Inland Empire Brine Line
Air Release and Vacuum Valve Program

The following documents are part of the AV program:

1. AV List and maintenance summary
2. AV maps
3. Brine Line Reach 5 profile with AV locations
4. Reach 5 operating pressure at AV locations under different flow conditions
5. AV Maintenance SOP

Inland Empire Brine Line
Air Release and Vacuum Valve Program

AV ID	AV Model	Location	Date of last replacement	Notes	Replacement by others	Above/Below Ground
AV-0030	VM804	Collier/Chaney	8/11/2015			Above
AV-0050	VM804	Minthorne/Flood Control Channel	8/11/2015			Above
AV-0070	VM804	Pasadena/Hunco Way	8/11/2015			Above
AV-0080	VM804	Pasadena/Enterprise Way	6/4/2014			Above
AV-0090	VM804	Pasadena/Riverside Drive	6/3/2014			Above
AV-0120	VM804	Riverside Drive/Baker Street	6/3/2014	Shut-off valve at AV needs to be replaced		Above
AV-0140	VM804	Baker Street/Turnbull	6/3/2014			Above
AV-0160	VM804	Baker Street	6/18/2014			Above
AV-0180	VM804	Coal Avenue	6/18/2014	Needs overhauled AV - AV to be abandoned as part of Nichols Rd. relocation	X	Above
AV-0200	VM804	Coal Avenue / Terra Cota	6/18/2014	AV to be abandoned as part of Nichols Rd. relocation	X	Above
AV-0250	VM804	Lake Street	7/17/2013	Needs overhauled AV		Above
AV-0260	VM804	Lake Street	7/17/2013	Needs overhauled AV		Above
AV-0270	VM804	Temescal Canyon Road / Lake Street	12/4/2014	Overhauled unit leaked. No records showing reinstalling		Above
AV-0290	VR41/M5	Temescal Canyon Road	4/6/2015			Above
AV-0310	ARI D-023	Temescal Canyon Road	10/6/2014			Above
AV-0330	VM804	Temescal Canyon Road / Hostettler	7/16/2015			Below
AV-0340	Claval	Temescal Canyon Road / Earthmover		Needs overhauled AV		Below
AV-0350	Claval	Temescal Canyon Road / Horsethief Canyon		Needs overhauled AV		Below
AV-0370	ARI D-023	Temescal Canyon Road / Lee Lake	4/1/2014			Below
AV-0380	VM804	Temescal Canyon Road / Indian Truck Trail		Needs overhauled AV - Isolation valve needs replacement		Below
AV-0400	Claval	Temescal Canyon Road / Indian Truck Trail		Needs overhauled AV - Isolation valve needs replacement		Below
AV-0410	ARI D-023	Temescal Canyon Road	8/27/2015			Above
AV-0430	ARI D-023	Temescal Canyon Road / Maitri	8/27/2015			Below
AV-0440	VM804	Temescal Canyon Road / Glen Ivy	11/13/2014	Isolation valve missing	X	Above
AV-0450	VM804	Temescal Canyon Road / Glen Ivy	10/21/2014		X	Below
AV-0480	Claval	Temescal Canyon Road / Trilogy		Isolation valve needs replacement	X	Below
AV-0510	VM804	Temescal Canyon Road / Trilogy	10/21/2014		X	Below
AV-0550	ARI D-023	Temescal Canyon Road / I-15	4/1/2014		X	Below
AV-0570	VM804	Temescal Canyon Road / Dawson Canyon	12/31/2014		X	Below
AV-0590	VM804	Temescal Canyon Road		Needs overhauled AV	X	Below
AV-0610	VM804	Temescal Canyon Road		Needs overhauled AV - Need to update report (valved closed 8/3/2015)	X	Below
AV-0630	VM804			Removed?	X	Below
AV-0650	VM804	Temescal Canyon Road / Stellar Ct.		Needs overhauled AV	X	Below
AV-0670	ARI D-025	Temescal Canyon Road / Leroy		Needs overhauled AV	X	Below
AV-0700	VM804		N/A	Recently found - No maintenance records	X	Below
AV-0710	ARI D-025	Temescal Canyon Road / Cabot	11/18/2014	Need to update records - ARI valved cleaned	X	Below
AV-0730	ARI D-025	Temescal Canyon Road / Lakeshore	11/18/2014	Needs overhauled AV - Update records	X	Below
AV-0810	ARI D-025	Temescal Canyon Road / Cajalco	11/18/2014	Need to update records - ARI valved cleaned	X	Below
AV-0830	VM804	Temescal Canyon Road / Cajalco		Needs overhauled AV	X	Below
AV-0840				Missing AV?	X	Below
AV-0850	Crispin	Temescal Canyon Road / La Gloria	7/17/2014	Needs overhauled AV		Above
AV-0880	Crispin	Temescal Canyon Road / Jolora		Needs overhauled AV - Update records (isolation valve found)		Above
AV-0900	Crispin	Temescal Canyon Road / Envoy		Needs overhauled AV - AV shutoff valve needs replacement		Above
AV-0910	VM804	Ontario Ave / Diplomat		Needs overhauled AV - Update records (isolation valve replaced 7/22/15)		Above
AV-0920	VM804	Ontario Ave / Rising Sun	6/16/2015	Needs overhauled AV		Above
AV-0930	VM804	Ontario Ave / Grovewood	6/15/2015	Needs overhauled AV		Above
AV-0945	Crispin	Compton / Old Temescal Rd		Needs overhauled AV		Above
AV-0950	Crispin	Compton / Old Temescal Rd		Needs overhauled AV		Above
AV-0960	Crispin	Compton / Pico		Needs overhauled AV		Above
AV-0970	Crispin	California / Olympic		Needs overhauled AV		Above
AV-0990	VM804	California / Rimpau	12/4/2014	Needs overhauled AV		Above
AV-1000	VM804	Magnolia / Rimpau	7/22/2014	Needs overhauled AV - Update records		Above
AV-1010	VM804	El Sobrante	7/22/2014	Needs overhauled AV		Above
AV-1030	ARI D-025	6th - Flood Control Channel	2/25/2015			Above
AV-1040	VM804	Flood Control Channel	3/11/2015			Above


Brine Line
Air Release and Vacuum Valves
(1 of 4)
Air Vac Valves
Brine Line
RIVERSIDE FWY
RIVERSIDE
N
W
E
S
AV-1040
GRAND
6TH
AV-1030
CORONA
FULLERTON
AV-1010
AV-1000
KELLOGG
AV-0990
AV-0970
AV-0960
AV-0945
AV-0950
ONTARIO
91
AV-0930
AV-0920
RIMPAU
FOOTHILL
AV-0910
AV-0900
CHASE
EL CERRITO
AV-0880
UPPER
CALIFORNIA
AV-0850
AV-0840
AV-0830
CAJALCO
AV-0810
TEMESCAL CANYON
AV-0730
AV-0710
AV-0700
AV-0690
4,000
2,000
0
4,000 Feet
SAWPA


Brine Line
Air Release and Vacuum Valves
(2 of 4)
Air Vac Valves
Brine Line
N
W
E
S
AV-0710
AV-0700
AV-0690
KNABE
AV-0670
AV-0630
AV-0650
AV-0610
AV-0590
I 15
CORONA
AV-0570
AV-0550
DAWSON CANYON
HUNT
LAWSON
TEMESCAL WASH
AV-0510
AV-0470
AV-0480
AV-0450
AV-0440
AV-0430
TEMESCAL CANYON
I 15
AV-0410
AV-0400
AV-0380
AV-0370
CORONA
4,000
2,000
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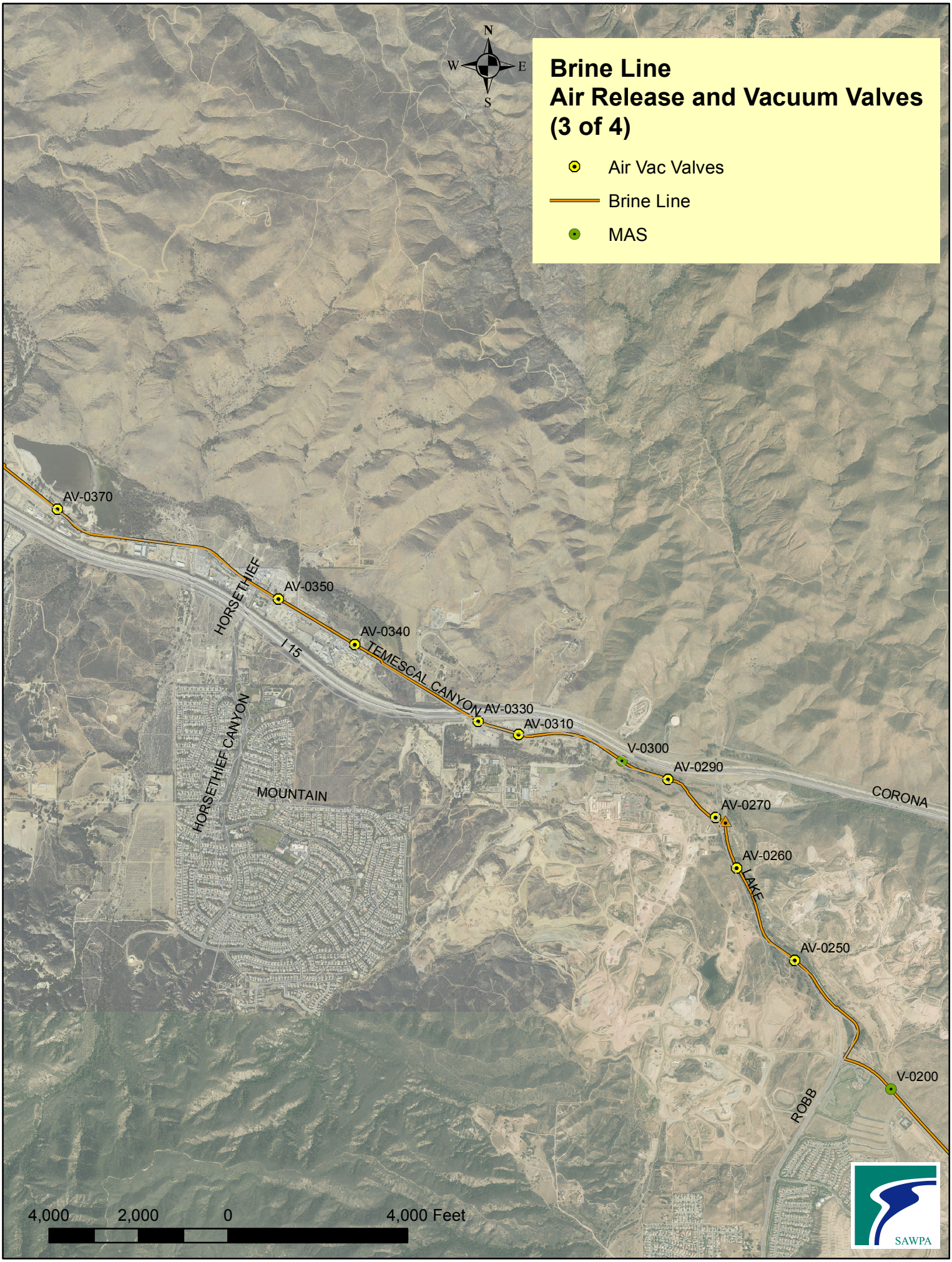
4,000 Feet
SAWPA


