

HARSHAD

SAFETY VALVE MANUFACTURER

SAFETY VALVE

ISO 9001 CERTIFIED COMPANY

SERIES # 077

CE 1128

DESIGN FEATURES

- SAFETY VALVE MANUFACTURED IN ACCORDANCE WITH REQUIREMENT OF ASME SECTION VIII DIVISION.1-PTC25, API 527, EN ISO 4126 PART 1, API 520, IS 12992, ASME 16.34
- DIRECT SPRING OPERATED, FULL LIFT, SMALL ORIFICE, SINGLE TRIM & HIGH PRESSURE DESIGN
- ADJUSTABLE BLOW DOWN RING FOR PERFECT POPPING AND BLOW DOWN ADJUSTMENT
- SUPERIOR SEAT TIGHTNESS. AVAILABLE IN FLAT METAL SEAT, RUBBER & TEFLON SEAT.
- STELLITE DISC & NOZZLE ARE OFFER
- AVAILABLE IN MIX END CONNECTION (THREAD END & FLANGE END)
- SPECIAL MATERIAL OFFERS LIKE MONEL, HASTE ALLOY, SUPER DUPLEX, INCONEL, ETC.
- MATERIAL COMPLIANCE TO NACE MR0175 ARE ALSO AVAILABLE.

TECHNICAL DATA : -

- SIZES : 1/2" X 1" TO 1" X 1.5" (ORIFICE "B" TO "F")
- END CONNECTION : THREAD END & FLANGE END
- SET PRESSURE RANGE : 1BARG TO 255BARG
- TEMPERATURE RANGE : -196°C TO 300°C
- APPLICATION : AIR, GAS, STEAM, LIQUID



REV.7 / 09.2024

HARSHAD ENGINEERING WORKS

WORK & OFFICE ADDRESS : -

S-120 TO S-125, VIVEKANAND
INDUSTRIAL ESTAE, NEAR RAKHIAL
CROSS ROAD, RAKHIAL,
AHMEDABAD - 380 023. GUJARAT,
INDIA.

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EMAIL

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WEB 1

: www.hewvalve.com

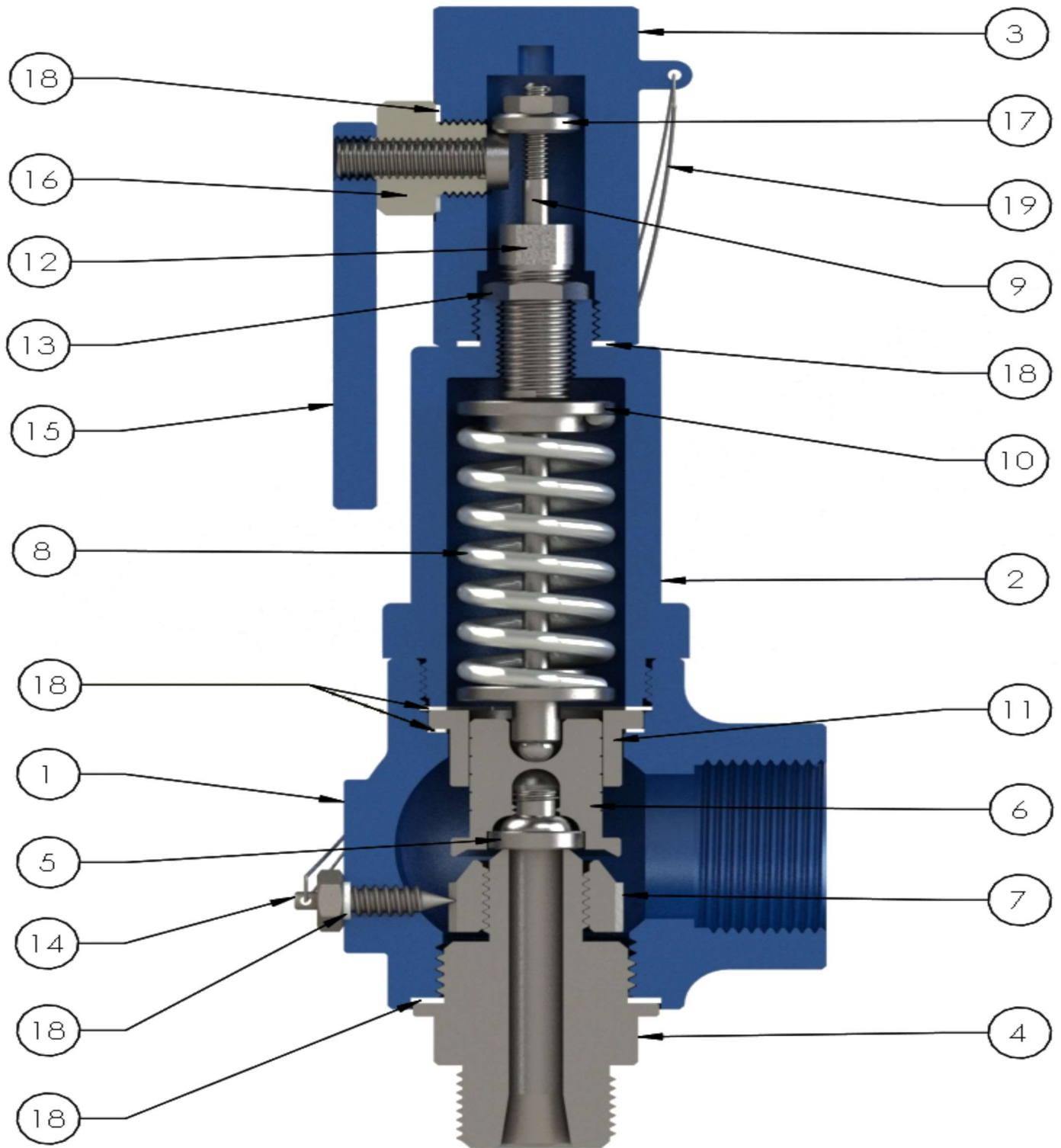
WEB 2

: www.hewsafetyvalves.com

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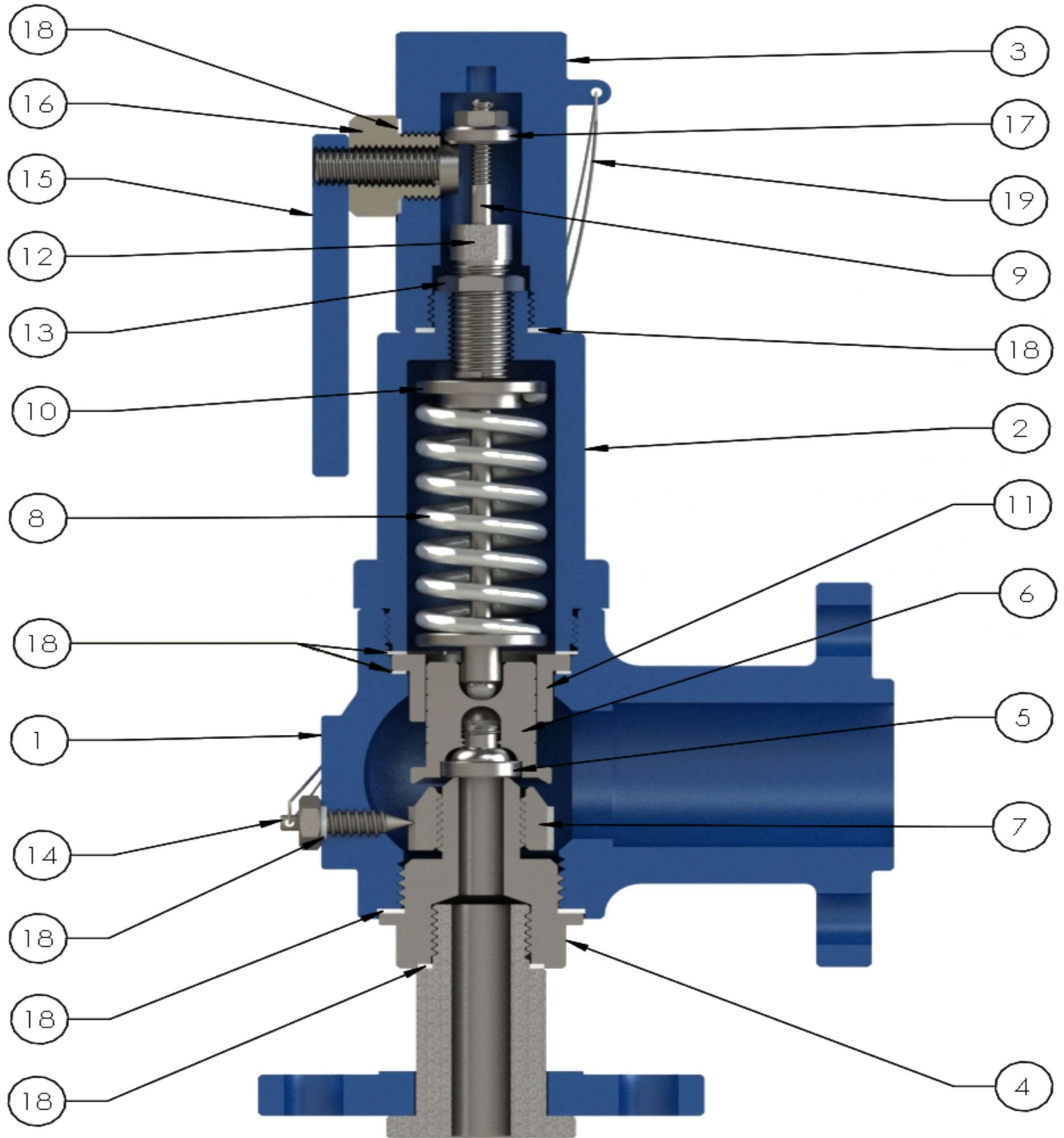
THREAD END

