

# SPECIALTY PRODUCTS

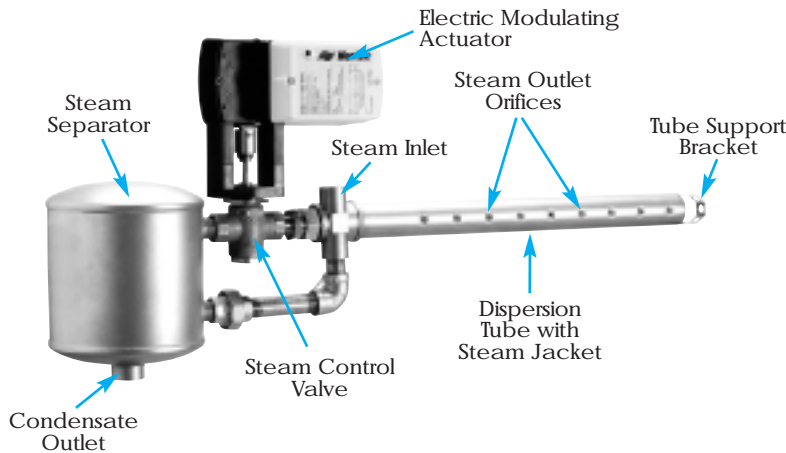
## WLS & WSE

### Steam Humidifiers

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#### WLS - Steam Injection Humidifier



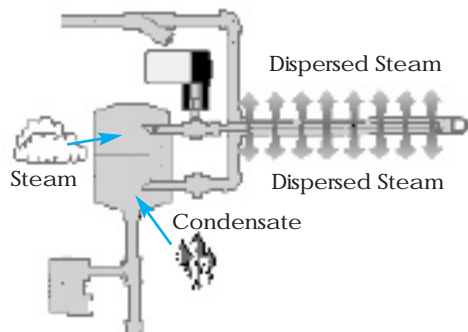
**WSAM-e (Short Absorption Manifold)**  
WLS Steam Humidifier mounted with a WSAM-e Manifold.

#### TYPICAL APPLICATIONS

The WLS Steam Injection Humidifier and the WSE Steam Exchange Humidifier supply precise humidity control from the facility steam boiler into the air stream. Typically used in manufacturing plants, printing plants, commercial offices, hospitals and any other facilities which require a critical balance between temperature and humidity control.

#### HOW IT WORKS

The WLS Steam Injection Humidifier works by injecting steam directly from the boiler (live steam) into the duct work or an air stream. Live steam enters a steam jacket to preheat the dispersion tube. Steam then flows into the separator where condensate is removed. Dry steam is then discharged through the dispersion tube for circulation into the air stream.



#### MATERIALS

Separator	304 & 316 SST
Dispersion Tube	304 SST

#### FEATURES

- Provides accurate humidity control
- Simple and cost efficient system to meet high humidity requirements
- Available for regular or purified boiler steam
- Available for single or multiple tube applications
- Capacities up to 3200 lbs/hr
- Pressure ranges from 2-50 PSIG
- Available for pneumatic or electric controls
- All stainless steel distributors and nozzles ensure permanent bond
- Separator & Steam jacket included in order to provide highest quality steam (WLS only)

#### INSTALLATION

Distributor must be mounted level in a straight section of duct, with steam outlets facing into the air stream. A steam trap should be installed on the separator outlet, allowing for proper condensate removal. Also include a strainer upstream of humidifier inlet.

#### MAINTENANCE

The strainer should be cleaned periodically. The valve, actuator, steam trap and temperature switch should be inspected annually to confirm proper operation. For full maintenance details, see installation and maintenance manual.

#### HOW TO ORDER

Consult factory for sizing and selection. Provide required humidification load, steam pressure at humidifier inlet, duct dimensions, actuator type and any accessories.

# SPECIALTY PRODUCTS

## WLS & WSE

### Steam Humidifiers

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#### WSE - Steam Exchange Humidifier

#### HOW IT WORKS

The WSE Steam Exchange Humidifier works by using existing boiler steam and creating clean steam by using steam to steam generation. The clean steam generated by this process is then used for humidification. The WSE will heat clean water and disperse it into the air.



#### FEATURES

- Provides accurate humidity control
- Intuitive scale management based on steam production
- All components suitable for RO or DI water
- Internal water tempering for drain water cooling
- Capacities up to 1050 lbs/hr
- Built-in Float & Thermostatic Steam trap(s)
- Fully insulated tank for efficient operation
- Pre-cleaning sequence ensures shorter maintenance time
- All stainless steel distributors and nozzles ensure permanent bond
- Network up to 10 units

#### WLS Series – Technical Data

SPECIFICATION	Separator Distributor	Model 200	Model 300	Model 450	Model 600	Model 800	
		Model WLS1	Model WLS2	Model WLS3	Model WLS3	Model WLS3	WSAM-e
Pressure Range - PSIG (kPa)		2-50 (14-354)					
Max. Capacity Single Tube-lbs/hr (kg/hr)		284(129)	571(259)	916(417)	1258(572)	N/A	N/A
Max. Capacity Multi Tube-lbs/hr (kg/hr)		374(170)	653(297)	1030(468)	1664(757)	3209(1456)	3200(1451.5)
Separator Physical Data		7.7" x 6"	8.8" x 6"	10.5" x 6"	11.2" x 9"	12.6" x 9"	Custom
Height x Diameter		195mm x 152mm	223mm x 152mm	268mm x 152mm	284mm x 229mm	322mm x 229mm	
Standard Actuator		Electric Modulating 0-10 VDC, 24 VAC					
Standard Steam Trap		Float & Thermostatic					
Separator and Dispersion Tube Material		Stainless Steel 304					

Options available, contact factory; Pneumatic actuator, Electric on/off actuator, tube insulation, DI water installation.

#### WSE Series – Technical Data

SPECIFICATION	WSE 100	WSE 175	WSE 250	WSE 375	WSE 475	WSE 675	WSE 950	WSE 1050
Pressure Range - PSIG (kPa)	5-15(35-105)							
Max. Capacity - lbs/hr (kg/hr)	5-100(245)	7-175(3-79)	11-250(5-114)	15-375(7-110)	24-475(11-215)	30-675(14-306)	58-950(26-430)	67-1050(30-476)
Physical Data	7.7" x 6"		8.8" x 6"		10.5" x 6"		11.2" x 9"	
Height x Diameter	195mm x 152mm		223mm x 152mm		268mm x 152mm		284mm x 229mm	
Standard Actuator	Electric Modulating 0-10 VDC, 24 VAC							
Built-in Steam Trap	Float & Thermostatic							
Insulation & Cabinetry	Standard							
Voltage/Phase	110-120/1							
Full Load Amps	2.1							
Internal Smart Drain Water Cooler	Standard							
Telescope Stand	Standard							
Steam Outlet(s) - OD	1 x 1.75" (1 x 4.44cm)		1 x 3" (1 x 7.62cm)		1 x 4" (1 x 10.16cm)		2 x 4" (2 x 10.16cm)	

Options available, contact factory; Keep Warm Feature, Freeze Protection, Outdoor Enclosure.

SPECIALTY

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## WSVB Series

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### Safety Relief Valves "UV" Steam-ASME Section VIII Pressure Vessels

Revised 9/2004

Model	WSVB
Sizes	1/2", 3/4", 1", 1 1/4", 1 1/2", 2", 2 1/2"
Connections	NPT
Body Material	Bronze
PMO Max. Operating Pressure	250 PSIG (steam)
TMO Max. Operating Temperature	406 °F



#### TYPICAL APPLICATIONS

The WSVB Safety Relief Valves are used for over-pressure protection on unfired pressure vessels in saturated steam systems.

#### HOW IT WORKS

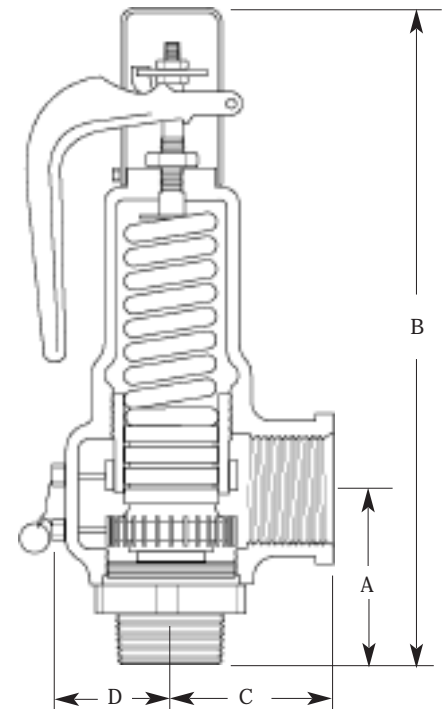
As safety relief valves open on a non-compressible fluid application, the disc lifts directly proportional to the increase in system pressure over the valve set point. Safety relief valves not only provide over pressure protection resulting from thermal expansion of liquids but will respond with a rapid full opening "pop" action on systems which contain steam, air or gas.

#### FEATURES

- Stainless Steel springs
- Teflon® PFA seat resists corrosive boiler chemicals
- Two control rings for maximum performance & adjustability
- Tapped body drain allows piping of condensate away from equipment

#### SAMPLE SPECIFICATION

Safety relief valves shall be cast bronze construction with stainless steel springs, Teflon PFA seats and rust-proof steel stems. Units shall be qualified to the ASME Boiler Code, Section VIII and suitable for steam service.



#### DIMENSIONS – inches / pounds

Model No.	Orifice Size	Inlet x Outlet MNPT x FNPT	A	B	C	D	Weight (lbs)
WSVB-12M-13S-D	D	1/2" x 3/4"	1 <sup>25</sup> / <sub>32</sub>	6 <sup>1</sup> / <sub>8</sub>	1 <sup>23</sup> / <sub>64</sub>	27 <sup>32</sup> / <sub>32</sub>	1.5
WSVB-13M-13S-D	D	3/4" x 3/4"	1 <sup>25</sup> / <sub>32</sub>	6 <sup>3</sup> / <sub>16</sub>	1 <sup>23</sup> / <sub>64</sub>	27 <sup>32</sup> / <sub>32</sub>	1.5
WSVB-13M-14S-E	E	3/4" x 1"	1 <sup>6</sup> / <sub>64</sub>	6 <sup>5</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>16</sub>	1.9
WSVB-14M-14S-E	E	1" x 1"	2 <sup>5</sup> / <sub>64</sub>	6 <sup>3</sup> / <sub>4</sub>	1 <sup>3</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>16</sub>	2.08
WSVB-14M-15S-F	F	1" x 1 1/4"	2 <sup>3</sup> / <sub>8</sub>	8 <sup>25</sup> / <sub>32</sub>	2	1 <sup>7</sup> / <sub>16</sub>	3.90
WSVB-15M-15S-F	F	1 1/4" x 1 1/4"	2 <sup>7</sup> / <sub>16</sub>	8 <sup>27</sup> / <sub>32</sub>	2	1 <sup>7</sup> / <sub>16</sub>	4.05
WSVB-15M16S-G	G	1 1/4" x 1 1/2"	2 <sup>11</sup> / <sub>16</sub>	10 <sup>3</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>8</sub>	1 <sup>11</sup> / <sub>16</sub>	7.03
WSVB-16M-16S-G	G	1 1/2" x 1 1/2"	2 <sup>3</sup> / <sub>4</sub>	10 <sup>1</sup> / <sub>4</sub>	2 <sup>3</sup> / <sub>8</sub>	1 <sup>11</sup> / <sub>16</sub>	6.98
WSVB-16M-17S-H	H	1 1/2" x 2"	3 <sup>3</sup> / <sub>64</sub>	11 <sup>9</sup> / <sub>32</sub>	2 <sup>3</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>16</sub>	11.20
WSVB-17M-17S-H	H	2" x 2"	3 <sup>7</sup> / <sub>64</sub>	11 <sup>11</sup> / <sub>32</sub>	2 <sup>3</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>16</sub>	11.33
WSVB-17M-18S-J	J	2" x 2 1/2"	3 <sup>7</sup> / <sub>16</sub>	13 <sup>5</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>16</sub>	19.20
WSVB-18M-18S-J	J	2 1/2" x 2 1/2"	3 <sup>13</sup> / <sub>16</sub>	14	3 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>16</sub>	19.80

#### MATERIALS

Body	Bronze
Guide Ring	Brass
Disc	Brass
Seat Insert	Teflon® PFA
Stem	Steel-Plated

SPECIALTY

# SPECIALTY PRODUCTS

## WSVB Series

### Safety Relief Valves "UV" Steam-ASME Section VIII Pressure Vessels

Revised 9/2004

CAPACITIES – Pounds of saturated steam per hour (lbs/hr)						
SET PRESSURE (PSIG)	Orifice "D" .405 Diameter	Orifice "E" .541 Diameter	Orifice "F" .676 Diameter	Orifice "G" .866 Diameter	Orifice "H" 1.082 Diameter	Orifice "J" 1.386 Diameter
15	179	320	499	819	1278	2099
20	207	369	576	945	1474	2420
25	234	417	652	1070	1669	2741
30	262	467	728	1195	1865	3062
35	292	521	812	1333	2080	3415
40	322	574	896	1471	2295	3768
45	352	628	980	1609	2510	4121
50	382	682	1064	1746	2725	4474
55	412	736	1148	1884	2940	4827
60	443	790	1232	2022	3155	5180
65	473	843	1316	2160	3370	5533
70	503	897	1400	2298	3585	5886
75	533	951	1484	2435	3800	6239
80	563	1005	1568	2573	4015	6592
85	593	1059	1652	2711	4230	6946
90	623	1112	1736	2849	4445	7299
95	654	1166	1820	2987	4660	7652
100	684	1220	1904	3124	4875	8005
105	714	1274	1988	3262	5090	8358
110	744	1328	2072	3400	5305	8711
115	774	1381	2156	3538	5520	9064
120	804	1435	2240	3676	5735	9417
125	835	1489	2324	3813	5950	9770
130	865	1543	2408	3951	6165	10123
135	895	1597	2492	4089	6380	10476
140	925	1651	2576	4227	6595	10829
145	955	1704	2660	4365	6810	11182
150	985	1758	2744	4502	7025	11535
160	1046	1866	2912	4778	7455	12241
170	1106	1973	3080	5054	7885	12947
180	1166	2081	3248	5329	8315	13654
190	1227	2189	3416	5605	8745	14360
200	1287	2296	3584	5881	9175	15066
210	1347	2404	3752	6156	9605	15772
220	1408	2512	3920	6432	10035	16478
230	1468	2619	4088	6707	10465	17184
240	1528	2727	4256	6983	10895	17890
250	1590	2834	4424	7259	11325	18596
Approx. 1 PSI Incr.	6.0	10.8	16.8	27.6	43.0	70.6

Notes: Ratings are 90% of actual capacity.  
Set Pressures over 250 PSI; consult factory.

