287	146	513	235	352
	0	-18	15.7	1.1	22.7	80	34.0	120	53.9	190	94.6	333	156	549
Suction Lines Booster	-20	-29	3.6	0.3	16.8	59	24.8	87	39.7	140	68.9	242	114	401
	-40	-40	8.7	0.6	9.9	35	14.4	51	23.4	82	40.8	144	66.8	235
Liquid Overfeed Return Lines (4X)	+20	-7	33.5	2.3	20.6	72	29.4	103	47.0	165	84.3	296	135	475
	0	-18	15.7	1.1	13.6	48	20.5	72	32.4	114	56.8	200	93.8	330
	-20	-29	3.6	0.3	8.9	31	13.1	46	21.0	74	36.4	128	60.5	213
	-40	-40	8.7	0.6	5.4	19	7.9	28	12.8	45	22.4	79	36.7	129
Hot Gas Feed Hot Gas Main	+70	+21	114.1	7.9	36.5	128	53	186	82.5	290	145	510	231	812
	+70	+21	114.1	7.9	73.0	257	106	373	165	580	290	1020	463	1682
Compressor Discharge	+86	+30	154.5	10.7	62.6	220	90.3	318	142	499	249	876	397	1396
Condenser Drains	+86	+30	—	—	140	492	220	774	375	1319	740	2603	1320	4642
Liquid Mains	+86	+30	—	—	454	1597	657	2311	1031	3626	1808	6359	2886	10150
Liquid Feed Branch	+86	+30	—	—	881	3098	1273	4477	1999	7030	3506	12330	5596	19681
Liquid Overfeed Supply (4X)	+10	-13	—	—	144	506	208	732	327	1150	573	2015	915	3218

SERVICE	CONDITIONS				CAPACITIES									
	TEMPERATURE		PRESSURE		6"(150MM)		8"(200MM)		10"(250MM)		12"(300MM)		14"(350MM)	
	°F	°C	PSIG	BAR	TONS	kW	TONS	kW	TONS	kW	TONS	kW	TONS	kW
Suction Lines Single Stage Compressor	+20	-7	33.5	2.3	343	1206	628	2209	1020	3387	1490	5240	1821	6404
	0	-18	15.7	1.1	225	791	414	1456	662	2328	946	3327	1156	4066
Suction Lines Booster	-20	-29	3.6	0.3	165	580	306	1076	486	1709	709	2494	867	3049
	-40	-40	8.7	0.6	97.8	344	181	637	288	1013	419	1474	512	1801
Liquid Overfeed Return Lines (4X)	+20	-7	33.5	2.3	198	696	362	1273	587	2064	856	3010	1046	3679
	0	-18	15.7	1.1	135	475	249	876	398	1400	568	1998	694	2441
	-20	-29	3.6	0.3	87.5	308	162	570	256	900	375	1319	458	1611
	-40	-40	8.7	0.6	53.7	189	100	352	158	556	232	816	284	999
Hot Gas Feed Hot Gas Main	+70	+21	114.1	7.9	338	1189	595	2093	949	3338	1377	4843	1683	5919
	+70	+21	114.1	7.9	673	2367	1190	4185	1898	6675	2754	9686	3366	11838
Compressor Discharge	+86	+30	154.5	10.7	580	2040	1021	3591	1629	5729	2363	8311	2888	10157
Condenser Drains	+86	+30	—	—	2030	7140	4200	14771	—	—	—	—	—	—
Liquid Mains	+86	+30	—	—	4218	14835	—	—	—	—	—	—	—	—
Liquid Feed Branch	+86	+30	—	—	8179	28766	—	—	—	—	—	—	—	—
Liquid Overfeed Supply (4X)	+10	-13	—	—	1337	4702	—	—	—	—	—	—	—	—

SIZING GUIDE

These flow capacity recommendations are not affected by the length of the pipe line. These are approximate optimum sizes based on power costs versus the investment costs of piping and its total installed cost. Piping sized to this capacity will have a 1°F (0.6°C) pressure drop for the following equivalent lengths:

- suction lines 700 diameters
- discharge lines 1400 diameters
- liquid lines 2400 diameters

Example: 275 feet (84 m) of 3" (80 mm) pipe and equivalent fittings amount to 1100 diameters, pressure drop for a suction line handling 81.5 tons (287 kW) at 20°F (-7°C) is 1100/700 times 1°F (0.6°C) drop, equals 1.6°F (1°C) or 1.8 psi (0.12 bar).

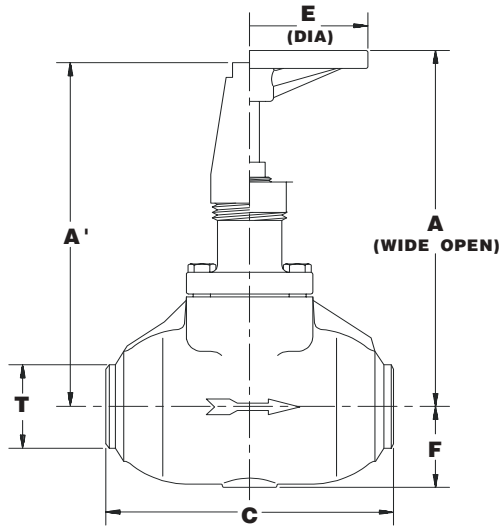
Example: Hansen valves have about 145 diameters of equivalent flow resistance, or 145/700 = 0.2°F (0.12°C) of equivalent pressure drop at the suction line capacities shown for a valve in a suction line.

The rationale for the vapor line sizing was developed by William V. Richards in two papers: "Refrigerant Vapor Line Sizing Not Dependent of Length," 16th International Congress of Refrigeration, IIR, Paris, 1983; and "Practical Pipe Sizing for Refrigerant Vapor Lines," Sixth Annual Meetings, IIR, San Francisco, 1984.

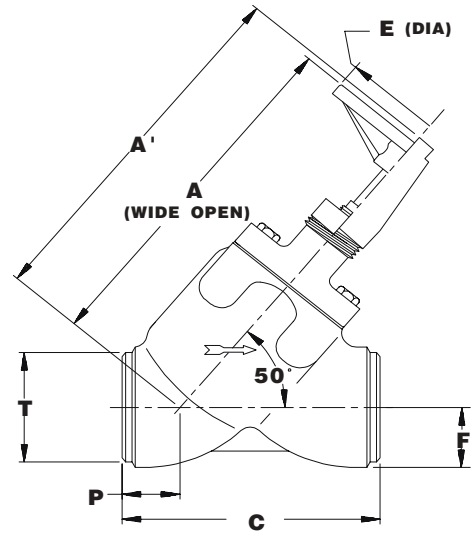
FLOW COEFFICIENTS

SIZE		ANGLE				GLOBE			
		Cv	Kv	EQUIVALENT LENGTH FEET	EQUIVALENT LENGTH METERS	Cv	Kv	EQUIVALENT LENGTH FEET	EQUIVALENT LENGTH METERS
2"	(50 MM)	80	69	28	8.5	67	58	40	12.2
2½"	(65 MM)	176	152	14	4.3	163	141	16	4.9
3"	(80 MM)	205	177	31	9.5	195	169	34	10.4
4"	(100 MM)	320	277	51	15.6	290	251	62	18.9
5"	(125 MM)	600	519	45	13.7	575	497	49	14.9
6"	(150 MM)	820	709	61	18.6	790	683	66	20.1
8"	(200 MM)	1435	1241	84	25.6	1380	1194	91	27.7
10"	(250 MM)	2450	2121	93	28.4	2350	2035	101	30.8
12"	(300 MM)	3400	2944	117	35.7	3270	2731	126	38.4
14"	(350 MM)	4600	3983	143	43.6	4350	3766	156	47.6