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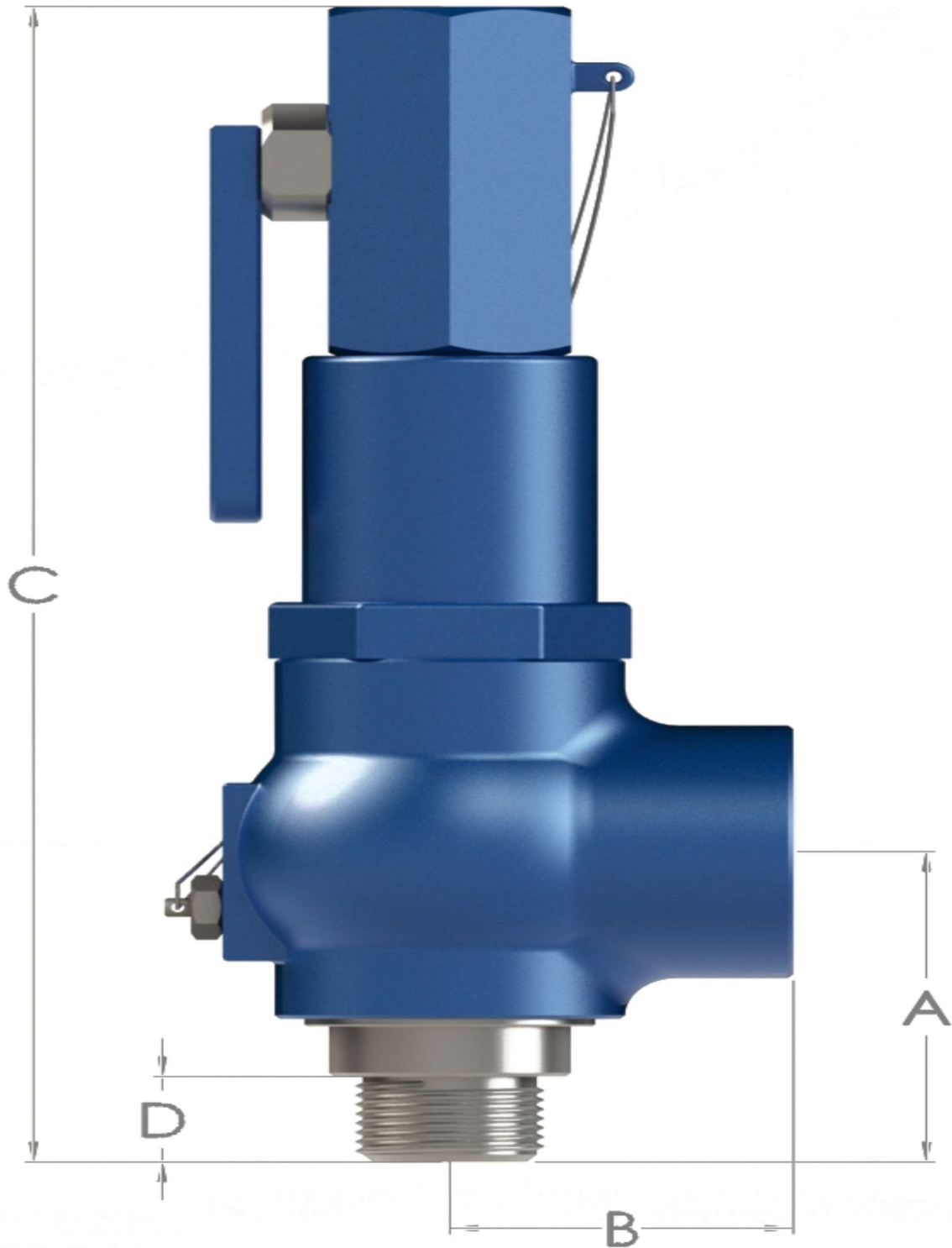
FLANGE END

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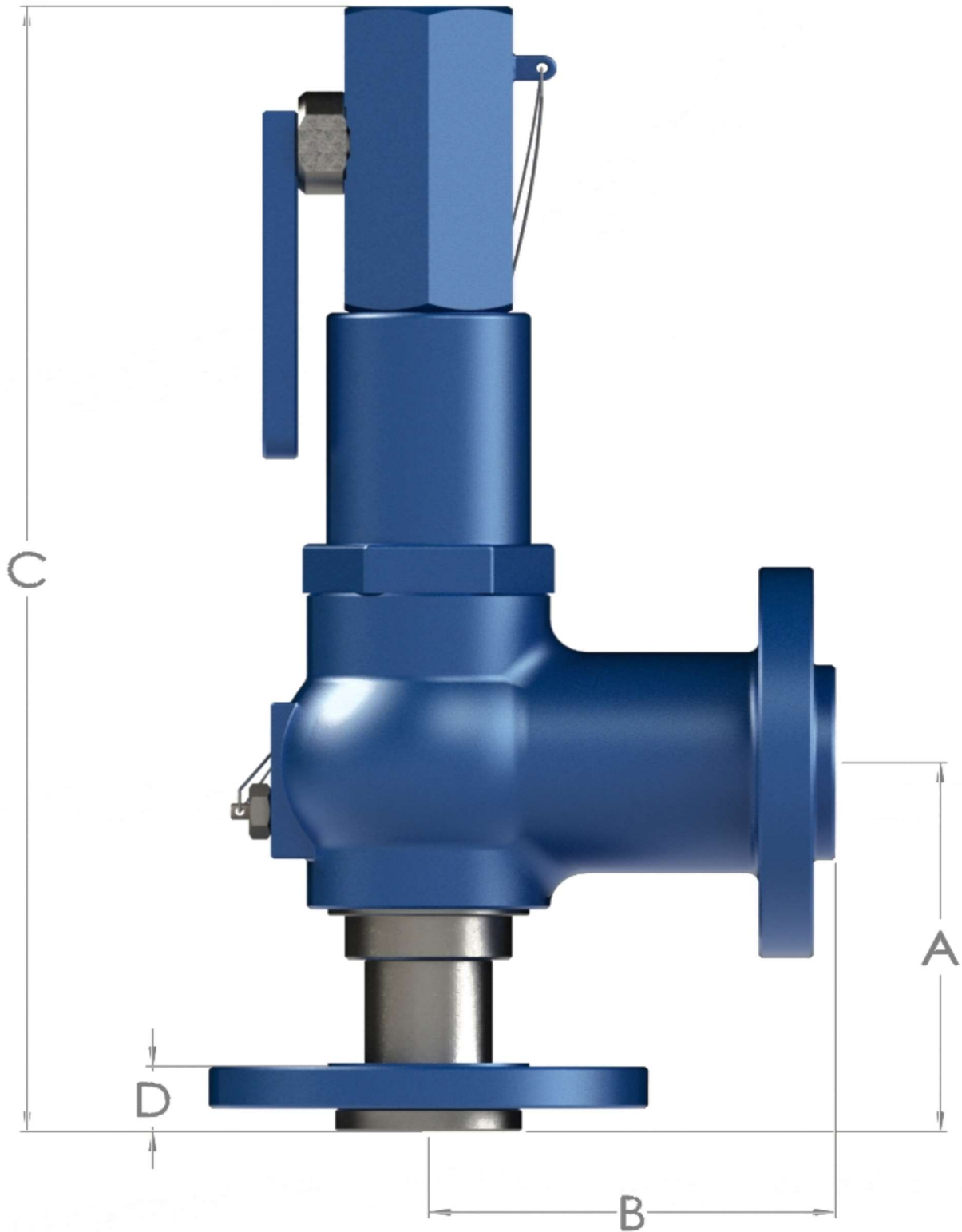
THREAD END

