

**ASME Section 1, Steam Boiler Applications**

Job Name \_\_\_\_\_  
 Job Location \_\_\_\_\_  
 Engineer \_\_\_\_\_  
 Approval \_\_\_\_\_

Contractor \_\_\_\_\_  
 Approval \_\_\_\_\_  
 Contractor's P.O. No. \_\_\_\_\_  
 Representative \_\_\_\_\_

**Series Figure 31**  
**Bronze and Cast Iron Safety**  
**Relief Valves**  
**For Steam Boilers**

**Sizes: Bronze - 1/2" – 2 1/2" (15 – 65mm)**  
**Cast iron - 1 1/2" – 6" (40 – 150mm)**

Figure 31 is a safety relief valve which provides over pressure protection of steam boilers operating up to 250psi (17.2 bar) and 406°F (208°C) saturated steam. Figure 31 safety relief valves meet ASME Section 1 code.

**Features**

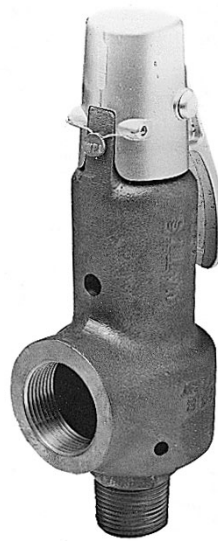
- 2 piece body design
- Enclosed springs
- 2-ring control
- Provides precise pop action and seat tightness
- Single unit cap and lifting lever

**Approvals**

Rated in accordance with ASME Section I

**Pressure – Temperature**

Maximum Working Pressure: 250psi (17.2 bar)  
 Maximum Working Temperature: 406°F (208°C)



**Fig. 31**  
Bronze safety valves



**Fig. 31**  
Flanged cast iron safety valves

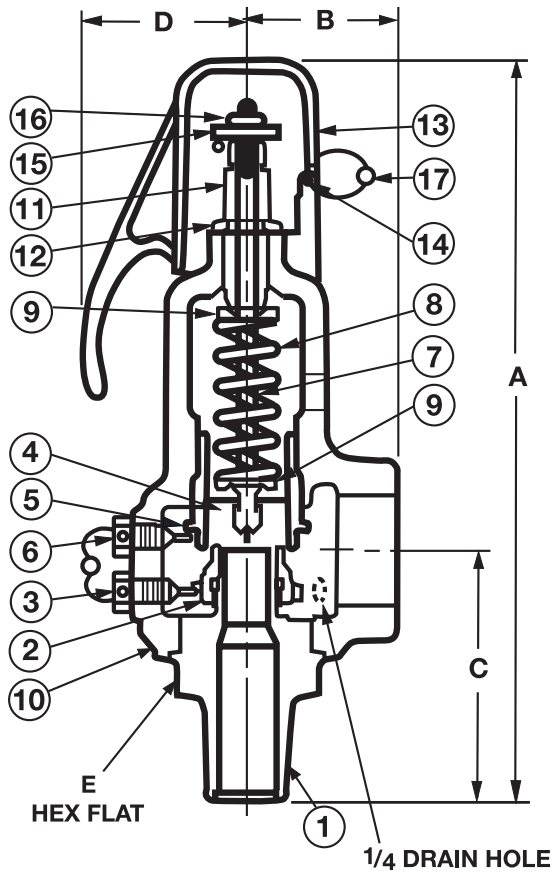


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## Dimensions – Weights

### Watts Bronze Safety Relief Valves

Figure 31



## Materials

REF. NO.	PART NAME	MATERIAL
1	Base	Bronze
2	Base Ring	Bronze
3	Base Ring Set Screw	Brass
4	Disc	Bronze
5	Guide and Ring	Bronze
6	Guide Ring Set Screw	Brass
7	Spindle	Steel
8	Spring	Plated Steel
9	Spring Washer	Steel
10	Bonnet	Bronze
11	Adjusting Bolt	Brass
12	Adjusting Bolt Locknut	Plated Steel
13	Lifting Cap Zinc	Alloy/Steel
14	Lifting Cap Pin	Plated Steel
15	Spindle Nut	Plated Steel
16	Spindle Nut Locknut	Plated Steel
17	Seal and Wire	Stainless Steel