Brine Line
Air Release and Vacuum Valves
(3 of 4)
Air Vac Valves
Brine Line
MAS
N
W
E
S
AV-0370
AV-0350
AV-0340
AV-0330
AV-0310
V-0300
AV-0290
AV-0270
AV-0260
AV-0250
V-0200
HORSETHIEF
I 15
TEMESCAL CANYON
HORSETHIEF CANYON
MOUNTAIN
CORONA
LAKE
ROBB
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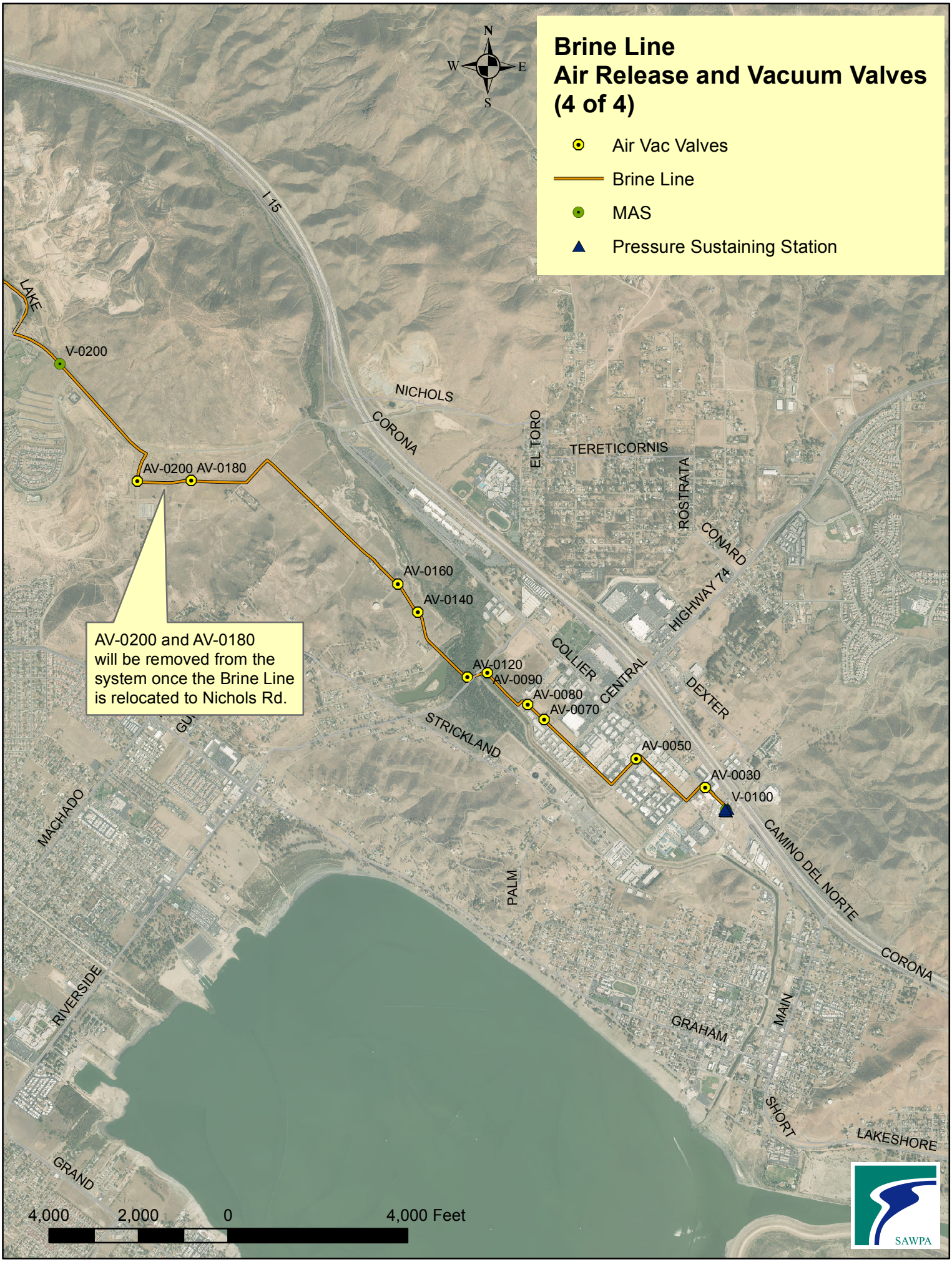
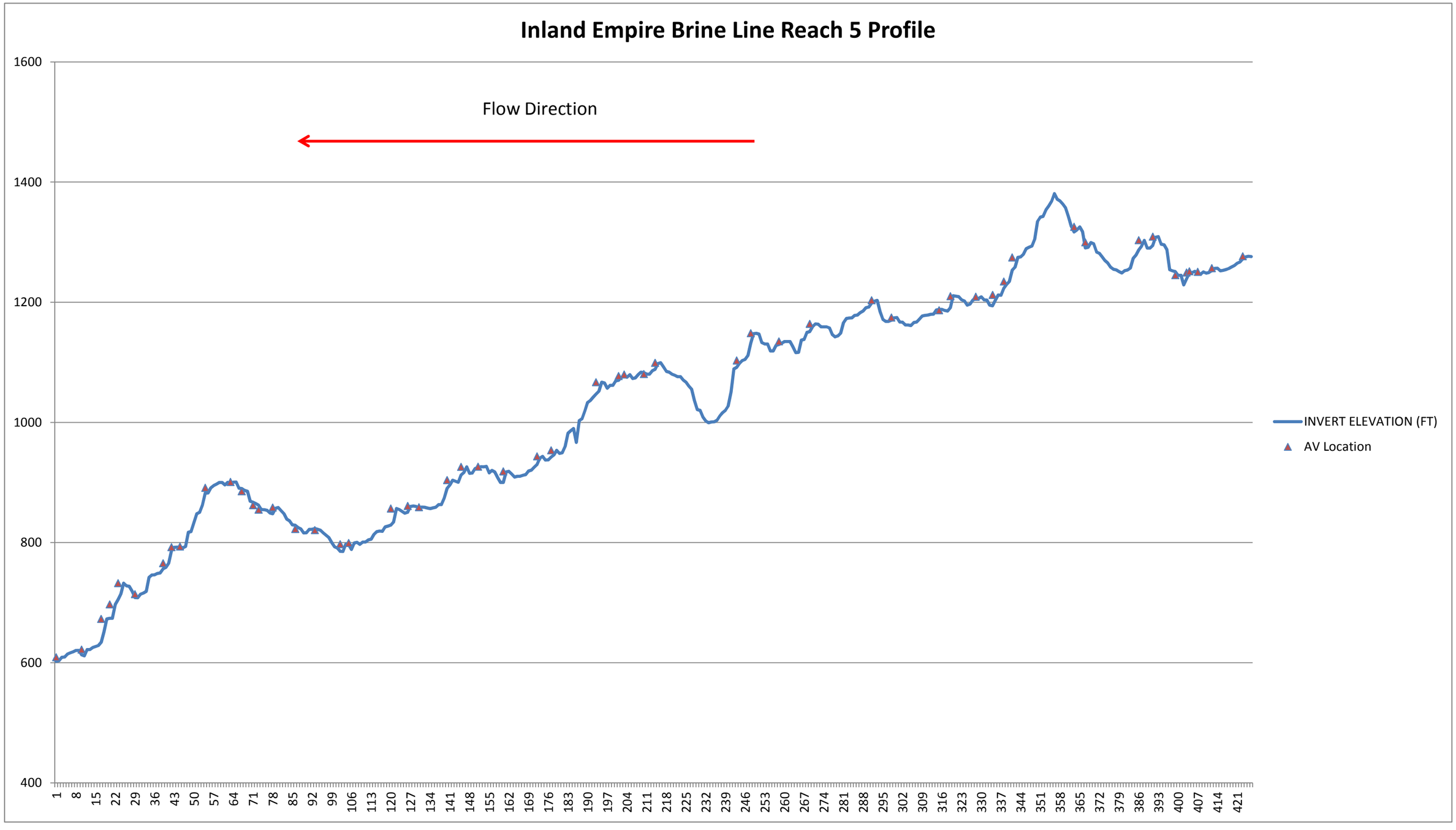
SAWPA


Brine Line
Air Release and Vacuum Valves
(4 of 4)
Air Vac Valves
Brine Line
MAS
Pressure Sustaining Station
N
W
E
S
I 15
LAKE
V-0200
AV-0200
AV-0180
NICHOLS
CORONA
EL TORO
TERETICORNIS
ROSTRATA
CONARD
HIGHWAY 74
AV-0160
AV-0140
AV-0120
AV-0090
AV-0080
AV-0070
COLLIER
CENTRAL
DEXTER
STRICKLAND
AV-0050
AV-0030
V-0100
CAMINO DEL NORTE
CORONA
AV-0200 and AV-0180 will be removed from the system once the Brine Line is relocated to Nichols Rd.
MACHADO
PALM
RIVERSIDE
GRAHAM
MAIN
SHORT
LAKESHORE
GRAND
4,000
2,000
0
4,000 Feet
SAWPA

Inland Empire Brine Line Reach 5 Profile



	Pressure (psi)				
	400 gpm	1585 gpm	2500 gpm	3500 gpm	6000 gpm
AV-0030	45.772	46.353	47.135	48.367	52.947
AV-0050	54.073	54.608	55.375	56.464	60.684
AV-0070	56.597	57.063	57.716	58.661	62.219
AV-0080	56.171	56.638	57.268	58.196	61.643
AV-0090	57.454	57.884	58.504	59.39	62.613
AV-0120	59.031	59.47	60.052	60.912	64.067
AV-0140	31.186	31.596	32.119	32.9	35.713
AV-0160	33.808	34.208	34.704	35.445	38.129
AV-0250	0.076	0.159	0.201	0.239	0.318
AV-0260	0.087	0.187	0.239	0.288	0.357
AV-0270	0.101	0.215	0.772	1.751	7.175
AV-0290	0.882	1.244	1.723	2.43	6.9
AV-0310	0.071	0.148	0.187	0.222	2.863
AV-0330	6.624	7.115	7.676	8.582	11.809
AV-0340	12.567	12.861	13.18	13.564	14.88
AV-0350	0.117	0.25	0.318	0.383	0.532
AV-0370	0.114	0.249	0.321	0.392	0.554
AV-0380	6.075	6.387	6.634	6.969	8.11
AV-0400	0.168	0.367	0.473	0.576	0.839
AV-0410	0.512	1.283	2.316	3.925	10.093
AV-0430	0.135	0.3	0.39	0.479	0.688
AV-0440	0.072	0.151	0.19	0.226	0.3
AV-0450	0.074	0.154	0.194	0.231	0.308
AV-0480	0.972	1.142	1.257	1.383	1.643
AV-0510	0.061	0.127	0.16	0.19	0.25
AV-0550	0.076	0.16	0.201	0.24	35.802
AV-0570	0.069	0.145	0.182	2.006	40.727
AV-0590	3.81	4.157	4.45	10.558	47.269
AV-0610	0.075	0.158	0.2	6.317	41.51
AV-0650	0.081	0.172	0.217	6.244	40.818
AV-0670	2.38	5.456	10.183	17.685	49.059
AV-0700	18.295	20.557	24.024	29.466	52.186
AV-0710	22.168	24.18	27.245	32.032	52.019
AV-0730	19.36	21.284	24.193	28.719	47.656
AV-0810	43.092	44.065	45.457	47.564	56.312
AV-0830	45.007	45.768	46.803	48.35	54.732
AV-0840	36.831	37.14	37.411	37.782	39.152
AV-0850	33.021	33.324	33.606	33.944	35.265
AV-0880	18.563	18.815	19.063	19.314	20.294
AV-0900	20.205	20.443	20.615	20.835	21.538
AV-0910	15.655	15.879	16.038	16.232	16.838
AV-0920	6.145	6.37	6.487	6.599	6.943
AV-0930	0.156	0.328	0.415	0.487	0.672
AV-0945	0.735	0.946	1.063	1.167	1.374
AV-0950	0.073	0.159	0.2	0.238	0.321
AV-0960	0.064	0.138	0.173	0.205	0.273
AV-0970	8.098	8.35	8.614	8.975	10.302
AV-0990	0.076	0.166	0.21	0.25	0.339
AV-1000	0.058	0.124	0.155	0.183	0.244
AV-1010	0.06	0.128	0.16	0.189	0.251
AV-1030	0.047	0.099	0.124	0.146	0.193
AV-1040	0.078	0.169	0.212	0.252	0.338

Procedure: Air Release and Vacuum Valve Maintenance	Revision: 0 Effective: 7/1/2015	Prepared By: CQ Approved By:
Department: Engineering and Operations ***Activity: Brine Line Operations***	*Filename: K:\Brine Line\Operations\AirVacs\SOP\SOP_AV_Maintenance* *Document No: BL-AV-01*	

1. Purpose/Background

SAWPA has the responsibility for operation and maintenance of the Inland Empire Brine Line. Air Release and Vacuum valves are an important asset to protect the pipeline against potential water hammer. Most of the Air Release and Vacuum valves are located along Reach 5, a 22-mile section of the Brine Line starting in Lake Elsinore and connecting to Reach 4B in the City of Corona. Reach 5 of the Brine Line has a total of 54 Air Release and Vacuum valves, with a total of 32 valves located above ground and the remaining 22 located in underground vaults.