# SPECIALTY PRODUCTS

## WSVI Series

### Safety Relief Valves "UV" Steam-ASME Section VIII Pressure Vessels

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Model	WSVI
Sizes	1½", 2", 2½", 3", 4", 6"
Connections	NPT, Flanged
Body Material	Cast Iron
PMO Max. Operating Pressure	300 PSIG
TMO Max. Operating Temperature	422° F



### TYPICAL APPLICATIONS

The WSVI Safety Relief Valves are used for over-pressure protection on unfired pressure vessels in saturated steam systems.

### HOW IT WORKS

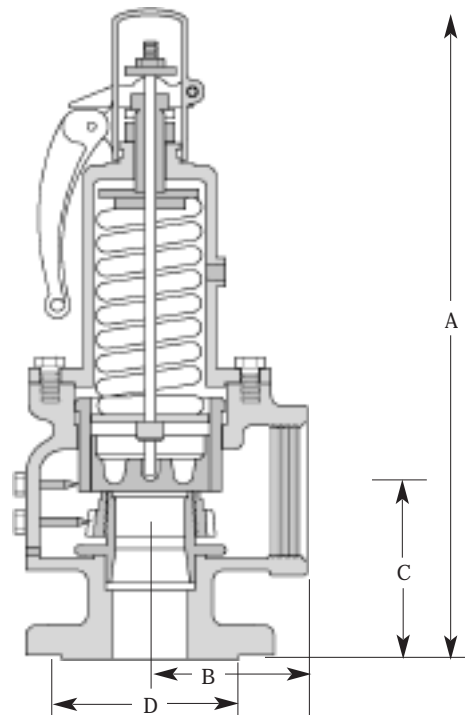
As safety relief valves open on a non-compressible fluid application, the disc lifts directly proportional to the increase in system pressure over the valve set point. Safety relief valves not only provide over pressure protection resulting from thermal expansion of liquids, but will respond with a rapid full opening "pop" action on systems which contain or generate steam, air or gas.

### FEATURES

- Metal to metal seating, lapped to optical flatness
- Two control rings assure maximum performance & adjustability
- Rust-proofed steel stem, spring and spring washers

### SAMPLE SPECIFICATION

Safety relief valves shall be high capacity design with cast iron construction featuring rust-proof steel stems, springs, washers and metal to metal lapped seats. Units shall be qualified to the ASME Boiler Code Section VIII and suitable for steam service.



DIMENSIONS – inches / pounds								
Model No.	Valve Size Inlet x Outlet	Orifice Size	A	B	C	Hex Flat D	Weight (lbs)	
WSVI-16F-18S-J	1½" 250# x 2½" FNPT	J	15	4	4 <sup>5</sup> / <sub>16</sub>		35	
WSVI-17F-19S-K	2" 250# x 3" FNPT	K	16	4	4 <sup>5</sup> / <sub>8</sub>		36	
WSVI-17S-19S-K	2" FNPT x 3" FNPT	K	16	4	4 <sup>5</sup> / <sub>8</sub>	3¾	37	
WSVI-18F-19S-K	2½" 250# x 3" FNPT	K	16	4	4 <sup>5</sup> / <sub>8</sub>		41	
WSVI-18F-20S-L	2½" 250# x 4" FNPT	L	22	5½	5 <sup>5</sup> / <sub>8</sub>		84	
WSVI-18S-20S-L	2½" FNPT x 4" FNPT	L	22	5½	5 <sup>5</sup> / <sub>8</sub>	5¾	81	
WSVI-19F-20S-L	3" 250# x 4" FNPT	L	22	5½	5 <sup>5</sup> / <sub>8</sub>		85	
WSVI-19S-20S-M	3" FNPT x 4" FNPT	M	22	5½	5 <sup>5</sup> / <sub>8</sub>	5¾	80	
WSVI-19F-20S-M	3" 250# x 4" FNPT	M	22	5½	5 <sup>5</sup> / <sub>8</sub>		87	
WSVI-20F-22F-N	4" 250# x 6" 125#	N	28	7¼	6¾		210	
WSVI-20F-22F-P	4" 250# x 6" 125#	P	28	7¼	6¾		215	
WSVI-22F-23F-Q	6" 250# x 8" 125#	Q	42	10	9¼		530	
WSVI-22F-23F-R	6" 250# x 8" 125#	R	42	10	9¼		530	

### MATERIALS

Body	Cast Iron
Guide Ring	Brass
Disc	Brass or Bronze
Stem	Steel-Plated

SPECIALTY

# SPECIALTY PRODUCTS

## WSVI Series

### Safety Relief Valves “UV” Steam-ASME Section VIII Pressure Vessels

Revised 9/2004

CAPACITIES – Pounds of saturated steam per hour (lbs/hr)								
Set Pressure PSI	Orifice Letter / Area in Square Inches							
	“J” = 1.358	“K” = 1.926	“L” = 2.990	“M” = 3.774	“N” = 4.550	“P” = 6.692	“Q” = 11.593	“R” = 16.798
15	2008	2848	4421	5580	6728	9895	17141	24820
20	2315	3283	5097	6433	7756	11408	19762	28615
25	2622	3719	5773	7287	8785	12921	22383	32410
30	2929	4154	6449	8140	9814	14434	25004	36205
35	3267	4633	7193	9079	10945	16098	27887	40379
40	3604	5112	7936	10017	12077	17762	30771	44554
45	3942	5591	8680	10956	13208	19426	33654	48729
50	4280	6070	9423	11894	14340	21091	36537	52903
55	4618	6549	10167	12833	15471	22755	39420	57078
60	4955	7028	10911	13771	16603	24419	42303	61252
65	5293	7507	11654	14710	17735	26083	45186	65427
70	5631	7986	12398	15649	18866	27748	48069	69601
75	5969	8465	13141	16587	19998	29412	50952	73776
80	6306	8944	13885	17526	21129	31076	53835	77951
85	6664	9423	14629	18464	22261	32740	56719	82125
90	6982	9902	15372	19403	23392	34405	59602	86300
95	7319	10381	16116	20341	24524	36069	62485	90474
100	7657	10860	16859	21280	25655	37733	65368	94649
105	7995	11339	17603	22218	26787	39397	68251	98823
110	8333	11818	18346	23157	27919	41062	71134	102998
115	8670	12297	19090	24096	29050	42726	74017	107173
120	9008	12776	19834	25034	30182	44390	76900	111347
125	9346	13255	20577	25973	31313	46055	79783	115522
130	9684	13734	21321	26911	32445	47719	82666	119696
135	10021	14213	22064	27850	33576	49383	85550	123871
140	10359	14692	22808	28788	34708	51047	88433	128045
145	10697	15171	23552	29727	35839	52712	91316	132220
150	11034	15650	24295	30666	36971	54376	94199	136395
160	11710	16608	25782	32543	39234	57704	99965	144744
165	12048	17087	26526	33481	40366	59369	102848	148918
170	12385	17566	27270	34420	41497	61033	105731	153093
175	12723	18045	28013	35358	42629	62697	108614	157267
180	13061	18524	28757	36297	43760	64361	111497	161442
190	13736	19482	30244	38174	46023	67690	117264	169791
200	14412	20440	31731	40051	48287	71018	123030	178140
210	15087	21398	33218	41928	50550	74347	128796	186489
220	15763	22355	34706	43806	52813	77675	134562	194839
230	16438	23313	36193	45683	55076	81004	140329	203188
240	17113	24271	37680	47460	57339	84332	146095	211537
250	17789	25229	39167	49437	59602	87661	151861	219886
Approx. 1 psi incr.	68	96	149	188	226	333	577	835

Notes: Ratings are 90% of actual capacity.

Set Pressures over 250 PSI; consult factory.

ASME Section 1 – Steam Boilers – pounds of saturated steam per hour @ 3% or 2 PSIG accumulation, (which ever is greater).

ASME Section 8 – Pressure Vessels – pounds of saturated steam per hour @ 10 % or 3 PSIG accumulation, (which ever is greater).

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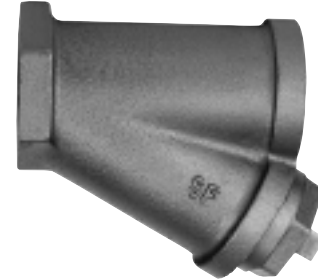
## WCIY Series

### Cast Iron Y-Type Strainers

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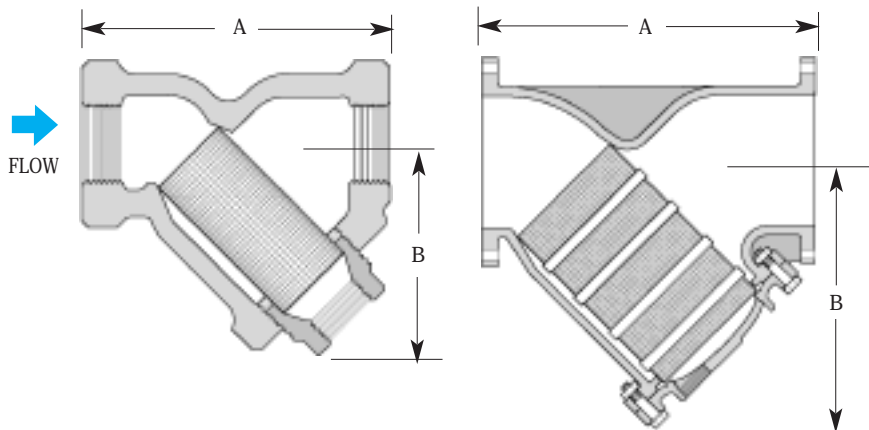
Revised 9/2004

Model	WCIY
Sizes	1/2", 3/4", 1", 1 1/4", 1 1/2", 2", 2 1/2", 3", 4"
Connections	NPT, Flanged
Body Material	Cast Iron



#### PRESSURE/TEMPERATURE RATINGS

NPT 250 PSIG @ 406° F	- Steam
NPT 400 PSIG @ 150° F	- WOG
125# FLG 125 PSIG @ 450° F	- Steam
125# FLG 200 PSIG @ 150° F	- WOG
250# FLG 250 PSIG @ 450° F	- Steam
250# FLG 500 PSIG @ 150° F	- WOG



#### TYPICAL APPLICATIONS

The WCIY Y-Strainer is used to strain dirt particles from fluid in pipe lines and provide inexpensive protection for costly pumps, meters, valves, traps, turbines, and compressors.

#### FEATURES

- Machined seat assures perfect fit for screen
- Blow off connection & easily removable stainless steel cylindrical screens for easy maintenance
- Durable cast iron body

#### INSTALLATION

The strainer should be installed in the flow direction as indicated on the body in either a vertical down or horizontal pipeline. The strainer must be accessible for periodic cleaning.

#### DIMENSIONS - inches / pounds

Size/Connection	Model	A	B	Blowdown NPT	Weight (lbs)	Screen Area
1/2" NPT	WCIY-12-020S250	3 1/4	2 1/4	1/4	2 1/2	5.4
3/4" NPT	WCIY-13-020S250	3 3/4	2 5/8	1/2	3	9.4
1" NPT	WCIY-14-020S250	4	2 3/4	1/2	5	11.9
1 1/4" NPT	WCIY-15-020S250	5	3 3/4	3/4	9	16.2
1 1/2" NPT	WCIY-16-020S250	5 13/16	4	3/4	10	23.2
2" NPT	WCIY-17-020S250	7	5	1	16	35.0
2" 125# FLG	WCIY-17-020F125	9 7/8	6 1/4	1 1/2	36	34.5
2" 250# FLG	WCIY-17-020F250	11 5/8	6 1/2	1 1/2	40	34.5
2 1/2" NPT	WCIY-18-045S250	9 5/16	6	1 1/2	29	47.9
2 1/2" 125# FLG	WCIY18-045F125	11 1/4	7 5/8	1	48	47.3
2 1/2" 250# FLG	WCIY-18-045F250	11 1/16	7	1	52	47.3
3" NPT	WCIY-19-045S250	10 1/8	7	1 1/2	38	64.8
3" 125# FLG	WCIY-19-045F125	12 1/2	8 1/4	1 1/4	86	64.8
3" 250# FLG	WCIY-19-045F250	12 5/8	8	1	86	64.8
4" 125# FLG	WCIY-20-045F125	14 7/8	10 1/8	1 1/4	106	127.2
4" 250# FLG	WCIY-20-045F125	15 1/2	10 3/4	1 1/4	160	127.2

#### MATERIALS

Body	Cast Iron, A126 CLASS B
Plug	Cast Iron, A126 CLASS B
Cover	Cast Iron, A126 CLASS B
*Screen	Stainless Steel
*Gasket	Blue Guard

\*Recommended spare parts.