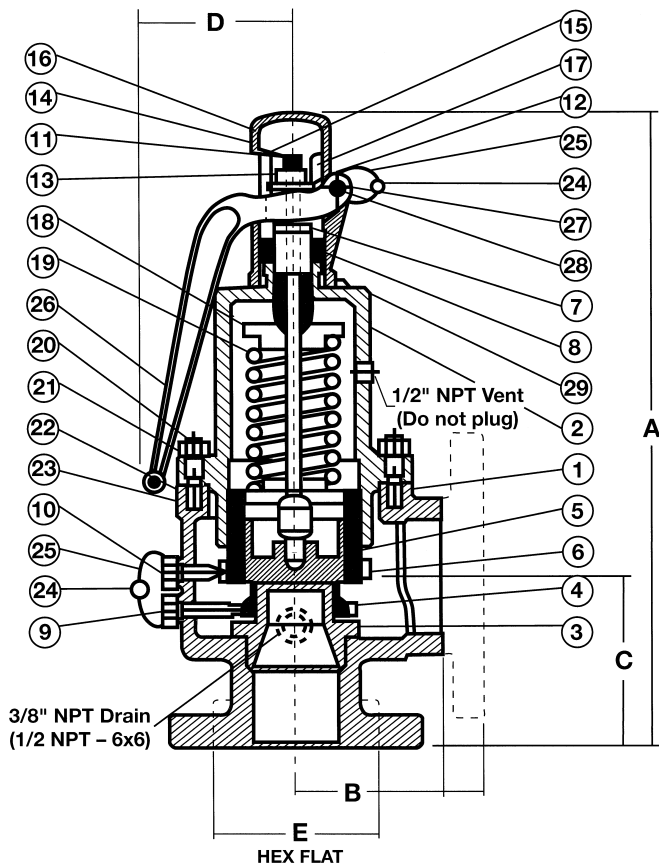
VALVE SIZE		ORIFICE SIZE	DIMENSIONS						WEIGHT					
Inlet x Outlet			A		B		C		D*		E		lbs.	kgs.
in.	mm		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm		
1/2 x 3/4	15 x 20	D	6 <sup>9</sup> / <sub>16</sub>	167	1 <sup>3</sup> / <sub>8</sub>	35	2 <sup>1</sup> / <sub>4</sub>	57	1 <sup>3</sup> / <sub>8</sub>	35	1 <sup>1</sup> / <sub>8</sub>	29	2	0.9
3/4 x 3/4	20 x 20	D	6 <sup>9</sup> / <sub>16</sub>	167	1 <sup>3</sup> / <sub>8</sub>	35	2 <sup>1</sup> / <sub>4</sub>	57	1 <sup>3</sup> / <sub>8</sub>	35	1 <sup>1</sup> / <sub>4</sub>	32	2.25	1.0
3/4 x 1	20 x 25	E	7 <sup>1</sup> / <sub>8</sub>	181	1 <sup>5</sup> / <sub>8</sub>	41	2 <sup>5</sup> / <sub>16</sub>	59	1 <sup>3</sup> / <sub>8</sub>	35	1 <sup>1</sup> / <sub>4</sub>	32	2.5	1.1
1 x 1	25 x 25	E	7 <sup>1</sup> / <sub>8</sub>	181	1 <sup>5</sup> / <sub>8</sub>	41	2 <sup>5</sup> / <sub>16</sub>	59	1 <sup>3</sup> / <sub>8</sub>	35	1 <sup>1</sup> / <sub>2</sub>	38	2.75	1.2
1 x 1 <sup>1</sup> / <sub>4</sub>	25 x 32	F	9	229	1 <sup>7</sup> / <sub>8</sub>	48	2 <sup>13</sup> / <sub>16</sub>	71	1 <sup>13</sup> / <sub>16</sub>	46	1 <sup>1</sup> / <sub>2</sub>	38	4	1.8
1 <sup>1</sup> / <sub>4</sub> x 1 <sup>1</sup> / <sub>4</sub>	32 x 32	F	9	229	1 <sup>7</sup> / <sub>8</sub>	48	2 <sup>13</sup> / <sub>16</sub>	71	1 <sup>13</sup> / <sub>16</sub>	46	1 <sup>3</sup> / <sub>4</sub>	44	4.25	1.9
