

HARSHAD

SAFETY VALVE MANUFACTURER



SAFETY RELIEF VALVE

CE 1128

ISO 9001 CERTIFIED CO.

SERIES # 006



DESIGN FEATURES

- SAFETY VALVE MANUFACTURED IN ACCORDANCE WITH REQUIREMENT OF ASME BOILER SECTION I & SECTION VIII, API 526, API 527, ANSI B 16.34, EN ISO 4126 PART 1, IS 12992 PART 1 & 2, IBR (INDIAN BOILER REGULATION) REG. 1950.
- DIRECT SPRING OPERATED, FULL LIFT, FULL NOZZLE, SINGLE TRIM, HIGH CAPACITY DESIGN
- ADJUSTABLE NOZZLE RING FOR PERFECT POPPING AND BLOW DOWN ADJUSTMENT
- SUPERIOR SEAT TIGHTNESS PRECISION LAPPED FLAT METAL TO METAL SEAT
- SEAT TIGHTNESS AT 95% OF SET PRESSURE
- OPEN BONNET DESIGN ENSURES PROPER SPRING COOLING FOR STABILITY & ALIGNMENT
- SATURATED STEAM & SUPER HEATED STEAM
- RELIABLE, LONG LIFE & LOW MAINTANENCE
- CE CERTIFIED UNDER PED 97/23/EC CATEGORY VI MODULE H.

TECHNICAL DATA : -

- SIZES : 1" X 2" TO 6" X 8" (ORIFICE "G" TO "Q")
- END CONNECTION : FLANGE END (ANSI B 16.5 R.F.)
- SET PRESSURE RANGE : 1BARG TO 30BARG
- TEMPERATURE RANGE : UPTO 538°C
- APPLICATION : AIR & STEAM



REV.7 / 01.08.22

HARSHAD ENGINEERING WORKS

WORK & OFFICE ADDRESS : -

S-121 TO S-124, VIVEKANAND
INDUSTRIAL ESTAE, NEAR RAKHIAL
CROSS ROAD, RAKHIAL, AHMEDABAD
- 380 023. GUJARAT, INDIA.

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

SERIES # 006

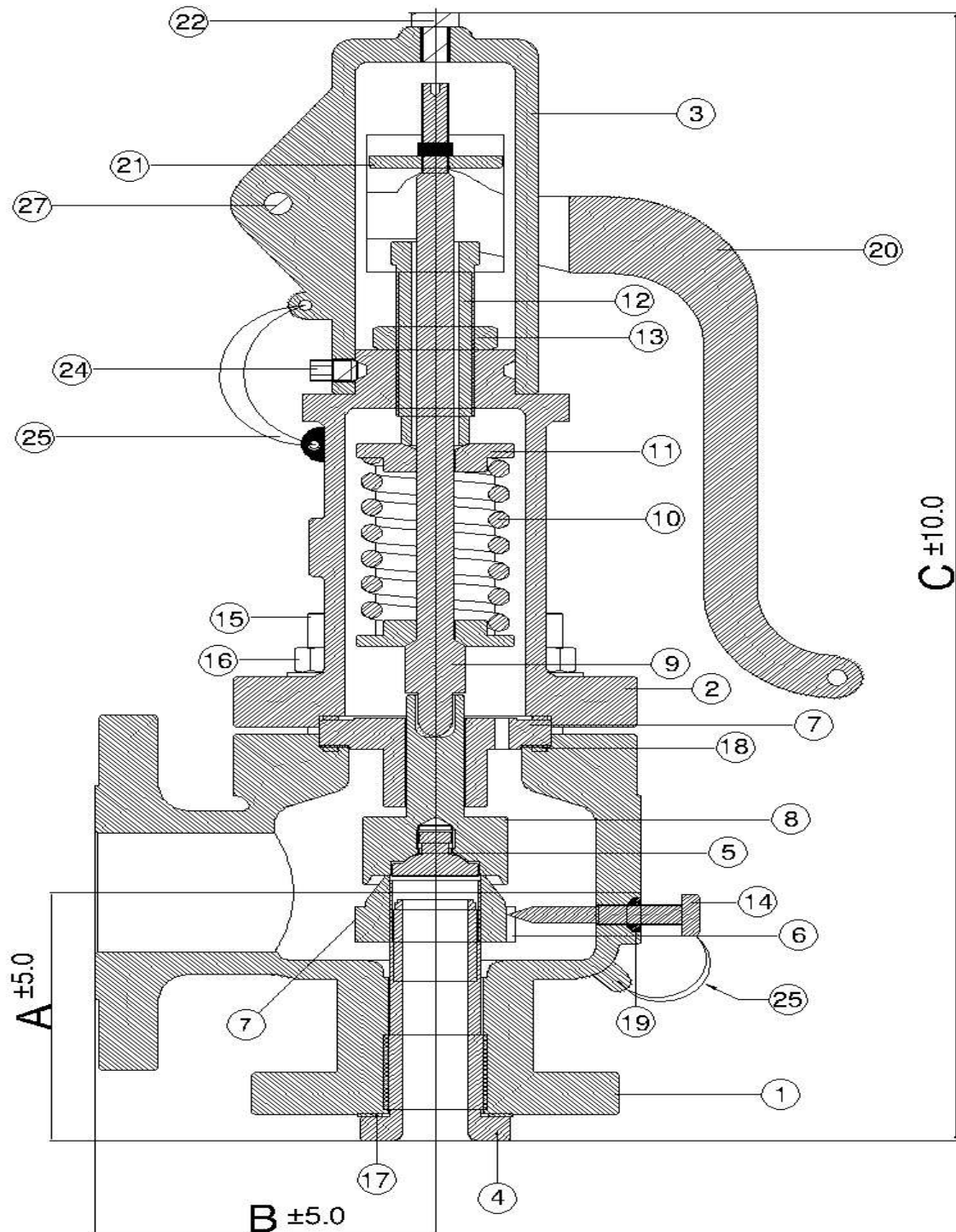
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PRESSURE V/S TEMPERATURE SELECTION TABLE