GLOBE INSTALLATION DIMENSIONS 2" THROUGH 8" (50 MM THROUGH 200 MM)

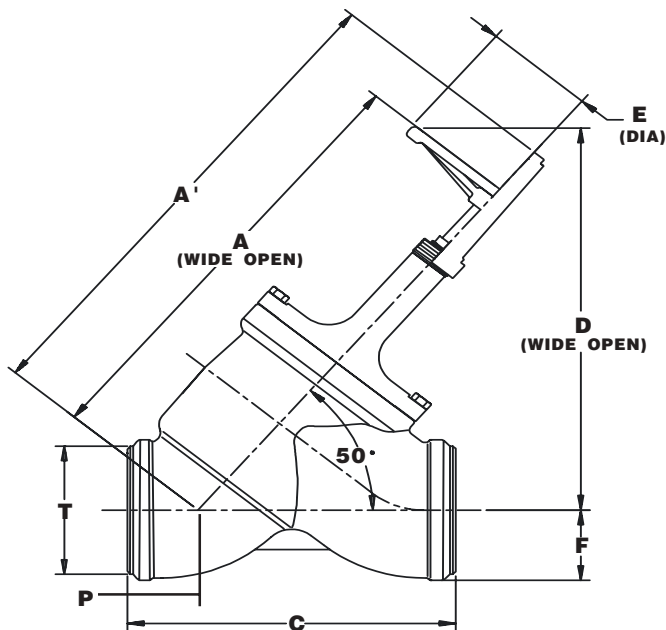


**2", 2½", AND 3"
(50 MM, 65 MM, AND 80 MM)**



**4", 5", 6", AND 8"
(100 MM, 125 MM, 150 MM, AND 200 MM)**

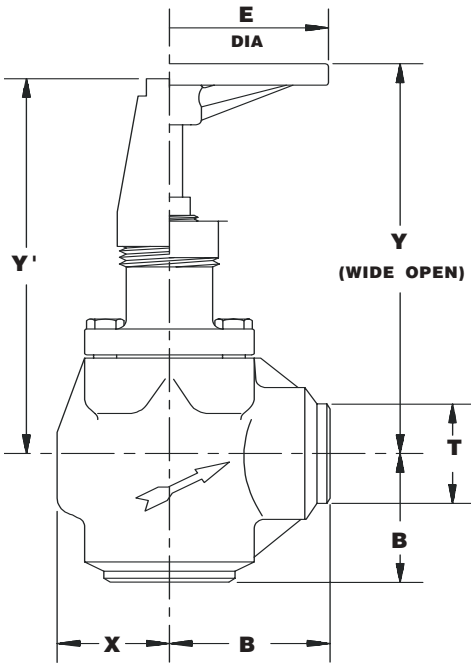
SIZE	A	A'	C	E	F	P	T
2" (50 mm)	8.88" (225 mm)	9.13" (232 mm)	7.25" (184 mm)	4.25" (108 mm)	2.13" (54 mm)	--	2.38" (60 mm)
2½" (65 mm)	12.13" (308 mm)	11.75" (298 mm)	9.25" (235 mm)	7.63" (194 mm)	2.75" (70 mm)	--	2.88" (73 mm)
3" (80 mm)	12.13" (308 mm)	11.75" (298 mm)	9.25" (235 mm)	7.63" (194 mm)	2.75" (70 mm)	--	3.50" (89 mm)
4" (100 mm)	13.75" (349 mm)	14.25" (362 mm)	10.00" (254 mm)	14.00" (356 mm)	2.50" (64 mm)	2.50" (64 mm)	4.50" (114 mm)
5" (125mm)	21.38" (543mm)	21.63" (549mm)	11.65" (396 mm)	10.00" (254 mm)	3.00" (76mm)	2.65" (67 mm)	5.56" (141 mm)
6" (150mm)	22.10" (561 mm)	22.15" (563 mm)	13.26" (337 mm)	10.00" 254 mm)	3.50" (89 mm)	2.73" (69 mm)	6.63" (168 mm)
8" (200mm)	29.10" (739 mm)	29.51" (750mm)	18.10" (459 mm)	16.00" (406mm)	4.61" (117 mm)	3.98" (101 mm)	8.63" (219 mm)



**GLOBE INSTALLATION
DIMENSIONS
10", 12", AND 14"
(250 MM, 300 MM, AND 350 MM)**

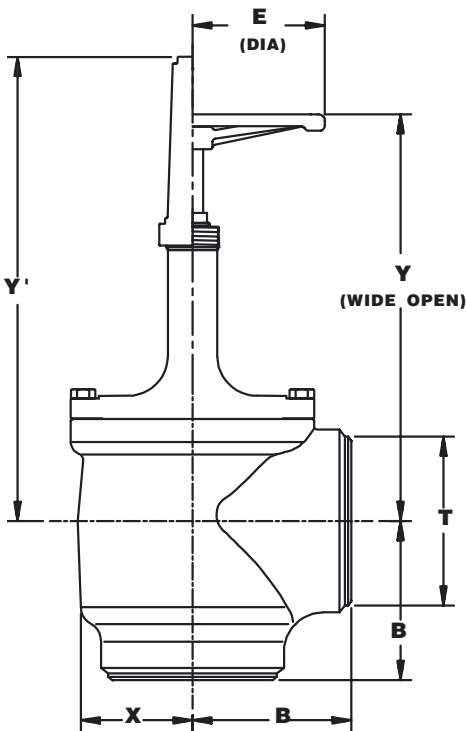
SIZE	A	A'	C	D	E	F	P	T
10" (250mm)	35.29" (896 mm)	36.16" (918 mm)	23.38" (594 mm)	33.24" (844 mm)	16.00" (406 mm)	5.81" (148 mm)	5.19" (132 mm)	10.75" (273 mm)
12" (300mm)	42.16" (1071 mm)	46.39" (1178 mm)	29.20" (742 mm)	38.51" (978 mm)	20.00" (508 mm)	7.00" (178 mm)	6.27" (159 mm)	12.75" (324 mm)
14" (350mm)	47.55" (1208 mm)	49.66" (1261 mm)	32.86" (835 mm)	47.55" (1208 mm)	20.00" (508 mm)	7.63" (194 mm)	7.23" (184 mm)	14.00" (356 mm)

**ANGLE INSTALLATION DIMENSIONS
2" THROUGH 8" (50 MM THROUGH 200 MM)**



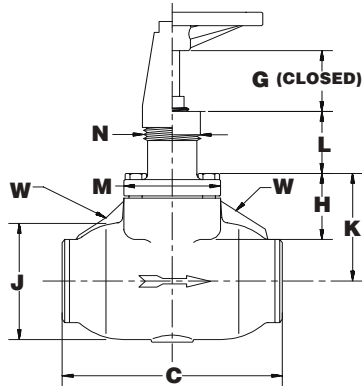
SIZE	B	E	T	X	Y	Y'
2" (50 mm)	3.38" (86 mm)	4.25" (108 mm)	2.38" (60 mm)	1.88" (48 mm)	7.75" (197 mm)	8.00" (203 mm)
2½" (65 mm)	3.38" (86 mm)	7.63" (194 mm)	2.88" (73 mm)	2.38" (60 mm)	11.00" (280 mm)	10.63" (270 mm)
3" (80 mm)	3.38" (86 mm)	7.63" (194 mm)	3.50" (89 mm)	2.38" (60 mm)	11.00" (280 mm)	10.63" (270 mm)
4" (100 mm)	3.88" (98 mm)	7.63" (194 mm)	4.50" (114 mm)	3.00" (76 mm)	11.00" (280 mm)	10.63" (270 mm)
5" (125 mm)	4.47" (131 mm)	10.00" (254 mm)	5.56" (141 mm)	3.47" (88 mm)	16.42" (417 mm)	16.62" (422 mm)
6" (150 mm)	5.15" (131 mm)	10.00" (254 mm)	6.63" (168 mm)	3.85" (98 mm)	16.55" (420 mm)	16.78" (426 mm)
8" (200 mm)	6.90" (175 mm)	16.00" (406 mm)	8.63" (219 mm)	6.11" (155 mm)	22.12" (562 mm)	22.52" (572 mm)