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FLANGE END

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MATERIAL OF CONSTRUCTION

PART LIST		MODEL # 077-18 STANDARD SERVICE	MODEL # 077-36 CORROSIVE SERVICE
LINE NO.	DESCRIPTION	TEMPERATURE -20°C TO 200°C	TEMPERATURE -59°C TO 300°C
01	BODY	CAST STEEL (ASTM A 216 GR.WCB)	STAINLESS STEEL (ASTM A 351 GR.CF8M)
02	BONNET	CAST STEEL (ASTM A 216 GR.WCB)	STAINLESS STEEL (ASTM A 351 GR.CF8M)
03	CAP	CAST STEEL (ASTM A 216 GR.WCB)	S.S.304 (ASTM A 479 TYPE S.S.304)
04	BALL *	S.S.304 (ASTM A 479 TYPE SS304)	S.S.304 (ASTM A 479 TYPE SS304)
05	DISC *	S.S.304 (ASTM A 479 TYPE S.S.304)	S.S.316 (ASTM A 479 TYPE S.S.316)
06	PISTON GUIDE	S.S.304 (ASTM A 479 TYPE S.S.304)	S.S.304 (ASTM A 479 TYPE S.S.304)
07	NOZZLE RING	STAINLESS STEEL (ASTM A 351 GR.CF8M)	STAINLESS STEEL (ASTM A 351 GR.CF8M)
08	SPRING *	ACCORDING TO MEDIUM & TEMPERATURE	
09	SPINDLE *	S.S.410 (ASTM A 479 TYPE S.S.410)	S.S.304 (ASTM A 479 TYPE S.S.304)
10	SPRING WASHER	S.S.304 (ASTM A 479 TYPE S.S.304)	S.S.304 (ASTM A 479 TYPE S.S.304)
11	BODY BONNET GUIDE	S.S.304 (ASTM A 479 TYPE S.S.304)	S.S.304 (ASTM A 479 TYPE S.S.304)
12	PRESSURE ADJUSTMENT SCREW	S.S.304 (ASTM A 479 TYPE S.S.304)	S.S.304 (ASTM A 479 TYPE S.S.304)
13	ADJUSTMENT SCREW LOCK NUT	S.S.304 (ASTM A 479 TYPE S.S.304)	S.S.304 (ASTM A 479 TYPE S.S.304)
14	NOZZLE RING LOCK NUT	S.S.304 (ASTM A 479 TYPE S.S.304)	S.S.304 (ASTM A 479 TYPE S.S.304)
15	HANDLE	S.S.410 (ASTM A 479 TYPE S.S.410)	S.S.304 (ASTM A 479 TYPE S.S.304)
16	HANDLE ASSEMBLY	S.S.410 (ASTM A 479 TYPE S.S.410)	S.S.304 (ASTM A 479 TYPE S.S.304)
17	HANDLE WASHER AND NUT	S.S.304 (ASTM A 479 TYPE S.S.304)	S.S.304 (ASTM A 479 TYPE S.S.304)
18	GASKET *	TEFLON / PTFE / GRAPHOIL	TEFLON / PTFE / GRAPHOIL
19	SS WIRE AND SEAL	S.S.304 & LEAD	S.S.304 & LEAD
20	INLET FLANGE	FORGED STEEL (ASTM A 105)	S.S.316 (ASTM A 479 TYPE S.S.316)
21	NAME PLATE (NOT SHOWN)	S.S.304	S.S.304
22	TEST GAG & BOLT	S.S.304 (ASTM A 479 TYPE S.S.304)	S.S.304 (ASTM A 479 TYPE S.S.304)
23	INLET FLANGE	FORGED STEEL (A105)	S.S.316 (ASTM A 479 TYPE S.S.316)

RECOMMENDED SPRING MATERIAL	
MATERIAL	TEMPERATURE RANGE
1.) SPRING STEEL (IS 4454 GR.II / IID)	-29°C TO 200°C
2.) ALLOY STEEL (50CRV4)	-29°C TO 350°C
3.) INCONEL (X750)	-196°C TO 538°C
4.) S.S.302 / SS316	-196°C TO 300°C

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TECHNICAL DETAIL

THREAD END

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ORIFICE (API 526)		SIZES (SCREW END)		MAX SET PRESSURE (IN BARG) AT 15°C	A (MM) ± 5	B (MM) ± 5	C (MM) ± 10	D (MM) ± 2	APPROX WEIGHT (KGS)
DESIGNATION & EFFECTIVE AREA (IN2)	ACTUAL AREA (IN2 & INLET BORE (MM)	INLET	OUTLET						
"B" (0.044)	0.044 (6MM)	1/2"	1"	255	64	50	260	20	3.0
		3/4"	1"	255	64	50	260	21	3.5
		1"	1"	255	64	50	260	21	3.5
"C" (0.068)	0.084 (8.1MM)	1/2"	1"	153	64	55	260	20	3.0
		3/4"	1"	153	64	50	260	21	3.5
		1"	1"	153	64	55	260	21	3.5
"D" (0.110)	0.12 (10MM)	1/2"	1"	102	64	55	260	20	3.0
		3/4"	1"	102	64	55	260	21	3.5
		1"	1"	102	64	55	260	21	3.5
"E" (0.196)	0.23 (14MM)	1"	1-1/2"	51	82	65	310	310	6.5
"F" (0.307)	0.35 (17MM)	1"	1-1/2"	51	82	65	310	310	6.5

FLANGE END

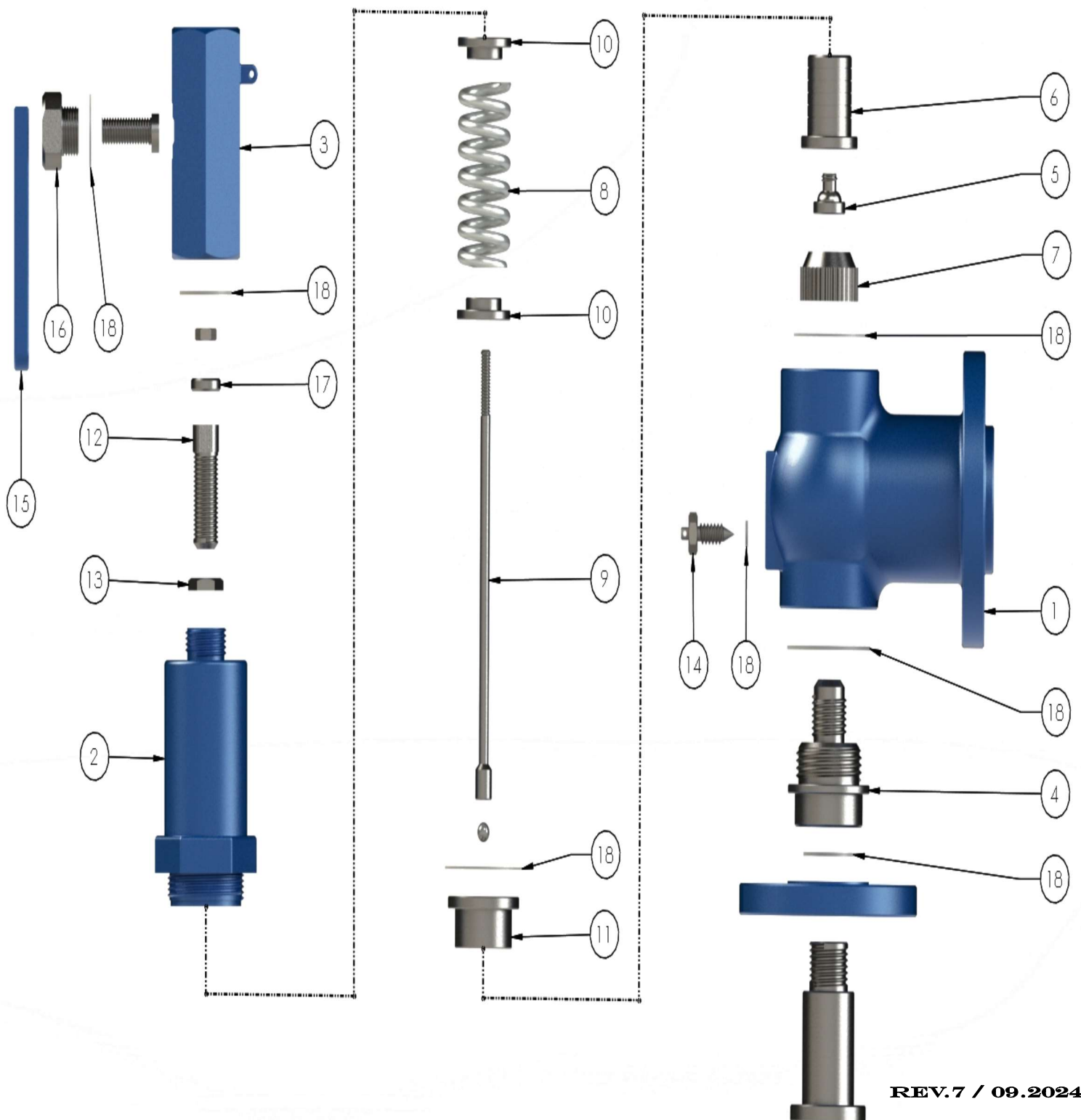
ORIFICE (API 526)		SIZES (FLANGE END)		INLET CLASS	OUTLET CLASS	MAX SET PRESSURE (IN BARG) AT 15°C	A (MM) ± 5	B (MM) ± 5	C (MM) ± 10	D (MM) ± 5	APPROX WEIGHT (KGS)
DESIGNATION & EFFECTIVE AREA (IN2)	ACTUAL AREA (IN2 & INLET BORE (MM)	INLET	OUTLET								
"B" (0.044)	0.044 (6MM)	1/2", 3/4" & 1"	1"	150	150	19.5	100	85	310	22	4.5
				300	150	51	100	85	310	26	5.0
				600	150	102	100	85	310	26	5.0
				900	300	153	125	125	390	40	7.0
				1500	300	255	125	125	390	40	7.5
"C" (0.084)	0.084 (8.1MM)	1/2", 3/4" & 1"	1"	150	150	19.5	100	85	310	22	4.5
				300	150	51	100	85	310	26	5.0
				600	150	102	100	85	310	26	5.0
				900	300	153	125	125	390	40	7.0
"D" (0.110)	0.12 (10MM)	1/2", 3/4" & 1"	1"	150	150	19.5	100	85	310	22	4.5
				300	150	51	100	85	310	26	5.0
				600	150	102	100	85	310	26	5.0
"E" (0.196)	0.23 (14MM)	1"	1-1/2"	150	150	19.5	130	120	390	22	8.0
				300	150	51	130	120	390	26	8.0
"F" (0.307)	0.35 (17MM)	1"	1-1/2"	150	150	19.5	130	120	390	330	8.0
				300	150	51	130	120	390	330	8.0