Orifice		Sizes		ANSI Flange Class		Maximum Set Pressure (in Barg) as per ANSI B 16.34								Material	
API Letter	Area In2	Inlet	Outlet	Inlet RF	Outlet RF	149°C	204°C	260°C	316°C	371°C	427°C	482°C	538°C	Body & Bonnet	Spring
G	0.643	1"	2"	300#	150#	45.1	43.8	41.7	39.3	36.5	28.3	*	*	WCB	C.S.
						*	*	*	*	*	*	31.0	14.8	Wc6	A.S.
G	0.643	1-1/2"	3"	300#	150#	45.1	43.8	41.7	39.3	36.5	28.3	*	*	WCB	C.S.
						*	*	*	*	*	*	31.0	14.8	Wc6	A.S.
H	0.822	1-1/2"	3"	300#	150#	45.1	43.8	41.7	39.3	36.5	28.3	*	*	WCB	C.S.
						*	*	*	*	*	*	31.0	14.8	Wc6	A.S.
J	1.285	2"	3"	300#	150#	45.1	43.8	41.7	39.3	36.5	28.3	*	*	WCB	C.S.
						*	*	*	*	*	*	31.0	14.8	Wc6	A.S.
L	3.04	2-1/2"	4"	300#	150#	45.1	43.8	41.7	39.3	36.5	28.3	*	*	WCB	C.S.
						*	*	*	*	*	*	31.0	14.8	Wc6	A.S.
M	3.81	3"	4"	300#	150#	45.1	43.8	41.7	39.3	36.5	28.3	*	*	WCB	C.S.
						*	*	*	*	*	*	31.0	14.8	Wc6	A.S.
N	4.83	4"	6"	300#	150#	45.1	43.8	41.7	39.3	36.5	28.3	*	*	WCB	C.S.
						*	*	*	*	*	*	31.0	14.8	Wc6	A.S.
P	7.02	4"	6"	300#	150#	45.1	43.8	41.7	39.3	36.5	28.3	*	*	WCB	C.S.
						*	*	*	*	*	*	31.0	14.8	Wc6	A.S.
Q	11.69	6"	8"	300#	150#	12	12	12	12	12	12	*	*	WCB	C.S.
						*	*	*	*	*	*	12	12	Wc6	A.S.

NOTE :-

* BODY MATERIAL WCB = CAST STEEL (ASTM A 216 GR.WCB)

* BODY MATERIAL WC6 = CAST STEEL (ASTM A 217 GR.WC6)

* SPRING MATERIAL C.S. = CAST STEEL (IS 4454 HT GR.II)

* SPRING MATERIAL A.S. = 1.) TUNGSTEN STEEL
2.) INCONEL X750

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MATERIAL OF CONSTRUCTION

PART LIST		MODEL # 006-16 STANDARD CONSTRUCTION	MODEL # 006-26 HIGH TEMP. SERVICES
SR.NO.	DESCRIPTION	TEMPERATURE UPTO 399°C (750°F)	TEMPERATURE UPTO 538°C (1000°F)
01	BODY	CAST STEEL (ASTM A 216 GR.WCB)	CAST STEEL (ASTM 217 GR.WC6)
02	BONNET	CAST STEEL (ASTM A 216 GR.WCB)	CAST STEEL (ASTM A 216 GR.WCB)
03	CAP	CAST STEEL (ASTM A 216 GR.WCB)	CAST STEEL (ASTM A216 GR.WCB)
04	NOZZLE	S.S.316 / S.S.304	S.S.316 / S.S.304
05	DISC	S.S.316 / S.S.304	S.S.316 / S.S.304
06	NOZZLE RING	S.S. (ASTM A 351 GR.CF8)	S.S. (ASTM A 351 GR.CF8)
07	BODY - BONNET GUIDE	S.S. (ASTM A 351 GR.CF8)	S.S. (ASTM A 351 GR.CF8)
08	PISTON GUIDE	S.S.304	S.S.304
09	SPINDLE	S.S.410 / S.S.304	S.S.410 / S.S.304
10	SPRING	SPRING STEEL (IS 4454)	ALLOY STEEL
11	SPRING WASHER	S.S.410	S.S.410
12	SETTING SCREW	S.S.304	S.S.304
13	LOCK NUT	S.S.304	S.S.304
14	RING LOCK SCREW & NUT	S.S.304	S.S.304
15	STUD	HIGH TENSILE (ASTM 193 GR.B7)	HIGH TENSILE (ASTM A 193 GR.B7)
16	NUT	HIGH TENSILE (ASTM A 194 GR.2H)	HIGH TENSILE (ASTM A 194 GR.2H)
17	NOZZLE GASKET	NON - ASBESTOS	NON - ASBESTOS
18	BODY - BONNET GASKET	NON - ASBESTOS / GRAPHOIL	NON - ASBESTOS / GRAPHOIL
19	RING LOCK SCREW GASKET	TEFLON / PTFE	TEFLON / PTFE
20	HANDLE	CAST STEEL (ASTM A 216 GR.WCB)	CAST STEEL (ASTM A 216 GR.WCB)
21	HANDLE WASHER & NUT	STAINLESS STEEL	STAINLESS STEEL
22	TEST GAG & PLUG	STAINLESS STEEL	STAINLESS STEEL
23	GRUP SCREW LOCK	HIGH TENSILE	HIGH TENSILE
24	NAME PLATE (NOT SHOWN)	S.S.304	S.S.304
25	WIRE & SEAL	S.S. & LEAD	S.S. & LEAD
26	DRAIN PLUG	STAINLESS STEEL	STAINLESS STEEL
27	HANDLE LOCK PIN	STAINLESS STEEL	STAINLESSSTEEL