The purpose of this Standard Operating Procedure (SOP) is to provide guidance, steps and instructions related to air release and vacuum valve maintenance.

2. Definitions

AV: Air Release and Vacuum Valve

3. Materials/Equipment

SAWPA owns the following models of air release and vacuum valves:

-Valmatic 804 (VM 804)

-Crispin UB41

-Claval

-Crispin VR41/M5

-ARI D-025

-ARI D-023

Ball valves and fittings

Pressure gauge (vacuum to 100 psig)

4. Procedures

All Air Release and Vacuum valves will be maintained by removing any accumulated scale and replacing any non-operational parts. A drawing for each Air Release and Vacuum valve indicating spare parts is included as an attachment for this SOP.

Operations staff will also make sure the Air Release and Vacuum valve seats by applying pressure using a water hose. The seating pressure should be noted. All Air Release and Vacuum

valves should be retrofitted with a brass nipple and a ball valve at one of the draining ports. This will allow taking a pressure reading as required.

Additionally, for all the above ground Air Release and Vacuum valves, both isolation valves should be exercised at the time the AV is replaced.

Once a refurbished Air Release and Vacuum valve is ready, it will be replaced with a unit in the field. See Section 4.3 for documentation of any Air Release and Vacuum valve replacement.

All Air Release and Vacuum valves should be inspected and refurbished if required, at least once per year.

4.1. Safety

All safety procedures, as outlined in the SAWPA Injury and Illness Prevention Plan must be followed prior to any Air Release and Vacuum valve maintenance.

It is especially important to set-up adequate traffic control to ensure a safe environment while performing any maintenance activities.

Underground vaults often harbor spiders and other potentially harmful wildlife. Special care must be taken to make sure there are no threats to the confined space entrant.

4.2. Isolation valves

Operations staff needs to make sure the Air Release and Vacuum valve isolation valve is working properly before removing the AV for servicing. The SAWPA Project Manager should be notified when an isolation valve is not working properly.

4.3. Documentation

Proper documentation must be kept to demonstrate that maintenance was performed on the Air Release and Vacuum valves. The main mechanism to keep track of any maintenance activities is through the Brine Line Tools (www.sawpa.net/saritoc/flex/saritoc.html).

The report needs to include the date when maintenance was performed and the model of the Air Release and Vacuum valve installed.

Additionally, a tag should be kept at the Air Release and Vacuum valve location with the same information.

An updated spreadsheet shall be kept by the SAWPA Project Manager summarizing the Air Release and Vacuum valve model installed, date of last replacement, as well as other relevant information.

5. Safety

Proper personal protective equipment shall be worn at all times during any Air Release and Vacuum valve maintenance activity.

Confined Space Entry procedures, as outlined in the SAWPA Injury and Illness Prevention Plan must be followed for any maintenance activities on underground Air Release and Vacuum valves.

The Hand and Portable Powered Tools plan needs to be followed at all times during Air Release and Vacuum valve refurbishment.

6. Responsibility & Authority

SAWPA is ultimately responsible to ensure that the Air Release and Vacuum valves are maintained to protect the Inland Empire Brine Line and to prevent any Sanitary Sewer Overflows due to their malfunction.

Executive Manager of Engineering and Operations: The Executive Manager of Engineering and Operations has the ultimate authority regarding the Brine Line Operations.

Project Manager: The SAWPA Project Manager has authority over all activities required to maintain Air Release and Vacuum valves and keep adequate records.

Brine Line Operator: The Brine Line operator has the responsibility to follow this SOP to maintain the Air Release and Vacuum valves, and report any findings to SAWPA's Project Manager.

7. References

Inland Empire Brine Line Sewer System Management Plan

SAWPA Injury and Illness Prevention Plan

8. Procedure Change Approval Summary

All changes to this procedure must be completed in writing in a timely manner and approved by the Executive Manager of Engineering and Operations.

9. Attachments

9.1. Drawings for Air Release and Vacuum valves

Procedure Change Approval Summary

Revision Number	Summary of Change	Reviewer	Approval
2			
1			
0	Included cut sheets for existing Brine Line AVs.	CQ	8/13/2015

A.R.I.

Wastewater

D-023 PN 16

Combination Air Valve for Wastewater PATENTED

Description

The D-023 Combination Air Valve combines an air & vacuum orifice and an air release orifice in a single body. The valve is specially designed to operate with liquids carrying solid particles such as wastewater and effluents. The combination air valve discharges air (gases) during the filling or charging of the system, admits air into the system while it is being emptied of liquid and releases accumulated air (gases) from the system while it is under pressure and operating. The valve's unique design enables the separation of the liquid from the sealing mechanism and assures optimum working conditions.

Applications

- Pump stations for sewage, waste water & water treatment plants.
- Wastewater, effluent water and sea water supply lines.

Operation

The air & vacuum component discharges air at high flow rates during the filling of the system and admits air into the system at high flow rates during its drainage and at water column separation. High velocity air will not blow the float shut. Water will lift the float which seals the valve.
At any time during system operation, should internal pressure of the system fall below atmospheric pressure, air will enter the system. The smooth discharge of air reduces pressure surges and other destructive phenomena.
The intake of air in response to negative pressure protects the system from destructive vacuum conditions and prevents damage caused by water column separation. Air entry is essential to efficiently drain the system.
The automatic air release component releases entrapped air in pressurized systems.

Without air valves, pockets of accumulated and entrained air may cause the following hydraulic disturbances:
- Restriction of effective flow due to a throttling effect as would a partially closed valve. In extreme cases this will cause complete flow stoppage.
- Obstruction of efficient hydraulic transmission due to air flow disturbances.
- Accelerate cavitation damages.
- Pressure transients and surges.
- Corrosion in pipes, fittings and accessories.
- Danger of high-energy bursts of compressed air.
- Inaccuracies in flow metering.

As the system starts to fill, the combination wastewater valve functions according to the following stages:
1.Entrapped air/gas is discharged by the valve
2. When the liquid level reaches the valve's lower portion, the lower float is lifted, pushing the sealing mechanism to its sealing position.
3. The entrapped air is confined in a pocket between the liquid and the sealing mechanism. The air pressure is equal to the system pressure.
4. Increases in system pressure compress the trapped air in the upper section of the conical chamber. The conical shape assures the height of the air gap. This enables separation of the liquid from the sealing mechanism.
5. Entrapped air (gas), accumulating at peaks and along the system, rises to the top of the valve, and displaces the liquid in the valve's body.
6. When the liquid level is lowered to a point where the float is no longer buoyant, the float drops, unsealing the rolling seal. The air release orifice opens and allows part of the air that accumulated in the upper portion of the valve to be released to the atmosphere.
7. Liquid enters the valve. The float rises, pushing the rolling seal to its sealing position. The remaining air gap prevents the wastewater from fouling the mechanism.
When internal pressure falls below atmospheric pressure (negative pressure):
1. The floats will immediately drop down, opening the air & vacuum and air release orifices.
2. Air will enter the system.

Main Features

- Working pressure range: 0.2 - 16 bar.
- Testing pressure: 25 bar.
- Maximum working temperature: 60° C.
- Maximum intermittent temperature: 90° C.
- The unique design of the valve prevents contact between the wastewater and the sealing mechanism by creating an air gap at the top of the valve. These features are achieved by:
• **The conical body shape and the external lever:** designed to maintain the maximum distance between the liquid and the sealing mechanism and still obtain minimum body length.
• **Spring loaded joint between the stem and the upper float:** vibrations of the lower float will not unseal the automatic valve. Release of air will occur only after enough air accumulates.
• **Funnel-shaped lower body:** designed to ensure that residue wastewater matter will fall back into the system and be carried away by the main pipe.
- All inner metal parts made of Stainless Steel.

- Unique design of external lever prevents contact between the wastewater and the sealing mechanism, prevents clogging by floating solids and ensures drip-tight sealing.
- The D-023's orifice plug-disc linkage assembly is external, keeping the levers and pins outside the air valve body and its corrosive atmosphere.
- 1" ball valve releases trapped pressure and drains the valve body prior to maintenance.
- Discharge outlet enables removal of excess fluids

Valve Selection

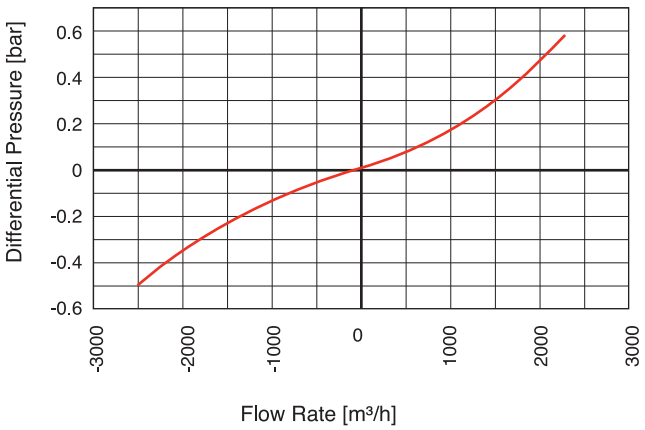
- Size range availability: 3" - 8".
- Valves manufactured with flange ends to meet any requested standard.
- Standard metal body, also available with a ST ST body.
- Valve body coating: fusion bonded epoxy coating according to the standard DIN 30677-2.
- Additional coatings available upon request.
- Optional Accessories:

D-023 V - With a One-way, Out-only attachment, allows for air discharge only, prevents air intake.
D-023 I - With a Vacuum Breaker, In-only attachment, allows for air intake only, prevents air discharge.
D-023 NS - With a Non-Slam discharge-throttling attachment, allows for free air intake, throttles air discharge.

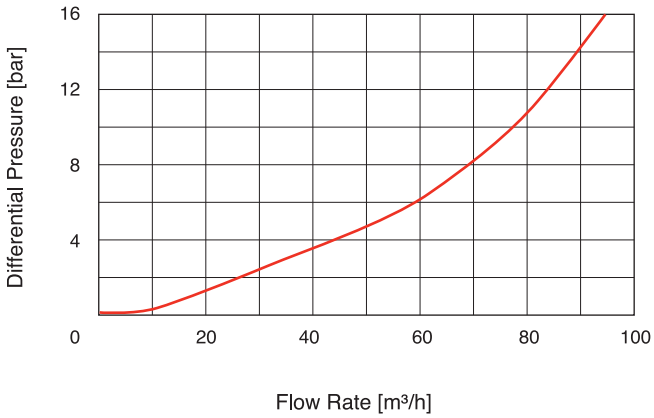
Note

- The D-023 air valve is intended for use with raw wastewater. For use with aggressive liquids, please consult with our application engineers or with the marketing dept.
- For best suitability, it is recommended to send the fluid chemical properties along with the valve request.
- Upon ordering, please specify: model, size, working pressure, threads standard and type of liquid.