SPECIALTY

# SPECIALTY PRODUCTS

## WCSY/WSSY Series Y-Type Strainers- Carbon Steel/Stainless

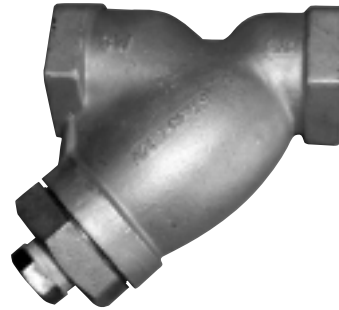
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Model	WCSY, WSSY
Sizes	1/2", 3/4", 1", 1 1/4", 1 1/2", 2"
Connections	NPT, SW
Body Material	Carbon Steel (WCSY) Stainless Steel (WSSY)

### PRESSURE/TEMPERATURE RATINGS

Carbon Steel NPT 600 PSIG @ 839°F  
Stainless Steel NPT 600 PSIG @ 1124°F



### TYPICAL APPLICATION

The WCSY/WSSY Y-Strainers are used to strain dirt particles from fluid in pipe lines and provide inexpensive protection for costly pumps, meters, valves, traps, turbines, and compressors.

### FEATURES

- Machined seat assures perfect fit for screen
- Blow-off connection & easily removable stainless steel cylindrical screens for easy maintenance
- Choice of carbon steel or stainless steel bodies

### INSTALLATION

The strainer should be installed in the flow direction as indicated on the body in either a vertical down or horizontal pipeline. The strainer must be accessible for periodic cleaning.

### MATERIALS

#### WCSY CARBON STEEL MODEL

Body	Carbon Steel, A216 GR WCB
Plug	Carbon Steel, A216 GR WCB
Cover	Carbon Steel, A216 GR WCB
Screen	Stainless Steel
Gasket	Blue Guard

#### WSSY STAINLESS STEEL MODEL

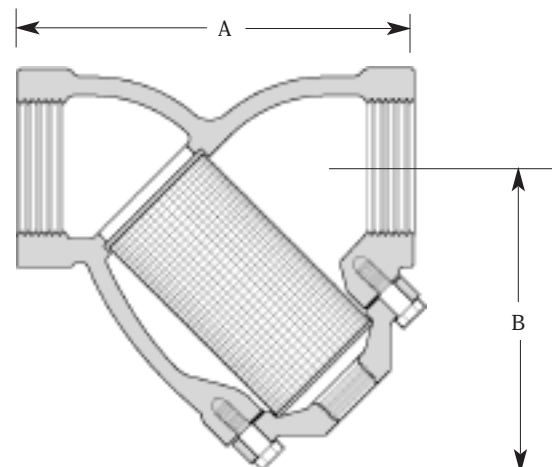
Body	Stainless Steel, A351 GR CF8M
Plug	Stainless Steel, A351 GR CF8M
Cover	Stainless Steel, A351, GR CF8M
Screen	Stainless Steel
Gasket	Blue Guard

### HOW TO ORDER

Specify connection size and connection configuration (NPT or flanged) that will meet application requirements.

### DIMENSIONS – inches / pounds

Size	A	B	Blowdown	Weight (lbs)	Screen Area
1/2"	3 1/4	2 3/16	1/4	4	5.4
3/4"	3 5/8	2 3/4	1/4	5	8.7
1"	4 1/4	3 3/16	1/2	6	12.7
1 1/4"	5 1/4	3 7/8	1/2	8	18.1
1 1/2"	6 1/4	4 3/4	1/2	10	25.3
2"	7 5/8	6	1/2	18	39.2



# SPECIALTY PRODUCTS

## Suction/Mixing Tee

Cast Iron, Bronze or Stainless Steel

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Model	Suction Tee
Sizes	1/2", 3/4", 1", 1 1/4", 1 1/2", 2", 2 1/2", 3"
Connections	NPT
Body Material	Cast Iron, Bronze & Stainless Steel



### PRESSURE/TEMPERATURE RATINGS

Cast Iron NPT 250 PSIG @ 406° F  
Bronze NPT 300 PSIG @ 422° F  
Stainless Steel NPT 450 PSIG @ 400° F

### TYPICAL APPLICATION

The Watson McDaniel Cast Iron, Bronze or Stainless Steel Suction Tee is a specialized type of pipe fitting used for blending, agitation, recirculation, mixing, aeration, and heating.

### HOW IT WORKS

**Heating by Direct Steam Injection:** When using a Suction Tee for heating by direct steam injection, the Suction Tee must be completely submerged in the liquid being heated. When steam enters the primary inlet side of the Suction Tee, a low pressure condition is created inside the Suction Tee body. This causes the liquid inside the tank to circulate through the suction tee and intermix with the steam causing the liquid to be heated.

**Mixing:** When liquid is pumped through the primary inlet of a Suction Tee, a low pressure region is created inside the Suction Tee body. When a Suction tee is submerged, the liquid inside the tank will circulate through the secondary inlet of the Suction Tee causing a mixing action to occur. An alternate method when mixing two different liquids is to pump one liquid through the primary side and the other liquid through the secondary side of the Suction Tee.

**Aeration:** A tank or reservoir of liquid can be aerated by connecting the secondary inlet of the Suction Tee to an air or gas line under pressure while pumping liquid through the primary inlet.

### FEATURES

- Available in cast iron, bronze or stainless steel
- No moving parts
- Quiet operation
- Replaces mixing pumps, propellers & other mechanical devices

### INSTALLATION

Installation should include a strainer and isolation valves for maintenance purposes.

### MAINTENANCE

Watson McDaniel Suction Tee will operate for extended periods of time without maintenance.

### MATERIALS

<b>CAST IRON MODEL</b>	
Body	Cast Iron, A126 CLASS 30
Plug	Cast Iron, A126 CLASS 30
<b>BRONZE MODEL</b>	
Body	Bronze, ASTM B-62
Plug	Stainless Steel, A296, GR 316
<b>STAINLESS STEEL MODEL</b>	
Body	Stainless Steel, A351 GR CF8M
Plug	Stainless Steel, A296, GR 316

# SPECIALTY PRODUCTS

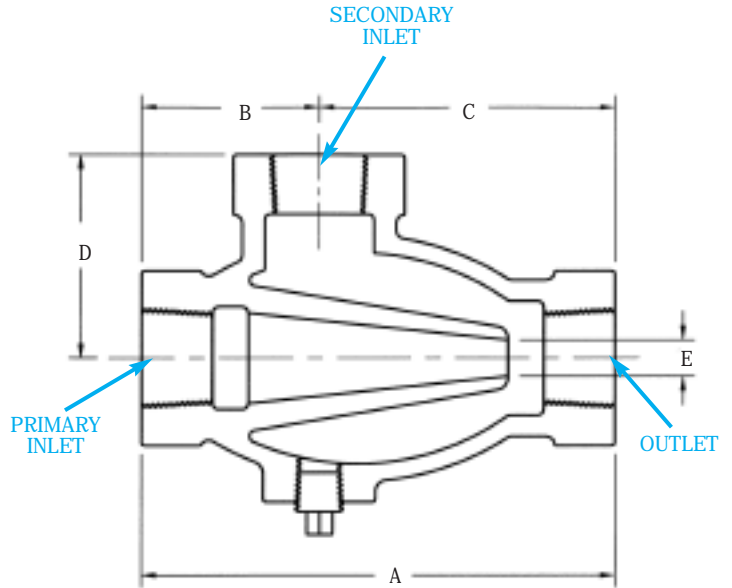
## Suction/Mixing Tee

Cast Iron, Bronze or Stainless Steel

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### DIMENSIONS – inches / pounds

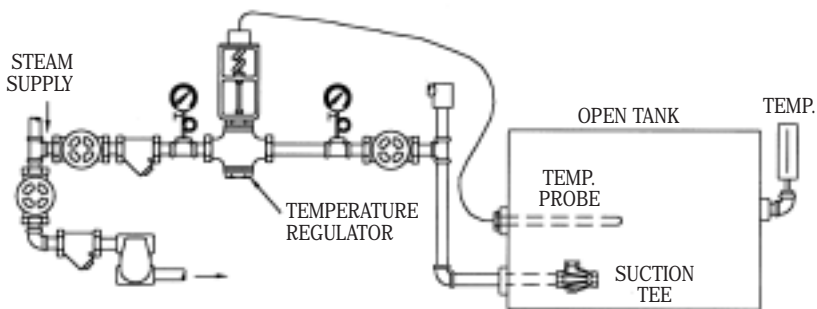
Pipe Size	A	B	C	D	E	Weight (lbs)
<b>125# Cast Iron Body with screwed ends</b>						
1/2"	3 <sup>3</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>4</sub>	1 <sup>3</sup> / <sub>4</sub>	1/4	1.5
3/4"	5	2	3	2-1/8	3/8	3.25
1"	5 <sup>5</sup> / <sub>8</sub>	2 <sup>3</sup> / <sub>16</sub>	3 <sup>7</sup> / <sub>16</sub>	2 <sup>1</sup> / <sub>2</sub>	11/16	4
1 <sup>1</sup> / <sub>4</sub> "	5 <sup>3</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>4</sub>	3 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	11/16	4.75
1 <sup>1</sup> / <sub>2</sub> "	6 <sup>1</sup> / <sub>16</sub>	2 <sup>7</sup> / <sub>16</sub>	3 <sup>5</sup> / <sub>8</sub>	2 <sup>7</sup> / <sub>8</sub>	7/8	5.50
2"	7	2 <sup>7</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>8</sub>	3	15/16	7
2 <sup>1</sup> / <sub>2</sub> "	8 <sup>3</sup> / <sub>8</sub>	3-1/2	4 <sup>7</sup> / <sub>8</sub>	3 <sup>5</sup> / <sub>16</sub>	1	11.75
3"	9 <sup>1</sup> / <sub>2</sub>	4 <sup>1</sup> / <sub>8</sub>	5 <sup>3</sup> / <sub>8</sub>	3 <sup>7</sup> / <sub>8</sub>	1 <sup>5</sup> / <sub>16</sub>	20.50
<b>250# Cast Iron Body &amp; SST with screwed ends</b>						
1"	6 <sup>1</sup> / <sub>16</sub>	2 <sup>5</sup> / <sub>16</sub>	3 <sup>3</sup> / <sub>4</sub>	2 <sup>11</sup> / <sub>16</sub>	11/16	6.75
1 <sup>1</sup> / <sub>4</sub> "	6 <sup>3</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>8</sub>	3 <sup>13</sup> / <sub>16</sub>	2 <sup>13</sup> / <sub>16</sub>	11/16	8
1 <sup>1</sup> / <sub>2</sub> "	6 <sup>1</sup> / <sub>2</sub>	2 <sup>13</sup> / <sub>16</sub>	3 <sup>11</sup> / <sub>16</sub>	2 <sup>7</sup> / <sub>8</sub>	7/8	10.50
2"	7 <sup>3</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>16</sub>	4 <sup>5</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>4</sub>	15/16	16.50



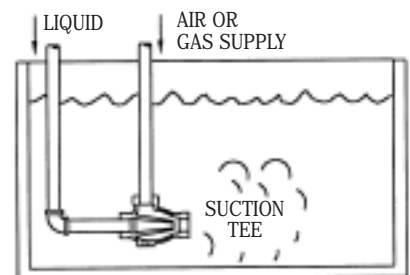
### CAPACITIES – Steam (lbs/hr)

Size	Supply Pressure (PSIG)																	
	5	10	15	20	25	30	35	40	45	50	55	60	65	75	85	100	125	150
1/2"	66	96	114	135	156	165	174	207	240	258	276	294	312	354	396	456	552	630
3/4"	108	138	168	198	228	255	282	309	336	363	390	402	414	504	564	648	792	936
1"	312	390	468	549	630	711	792	882	972	1026	1080	1170	1260	1428	1584	1800	2232	2556
1 <sup>1</sup> / <sub>4</sub> "	444	558	672	783	894	1005	1116	1230	1344	1461	1578	1689	1800	2010	2232	2592	3168	3708
1 <sup>1</sup> / <sub>2</sub> "	612	756	900	1026	1152	1332	1512	1674	1836	1980	2124	2286	2448	2772	3060	3528	4320	5040
2"	798	1008	1206	1410	1614	1815	2016	2214	2412	2610	2808	3024	3240	3636	3996	4680	5652	6696
2 <sup>1</sup> / <sub>2</sub> "	912	1152	1368	1584	1800	2052	2304	2538	2772	2997	3222	3447	3672	4140	4608	5292	6480	7560
3"	1332	1656	1980	2304	2628	2970	3312	3636	3960	4302	4644	4986	5328	5976	6600	7620	9300	10800

### APPLICATIONS



Controlling temperature of large open tank by steam injection



Aeration or Agitation

# SPECIALTY PRODUCTS

## Ejectors

Syphons, Eductors, Exhausters & Injectors

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Model	W-EJECT, W-ELL, W-LM
Sizes	1/2", 3/4", 1", 1 1/4", 1 1/2", 2"
Connections	NPT
Body Material	Bronze (1/2" - 1 1/2") Cast Iron (2")
PMO Max. Operating Pressure	100 PSIG
TMO Max. Operating Temperature	130°F
PMA Max. Allowable Pressure	250 PSIG up to 450°F
TMA Max. Allowable Temperature	450°F @ 250 PSIG



W-ELL  
W-LM

### TYPICAL APPLICATION

Watson McDaniel Ejectors perform a variety of functions depending on the application and motive fluid (steam or water) used. See performance charts on the following pages. Applications include: exhausting, agitating, aerating, circulating, pumping and mixing.

