

Specialty Products



STAINLESS STEEL CHECK VALVES

Watson McDaniel Check Valves are available in all 316 SS construction in 1/2" thru 3" sizes and were specifically designed to handle the difficult environments associated with steam and hot condensate service. As a standard procedure, check valves should be installed on the discharge side of all steam traps to eliminate backflow into the trap. With the specially designed 1/4 PSI low cracking pressure spring, these check valves come standard on all Watson McDaniel Pressure Motive Pumps.



Y-STRAINERS

Strainers remove scale and dirt from steam systems and are designed to protect critical components such as Regulators and Steam Traps from damage. These strainers are available in Cast Iron, Carbon Steel and Stainless Steel up to 4" in size.



SUCTION/MIXING TEES

This is a unique and specialized product used for blending, mixing, aeration or even heating by mixing steam and water together. Available in Cast Iron, Bronze and Stainless Steel.



DRIP PAN ELBOWS

Drip Pan Elbows are used to collect and remove condensate. Typically used with steam boilers, pressure relief valves, safety valves and steam pressure vessels and lines.



EJECTORS

Ejectors are used for non electric pumping of fluids or evacuating a tank or vessel of air or other gases. Commonly used on sterilizing equipment for pre and post evacuation of the chamber.



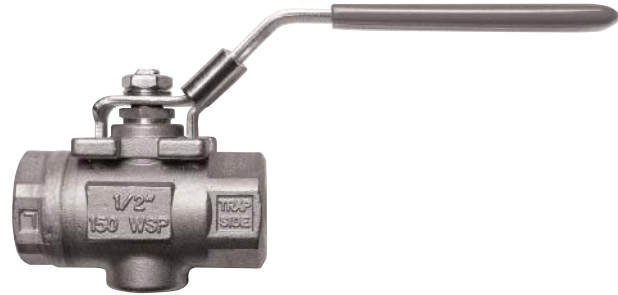
AIR ELIMINATORS

Air Eliminators are used on tanks or piping systems to vent entrained air without allowing the liquid inside the tank or piping to escape. Available in Cast Iron and Stainless Steel.



SAFETY RELIEF VALVES

Pressure relief valve standards regarding design, installation, performance and certification are covered in codes developed by the American Society of Mechanical Engineers (ASME) in Section I (for power boilers) and Section VIII (for pressure vessels). Watson McDaniel Safety Relief Valves are ASME qualified for steam service and are available in Bronze and Cast Iron in 1/2" thru 6" sizes.



STEAM TRAP TEST VALVES

Test Valves can be installed downstream of any steam trap to visually inspect the discharge of condensate from the traps. Available in Bronze and Stainless Steel up to 1" in size.



EXHAUST HEADS

Exhaust heads are used to separate entrained water from steam prior to being discharged directly to the atmosphere, preventing damage to rooftops and other equipment.



VACUUM BREAKERS

Vacuum Breakers "break the vacuum" caused by the condensing of steam or draining of liquid. These are primarily positioned on the top of heat exchangers, allowing condensate to properly drain from the system.



FREEZE/SCALD PROTECTION VALVES

Freeze Protection valves automatically open and dump liquid to protect equipment from freeze damage. Scald Protection valves automatically open and dump overheated liquid from a system to protect personnel from possible injury due to scalding.



STEAM HUMIDIFIERS

Watson McDaniel offers a complete line of steam humidification products for controlling humidity in commercial offices, hospitals, warehouses and various types of industrial facilities.



THERMOSTATIC AIR VENTS

Air Vents purge unwanted air from steam systems which can inhibit the steam from entering process equipment, vessels and piping. Air vents should be placed at all high points in the system but primarily on all pieces of heat transfer equipment.



AIR/STEAM MOISTURE SEPARATORS

Separators are used for the removal of entrained moisture in steam and compressed air lines. Separators should be placed before all regulating valves to eliminate problems caused by water logging and wire drawing of the valve seats.

SPECIALTY PRODUCTS

Specialty Products

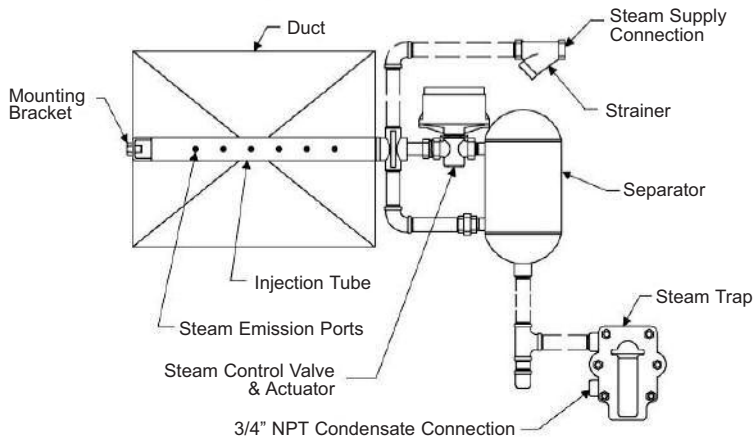
Model/Series	Product	Body Material	PMO (PSIG)	Sizes	Connection	Page No.
WSI, WIP, WSX	Steam Humidifiers	Stainless Steel	60	–	–	227-231
WSVB	Safety Relief Valve	Bronze	250	1/2" - 2 1/2"	NPT	232-233
WSVI	Safety Relief Valve	Cast Iron	250	1 1/2" - 6"	NPT, FLG	234-235
WCYI	Strainer	Cast Iron	125-500	1/2" - 4"	NPT, FLG	236
WCSY	Strainer	Carbon Steel	600	1/2" - 2"	NPT, SW	237
WSSY	Strainer	Stainless Steel	600	1/2" - 2"	NPT, SW	237
SUCTION TEE	Mixing Tee	Cast Iron, Bronze, SS	250-450	1/2" - 3"	NPT	238-239
W-EJECT/ELL/LM	Ejector	Cast Iron, Bronze	100	1/2" - 2"	NPT	240-243
AV813W	Air Eliminator	Cast Iron	150	3/4"	NPT	244
AE1800/1800R	Air Eliminator	Stainless Steel	400	1/2", 3/4"	NPT	245
AV2000C	Air Vent	Stainless Steel	650	1/2", 3/4"	NPT	246
AVT125	Air Vent	Brass	125	1/2", 3/4"	NPT	247
WDS	Separator	C.I., Carbon Steel	250/300	3/4" - 12"	NPT, SW, FLG	248-249
WCIS	Separator	Cast Iron	145/200	3/4" - 4"	NPT, FLG	250-251
WEH	Exhaust Head	C.I., Carbon Steel, SS	NA	1" - 10"	NPT, FLG	252-253
WVBSS	Vacuum Breaker	Stainless Steel	300	1/2"	NPT	254
WSSCV	Check Valve	Stainless Steel	500	1/2" - 3"	NPT, SW	255
WFPV	Freeze Protection Valve	Stainless Steel	200	1/2"	NPT	256
WSPV	Scald Protection Valve	Stainless Steel	200	1/2", 3/4"	NPT	257
WDPL	Drip Pan Elbow	Cast Iron	250	3/4" - 8"	NPT, FLG	258
WFLV	Flash Tank	Carbon Steel	150	6", 8", 12", 16"	FLG	259
WSTTV	Steam Trap Test Valve	Bronze, Stainless Steel	150	1/2" - 1"	NPT	260

Steam Humidifiers

Steam Injection

Humidification Overview

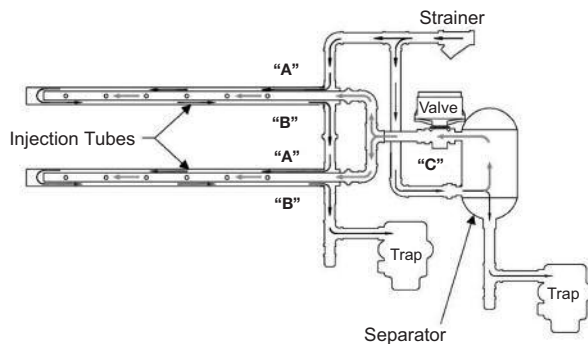
Single Tube Humidifier



Single Tube (WSI)

- For direct injection of steam humidification into air stream
- Many tube length options to accommodate various duct widths
- Recommended for relatively small duct heights where dissipation distance is not critical

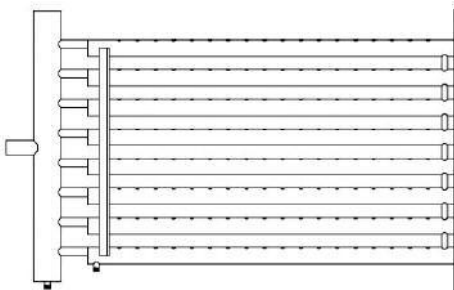
Multiple Tube Humidifier



Multiple Tube (WSI)

- Used for improved dissipation distances in duct heights above 20"
- Number of tubes can be selected to optimize performance
- Many tube length options to accommodate various duct widths

Insty-Pac Manifold-Style Humidifier



Insty-Pac (WIP)

- Custom-engineered manifold design for job-specific requirements
- Used when dissipation distances are critical for optimum air stream humidification
- Number of tubes properly selected to achieve design requirements

SPECIALTY PRODUCTS

Steam Humidifiers

Steam Injection

Watson McDaniel reserves the right to change the designs and/or materials of its products without notice.
©2010 Watson McDaniel Company

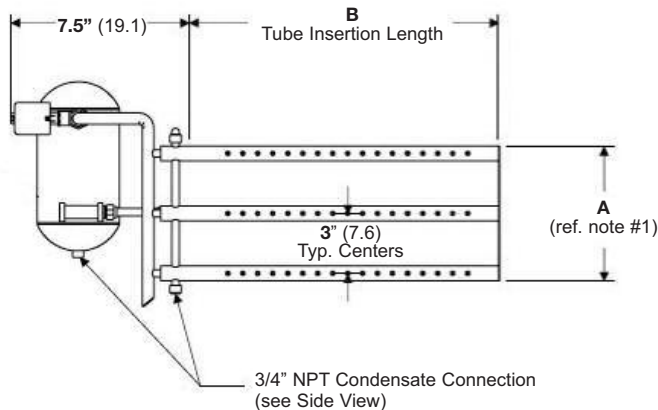
Humidification Overview



Steam Heat Exchanger (WSX)

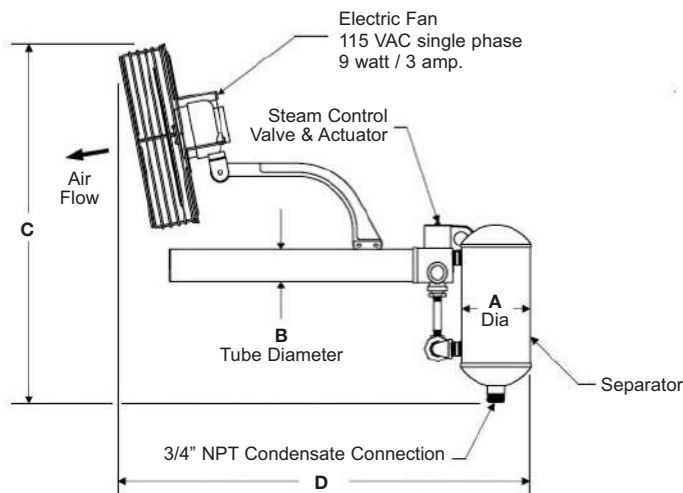
- Provides humidification for today's stringent indoor air quality requirements
- Utilizes boiler steam to heat tap water providing injection steam free from chemical or mineral carry-over
- Ideal for use where electric humidifiers would be cost-prohibitive

Mini-Mult Front View



Mini-Mult

- Designed for applications that require small humidification loads in a small duct size
- Ideal for any high humidity job where fast steam dissipation in cool air in a short-run duct is essential
- Number of tubes can be specified per duct size and job requirements



Area Type

- Designed for applications that require humidification without the use of duct work
- Ideal for area humidity control in paper, textile or wood manufacturing applications as well as printing plants and storage areas

SPECIALTY PRODUCTS

WSI & WIP

Steam Humidifiers



**Series "WSI"
Steam Injection
Humidifiers**



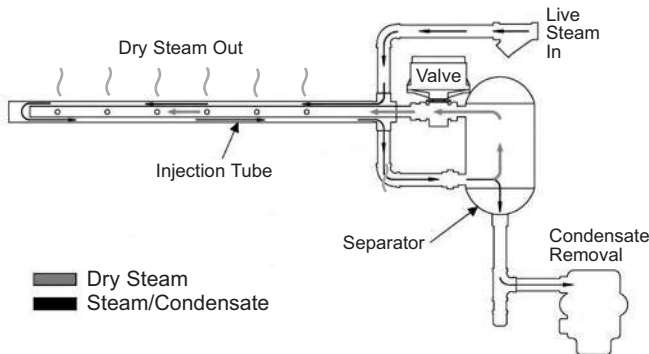
**Series "WIP"
INSTY-PAC
Steam Injection
Humidifiers**

TYPICAL APPLICATIONS

A Steam Injection Humidifier supplies 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 Steam Injection Humidifier receives steam directly from the boiler (live steam), removes the condensate and injects the dry steam into the duct work or an air stream. Live steam enters a steam jacket to preheat the injection tube. Steam then flows into the separator where condensate is removed. Dry steam is then discharged through the injection tube for circulation into the air stream.