AIR & VACUUM FLOW RATE



AUTOMATIC AIR RELEASE FLOW RATE

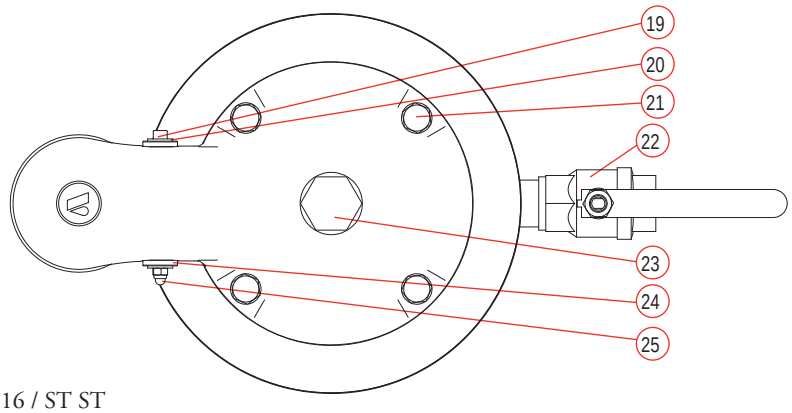


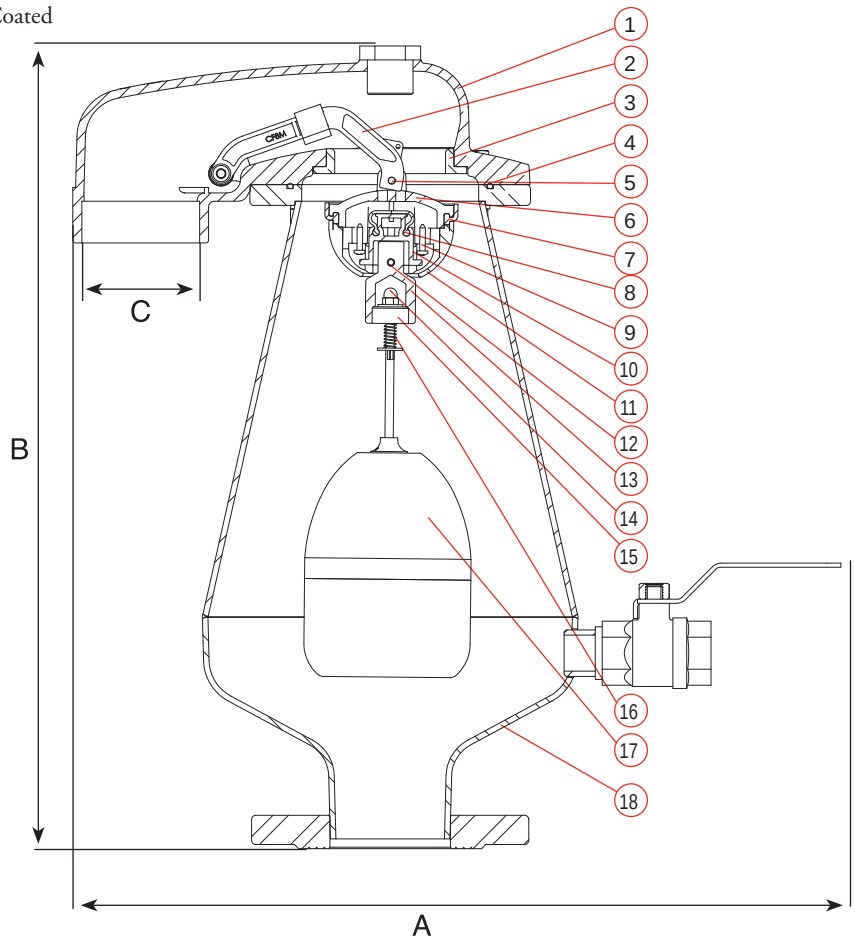
DIMENSIONS AND WEIGHTS

Nominal Size	Dimensions mm A	B	Connection C	Weight Kg.	Orifice Area mm² Auto.	A / V
3" (80 mm)	554	580	3" BSP / NPSM Female	22	15.7	5024
4" (100 mm)	554	580	3" BSP / NPSM Female	23	15.7	5024
6" (150 mm)	554	580	3" BSP / NPSM Female	24.5	15.7	5024
8" (200 mm)	554	580	3" BSP / NPSM Female	27.5	15.7	5024

PARTS LIST AND SPECIFICATION

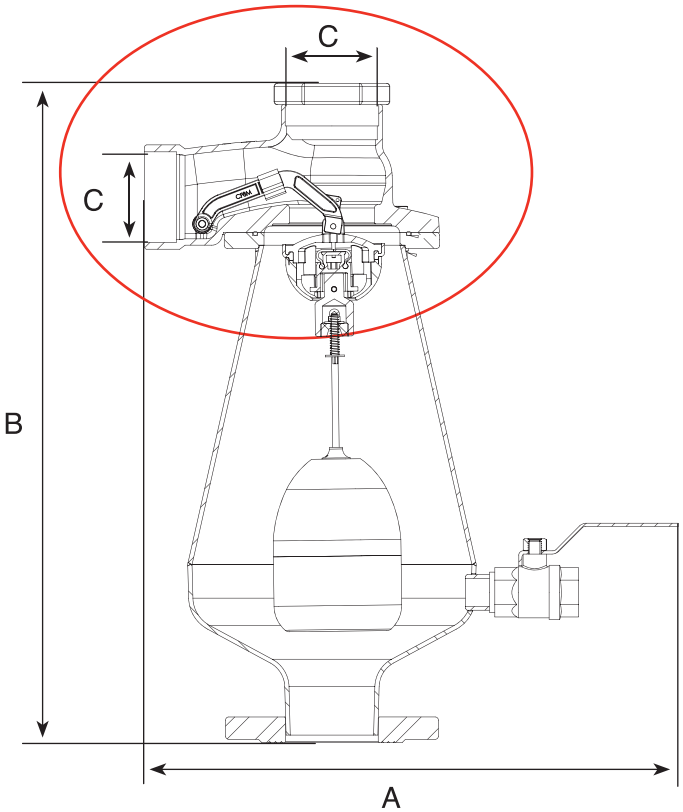
No.	Part	Material
1.	Cover	Ductile Iron ASTM A-536-60-40-18 / ST ST ASTM A744 CF8M
2.	Disk Arm Assy.	ST ST ASTM A744 CF8M + E.P.D.M.
3.	Orifice (Ductile cover only)	Bronze B 62
4.	O-Ring	BUNA-N
5.	Rivet	ST ST SAE 304
6.	Air & Vacuum Disc	Reinforced Nylon / ST ST ASTM A744 CF8M
7.	Air & Vacuum Disc Seal	E.P.D.M.
8.	Air Release Disc Seal	E.P.D.M.
9.	Bolt (Screw)	ST ST SAE 304
10.	Air Release Disc	Reinforced Nylon
11.	Air Release Disc Cover	Reinforced Nylon
12.	Pin	ST ST SAE 304
13.	Rod Adaptor	Polypropylene
14.	Domed Nut	ST ST SAE 304
15.	Stopper	Polypropylene
16.	Spring	ST ST SAE 316
17.	Float Assy.	Polycarbonate + ST ST 316 / ST ST
18.	Body 3”	Steel Din St.37 / ST ST SAE 316 / Steel A216 WCB / ST ST ASTM A744 CF8M
	4” - 8”	Steel Din St.37 / ST ST SAE 316
19.	Bolt	ST ST SAE 304
20.	Washer	ST ST SAE 304
21.	Bolt, Nut & Washer	ST ST SAE 316
22.	Ball Valve 1”	ST ST SAE 316 / Brass, Chrome Coated
23.	Plug	Polypropylene
24.	Bushing	Acetal
25.	Domed Nut	ST ST SAE 316

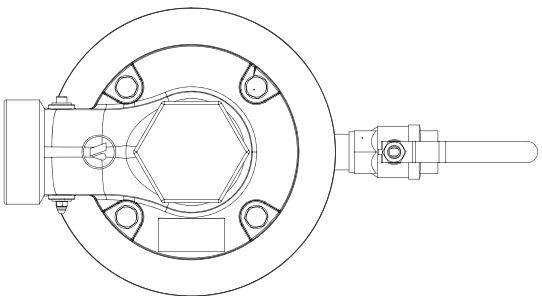




Two-directional discharge outlet cover

The D-023 combination air valve for wastewater is available with an optional stainless steel two-directional discharge outlet cover.
One outlet is always open for air discharge while the other is closed with a plug. Both outlets have a 3" female thread.
With this option, air can be discharged either in a horizontal or vertical direction, depending on the installation. This option allows for easy vertical air discharge from valves installed in manholes.
This cover is standard on all D-023 SB underground air valves and is optional for all D-023 air valves, both stainless steel and epoxy coated.





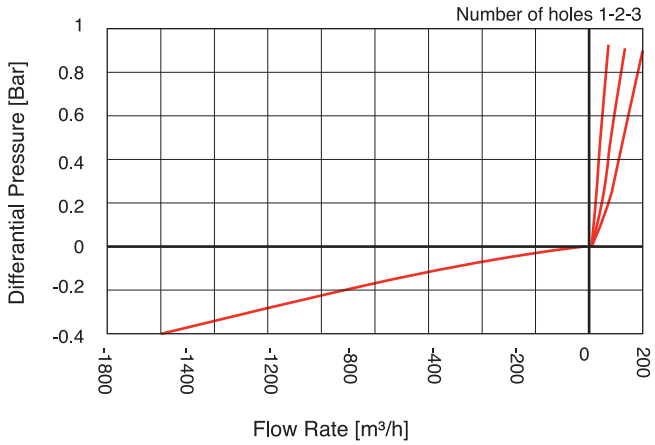
DIMENSIONS AND WEIGHTS

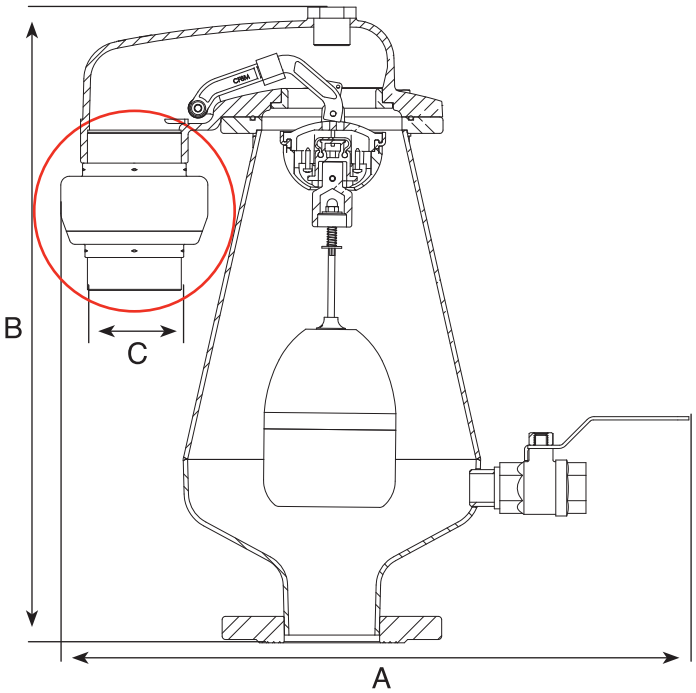
Nominal Size	Dimensions mm A	B	Connection C	Weight Kg.	Orifice Area mm² Auto.	A / V
3" (80 mm)	500	620	3" BSP / NPSM Female	25	15.7	5024
4" (100 mm)	500	620	3" BSP / NPSM Female	26	15.7	5024
6" (150 mm)	500	620	3" BSP / NPSM Female	27.5	15.7	5024
8" (200 mm)	500	620	3" BSP / NPSM Female	30.5	15.7	5024

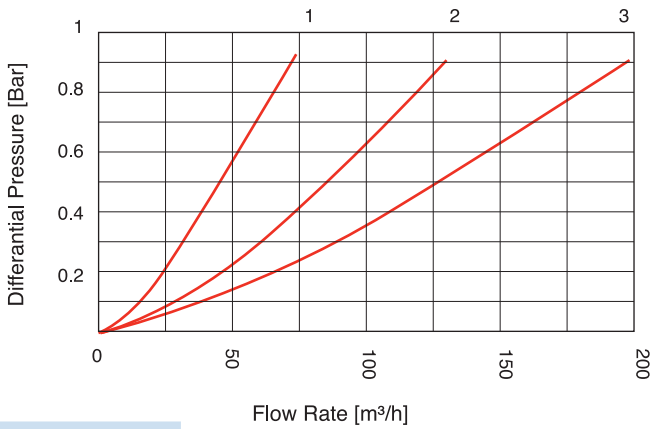
Combination Air Valve for Wastewater - Non Slam

The D-023 Combination Wastewater Non Slam accessory will dampen surge and prevent slam. The non slam accessory provides efficient surge suppression.
At sudden drainage and/or water column separation (sudden pump trips or valve closure, for instance), the air & vacuum orifice admits air at high flow rates, thus preventing vacuum. As the water column and/or pressure wave returns, the large volumes of air are exhausted slowly through the smaller orifice of the non-slam accessory. This slowly exhausting air pocket dampens the slam of the returning water column, thus suppressing the pressure surge. As the water flow arrives at a much slower rate, dampened by the slower air discharge, it buoys up the main float, gently closing the air & vacuum component of the air valve.