### HOW IT WORKS

Using water, steam or air pressure as the motive force, ejectors operate on the principle that a high velocity flow through a nozzle will create a pressure drop in the area around the nozzle discharge. The resulting vacuum will induce flow into the secondary inlet of the ejector.

### FEATURES

- No moving parts
- Can be used with water or steam pressure
- Submersible
- Available in cast iron or bronze

### SAMPLE SPECIFICATION

Ejectors shall be constructed from bronze or cast iron. Units shall be capable of using steam, water or air as a motive force.

### INSTALLATION

See installation examples on following page.

### MATERIALS

Body (1/2" - 1 1/2")	Bronze
Body (2")	Cast Iron
Nozzles (all sizes)	Bronze

# SPECIALTY PRODUCTS

## Ejectors

### Syphons, Eductors, Exhausters & Injectors

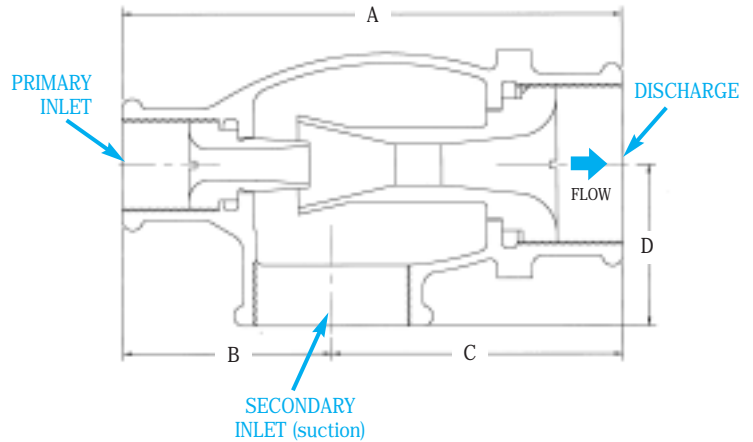
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#### W-EJECT

#### DIMENSIONS & WEIGHTS – inches / pounds

Size	Connection Sizes			Dimensions			
	Suction	Discharge	Inlet	A	B	C	D
<b>Bronze Body &amp; Nozzles</b>							
1/2"	1/2	1/2	1/4	3 1/4	17/16	11 3/16	1 1/8
3/4"	3/4	3/4	3/8	4	1 1/2	2 1/2	1 3/8
1"	1	1	1/2	5 1/8	2 1/4	2 7/8	1 5/8
1 1/4"	1 1/4	1 1/4	3/4	5 7/8	2 7/16	3 7/16	1 13/16
1 1/2"	1 1/2	1 1/2	3/4	6 1/4	2 11/16	3 9/16	1 15/16
<b>Cast Iron Body with Bronze Nozzles</b>							
2"	2	2	1	7 1/4	3 1/8	4 1/8	2 3/8

Connections are female NPT



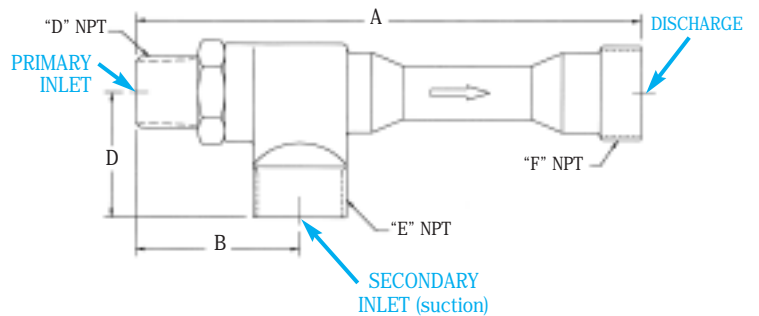
#### W-ELL / W-LM

Bronze Body & Nozzles

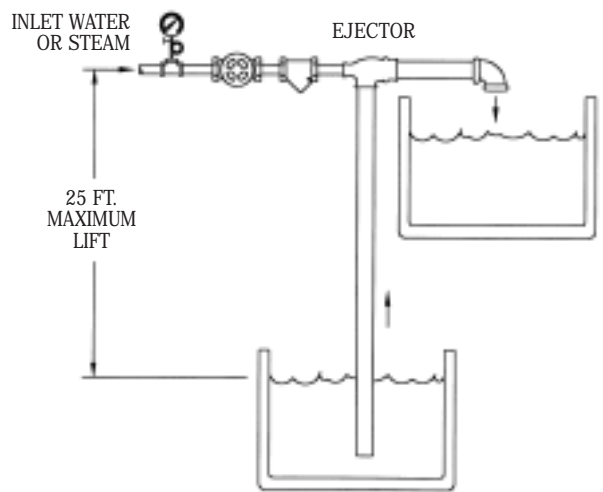
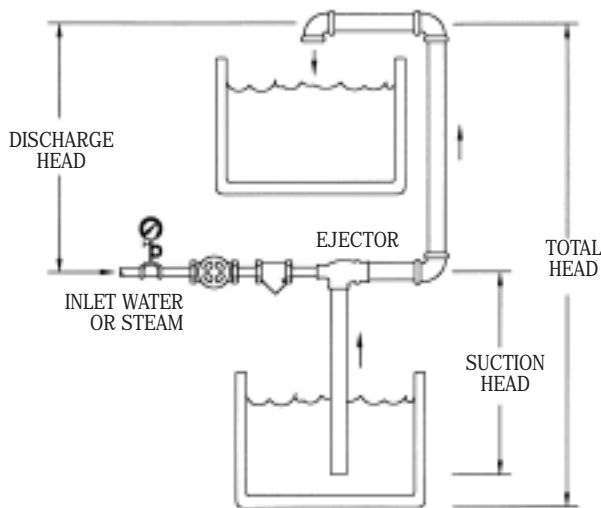
#### DIMENSIONS & WEIGHTS – inches / pounds

Size	Connection Sizes			Dimensions		
	Suction	Discharge	Inlet	A	B	D
3/4"	3/4	3/4	1/2	5 13/16	2	1 3/8
1"	1	1	3/4	7 1/8	2 5/16	1 3/4
1 1/4"	1 1/4	1 1/4	1	9	2 7/16	2 1/8

Connections are male NPT



#### Ejectors shown Pumping Fluid



It is always desirable to keep the Ejector as close to the actual liquid being pumped as possible. The maximum height the liquid can be pumped depends on the pressure of the "motive" liquid or steam available. Please refer to the capacity graphs for maximum flow rates and maximum achievable heads.

The maximum height that water or any liquid with a specific gravity of one can be lifted is 27 ft. Increases in the temperature of the liquid you are trying to lift will cause this maximum height to decrease. We don't recommend pumping liquid in excess of 130°F. Please consult factory with any specific application.

# SPECIALTY PRODUCTS

## Ejector Sizing

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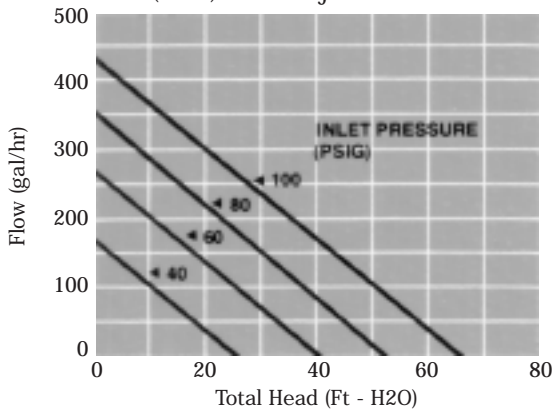
### Example 1

A #14 1" Ejector using 60 lbs. of steam pressure as a motive force will pump water to a maximum height of 60 ft. When pumping water to a height of 53 ft. using 60 lbs of steam pressure the amount of water being pumped is 650 Gal/hr.

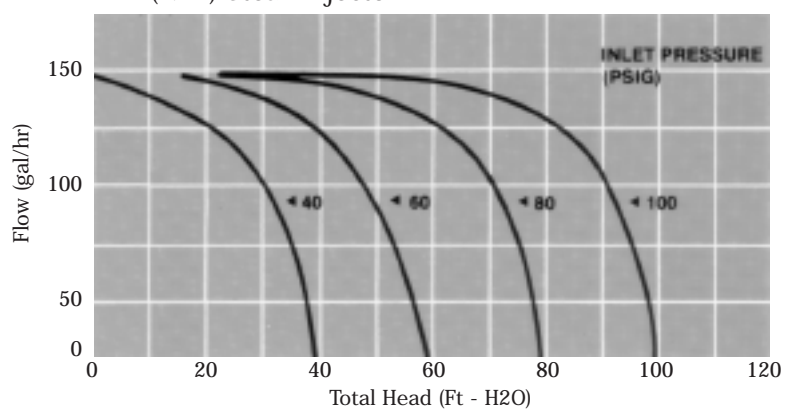
### Example 2

A #14 1" Ejector using 60 lbs. of water pressure as a motive force will pump water to a maximum height of 40 ft. When pumping water to a height of 20 ft. using 60 lbs of water pressure the maximum amount of water being pumped is 700 Gal/hr.