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TECHNICAL DETAIL

SIZE		ORIFICE (API526 / API 520 EN ISO 4126)		FLANGE CONNECTION (ANSI B16.5 R.F.)		MAX SET PRESSURE (IN BARG)	DIMENSIONS (MM)			APPROX WEIGHT (KG)
INLET	OUTLET	DESIGNATION & ACTUAL AREA (IN2)	ACTUAL AREA MM2 (IN MM)	INLET	OUTLET		A ± 3	B ±3	C ±10	
1"	2"	"G" (0.643)	414.8 (23MM)	300	150	28	105	114	480	18
1-1/2"	2"	"G" (0.643)	414.8 (23MM)	300	150	28	124	121	480	18
1-1/2"	3"	"H" (0.822)	530.3 (26MM)	300	150	28	124	137	550	30
2"	3"	"J" (1.285)	829.0 (32.5MM)	300	150	28	130	135	560	32
2-1/2"	4	"L" (3.04)	1961.3 (50MM)	300	150	28	156	165	690	56
3"	4"	"M" (3.81)	2458.1 (56MM)	300	150	28	156	165	690	56
4"	6"	"N" (4.83)	3116.1 (63MM)	300	150	18	197	210	900	130
		"P" (7.02)	4529.0 (76MM)	300	150	18	197	210	900	130
6"	8"	"Q" (11.69)	7541.9 (98MM)	300	150	12	240	241	1440	190

NOTE :-

- SERIES # 006 SAFETY VALVE IS AVAILABLE IN FLANGE END CONNECTION ONLY. (FLANGES CONFIRM TO ANSI B 16.5 R.F. 300# X 150#)
- HYDRO TEST IS CONDUCTED FOR NOZZLES AT 1.5 TIMES OF DESIGN PRESSURE OF SAFETY VALVE AS PER API 526, API 598, EN ISO 4126 PART 1 & IS 12992.
- PNEUMATIC NOZZLE TEST CONDUCT ON 7BARG (100PSIG) AS PER ASME PRESSURE VESSEL SECTION VIII DIVISION.1.
- SEAT LEAKAGE TEST IS CONDUCTED AS PER API 527 OR AS SPECIFIED.
- TECHNICAL DATA SHEET WILL BE PROVIDED ON REQUEST.
- WE OFFER THIRD PARTY INSPECTION IF REQUIRED.(TUV, LLYODS, BVQI, SGS, IBR, ETC.)
- SAFETY VALVE IS SUPPLIED WITH ONE SET OF TEST CERTIFICATE OF HYDRO TEST, SET PRESSURE TEST & SEAT LEAKAGE TEST.
- SAFETY VALVE COMES WITH GUARANTEE OF 12MONTHS FROM THE DATE OF SUPPLY.

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ORDERING INFORMATION - MODEL NUMBER

Position No.	1	2	3	4	5	6	7	8	9
Model #	006	1	6	1	2"	J	3"	1	...
Description	Series #	Body Material	Trim Material	Spring Material	Inlet Size	Orifice	Outlet Size	Accessories	*
Options	*	*	*	*	*	*	*	*	*
I	006	1 = C.S. (SA 216 WCB)	6 = SS316	1 = C.S. (ZN COATED)	1"	G	2"	1 = No Accessories	*
II	*	2 = C.S. (SA 217 WC6)	*	2 = Tungsten Alloy Steel	1-1/2"	G	2"	2 = Test Gag	*
III	*	*	*	3 = Inconel Spring X750	1-1/2"	H	3"	3 = Stellite Disc & Nozzle	*
IV	*	*	*	*	2"	J	3"	4 = Drain Plug	*
V	*	*	*	*	2-1/2"	L	4"	*	*
VI	*	*	*	*	3"	M	4"	*	*
VII	*	*	*	*	4"	N P	6"	*	*
VIII	*	*	*	*	6"	Q	8"	*	*