WITH ADJUSTABLE NS C.V.







DIMENSIONS AND WEIGHTS

Nominal Size	Dimensions mm A	Dimensions mm B	Connection C	Weight Kg.	Orifice Area mm² Auto.	Orifice Area mm² A / V
3" (80 mm)	573	580	3" BSP / NPSM Male	22.45	15.7	5024
4" (100 mm)	573	580	3" BSP / NPSM Male	23.45	15.7	5024
6" (150 mm)	573	580	3" BSP / NPSM Male	24.95	15.7	5024
8" (200 mm)	573	580	3" BSP / NPSM Male	27.95	15.7	5024

D-023 NS Non-Slam Add-on Component Data Table for Variable Orifices

Model	Discharge orifice mm	Total NS area mm²	NS orifice mm	Switching point	Flow at 0.4 bar m³/h
1 orifice	75	50.3	8	Spring loaded normally closed	40
2 orifice	75	100.5	11.3		75
3 orifice	75	150.8	13.9		105

A.R.I. FLOW CONTROL ACCESSORIES Ltd. www.arivalves.com ari@ari.co.il Tel: 972-4-6761988

A.R.I.

Wastewater

D-025 PN 10

Combination Air Valve for Wastewater - Short Version

Description

The D-025 Combination Air Valve combines an air & vacuum orifice and an air release orifice in a single body. The valve is specially designed to operate with liquids carrying solid particles such as wastewater and effluents. The combination air valve discharges air (gases) during the filling or charging of the system, admits air into the system while it is being emptied of liquid and releases accumulated air (gases) from the system while it is under pressure and operating. The valve's unique design enables the separation of the liquid from the sealing mechanism and assures optimum working conditions.

Applications

- Pump stations for sewage, wastewater & water treatment plants.
- Wastewater, effluent water and sea water supply lines.

Operation

The air & vacuum component discharges air at high flow rates during the filling of the system and admits air into the system at high flow rates during its drainage and at water column separation. High velocity air will not blow the float shut. Water will lift the float which seals the valve.
At any time during system operation, should internal pressure of the system fall below atmospheric pressure, air will enter the systems. The smooth discharge of air reduces pressure surges and other destructive phenomena.
The intake of air in response to negative pressure protects the system from destructive vacuum conditions and prevents damage caused by water column separation. Air entry is essential to efficiently drain the system.
The air release component releases entrapped air in pressurized systems.

Without air valves, pockets of accumulated air may cause the following hydraulic disturbances:
- Restriction of effective flow due to a throttling effect as would a partially closed valve. In extreme cases this will cause complete flow stoppage.
- Obstruction of efficient hydraulic transmission due to air flow disturbances.
- Accelerate cavitation damages.
- Pressure transients and surges.
- Corrosion in pipes, fittings and accessories.
- Danger of high-energy bursts of compressed air.
- Inaccuracies in flow metering.

As the system starts to fill, the combination wastewater valve functions according to the following stages:
1. Entrapped air/gas is discharged by the valve
2. When the liquid level reaches the valve's lower portion, the lower float is lifted, pushing the sealing mechanism to its sealing position.
3. The entrapped air is confined in a pocket between the liquid and the sealing mechanism. The air pressure is equal to the system pressure.
4. Increases in system pressure compress the trapped air in the upper section of the conical chamber. The conical shape assures the height of the air gap. This enables separation of the liquid from the sealing mechanism.
5. Entrapped air (gas), accumulating at peaks and along the system, rises to the top of the valve, and displaces the liquid in the valve's body.
6. When the liquid level is lowered to a point where the float is no longer buoyant, the float drops, unsealing the rolling seal. The air release orifice opens and allows part of the air that accumulated in the upper portion of the valve to be released to the atmosphere.
7. Liquid enters the valve. The float rises, pushing the rolling seal to its sealing position. The remaining air gap prevents the wastewater from fouling the mechanism.

When internal pressure falls below atmospheric pressure (negative pressure):
1. The floats will immediately drop down, opening the air & vacuum and air release orifices.
2. Air will enter into the system.

Main Features

- Working pressure range: 0.2 - 10 bar.
- Testing pressure: 16 bar.
- Maximum working temperature: 60° C.
- Maximum intermittent temperature: 90° C.
- The unique design of the valve prevents contact between the wastewater and the sealing mechanism by creating an air gap at the top of the valve. These features are achieved by:

• **The conical body shape:** designed to maintain the maximum distance between the liquid and the sealing mechanism and still obtain minimum body length.
• **Spring-loaded joint between the stem and the upper float:** vibrations of the lower float will not unseal the air release component. Release of air will occur only after enough air accumulates.
• **The Rolling Seal Mechanism:** less sensitive to pressure differentials than a direct float seal. It accomplishes this by having a

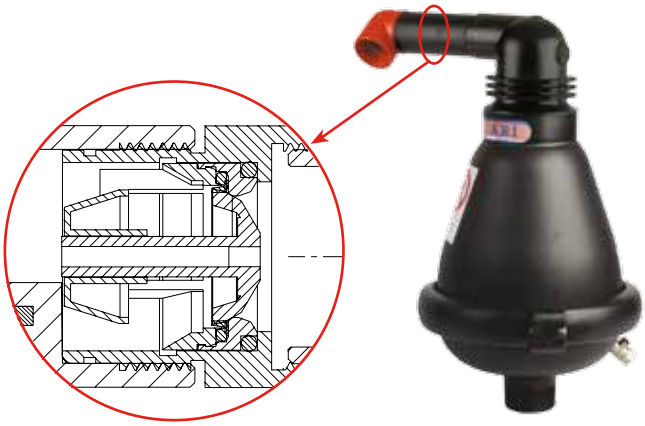
comparably large orifice for a wide pressure range (up to 10 bar).
• **Funnel-shaped lower body:** designed to ensure that residue wastewater matter will fall back into the system and be carried away by the main pipe.
- All inner metal parts made of stainless steel. Float made of composite materials.
- 1 ½" threaded discharge outlet enables removal of excess fluids.
- Dynamic design allows for high velocity air discharge while preventing premature closure.
- 1/4" ball valve releases trapped pressure and drains the valve body prior to maintenance.

Valve Selection

- These valves are available in 2", 3", and 4" with a BSP/NPT male threaded connection or flanged, standard upon request.
- Valve is manufactured of composite materials, also available in stainless steel SAE 316 or ductile iron.
- With a One-way, Out-only attachment, allows for air discharge only, prevents air intake.
- With a Vacuum Breaker, In-only attachment, allows for air intake only, prevents air discharge.
- With a Non-Slam discharge-throttling attachment, allows for free air intake, throttles air discharge.

Note

- The D-025 air valve is intended for use with raw wastewater. For use with aggressive liquids, please consult with our application engineers or with the marketing dept.
- For best suitability, it is recommended to send the fluid chemical properties along with the valve request.
- Upon ordering, please specify: model, size, working pressure, threads standard and type of liquid.

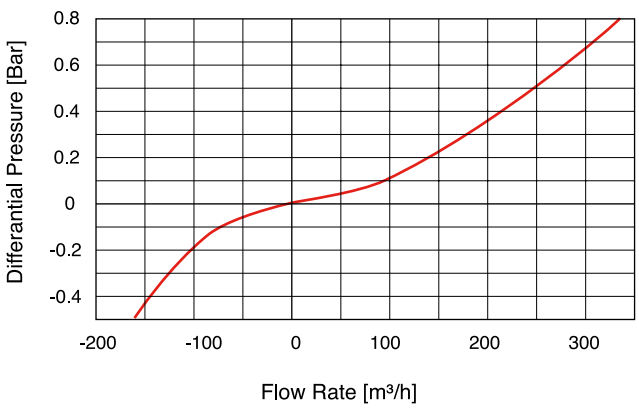


D-025-NS

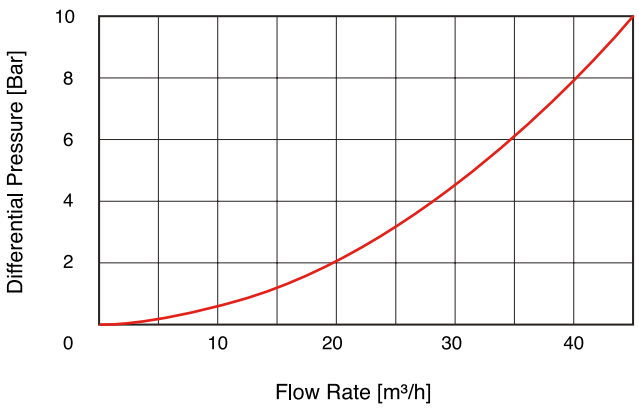
D-025 Non-Slam Single Orifice Add-on Component Data Table

Nominal Size	Discharge orifice	Total NS area	NS orifice	Switching point	Flow at 0.4 bar
2" (50mm) 3" (80mm) 4" (100mm)	37.5 mm	12.6 mm^2	4 mm	Spring loaded normally closed	17.5 m^3/h

AIR & VACUUM FLOW RATE



AUTOMATIC AIR RELEASE FLOW RATE

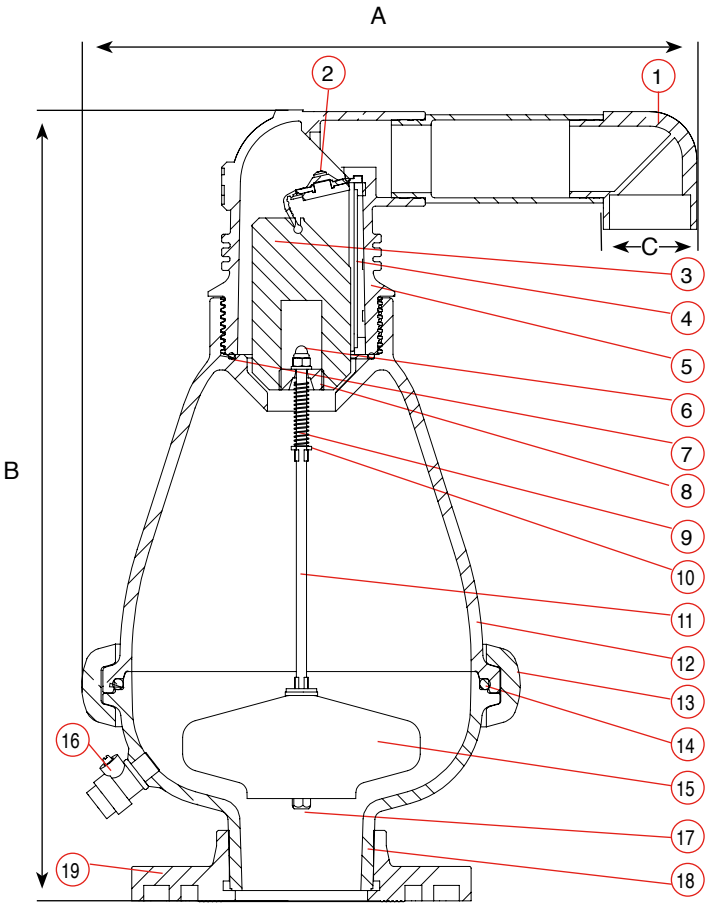


DIMENSIONS AND WEIGHTS

Nominal Size	Dimensions mm A	B	Connection C	Weight Kg. RN	ST ST	DI	Orifice Area mm² Auto.	A / V
2" (50mm) Threaded	370	455	1½" BSP Female	3.8	14.4	14.4	12	804
2" (50mm) Flanged	370	460	1½" BSP Female	4.2	16.2	16.2	12	804
3" (80mm) Threaded	370	455	1½" BSP Female	3.8	14.7	14.7	12	804
3" (80mm) Flanged	370	460	1½" BSP Female	5.4	16.5	16.5	12	804
4" (100mm) Threaded	370	455	1½" BSP Female	3.9	16.6	16.6	12	804
4" (100mm) Flanged	370	460	1½" BSP Female	6.0	18.4	18.4	12	804

PARTS LIST AND SPECIFICATION

No.	Part	Material
1.	Discharge Outlet	Polypropylene
2.	Rolling Seal Assembly	RN + E.P.D.M. + ST ST
3.	Float	Foamed Polypropylene
4.	Clamping Stem	Reinforced Nylon
5.	Body	Reinforced Nylon / Stainless Steel SAE 316
6.	Domed Nut	Stainless Steel SAE 316
7.	O-Ring	BUNA-N
8.	Stopper	Polypropylene
9.	Spring	Stainless Steel SAE 316
10.	Washer	Stainless Steel SAE 316
11.	Stem	Stainless Steel SAE 316
12.	Body	Reinforced Nylon / Ductile Iron / Stainless Steel SAE 316
13.	Clamp RN Body	Reinforced Nylon + Stainless Steel SAE 316
	ST ST/ DI Body	Stainless Steel SAE 316
14.	O-Ring	BUNA-N
15.	Float	Foamed Polypropylene
16.	Tap 1/4 "	Brass ASTN A124 / Stainless Steel
17.	Washer	Stainless Steel SAE 316
18.	Base	Reinforced Nylon / Ductile Iron / Stainless Steel SAE 316
19.	Flange	Reinforced Nylon / Ductile Iron / Stainless Steel SAE 316



* in STST or DI Body, the flange is an integral part of the base.