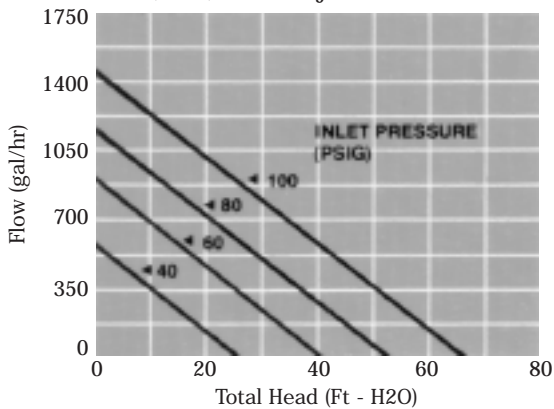
#12 (1/2") Water Ejector



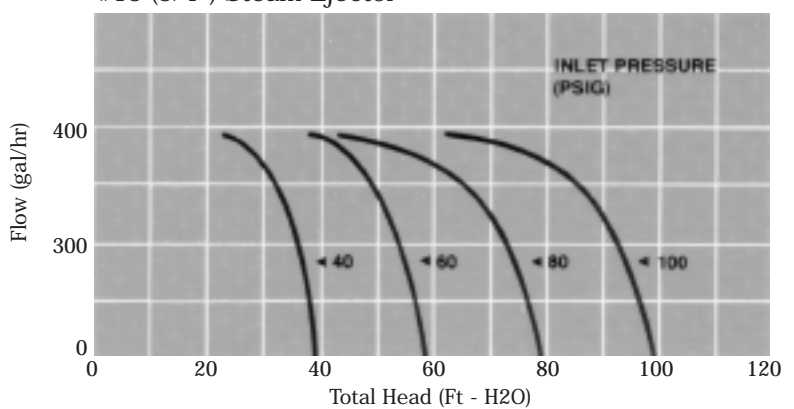
#12 (1/2") Steam Ejector



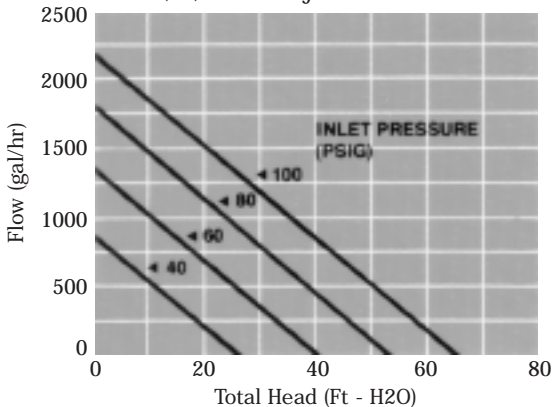
#13 (3/4") Water Ejector



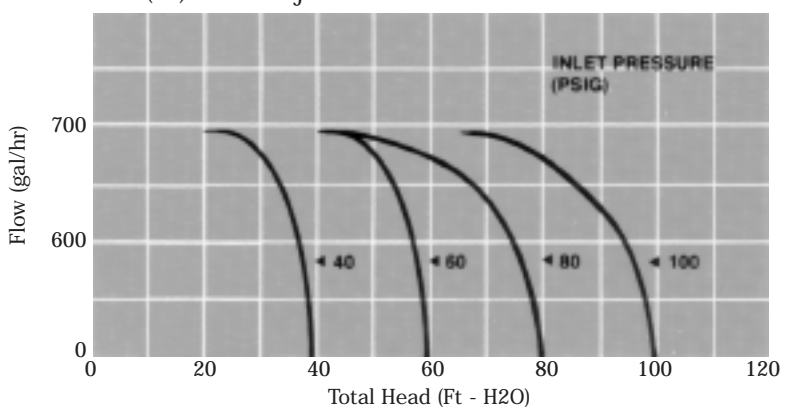
#13 (3/4") Steam Ejector



#14 (1") Water Ejector



#14 (1") Steam Ejector

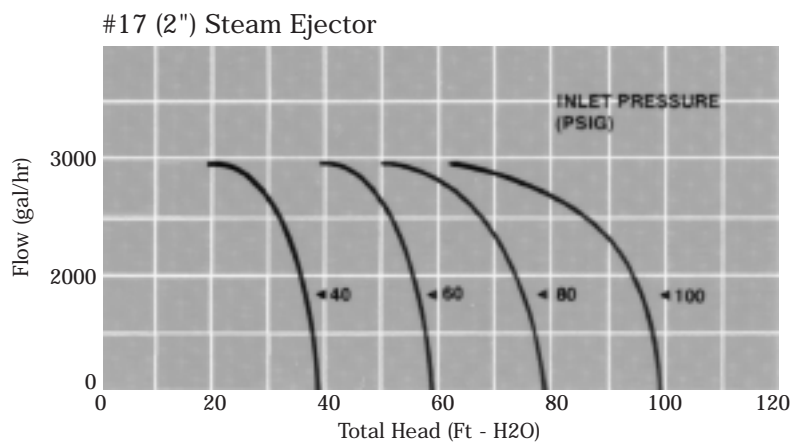
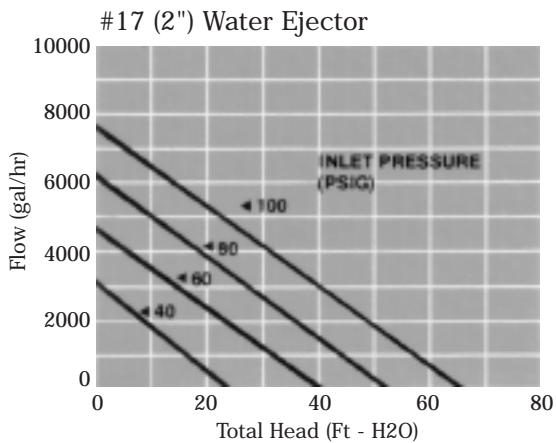
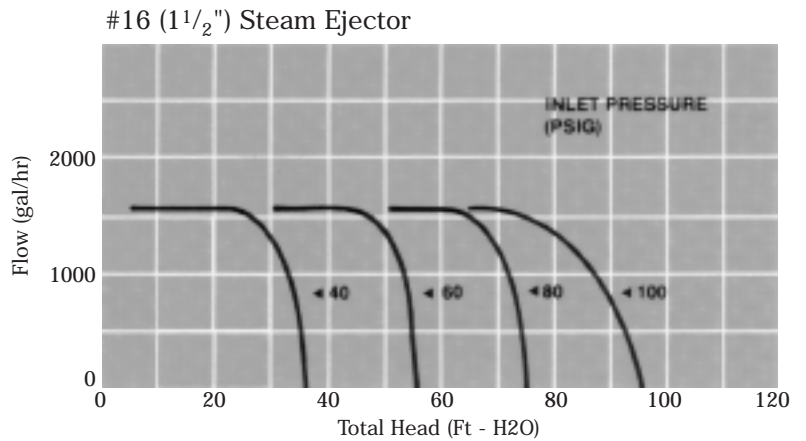
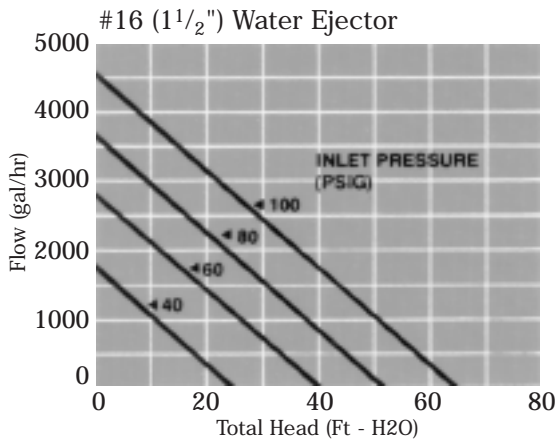
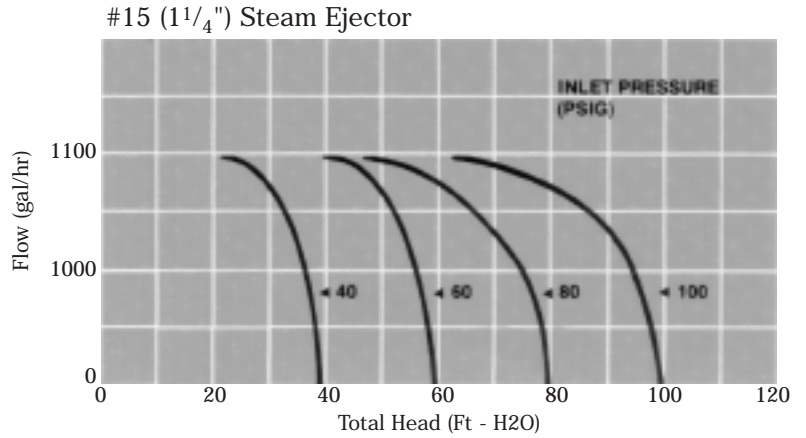
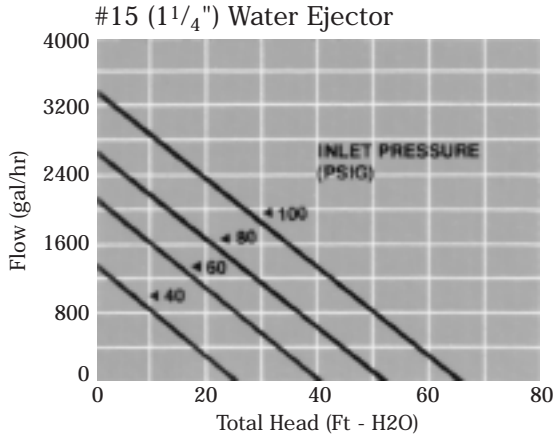


SPECIALTY

# SPECIALTY PRODUCTS

## Ejector Sizing

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SPECIALTY

# SPECIALTY PRODUCTS

## AV813W

### Air Eliminator

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Model	AV813W
Sizes	3/4"
Connections	NPT
Body Material	Cast Iron
PMO Max. Operating Pressure	150 PSIG
TMO Max. Operating Temperature	300°F
PMA Max. Allowable Pressure	150 PSIG up to 350° F
TMA Max. Allowable Temperature	353° F @ 150 PSIG



#### TYPICAL APPLICATION

The AV813W Air Eliminator is used for the removal of air and other gases from vessels or piping systems without allowing the contained liquid to escape.

#### HOW IT WORKS

The valve and seat assembly inside the air eliminator is connected to a stainless steel float. When there is no liquid in the body of the air eliminator, the float will be in the down position allowing air or other gases in the vessel or piping system to escape. When liquid enters the body, it will lift the float and the valve will be closed off before any liquid can escape.

#### FEATURES

- Rugged cast iron housing
- Simple design for easy maintenance
- Stainless steel internals
- Viton Valve head for high temperatures & Tight shut-off

#### SAMPLE SPECIFICATION

Air Eliminator shall be of cast iron construction with stainless steel internals and soft Viton seat for elevated temperatures and tight shut-off.

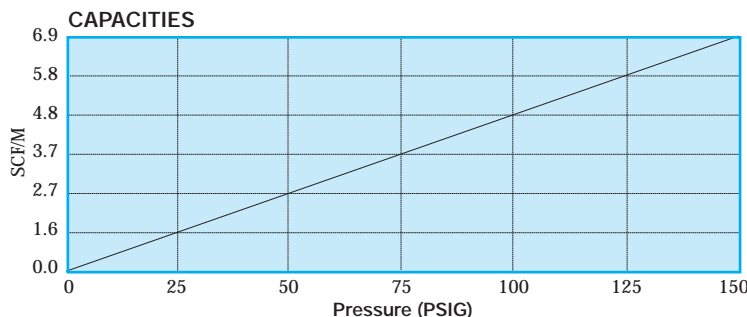
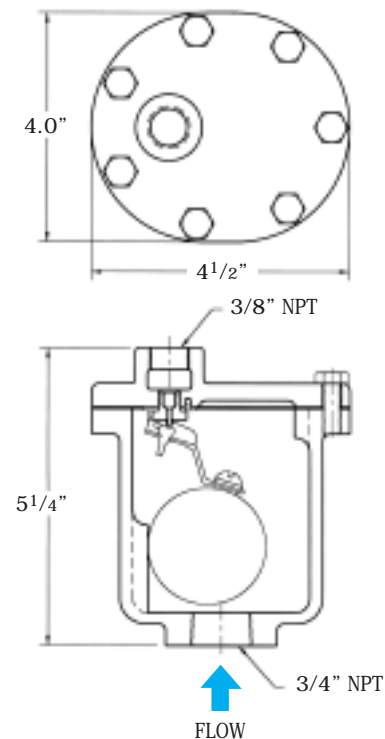
#### INSTALLATION & MAINTENANCE

The AV813W should be located at a high point in the system or vessel. The unit must be installed level and upright with flow upward for the float mechanism to operate properly. Isolation valves should be installed for ease of maintenance.

#### MATERIALS

Cover	Cast Iron, ASTM A-126, Class B
Body	Cast Iron, ASTM A-126, Class B
Gasket	Grafoil
Seat Yoke	Stainless Steel, Type 304
Valve Seat	Stainless Steel, Type 304
Pivot Pin	Stainless Steel, Type 304
Valve Head	Viton
Lever	Stainless Steel, Type 304
Float	Stainless Steel, Type 304
Washer	Stainless Steel, Type 304
Screw & Washer	Stainless Steel, Type 304

#### DIMENSIONS



# SPECIALTY PRODUCTS

## AE1800 Series

### Air Eliminator

Revised 9/2004

Model	AE1800, AE1800R
Sizes	1/2", 3/4"
Connections	NPT
Body Material	Stainless Steel
PMO Max. Operating Pressure	400 PSIG
TMO Max. Operating Temperature	500°F
PMA Max. Allowable Pressure	400 PSIG up to 500° F
TMA Max. Allowable Temperature	500° F @ 400 PSIG

### TYPICAL APPLICATION

The AE1800 Air Eliminator is used for the removal of air and other gases from vessels or piping systems without allowing the contained liquid to escape.

### HOW IT WORKS

The valve and seat assembly inside the air eliminator is connected to a stainless steel float. When there is no liquid in the body of the air eliminator, the float will be in the down position allowing air or other gases in the vessel or piping system to escape. When liquid enters the body, it will lift the float and the valve will be closed off before any liquid can escape.

### FEATURES

- All stainless steel body & Internals
- Hardened SST seat (55Rc) for longer service life
- Repairable unit available (AE1800R)

### INSTALLATION

The AE1800 should be located at a high point in the system or vessel. The unit must be installed level and upright with flow upward for the float mechanism to operate. Isolation valves should be installed for ease of maintenance.

DIMENSIONS – inches / pounds			
Model	Size (Inlet x Outlet)	A	Weight (lbs)
AE1801	3/4" x 1/2"	7	4
AE1801R	3/4" x 1/2"	7 <sup>3</sup> / <sub>8</sub>	5
AE1802	3/4" x 3/4"	7	4
AE1802R	3/4" x 3/4"	7 <sup>3</sup> / <sub>8</sub>	5
AE1803	1/2" x 1/2"	7	4
AE1803R	1/2" x 1/2"	7 <sup>3</sup> / <sub>8</sub>	5

### AIR CAPACITIES – (scfm)

Series	Orifice	PMO	Pressure (PSIG)																											
			5	7	9	12	15	20	25	30	40	50	60	70	80	90	100	110	120	125	150	200	250	300	400					
AE1800	.078	400	1.0	1.1	1.3	1.5	1.7	1.9	2.2	2.5	3.1	3.4	3.7	4.2	5.4	6.0	6.8	7.2	7.5	7.9	9.4	12.5	15.4	18.4	24.4					
	.101	300	1.7	1.9	2.1	2.4	2.6	3.1	3.5	4.0	4.8	5.3	5.7	6.6	8.4	9.3	10.2	11.1	12	12.4	14.5	19.1	23.5	28	-					
	.125	150	2.5	3.0	3.4	3.9	4.3	5.1	5.8	6.5	8.0	8.7	9.5	10.9	13.9	15.4	16.9	18.4	19.9	20.5	24.4	-	-	-	-					

When ordering: Specify pipe connections or Model (1801, 1802, 1803) & Orifice size. Orifice size of 0.078 with a Max operating pressure of 400 PSI will be supplied unless otherwise specified.