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ASSEMBLY DRAWING



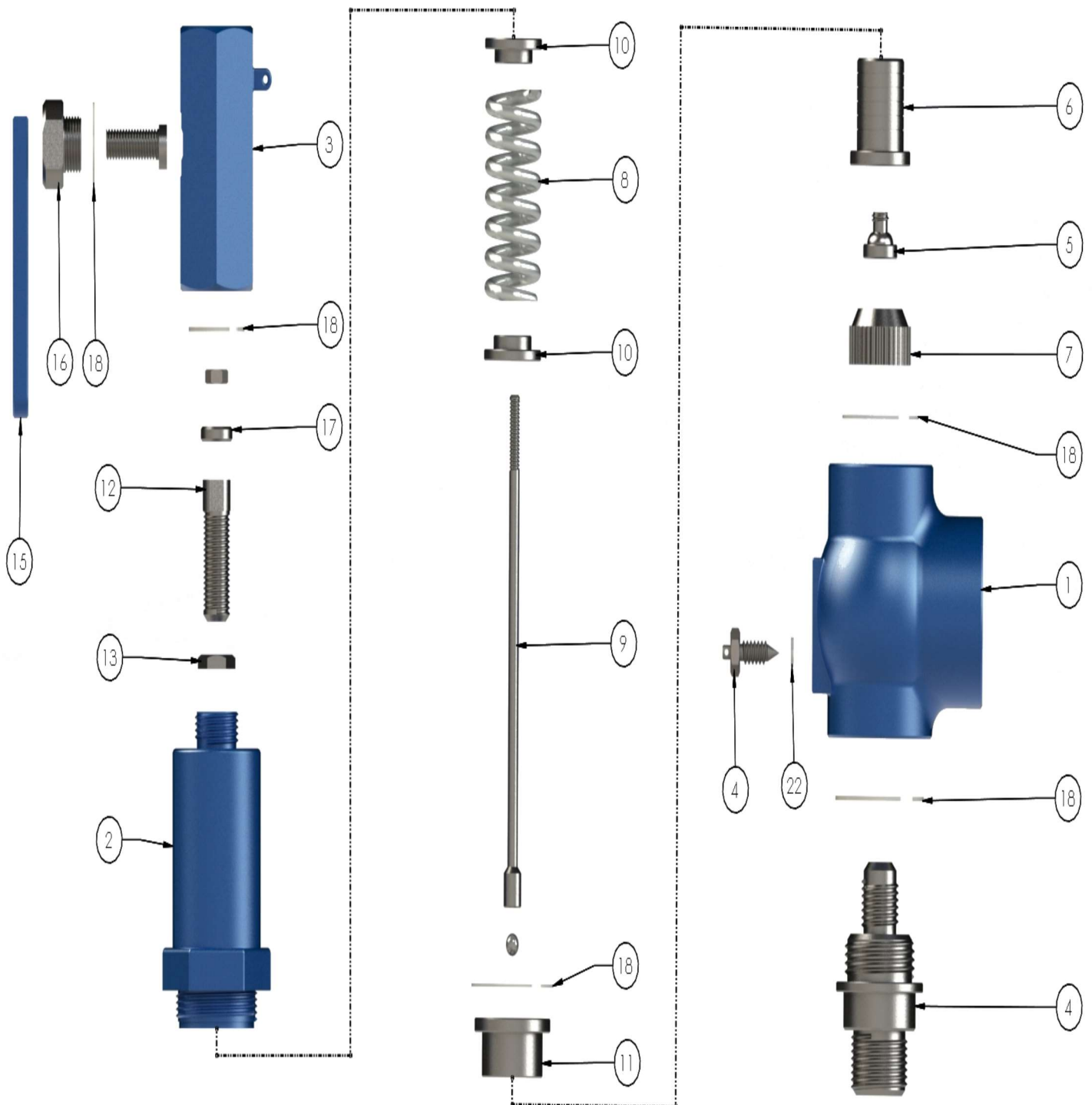
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ASSEMBLY DRAWING



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TYPE OF CAP & HANDLE



TYPE A
**(THREADED CAP
& NO LEVER)**



TYPE B
**(THREADED CAP
& PACKED LEVER)**

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ORDERING INFORMATION - MODEL NUMBER

Position No.	1	2	3	4	5	6	7	8	9	10	11	12
Model #	077	1	8	1	A	1	M	3/4"	D	1"	A	1
Description	Series #	Body Material	Trim Material	End Connection	Application / Medium	Spring Material	Seat	Inlet Size	Orifice	Outlet Size	Cap & Lever Type	Accessories
Options	*	*	*	*	*	*	*	*	*	*	*	*
I	077	1 = C.S. (SA 216 WCB)	6 = SS 316	1 = Thread End (M x F)	A = Air, Gas, Vapor	1 = Spring Steel	M = Metal	1/2" 3/4" 1"	B	1"	A	1 = No Accessories
II	*	2 = SS (SA 217 WC6)	8 = SS 304	2 = Flange End	S = Steam	2 = Alloy Steel	P = Plastic	1/2" 3/4" 1"	C	1"	B	2 = Test Gag
III	*	3 = SS (SA 351 CF8M)	*	3 = Thread End (F x F)	L = Liquid	3 = Inconel Spring X750	V = Viton Rubber	1/2" 3/4" 1"	D	1"	*	3 = Stellite Disc & Nozzle
IV	*	4 = SS (SA 351 CF8)	*	4 = Mixed Connection	*	4 = SS302	S = Silicon Rubber	1"	E	1-1/2"	*	4 = Open Bonnet
V	*	5 = SS (SA 351 CF3M)	*	*	*	5 = SS316	*	1"	F	1-1/2"	*	*

MODEL NO. GENERATED FROM THE ABOVE TABLE

MODEL # 077 - 18 - 1A1 - M - 3/4" D 1" - A - 1

WHILE ENQUIRY PLEASE MENTION FOLLOWING DETAIL:

- SET PRESSURE (BARG, KG/CM2G, PSIG)
- WORKING TEMPERATURE (CELSIUS OR FAHRENHEIT)
- APPLICATION / MEDIUM TYPE (AIR, GAS, LIQUID OR STEAM)
- REQUIRED FLOW CAPACITY (KG/HR, LBS/HR, CFM, M3/MIN, ETC.)
- BACK PRESSURE
- END CONNECTION (FLANGE END OR THREAD END)

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SOFT SEAT DESIGN SELECTION

RUBBER O-RING SEAT VALVE PRESSURE & TEMPERATURE LIMITS

ORIFICE	PRESSURE RANGE IN BARG	
	VITON / SILICON RUBBER	PTFE / PCTFE
“B”	1.0 TO 102	10 TO 275
“C”	1.0 TO 102	10 TO 275
“D”	1.0 TO 102	10 TO 172
“E”	1.0 TO 51	10 TO 51
“F”	1.0 TO 51	10 TO 51
“G”	1.0 TO 19.5	10 TO 19.5

MATERIAL TEMPERATURE RANGE

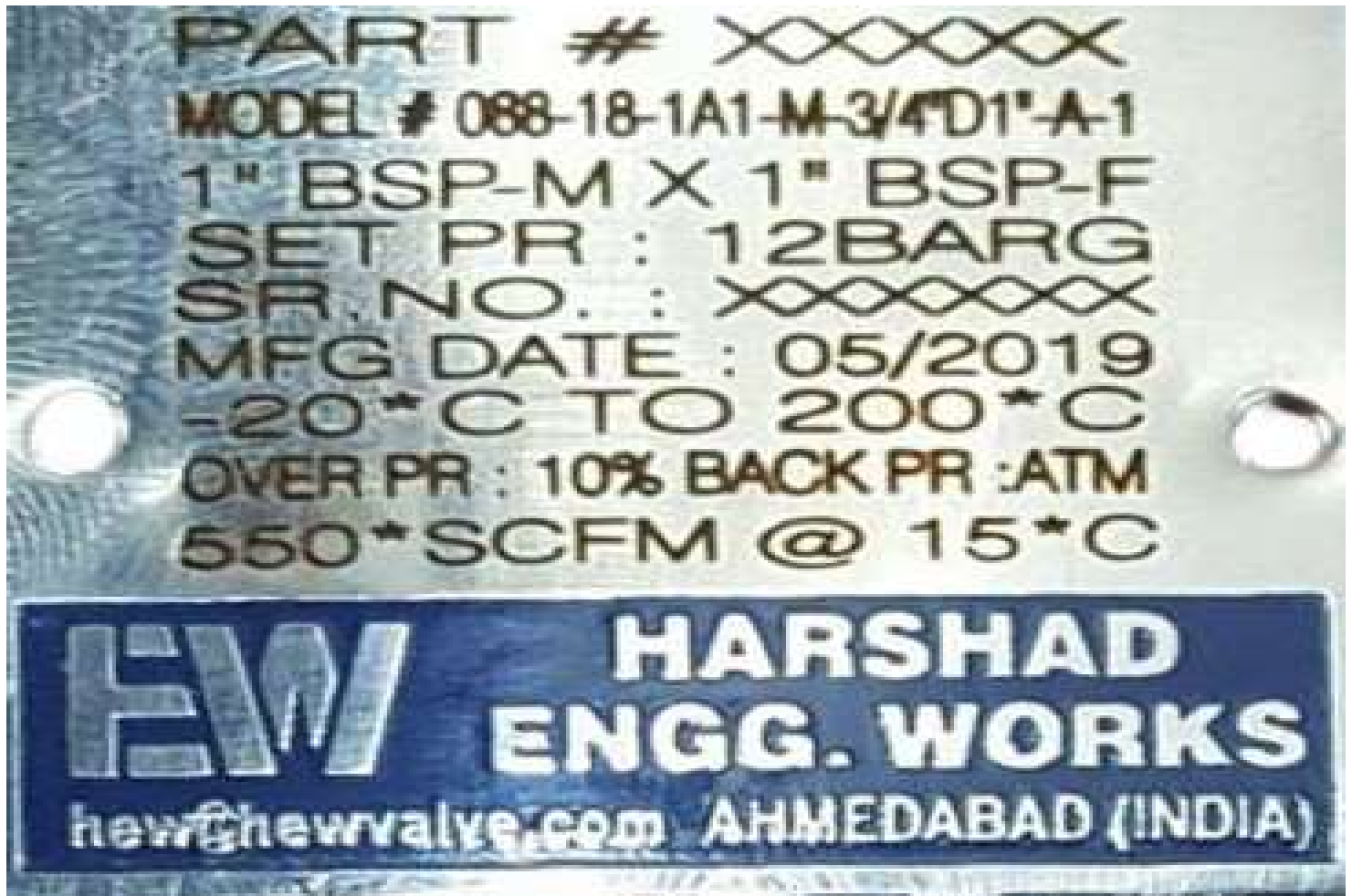
MATERIAL	TEMPERATURE RANGE (*C)
VITON RUBBER	-29*C TO 200*C
SILICONE RUBBER	-45*C TO 180*C
PTFE / TEFLON	-184*C TO 260*C