MODEL NO. GENERATED FROM THE ABOVE TABLE

MODEL # 006-16-1-2"J3"-1

- WHILE ENQUIRY PLEASE MENTION FOLLOWING DETAIL:

- SET PRESSURE (BARG, KG/CM2G, PSIG)
- TEMPERATURE (CELSIUS OR FAHRENHEIT)
- APPLICATION (AIR OR STEAM)
- REQUIRED FLOW CAPACITY (KG/HR, LBS/HR)

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STEAM CAPACITY TABLE

Steam Capacities in KG/HR at 5% Over Pressure & at Saturation Temperature as per IBR Reg.293 (1950)

Orifice Area & Letter Designation, (in2 & mm2) (API 526)

Calculation as per IBR Reg.293, E = CAP where IBR Constant 0.24, E = Capacity (KG/HR), A = Area (mm2) & P = Pressure (Barg)

API Letter	“G”	“H”	“J”	“L”	“M”	“N”	“P”	“Q”
Actual Area (in2)	0.643	0.822	1.285	3.04	3.81	4.83	7.02	11.69
Actual Area (mm2)	414.8	530.3	829.0	1961.2	2458.1	3116.1	4529.0	7541.9
Set Pr. (Barg)	DISCHARGE CAPACITY (IN KG/HR)							
1	219	280	438	1036	1298	1645	2391	3982
2	318	407	637	1506	1888	2393	3478	5792
3	413	528	826	1953	2448	3104	4511	7512
4	518	662	1035	2448	3068	3889	5652	9412
5	622	795	1243	2942	3687	4674	6793	11313
6	727	929	1452	3436	4307	5459	7935	13304
7	831	1063	1661	3930	4926	6245	9076	15114
8	936	1196	1870	4425	5545	7030	10217	17015
9	1040	1330	2079	4919	6165	7815	11359	18915
10	1145	1464	2288	5413	6784	8600	12500	20816
11	1249	1597	2497	5907	7404	9386	13641	22716
12	1354	1731	2706	6402	8023	10171	14783	24617
13	1458	1865	2915	6896	8643	10956	15924	26517
14	1563	1998	3124	7390	9262	11741	17065	28418
15	1667	2132	3333	7884	9882	12527	18206	30318
16	1772	2265	3541	8379	10501	13312	19348	32219
17	1877	2399	3750	8873	11120	14097	20489	34120
18	1981	2533	3959	9367	11740	14882	21630	36020
19	2086	2666	4168	9861	12359	15668	22772	37921
20	2190	2800	4377	10355	12979	16453	23913	39821
21	2296	2934	4586	10849	13598	17238	25054	41722
22	2401	3067	4795	11344	14218	18024	26196	43622
23	2505	3201	5004	11838	14837	18809	27337	45523
24	2610	3335	5213	12332	15457	19594	28478	47423
25	2714	3468	5422	12826	16076	20379	29620	49324
26	2819	3602	5631	13320	16695	21165	30761	51225
27	2923	3735	5839	13815	17315	21950	31902	53125
28	3028	3869	6048	14309	17934	22735	33044	55026
29	3132	4003	6257	14803	18554	23520	34185	56926
30	3237	4136	6466	15297	19173	24306	35326	58827

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SERIES # 006 STEAM CAPACITY TABLE

Steam Capacities 3% Over Pressure, Saturation Temperature (in LBS/HR) as per ASME SECTION 1 Power Boiler

Orifice Area & Letter Designation, (in2 & mm2) (API 526)

Calculation as per ASME Sec. I, $W = 51.5 \times AP \times K$ Where W = Capacity (LB/HR), $K = 0.868$, A = Orifice Area (in2) & P = Pressure (PSIG)

API Letter	“G”	“H”	“J”	“L”	“M”	“N”	“P”	“Q”
Actual Area (in2)	0.643	0.822	1.285	3.04	3.81	4.83	7.02	11.69
Actual Area (mm2)	414.8	530.3	829.0	1961.3	2458.1	3116.1	4529.0	7541.9
Set Pr. (Barg)	DISCHARGE CAPACITY (IN LBS/HR)							
1	939	1200	1877	4439	5564	7053	10251	17071
2	1315	1681	2628	6216	7791	9876	14354	23904
3	1733	2215	3463	8191	10266	13015	18916	31499
4	2150	2749	4297	10164	12739	16150	23472	39087
5	2400	3068	4796	11345	14219	18026	26199	43627
6	3003	3838	6000	14194	17789	22552	32777	54582
7	3433	4388	6859	16226	20336	25781	37470	62397
8	3862	4937	7718	18259	22884	29010	42164	70213
9	4292	5487	8577	20291	25431	32239	46857	78029
10	4722	6037	9437	22324	27978	35469	51551	85844
11	5153	6586	10296	24356	30525	38699	56244	93660
12	5582	7136	11155	26389	33073	41927	60937	101476
13	6012	7685	12014	28421	35620	45146	65631	109291
14	6442	8235	12873	30453	38167	48385	70324	117106
15	6872	8785	13732	32486	40174	51614	75017	124922
16	7302	9334	14591	34518	43261	54844	79711	132738
17	7732	9884	15450	36551	45809	58073	84404	140553
18	8162	10433	16310	38583	48356	61302	89097	148369
19	8592	10983	17169	40616	50903	64531	93791	156182
20	9022	11533	18028	42648	53450	67761	98484	164000
21	9452	12082	18887	44681	55998	70990	103178	171816
22	9882	12632	19746	46713	58545	74219	107871	179631
23	10312	13181	20605	48745	61092	77448	112564	187447
24	10742	13731	21464	50779	63639	80677	117257	195262
25	11171	14281	22324	52810	66187	83906	121951	203079
26	11601	14830	23183	54843	68734	87136	126644	210893
27	12031	15380	24042	56875	71281	90365	131338	218709
28	12461	15930	24901	58908	73828	93594	136031	226525
29	12891	16479	25760	60940	76356	96823	140724	234340
30	13321	17029	26619	62973	78923	100052	145418	242156