AE1800  
(Non-Repairable)

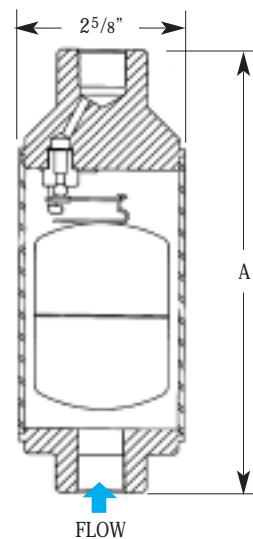


AE1800R  
(Repairable)

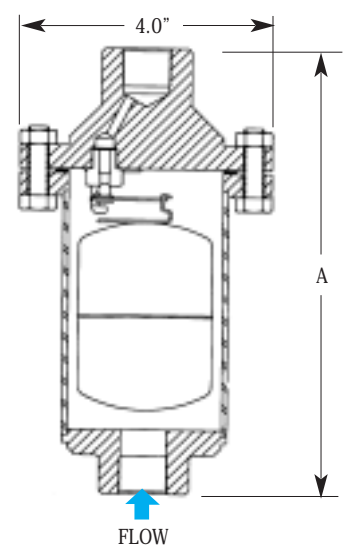
### MATERIALS

Body & Shell	Stainless Steel, AISI 304
Float Assembly	Stainless Steel, AISI 304
Valve & Seat Assembly	Hardened Stainless Steel, 55Rc
Seat	Stainless Steel, AISI 420
Washer, Seat	Garlock
*Gasket	Garlock
*Bolt, Hex, HD	Stainless Steel, AISI 316
*Nut	Stainless Steel, 18-8

\* AE1800R Repairable unit only



AE1800  
(Non-Repairable)



AE1800R  
(Repairable)

SPECIALTY

# SPECIALTY PRODUCTS

## AV2000C

### Thermostatic Air Vent

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Revised 9/2004

Model	AV2000C
Sizes	1/2", 3/4"
Connections	NPT
Body Material	Stainless Steel
PMO Max. Operating Pressure	650 PSIG
TMO Max. Operating Temperature	Saturated Steam Temp.
PMA Max. Allowable Pressure	1032 PSIG @ 100°F
TMA Max. Allowable Temperature	750°F @ 800 PSIG



#### TYPICAL APPLICATION

The AV2000C is used on industrial steam applications up to 650 PSIG for the removal of air and non-condensable gases from process equipment, vessels and piping.

#### HOW IT WORKS

The thermostatic air vent contains a welded stainless steel thermal element that expands when heated and contracts when cooled. When air and non-condensable gases are present, the valve is in the open discharge position. When steam reaches the air vent the element expands and closes valve off tightly.

#### FEATURES

- Welded stainless steel thermal element
- Hardened stainless steel seat and disc for extended service life
- Integral strainer to protect from contamination
- Steam pressures up to 650 PSIG

#### SAMPLE SPECIFICATION

Air Vent shall have a thermal element operation with a seal-welded tamper-proof stainless steel construction. All internals shall be stainless steel featuring an integral strainer and hardened seating system.

#### INSTALLATION

The air vent should be located at a high point in the system or vessel. The air vent can be installed in any orientation. Isolation valve should be installed to facilitate removal and replacement without system shut-down. Unit is seal-welded and non-repairable.

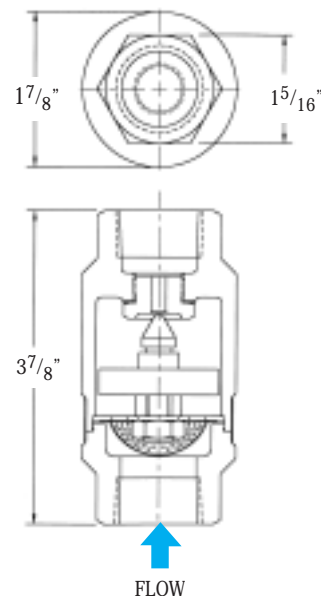
#### MATERIALS

Housing	Stainless Steel, ASTM A351-CF3
Thermal Element	Stainless Steel
Valve & Seat	Hardened Stainless Steel, 40 Rc
Strainer Screen .033" perf.	Stainless Steel

#### HOW TO ORDER

Specify model, pipe size and orifice size. If orifice size is not specified, the standard 5/16" diameter will be used.

#### DIMENSIONS



#### AIR CAPACITIES – (scfm)

Model	Orifice	PMO PSI	Inlet Pressure (PSIG)																	
			2	5	10	25	50	100	125	150	200	250	300	350	400	450	500	550	600	650
AV2001C	3/16"	650	5.2	6.2	7.7	12.4	20.2	35.9	43.9	51.5	67.2	82.8	98.5	114	130	145	161	177	192	208
AV2003C	5/16"	650	10.7	12.6	15.8	25.4	41.4	73.3	89.4	105	137	169	201	233	265	297	329	361	393	425

SPECIALTY

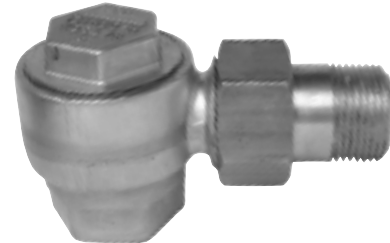
# SPECIALTY PRODUCTS

## AVT125

### Thermostatic Air Vent

Revised 9/2004

Model	AVT125
Sizes	1/2", 3/4"
Connections	NPT
Body Material	Forged Brass
PMO Max. Operating Pressure	125 PSIG
TMO Max. Operating Temperature	353°F
PMA Max. Allowable Pressure	125 PSIG up to 450°F @
TMA Max. Allowable Temperature	450°F @ 125 PSIG



### TYPICAL APPLICATION

The AVT125 is used on steam applications up to 125 PSIG for removal of air and non-condensable gases from process equipment, vessels and piping.

### HOW IT WORKS

The thermostatic air vent contains a welded stainless steel thermal element that expands when heated and contracts when cooled. When air and non-condensable gases are present the valve is in the open discharge position. When steam reaches the air vent, the element expands and closes the valve off tightly.

### FEATURES

- Simple design for easy maintenance
- All Stainless Steel Internals
- Thermal element is the only moving part

### SAMPLE SPECIFICATION

Air Vent shall have a stainless steel thermal element operation with a forged brass construction featuring a union nipple inlet connection. The valve and seat shall be stainless steel.

### INSTALLATION & MAINTENANCE

The AVT125 should be located at a high point in the system or vessel. The air vent can be installed in any orientation. An isolation valve should be installed to facilitate repair without system shut-down. Unit is inline repairable. Repair kits available.

### MATERIALS

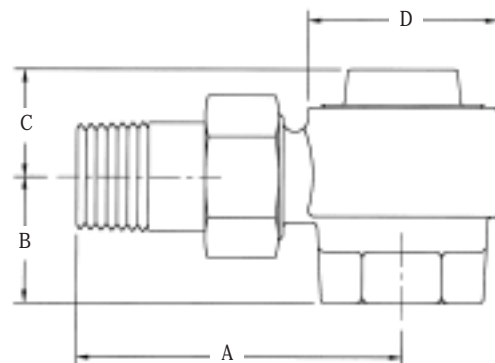
Body & Cover	Forged Brass, CA 377
Element	Welded Stainless Steel, AISI 302
Spring	Stainless Steel, AISI 304
Seat	Stainless Steel, AISI 303
Gasket	Brass, ASTM B-21
Union Nipple	Brass, ASTM B-16
Union Nut	Brass, ASTM B-16

### AIR CAPACITIES – (scfm)

Size	Orifice	Inlet Pressure (PSIG)					
		5	10	25	50	100	125
1/2"	.25"	9	13	22	37	65	80
3/4"	.30"	12	16	27	46	82	100

### DIMENSIONS – inches / pounds

Size	A	B	C	D	Weight
1/2"	2 <sup>13</sup> / <sub>16</sub>	1 <sup>3</sup> / <sub>16</sub>	1	2 <sup>1</sup> / <sub>8</sub>	2.75
3/4"	3 <sup>1</sup> / <sub>16</sub>	1 <sup>3</sup> / <sub>16</sub>	1	2 <sup>1</sup> / <sub>8</sub>	2.75



# SPECIALTY PRODUCTS

## WDS Series

### Steam Moisture Separator

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Model	WDS	
Body Material	Cast Iron	Carbon Steel
Sizes	3/4", 1", 1 1/4", 1 1/2", 2", 2 1/2", 3", 4"	1", 1 1/4", 1 1/2", 2", 2 1/2", 3", 4", 5", 6", 8", 10", 12"
Connections	NPT, 125# Flanged	NPT, SW, 150# & 300# Flanged
PMO Max. Operating Pressure	250 PSIG	300 PSIG (NPT & SW)
Pressure/ Temperature Rating	NPT 250 PSIG @ 450F 125# FLG 150 PSIG @ 450F	NPT, SW 300 PSIG @ 650F 150 # FLG 150 PSIG @ 450F



#### TYPICAL APPLICATION

The WDS Series Separators are used for the removal of entrained liquid or solids from steam. Effective in applications where the system has an entrained liquid flow rate of up to 40% by weight of the units flow capacity.

#### HOW IT WORKS

Moisture-laden steam enters the inlet of the separator where it is deflected in a centrifugal downward motion. The entrained moisture is separated out by reduction in velocity. Separated liquid then falls below the Vortex containment plate where it cannot be re-entrained. Dry, clean steam then flows upward and exits through the outlet of the separator.

#### FEATURES

- High efficiency: 99% of all particles 10 microns and larger
- Minimum pressure drop
- Gauge ports on 3" & 4" cast iron units
- Code constructed

#### SAMPLE SPECIFICATION

Steam Moisture Separator shall be "T" style for horizontal piping installations. Separator to be code constructed in cast iron or carbon steel and available in FNPT and flanged connections.

#### INSTALLATION

The WDS Steam Moisture Separator must be installed in a horizontal run of pipe. Exercise standard piping and structural practices when installing this unit. Proper drainage of the separator utilizing a float and thermostatic steam trap is essential for proper operation.

#### MATERIALS

WDS Cast Iron Model	All Parts Cast Iron
WDS Carbon Steel Model	All Parts Fabricated Carbon Steel

#### CAPACITIES – Steam – (lbs/hr)

Size	Operating Pressure (PSIG)											
	5	10	25	50	100	150	200	250	300	400	450	500
1"	192	219	289	384	536	661	772	872	964	1132	1210	1284
1 1/4"	305	348	459	609	851	1050	1225	1384	1531	1797	1921	2038
1 1/2"	434	495	653	868	1211	1495	1744	1970	2179	2559	2734	2902
2"	769	877	1156	1536	2143	2646	3087	3487	3857	4529	4839	5136
2 1/2"	1220	1391	1834	2437	3401	4199	4900	5535	6121	7188	7680	8151
3"	1912	2181	2876	3821	5333	6583	7682	8677	9597	11269	12041	12779
4"	3183	3632	4787	6362	8878	10959	12788	14446	15977	18760	20046	21274
5"	4823	5501	7252	9637	13449	16603	19373	21884	24203	28420	30367	32229
6"	7465	8516	11226	14917	20818	25699	29988	33874	37464	43992	47006	49887
8"	12444	14196	18713	24867	34704	42840	49989	56468	62452	73334	78359	83161
10"	19376	22104	29137	38720	54036	66705	77836	87924	97241	114186	122009	129487
12"	28560	32580	42947	57071	79648	98320	114728	129597	143331	168306	179836	190859

# SPECIALTY PRODUCTS

## WDS Series

### Steam Moisture Separator

Revised 9/2004

#### CAST IRON

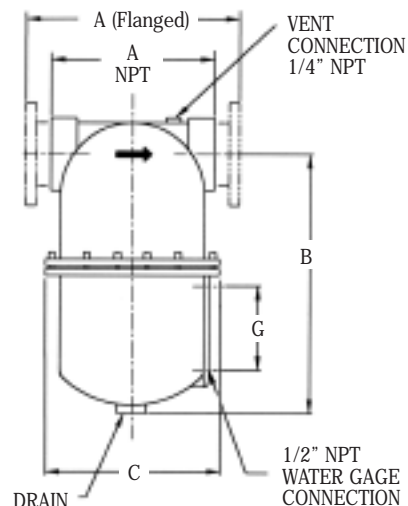
#### WDS CAST IRON NPT MODEL DIMENSIONS – inches / pounds

Size (NPT)	A	B	C	Vent NPT	Drain NPT	Gauge Centers G	Weight
3/4"	5 1/2	10 1/8	5 3/4	1/4	3/4	N/A	23
1"	6	10 1/8	6 3/4	1/4	1	N/A	26
1 1/4"	6	10 3/8	7	1/4	1	N/A	30
1 1/2"	7 1/4	13 1/8	8 1/8	1/4	1	N/A	45
2"	8 1/8	15 5/8	8 1/2	1/4	1	N/A	50
2 1/2"	12	18 1/4	11 3/8	1/4	1 1/4	N/A	95
3"	11	18 1/4	11 3/8	1/4	1 1/4	3 1/2	90

#### WDS CAST IRON FLANGED MODEL DIMENSIONS – inches / pounds

Size (Flanged)	A	B	C	Vent NPT	Drain NPT	Gauge Centers G	Weight
2"	10 1/2	13 3/4	8 1/2	1/4	1	N/A	50
3"	14	16	11 3/8	1/4	1 1/4	4 3/4	95
4"	15 7/8	19 3/8	14	1/4	1 1/4	5 3/4	195

#### CAST IRON WDS



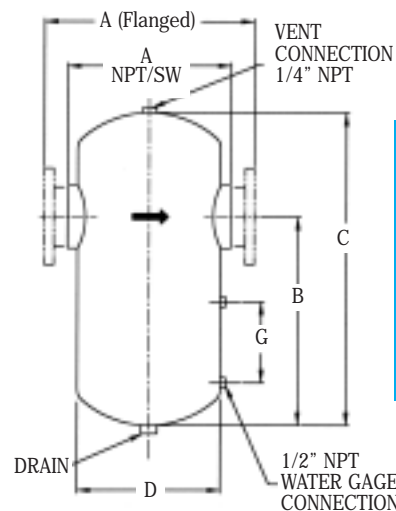
#### CARBON STEEL

#### WDS CARBON STEEL MODEL DIMENSIONS – inches / pounds

Size	NPT, SW A	150#, 300# FLG A	B	C	D	G	NPT Drain		Weight		
							Std.	Opt.	NPT, SW	150# FLG	300# FLG
1"	6 3/8	10 1/2	10 1/2	12	5 9/16	Opt.	1	1 1/2	29	33	35
1 1/4"	6 3/8	10 1/2	10 1/2	12	5 9/16	Opt.	1	1 1/2	30	35	37
1 1/2"	7 5/8	11 1/2	12 1/2	14	6 5/8	Opt.	1	2	55	50	56
2"	7 7/8	11 1/2	12 1/2	14	6 5/8	Opt.	1	2	57	55	59
2 1/2"	–	16	15	22	8 3/8	5 3/4	1	2	–	100	110
3"	–	18	18	26	10 3/4	5 3/4	1 1/2	2 1/2	–	140	150
4"	–	20	22	31	12 3/4	5 3/4	1 1/2	2 1/2	–	195	220
5"	–	22	26	36	14	7 7/8	1 1/2	2 1/2	–	230	290
6"	–	24	30	41	16	7 7/8	1 1/2	2 1/2	–	350	380
8"	–	28	37	50	18	7 7/8	2	3	–	475	610
10"	–	34	55	70	24	7 7/8	2	3	–	780	1180
12"	–	38	58	75	28	7 7/8	2 1/2	4	–	940	1510

\* 1" - 2" units are Cast Steel. 2 1/2" and up are Fabricated Steel.