**ANGLE INSTALLATION DIMENSIONS
10", 12", AND 14" (250 MM, 300 MM, AND 350 MM)**

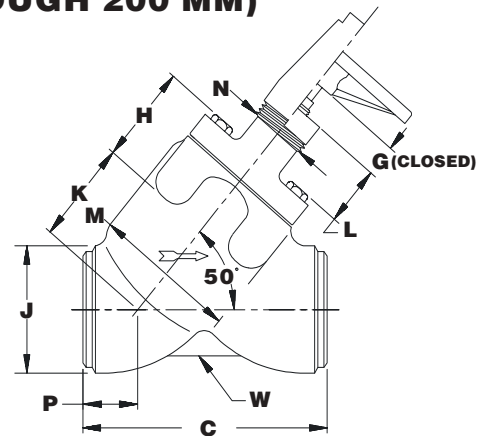


SIZE	B	E	T	X	Y	Y'
10" (250mm)	9.44" (240 mm)	16.00" (406 mm)	10.75" (273 mm)	6.63" (168 mm)	26.47" (672 mm)	27.34" (694 mm)
12" (300mm)	12.00" (305 mm)	20.00" (508 mm)	12.75" (324 mm)	8.66" (220 mm)	30.34" (783 mm)	33.86" (860 mm)
14" (350mm)	12.97" (329 mm)	20.00" (508 mm)	14.00" (356 mm)	9.20" (234 mm)	34.92" (887 mm)	36.91" (938 mm)

GLOBE INSULATION DIMENSIONS 2" THROUGH 8" (50 MM THROUGH 200 MM)



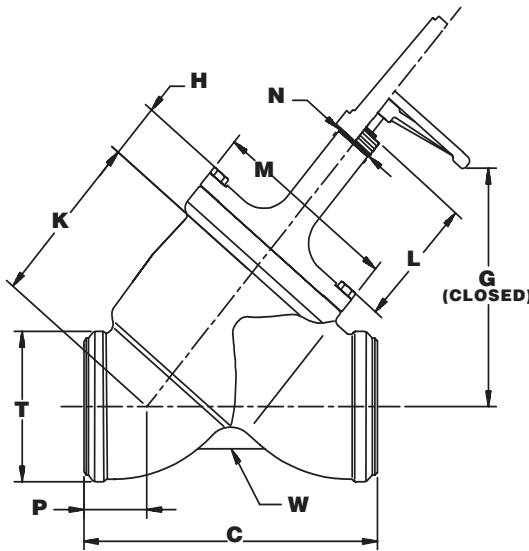
**2", 2½", AND 3"
(50 MM, 65 MM, AND 80 MM)**



**4", 5", 6", AND 8"
(100 MM, 125 MM, 150 MM, AND 200 MM)**

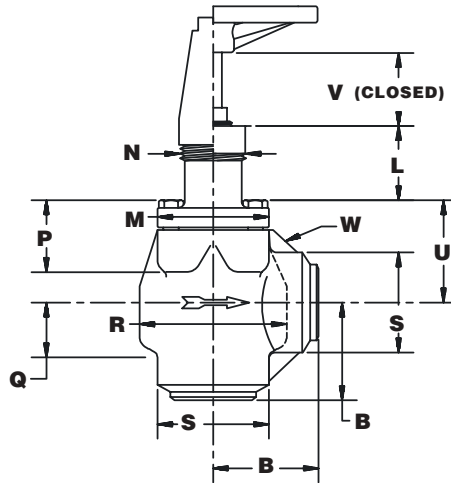
SIZE	C	G	H	J	K	L	M	N	P	W
2" (50 mm)	7.25" (184 mm)	1.38" (35 mm)	3.00" (76 mm)	4.00" (102 mm)	4.38" (111 mm)	1.63" (41 mm)	3.50" (89 mm)	1.25" (38 mm)	--	1.00" (25 mm)
2½" (65 mm)	9.25" (235 mm)	1.88" (48 mm)	3.00" (76 mm)	5.38" (137 mm)	5.00" (127 mm)	2.75" (70 mm)	4.00" (102 mm)	2.25" (57 mm)	--	1.75" (45 mm)
3" (80 mm)	9.25" (235 mm)	1.88" (48 mm)	3.00" (76 mm)	5.38" (137 mm)	5.00" (127 mm)	2.75" (70 mm)	4.00" (102 mm)	2.25" (57 mm)	--	1.75" (45 mm)
4" (100 mm)	10.00" (254 mm)	7.50" (191 mm)	4.00" (102 mm)	5.00" (127 mm)	1.25" (32 mm)	2.25" (57 mm)	5.75" SQ. (146 mm)	2.25" (57 mm)	2.50" (64 mm)	1.75" (45 mm)
5" (125 mm)	11.65" (296 mm)	1.73" (44 mm)	3.73" (95 mm)	5.94" (151 mm)	5.32" (135 mm)	4.75" (121 mm)	6.81" (173 mm)	2.75" (70 mm)	2.65" (67 mm)	1.60" (41 mm)
6" (150 mm)	13.26" (337 mm)	1.00" (25 mm)	2.80" (71 mm)	7.00" (178 mm)	6.69" (170 mm)	4.38" (111 mm)	7.75" (197 mm)	2.75" (70 mm)	2.73" (69 mm)	2.10" (53 mm)
8" (200 mm)	18.10" (459 mm)	1.17" (30 mm)	4.24" (108 mm)	9.22" (234 mm)	10.53" (267 mm)	5.59" (142 mm)	11.75" (298 mm)	3.00" (76 mm)	3.98" (101 mm)	4.00" (102 mm)

GLOBE INSULATION DIMENSIONS 10", 12", AND 14" (250 MM, 300 MM, AND 350 MM)



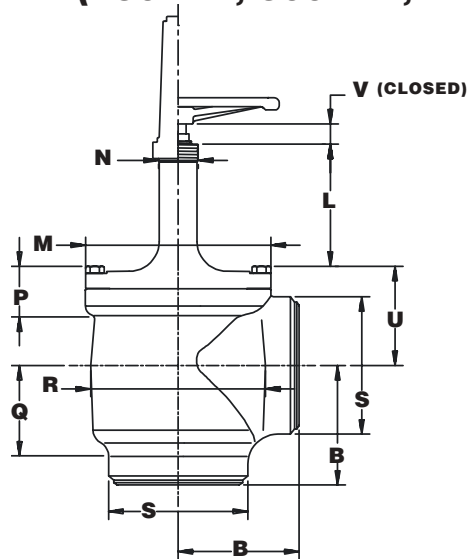
SIZE	C	G	H	J	K	L	M	N	P	W
10" (250mm)	23.38" (594 mm)	16.79" (427 mm)	3.59" (91 mm)	11.60" (295 mm)	12.02" (305 mm)	10.00" (254 mm)	14.50" (368 mm)	3.00" (76 mm)	5.19" (132 mm)	1.00" (25 mm)
12" (300 mm)	29.20" (742 mm)	21.45" (545 mm)	4.91" (125 mm)	14.00" (356 mm)	16.29" (414 mm)	12.40" (315 mm)	18.37" (467 mm)	4.00" (102 mm)	6.27" (159 mm)	1.00" (25 mm)
14" (350 mm)	32.86" (835 mm)	24.94" (634 mm)	5.76" (146 mm)	15.25" (387 mm)	17.80" (452 mm)	13.35" (339 mm)	19.00" (483 mm)	4.00" (102 mm)	7.23" (184 mm)	1.00" (25 mm)