MATERIALS

Separator	304 SS
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 2900 lbs/hr
- Pressure ranges from 2-60 PSIG
- Available for pneumatic or electric controls
- All stainless steel distributors and nozzles ensure permanent bond
- Separator & Steam Jacket included to provide highest quality steam

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

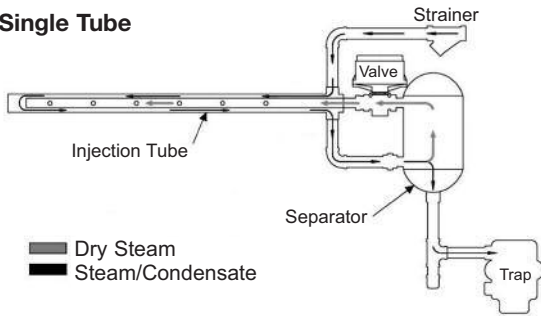
SPECIALTY PRODUCTS

WSI & WIP

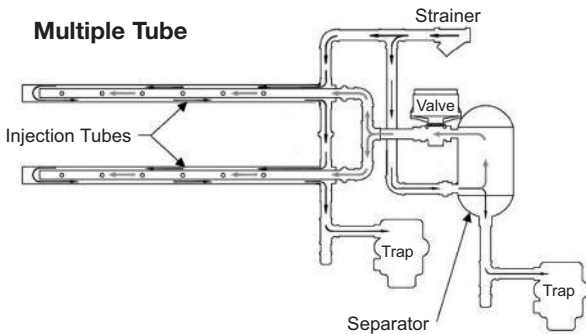
Watson McDaniel reserves the right to change the designs and/or materials of its products without notice.
©2010 Watson McDaniel Company

Steam Humidifiers

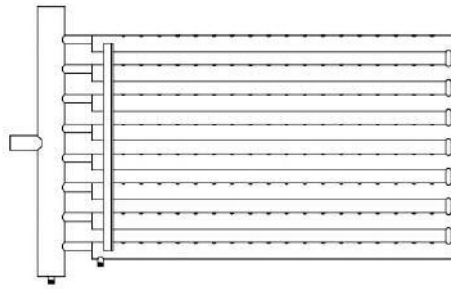
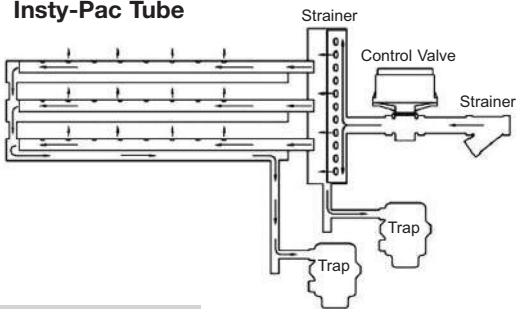
Single Tube



Multiple Tube



Insty-Pac Tube



To prevent condensation on in-duct objects, such as dampeners, coils, filters or turning vanes, it is very important that the dissipation distance be shorter than the distance from the humidifier to the in-duct object. The following recommendations should be used when designing a multiple injection tube system:

Duct Height	Recommended Qty. of Tubes †
Up to 36"	2
37" - 48"	3
49" - 72"	4
73" - 96"	5
Above 96"	6

† Final duct relative humidity, air velocity and available dissipation distance will affect the quantity of tubes required.

MODEL NUMBERS

Insty Pac	Single Tube	Multi Tube	Valve / Size Cv / NPT	Steam Pressure to Humidifier Supply Connection (PSIG)																						
				2	3	4	5	6	7	8	9	10	11	12	13	14	15	20	25	30	35	40	45	50	55	60
BP-1	50-10	50	.10 (1/2")	1.6	1.9	2.3	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.3	4.4	5.1	5.7	6.3	6.8	7.3	7.7	8.1	8.5	8.9
			.22 (1/2")	3.5	4.2	5.0	5.6	6.5	6.6	7.1	7.6	8	8	9	9	10	10	11	13	14	15	16	17	18	19	20
			.40 (1/2")	6.4	7.6	9.1	10	11	12	13	14	15	15	16	16	17	18	20	23	25	27	29	31	33	34	36
			.75 (1/2")	12	14	17	19	21	23	24	26	27	28	30	31	32	33	38	43	47	50	54	57	60	63	66
			.95 (1/2")	15	18	21	24	27	29	31	33	34	36	38	39	40	42	48	54	59	64	68	72	76	80	84
			1.30 (1/2")	21	24	29	33	36	39	42	44	47	49	51	53	55	57	66	74	80	87	93	99	104	109	114
			1.75 (1/2")	28	33	40	44	49	52	55	60	63	66	69	72	74	76	88	99	107	116	124	132	139	146	153
			2.20 (1/2")	35	41	50	55	61	66	71	75	79	82	86	90	93	95	111	123	134	146	156	165	174	183	192
			2.80 (1/2")	45	53	64	70	78	84	90	96	100	104	109	114	118	121	141	157	171	186	199	210	221	233	244
			3.25 (1/2")	52	61	73	82	90	96	104	110	116	121	127	132	137	140	163	181	198	214	229	244	257	270	282
BP-2	60-20	60	4.40 (1/2")	70	83	98	110	121	130	141	149	157	163	172	178	185	190	221	244	256	290	310	328	345	363	381
			5.50 (3/4")	85	104	123	138	150	161	176	186	196	204	213	222	231	235	275	305	333	360	385	408	430	451	471
			6.20 (3/4")	96	117	138	155	169	182	198	210	220	230	240	250	259	265	310	343	372	403	434	459	485	508	529
BP-3	70-20	70	7.50 (3/4")	116	142	166	186	204	220	238	253	265	277	289	302	312	320	373	412	450	487	525	555	585	614	640
			8.20 (1")	123	155	180	204	223	240	261	275	290	303	313	328	341	349	407	443	488	529	570	603	635	668	703
BP-4	80-30	80	10.0 (1")	150	189	220	248	272	293	317	335	354	370	380	400	414	423	497	540	595	645	695	735	770	810	850
			12.0 (1")	180	228	264	296	326	351	378	402	422	441	456	465	492	505	595	648	714	774	828	876	-	-	-
BP-5	N/A	90	20.0 (1-1/4")	300	375	440	494	540	582	630	666	702	736	750	772	814	834	990	1060	1180	1280	1376	1460	-	-	-
			28.0 (1-1/4")	420	511	612	686	756	812	873	927	980	1024	1044	1075	1128	1165	1383	1484	1638	1778	1912	2044	-	-	-

SPECIALTY PRODUCTS

TYPICAL APPLICATIONS

Steam Heat Exchanger Humidifiers can be used for humidification applications where steam injection is to be used, but chemically treated boiler steam is not allowable. They provide humidification to meet stringent indoor air quality requirements and are ideal for use where electric humidifiers would be cost-prohibitive.

HOW IT WORKS

The WSX Steam Heat Exchanger Humidifier works by utilizing existing boiler steam to heat tap water, providing injection steam free from chemical or mineral carry-over. Several steam injection dispersion methods are available to suit the application requirements.

FEATURES

- Single unit capacity up to 2,035 lbs/hr
- 304 Stainless Steel reservoir construction
- Stainless Steel heat exchanger
- Unique side-entry heat exchanger provides a large clean out access section without disturbing the cover or injection tube system's steam supply piping
- Pneumatic modulating steam control valve
- Tri-Probe level controller
- Adjustable surface water flusher
- Motorized drain valve with brass body
- User-adjustable automatic drain system
- Float & Thermostatic steam trap(s)
- Inlet "Y" strainer(s)



OPTIONS

- INTAC microprocessor controller
- Electric modulating actuator
- Factory-mounted control panel
- NEMA 4 weather-tight control panel
- Control panel door lock
- Seasonal End-of-Use drain system
- Door interlock safety switch
- Factory-insulated reservoir
- Support legs
- Wall brackets
- Freeze protection
- Stand-by water temperature sensing
- Blower Pack for area humidification
- Variable air volume control
- Outdoor air temperature sensing
- Drain tempering kit
- Remote INTAC microprocessor controller
- Outdoor enclosure

Humidifier Capacity – lbs/hr (kg/hr) †

Model	Steam Pressure in at the control valve – PSIG (kPa)			
	5 (34.5)	10 (69.0)	13 (89.6)	15 (103.4)
SX-1R	32 (14.5)	76 (34.5)	100 (45.3)	122 (55.3)
SX-2R	52 (23.6)	108 (48.9)	140 (63.5)	169 (76.7)
SX-3R	102 (46.3)	228 (103.4)	292 (132.5)	348 (157.8)
SX-4R	192 (87.1)	484 (219.5)	655 (297.1)	753 (341.7)
SX-8R	370 (167.8)	840 (381.0)	1200 (544.3)	1350 (612.4)
SX-12R	560 (254.0)	1265 (573.8)	1810 (821.0)	2035 (923.1)

† Actual humidifier capacity may vary due to the heat loss from the humidifier reservoir. The ambient air temperature, air velocity and injection tube system will affect the rate of the heat loss from the reservoir.

The capacities shown are based on a non-insulated humidifier reservoir tested in a 70°F environment.

SPECIALTY PRODUCTS

WSVB Series

Watson McDaniel reserves the right to change the designs and/or materials of its products without notice.
©2010 Watson McDaniel Company

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

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

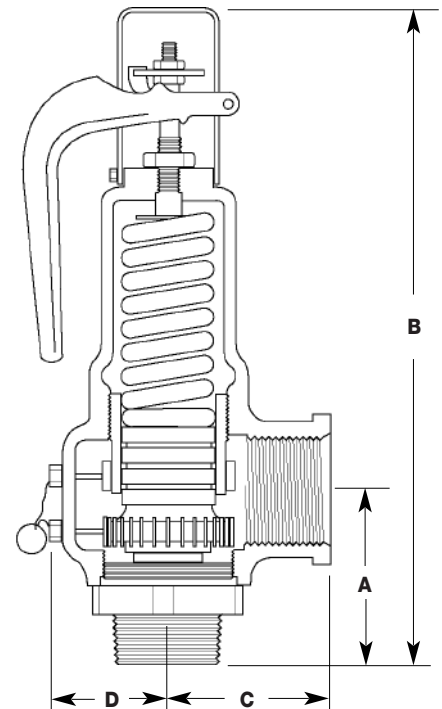
As safety valves open on a non-compressible fluid application, the disc lifts directly proportional to the increase in system pressure over the valve set point. Safety relief valves not only provide over pressure protection resulting from thermal expansion of liquids, but will respond with a rapid full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

FEATURES

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



DIMENSIONS & WEIGHTS – 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"	2.21	6.52	1.37	0.84	1.6
WSVB-13M-13S-D	D	3/4" x 3/4"	2.21	6.52	1.37	0.84	1.6
WSVB-13M-14S-E	E	3/4" x 1"	2.50	7.16	1.75	1.06	2.0
WSVB-14M-14S-E	E	1" x 1"	2.64	7.30	1.75	1.06	2.2
WSVB-14M-15S-F	F	1" x 1 1/4"	2.95	9.34	2.00	1.44	4.1
WSVB-15M-15S-F	F	1 1/4" x 1 1/4"	2.95	9.34	2.00	1.44	4.3
WSVB-15M-16S-G	G	1 1/4" x 1 1/2"	3.38	11.01	2.37	1.69	7.4
WSVB-16M-16S-G	G	1 1/2" x 1 1/2"	3.38	11.01	2.37	1.69	7.6
WSVB-16M-17S-H	H	1 1/2" x 2"	3.63	11.96	2.75	2.06	11.5
WSVB-17M-17S-H	H	2" x 2"	3.63	11.96	2.75	2.06	11.6
WSVB-16S-18S-J	J	1 1/2" FNPT x 2 1/2" FNPT	3.80	14.00	3.50	2.06	20.0
WSVB-17M-18S-J	J	2" x 2 1/2"	4.06	14.25	3.50	2.06	19.9
WSVB-18M-18S-J	J	2 1/2" x 2 1/2"	4.50	14.68	3.50	2.06	20.8