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MARKING DETAIL



MARKING DETAIL

LINE NO. 01 = PART # / TAG #
LINE NO. 02 = HEW MODEL #
LINE NO. 03 = INLET X OUTLET SIZE AND THREAD TYPE
LINE NO. 04 = SET PRESSURE
LINE NO. 05 = UNIQUE SR.NO.
LINE NO. 06 = MFG DATE
LINE NO. 07 = WORKING TEMP. RANGE
LINE NO. 08 = OVER PRESSURE & BACK PRESSURE
LINE NO. 09 = FLOW RATE (SCFM / KG/HR / LPM / ETC.)

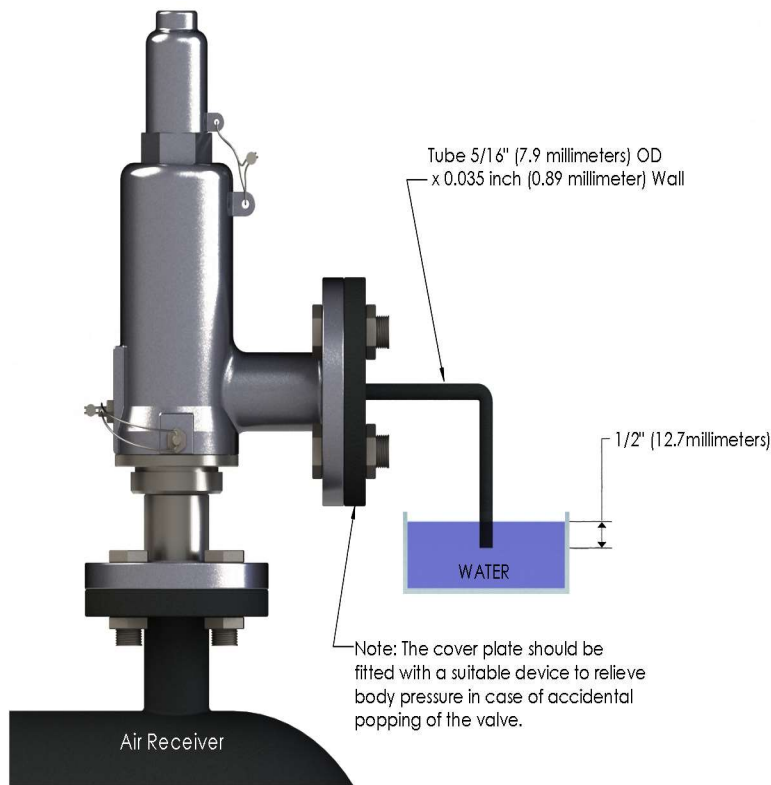
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SEAT LEAKAGE & BACK PRESSURE TEST

SEAT LEAKAGE



SEAT LEAKAGE ACCEPTANCE CRITERIA AS PER (API 527)

FOR A VALVE WITH METAL SEAT, THE LEAKAGE RATE IN BUBBLES PER MINUTE SHALL NOT EXCEED THE APPROPRIATE VALUE IN BELOW TABLE 1. FOR A SOFT SEATED SAFETY VALVE (RUBBER OR TEFLON), THERE SHALL BE NO LEAKAGE FOR ONE MINUTE (0 BUBBLE / MIN)

TABLE 1

SET PRESSURE PSIG (BARG)	EFFECTIVE ORIFICE SIZES 0.307IN ² AND SMALLER		EFFECTIVE ORIFICE SIZES LARGER THAN 0.307IN ²	
	MAX BUBBLE S PER MINUTE	APPROX LEAKAGE RATE PER 24 HOURS	MAX BUBBLE PER MINUTE	APPROX LEAKAGE RATE PER 24 HOURS
		STD. CUBIC FEET		STD. CUBIC FEET
15-1000 (1.03 - 68.9)	40	0.60	20	0.30
1500 (103.4)	60	0.90	30	0.45
2000 (137.9)	80	1.20	40	0.60
2500 (172.4)	100	1.50	50	0.75
3000 (206.8)	100	1.50	60	0.90
4000 (275.8)	100	1.50	80	1.20
5000 (344.8)	100	1.50	100	1.50
6000 (413.7)	100	1.50	100	1.50

BACK PRESSURE TEST



- BACK PRESSURE TEST CONDUCT AT 7KG/CM²G BY AIR OR WATER FLUID AS PER SHOWN DIAGRAM.
- ZERO LEAKAGE ALLOWED.
- CHECK POINT ALL GASKET SEALANT, BODY & CAP.

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PRESSURE V/S TEMPERATURE SELECTION TABLE

Orifice		Valve Sizes	ANSI Flange Class		Maximum Set Pressure (in Barg) as per ANSI B 16.34			Material	
API Letter	Area In2	Inlet x Outlet	Inlet RF	Outlet RF	-45.6*C to 37.8*C	204*C	399*C	Body	Nozzle
“B”	0.044	1/2" x 1"	150# 300# 600# 900# 1500#	150# 150# 150# 300# 300#	20 51 102 153 255	14 44 88 131 218	6 35 69 104 174	Carbon Steel / Stainless Steel	Stainless Steel
		3/4" x 1"	150# 300# 600# 900# 1500#	150# 150# 150# 300# 300#	20 51 102 153 255	14 44 88 131 218	6 35 69 104 174	Carbon Steel / Stainless Steel	Stainless Steel
		1" x 1"	150# 300# 600# 900# 1500#	150# 150# 150# 300# 300#	20 51 102 153 255	14 44 88 131 218	6 35 69 104 174	Carbon Steel / Stainless Steel	Stainless Steel
“C”	0.084	1/2" x 1"	150# 300# 600# 900#	150# 150# 150# 300#	20 51 102 153	14 44 88 131	6 35 69 104	Carbon Steel / Stainless Steel	Stainless Steel
		3/4" x 1"	150# 300# 600# 900#	150# 150# 150# 300#	20 51 102 153	14 44 88 131	6 35 69 104	Carbon Steel / Stainless Steel	Stainless Steel
		1" x 1"	150# 300# 600# 900#	150# 150# 150# 300#	20 51 102 153	14 44 88 131	6 35 69 104	Carbon Steel / Stainless Steel	Stainless Steel
“D”	0.12	1/2" x 1"	150# 300# 600#	150# 150# 150#	20 51 102	14 44 88	6 35 69	Carbon Steel / Stainless Steel	Stainless Steel
		3/4" x 1"	150# 300# 600#	150# 150# 150#	20 51 102	14 44 88	6 35 69	Carbon Steel / Stainless Steel	Stainless Steel
		1" x 1"	150# 300# 600#	150# 150# 150#	20 51 102	14 44 88	6 35 69	Carbon Steel / Stainless Steel	Stainless Steel
“E”	0.23	1" X 1-1/2"	150# 300#	150# 150#	20 51	14 44	6 35	Carbon Steel / Stainless Steel	Stainless Steel
“F”	0.35	1" X 1-1/2"	150# 300#	150# 150#	20 51	14 44	6 35	Carbon Steel / Stainless Steel	Stainless Steel

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COLD DIFFERENTIAL TEST PRESSURE

WHEN SETTING A VALVE INTENDED FOR USE AT HIGH TEMPERATURE ON A TEST RIG USING A TEST FLUID AT AMBIENT TEMPERATURES, IT IS NECESSARY TO SET THE VALVE AT SLIGHTLY HIGHER PRESSURE, SO THAT IT WILL OPEN AT THE CORRECT SET PRESSURE UNDER OPERATING CONDITIONS. THE NECESSARIES ALLOWANCE IS SHOWN IN THE FOLLOWING TABLE.