ANGLE INSULATION DIMENSIONS 2" THROUGH 8" (50 MM THROUGH 200 MM)



SIZE	B	L	M	N	P	Q	R	S	U	V	W
2" (50 mm)	3.38" (86 mm)	1.63" (41 mm)	3.50" (89 mm)	1.25" (38 mm)	--	1.50" (38 mm)	3.75" (95 mm)	3.00" (76 mm)	3.13" (79 mm)	1.25" (32 mm)	1.00" (25 mm)
2 1/2" (65 mm)	3.38" (86 mm)	2.75" (70 mm)	4.00" (102 mm)	2.25" (57 mm)	2.88" (73 mm)	2.00" (51 mm)	4.75" (121 mm)	3.75" (95 mm)	4.00" (102 mm)	1.13" (29 mm)	1.75" (45 mm)
3" (80 mm)	3.38" (86 mm)	2.75" (70 mm)	4.00" (102 mm)	2.25" (57 mm)	2.88" (73 mm)	2.00" (51 mm)	4.75" (121 mm)	3.75" (95 mm)	4.00" (102 mm)	1.13" (29 mm)	1.75" (45 mm)
4" (100 mm)	3.88" (98 mm)	2.25" (57 mm)	5.50" (140 mm)	2.25" (57 mm)	3.00" (76 mm)	2.63" (67 mm)	6.00" (152 mm)	4.75" (121 mm)	4.25" (108 mm)	1.13" (29 mm)	--
5" (125 mm)	4.47" (114 mm)	4.75" (121 mm)	6.75" (171 mm)	2.75" (70 mm)	3.73" (95 mm)	3.46" (88 mm)	6.81" (173 mm)	5.92" (150 mm)	4.65" (118 mm)	1.75" (44 mm)	--
6" (150 mm)	5.15" (131 mm)	4.38" (111 mm)	9.88" (251 mm)	2.75" (70 mm)	2.80" (71 mm)	3.98" (99 mm)	7.75" (197 mm)	7.0" (178 mm)	5.19" (132 mm)	1.00" (25 mm)	--
8" (200 mm)	6.90" (175 mm)	5.59" (142 mm)	12.22" (310 mm)	3.00" (76 mm)	4.24" (108 mm)	6.90" (175 mm)	12.22" (310 mm)	9.15" (232 mm)	7.78" (198 mm)	1.17" (30 mm)	--

ANGLE INSULATION DIMENSIONS 10", 12", AND 14" (250 MM, 300 MM, AND 350 MM)



SIZE	B	L	M	N	P	Q	R	S	U	V
10" (250mm)	9.44" (240 mm)	10.00" (254 mm)	14.50" (368 mm)	3.00" (76 mm)	3.59" (91 mm)	4.30" (109 mm)	13.25" (337 mm)	11.60" (295 mm)	8.20" (208 mm)	1.69" (43 mm)
12" (300mm)	12.00" (305 mm)	12.40" (315 mm)	18.37" (467 mm)	4.00" (102 mm)	4.91" (125 mm)	9.07" (230 mm)	17.33" (440 mm)	13.79" (350 mm)	9.81" (249 mm)	1.31" (33 mm)
14" (350mm)	12.97" (329 mm)	13.33" (339 mm)	19.00" (483 mm)	4.00" (102 mm)	5.76" (146 mm)	11.38" (289 mm)	18.40" (467 mm)	15.25" (387 mm)	10.69" (272 mm)	2.64" (67 mm)

SERVICE AND MAINTENANCE

Hansen steel butt welding shut-off valves require practically no service or maintenance due to the combination of polished stainless steel stems and reliable O-ring stem seals plus graphite composite packing. This almost entirely eliminates stem leakage, the common ailment of shut-off valves.

To help ensure safety, verify the tightness of the packing nut whenever the position (open or closed) is changed on isolation shut-off valves before opening the system. Ensuring that the packing nut is tight helps reduce the possibility that any line or system vibration may cause a slight unseating of a closed valve.

STEM PACKING

When verifying the tightness of the packing nut, use an adjustable wrench. Extrusion of some black graphite packing material along the stem is normal. If the O-ring or the adjustable packing ever needs replacement as evidenced by refrigerant or oil leakage at the stem, open the valve stem firmly to the back-seat position. This separates the O-ring and packing from the system refrigerant. See the CAUTION section. Remove the packing nut carefully and then use a wire hook or a small blade screwdriver to remove the packing and O-ring. Take care not to scratch the stem or bonnet sealing surfaces. Carefully install a backup washer, new lubricated stem O-ring, stem washer, and stem packing. Tighten the packing nut only enough to give the handwheel slight turning friction.

VALVE SEAT

To inspect or replace the valve seat disc, isolate the valve from the system and safely pump out all refrigerant to zero pressure with the stem open at least one turn. Evenly loosen all bolts one to two turns. Using a screwdriver, break the seal between the bonnet and valve body, proceeding cautiously to avoid any refrigerant which may still remain inside the valve body. Remove the bonnet bolts and bonnet assembly, being careful not to damage the Teflon seat disc surface.

If the seat surface in the body is marred, it may be possible to repair the seat by polishing with emery paper.

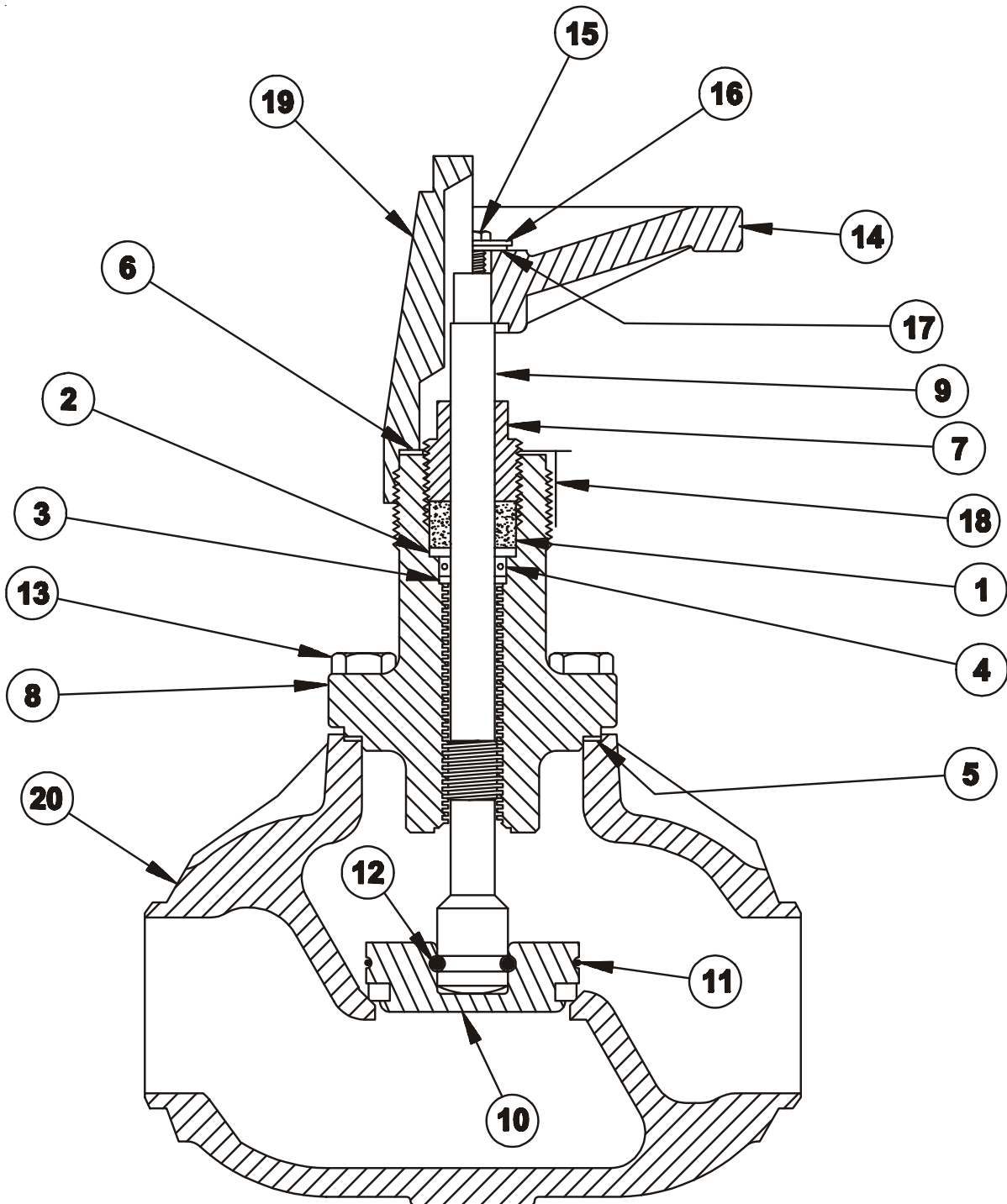
If the Teflon seat disc is damaged, replace the entire disc assembly 2" thru 4" by first removing the ball retainer spring and ball bearings. Install a new disc assembly. Alternately, use a lathe to take a $\frac{1}{64}$ " (0.4 mm) by 45° surface cut on the Teflon seat.