MATERIALS

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

SPECIALTY PRODUCTS

WSVB Series

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

CAPACITIES – Pounds of saturated steam per hour (lbs/hr)						
Set Pressure (PSIG)	Orifice "D" .129" Diameter	Orifice "E" .230" Diameter	Orifice "F" .359" Diameter	Orifice "G" .586" Diameter	Orifice "H" .919" Diameter	Orifice "J" 1.509" Diameter
15	179	320	499	820	1279	2100
20	207	369	576	945	1474	2421
25	234	418	652	1070	1670	2742
30	262	467	729	1195	1865	3063
35	292	521	813	1333	2080	3416
40	322	574	897	1471	2295	3769
45	352	628	981	1609	2510	4122
50	383	682	1065	1747	2725	4475
55	413	736	1149	1885	2941	4828
60	443	790	1233	2022	3156	5181
65	473	844	1317	2160	3371	5535
70	503	897	1401	2298	3586	5888
75	534	951	1485	2436	3801	6241
80	564	1005	1569	2574	4016	6594
85	594	1059	1653	2712	4231	6947
90	624	1113	1737	2849	4446	7300
95	654	1167	1821	2987	4661	7653
100	684	1220	1905	3125	4876	8007
105	715	1274	1989	3263	5091	8360
110	745	1328	2073	3401	5306	8713
115	775	1382	2157	3539	5521	9066
120	805	1436	2241	3677	5736	9419
125	835	1489	2325	3814	5951	9772
130	866	1543	2409	3952	6167	10125
135	896	1597	2493	4090	6382	10479
140	926	1651	2577	4228	6597	10832
145	956	1705	2661	4366	6812	11185
150	986	1759	2745	4504	7027	11538
155	1017	1812	2829	4641	7242	11891
160	1047	1866	2913	4779	7457	12244
165	1077	1920	2997	4917	7672	12597
170	1107	1973	3081	5055	7887	12951
180	1167	2081	3249	5331	8317	13657
190	1228	2189	3417	5606	8747	14363
200	1288	2296	3585	5882	9177	15069
210	1349	2404	3753	6158	9608	15776
220	1409	2512	3921	6433	10038	16482
230	1469	2619	4089	6709	10468	17188
240	1530	2727	4257	6985	10898	17894
250	1590	2834	4425	7260	11328	18601
Approx. 1 PSI Incr.	6.0	10.8	16.8	27.6	43.0	70.6

Notes: 1) Ratings are 90% of actual capacity.
 2) For Set Pressures over 250 PSIG, consult factory.
 3) For other sizes, consult factory.

SPECIALTY PRODUCTS

WSVI Series

Watson McDaniel reserves the right to change the designs and/or materials of its products without notice.
©2010 Watson McDaniel Company

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

Model	WSVI
Sizes	1 1/2", 2", 2 1/2", 3", 4", 6"
Connections	NPT, Flanged
Body Material	Cast Iron
PMO Max. Operating Pressure	250 PSIG (Steam)
TMO Max. Operating Temperature	422° F



TYPICAL APPLICATIONS

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

HOW IT WORKS

As safety 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 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

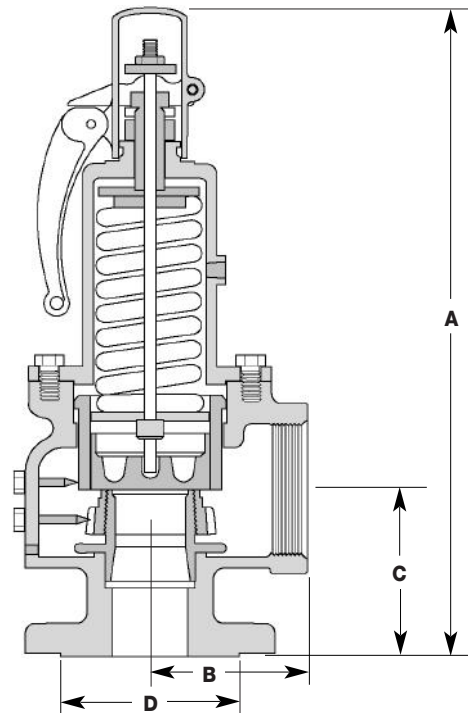
- Stainless Steel wetted trim nozzle & disc
- Metal to metal seating, lapped to optimum flatness
- Two control rings assure maximum performance & adjustability

SAMPLE SPECIFICATION

Safety 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 & WEIGHTS – inches / pounds

Model No.	Valve Size Inlet x Outlet	Orifice Size	A	B	C	Hex Flat D	Weight (lbs)
WSVI-16F-18S-J	1 1/2" 250# x 2 1/2" FNPT	J	15	4	4.31		35
WSVI-17F-19S-K	2" 250# x 3" FNPT	K	16	4	4.63		36
WSVI-17S-19S-K	2" FNPT x 3" FNPT	K	16	4	4.63	3.75	37
WSVI-18F-19S-K	2 1/2" 250# x 3" FNPT	K	16	4	4.63		41
WSVI-19F-19S-K	3" 250# x 3" FNPT	K	16	4	4.63		45
WSVI-18F-20S-L	2 1/2" 250# x 4" FNPT	L	22	5.13	5.63		84
WSVI-18S-20S-L	2 1/2" FNPT x 4" FNPT	L	22	5.13	5.63	5.38	81
WSVI-19F-20S-L	3" 250# x 4" FNPT	L	22	5.13	5.63		85
WSVI-20F-20S-L	4" 250# x 4" FNPT	L	22	5.13	5.63		90
WSVI-19S-20S-M	3" FNPT x 4" FNPT	M	22	5.13	5.63	5.38	80
WSVI-19F-20S-M	3" 250# x 4" FNPT	M	22	5.13	5.63		87
WSVI-20F-20S-M	4" 250# x 4" FNPT	M	22	5.13	5.63		95
WSVI-20F-22F-N	4" 250# x 6" 125#	N	28	7.25	6.75		210
WSVI-20F-22F-P	4" 250# x 6" 125#	P	28	7.25	6.75		215
WSVI-22F-23F-Q	6" 250# x 8" 125#	Q	42	10	9.25		530
WSVI-22F-23F-R	6" 250# x 8" 125#	R	42	10	9.25		530



MATERIALS

Body	Cast Iron
Guide Ring	Brass
Disc	SST
Stem	Steel-Plated

SPECIALTY PRODUCTS

SPECIALTY PRODUCTS

WSVI Series

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

CAPACITIES – Pounds of saturated steam per hour (lbs/hr)

Set Pressure (PSIG)	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	6644	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
155	11372	16129	25039	31604	38103	56040	97082	140569
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
185	13399	19003	29500	37236	44892	66026	114381	165617
190	13736	19482	30244	38174	46023	67690	117264	169791
195	14074	19961	30988	39113	47155	69354	120147	173966
200	14412	20440	31731	40051	48287	71018	123030	178140
205	14749	20919	32475	40990	49418	72683	125913	182315
210	15087	21398	33218	41928	50550	74347	128796	186489
215	15425	21876	33962	42867	51681	76011	131679	190664
220	15763	22355	34706	43806	52813	77675	134562	194839
225	16100	22834	35449	44744	53944	79340	137445	199013
230	16438	23313	36193	45683	55076	81004	140329	203188
235	16776	23792	36936	46621	56207	82668	143212	207362
240	17113	24271	37680	47560	57339	84332	146095	211537
245	17451	24750	38424	48498	58471	85997	148978	215711
250	17789	25229	39167	49437	59602	87661	151861	219886
Approx. 1 PSI incr.	68	96	149	188	226	333	577	835

Notes: 1) Ratings are 90% of actual capacity. 2) For Set Pressures over 250 PSIG, consult factory. 3) For other sizes, consult factory.
 4) ASME Section I – Steam Boilers – pounds of saturated steam per hour @ 3% or 2 PSIG accumulation (whichever is greater).
 5) ASME Section VIII – Pressure Vessels – pounds of saturated steam per hour @ 10 % or 3 PSIG accumulation (whichever is greater).

SPECIALTY PRODUCTS

WCIY Series

Cast Iron Y-Type Strainers

Watson McDaniel reserves the right to change the designs and/or materials of its products without notice.
©2010 Watson McDaniel Company

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



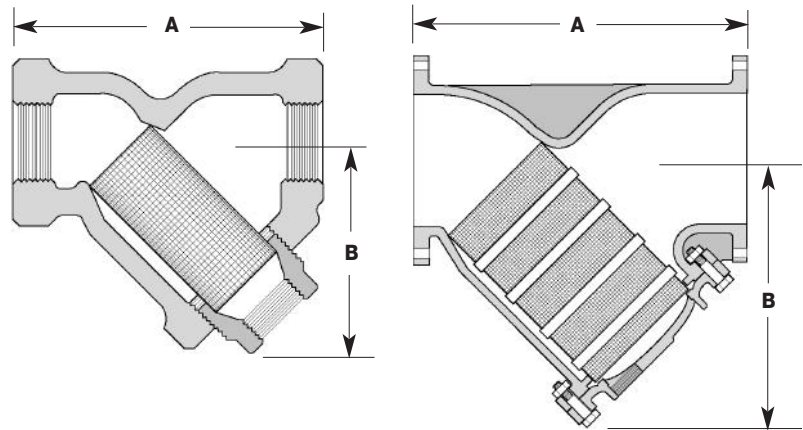
PRESSURE/TEMPERATURE RATINGS

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

Note: WOG = Water, Oil or Gas.



FLOW



TYPICAL APPLICATIONS

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

FEATURES

- Machined seat assures perfect fit for screen
- Blowdown 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 & WEIGHTS – inches / pounds

Size/ Connection	Model	A	B	Blowdown NPT	Weight (lbs)	Screen Opening
1/2" NPT	WCIY-12-020S250	3 ³ / ₁₆	2 ¹ / ₁₆	3/8	1.5	0.033
3/4" NPT	WCIY-13-020S250	3 ³ / ₄	2 ⁷ / ₁₆	3/8	2.5	0.033
1" NPT	WCIY-14-020S250	4	2 ⁷ / ₁₆	3/4	3	0.033
1 1/4" NPT	WCIY-15-020S250	5	3 ³ / ₈	3/4	5.5	0.033
1 1/2" NPT	WCIY-16-020S250	5 ³ / ₄	3 ⁷ / ₈	1	8	0.033
2" NPT	WCIY-17-020S250	7	4 ³ / ₄	1 1/2	13	0.033
2" 125# FLG	WCIY-17-020F125	8 ⁷ / ₈	6	1/2	22	0.033
2" 250# FLG	WCIY-17-020F250	8 ⁷ / ₈	6 ¹ / ₂	1/2	28	0.033
2 1/2" NPT	WCIY-18-045S250	9 ¹ / ₄	5 ⁷ / ₈	1 1/2	22	0.045
2 1/2" 125# FLG	WCIY-18-045F125	10 ³ / ₄	8	1	35	0.045
2 1/2" 250# FLG	WCIY-18-045F250	11 ¹ / ₄	7	1	38	0.045
3" NPT	WCIY-19-045S250	10	6	1 1/2	30	0.045
3" 125# FLG	WCIY-19-045F125	11 ¹ / ₂	8 ³ / ₄	1	43	0.045
3" 250# FLG	WCIY-19-045F250	11 ⁵ / ₈	8	1	54	0.045
4" 125# FLG	WCIY-20-045F125	13 ⁷ / ₈	9 ¹ / ₂	1 1/4	75	0.045
4" 250# FLG	WCIY-20-045F250	14 ¹ / ₂	10 ³ / ₄	1	110	0.125

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 PRODUCTS

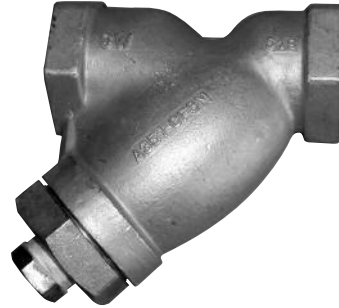
WCSY/WSSY Series

Y-Type Strainers - Carbon Steel/Stainless Steel

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 pipelines and provide inexpensive protection for costly pumps, meters, valves, traps, turbines and compressors.

FEATURES

- **Machined seat assures perfect fit for screen**
- **Blowdown 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

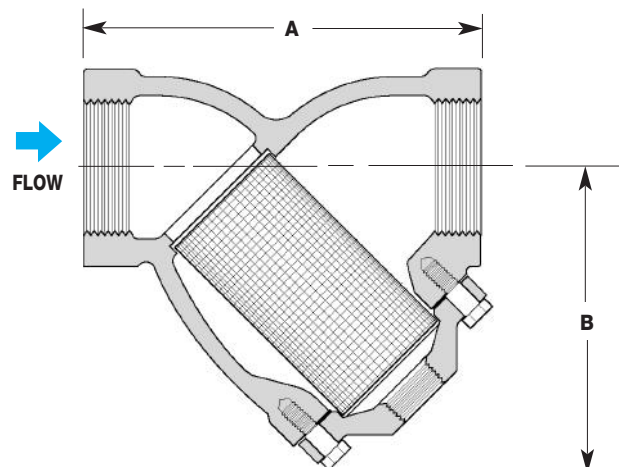
Body	Stainless Steel, A351 GR CF8M
Plug	Stainless Steel, A351 GR CF8M
Cover	Stainless Steel, A351 GR CF8M
Screen	Stainless Steel
Gasket	Blue Guard

HOW TO ORDER

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

DIMENSIONS & WEIGHTS – inches / pounds

Size NPT	A	B	Blowdown NPT	Weight (lbs)	Screen Opening
1/2"	3	2 ⁷ / ₁₆	1/4	2	0.033
3/4"	3 ³ / ₄	2 ¹⁵ / ₁₆	3/8	3	0.033
1"	4 ⁵ / ₈	3 ³ / ₄	3/8	5	0.033
1 1/4"	5	4	3/4	7	0.033
1 1/2"	5 ⁵ / ₈	4 ¹³ / ₁₆	3/4	10	0.033
2"	7	6 ¹ / ₈	1	15	0.045



SPECIALTY PRODUCTS

Suction/Mixing Tee

Cast Iron, Bronze or Stainless Steel

Watson McDaniel reserves the right to change the designs and/or materials of its products without notice.
©2010 Watson McDaniel Company

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	125# & 250#
	Bronze	250#
	Stainless Steel	300#

PRESSURE/TEMPERATURE RATINGS

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



TYPICAL APPLICATIONS

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 inlet and the other liquid through the secondary inlet 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 and requires no maintenance.