OPERATING TEMPERATURE (CENTIGRADE)	OPERATING TEMPERATURE (FAHRENHEIT)	% INCREASE IN SET PRESSURE AT (AMBIENT TEMPERATURE)
UPTO 121 *C	UPTO 250 *F	0 %
122 *C TO 316 *C	251 *F TO 600 *F	1 %
317 *C TO 427 *C	601 *F TO 800 *F	2 %
428 *C TO 538 *C	801 *F TO 1000 *F	3 %

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AIR CAPACITY TABLE

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AIR CAPACITIES IN STANDARD CUBIC METRES PER MINUTE (SCFM @ 15°C & 10% OVER PRESSURE (AS PER API 520)

ORIFICE AREA, SQ.IN. (IN2)

SET PRESSURE (IN BARG)	"B"	"C"	"D"	"E"	"F"	"G"	SET PRESSURE (IN BARG)	"B"	"C"	"D"	"E"	"F"	"G"
	0.044	0.084	0.12	0.23	0.35	0.59		0.044	0.084	0.12	0.23	0.35	0.59
1	24	41	59	125	189	319	44	506	967	1382	2648	4030	*
2	33	63	90	173	263	443	45	517	989	1412	2707	4119	*
3	44	84	121	232	352	593	46	529	1010	1443	2766	4209	*
4	55	106	151	291	442	744	47	540	1032	1474	2825	4299	*
5	66	127	182	350	532	895	48	551	1053	1505	2884	4389	*
6	78	149	213	409	622	1047	49	562	1075	1535	2943	4478	*
7	89	171	244	469	712	1198	50	574	1096	1566	3002	4568	*
8	101	192	343	528	803	1349	55	631	1204	1720	3061	4658	*
9	112	214	381	587	893	1500	60	687	1312	1874	*	*	*
10	125	235	420	646	983	1651	65	744	1419	2027	*	*	*
11	135	257	458	705	1072	1803	70	800	1527	2181	*	*	*
12	147	278	497	764	1163	1954	75	856	1635	2335	*	*	*
13	156	300	535	823	1253	2105	80	913	1742	2489	*	*	*
14	168	321	574	883	1343	2256	85	969	1850	2643	*	*	*
15	179	343	612	942	1433	2408	90	1025	1957	2796	*	*	*
16	191	364	651	1001	1523	2559	95	1082	2065	2950	*	*	*
17	203	386	689	1060	1613	2710	100	1138	2173	3140	*	*	*
18	213	407	727	1119	1703	2861	105	1194	2280	3258	*	*	*
19	224	429	766	1178	1793	3012	110	1251	2388	*	*	*	*
20	235	450	804	1238	1883	3164	115	1307	2496	*	*	*	*
21	247	472	843	1297	1973	3315	120	1364	2603	*	*	*	*
22	258	493	881	1355	2063	*	125	1420	2711	*	*	*	*
23	269	515	920	1414	2153	*	130	1476	2819	*	*	*	*
24	280	537	958	1474	2243	*	135	1533	2926	*	*	*	*
25	292	558	996	1533	2333	*	140	1589	3034	*	*	*	*
26	303	580	1035	1587	2415	*	145	1646	3142	*	*	*	*
27	314	601	1073	1646	2505	*	150	1701	3249	*	*	*	*
28	326	623	1112	1705	2594	*	160	1815	3465	*	*	*	*
29	337	644	1150	1764	2684	*	170	1927	3680	*	*	*	*
30	348	666	1189	1823	2774	*	180	2040	3895	*	*	*	*
31	359	687	1227	1882	2863	*	190	2153	4110	*	*	*	*
32	371	709	1266	1941	2953	*	200	2266	4326	*	*	*	*
33	382	730	1304	2000	3042	*	210	2379	4541	*	*	*	*
34	393	752	1343	2059	3133	*	220	2491	4756	*	*	*	*
35	404	773	1381	2118	3222	*	230	2604	4972	*	*	*	*
36	416	795	1419	2177	3312	*	240	2717	5187	*	*	*	*
37	427	816	1458	2235	3402	*	250	2830	5402	*	*	*	*
38	438	838	1496	2294	3491	*	260	2942	5617	*	*	*	*
39	450	859	1535	2353	3581	*	270	3055	5833	*	*	*	*
40	461	881	1573	2412	3671	*	280	3168	6048	*	*	*	*
41	472	903	1612	2471	3761	*	290	3281	6263	*	*	*	*
42	483	924	1650	2530	3850	*	300	3393	6479	*	*	*	*
43	495	946	1689	2589	3940	*	310	3506	6694	*	*	*	*

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AIR CAPACITY TABLE

REV.6 / 05.2019

AIR CAPACITIES IN KG/HR @ 15°C & 10% OVER PRESSURE (AS PER EN ISO 4126 PART.1)

ORIFICE AREA (MM²)

SET PRESSURE (IN BARG)	"B"	"C"	"D"	"E"	"F"	"G"	SET PRESSURE (IN BARG)	"B"	"C"	"D"	"E"	"F"	"G"
	28.39	54.19	77.42	148.39	225.81	380.64		28.39	54.19	77.42	148.39	225.81	380.64
1	45	86	123	236	359	604	44	1054	2012	2875	5510	8385	*
2	69	131	187	358	545	919	45	1077	2057	2939	5633	8572	*
3	92	176	251	481	732	1234	46	1101	2102	3003	5755	8758	*
4	115	220	315	604	919	1548	47	1124	2147	3067	5878	8945	*
5	139	265	379	726	1105	1863	48	1148	2191	3131	6001	9132	*
6	162	310	443	849	1292	2178	49	1171	2236	3195	6123	9318	*
7	186	355	507	972	1479	2492	50	1195	2281	3259	6246	9505	*
8	209	400	571	1094	1665	2807	55	1312	2505	3579	6859	10438	*
9	233	444	635	1217	1852	3122	60	1429	2729	3899	*	*	*
10	256	489	699	1340	2038	3436	65	1547	2953	4219	*	*	*
11	280	534	763	1462	2225	3751	70	1664	3177	4539	*	*	*
12	303	579	827	1585	2412	4066	75	1781	3401	4859	*	*	*
13	327	624	891	1708	2598	4380	80	1899	3625	5179	*	*	*
14	350	668	955	1830	2785	4695	85	2016	3849	5499	*	*	*
15	374	713	1019	1953	2972	5009	90	2133	4073	5819	*	*	*
16	397	758	1083	2076	3158	5324	95	2251	4297	6139	*	*	*
17	420	803	1147	2198	3345	5639	100	2368	4521	6459	*	*	*
18	444	848	1211	2321	3532	5953	105	2485	4745	6779	*	*	*
19	467	892	1275	2444	3718	6268	110	2603	4969	*	*	*	*
20	491	937	1339	2566	3905	6583	115	2720	5193	*	*	*	*
21	514	982	1403	2689	4092	6897	120	2837	5417	*	*	*	*
22	538	1027	1467	2812	4278	*	125	2954	5641	*	*	*	*
23	561	1072	1531	2934	4465	*	130	3072	5865	*	*	*	*
24	585	1116	1595	3057	4652	*	135	3189	6089	*	*	*	*
25	608	1161	1695	3180	4838	*	140	3306	6313	*	*	*	*
26	632	1206	1723	3302	5025	*	145	3424	6537	*	*	*	*
27	655	1251	1787	3425	5212	*	150	3541	6760	*	*	*	*
28	679	1296	1851	3548	5398	*	160	3658	6984	*	*	*	*
29	702	1340	1915	3670	5585	*	170	4010	7656	*	*	*	*
30	725	1385	1979	3793	5772	*	180	4245	8104	*	*	*	*
31	749	1430	2043	3916	5958	*	190	4480	8552	*	*	*	*
32	772	1475	2107	4038	6145	*	200	4714	9000	*	*	*	*
33	796	1519	2171	4161	6332	*	210	4949	9448	*	*	*	*
34	819	1564	2235	4284	6518	*	220	5183	9896	*	*	*	*
35	843	1609	2299	4406	6705	*	230	5418	10344	*	*	*	*
36	866	1654	2363	4529	6892	*	240	5653	10792	*	*	*	*
37	890	1699	2427	4652	7078	*	250	5887	11240	*	*	*	*
38	913	1743	2491	4774	7265	*	260	6122	11688	*	*	*	*
39	937	1788	2555	4897	7452	*	270	6357	12136	*	*	*	*
40	960	1833	2619	5019	7638	*	280	6591	12584	*	*	*	*
41	984	1878	2683	5142	7825	*	290	6826	13032	*	*	*	*
42	1007	1923	2747	5265	8012	*	300	7061	13480	*	*	*	*
43	1031	1967	2811	5387	8198	*	310	7295	13928	*	*	*	*

HARSHAD

SAFETY VALVE MANUFACTURER

SERIES # 077

REV.6 / 05.2019

WATER CAPACITY TABLE

WATER CAPACITIES IN LITRES PER MINUTE (LPM) @ 20C & 10% OVER PRESSURE (AS PER API 520)

ORIFICE AREA, SQ.IN. (IN2)