D-025

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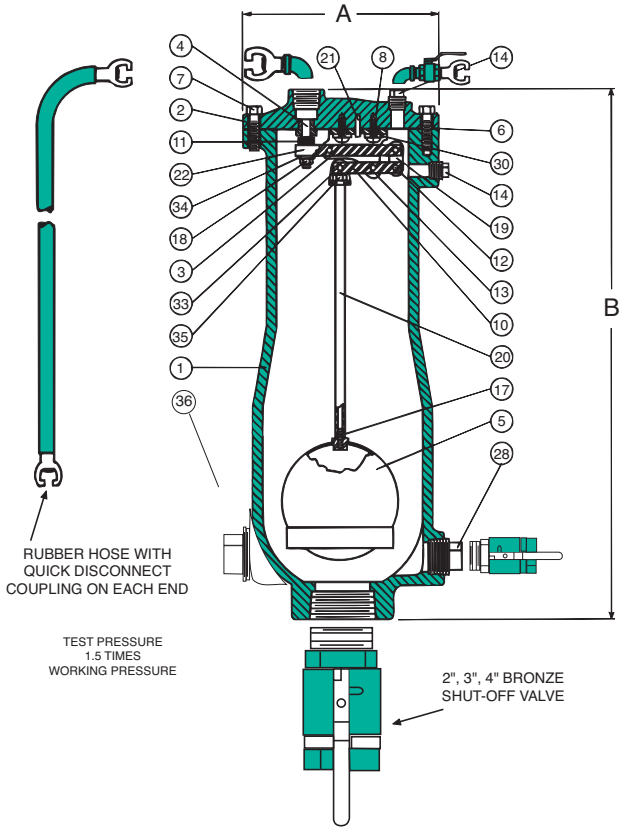
CLA-VAL

Series 34-WWBW

Wastewater Air Release Valve

with Backwash Kit



Detail No.	Part Name	Material
1	Body	Cast Iron ASTM A126, Class B
2	Cover	Cast Iron ASTM A126, Class B
3	Leverage Frame	Stainless Steel T316, ASTM A276
4	Seat	Stainless Steel T316, ASTM A276
5	Float	Stainless Steel T316, ASTM A276
6	Gasket	Lexide NK-511 (non-Asbestos)
7	Cover Bolt	Alloy Steel ASTM A449, Grade 5
8	Retaining Screws	Stainless Steel T316, ASTM A276
10	Float Arm	Stainless Steel T316, ASTM A276
11	Orifice Button	Stainless Steel T316 & Buna-N®
12	Pivot Pin	Stainless Steel T316, ASTM A276
13	Retaining Ring	Stainless Steel PH 15-7 Mo

Detail No.	Part Name	Material
14	Cover Pipe Plug	Malleable Iron
17	Float Retainer	Stainless Steel T316, ASTM A276
18	Lock Nut	Stainless Steel T316, ASTM A276
19	Link	Stainless Steel T316, ASTM A276
20	Guide Shaft	Stainless Steel T316, ASTM A276
21	Location Pin	Stainless Steel T316, ASTM A276
22	Orifice Button	Stainless Steel T316, ASTM A276
28	Body Pipe Plug	Malleable Steel
30	Washer	Stainless Steel T316, ASTM A276
33	Clevis	Stainless Steel T316, ASTM A276
34	Lock Washer	Stainless Steel T316, ASTM A276
35	Retainer	Stainless Steel T316, ASTM A276
36	Body Pipe Plug	Stainless Steel T316, ASTM A276

Model No.			Model No.		Model No.							
Valve Size	75 psi Max. W.P.	75 psi Orifice	150 psi Max. W.P.	150 psi Orifice	300 psi Max. W.P.	300 psi Orifice	Inlet Size	Outlet Size	A	B	Width	Wt. Lbs.
2"	34-WW25-516BW	5/16"	34-WW25-316BW	3/16"	34-WW25-332.3BW	3/32"	2"	1/2" N.P.T.	7"	25"	11"	55
3"	34-WW35-516BW	5/16"	34-WW35-316BW	3/16"	34-WW35-332.3BW	3/32"	3"	1/2" N.P.T.	7"	28"	11"	85
4"	34-WW45-516BW	5/16"	34-WW45-316BW	3/16"	34-WW45-332.3BW	3/32"	4"	1/2" N.P.T.	7"	33"	11"	102
2"	34-WW21-050BW	1/2"	34-WW21-716BW	7/16"	34-WW21-025BW	1/4"	2"	1" N.P.T.	9 1/2"	27"	11"	95
3"	34-WW31-050BW	1/2"	34-WW31-716BW	7/16"	34-WW31-025BW	1/4"	3"	1" N.P.T.	9 1/2"	30"	11"	119
4"	34-WW41-050BW	1/2"	34-WW41-716BW	7/16"	34-WW41-025BW	1/4"	4"	1" N.P.T.	9 1/2"	32"	11"	138

Note: Manufactured to meet ANSI/AWWA C512-04

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The M Series
Midget Air Release Valves

Sizes 3/8” thru 1” Available • Vents Trapped Air
Ideal for Automatic Priming of Vacuum Primed Pumps

Crispin
Since 1905

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Midget Air Release Valves

M SERIES

Valve Function

- Vents trapped air in hot water systems
- Vents air from cold water, petroleum products and many other liquids with varying specific gravities
- Ideal for automatic priming of Vacuum Primed Pumps
- Meets AWWA C-512

With Stainless Steel Trim Standard

Crispin Midget Air Valves are chosen for use in venting trapped air in hot water systems by being installed at the high points of the line, thereby resulting in an increase of the B.T.U. output. The Crispin Midget Air Valve is equally well designed for venting air from cold water, petroleum products and many other liquids of varying specific gravities. The Midget is also ideal for automatic priming of vacuum primed pumps. A vacuum check is available, if desired, for attachment to the valve outlet to prevent air from re-entering the system

All Crispin Valves are hydrostatically tested at 150% of their maximum working pressure.

Orifice Sizing Information

ORIFICE DIA.	MAX WORKING PRESSURE
1/8”	50 PSIG
3/32”	85 PSIG
1/16”	150 PSIG
3/64”	200 PSIG
1/32”	300 PSIG

Note: Materials and Prices Subject to Change Without Notice

Midget Valve Parts List

PART NO.	ITEM	MATERIAL	QTY/ UNIT
1	VALVE SEAT	Stainless Steel	1
2	PLUNGER BUTTON	Viton	1
4	VALVE LEVER	Stainless Steel	1
5	SCREW (DRIVE)	Stainless Steel	1
6	BALL FLOAT	Stainless Steel	1
7	HINGE PIN	Stainless Steel	1
7A	PIN CLIP	Stainless Steel	1
8	HINGE BUTT	Stainless Steel	1
9	BOLT	Steel	6
10	SCREW	Stainless Steel	1
11	FLANGE	Cast Iron	1
12	BODY	Cast Iron	1
13	FLANGE GASKET	Armstrong	1
14N*	NIPPLE	Steel	1
14V*	VACUUM CHECK VALVE	Brass	1

*14N and 14V are optional at customer’s request

Model Information

Valve Inlet	3/8”	1/2”	3/4”	1”
Model No.	M3	M5	M8	M10
NPT-Outlet	3/8”	3/8”	3/8”	3/8”
Height	5 9/16”	5 9/16”	5 9/16”	5 9/16”
Width	5”	5”	5”	5”
Weight	6lbs	7lbs	7lbs	8lbs

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SUBMITTAL SHEET FOR M SERIES

Submittal Sheet for Crispin M Series

3/8"–1" Pressure Air Release Midget

Manufactured in compliance with ANSI/AWWA C512 **Date: October, 2001**

Orifice Options

DIAMETER	MAX. PRESSURE	DISCHARGE RATE
5/32	40 PSIG	12.6 SCFM
1/8	50 PSIG	9.6 SCFM
3/32	85 PSIG	8.3 SCFM
1/16	150 PSIG	6.1 SCFM
3/64	200 PSIG	4.5 SCFM
1/32	300 PSIG	3.2 SCFM

Specifications

The valve(s) shall be installed at high points in the line to vent the accumulation of air and other gases with the line under pressure.

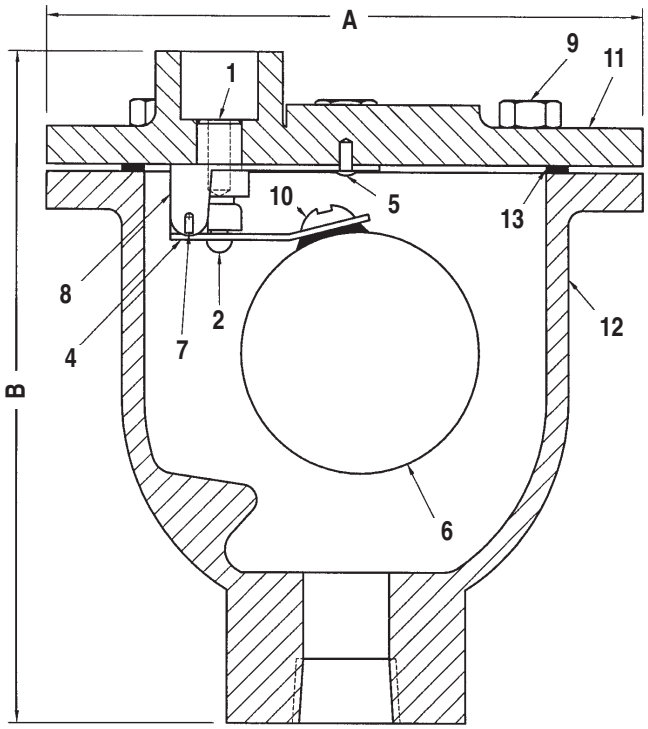
The valve(s) shall have a _____" orifice with valve sealing faces of stainless steel and Buna-N rubber, and shall operate at _____ PSIG. Valves which use a needle valve to seal the orifice shall not be acceptable.

The valve(s) shall be Crispin-Multiplex Model _____ Midget Air Valve(s) as manufactured by Multiplex Manufacturing Co., Berwick, PA.

Valve construction shall be _____" NPT screwed, cast iron body and top flange with stainless steel float and trim.

Option: Where pressures are greater than 300 PSIG, the valve(s) shall be _____ NPT" inlet connection, and shall have a (steel, stainless steel, or ductile iron) body, top and inlet flange.