MATERIALS

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

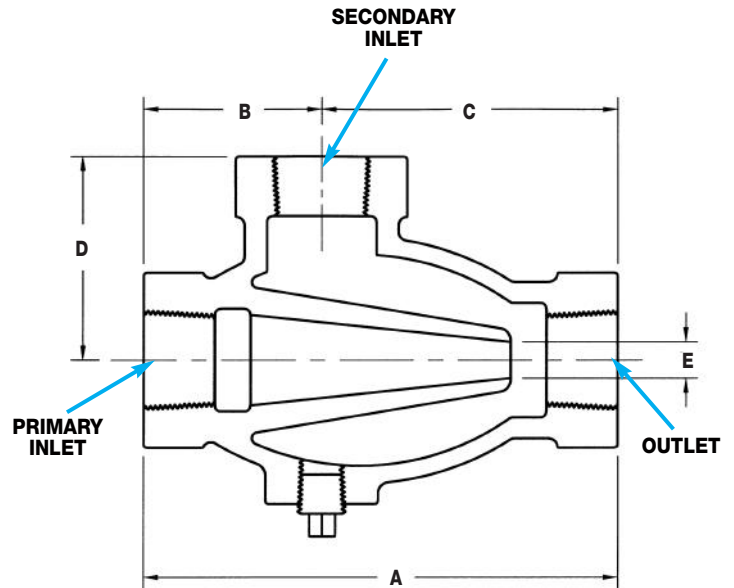
SPECIALTY PRODUCTS

Suction/Mixing Tee

Cast Iron, Bronze or Stainless Steel

DIMENSIONS & WEIGHTS – inches / pounds

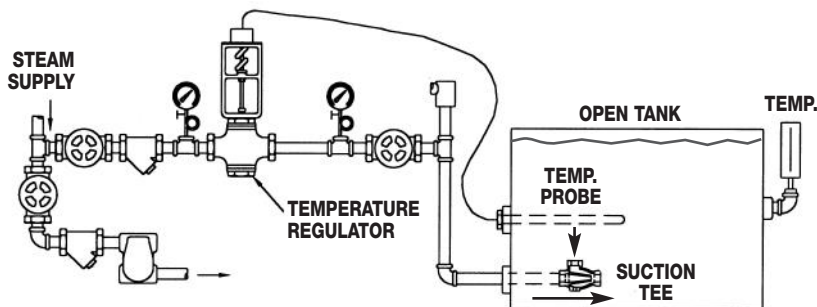
Pipe Size	A	B	C	D	E	Weight (lbs)
125# Cast Iron Body & Bronze 250#						
1/2"	3 ³ / ₄	1 ¹ / ₂	2 ¹ / ₄	1 ³ / ₄	1/4	1.5
3/4"	5	1 ⁷ / ₈	3 ¹ / ₈	3 ¹ / ₈	3/8	3.25
1"	5 ⁵ / ₈	2 ³ / ₁₆	3 ⁷ / ₁₆	2 ¹ / ₂	5/8	4
1 ¹ / ₄ "	5 ³ / ₄	2 ¹ / ₄	3 ¹ / ₂	2 ¹ / ₂	11/16	4.75
1 ¹ / ₂ "	6 ¹ / ₁₆	2 ⁷ / ₁₆	3 ⁵ / ₈	2 ⁷ / ₈	7/8	5.50
2"	7	2 ⁷ / ₈	4 ¹ / ₈	3	15/16	7
2 ¹ / ₂ "	8 ³ / ₈	3 ¹ / ₂	4 ⁷ / ₈	3 ⁵ / ₁₆	1	11.75
3"	9 ¹ / ₂	4 ¹ / ₈	5 ³ / ₈	3 ⁷ / ₈	1 ⁵ / ₁₆	20.50
250# Cast Iron Body & Stainless Steel 300#						
1"	6 ¹ / ₁₆	2 ⁵ / ₁₆	3 ³ / ₄	2 ¹¹ / ₁₆	11/16	6.75
1 ¹ / ₄ "	6 ³ / ₁₆	2 ³ / ₈	3 ¹³ / ₁₆	2 ¹³ / ₁₆	11/16	8
1 ¹ / ₂ "	6 ¹ / ₂	2 ¹³ / ₁₆	3 ¹¹ / ₁₆	2 ⁷ / ₈	7/8	10.50
2"	7 ³ / ₈	3 ¹ / ₁₆	4 ⁵ / ₁₆	3 ¹ / ₄	15/16	16.50



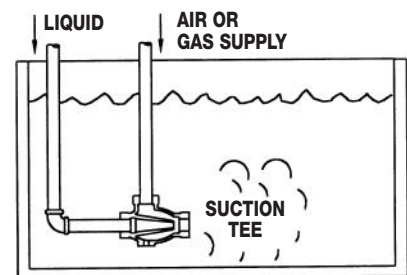
CAPACITIES – Steam (lbs/hr)

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 ¹ / ₄ "	444	558	672	783	894	1005	1116	1230	1344	1461	1578	1689	1800	2010	2232	2592	3168	3708
1 ¹ / ₂ "	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 ¹ / ₂ "	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

SPECIALTY PRODUCTS

Ejectors

Syphons, Eductors, Exhausters & Injectors

Watson McDaniel reserves the right to change the designs and/or materials of its products without notice.
©2010 Watson McDaniel Company

Model	W-EJECT, W-ELL, W-LM
Sizes	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

Note: Minimum Operating Pressure for W-ELL & W-LM is 20 PSIG.



W-ELL & W-LM



W-EJECT

TYPICAL APPLICATIONS

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

Note: W-ELL & W-LM for liquid motive service only.

SPECIALTY PRODUCTS

Ejectors

Syphons, Eductors, Exhausters & Injectors

W-EJECT

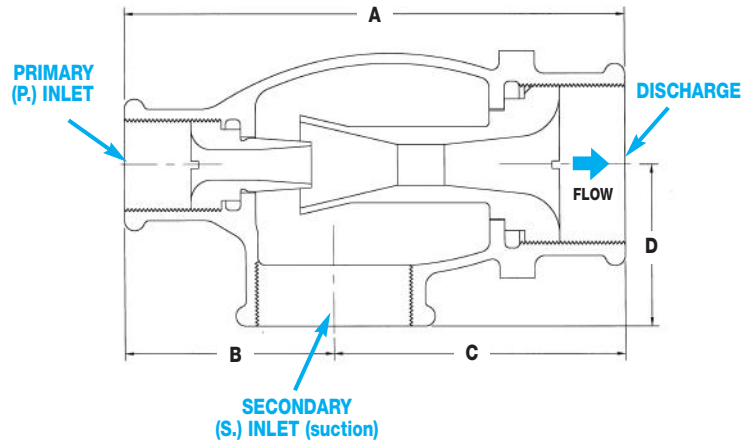
DIMENSIONS – inches

Size	Connection Sizes *			Dimensions			
	S. Inlet	Discharge	P. Inlet	A	B	C	D
Bronze Body & Nozzles							
1/2"	1/2	1/2	1/4	3 1/4	17/16	1 13/16	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

Cast Iron Body with Bronze Nozzles

2"	2	2	1	7 1/4	3 3/8	4 1/8	2 3/8
----	---	---	---	-------	-------	-------	-------

* Connections are female NPT.



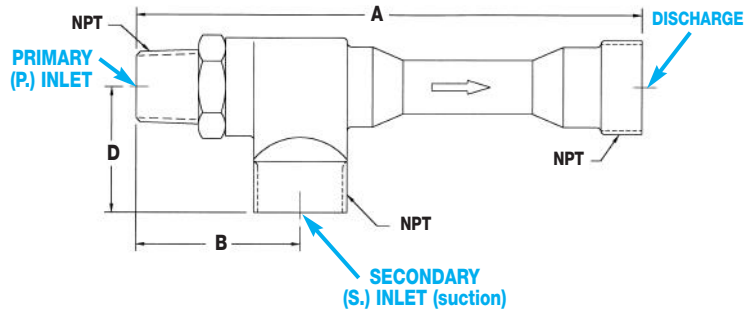
W-ELL / W-LM

Bronze Body & Nozzles

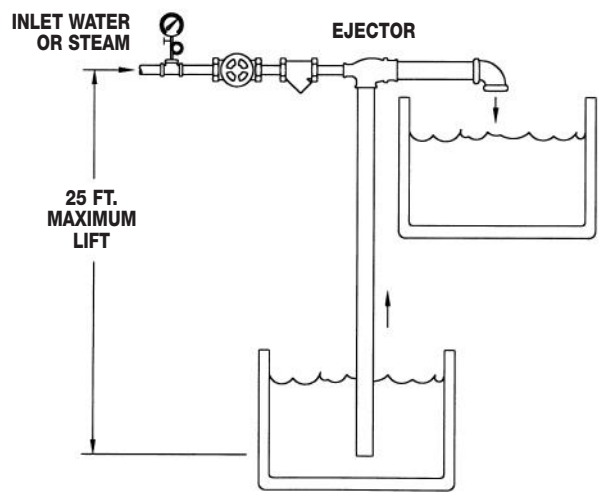
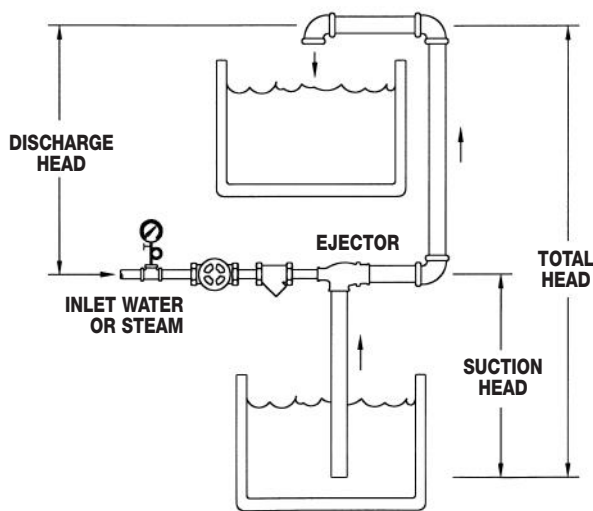
DIMENSIONS – inches

Size	Connection Sizes **			Dimensions		
	S. Inlet	Discharge	P. 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 Liquid



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 1 can be lifted is 25 feet. Increases in the temperature of the liquid being lifted will cause this maximum height to decrease. Pumping liquids in excess of 130°F is not recommended. Please consult factory with any specific application.

Ejector Sizing

Watson McDaniel reserves the right to change the designs and/or materials of its products without notice.
©2010 Watson McDaniel Company

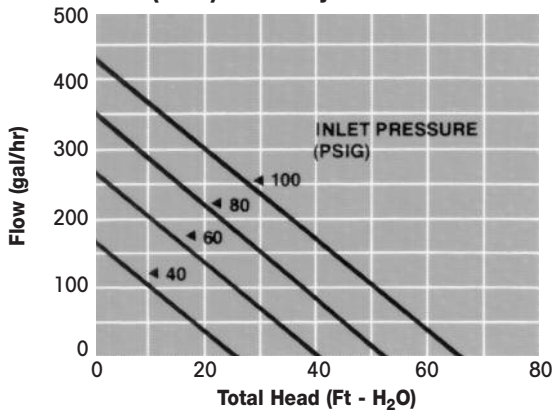
Example 1

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 amount of water being pumped is 700 gal/hr.