The 5" thru 14" Teflon seats can be replaced by disassembling the disk holder by loosening and removing the disk screws. Replace Teflon ring and reassemble disk.

Replace body gasket or o-ring and reassemble bonnet into body using care not to damage Teflon seat surface. Ensure the stem is opened at least several turns.

The bonnet cap screws on the 2" (50 mm) require a torque of 40 ft.-lbs (55Nm); 2 1/2" and 3" (65mm and 80mm) require valves require a torque of 60 ft-lbs (82 Nm); 180 ft-lbs (245 Nm) on the 4" (100 mm) valves, 200 ft-lbs (270 Nm) on the 5", 6", 8", 10", 12" and 14" valves. Test the valve for leaks before returning it to service.

**2" THROUGH 4" (50 MM THROUGH 100 MM)
BUTT WELD VALVE**



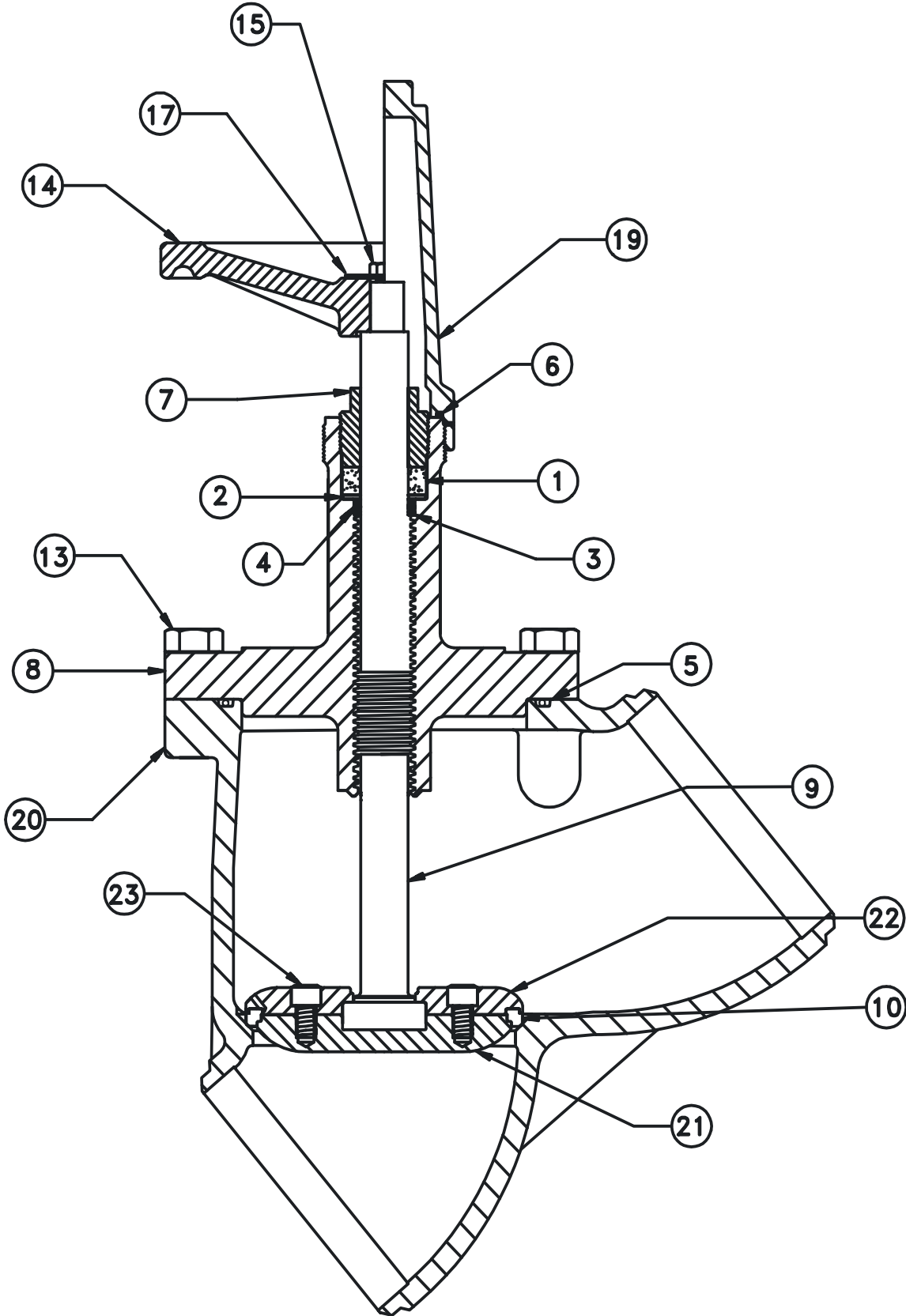
2" THROUGH 4" (50 MM THROUGH 100 MM) BUTT WELD VALVE