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STEAM CAPACITY TABLE

Steam Capacities 3% Over Pressure, Saturation Temperature (in KG/HR) as per ASME SECTION 1 Power Boiler

Orifice Area & Letter Designation, (in2 & mm2) (API 526)

Calculation as per ASME Sec. I, $W = 51.5 \times AP \times K$ Where W = Capacity (LB/HR), $K = 0.868$, A = Orifice Area (in2) & P = Pressure (PSIG)

API Letter	“G”	“H”	“J”	“L”	“M”	“N”	“P”	“Q”
Actual Area (in2)	0.643	0.822	1.285	3.04	3.81	4.83	7.02	11.69
Actual Area (mm2)	414.8	530.3	829.0	1961.3	2458.1	3116.1	4529.0	7541.9
Set Pr. (Barg)	DISCHARGE CAPACITY (IN KG/HR)							
1	426	544	851	2014	2524	3199	4650	7743
2	596	762	1192	2820	3534	4480	6511	10843
3	786	1005	1571	3715	4657	5904	8580	14288
4	975	1247	1949	4610	5778	7326	10647	17729
5	1089	1392	2175	5146	6450	8176	11884	19789
6	1362	1741	2721	6438	8069	10229	14867	24758
7	1557	1990	3111	7360	9225	11694	16996	28548
8	1752	2239	3501	8282	10380	13159	19125	31848
9	1947	2489	3890	9204	11535	14623	21254	35393
10	2142	2738	4281	10126	12691	16088	23383	38938
11	2338	2987	4670	11048	13846	17554	25512	42483
12	2532	3237	5060	11970	15002	19018	27641	46029
13	2727	3486	5449	12892	16157	20478	29770	49573
14	2922	3735	5839	13813	17312	21947	31898	53118
15	3117	3984	6229	14735	18223	23412	34027	56663
16	3312	4233	6618	15657	19623	24877	36156	60209
17	3507	4302	7008	16579	20779	26341	38285	63754
18	3702	4732	7398	17501	21934	27806	40414	67299
19	3897	4982	7788	18423	23089	29271	42543	70843
20	4092	5231	8177	19345	24245	30736	44672	74389
21	4287	5480	8567	20267	25400	32201	46801	77934
22	4482	5730	8956	21189	26556	33666	48929	81479
23	4677	5979	9346	22110	27711	35130	5058	85025
24	4873	6228	9736	23033	28866	36595	53187	88569
25	5067	6478	10126	23954	30022	38059	55316	92115
26	5262	6727	10516	24876	31177	39524	57445	95659
27	5457	6976	10905	25798	32333	40989	59574	99205
28	5652	7226	11295	26720	33488	42454	61703	102750
29	5847	7475	11685	27642	34634	43918	63831	106295
30	6042	7724	12074	28564	35799	45383	65960	109840

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STEAM CAPACITY TABLE

Steam Capacities 10% Over Pressure, Saturation Temperature (in LBS/HR) as per ASME SECTION VIII

Orifice Area & Letter Designation, (in2 & mm2) (API 526)

Calculation as per ASME Sec.VIII, $W = 51.5 \times A \times P_1 \times K$ Where $K = 0.869$, A = Orifice Area (in2) & P = Pressure (PSIG)