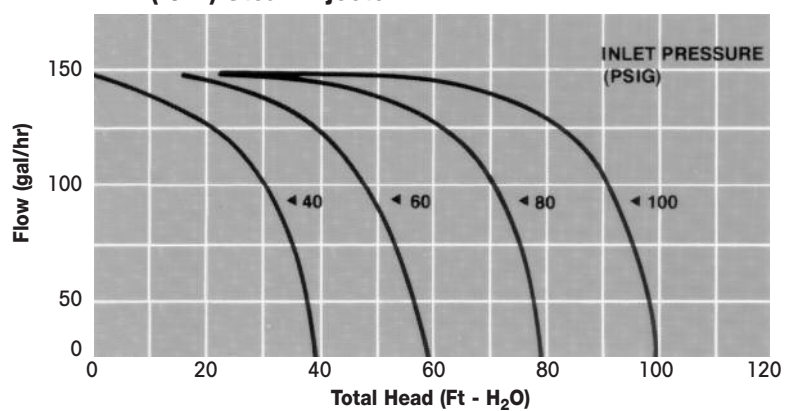
Example 2

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.

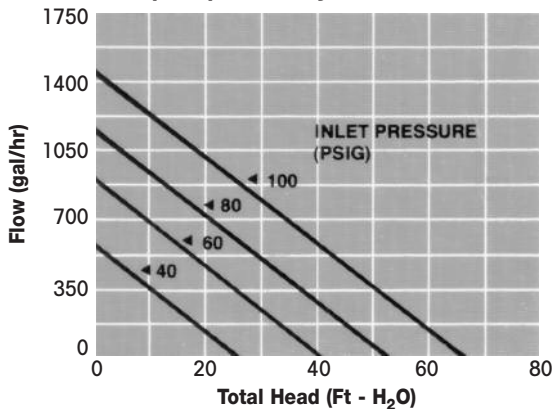
#12 (1/2") Water Ejector



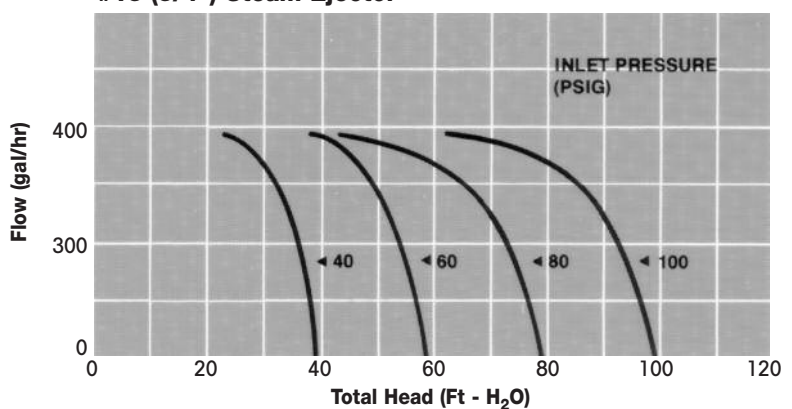
#12 (1/2") Steam Ejector



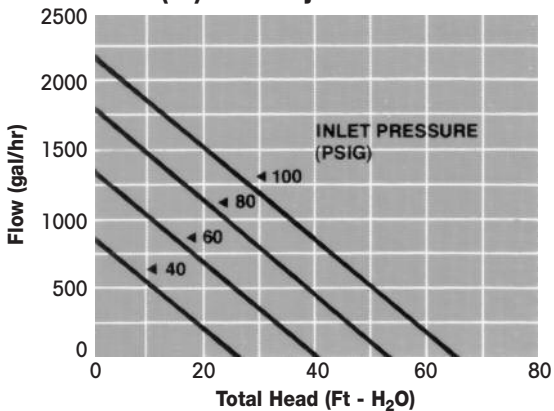
#13 (3/4") Water Ejector



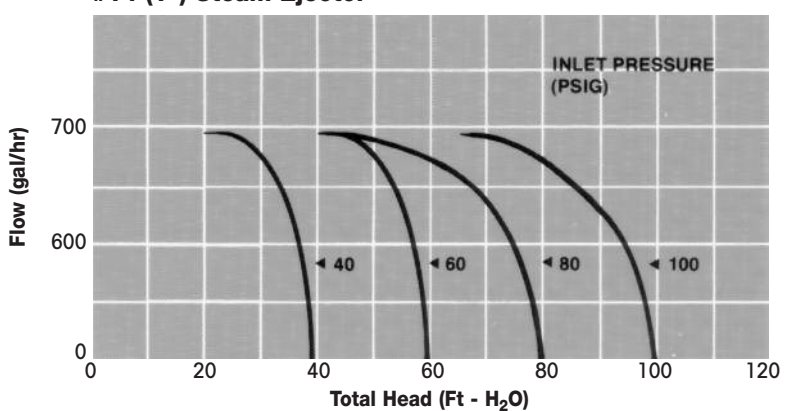
#13 (3/4") Steam Ejector



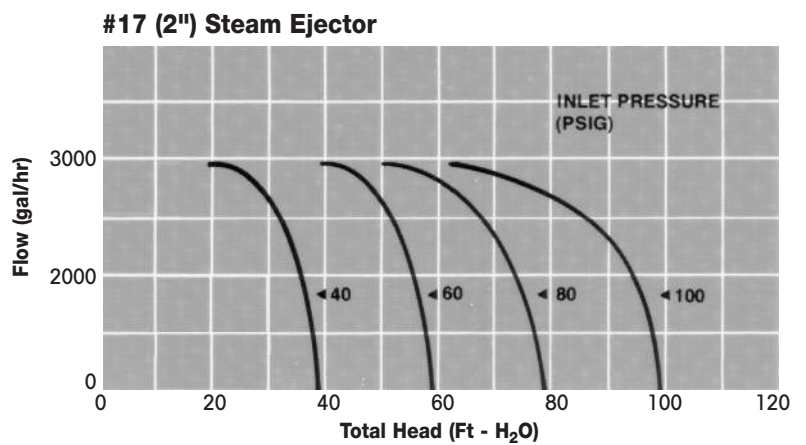
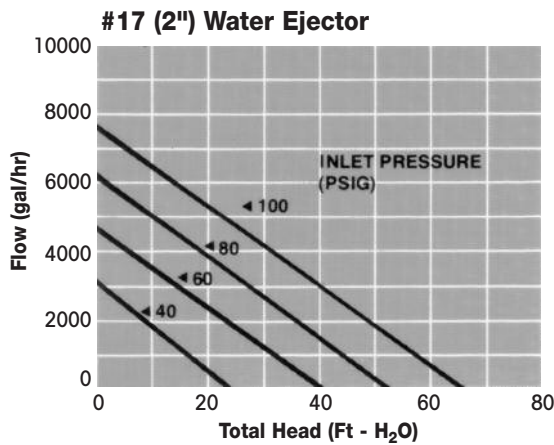
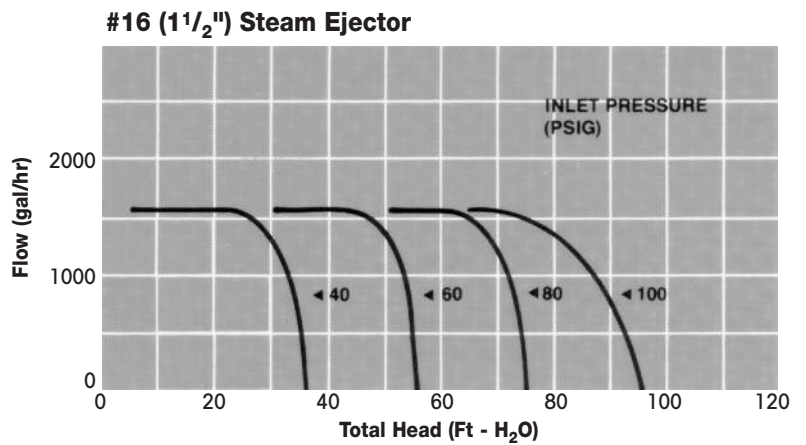
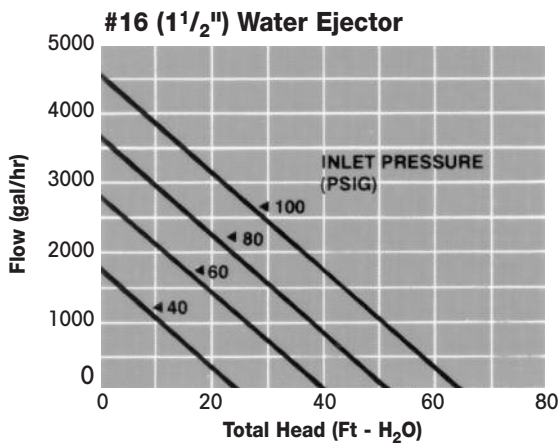
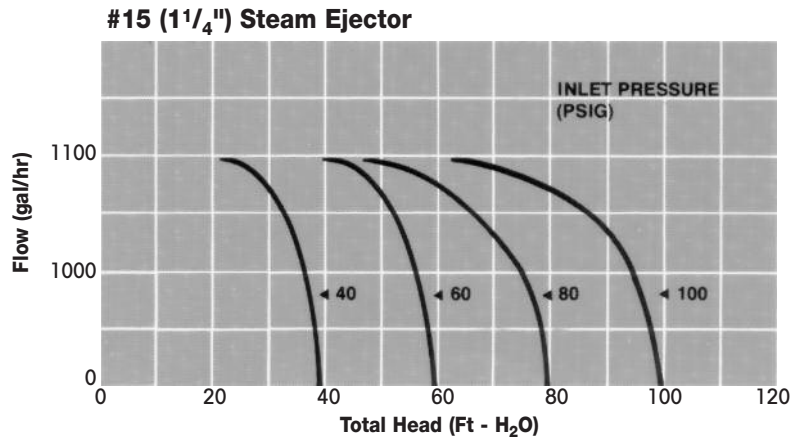
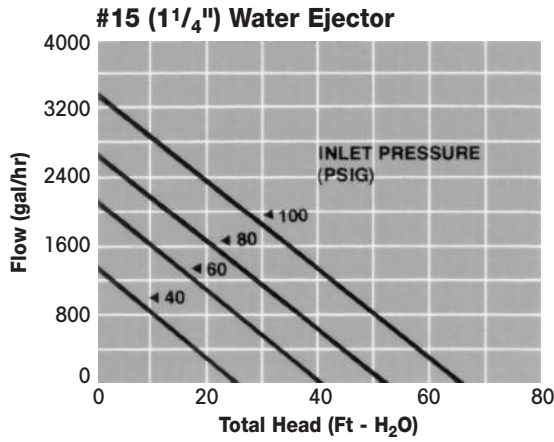
#14 (1") Water Ejector



#14 (1") Steam Ejector



Ejector Sizing



SPECIALTY PRODUCTS

SPECIALTY PRODUCTS

AV813W

Air Eliminator

Watson McDaniel reserves the right to change the designs and/or materials of its products without notice.
©2010 Watson McDaniel Company

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 APPLICATIONS

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
- Optional 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 EPDM seat for tight shut-off. Optional Viton seat is available for elevated temperatures and tight shut-off.

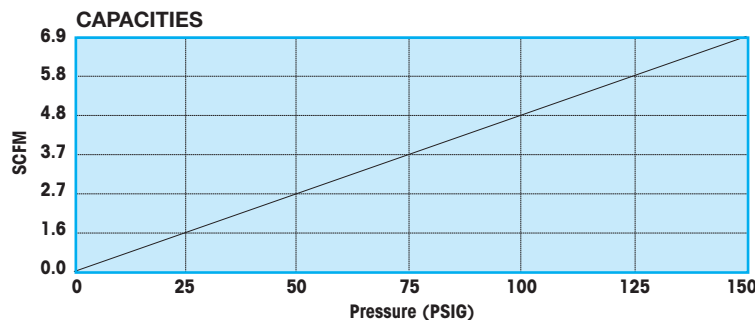
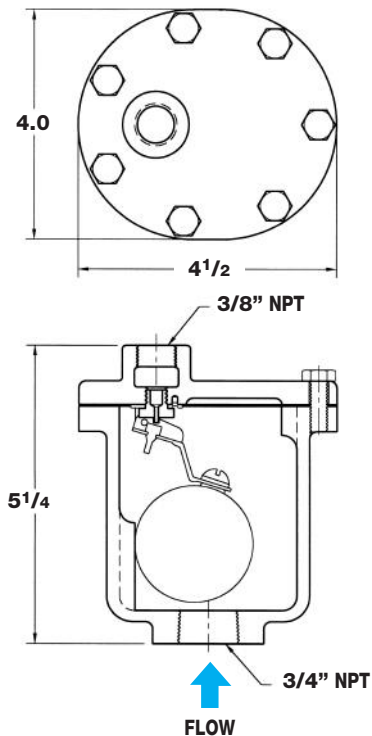
INSTALLATION & MAINTENANCE

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	EPDM (Viton optional)
Lever	Stainless Steel, Type 304
Float	Stainless Steel, Type 304
Washer	Stainless Steel, Type 304
Screw & Washer	Stainless Steel, Type 304

DIMENSIONS – inches



SPECIALTY PRODUCTS

AE1800/1800R Series

Air Eliminator

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 (55 Rc) for longer service life
- Repairable units available (AE1800R Series)

INSTALLATION & MAINTENANCE

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 properly. Isolation valves should be installed for ease of maintenance.