1 <sup>1</sup> / <sub>4</sub> x 1 <sup>1</sup> / <sub>2</sub>	32 x 40	G	9 <sup>11</sup> / <sub>16</sub>	246	2 <sup>1</sup> / <sub>8</sub>	54	3	76	1 <sup>13</sup> / <sub>16</sub>	46	1 <sup>7</sup> / <sub>8</sub>	48	7	3.2
1 <sup>1</sup> / <sub>2</sub> x 1 <sup>1</sup> / <sub>2</sub>	40 x 40	G	9 <sup>11</sup> / <sub>16</sub>	246	2 <sup>1</sup> / <sub>8</sub>	54	3	76	1 <sup>13</sup> / <sub>16</sub>	46	2 <sup>1</sup> / <sub>16</sub>	52	7.25	3.3
1 <sup>1</sup> / <sub>2</sub> x 2	40 x 50	H	12 <sup>1</sup> / <sub>8</sub>	308	2 <sup>9</sup> / <sub>16</sub>	65	3 <sup>1</sup> / <sub>2</sub>	89	2 <sup>3</sup> / <sub>4</sub>	70	2 <sup>1</sup> / <sub>4</sub>	57	13.5	6.1
2 x 2	50 x 50	H	12 <sup>1</sup> / <sub>8</sub>	308	2 <sup>9</sup> / <sub>16</sub>	65	3 <sup>1</sup> / <sub>2</sub>	89	2 <sup>3</sup> / <sub>4</sub>	70	2 <sup>9</sup> / <sub>16</sub>	65	13.75	6.2
2 x 2 <sup>1</sup> / <sub>2</sub>	50 x 65	J	13 <sup>3</sup> / <sub>16</sub>	338	3 <sup>1</sup> / <sub>8</sub>	79	3 <sup>3</sup> / <sub>4</sub>	95	2 <sup>3</sup> / <sub>4</sub>	70	2 <sup>3</sup> / <sub>4</sub>	70	17.5	7.9
2 <sup>1</sup> / <sub>2</sub> x 2 <sup>1</sup> / <sub>2</sub>	65 x 65	J	13 <sup>3</sup> / <sub>16</sub>	338	3 <sup>1</sup> / <sub>8</sub>	79	3 <sup>3</sup> / <sub>4</sub>	95	2 <sup>3</sup> / <sub>4</sub>	70	3	76	17.75	8.0