API Letter	"G"	"H"	"J"	"L"	"M"	"N"	"P"	"Q"
Actual Area (in2)	0.643	0.822	1.285	3.04	3.81	4.83	7.02	11.69
Actual Area (mm2)	414.8	530.3	829.0	1961.3	2458.1	3116.1	4529.0	7541.9
Set Pr. (Barg)	DISCHARGE CAPACITY (IN LBS/HR)							
1	942	1204	1883	4460	5583	7078	10287	17130
2	1342	1716	2683	6354	7954	10084	14656	24406
3	1798	2298	3593	8511	10654	13507	19631	32691
4	2256	2885	4510	10682	13372	16952	24638	41029
5	2715	3471	5426	12852	16089	20396	29645	49366
6	3173	4057	6343	15023	18806	23841	34651	57703
7	3632	4643	7559	17193	21523	27286	39658	66040
8	4091	5229	8175	19364	24240	30730	44664	74377
9	4549	5815	9092	21534	26957	34175	49671	82714
10	5008	6401	10008	23705	29674	37620	54678	91052
11	5466	6988	10925	25876	32392	41064	59684	99389
12	5952	7574	11841	28046	35109	44509	64691	107726
13	6383	8160	12757	30217	37826	47954	69697	116063
14	6842	8746	13674	32387	40543	51398	74704	124400
15	7300	9332	14590	34558	43260	54843	79710	132737
16	7759	9918	15507	36728	45977	58287	84717	141074
17	8217	10505	16423	38899	48695	61732	89724	149412
18	8676	11091	17339	41070	51412	65177	94730	157749
19	9134	11677	18256	43240	54129	68622	99737	166086
20	9593	12263	19172	45411	56846	72066	104743	174423
21	10051	12849	20089	47581	59563	75511	109750	182760
22	10510	13435	21005	49752	62281	78956	114757	191099
23	10968	14021	21921	51922	64997	82400	119762	199434
24	11427	14607	22838	54092	67714	85844	124768	207769
25	11885	15194	23754	56263	70432	89290	129776	216109
26	12344	15780	24671	58434	73149	92734	134783	224446
27	12803	16367	25589	60609	75871	96186	139799	232800
28	13261	16952	26504	62775	78583	99623	144796	241120
29	13719	17539	27420	64946	81301	103069	149803	249459
30	14178	18125	28336	67116	84017	106513	154809	257794

HARSHAD

SAFETY VALVE MANUFACTURER

SERIES # 006

STEAM CAPACITY TABLE

Steam Capacities 10% Over Pressure, Saturation Temperature (in KG/HR) as per ASME SECTION VIII

Orifice Area & Letter Designation, (in2 & mm2) (API 526)

Calculation as per ASME Sec.VIII, $W = 51.5 \times A \times P^1 \times K$ Where $K = 0.869$, A = Orifice Area (in2) & P = Pressure (PSIG)

API Letter	"G"	"H"	"J"	"L"	"M"	"N"	"P"	"Q"
Actual Area (in2)	0.643	0.822	1.285	3.04	3.81	4.83	7.02	11.69
Actual Area (mm2)	414.8	530.3	829.0	1961.3	2458.1	3116.1	4529.0	7541.9
Set Pr. (Barg)	DISCHARGE CAPACITY (IN KG/HR)							
1	427	546	854	2023	2532	3211	4666	7770
2	609	778	1217	2882	3608	4574	6648	11070
3	816	1042	1630	3860	4833	6126	8904	14828
4	1023	1308	2046	4845	6065	7689	11176	18610
5	1231	1574	2461	5829	7298	9251	13446	22392
6	1439	1840	2877	6814	8530	10814	15717	26173
7	1647	2106	3429	7799	9763	12376	17988	29955
8	1856	2372	3708	8783	10995	13938	20259	33736
9	2063	2638	4124	9767	12227	15501	22530	37518
10	2272	2903	4540	10752	13459	17064	24801	41301
11	2479	3169	4955	11737	14693	18626	27072	45082
12	2700	3435	5371	12721	15925	20188	29343	48864
13	2895	3701	5786	13706	17158	21751	31614	52645
14	3103	3967	6202	14690	18390	23313	33885	56427
15	3311	4232	6618	15675	19622	24876	36155	60208
16	3519	4499	7034	16659	20854	26439	38427	63990
17	3727	4765	7449	17644	22088	28001	40698	67772
18	3935	5031	7865	18629	23320	29564	42969	71554
19	4143	5296	8281	19613	24553	31126	45240	75335
20	4351	5562	8696	20598	25785	32689	47511	79117
21	4559	5828	9112	21582	27017	34251	49782	82898
22	4767	6094	9528	22567	28250	35814	52053	86681
23	4975	6360	9943	23551	29482	37376	54323	90461
24	5183	6626	10359	24536	30714	38938	56594	94242
25	5391	6892	10774	25520	31947	40501	58865	98025
26	5599	7158	11191	26505	33179	42063	61137	101807
27	5807	7424	11607	27492	34414	43629	63412	105596
28	6015	7689	12022	28474	35645	45188	65678	109370
29	6223	7956	12438	29459	36878	46751	67949	113153
30	6431	8221	12853	30443	38109	48313	70220	116933

HARSHAD

SAFETY VALVE MANUFACTURER

SERIES # 006

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 %

HARSHAD

SAFETY VALVE MANUFACTURER

SERIES # 006

SIZING FORMULA

AS PER IBR 1950 REG.293

1. SIZING FORMULA FOR DISCHARGE CAPACITY FOR SATURATED STEAM AS PER IBR 1950 REG.293, EQUATION 78.

$$E = CAP$$

WHERE :-

- * E = RATED DISCHARGE CAPACITY OF SATURATED STEAM IN KG/HR
- * C = CONSTANT 0.24 AS PER IBR 1950 REG.293
- * A = AREA IN MM²
- * P = SET PRESSURE IN KG/CM²

2. SIZING FORMULA FOR DISCHARGE CAPACITY FOR SUPERHEATED STEAM AS PER IBR 1950 REG.293, EQUATION 79.

$$E_s = \frac{E}{\sqrt{1 + 2.7T_s / 1000}}$$

WHERE :-

- * E_s = RATED DISCHARGE CAPACITY OF SUPER HEATED STEAM IN KG/HR
- * E = RATED DISCHARGE CAPACITY OF SATURATED STEAM IN KG/HR
- * T_s = DEGREE OF SUPERHEAT IN *C