#### CARBON STEEL WDS



SPECIALTY

# SPECIALTY PRODUCTS

## WEH Series Exhaust Head

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Model	WEHC	WEHF
Sizes	1", 1½", 2", 2½", 3", 4", 5", 6", 8", 10"	2½", 3", 4", 5", 6", 8", 10"
Connections	NPT, 125# Flanged	150# Flanged
Body Material	Cast Iron	Carbon Steel



### TYPICAL APPLICATION

The WEH Series Exhaust Heads are used to separate entrained water and particles from steam prior to being discharged directly to the atmosphere. Typically used to eliminate water damage to rooftops and other equipment.

### HOW IT WORKS

Exhaust heads use the cyclonic effect where the velocity of the steam is used to generate centrifugal force that whirls the steam and throws the entrained water to the wall of the unit where it is released to a drain below. Correct sizing of exhaust heads for steam service is important in order to assure the highest possible dryness.

### FEATURES

- Up to 99% of particles 10 micron and larger are separated from discharging steam
- Maximizes separation of water and steam
- Contains Vortex Containment Plate

### SAMPLE SPECIFICATION

Steam Exhaust Head shall be a cyclone design for vertical venting to atmosphere. Unit shall have a vortex containment plate feature to prevent re-entrainment of liquid. Exhaust Head to be constructed in cast iron or carbon steel and available in FNPT and flanged connections.

### INSTALLATION

The WEH Steam Exhaust Head must be installed at the top of a vertical vent pipe. Exercise standard piping and structural practices when installing this unit. Proper drainage of the exhaust head is essential for proper operation. Pipe the drain connection of the head to a roof gutter or down spout.

### MATERIALS

WEHC	All Parts Cast Iron
WEHF	All Parts Fabricated Carbon Steel

### HOW TO ORDER

Refer to the capacity chart to determine which model is required to satisfy the application needs.

#### *Available sizes and connections:*

Cast Iron  
NPT - 1", 1½", 2", 2½", 3", 4"  
125# Flanged - 4", 5", 6", 8", 10"

Carbon Steel  
150# Flanged - 2½", 3", 4", 5", 6", 8", 10"

# SPECIALTY PRODUCTS

## WEH Series Exhaust Head

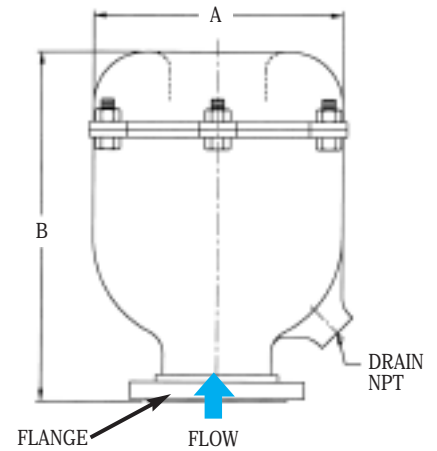
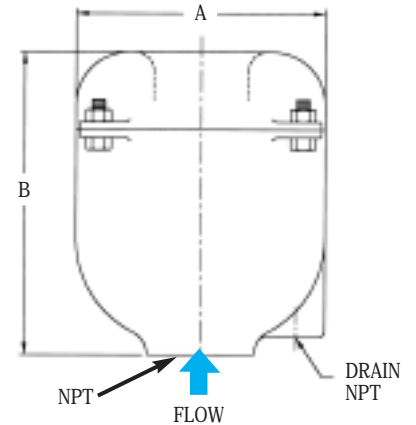
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### WEHF (Carbon Steel)

#### WEHC DIMENSIONS, WEIGHTS & CAPACITIES – inches

Size	Inlet Connection	A	B	Drain NPT	Weight (lbs)	Capacity*
1"	NPT	5 1/4	6 1/8	1/2	11	160
1 1/2"	NPT	5 1/4	6 1/8	1/2	11	370
2" & 2 1/2"	NPT	7 1/2	8 7/8	3/4	25	1,000
3"	NPT	8 3/4	11 1/4	3/4	40	2,100
4"	NPT	10	11 1/4	1	50	2,700
4"	FLG	10	15	1	68	2,700
5"	FLG	13	14	1 1/2	90	4,000
6"	FLG	14 3/4	18 3/4	1 1/2	115	6,000
8"	FLG	18	20	2	190	10,500
10"	FLG	23	24	2	335	16,000

\*Capacity in pounds of exhaust steam/hour at atmosphere pressure of 14.7 PSIA.

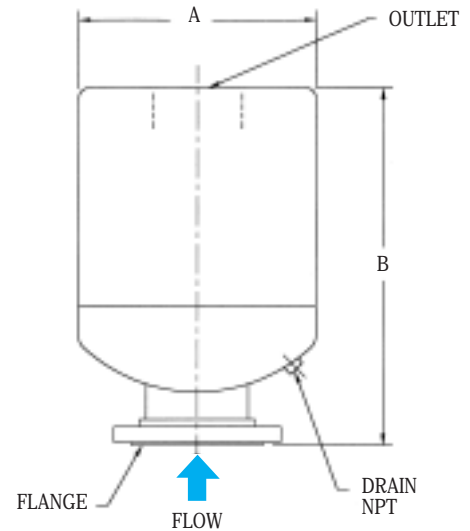


### WEHF (Carbon Steel)

#### WEHF DIMENSIONS, WEIGHTS & CAPACITIES – inches

Inlet Size	Inlet Connection	A	B	Drain NPT	Weight (lbs)	Capacity*
2 1/2"	FLG	8 5/8	16	1	55	1,000
3"	FLG	10 3/4	19	1 1/2	65	1,600
4"	FLG	14	24	1 1/2	100	2,700
5"	FLG	16	26	1 1/2	130	4,000
6"	FLG	18	30	1 1/2	140	6,000
8"	FLG	20	36	2	240	10,500
10"	FLG	24	42	2	390	16,000

\*Capacity in pounds of exhaust steam/hour at atmosphere pressure of 14.7 PSIA.



# SPECIALTY PRODUCTS

## WVBSS

### Stainless Steel Vacuum Breaker

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Model	WVBSS
Sizes	1/2"
Connections	NPT
Body Material	Stainless Steel
PMO Max. Operating Pressure	300 PSIG
TMO Max. Operating Temperature	752°F
PMA Max. Allowable Pressure	300 PSIG up to 752°F
TMA Max. Allowable Temperature	752°F @ 300 PSIG



#### TYPICAL APPLICATION

The WVBSS Vacuum Breaker is used on heat exchangers, air coils, jacketed kettles, pressing machines, boiler feed water tanks, sparge systems, water lines or anywhere else an unwanted vacuum may occur. The WVBSS allows air to enter the steam or liquid system in order to "break the vacuum" caused by the condensing of steam or draining of liquid from a system. Eliminating vacuum is necessary to allow for proper drainage of liquid from process systems.

#### HOW IT WORKS

The Vacuum Breaker functions like a simple check valve. Outside air is allowed to enter the system through the vacuum breaker, however, when steam or water try to escape, the vacuum breaker closes off tightly.

#### FEATURES

- All stainless steel construction
- Small & compact

#### SAMPLE SPECIFICATION

Vacuum Breakers shall be of all stainless steel construction with a hardened stainless steel ball valve design.

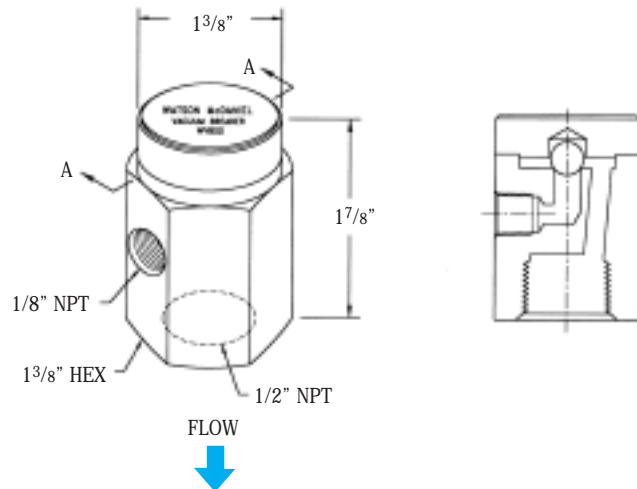
#### INSTALLATION

Unit must be installed in a vertical position and should be placed at the highest point in the system.

#### MATERIALS

Body	Stainless Steel, Series 300
Internals	Stainless Steel, Series 300
Nameplate	Stainless Steel, Series 300

#### DIMENSIONS



#### AIR CAPACITIES - (scfm)

Size NPT	in Hg Vacuum					
	2	4	6	8	10	12
1/2"	2.4	3.4	4.0	4.3	4.7	4.9

SPECIALTY

# CHECK VALVES

## WSSCV Series

### Stainless Steel Check Valves

Revised 9/2004

Model	WSSCV
Sizes	1/2", 3/4", 1", 1 1/4", 1 1/2", 2", 3"
Connections	NPT, SW
Body Material	316 Stainless Steel
PMA Max. Allowable Pressure	750 PSIG @ 100 °F
TMA Max. Allowable Temperature	850 °F @ 420 PSIG



### TYPICAL APPLICATIONS

The model WSSCV is an all stainless steel in-line check valve for steam, gas, or liquid service. It provides tight shut-off, minimizes water hammer and also stops recycling of pumps by preventing back flow of liquid. Used in the petrochemical, pulp and paper, textile and the food & beverage industry. The WSSCV all stainless steel check valves will operate much longer and are less problematic than bronze or cast iron check valves.

### FEATURES

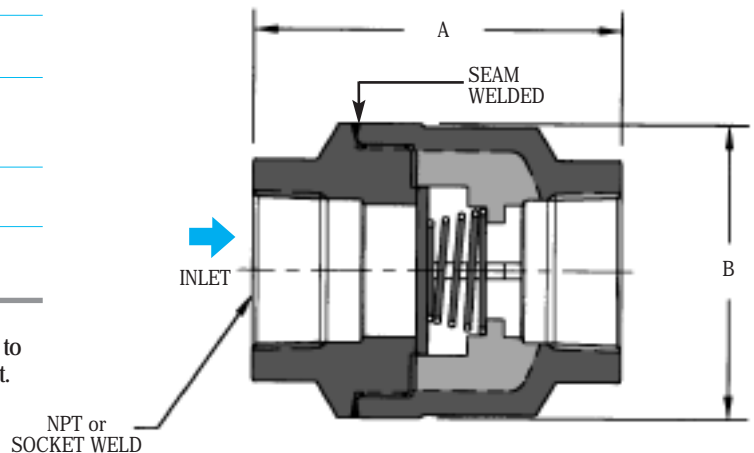
- 316 Stainless Steel Body and Internals
- Low cracking Pressure on spring (1/4 PSI) to minimize resistance and maximize flow.
- Available with NPT or SW connections.
- Spring made from Inconel-X-750 to handle extreme temperature as well as corrosive applications.
- Body is seam welded to eliminate O-rings or gasket seals which can be affected by high temperature steam or hot condensate.
- Spring assisted closing of check valve to minimize noise and wear.

### SAMPLE SPECIFICATION

Check valve shall have a 316 stainless steel body and disc. Spring shall be made from Inconel X-750. Check valve body to be seal welded together to eliminate need for O-ring or gasket.

### MATERIALS

Body	316 Stainless Steel
Disc	316 Stainless Steel
Spring	Inconel X-750



### DIMENSIONS & SPECIFICATIONS - inches/pounds

Size MODEL	1/2" WCV-12	3/4" WCV-13	1" WCV-14	1 1/4" WCV-15	1 1/2" WCV-16	2" WCV-17	3" WCV-19
A	2.69	3.00	3.32	3.81	4.75	5.03	6.87
B	1.62	2.12	2.56	3.06	3.44	4.38	6.19
Weight (lbs)	1.1	1.5	1.9	3.8	4.7	7.7	18.8
*Opening Pressure	0.4	0.3	0.3	0.4	0.2	0.2	0.3
Cv	7	13	22	39	54	93	180

\*NOTE: Pressure at which valve opens and flow occurs. (PSI)

# SPECIALTY PRODUCTS

## WFPV

### Freeze Protection Valve

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Model	WFPV
Sizes	1/2"
Connections	NPT
Body Material	Stainless Steel
PMO Max. Operating Pressure	200 PSIG
TMO Max. Operating Temperature	250 °F



### TYPICAL APPLICATION

The WFPV is used for freeze protection on pipes, valves, fittings, pumps, condensate systems, safety showers, fire lines, spray nozzles, freeze sensitive equipment or as backup protection on steam tracing line.