DIMENSIONS – inches / pounds

Model & Orifice Size			Size (Inlet x Outlet)	Height A	Weight (lbs)
.078"	.101"	.125"			
AE1811	AE1821	AE1831	3/4" x 1/2"	7.5	4
AE1811R	AE1821R	AE1831R		7.9	5
AE1812	AE1822	AE1832		3/4" x 3/4"	7.5
AE1812R	AE1822R	AE1832R	7.9		5
AE1813	AE1823	AE1833	1/2" x 1/2"		7.5
AE1813R	AE1823R	AE1833R		7.9	5

CAPACITIES – Air (SCFM)

Series	Orifice Size	PMO* (PSIG)	Inlet Pressure (PSIG)																						
			5	7	9	12	15	20	25	30	40	50	60	70	80	90	100	110	120	125	150	180	265	300	400
AE1810	.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	11.2	16.3	18.4	24.4
AE1820	.101"	265	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	17.3	24.8	-	-
AE1830	.125"	180	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	29.6	-	-	-

Note: Specify Model Number when ordering. Example: **AE1812R** (.078" Orifice, 3/4" x 3/4", 400 PSIG max, Repairable unit)

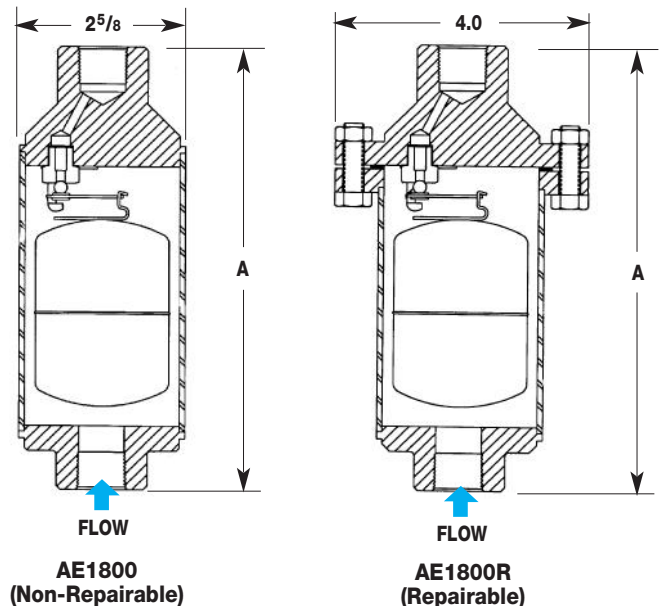
* PMO based on liquids with specific gravity of 1. Consult factory for PMO for liquids of other specific gravity values.



MATERIALS

Body & Shell	Stainless Steel, AISI 304
Float Assembly	Stainless Steel, AISI 304
Valve & Lever Assembly	Hardened Stainless Steel, 55 Rc
Seat	Stainless Steel, AISI 420
Washer, Seat	302 SS
*Gasket	Grafoil
*Bolt, Hex, HD	Stainless Steel, AISI 316
*Nut	Stainless Steel, 18-8

* AE1800R Repairable models only.



SPECIALTY PRODUCTS

SPECIALTY PRODUCTS

AV2000C

Thermostatic Air Vent

Watson McDaniel reserves the right to change the designs and/or materials of its products without notice.
©2010 Watson McDaniel Company

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 APPLICATIONS

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 the valve off tightly.

FEATURES

- Welded stainless steel thermal element
- Hardened stainless steel seat and valve plugs for extended service life
- Integral strainer to protect from contamination
- Steam pressures up to 650 PSIG
- Special Subcool Options Available

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. An isolation valve should be installed to facilitate removal and replacement without system shut-down. Unit is seal-welded and non-repairable.

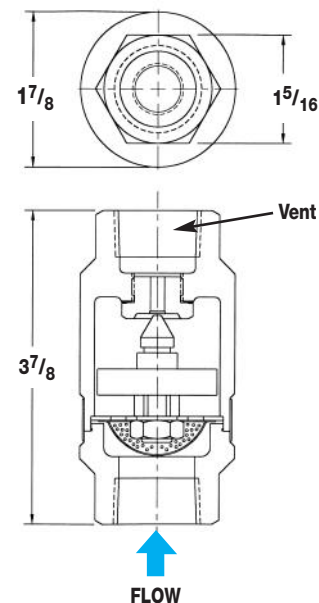
MATERIALS

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 – inches



CAPACITIES – Air (SCFM)

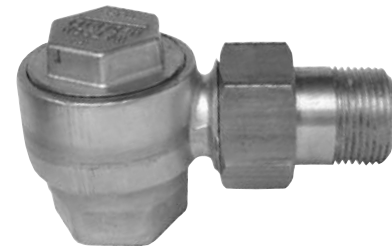
Model	Orifice Size	PMO (PSIG)	Inlet Pressure (PSIG)																	
			2	5	10	25	50	100	125	150	200	250	300	350	400	450	500	550	600	650
AV2001C	3/16"	650	5.2	6.2	7.7	12.4	20.2	35.9	43.9	51.5	67.2	82.8	98.5	114	130	145	161	177	192	208
AV2003C	5/16"	650	10.7	12.6	15.8	25.4	41.4	73.3	89.4	105	137	169	201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

SPECIALTY PRODUCTS

AVT125

Thermostatic Air Vent

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 APPLICATIONS

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 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 in-line repairable. Repair kits are available.

MATERIALS

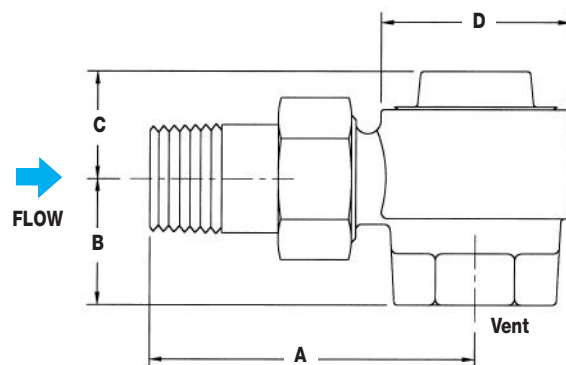
Body & Cover	Forged Brass, CA 377
Element	Welded Stainless Steel, AISI 302
Spring	Stainless Steel, AISI 304
Seat	Stainless Steel, AISI 303
Gasket	Brass, ASTM B-21
Union Nipple	Brass, ASTM B-16
Union Nut	Brass, ASTM B-16

CAPACITIES – Air (SCFM)

Size	Orifice Size	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 & WEIGHTS – inches / pounds

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



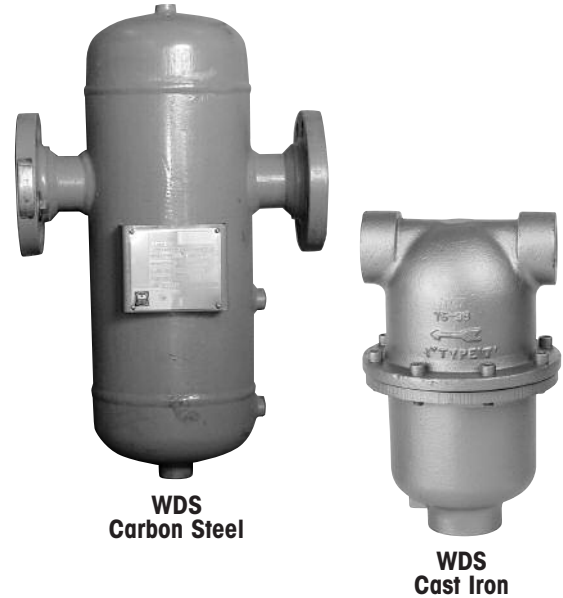
SPECIALTY PRODUCTS

WDS Series

Air/Steam Moisture Separator

Watson McDaniel reserves the right to change the designs and/or materials of its products without notice.
©2010 Watson McDaniel Company

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 @ 450°F 125# FLG: 150 PSIG @ 450°F	NPT, SW: 1000 PSIG @ 650°F 150# FLG: 150 PSIG @ 450°F 300# FLG: 500 PSIG @ 650°F



TYPICAL APPLICATIONS

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 unit's 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
- Standard gauge ports on 2 1/2"-12" carbon steel units
- ASME 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 & 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*
3/4", 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

* Not to be used for steam service at these pressures. For air service only.

SPECIALTY PRODUCTS

WDS Series

Air/Steam Moisture Separator

CAST IRON

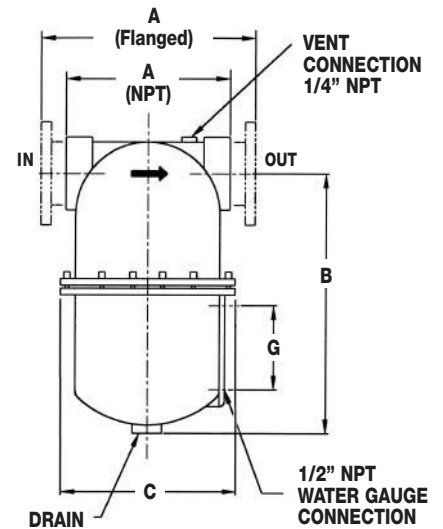
WDS CAST IRON NPT MODEL DIMENSIONS – inches / pounds

Size (NPT)	A	B	C	Vent NPT	Drain NPT	Gauge Centers G	Weight (lbs)
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 (lbs)
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



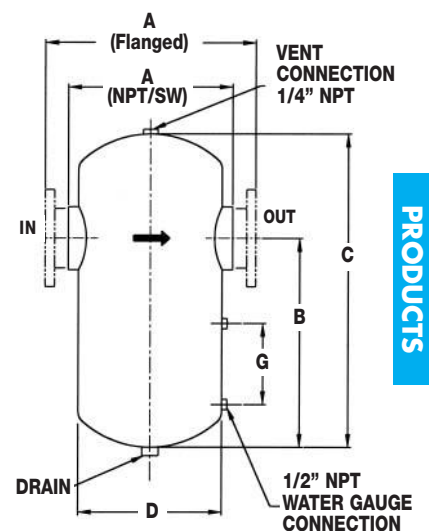
CARBON STEEL

WDS CARBON STEEL MODEL DIMENSIONS – inches / pounds

Size	NPT & SW		150# & 300# FLG		Gauge Centers G	NPT Drain		Weight (lbs)			
	A	A	B	C		D	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 5/8	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

Note: 1" - 2" units are Cast Steel; 2 1/2" and up are Fabricated Steel.

CARBON STEEL WDS



SPECIALTY PRODUCTS

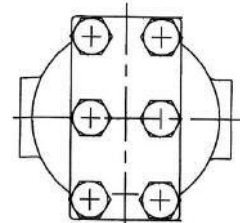
SPECIALTY PRODUCTS

WCIS Series

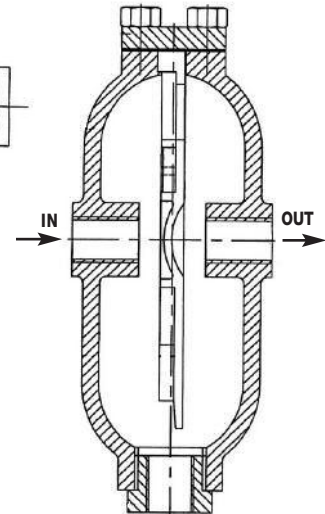
Air/Steam Moisture Separator

Watson McDaniel reserves the right to change the designs and/or materials of its products without notice.
©2010 Watson McDaniel Company

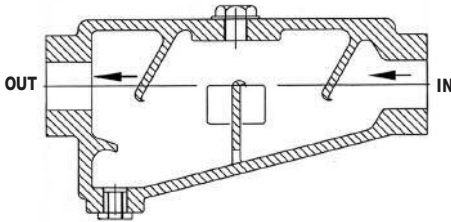
Model	WCIS1	WCIS2	WCIS3
Sizes	3/4", 1"	1 1/2", 2"	2" to 4"
Connections	NPT	NPT	ANSI 125#
Body Material	Cast Iron	Cast Iron	
PMO Max. Operating Pressure	200 PSIG	145 PSIG	
TMO Max. Operating Temperature	388°F	363°F	
PMA Max. Allowable Pressure	232 PSIG @ 0-248°F 160 PSIG @ 572°F	232 PSIG @ 0-248°F 188 PSIG @ 428°F	
TMA Max. Allowable Temperature	572°F @ 160 PSIG	428°F @ 0-188 PSIG	



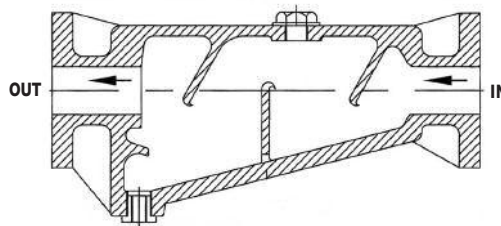
MODEL WCIS1



MODEL WCIS2



MODEL WCIS3



TYPICAL APPLICATIONS

- On steam mains, as a drip station ahead of steam pressure reducing or temperature control valves
- On the steam inlet to laundry presses and other process equipment which require dry saturated steam
- On the compressed air supply to sensitive instruments and before filters

HOW IT WORKS

When a vapor entrained with moisture enters the steam separator, a series of baffles change its flow direction several times. During the process, the baffles in the housing collect impinging water droplets that are carried in the vapor. Gravity causes the accumulated water droplets and other foreign particles to fall to the drain and exit through an external trap. This allows clean, dry vapor to exit at the outlet of the separator.