HARSHAD

SAFETY VALVE MANUFACTURER

SERIES # 006

SIZING FORMULA

ASME SECTION I & SECTION VIII

EQUATION :-

$$A = \frac{W_s}{51.5 P K_d K_{sh}}$$

WHERE :-

A = REQUIRED ORIFICE AREA IN SQUARE INCHES (IN²)

P = RELIVING PRESSURE IN POUNDS PER SQUARE INCH
ABSOLUTE = SET PR. + OVER PRESSURE + 14.7PSI

W_s = REQUIRED STEAM CAPACITY IN POUNDS PER HOUR

K_d = CO-EFFICIENT OF DISCHARGE, 0.878

K_{sh} = STEAM SUPERHEAT CORRECTION FACTOR, SEE TABLE BELOW

Appendix I

Capacity Correction Factor for Super Heat, K_{sh}

The Steam sizing formula are based on the flow of dry saturated steam. To size for superheated steam, the superheat correction factor is used to correct the calculated saturated steam flow to superheated steam flow. For Saturated steam, K_{sh}=1. When the steam is superheated, use Appendix I and read the superheat correction factor under the total steam temperature column.

Pressure	Total Temperature of superheated steam (°F)																	
(psia)	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	
50	0.987	0.957	0.963	0.905	0.882	0.861	0.841	0.823	0.805	0.789	0.774	0.759	0.745	0.732	0.719	0.708	0.696	
100	0.998	0.963	0.935	0.909	0.885	0.864	0.843	0.825	0.807	0.79	0.775	0.76	0.746	0.733	0.72	0.708	0.697	
150	0.984	0.97	0.94	0.913	0.888	0.866	0.846	0.826	0.808	0.792	0.776	0.761	0.747	0.733	0.721	0.709	0.697	
200	0.979	0.977	0.945	0.917	0.892	0.869	0.848	0.828	0.81	0.793	0.777	0.762	0.748	0.734	0.721	0.709	0.698	
250	***	0.972	0.951	0.921	0.895	0.871	0.85	0.83	0.812	0.794	0.778	0.763	0.749	0.735	0.722	0.71	0.698	
300	***	0.968	0.957	0.926	0.898	0.874	0.852	0.832	0.813	0.796	0.78	0.764	0.75	0.736	0.723	0.71	0.699	
350	***	0.968	0.963	0.93	0.902	0.877	0.854	0.834	0.815	0.797	0.781	0.765	0.75	0.736	0.723	0.711	0.699	
400	***	***	0.963	0.935	0.906	0.88	0.857	0.836	0.816	0.798	0.782	0.766	0.751	0.737	0.724	0.712	0.7	
450	***	***	0.961	0.94	0.909	0.883	0.859	0.838	0.818	0.8	0.783	0.767	0.752	0.738	0.725	0.712	0.7	
500	***	***	0.961	0.946	0.914	0.886	0.862	0.84	0.82	0.801	0.784	0.768	0.753	0.739	0.725	0.713	0.701	
550	***	***	0.962	0.952	0.918	0.889	0.864	0.842	0.822	0.803	0.785	0.769	0.754	0.74	0.726	0.713	0.701	
600	***	***	0.964	0.958	0.922	0.892	0.867	0.844	0.823	0.804	0.787	0.77	0.755	0.74	0.727	0.714	0.702	
650	***	***	0.968	0.958	0.927	0.896	0.869	0.846	0.825	0.806	0.788	0.771	0.756	0.741	0.728	0.715	0.702	
700	***	***	***	0.958	0.931	0.899	0.872	0.848	0.827	0.807	0.789	0.772	0.757	0.742	0.728	0.715	0.703	
750	***	***	***	0.958	0.936	0.903	0.875	0.85	0.828	0.809	0.79	0.774	0.758	0.743	0.729	0.716	0.703	
800	***	***	***	0.96	0.942	0.906	0.878	0.852	0.83	0.81	0.792	0.774	0.759	0.744	0.73	0.716	0.704	
850	***	***	***	0.962	0.947	0.91	0.88	0.855	0.832	0.812	0.793	0.776	0.76	0.744	0.73	0.717	0.704	
900	***	***	***	0.965	0.953	0.914	0.883	0.857	0.834	0.813	0.794	0.777	0.76	0.745	0.731	0.718	0.705	
950	***	***	***	0.969	0.958	0.918	0.886	0.86	0.836	0.815	0.796	0.778	0.761	0.746	0.732	0.718	0.705	
1000	***	***	***	0.974	0.959	0.923	0.89	0.862	0.838	0.816	0.797	0.779	0.762	0.747	0.732	0.719	0.706	
1050	***	***	***	***	0.96	0.927	0.893	0.864	0.84	0.818	0.798	0.78	0.763	0.748	0.733	0.719	0.707	
1100	***	***	***	***	0.962	0.931	0.896	0.867	0.842	0.82	0.8	0.781	0.764	0.749	0.734	0.72	0.707	
1150	***	***	***	***	0.964	0.936	0.899	0.87	0.844	0.821	0.801	0.782	0.765	0.749	0.735	0.721	0.708	
1200	***	***	***	***	0.96	0.941	0.903	0.872	0.846	0.823	0.802	0.784	0.766	0.75	0.735	0.721	0.708	
1250	***	***	***	***	0.969	0.946	0.906	0.875	0.848	0.825	0.804	0.785	0.767	0.751	0.736	0.722	0.709	
1300	***	***	***	***	0.973	0.952	0.91	0.878	0.85	0.826	0.805	0.786	0.768	0.752	0.737	0.723	0.709	
1350	***	***	***	***	0.977	0.958	0.914	0.88	0.852	0.828	0.807	0.787	0.769	0.753	0.737	0.723	0.71	
1400	***	***	***	***	0.982	0.963	0.918	0.883	0.854	0.83	0.808	0.788	0.77	0.754	0.738	0.724	0.71	
1450	***	***	***	***	0.987	0.968	0.922	0.886	0.857	0.832	0.809	0.79	0.771	0.754	0.739	0.724	0.711	
1500	***	***	***	***	0.993	0.97	0.926	0.889	0.859	0.833	0.811	0.791	0.772	0.755	0.74	0.725	0.711	
1550	***	***	***	***	***	0.972	0.93	0.892	0.861	0.835	0.812	0.792	0.773	0.756	0.74	0.726	0.712	
1600	***	***	***	***	***	0.973	0.934	0.894	0.863	0.836	0.813	0.792	0.774	0.756	0.74	0.726	0.712	
1650	***	***	***	***	***	0.973	0.936	0.895	0.863	0.836	0.812	0.791	0.772	0.755	0.739	0.724	0.71	
1700	***	***	***	***	***	0.973	0.938	0.895	0.863	0.835	0.811	0.79	0.771	0.754	0.738	0.723	0.709	
1750	***	***	***	***	***	0.974	0.94	0.896	0.862	0.835	0.81	0.789	0.77	0.752	0.736	0.721	0.707	
1800	***	***	***	***	***	0.975	0.942	0.897	0.862	0.834	0.81	0.788	0.768	0.751	0.735	0.72	0.705	
1850	***	***	***	***	***	0.976	0.944	0.897	0.862	0.833	0.809	0.787	0.767	0.749	0.733	0.718	0.704	
1900	***	***	***	***	***	0.977	0.946	0.898	0.862	0.832	0.807	0.785	0.766	0.748	0.731	0.716	0.702	
1950	***	***	***	***	***	0.979	0.949	0.898	0.861	0.832	0.806	0.784	0.764	0.746	0.729	0.714	0.7	
2000	***	***	***	***	***	0.982	0.952	0.899	0.861	0.831	0.805	0.782	0.762	0.744	0.728	0.712	0.698	