SET PRESSURE (IN BARG)	"B"	"C"	"D"	"E"	"F"	"G"	SET PRESSURE (IN BARG)	"B"	"C"	"D"	"E"	"F"	"G"
	0.044	0.084	0.12	0.23	0.35	0.59		0.044	0.084	0.12	0.23	0.35	0.59
1	18	32	46	87	144	242	44	110	212	303	571	882	*
2	23	45	65	124	188	317	45	112	214	306	578	892	*
3	29	55	79	152	230	387	46	113	217	310	584	902	*
4	33	64	91	175	266	447	47	114	219	313	591	912	*
5	37	71	102	196	297	500	48	115	221	316	597	921	*
6	41	78	112	214	325	548	49	116	224	319	603	931	*
7	44	85	121	231	352	592	50	117	226	323	609	941	*
8	47	90	129	247	376	632	55	123	237	338	649	987	*
9	50	96	137	262	399	671	60	129	247	354	*	*	*
10	52	101	144	277	421	707	65	134	258	368	*	*	*
11	55	106	151	290	441	742	70	139	267	382	*	*	*
12	57	111	158	303	461	774	75	144	277	395	*	*	*
13	60	115	165	315	480	807	80	148	286	408	*	*	*
14	62	120	171	327	498	837	85	153	295	421	*	*	*
15	64	124	177	339	515	866	90	157	303	433	*	*	*
16	67	128	183	350	532	895	95	162	311	445	*	*	*
17	69	132	188	361	548	922	100	166	319	456	*	*	*
18	70	136	194	371	564	949	105	170	327	468	*	*	*
19	72	139	199	381	580	975	110	174	335	*	*	*	*
20	74	143	204	391	595	1000	115	178	343	*	*	*	*
21	76	146	209	401	610	*	120	182	350	*	*	*	*
22	78	150	214	410	624	*	125	186	357	*	*	*	*
23	79	153	219	420	638	*	130	189	364	*	*	*	*
24	81	156	224	429	651	*	135	193	371	*	*	*	*
25	83	160	228	437	665	*	140	196	378	*	*	*	*
26	84	163	233	446	678	*	145	200	385	*	*	*	*
27	86	166	237	455	691	*	150	204	391	*	*	*	*
28	88	169	241	463	704	*	160	209	404	*	*	*	*
29	89	172	246	471	716	*	170	217	417	*	*	*	*
30	91	175	250	479	729	*	180	223	429	*	*	*	*
31	92	178	254	487	740	*	190	229	440	*	*	*	*
32	94	181	258	495	752	*	200	235	452	*	*	*	*
33	95	184	262	502	764	*	210	241	463	*	*	*	*
34	97	186	266	510	776	*	220	247	474	*	*	*	*
35	98	189	270	517	787	*	230	252	484	*	*	*	*
36	99	192	274	525	798	*	240	257	495	*	*	*	*
37	101	194	278	532	809	*	250	263	505	*	*	*	*
38	102	197	281	539	820	*	260	268	515	*	*	*	*
39	103	199	285	546	830	*	270	273	525	*	*	*	*
40	105	202	289	553	841	*	280	278	535	*	*	*	*
41	106	205	292	560	852	*	290	283	544	*	*	*	*
42	107	207	296	567	861	*	300	288	553	*	*	*	*
43	109	209	299	574	872	*	310	295	562	*	*	*	*

HARSHAD

SAFETY VALVE MANUFACTURER

SERIES # 077

WATER CAPACITY TABLE

WATER CAPACITIES IN KG/HR @ 20C & 10% OVER PRESSURE (AS PER EN ISO 4126 PART.1)

ORIFICE AREA (MM2)

SET PRESSURE (IN BARG)	"B"	"C"	"D"	"E"	"F"	"G"	SET PRESSURE (IN BARG)	"B"	"C"	"D"	"E"	"F"	"G"
	28.39	54.19	77.42	148.39	225.81	380.64		28.39	54.19	77.42	148.39	225.81	380.64
1	997	1904	2720	5213	7933	13372	44	6616	12620	18041	34578	52619	*
2	1410	2692	3846	7372	11218	18911	45	6690	12770	18245	34969	53214	*
3	1727	3297	4711	9029	13740	23161	46	6764	12911	18446	35356	53802	*
4	1995	3807	5439	10426	15865	26744	47	6837	13051	18646	35738	54383	*
5	2230	4257	6082	11656	17738	29900	48	6910	13189	18843	36116	54959	*
6	2443	4663	6662	12769	19431	32754	49	6981	13326	19038	36490	55528	*
7	2639	5037	7196	13792	20988	35378	50	7052	13461	19231	36861	56092	*
8	2821	5384	7693	14744	22437	37821	55	7396	14118	20170	38660	58830	*
9	2992	5711	8159	15639	23798	40115	60	7725	14746	21067	*	*	*
10	3154	6020	8601	16485	25085	42285	65	8041	15348	21927	*	*	*
11	3308	6314	9020	17289	26310	44349	70	8344	15927	22755	*	*	*
12	3455	6595	9421	18058	27479	46321	75	8637	16486	23554	*	*	*
13	3596	6864	9806	18795	28602	48213	80	8921	17027	24236	*	*	*
14	3732	7123	10176	19505	29681	50033	85	9195	17551	25075	*	*	*
15	3863	7373	10533	20189	30723	51789	90	9462	18060	25802	*	*	*
16	3989	7615	10879	20852	31731	53487	95	9721	18555	26509	*	*	*
17	4112	7849	11214	21493	32707	55133	100	9973	19037	27197	*	*	*
18	4231	8077	11539	22116	33655	56732	105	10220	19507	*	*	*	*
19	4347	8298	11855	22722	34578	58286	110	10460	19966	*	*	*	*
20	4460	8513	12163	23313	35476	59800	115	10695	20415	*	*	*	*
21	4570	8724	12463	23888	36352	61277	120	10925	20854	*	*	*	*
22	4678	8929	12757	24451	37207	*	125	11151	21284	*	*	*	*
23	4783	9130	13043	25000	38044	*	130	11371	21705	*	*	*	*
24	4886	9326	13324	25538	38862	*	135	11588	22119	*	*	*	*
25	4987	9518	13599	26064	39663	*	140	11801	22525	*	*	*	*
26	5085	9707	13868	26581	40449	*	145	12010	22923	*	*	*	*
27	5182	9892	14132	27087	41219	*	150	12215	23315	*	*	*	*
28	5277	10073	14391	27584	41976	*	160	12615	24080	*	*	*	*
29	5371	10252	14646	28072	42719	*	170	13004	24821	*	*	*	*
30	5463	10427	14897	28552	43449	*	180	13381	25540	*	*	*	*
31	5553	10599	15143	29024	44167	*	190	13747	26240	*	*	*	*
32	5642	10769	15385	29489	44874	*	200	14105	26922	*	*	*	*
33	5729	10936	15624	29946	45570	*	210	14453	27587	*	*	*	*
34	5815	11100	15859	30396	46255	*	220	14793	28236	*	*	*	*
35	5900	11262	16090	30840	46930	*	230	15125	2887	*	*	*	*
36	5984	11422	16318	31277	47596	*	240	15451	29492	*	*	*	*
37	6067	11580	16543	31709	48252	*	250	15769	30100	*	*	*	*
38	6148	11735	16766	32134	48900	*	260	16082	30696	*	*	*	*
39	6228	11888	16985	32554	49539	*	270	16388	31281	*	*	*	*
40	6308	12040	17201	32969	50170	*	280	16689	31855	*	*	*	*
41	6386	12189	17415	33379	50794	*	290	16984	32418	*	*	*	*
42	6464	12337	17626	33783	51409	*	300	17274	32973	*	*	*	*
43	6540	12483	17834	34183	52018	*	310	17560	33518	*	*	*	*

HARSHAD

SAFETY VALVE MANUFACTURER

SERIES # 077

STEAM CAPACITY TABLE

STEAM CAPACITIES IN POUND PER HOUR (LB/HR) @ SATURATED STEAM & 10% OVER PRESSURE AS PER ASME SECTION-1

ORIFICE AREA (IN²)

SET
PRESSURE
(IN BARG)

"D"

"E"

"F"

"G"

0.12

0.23

0.35

0.59

SIZE (INLET X OUTLET)

3/4" X 1"

1" X 1-1/2"

1-1/2" X 1-1/2"

2" X 2"

1

159

305

464

782

2

239

458

697

1176

3

319

612

931

1570

4

399

765

1165

1964

5

480

919

1399

2358

6

560

1073

1632

2752

7

640

1226

1866

3146

8

720

1380

2100

3540

9

800

1533

2333

3934

10

880

1687

2567

4328

11

960

1841

2801

4722

12

1040

1994

3035

5116

13

1121

2148

3268

5510

14

1201

2301

3502

5904

15

1281

2455

3736

6298

16

1361

2609

3970

6692

17

1441

2762

4203

7086

18

1521

2916

4437

7480

19

1601

3069

4671

7874

20

1682

3223

4905

8268

21

1762

3377

5138

8662

22

1842

3530

5372

*

23

1922

3684

5606

*

24

2002

3837

5839

*

25

2082

3991

6073

*

26

2162

4145

6307

*

27

2243

4298

6541

*

28

2323

4452

6774

*

29

2403

4605

7008

*

30

2483

4759

7242

*

31

2563

4913

7476

*

32

2643

5066

7709

*

33

2723

5220

7943

*

34

2803

5373

8177

*

35

2884

5527

8410

*

36

2964

5680

8644

*

37

3044

5834

8878

*

38

3124

5988

9112

*

39

3204

6141

9345

*

40

3284

6295

9579

*

45

3685

7063

10748

*

50

4086

7831

11916

*

HARSHAD

SAFETY VALVE MANUFACTURER

SERIES # 077

STEAM CAPACITY TABLE

STEAM CAPACITIES IN KILOGRAM PER HOUR (KG/HR) @ SATURATED STEAM & 10% OVER PRESSURE AS PER EN ISO 4126 PART.1

ORIFICE AREA (MM2)