FEATURES

- Extracts nearly all moisture and solids > 10 microns
- Optimal gravity discharge
- Long-lasting cast iron construction

SAMPLE SPECIFICATION

Moisture Separator shall be of the high efficiency impingement type having a pressure drop that does not exceed an equivalent length of pipe. Body shall be iron with threaded or flanged connections. A threaded bottom drain shall be provided for the installation of a trap to discharge any accumulated liquid.

INSTALLATION

Install a horizontal pipeline with the drain directly below the line. Recommended trap is a continuous draining float operated type.

MAINTENANCE

The trap at the separator drain should be serviced periodically according to the manufacturer's instructions. The separator itself requires no maintenance.

MATERIALS

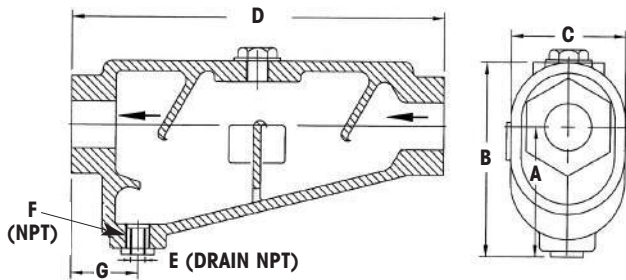
WCIS1 Body & Cover	Cast Iron ASTM A 126 GR CLB
WCIS2/3 Body	
WCIS1 Gasket	Semi-rigid Graphite Laminate
WCIS2/3 Gasket	Reinforced Exfoliated Graphite
Bolts	Steel UNF, BS 1766 Gr 5
Bushing	Malleable Iron
Plug	Malleable Iron

SPECIALTY PRODUCTS

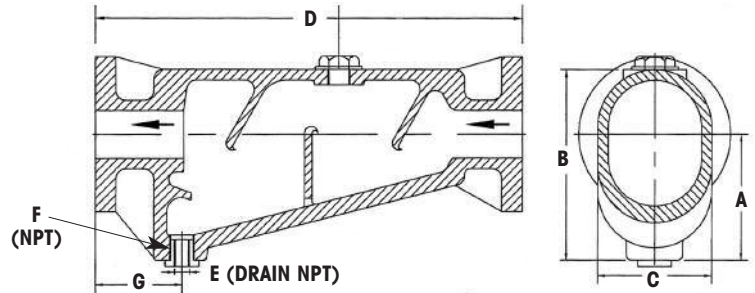
WCIS Series

Air/Steam Moisture Separator

MODEL WCIS2



MODEL WCIS3



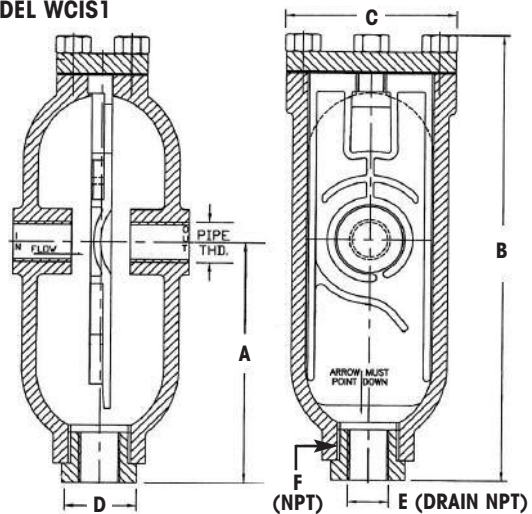
WCIS2 DIMENSIONS with threaded connections - in./mm

Size	A	B	C	D	E	F	G	Weight
1 1/2"	4 11/16 119	6 1/2 165	3 1/2 89	12 304	1/2" -	1 1/2" -	2 3/8 60	24 lb 11 kg
2"	5 15/16 150	8 1/4 210	4 1/2 115	15 11/16 398	1/2" -	1 1/2" -	2 7/8 73	42.0 lb 19 kg

WCIS3 DIMENSIONS with flanged connections - in./mm

Size	A	B	C	D	E	F	G	Weight
2"	5 3/8 137	8 1/8 207	4 13/16 122	18 457	1/2" -	1 1/2" -	3 3/4 94	67 lb 30.5 kg
2 1/2"	6 3/4 172	9 5/8 244	5 3/4 147	15 15/16 404	3/4" -	1 1/2" -	3 7/8 98	67 lb 30.5 kg
3"	6 3/4 172	10 254	6 1/8 155	19 1/16 484	1" -	1 1/2" -	3 7/8 98	86 lb 39 kg
4"	9 7/16 233	13 3/8 337	7 13/16 197	27 1/4 692	1" -	1 1/2" -	4 13/16 122	172 lb 78 kg

MODEL WCIS1



WCIS1 DIMENSIONS (nominal) - inches/mm

Size	A	B	C	D	E	F	Weight
3/4"	6 1/16 155	10 1/4 260	4 7/16 112	4 7/16 112	1/2" -	1 1/2" -	15 lb 7 kg
1"	9 229	15 1/4 388	5 7/8 149	6 1/16 155	1/2" -	2" -	30 lb 14 kg

Recommended Air Capacities in SCFM

Size	Operating Pressure (PSIG)						
	20	40	60	80	100	145	200
3/4"	31	51	67	87	102	148	194
1"	51	82	108	138	169	245	322
1 1/2"	123	190	262	334	406	587	
2"	206	437	437	556	674	968	
2 1/2"	288	623	623	793	957	1380	
3"	370	803	803	1019	1236	1776	
4"	643	1385	1385	1756	2132	3059	

Recommended Saturated Steam Capacities in lbs/hr

Size	Operating Pressure (PSIG)						
	5	10	25	50	100	145	200
3/4"	68	82	128	203	349	496	635
1"	110	133	208	330	567	804	1030
1 1/2"	260	317	494	783	1347	1845	
2"	429	523	814	1292	3220	3041	
2 1/2"	612	746	1162	1844	3168	4340	
3"	946	1153	1795	2848	4893	6702	
4"	1630	1985	3092	4906	8427	11542	

SPECIALTY PRODUCTS

WEH Series

Exhaust Head

Watson McDaniel reserves the right to change the designs and/or materials of its products without notice.
©2010 Watson McDaniel Company

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



TYPICAL APPLICATIONS

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 motion 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 desiccation of the steam.

FEATURES

- Up to 99% of particles 10 microns 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, carbon steel or stainless 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 exhaust head to a roof gutter or down spout.

MATERIALS

WEHC	All Parts Cast Iron
WEHF	All Parts Fabricated Carbon Steel
WEHFSS	All Parts Fabricated Stainless Steel

HOW TO ORDER

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

Available sizes & connections:

Cast Iron

NPT - 1", 1 1/2", 2", 2 1/2", 3", 4"
125# Flanged - 4", 5", 6", 8", 10"

Carbon Steel & Stainless Steel

150# Flanged - 2 1/2", 3", 4", 5", 6", 8", 10"

SPECIALTY PRODUCTS

WEH Series

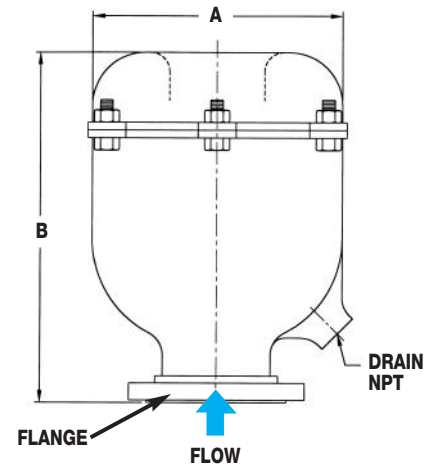
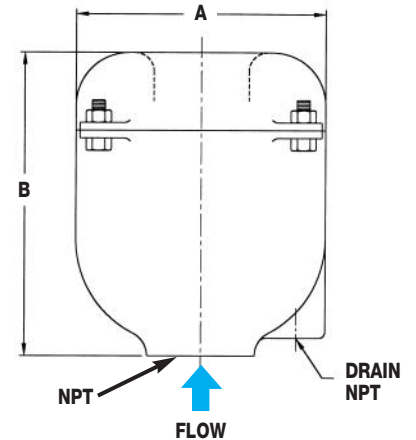
Exhaust Head

WEHC (Cast Iron)

WEHC DIMENSIONS (inches), WEIGHTS & CAPACITIES

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 ⁷ / ₈	1	50	2,700
4"	125# FLG	10	15	1	68	2,700
5"	125# FLG	13	14	1 ¹ / ₂	90	4,000
6"	125# FLG	14 ³ / ₄	18 ³ / ₄	1 ¹ / ₂	115	6,000
8"	125# FLG	18	20	2	190	10,500
10"	125# FLG	23	24	2	335	16,000

* Capacity in pounds of exhaust steam per hour at atmospheric pressure of 14.7 PSIA.

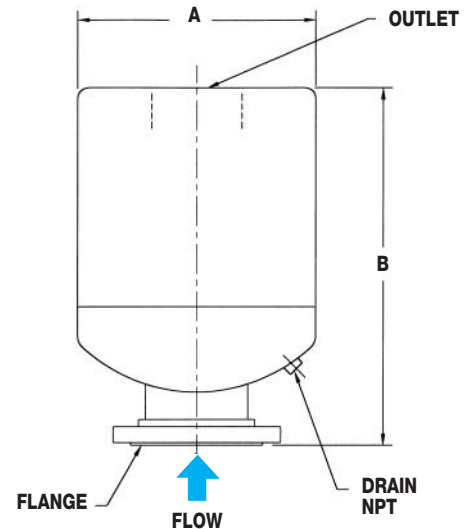


WEHF (Carbon Steel) & WEHFSS (Stainless Steel)

WEHF/SS DIMENSIONS (inches), WEIGHTS & CAPACITIES

Inlet Size	Inlet Connection	A	B	Drain NPT	Weight (lbs)	Capacity*
2 ¹ / ₂ "	150# FLG	8 ⁵ / ₈	16	1	55	1,000
3"	150# FLG	10 ³ / ₄	19	1 ¹ / ₂	65	1,600
4"	150# FLG	14	24	1 ¹ / ₂	100	2,700
5"	150# FLG	16	26	1 ¹ / ₂	130	4,000
6"	150# FLG	18	30	1 ¹ / ₂	140	6,000
8"	150# FLG	20	36	2	240	10,500
10"	150# FLG	24	42	2	390	16,000

* Capacity in pounds of exhaust steam per hour at atmospheric pressure of 14.7 PSIA.



SPECIALTY PRODUCTS

SPECIALTY PRODUCTS

WVBSS

Stainless Steel Vacuum Breaker

Watson McDaniel reserves the right to change the designs and/or materials of its products without notice.
©2010 Watson McDaniel Company

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 APPLICATIONS

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. The elimination of vacuum is necessary to allow 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 air inlet. 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.

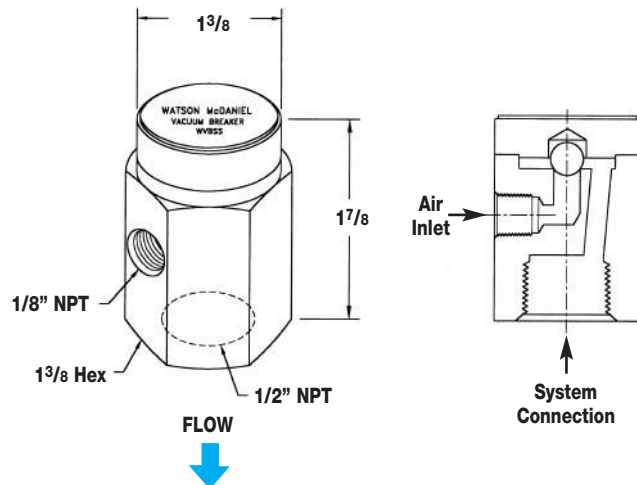
INSTALLATION

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
Ball	Hardened Stainless Steel
Nameplate	Stainless Steel, Series 300

DIMENSIONS – inches



CAPACITIES – Air (SCFM)

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

SPECIALTY PRODUCTS

WSSCV Series

Stainless Steel Check Valves

Model	WSSCV
Sizes	1/2", 3/4", 1", 1 1/4", 1 1/2", 2", 3"
Connections	NPT, SW
Body Material	316 Stainless Steel
PMO Max. Operating Pressure	500 PSIG
PMA Max. Allowable Pressure	750°F PSIG @ 100°F
TMA Max. Allowable Temperature	850°F @ 420 PSIG

Note: WSSCV is supplied with standard spring for 1/4 PSIG cracking pressure; optional 5 PSIG cracking pressure spring is available upon request.