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 # 006

INSTALLATION GUIDE

- Most Important customer have to check and make sure that the safety valve which is supplied by Harshad Engineering Works is in seal packed cardboard box or in wooden box and it is not tampered, dropped or damage from anywhere during transportation. If it is damaged or been dropped simply return back the safety valve to the manufacturer.
- Inspect each valve before installation and make sure that it is clean. Foreign particles can be carried into or through the valve during operation, which may damage the seat, resulting in leakage or malfunction.
- Prior to installation of the valve, clean the piping or vessel on which the Safety Valve is to be installed. It is recommended that safety relief valves be stored indoor in a clean, dry, place, well protected from the weather, sand, dust or other contamination sources.
- Safety Valve general detail like Inlet & Outlet Size, Set Pressure, Flow capacity, MOC, etc. is mentioned on the Name Plate which is attached to the body and if Name Plate is not attached then the detail is marked by permanent laser mark on bonnet of the Valve.
- Ensure the flange diameter on which valve is installed is same as Safety valve Inlet Size.
- Safety Valve should always be mounted in a vertical position directly on nozzle having well rounded approach that provides smooth and unobstructed flow from the vessel or line to the valve. Horizontal mounting could affect the alignment of the moving parts and affect the operation of the valve.
- Make sure there should not be any obstacle which create back pressure or blockage through outlet line of the safety valve.
- After installing safety valve customer has to check again by pulling handle by making sure that safety valve is in working conditions (Note: Handle will work only when pressure is flowing through the safety valve). If handle is not working or its jammed just reject safety valve.
- Test Gag is used for high pressure hydrostatic testing or cleaning of vessel or line but it is highly recommended to use blank flange at the time of hydrostatic test of vessel or line, because excessive tightening of test gag may damage or bend the valve spindle.
- Drain plug are located on the safety valve body and should piped to a drainage system to remove condensate from the valve bodies.
- Harshad Engineering Works hereby warrants that the goods delivered will be free from defect in material and workmanship for a period of 18months from the shipment or 12months from installation, whichever is earlier. within this period any of our products claimed defective may be returned to our factory after examination by us, Safety Valve will be repaired or replaced free of charge. Such defects shall be shall be exclusive of the effects of corrosion, erosion, normal ware or improper handling or storage.
- Safety Valve is a safety related component or instrument and it is recommend to calibrate every six months.
- Any Installation, Maintenance, Adjustment, Repair or Test performed on the product must be done in accordance with the requirements of all applicable codes and standard.