Standard operating pressure for Crispin Air Valves is 20 to 150 PSIG. Please check one of the following if your operating needs differ:
____ 2 to 40 PSIG ____ 151 to 300 PSIG



Parts List

ITEM	DESCRIPTION	MATERIAL	ASTM
1	VALVE SEAT	STAINLESS STEEL	A582
2	PLUNGER BUTTON	VITON	D2000
4	VALVE LEVER	STAINLESS STEEL	A240
5	SCREW (DRIVE)	STAINLESS STEEL	A193
6	BALL FLOAT	STAINLESS STEEL	A240
7	HINGE PIN	STAINLESS STEEL	A313
8	HINGE BUTT	STAINLESS STEEL	A240
9	BOLT	STEEL	A307
10	SCREW	STAINLESS STEEL	A193
11	FLANGE	CAST IRON	A126 CL.B
12	BODY	CAST IRON	A126 CL.B
13	FLANGE GASKET	ARMSTRONG N-8092	N/A
29	PLUG (NOT SHOWN)	BRASS	B505

Size Specifications

MODEL	INLET SIZE	OUTLET SIZE	A	B	WHT.
M3	3/8" NPT	3/8" NPT	5.00	5.75	6
M5	1/2" NPT	3/8" NPT	5.00	5.75	7
M8	3/4" NPT	3/8" NPT	5.00	5.75	7
M10	1" NPT	3/8" NPT	5.00	5.75	8

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VR Series
Vacuum Relief Valves

Vacuum Relief Valve:
Sizes 3” thru 36” available

Crispin
Since 1905

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Crispin Vacuum Relief Valves

VR SERIES

Valve Function

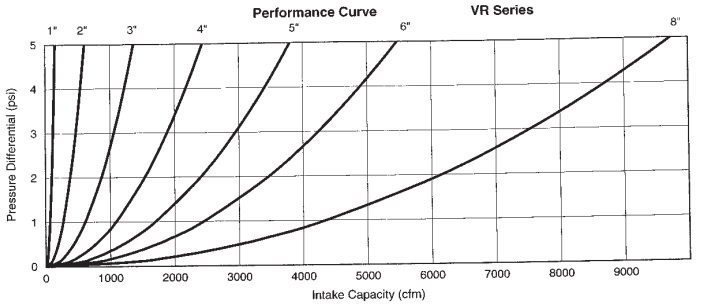
- Allows air to enter system when vacuum occurs
- Prevents air exhaustion during pump start-up

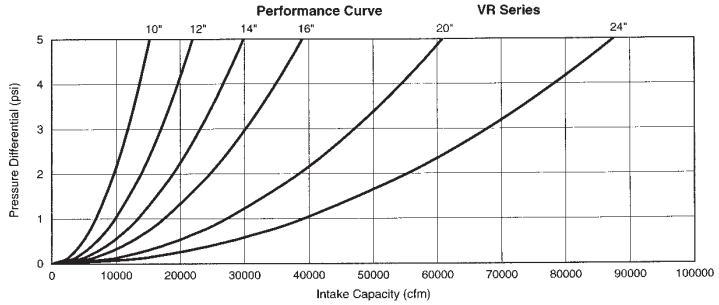
Features

- Cracks open to admit air at .25 PSIG differential pressure
- Resilient drip tight seat
- ANSI Class 125 & Class 250 flanged connection
- Sizes 3" to 36"

CRISPIN Vacuum Relief Valves allow large volumes of air to enter a system when a vacuum occurs, but prevent air from being exhausted upon pump start-up. If desired, this trapped air column could be exhausted by the addition of a small orifice air release valve. This controlled release allows air to act as a cushion to help prevent potential surge. Vacuum Relief Valves are installed at high points in the line, or as directed by the engineer, to relieve a vacuum due to column separation or draining the line.

Vacuum Relief Performance Curves





ANSI Class 125 & 250 Flanged Valves†

MODEL	INLET SIZE	INLET CLASS	O.D.	VALVE HEIGHT	HEIGHT W/ AR VALVE	WEIGHT (LBS)	WEIGHT W/ AR VALVE
VR31	3"	125	7 1/2"	9 1/2"	12 1/4"	36lbs	45lbs
VR32	3"	250	8 1/4"	9 1/2"	12 1/4"	52lbs	61lbs
VR41	4"	125	9"	11 1/4"	13 1/4"	56'bs	65lbs
VR42	4"	250	10"	11 1/2"	13 1/4"	85lbs	94lbs
VR51	5"	125	10"	13 1/4"	18 1/2"	70lbs	115lbs
VR52	5"	250	11"	13 3/4"	18 1/2"	115lbs	140lbs
VR61	6"	125	11"	14 1/2"	20"	94lbs	119lbs
VR62	6"	250	12 1/2"	15"	20"	151lbs	176lbs
VR81	8"	125	13 1/2"	18 1/4"	21 1/4"	158lbs	183lbs
VR82	8"	250	15"	18 3/4"	21 1/4"	243lbs	268lbs
VR101	10"	125	16"	22 1/4"	24 1/4"	269lbs	294lbs
VR102	10"	250	17 1/2"	22 3/4"	24 1/4"	385lbs	410lbs
VR121	12"	125	19"	22 1/4"	24"	387lbs	439lbs
VR122	12"	250	20 1/2"	23"	24"	562lbs	614lbs
VR141	14"	125	21"	24 1/4"	24 3/4"	453lbs	492lbs
VR142	14"	250	23"	24 3/4"	24 3/4"	700lbs	752lbs
VR161	16"	125	23 1/2"	25 3/4"	25 3/4"	580lbs	632lbs
VR162	16"	250	25 1/2"	25 3/4"	25 3/4"	960lbs	1012lbs

Standard Materials

NAME	MATERIAL (Standard)
BODY	Cast Iron*
SEAT	Bronze w/ Buna-N Seat*
DISC	Bronze*
BUSHING	Bronze*
FLANGE	Cast Iron*
SPRING	Stainless Steel*
BOLTS & NUTS	Steel*

*Consult factory for optional construction materials.

†For Sizes 1" and 2", and 18" thru 36", please consult the factory.

SUBMITTAL SHEET FOR VR SERIES

Submittal Sheet for Crispin VR Series

3”-5” Vacuum Relief Valve

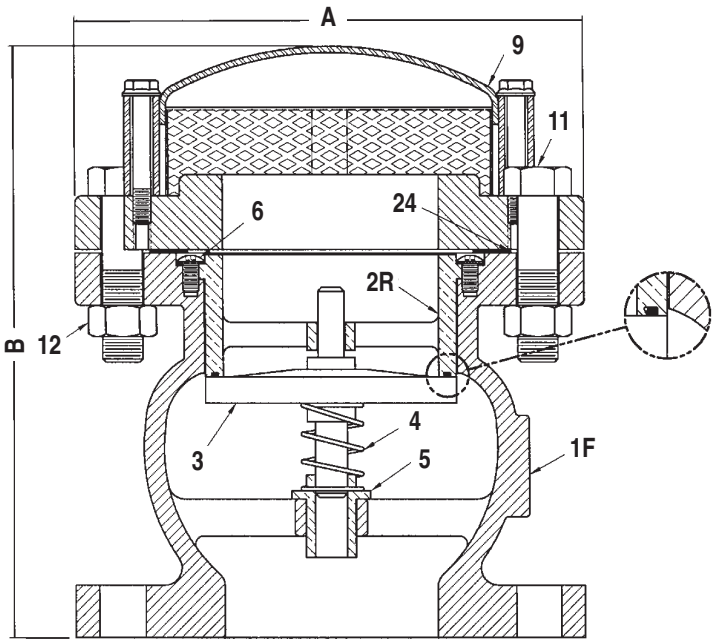
Date: October, 2001

Specifications

Vacuum Relief valve(s) shall be installed at high points in the line, or as directed by the engineer to relieve a vacuum due to column separation or draining the line.

The valve disc shall be center guided and held normally closed by a stainless steel spring. The seat surfaces shall be bronze and Buna-N. The minimum flow area, perpendicular to the direction of flow thru the valve, shall be equal to the pipe area. The oulet shall be protected by a hood and screen.

3”-5”—The valve(s) materials shall include a cast iron body, stainless steel spring, and cast bronze disc with a Buna-N seat. The inlet shall be _____ANSI Class (125, 250) Flange. The valve(s) shall be model _____as manufactured by Crispin-Multiplex Manufacturing Co., Berwick, PA.



• OPTIONAL TRIM MATERIAL: STAINLESS STEEL

Size Specifications

MODEL	INLET SIZE	OUTLET SIZE	A	B	WEIGHT
VR31	3” 125# FLG.	3” HOODED	7.50	9.50	36
VR32	3” 250# FLG.	3” HOODED	8.25	9.50	52
VR41	4” 125# FLG.	4” HOODED	9.00	11.25	56
VR42	4” 250# FLG.	4” HOODED	10.00	11.50	85
VR51	5” 125# FLG.	5” HOODED	10.00	13.25	70
VR52	5” 250# FLG.	5” HOODED	11.00	13.75	115

Vacuum Relief Valve Parts List

ITEM	DESCRIPTION	MATERIAL	ASTM
1F	BODY	CAST IRON	A126 CL. B
2R	RESILIENT SEAT	CAST BRONZE/BUNA-N RUBBER	B62/D2000
3	DISC	CAST BRONZE	B62
4	SPRING	STAINLESS STEEL	A313
5	BUSHING	BRONZE	B62
6	SCREW	STAINLESS STEEL	A193
9	HOOD ASSEMBLY	STEEL	N/A
11	BOLT	STEEL	A307
12	NUT	STEEL	A563
24	FLANGE GASKET	ARMSTRONG N—8092	N/A

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Submittal Sheet for Crispin VR Series

6”-24” Vacuum Relief Valve

Date: October, 2001

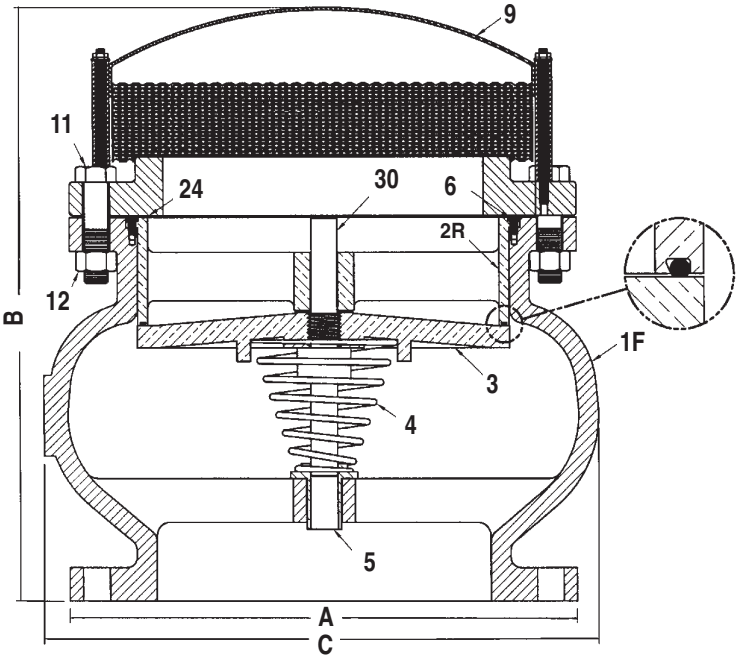
SUBMITTAL SHEET FOR VR SERIES

Specifications

Vacuum Relief valve(s) shall be installed at high points in the line, or as directed by the engineer to relieve a vacuum due to column separation or draining the line.

The valve disc shall be center guided and held normally closed by a stainless steel spring. The seat surfaces shall be bronze and Buna-N. The minimum flow area, perpendicular to the direction of flow thru the valve, shall be equal to the pipe area. The oulet shall be protected by a hood and screen.

6”-24”—The valve(s) materials shall include a cast iron body, stainless steel spring, and cast bronze disc with a Buna-N seat. The inlet shall be _____ ANSI Class (125, 250) Flange. The valve(s) shall be model _____ as manufactured by Crispin-Multiplex Manufacturing Co., Berwick, PA.