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 & paper, textile and food & beverage industries. The WSSCV all stainless steel check valves will operate much longer and are less problematic than bronze or cast iron check valves.

FEATURES & OPTIONS

- **316 Stainless Steel Body and Internals**
- **Low cracking Pressure on spring (1/4 PSI) to minimize resistance and maximize flow.**
- **Available with optional 5 PSI cracking pressure (must specify at time of order)**
- **Available with NPT, SW, or optional Flanged 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**

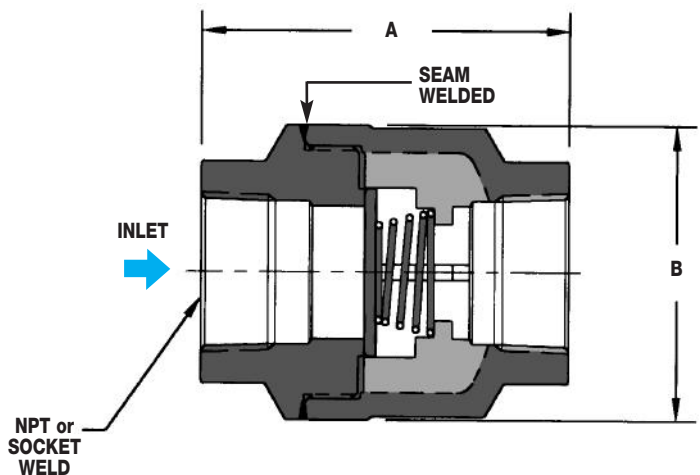
SAMPLE SPECIFICATION

Check valve shall have a 316 stainless steel body and disc. Spring shall be made from Inconel-X-750. Check valve body to be seam 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	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	3"
MODEL	WSSCV-12	WSSCV-13	WSSCV-14	WSSCV-15	WSSCV-16	WSSCV-17	WSSCV-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
Standard Cracking Pressure*	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Optional Cracking Pressure*	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Cv	7	13	22	39	54	93	180

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

SPECIALTY PRODUCTS

WFPV

Freeze Protection Valve

Watson McDaniel reserves the right to change the designs and/or materials of its products without notice.
©2010 Watson McDaniel Company

Model	WFPV
Sizes	1/2"
Connections	NPT
Body Material	Stainless Steel
PMO Max. Operating Pressure	200 PSIG
TMO Max. Operating Temperature	300°F



TYPICAL APPLICATIONS

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 lines.

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 affect 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 and tight shut-off.

INSTALLATION

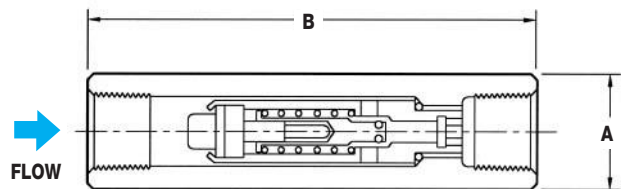
Unit should be installed in a vertical orientation with flow direction downward. For full details, see Installation and Maintenance Manual.

MATERIALS

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

DIMENSIONS & WEIGHTS – inches / pounds

Size NPT	A	B	Weight (lbs)
1/2"	1 1/4	4 1/2	0.9



CAPACITIES – Water (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

Model	WSPV
Sizes	1/2", 3/4"
Connections	NPT
Body Material	Stainless Steel
PMO Max. Operating Pressure	200 PSIG
TMO Max. Operating Temperature	300°F



TYPICAL APPLICATIONS

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 affect opening temperature

SAMPLE SPECIFICATION

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

INSTALLATION

Unit should be installed in a vertical orientation with flow direction downward. For full details, see Installation and Maintenance Manual.

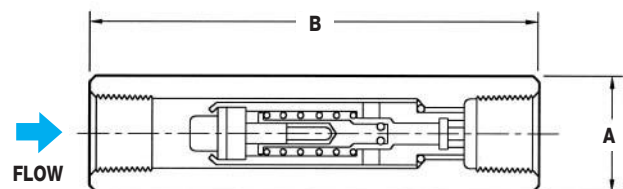
MATERIALS

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 & WEIGHTS – inches / pounds

Size NPT	A	B	Weight (lbs)
1/2"	1 1/4	4 1/2	0.9
3/4"	1 1/2	5 1/2	1.4



CAPACITIES – Water (lbs/hr)

Inlet Pressure (PSIG)	Capacity (lbs/hr)	
	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
200	10,600	14,140

SPECIALTY PRODUCTS

SPECIALTY PRODUCTS

WDPL Series

Drip Pan Elbow

Watson McDaniel reserves the right to change the designs and/or materials of its products without notice.
©2010 Watson McDaniel Company

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



WDPL Flanged

TYPICAL APPLICATIONS

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 Flanged connections available

SAMPLE SPECIFICATION

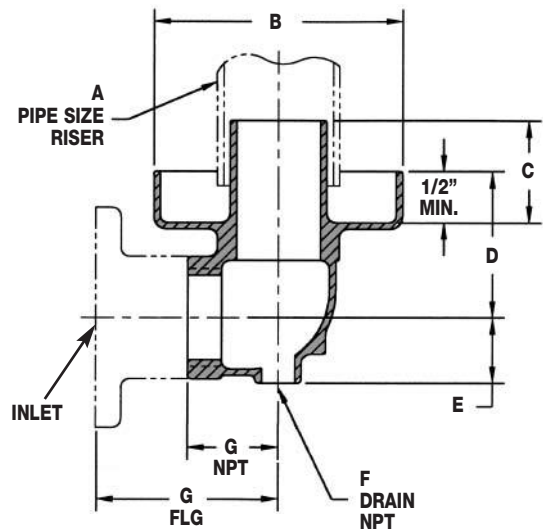
Drip Pan Elbow shall be made of cast iron and conform to the Power Piping Code. It shall have a pan to collect condensate in the steam riser pipe and a drain to pipe away the condensate.

HOW TO ORDER

Specify pipe size needed for application.

MATERIALS

Body	Cast Iron
------	-----------



DIMENSIONS & WEIGHTS – 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

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

Note: 250 PSIG unit available. Consult factory.

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/ORDER

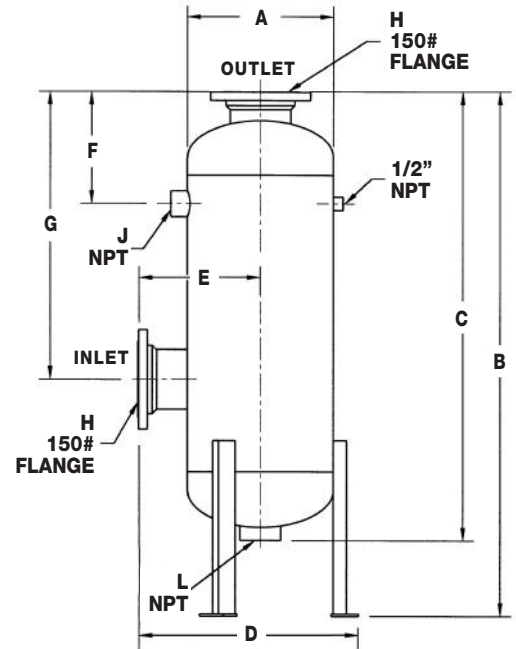
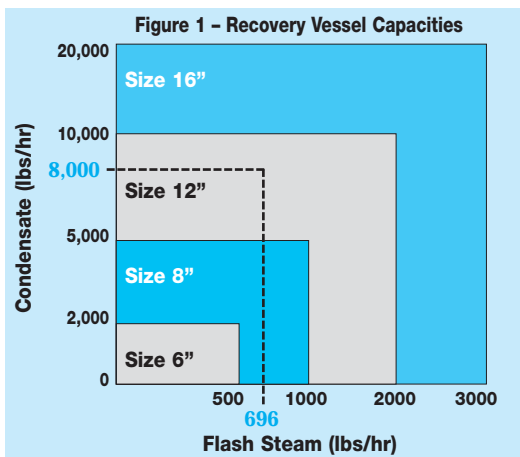
Use **Table 1** to determine amount of Flash Steam that will be generated by the hot pressurized condensate. The percentage of Flash Steam formed is found where Condensate Pressure and Flash Tank Pressure intersect.

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

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

.087 x 8000 = 696 lbs/hr of flash steam

Therefore Choose: **12" FLASH TANK**



Note: All Watson McDaniel flash recovery vessels are supplied with ASME Section VIII Code Stamp.

Table 1 – PERCENT (%) FLASH STEAM

Produced when condensate is discharged to atmosphere (0 PSIG) 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 ⁵ / ₈	47	38 ¹ / ₂	12	8	9	25 ¹ / ₂	2 ¹ / ₂	3/4	1 ¹ / ₂	75
8"	8 ⁵ / ₈	48	39 ³ / ₄	13	8 ¹ / ₂	9 ¹ / ₂	25 ⁵ / ₈	4	3/4	2	150
12"	12 ³ / ₄	49 ¹ / ₂	41 ¹ / ₄	21	11 ³ / ₄	11 ¹ / ₂	26	5	1 ¹ / ₂	3	165
16"	16	58	50	24	13 ³ / ₈	12 ¹ / ₂	32	6	2	3	215

SPECIALTY PRODUCTS

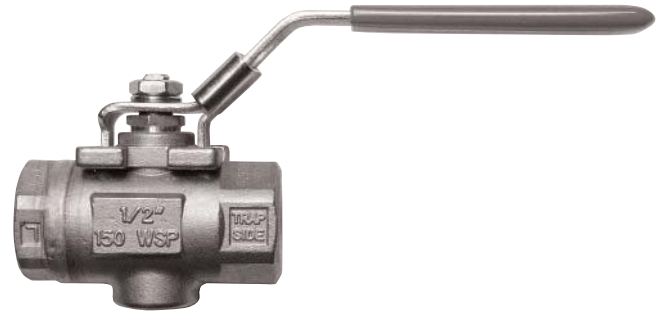
WSTTV Series

Steam Trap Test Valves

Watson McDaniel reserves the right to change the designs and/or materials of its products without notice.
©2010 Watson McDaniel Company

Model	WSTTV	
Sizes	1/2", 3/4", 1"	
Connections	NPT (Consult Factory for Options)	
Body Material	Bronze or Stainless Steel	
Pressure Ratings	Bronze	150 PSIG WSP
	Stainless Steel	150 PSIG WSP

WSP = Working Steam Pressure



TYPICAL APPLICATIONS

The **WSTTV** Steam Trap Test Valve offers simple, immediate, and visible diagnosis of any steam trap. Turning a single handle will instantly provide steam trap operational data.

HOW IT WORKS

With the **WSTTV** Steam Trap Test Valve installed downstream of the trap and in the open position, steam trap discharges normally. A quarter-turn of the handle repositions the specially designed ball and diverts the trap discharge through a port on the bottom of the valve. Discharge can then be observed and assessments made regarding the operation of the steam trap.

FEATURES (Bronze)

- Full Port
- Cast heavy wall bronze bodies
- Standard locking stainless steel handles

FEATURES (Stainless Steel)

- Seal welded construction
- Full stainless steel construction
- Fully compliant with ASME B16.34 & API 608
- NACE MR-01-75 compliant
- Standard locking stainless steel handles
- Single reduced bore/full porting (depending on size)

INSTALLATION

Test Valve to be mounted on the outlet side of any steam trap. Care should be taken to ensure that the discharge port will be positioned in such a manner so as to avoid danger to personnel. NOT AN ISOLATION OR STOP VALVE.

MAINTENANCE

No maintenance required.

MATERIALS (Bronze)

Description	150 lb. Rating
Body	Bronze B584 C84400
Tailpiece	Brass B124 C27700
Ball	ASTM A276 Gr. 316 SST
Stem	ASTM A276 Gr. 316 SST
Packing Nut	Brass B16 C36000
Seats (2)	R-TFM (Hostafion)
Packing	25% Carbon-filled PTFE
Thrust Washer	R-TFM (Hostafion)
Handle Assembly	300 Series SST
Handle Nut	300 Series SST

MATERIALS (Stainless Steel)

Description	150 lb. Rating
Body	CF8M
Tailpiece	CF8M
Ball	ASTM A276 Gr. 316 SST
Stem	ASTM A276 Gr. 316 SST
Packing Nut	ASTM A276 Gr. 316 SST
Seats (2)	R-TFM (Hostafion)
Tailpiece Seal	Graphite
Thrust Washer	R-TFM (Hostafion)
Stem Packing	Graphite
Lock Washer	300 Series SST
Handle Nut	300 Series SST
Handle Assembly	300 Series SST
Nameplate	300 Series SST

HOW TO ORDER

Specify size, pressure class and options, if applicable. Additional options available; consult factory.