REPLACEMENT PARTS

ITEM	DESCRIPTION	QTY.	PART NO.
	Gasket Kit 2" (50 mm)		50-1023
	Gasket Kit 2 1/2", 3" (65 mm, 80 mm)		50-1043
	Gasket Kit 4" (100 mm)		50-1065
	Above kits consist of:		
1a	Stem Packing 2"	1	50-0248
1b	Stem Packing 2 1/2", 3", 4" (65 mm, 80 mm, 100 mm)	1	50-0290
2a	Stem Washer 2" (50 mm)	1	50-0247
2b	Stem Washer 2 1/2", 3", 4" (65 mm, 80 mm, 100 mm)	1	50-0299
3a	Back-Up Washer 2" (50 mm)	1	50-0351
3b	Back-Up Washer 2 1/2", 3", 4" (65 mm, 80 mm, 100 mm)	1	50-0324
4a	Stem O-Ring 2" (50 mm)	1	50-0253
4b	Stem O-Ring 2 1/2", 3", 4" (65 mm, 80 mm, 100 mm)	1	50-0293
5a	Bonnet Gasket 2" (50 mm)	1	50-0259
5b	Bonnet Gasket 2 1/2", 3" (65 mm, 80 mm)	1	50-0310
5c	Bonnet Gasket 4" (100 mm)	1	50-0537
6a	Seal Cap Gasket 2" (50 mm)	1	50-0270
6b	Seal Cap Gasket 2 1/2", 3", 4" (65 mm, 80 mm, 100 mm)	1	50-0315
7a	Packing Nut 2" (50 mm)	1	50-0251
7b	Packing Nut 2 1/2", 3", 4" (65 mm, 80 mm, 100 mm)	1	50-0292
	Bonnet Ass'y Kit 2" (50 mm)		50-1024
	Bonnet Ass'y Kit 2 1/2", 3" (65 mm, 80 mm)		50-1044
	Bonnet Ass'y Kit 4" (100 mm)		50-1066
	Above kits consist of:		
8a	Bonnet 2" (50 mm)	1	50-0239
8b	Bonnet 2 1/2", 3" (65 mm, 80 mm)	1	50-0286
8c	Bonnet 4" (100 mm)	1	50-0515
9a	Stem 2" (50 mm)	1	50-0242
9b	Stem 2 1/2", 3", 4" (65 mm, 80 mm, 100 mm)	1	50-0287
10a	Disc Assembly 2" (50 mm)	1	50-0363
10b	Disc Assembly 2 1/2", 3" (65 mm, 80 mm)	1	50-0374
10c	Disc Assembly 4" (100 mm)	1	50-0524
11a	Ball Retainer 2" (50 mm)	1	50-0257
11b	Ball Retainer 2 1/2", 3", 4" (65 mm, 80 mm, 100 mm)	1	50-0297
12a	Balls 2" (50 mm)	16	50-0016
12b	Balls 2 1/2", 3", 4" (65 mm, 80 mm, 100 mm)	15	50-0305
13a	Bonnet Bolts 2" (50 mm)	4	50-0473
13b	Bonnet Bolts 2 1/2", 3" (65 mm, 80 mm)	4	50-0294
13c	Bonnet Bolts 4" (100 mm)	4	50-0521
	Gasket Kit 2" (50 mm)	1	50-1023
	Gasket Kit 2 1/2", 3" (65, 80 mm)	1	50-1043
	Gasket Kit 4" (100 mm)	1	50-1065

ITEM	DESCRIPTION	QTY.	PART NO.
	Disc Assembly Kit 2" (50 mm)		50-1025
	Disc Assembly Kit 2 1/2", 3" (65 mm, 80 mm)		50-1045
	Disc Assembly Kit 4" (100 mm)		50-1067
	Above kits consist of:		
10a	Disc Assembly 2" (50 mm)	1	50-0363
10b	Disc Assembly 2 1/2", 3" (65 mm, 80 mm)	1	50-0374
10c	Disc Assembly 4" (100 mm)	1	50-0524
11a	Ball Retainer 2" (50 mm)	1	50-0257
11b	Ball Retainer 2 1/2", 3", 4" (65 mm, 80 mm, 100 mm)	1	50-0297
12a	Balls 2" (50 mm)	16	50-0016
12b	Balls 2 1/2", 3", 4" (65, 80, 100 mm)	15	50-0305
5a	Bonnet Gasket 2" (50 mm)	1	50-0259
5b	Bonnet Gasket 2 1/2", 3" (65 mm, 80 mm)	1	50-0310
5c	Bonnet Gasket 4" (100 mm)	1	50-0537
	Handwheel Kit 2" (50 mm)		50-1026
	Handwheel Kit 2 1/2", 3", 4" (65 mm, 80 mm, 100 mm)		50-1037
	Above kits consist of:		
14a	Handwheel 2" (50 mm)	1	50-0321
14b	Handwheel 2 1/2", 3", 4" (65 mm, 80 mm, 100 mm)	1	50-0319
15a	Screw 2" (50 mm)	1	50-0254
15b	Screw 2 1/2", 3", 4" (65 mm, 80 mm, 100 mm)	1	50-0295
16a	Nameplate 2" (50 mm)	1	50-0094
16b	Nameplate 2 1/2", 3", 4" (65 mm, 80 mm, 100 mm)	1	50-0318
17	Support Washer 2 1/2", 3", 4" (65 mm, 80 mm, 100 mm)	1	50-0480
18	Bonnet Thread Cap 2" (50 mm)	1	50-0263
	Seal Cap Kit 2" (50 mm)		50-1027
	Seal Cap Kit 2 1/2", 3", 4" (65 mm, 80 mm, 100 mm)		50-1038
	Above kits consist of:		
19a	Seal Cap 2" (50 mm)	1	50-0260
19b	Seal Cap 2 1/2", 3", 4" (65 mm, 80 mm, 100 mm)	1	50-0304
6a	Seal Cap Gasket 2" (50 mm)	1	50-0270
6b	Seal Cap Gasket 2 1/2", 3", 4" (65 mm, 80 mm, 100 mm)	1	50-0315
20a	Body, Globe, 2" (50 mm) BW	1	50-0391
20b	Body, Globe, 2 1/2" (65 mm) BW	1	50-0454
20c	Body, Globe, 3" (80 mm) BW	1	50-0455
20d	Body, Globe, 4" (100 mm) BW	1	50-0671
20e	Body, Angle, 2" (50 mm) BW	1	50-0354
20f	Body, Angle, 2 1/2" (65 mm) BW	1	50-0285
20g	Body, Angle, 3" (80 mm) BW	1	50-0289
20h	Body, Angle, 4" (100 mm) BW	1	50-0516