\*Add 1/2" to D dimension when lever is pulled out to manually operate the valve.

# Dimensions – Weights

## Watts Cast Iron Safety Relief Valves

Figure 31



## Materials

REF. NO.	PART NAME	MATERIAL
1	Body	ASTM A126-B (Grey Iron)
2	Bonnet	ASTM A126-B (Grey Iron)
3	Nozzle	ASTM B26 (Bronze)
4	Nozzle Ring	ASTM B584-844 (Bronze)
5	Disc	ASTM B62 (Bronze)
6	Guide Ring	ASTM B584-844 (Bronze)
7	Adjusting Bolt	ASTM B16 (Brass)
8	Adjusting Bolt Locknut	Steel (Zn Plate)
9	Nozzle Ring Set Screw	Brass
10	Guide Ring Set Screw	Brass
11	Spindle	ASTM A108 Grade 1212
12	Spindle Nut	ASTM A108 Grade 1212
13	Spindle Nut Lock nut	Steel AISI (Zn Plate)
14	Lifting Cap	A126-B Cast Iron
15	Lifting Cap Pins	Steel 1020 (Zn Plate)
16	Pivot Post	Steel AISI
17	Post Pin	Steel AISI 1070 (Zn Plate)
18	Spring Washer	Steel AISI 1212
19	Spring	Steel (Zn Plate)
20	Stud	Steel ASTM A193 B7
21	Stud Nut	Steel ASTM A194 2H
22	Name Plate	SST AISI 304
23	Name Plate Screws	SST 18-8
24	Lead Seal	Lead Commercial
25	Seal Wire	SST AISI 304
26	Lifting Lever	A126-B Cast Iron
27	Clevis Pin	Steel (Zn)
28	Cotter Pin	Steel
29	Liftcap Lockscrew	Steel

VALVE SIZE		ORIFICE SIZE	DIMENSIONS								WEIGHT			
Inlet & Outlet (in.)			A		B		C		D		E		lbs.	kgs.
in.	mm		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm		
1½-250# x 2½ NPT	40 – 65	J	15	381	¾	83	4¼	108	3	76	–	–	24	11
1½ NPT x 2½ NPT	40 – 65	J	14½	368	¾	83	4¼	108	3	76	¾	70	20	9
2-250# x 3 NPT	50 – 80	J,K	15¾	400	4	102	4⅝	117	3½	89	–	–	42	19
2 NPT x 3 NPT	50 – 80	K	15¾	400	4	102	4⅝	117	3½	89	⅜	92	36	16
2½-250# x 3 NPT	65 – 80	K	15¾	400	4	102	4¾	121	3½	89	–	–	45	20
2½-250# x 4 NPT	65 – 100	L	23	584	5½	130	5½	140	6	152	–	–	105	48
2½ NPT x 4 NPT	65 – 100	L	23	584	5½	130	5½	140	6	152	4½	114	97	44
3-250# x 3 NPT	80 – 80	K	15¾	400	4	102	5	127	3½	89	–	–	48	22
3-250# x 4 NPT	80 – 100	L,M	23	584	5½	130	5½	140	6	152	–	–	107	49
3-NPT# x 4 NPT	80 – 100	M	23⅝	587	5½	130	5⅝	143	6	152	4½	114	99	45
4-250# x 6-125#	100 – 150	N,P	28½	724	7¼	184	6¾	171	6	152	–	–	212	96
6-250# x 8-125#	150 – 200	Q,R	45⅞	1151	10	254	9¼	235	10½	267	–	–	675	306