### HOW IT WORKS

A thermostatic element senses water temperature in the valve. If the temperature falls below 40° F, the valve will modulate open allowing water to drain from the system. The valve will remain open as long as the water flowing by the sensing element is less than 40° F. When the water temperature rises above 40° F, the valve will close.

### FEATURES

- Corrosion resistant stainless steel body
- Long service life
- Narrow temperature band
- System pressures will not effect opening temperature

### SAMPLE SPECIFICATION

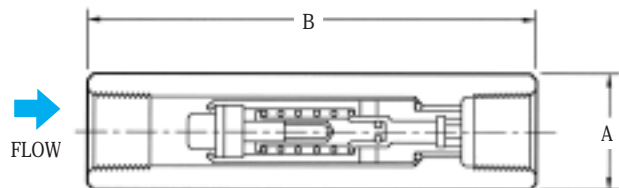
The freeze protection valve shall have a stainless steel body and actuated by a thermostatic element that senses water temperature. The unit shall feature a ram-type plug for reliable tight shut-off.

### MATERIALS

Body	Stainless Steel, 303
O-Ring	EPDM
Plug	Brass, CDA-360
Spring	Stainless Steel, 302
Thermal Actuator	Brass, CDA-360
Engine Body	Brass, CDA-360

### DIMENSIONS – inches / pounds

Size NPT	A	B	Weight (lbs)
1/2"	1 1/8	4 1/2	0.75



### CAPACITIES – (lbs/hr)

Inlet Pressure (PSIG)	Capacity (lbs/hr)
50	2475
75	3031
100	3500
125	3913
150	4287
175	4630
200	4950

# SPECIALTY PRODUCTS

## WSPV

### Scald Protection Valve

Revised 9/2004

Model	WSPV
Sizes	1/2", 3/4"
Connections	NPT
Body Material	Stainless Steel
PMO Max. Operating Pressure	150 PSIG
TMO Max. Operating Temperature	200 °F



### TYPICAL APPLICATION

The WSPV is used to protect personnel from accidental scalding by over heated water or other liquids. Installations such as eye-wash stations and safety showers can become over-heated by piping exposed to solar radiation or a heat exchanger malfunction

### HOW IT WORKS

When water temperature rises above 95° F, the thermal actuator modulates the valve open. If the water exceeds 115° F, the valve will go to full open position in order to discharge the over-heated water. When the water temperature returns to 95°F, the thermal actuator modulates the valve to close.

### FEATURES

- Corrosion resistant stainless steel body
- Long service life
- Narrow temperature band
- System pressures will not effect opening temperature

### SAMPLE SPECIFICATION

The scald protection valve shall have a stainless steel body that is actuated by a thermal element that senses water temperature. The unit shall feature a ram-type plug for reliable tight shut-off.

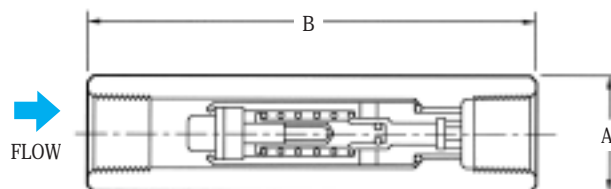
### MATERIALS

Body	Stainless Steel, 303
Seat Seal	PTFE
Plug	Brass*, CDA-360
Spring	Stainless Steel, 302
Thermal Actuator	Brass*, CDA-360

\* All stainless steel version available. Consult Factory.

### DIMENSIONS – inches / pounds

Size NPT	A	B	Weight (lbs)
1/2"	1 1/8	4 1/2	0.75
3/4"	1 3/8	5 1/2	1.2



### CAPACITIES – (lbs/hr)

Inlet Pressure (PSIG)	Capacity	
	1/2"	3/4"
50	5,300	7,070
75	6,495	8,660
100	7,500	10,000
125	8,385	11,180
150	9,180	12,240

# SPECIALTY PRODUCTS

## WDPL Series

### Drip Pan Elbow

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Revised 9/2004

Model	WDPL
Sizes	3/4" through 8"
Connections	NPT, Flanged
Body Material	Cast Iron
PMO Max. Operating Pressure	250 PSIG



### TYPICAL APPLICATION

The WDPL Drip Pan Elbow is used to collect and remove condensate. Typically used with steam boilers, pressure relief valves, safety valves and steam pressure vessels and lines.

### FEATURES

- Collects discharge condensate from steam systems
- Returns condensate to safe areas
- Increases life of safety valves
- Reduces discharge piping strain
- Female NPT or Flange connections available

### SAMPLE SPECIFICATION

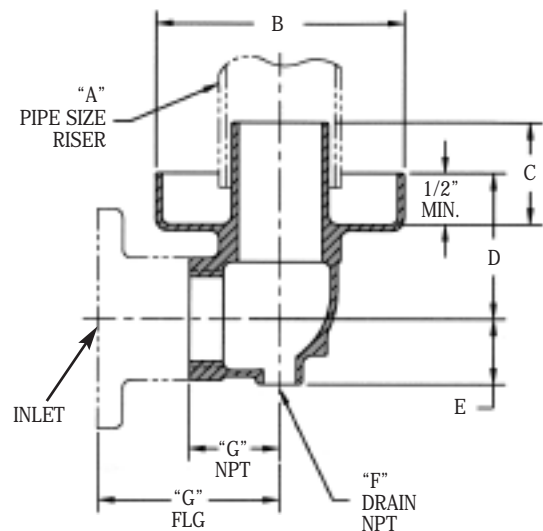
Drip Pan Elbow shall be made of cast iron and conform to the Power Piping Code. It shall have a pan to collect condensate in the steam riser pipe and a drain to pipe away the condensate.

### HOW TO ORDER

Specify pipe size needed for application.

### MATERIALS

Body Cast Iron



### DIMENSIONS – inches / pounds

Size	Connection	A	B	C	D	E	F	G	Weight (lbs)
3/4"	NPT	1 1/2	3 3/4	1 3/4	2 3/4	1 1/32	1/4	1 1/2	2
1"	NPT	1 1/2	3 3/4	1 3/4	2 3/4	1 1/32	1/4	1 1/2	2
1 1/4"	NPT	2	5 1/2	2 15/32	4 1/8	1 7/16	3/8	2 1/8	5
1 1/2"	NPT	2	5 1/2	2 15/32	4 1/8	1 7/16	3/8	2 1/8	5
2"	NPT	3	6 1/4	2 3/8	3 5/8	1 5/8	1/2	2 1/4	6.5
2 1/2"	NPT	4	7 3/8	3	4 5/16	1 15/16	3/4	2 11/16	11
3"	NPT	4	8	3 1/2	4 7/8	2 5/16	3/4	3 1/8	14
4"	NPT	6	9 5/8	4 1/2	5-3/4	2 7/8	3/4	3 3/4	27
6"	125# FLG	8	12 3/4	6 5/8	7 9/16	4 3/16	3/4	8	75
8"	125# FLG	10	16 1/2	7 1/2	8 9/16	5 3/8	1	10 3/4	102

# SPECIALTY PRODUCTS

## WFLV Series

### Flash Recovery Vessel

Revised 9/2004

Model	WFLV
Sizes	6", 8", 12", 16"
Connections	150 RF, NPT
Body Material	Carbon Steel
PMO Max. Operating Pressure	150 PSIG
TMO Max. Operating Temperature	366°F
PMA Max. Allowable Pressure	150 PSIG @ 562°F

### TYPICAL APPLICATION

The WFLV flash recovery vessels are installed in condensate return systems in order to capture and utilize the flash steam coming off of the hot condensate. This flash steam is typically piped away for use on low pressure steam processes.

### HOW TO SIZE

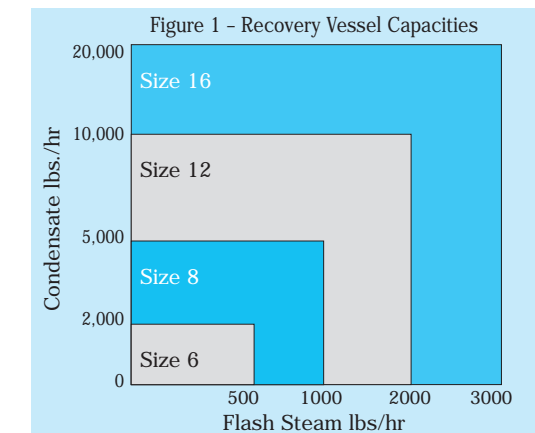
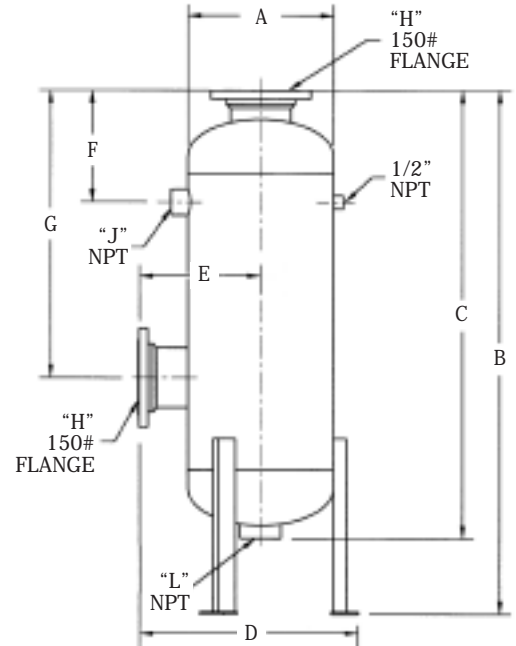
Use Table 1 to determine amount of Flash Steam that will be generated by the hot pressurized condensate. The percent of Flash Steam formed is found where Condensate Pressure (PSIG) and Flash Tank Pressure intersect.

Multiply your Condensate Load by the decimal equivalent of the Flash Steam Percent to determine the amount of Flash Steam in lbs/hr. Then, using Figure 1 to determine Flash Tank Size required:

Example: Condensate Pressure 100 PSIG  
 Flash Tank Pressure 20 PSIG  
 Condensate Load 8,000  
 % Flash Steam 8.7 % from chart  
 Decimal Equivalent % Flash Steam = .087

$.087 \times 1000 = 696 \text{ lbs/hr of flash steam}$

Choose: 12" FLASH TANK



PERCENT (%) FLASH STEAM									
Produced when condensate is discharged to atmosphere or into a flash tank controlled at various pressures									
Condensate Pressure (PSIG)	Flash Tank Pressure (PSIG)								
	0	5	10	20	30	40	60	80	100
5	1.6	0.0							
10	2.9	1.3	0.0						
15	3.9	2.4	1.1						
20	4.9	3.3	2.1	0.0					
30	6.5	5.0	3.7	1.7	0.0				
40	7.8	6.3	5.1	3.0	1.4	0.0			
60	10.0	8.5	7.3	5.3	3.7	2.3	0.0		
80	11.8	10.3	9.1	7.1	5.5	4.2	1.9	0.0	
100	13.3	11.8	10.6	8.7	7.1	5.8	3.5	1.6	0.0
125	14.9	13.5	12.3	10.4	8.8	7.5	5.3	3.4	1.8
150	16.3	14.9	13.7	11.8	10.3	9.0	6.8	4.9	3.3
200	18.7	17.3	16.2	14.3	12.8	11.5	9.4	7.6	6.0
250	20.8	19.4	18.2	16.4	14.9	13.7	11.5	9.8	8.2
300	22.5	21.2	20.0	18.2	16.8	15.5	13.4	11.7	10.2
350	24.1	22.8	21.7	19.9	18.4	17.2	15.1	13.4	11.9
400	25.6	24.2	23.1	21.4	19.9	18.7	16.7	15.0	13.5

DIMENSIONS & WEIGHTS - inches/pounds											
Size	A	B	C	D	E	F	G	H	J	L	Weight (lbs)
6"	6 <sup>5</sup> / <sub>8</sub>	47	38 <sup>1</sup> / <sub>2</sub>	12	8	9	25 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	3/4	1 <sup>1</sup> / <sub>2</sub>	75
8"	8 <sup>5</sup> / <sub>8</sub>	48	39 <sup>3</sup> / <sub>4</sub>	13	8 <sup>1</sup> / <sub>2</sub>	9 <sup>1</sup> / <sub>2</sub>	25 <sup>5</sup> / <sub>8</sub>	4	3/4	2	150
12"	12 <sup>3</sup> / <sub>4</sub>	49 <sup>1</sup> / <sub>2</sub>	41 <sup>1</sup> / <sub>4</sub>	21	11 <sup>3</sup> / <sub>4</sub>	11 <sup>1</sup> / <sub>2</sub>	26	5	1 <sup>1</sup> / <sub>2</sub>	3	165
16"	16	58	50	24	13 <sup>3</sup> / <sub>8</sub>	12 <sup>1</sup> / <sub>2</sub>	32	6	2	3	215

SPECIALTY