SET PRESSURE (IN BARG)	"D"	"E"	"F"	"G"
	77.42	148.39	225.81	380.64
SIZE (INLET X OUTLET)	3/4" X 1"	1" X 1-1/2"	1-1/2" X 1-1/2"	2" X 2"
1	74	141	215	363
2	112	215	327	551
3	151	288	439	740
4	189	362	551	929
5	227	436	663	1117
6	266	509	775	1306
7	304	583	887	1495
8	342	656	999	1684
9	381	730	1111	1872
10	419	803	1223	2061
11	458	877	1335	2250
12	496	951	1447	2438
13	534	1024	1558	2627
14	573	1098	1670	2816
15	611	1171	1782	3005
16	649	1245	1894	3193
17	688	1318	2006	3382
18	726	1392	2118	3571
19	765	1466	2230	3759
20	803	1539	2342	3948
21	841	1613	2454	4137
22	880	1686	2566	*
23	918	1760	2678	*
24	957	1833	2790	*
25	995	1907	2902	*
26	1033	1981	3014	*
27	1072	2054	3126	*
28	1110	2128	3238	*
29	1148	2201	3350	*
30	1187	2275	3462	*
31	1225	2348	3574	*
32	1264	2422	3686	*
33	1302	2496	3798	*
34	1340	2569	3910	*
35	1379	2643	4021	*
36	1417	2716	4133	*
37	1456	2790	4245	*
38	1494	2863	4357	*
39	1532	2937	4469	*
40	1571	3011	4581	*
45	1763	3378	5141	*
50	1955	3746	5701	*

HARSHAD

S A F E T Y V A L V E M A N U F A C T U R E R

SERIES # 077

INSTALLATION, MAINTENANCE & PRESSURE ADJUSTMENT

GENERAL

Harshad Engineering Works (HEW) Safety Relief Valve have been tested and adjusted at the factory. As service conditions differ it may be necessary to make slight adjustments. these adjustments are easily made if the instructions below are carefully followed.

Warning : To have trouble free performance be sure to thoroughly clean the inlets and outlets of valves before installing.

STORAGE AND HANDLING

Safety Relief Valves are often on hand at the job site months before they are installed. Unless properly stored and protected, valve performance may be adversely affected. Rough handling and dirt may damage or cause misalignment of the valve parts. It is recommended that the valves be left in their original packing and that they be stored in a warehouse or as a minimum on a dry surface with a protective covering until they are used.

Safety relief Valves must be handled carefully and never subjected to sharp impact loads. They should be not be struck, bumped or dropped. Rough handling may alert the pressure setting, deform valve parts and adversely affect seat tightness and valve performance.

Never lift or carry Safety Relief Valve by its lever or handle (Cap & Lever Type B), it may cause damage to spindle and results in malfunction of valves.

INSTALLATION

The Safety Relief Valve should be mounted vertically in an upright position either on a nozzle from the pressure vessel or on a short connection fitting that provides a direct, unobstructed flow between the vessel and the valve. Installing a pressure relief valve in other than this recommended position might adversely affect its operation.

While installing Safety Relief Valve use metal or plastic seal washer only for screw end connection and non asbestos or metal gasket for flange end connection.. Temporary seal material such as PTFE / TEFLON tape or liquid seal material should not be used as this type of material break off and enter the safety relief valve and damages the seat of valve which results in continuous leakage. Both the valve inlet and the vessel and line on which the valve is mounted must be thoroughly cleaned of all dirt and foreign material. Many Safety relief Valve are damaged when first placed in service because of the failure to clean the connections properly when installed. When screwing the valve onto the system, always use a square jaw wrench on the designed wrenching flats located at the inlet of the valve, never on the valves body or bonnet.

Similarly outlet piping from the Safety Relief Valve should be less than four feet (1.2m) in length and never of a pipe size diameter smaller than the outlet size of the valve. Long runs of small diameter pipe on the outlet of a relief valve will create a serious hazard to life and property. Larger piping is recommended to reduce the built - up back pressure.

Note : Valve should never be installed on a fitting having a smaller inside diameter than the inlet connection of the valve.

OPERATION

The Safety Valve set pressure must not exceed the maximum working pressure of the vessel / system. Best performance is usually obtained by installing a valve on a system where the operating pressure is at least 10 to 15% less than the valves set pressure. It is also important to check the back pressure and temperature limitations of the process are consistent with the valves ratings. Built back up pressure should not exceed the allowable over pressure for spring operated valves. Note that each material (Steel or Rubber) have temperature / pressure limitation. Using these material outside their limitation will cause the valve to fail. Please contact HEW to find different material limitation.

Additionally, corrosion effect from the systems media need to be accounted for in the material selections / compatibilities of the valve components. Proper material selection and designation is the responsibility of the user / purchaser of the valve. Extra care in material selection must be taken in application that effect the material of the valve like Hydrogen services. Standard materials are not acceptable in these types of application. Contact HEW for potential alternative materials.

HARSHAD

SAFETY VALVE MANUFACTURER

SERIES # 077

INSTALLATION, MAINTENANCE & PRESSURE ADJUSTMENT

MAINTENANCE & INSPECTION

HEW recommends all of its pressure relief valves to be tested annually for set point and function. During these intervals, a visual inspection, set pressure test, and leak check to at least 90% of set pressure. All inspections and repairs should be done by an authorised and trained professional personnel.

DO NOT BREAK THE SEAL WIRE. To do so invalidates the manufacturers warranty to repair or replace the valve. Should resetting be required in a field emergency situation, it should be performed by qualified personnel with calibrated instrumentation. Note that the as per ASME code it specifies that valves should only reset within the installed springs set pressure range which is specified by the manufacturer. Consult HEW for additional resetting information.

TESTING

Testing should be performed by trained personnel using the applicable test procedure.

The test fluid should be air or nitrogen for valves used on gas, steam and vapour service and water for valves used on liquid service. In such cases it may be necessary to make a correction to the adjusted set pressure to compensate for the difference in temperature for the test fluids.

Valve Operation

Valves intended for compressible fluid service and tested on air, nitrogen or steam will open with a sharp, clear popping action at the set point. Valves for liquid service tested with water are considered open at the first continuous unbroken stream of liquid flowing through the valve. Some times it is helpful to install a short piece of pipe in the valve outlet to determine the opening on water.

Set Pressure Adjustment

Before making any adjustments reduce the pressure under the valve seat to at least 25% below the stamped opening pressure. This will prevent seat damage due to turning of the disc on the nozzle seat and minimize the chance of an inadvertent opening. Every valve is fitted with a suitable spring and tested before leaving the factory. Safety valves can be preset on request but to alter the set pressure, the adjusting screw, when viewed from the top, should be screwed downwards in a clockwise direction to increase the set pressure and upwards in an anti-clockwise direction to decrease it. Set pressure adjustment must be carried out by experienced and approved personnel. Any change in set pressure must be within the range of existing spring, if it exceeds the range, a new spring will be required.

Blow Down Adjustment (Air, Gas or Vapour Service only)

The adjusting ring is set at the factory and resetting in service is seldom necessary. Should it be necessary to change blowdown the ring may be adjusted as follows. Careful any adjustments be made while the valve is installed on a pressurized system, the valve should be gagged while ring adjustment is made.

Remove the set screw and insert a screwdriver to engage the ring notched. Turning the ring to the right raises the ring, which results in decreasing the blowdown and increases over pressure & turning the ring to the left lowers the ring, which results in increasing the blowdown and decreases over pressure.

The adjusting ring should not be moved more than two notches before reseating. When making adjustments, always keep count of the number of notches and the direction in which the ring is moved. This will permit returning to the original setting in case of error.

Maintenance - Dismantling

- Remove Cap & then remove the setting screw and set screw gasket.
- Before removing the adjusting bolt, take a measurement from the top of the adjusting bolt to the top of the body as reference for resetting the valve later.
- Loosen the pressure adjusting bolt nut and turn the adjusting bolt anti clockwise to completely remove the load on the spring. Unless this is done, unnecessary damage to the seat or misalignment of the trim parts may occur when the valve is reassembled.
- Unscrew the body from the nozzle. Lift the body from the nozzle.
- Remove the spindle, spring & spring washer.
- Remove the disc from the ring guide, then unscrew the ring guide from the nozzle.

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INSTALLATION, MAINTENANCE & PRESSURE ADJUSTMENT

Cleaning

The following instructions are general guidelines. Certain applications may require the use of special cleaning procedures.

- After the valve has been completely dismantled, the seats on both the nozzle and the disc should be examined to determine how badly they are damaged, if at all. Any severe damage may make it advisable to replace the parts.
- External parts such as body and cap, can be cleaned by immersion in a bath such as hot alkali solutions or equivalent.
- Internal parts, except Rubber Pad or TEFLON insert can be cleaned using acetone, denatured alcohol or any other suitable solvent. Mechanical cleaning of internal parts, except seat of nozzle and disc can be performed using fine sandpaper or emery cloth.

Calibration & Service

It is recommended every safety valve should be service & calibrated every year for better life and performance of safety valve. And for steam application it is recommended every six months.