# Capacities

**WATTS FIG. 31 ASME SECTION I SERIES VALVES SATURATED STEAM CAPACITIES (LBS/HR @ 90% RATING AND 3% OVERPRESSURE)**

Orifice Area (in <sup>2</sup> )	D 0.1188	E 0.2116	F 0.3318	G 0.5424	H 0.8479	J 1.391	K 1.892	L 2.935	M 3.715	N 4.468	P 6.564	Q 11.365	R 16.475
Set Press. psi													
15	170	303	475	776	1213	1991	2708	4200	5318	6394	9394	16265	23579
20	197	351	550	899	1405	2305	3135	4863	6157	7403	10876	18831	27298
25	224	398	625	1021	1596	2619	3562	5526	6996	8412	12358	21396	31017
30	250	446	700	1144	1788	2933	3989	6188	7835	9420	13839	23962	34736
35	277	494	774	1266	1979	3247	4416	6851	8674	10429	15321	26527	38455
40	304	542	849	1388	2171	3561	4843	7513	9512	11437	16803	29093	42174
45	331	589	924	1511	2362	3875	5270	8176	10351	12446	18285	31658	45893
50	358	637	999	1633	2553	4189	5697	8838	11190	13455	19766	34224	49612
55	385	685	1074	1756	2745	4503	6125	9501	12029	14463	21248	36789	53331
60	411	733	1149	1878	2936	4817	6552	10163	12868	15472	22730	39355	57050
65	438	780	1224	2001	3128	5131	6979	10826	13707	16480	24212	41920	60769
70	466	829	1300	2126	3323	5451	7414	11502	14562	17509	25723	44537	64562
75	493	878	1377	2252	3520	5774	7854	12184	15426	18548	27249	47180	68393
80	521	928	1455	2378	3717	6098	8294	12866	16290	19587	28775	49822	72223
85	548	977	1532	2504	3914	6421	8734	13549	17154	20626	30302	52464	76054
90	576	1026	1609	2630	4111	6745	9174	14231	18018	21665	31828	55107	79884
95	604	1075	1686	2756	4308	7068	9614	14914	18882	22703	33354	57749	83715
100	631	1124	1763	2882	4506	7392	10054	15596	19746	23742	34880	60392	87546
105	659	1174	1840	3008	4703	7715	10494	16279	20610	24781	36406	63034	91376
110	687	1223	1917	3134	4900	8038	10934	16961	21474	25820	37932	65677	95207
115	714	1272	1995	3261	5097	8362	11374	17643	22338	26859	39459	68319	99037
120	742	1321	2072	3387	5294	8685	11813	18326	23202	27898	40985	70962	102868
125	769	1370	2149	3513	5491	9009	12253	19008	24066	28937	42511	73604	106699
130	797	1420	2226	3639	5688	9332	12693	19691	24930	29975	44037	76247	110529
135	825	1469	2303	3765	5886	9655	13133	20373	25794	31014	45563	78889	114360
140	852	1518	2380	3891	6083	9979	13573	21055	26658	32053	47090	81532	118190
145	880	1567	2457	4017	6280	10302	14013	21738	27522	33092	48616	84174	122021
150	908	1616	2535	4143	6477	10626	14453	22420	28386	34131	50142	86817	125851
155	935	1666	2612	4269	6674	10949	14893	23103	29250	35170	51668	89459	129682
160	963	1715	2689	4396	6871	11273	15333	23785	30114	36208	53194	92101	133513
165	990	1764	2766	4522	7068	11596	15773	24468	30978	37247	54721	94744	137343
170	1018	1813	2843	4648	7266	11919	16212	25150	31842	38286	56247	97386	141174
175	1046	1862	2920	4774	7463	12243	16652	25832	32706	39325	57773	100029	145004
180	1073	1912	2997	4900	7660	12566	17092	26515	33570	40364	59299	102671	148835
185	1101	1961	3075	5026	7857	12890	17532	27197	34434	41403	60825	105314	152666
190	1128	2010	3152	5152	8054	13213	17972	27880	35298	42442	62351	107956	156496
195	1156	2059	3229	5278	8251	13537	18412	28562	36162	43480	63878	110599	160327
200	1184	2108	3306	5404	8448	13860	18852	29244	37026	44519	65404	113241	164157
205	1211	2158	3383	5531	8646	14183	19292	29927	37890	45558	66930	115884	167988
210	1239	2207	3460	5657	8843	14507	19732	30609	38754	46597	68456	118526	171818
215	1267	2256	3538	5783	9040	14830	20172	31292	39618	47636	69982	121169	175649
220	1294	2305	3615	5909	9237	15154	20612	31974	40482	48675	71509	123811	179480
225	1322	2354	3692	6035	9434	15477	21051	32656	41346	49714	73035	126453	183310
230	1349	2404	3769	6161	9631	15800	21491	33339	42210	50752	74561	129096	187141
235	1377	2453	3846	6287	9829	16124	21931	34021	43074	51791	76087	131738	190971
240	1405	2502	3923	6413	10026	16447	22371	34704	43938	52830	77613	134381	194802
245	1432	2551	4000	6540	10223	16771	22811	35386	44802	53869	79140	137023	198633
250	1460	2600	4078	6666	10420	17094	23251	36069	45666	54908	80666	139666	202463



Water Safety & Flow Control Products

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