**5", 6", AND 8" (125 MM, 150 MM, AND 200 MM)
BUTT WELD VALVE**



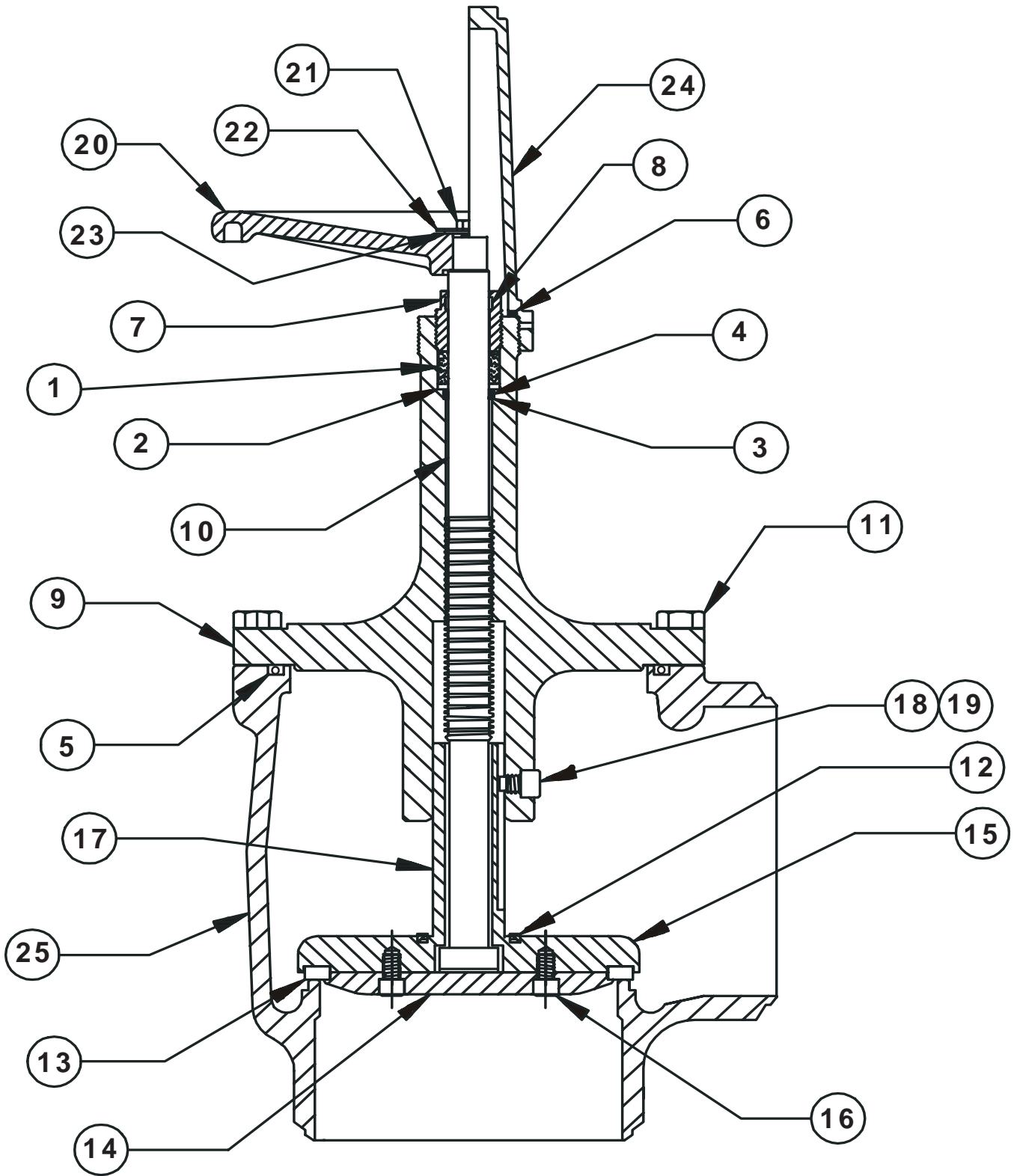
5", 6", AND 8" (125 MM, 150 MM, AND 200 MM) BUTT WELD VALVE

REPLACEMENT PARTS

ITEM	DESCRIPTION	QTY.	PART NO.
	Gasket Kit 5" (125 mm)		50-1082
	Gasket Kit 6" (150 mm)		50-1083
	Gasket Kit 8" (200 mm)		20-1084
	Above kits consist of:		
1a	Stem Packing 5", 6"	1	50-0703
1b	Stem Packing 8"	1	50-0745
2a	Stem Washer 5", 6"	1	50-0705
2b	Stem Washer 8"	1	50-0747
3a	Back-Up Washer 5", 6"	1	50-0706
3b	Back-Up Washer 8"	1	50-0748
4a	Stem O-Ring 5", 6"	1	50-0707
4b	Stem O-Ring 8"	1	50-0749
5a	Bonnet O-Ring 5"	1	50-0708
5b	Bonnet O-Ring 6"	1	50-0709
5b	Bonnet O-Ring 8"	1	50-0750
6a	Seal Cap O-Ring 5", 6"	1	50-0730
6b	Seal Cap O-Ring 8"	1	50-0761
7a	Packing Nut 5", 6"	1	50-0704
7b	Packing Nut 8"	1	50-0746
	Bonnet Ass'y Kit 5" (125 mm)		50-1080
	Bonnet Ass'y Kit 6" (150 mm)		50-1081
	Bonnet Ass'y Kit 8" (200 mm)		50-1085
	Above kit consists of:		
9a	Bonnet 5"	1	50-0675
9b	Bonnet 6"	1	50-0682
9c	Bonnet 8"	1	50-0699
10a	Stem Assembly 5", 6"	1	50-0734
10b	Stem Assembly 8"	1	50-1093
11a	Bonnet Bolts 5"	4	50-0521
11b	Bonnet Bolts 6"	6	50-0521
11c	Bonnet Bolts 8"	8	50-0959
	Gasket Kit 5" (125 mm)	1	50-1082
	Gasket Kit 6" (150 mm)	1	50-1083
	Gasket Kit 8" (200 mm)	1	20-1084
	Disc Kit 5" (125 mm)	1	50-1086
	Disc Kit 6" (150 mm)	1	50-1087
	Disc Kit 8" (200 mm)	1	50-1088

ITEM	DESCRIPTION	QTY.	PART NO.
	Disc Kit 5" (125)		50-1086
	Disc Kit 6" (150)		50-1087
	Disc Kit 8" (200)		50-1088
	Above kits consist of:		
10a	Seat Disc 5"	1	50-0717
10b	Seat Disc 6"	1	50-0716
10c	Seat Disc 8"	1	50-0755
21a	Lower Disc Holder 5"	1	50-0713
21b	Lower Disc Holder 6"	1	50-0711
21c	Lower Disc Holder 8"	1	50-0752
22a	Upper Disc Holder 5"	1	50-0712
22b	Upper Disc Holder 6"	1	50-0710
22c	Upper Disc Holder 8"	1	50-0751
23a	Disc Holder Screw 5", 6"	4	50-0729
23b	Disc Holder Screw 8"	6	50-0760
5a	Bonnet O-Ring 5"	1	50-0708
5b	Bonnet O-Ring 6"	1	50-0709
5c	Bonnet O-Ring 8"	1	50-0750
	Handwheel Kit 5", 6" (125 mm, 150 mm)		50-1089
	Handwheel Kit 8" (200m)		50-1090
	Above kits consist of:		
14a	Handwheel 5", 6"	1	50-0727
14b	Handwheel 8"	1	50-2229
15a	Screw 5", 6"	1	50-0732
15b	Screw 8"	1	50-0763
17a	Nameplate 5", 6"	1	50-0728
17b	Nameplate 8"	1	50-0759
	Seal Cap Kit 5", 6" (125 mm, 150 mm)		50-1091
	Seal Cap Kit 8" (200 mm)		50-1092
	Above kits consist of:		
19a	Seal Cap 5", 6"	1	50-0715
19b	Seal Cap 8"	1	50-0754
6a	Seal Cap Gasket 5", 6"	1	50-0730
6b	Seal Cap Gasket 8"	1	50-0761
20a	Body, Globe, 5" Butt Weld	1	50-0677
20b	Body, Globe, 6" Butt Weld	1	50-0693
20c	Body, Globe, 8" Butt Weld	1	50-0812
20d	Body, Angle, 5" Butt Weld	1	50-0673
20e	Body, Angle, 6" Butt Weld	1	50-0680
20f	Body, Angle, 8" Butt Weld	1	50-0695

**10", 12', AND 14" (250 MM, 300 MM, AND 350 MM)
BUTT WELD VALVE**



10", 12', AND 14" (250 MM, 300 MM, AND 350 MM) BUTT WELD VALVE REPLACEMENT PARTS

ITEM	DESCRIPTION	QTY.	PART NO.
	Gasket Kit 10" (250 mm)		50-1122
	Gasket Kit 12" (300 mm)		50-1123
	Gasket Kit 14" (350 mm)		20-1124
	Above kits consist of:		
1a	Stem Packing 10"	1	50-2309
1b	Stem Packing 12"	1	50-2310
1c	Stem Packing 14"	1	50-2311
2a	Packing Washer 10"	1	50-2278
2b	Packing Washer 12"	1	50-2215
2c	Packing Washer 14"	1	50-2254
3a	Back-Up Washer 10"	1	50-2217
3b	Back-Up Washer 12"	1	50-2216
3c	Back-Up Washer 14"	1	50-2253
4a	Stem O-Ring 10"	1	50-2224
4b	Stem O-Ring 12"	1	50-2264
4c	Stem O-Ring 14"	1	50-2245
5a	Bonnet O-Ring 10"	1	50-2223
5b	Bonnet O-Ring 12"	1	50-2260
5c	Bonnet O-Ring 14"	1	50-2243
6a	Seal Cap O-Ring 10"	1	50-0761
6b	Seal Cap O-Ring 12", 14"	1	50-2259
7a	Packing Nut 10"	1	50-2149
7b	Packing Nut 12"	1	50-2218
7c	Packing Nut 14"	1	50-2144
8a	Bushing, Stem Guide 10"	1	50-2179
8b	Bushing, Stem Guide 12"	1	50-2274
8c	Bushing, Stem Guide 14"	1	50-2161
	Bonnet Ass'y Kit 10" (254 mm)		50-1125
	Bonnet Ass'y Kit 12" (254 mm)		50-1126
	Bonnet Ass'y Kit 14" (254 mm)		50-1127
	Above kit consists of:		
9a	Bonnet 10"	1	50-2306
9b	Bonnet 12"	1	50-2307
9c	Bonnet 14"	1	50-2308
10a	Stem Assembly 10"	1	50-2303
10b	Stem Assembly 12"	1	50-2304
10c	Stem Assembly 14"	1	50-2305
11a	Bonnet Screw 10"	8	50-2235
11b	Bonnet Screw 12"	12	50-2250
11c	Bonnet Screw 14"	16	50-2250
	Disk Kit 10"	1	50-1128
	Disk Kit 12"	1	50-1129
	Disk Kit 14"	1	50-1130
	Gasket Kit 10" (254 mm)	1	50-1122
	Gasket Kit 12" (305 mm)	1	50-1123
	Gasket Kit 14" (356 mm)	1	50-1124

ITEM	DESCRIPTION	QTY.	PART NO.
	Disk Kit 10" (254 mm)		50-1128
	Disk Kit 12" (305 mm)		50-1129
	Disk Kit 14" (356 mm)		50-1130
	Above kits consist of:		
12a	Ring, Teflon Back Seat 10"	1	50-2233
12b	Ring, Teflon Back Seat 12"	1	50-2213
12c	Ring, Teflon Back Seat 14"	1	50-2248
13a	Ring, Teflon Main Seat 10"	1	50-2234
13b	Ring, Teflon Main Seat 12"	1	50-2212
13c	Ring, Teflon Main Seat 14"	1	50-2249
14a	Lower Disk Holder 10"	1	50-2153
14b	Lower Disk Holder 12"	1	50-2211
14c	Lower Disk Holder 14"	1	50-2145
15a	Upper Disk Holder 10"	1	50-2154
15b	Upper Disk Holder 12"	1	50-2210
15c	Upper Disk Holder 14"	1	50-2146
16a	Disk Screw 10", 12"	8	50-2236
16b	Disk Screw 14"	8	50-2251
17a	Guide Tube 10"	1	50-2155
17b	Guide Tube 12"	1	50-2209
17c	Guide Tube 14"	1	50-2143
18a	Screw Guide 10", 12"	1	50-2237
18b	Screw Guide 14"	1	50-2252
19	Washer, Screw Guide 10", 12", 14"	1	50-2238
5a	Bonnet O-Ring 10"	1	50-2223
5b	Bonnet O-Ring 12"	1	50-2260
5c	Bonnet O-Ring 14"	1	50-2243
	Handwheel Kit 10" (254 mm)		50-1131
	Handwheel Kit 12", 14" (305 mm, 356 mm)		50-1132
	Above kits consist of:		
20a	Handweheel 10"	1	50-2229
20b	Handweheel 12", 14"	1	50-2242
21	Screw 10", 12", 14"	1	50-0763
22	Nameplate 10", 12", 14"	1	50-0759
23	Flat Washer 10", 12", 14"	1	50-0764
	Seal Cap Kit 10" (254 mm)		50-1133
	Seal Cap Kit 12", 14" (305 mm, 356 mm)		50-1134
	Above kits consist of:		
24a	Seal Cap 10"	1	50-0754
24b	Seal Cap 12", 14"	1	50-2258
6a	Sea Cap O-Ring 10"	1	50-0761
6b	Sea Cap O-Ring 12", 14"	1	50-2259
25a	Body, Angle 10"	1	50-2177
25b	Body, Globe 10"	1	50-2197
25c	Body, Angle 12"	1	50-2186
25d	Body, Globe 12"	1	50-2199
25e	Body, Angle 14"	1	50-2148
25f	Body, Globe 14"	1	50-2195

ORDERING INFORMATION, BUTT WELD VALVES

SIZE	DESCRIPTION	CAT. NO.
2" (50 mm)	Globe, Handwheel	GW200H
	Angle, Handwheel	AW200H
	Globe, Seal Cap	GW200C
	Angle, Seal Cap	AW200C
2½" (65 mm)	Globe, Handwheel	GW251H
	Angle, Handwheel	AW251H
	Globe, Seal Cap	GW251C
	Angle, Seal Cap	AW251C
3" (80 mm)	Globe, Handwheel	GW301H
	Angle, Handwheel	AW301H
	Globe, Seal Cap	GW301C
	Angle, Seal Cap	AW301C
4" (100 mm)	Globe, Handwheel	GW402H
	Angle, Handwheel	AW402H
	Globe, Seal Cap	GW402C
	Angle, Seal Cap	AW402C
5" (125 mm)	Globe, Handwheel	GW500H
	Angle, Handwheel	AW500H
	Globe, Seal Cap	GW500C
	Angle, Seal Cap	AW500C
6" (150 mm)	Globe, Handwheel	GW600H
	Angle, Handwheel	AW600H
	Globe, Seal Cap	GW600C
	Angle, Seal Cap	AW600C
8" (200 mm)	Globe, Handwheel	GW800H
	Angle, Handwheel	AW800H
	Globe, Seal Cap	GW800C
	Angle, Seal Cap	AW800C
10" (250 mm)	Globe, Handwheel	GW1000H
	Angle, Handwheel	AW1000H
	Globe, Seal Cap	GW1000C
	Angle, Seal Cap	AW1000C
12" (300 mm)	Globe, Handwheel	GW1200H
	Angle, Handwheel	AW1200H
	Globe, Seal Cap	GW1200C
	Angle, Seal Cap	AW1200C
14" (350 mm)	Globe, Handwheel	GW1400H
	Angle, Handwheel	AW1400H
	Globe, Seal Cap	GW1400C
	Angle, Seal Cap	AW1400C

TO ORDER: Specify the catalog number.

CAUTION

Hansen valves are for refrigeration systems only. Read these instructions completely before selecting, using, or servicing these valves. Only knowledgeable, trained refrigeration technicians should install, operate, or service these valves. Stated temperature and pressure limits should not be exceeded. Bonnets should not be removed from valves unless the system has been evacuated to zero pressure. See also Safety Precautions in the current List Price Schedule and the Safety Precautions Sheet supplied with the product.

WARRANTY

Hansen valves are guaranteed against defective materials or workmanship for one year F.O.B. our factory. No consequential damages or field labor is included.

TYPICAL SPECIFICATIONS

“Weldable refrigerant shut-off valves shall have stainless steel stems with dual seals, cast steel bodies, back-seating design for packing replacement, bonnet threads for installation of stem seal caps, butt weld ends machined dimensionally correct for Schedule 40 pipe (sizes 2"-10") size and gauge or Standard Weight pipe (sizes 12" and above), and suitability for a safe working pressure of 400 psig (27 bar), as manufactured by Hansen Technologies Corporation, or approved equal.”

HANSEN TECHNOLOGIES CORPORATION

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