• **OPTIONAL TRIM MATERIAL: STAINLESS STEEL**

Valve Parts List

ITEM	DESC.	MATERIAL	ASTM
1F	Body	Cast Iron	A126 CL.B
2R	Resilient Seat	Cast Bronze/ Buna-N Rubber	B62/ D2000
3	Disc	Cast Bronze	B62
4	Spring	Stainless Steel	A313
5	Bushing	Bronze	B62
6	Screw	Stainless Steel	A193
9	Hood Assembly	Steel	N/A
11	Bolt	Steel	A193
12	Nut	Steel	A194
24	Flange Gasket	Armstrong N-8092	N/A
30	Shaft	Bronze	B62

Size Specifications

MODEL	INLET SIZE	OUTLET SIZE	A	B	C	WGHT.
VR61	6” 125# FLG.	6” HOODED	11.00	14.50		94
VR62	6” 250# FLG.	6” HOODED	12.50	15 00		151
VR81	8” 125# FLG.	8” HOODED	13.50	18 25		158
VR82	8” 250# FLG.	8” HOODED	15.00	18.75		243
VR101	10” 125# FLG.	10” HOODED	16.00	22.25	17.00	269
VR102	10” 250# FLG.	10” HOODED	17.50	22.75	17.00	385
VR121	12” 125# FLG.	12” HOODED	19.00	22.25	20.50	387
VR122	12” 250# FLG.	12” HOODED	20.50	23.00	20.50	562
VR141	14” 125# FLG.	14” HOODED	21.00	24.25	22.50	453
VR142	14” 250# FLG.	14” HOODED	23.00	25.00	22.50	700
VR161	16” 125# FLG.	16” HOODED	23.50	26.75	26.00	580
VR162	16” 250# FLG.	16” HOODED	25.50	27.75	26.00	960
VR181	18” 125# FLG	18” HOODED	25.00	28.25	29.75	892
VR182	18” 250# FLG	18” HOODED	28.00	30.00	30.00	1238
VR201	20” 125# FLG.	20” HOODED	27.50	31.00	31.25	1050
VR202	20” 250# FLG.	20” HOODED	30.50	31.00	31.25	1200
VR241	24” 125# FLG.	24” HOODED	32.00	39.25	37.25	1400
VR242	24” 250# FLG.	24” HOODED	36.00	39.25	37.25	1650

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SUBMITTAL FOR VR/M SERIES

Submittal Sheet for Crispin VR/M Series

3"-4" VR w/Pressure Air Release Valve

Air Release Valve manufactured in compliance with ANSI/AWWA C512 **Date: October, 2001**

Specifications

Vacuum Relief valve(s) shall be installed at high points in the line, or as directed by the engineer to relieve a vacuum due to column separation or draining the line. The valve disc shall be center guided and held normally closed by a stainless steel spring. The seat surfaces shall be (bronze, stainless steel) and Buna-N. The minimum flow area, perpendicular to the direction of flow thru the valve, shall be equal to the pipe area. The oulet shall be protected by a hood and screen. All Crispin Valves are hydrostatically tested at 150% of their maximum working pressure.

3"-4"—The valve(s) materials shall include a cast iron body, stainless steel spring, bronze disc, bushing and seat ring with a Buna-N seat. The inlet shall be _____" ANSI Class (125, 250) Flange. The valve(s) shall be model _____as manufactured by Crispin-Multiplex Manufacturing Co., Berwick, PA.

Option: A Pressure Air Release Valve shall be piped out of the side of the Vacuum Relief Valve. Refer to the Pressure Air Release Valve Specification.

Standard operating pressure for Crispin Air Valves is 20 to 150 PSIG. Please check one of the following if your operating needs differ:

____ 2 to 40 PSIG
____ 151 to 300 PSIG

Size Specifications

MODEL	INLET SIZE	OUTLET SIZE	A	B	WGHT.
VR31/M5	3" 125# FLG.	3" NPT	11.75	12.25	45
VR32/M5	3" 250# FLG.	3" NPT	11.75	12.25	61
VR41/M5	4" 125# FLG.	4" NPT	13.50	13.25	65
VR42/M5	4" 250# FLG.	4" NPT	13.50	13.25	94

Pressure Air Release Parts

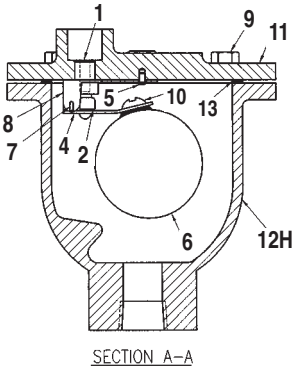
ITEM	DESCRIPTION	MATERIAL	ASTM
1	Valve Seat	Stainless Steel	A276
2	Plunger Button	Viton	D2000
4	Valve Lever	Stainless Steel	A276
5	Screw (Drive)	Stainless Steel	A193
6	Ball Float	Stainless Steel	A240
7	Hinge Pin	Stainless Steel	A580
8	Hinge Butt	Stainless Steel	A240
9	Bolt	Steel	A307
10	Screw	Stainless Steel	A193
11	Flange	Cast Iron	A126 CL.B
12H	1/2 NPT Body	Cast Iron	A126 CL.B
13	Flange Gasket	Armstrong N-8092	N/A
29	Plug	Brass	B505

Vacuum Relief Parts List

ITEM	DESCRIPTION	MATERIAL	ASTM
1FH*	Body	Cast Iron	A126/CL.B
2R	Resilient Seat	Cast Bronze/Buna-N	B62/D2000
3	Disc	Cast Bronze	B62
4	Spring	Stainless Steel	A313
5	Bushing	Bronze	B62
6	Screw	Stainless Steel	A193
9	Hood Assembly	Steel	N/A
11	Bolt	Steel	A307
12	Nut	Steel	A563
24	Flange Gasket	Armstrong N-8092	N/A

Connecting Parts

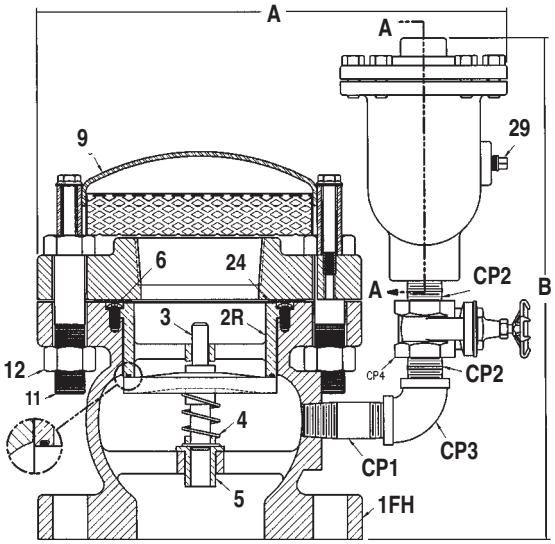
ITEM	DESCRIPTION	MATERIAL	ASTM
CP1	1 x 3 Nipple	Steel	A312
CP2	1 x CL. Nipple	Steel	A312
CP3	1/2"—90° Elbow	Malleable Iron	N/A
CP4	1" Gate Valve	Brass	N/A



SECTION A–A

Orifice Options

DIAMETER	MAXIMUM PRESSURE
5/32	40 PSIG
1/8	50 PSIG
3/32	85 PSIG
1/16	150 PSIG
3/64	200 PSiG
1/32	300 PSiG



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4”-10” VR w/Pressure Air Release (1 of 2)

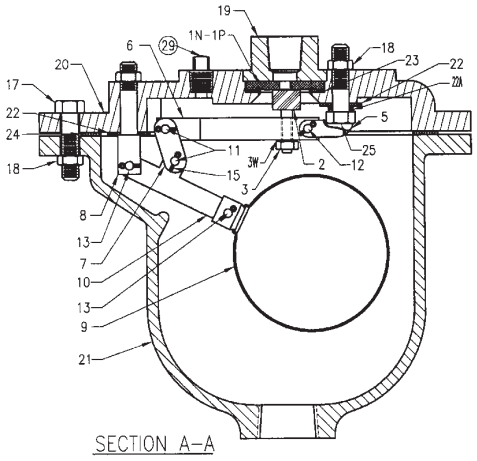
Air Release Valve manufactured in compliance with ANSI/AWWA C512 **Date: October, 2001**

Specifications

Vacuum Relief valve(s) shall be installed at high points in the line, or as directed by the engineer to relieve a vacuum due to column separation or draining the line. The valve disc shall be center guided and held normally closed by a stainless steel spring. The seat surfaces shall be (bronze, stainless steel) and Buna-N. The minimum flow area, perpendicular to the direction of flow thru the valve, shall be equal to the pipe area. The oulet shall be protected by a hood and screen. All Crispin Valves are hydrostatically tested at 150% of their maximum working pressure.

4”-10”—The valve(s) materials shall include a cast iron body, stainless steel spring, bronze disc, bushing and seat ring with a Buna-N seat. The inlet shall be _____” ANSI Class (125, 250) Flange. The valve(s) shall be model_____as manufactured by Crispin-Multiplex Manufacturing Co., Berwick, PA.

Option: A Pressure Air Release Valve shall be piped out of the side of the Vacuum Relief Valve. Refer to the Pressure Air Release Valve Specification.



SECTION A–A

Orifice Options

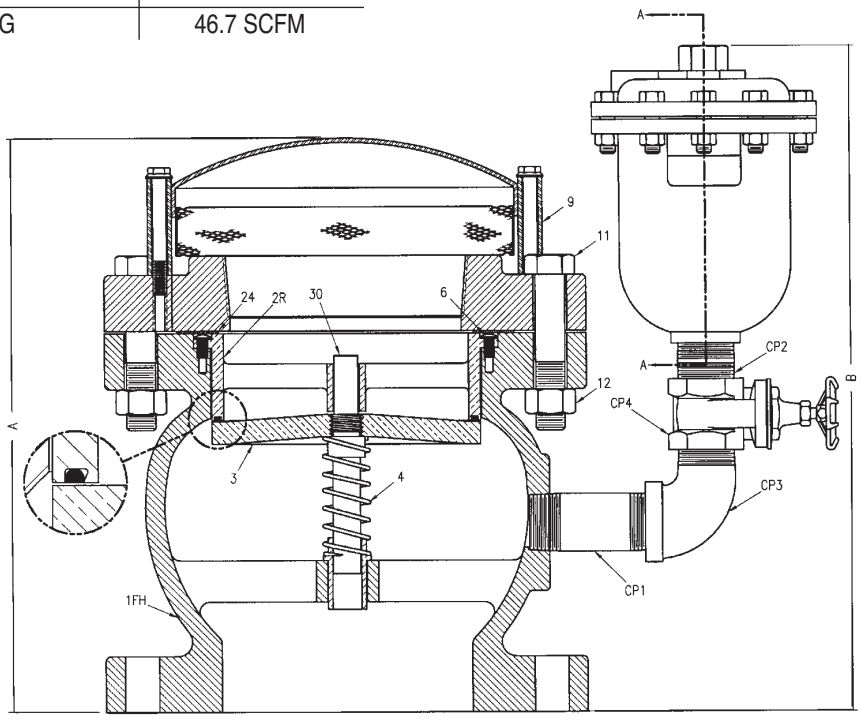
DIAMETER	MAXIMUM PRESSSURE	DISCHARGE RATE
5/16”	100 PSIG	105 SCFM
1/4”	150 PSIG	98 SCFM
3/16”	200 PSIG	72 SCFM
5/32”	250 PSIG	61.1 SCFM
1/8”	300 PSiG	46.7 SCFM

Optional Trim Material: Stainless Steel

VR41/42 has a single piece shaft and disc.

Standard operating pressure for Crispin Air Valves is 20 to 150 PSIG. Please check one of the following if your operating needs differ:

____ 2 to 40 PSIG
____ 151 to 300 PSIG



SUBMITTAL FOR VR/PL SERIES

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SUBMITTAL FOR VR/PL SERIES

Submittal Sheet for Crispin VR/PL Series

4”-10” VR w/Pressure Air Release (2 of 2)

Drawing Date: October, 2001

Pressure Air Relief Parts

ITEM	DESCRIPTION	MATERIAL	ASTM
1N*	Seat	PVC	1784
1P*	Seat	Stainless Steel	A240
2	Valve Plunger	Buna-N & S/S	D2000
3	Plunger Nut	Stainless Steel	A194
3W	Lock Washer	Stainless Steel	A240
5	Valve Fulcrum	Stainless Steel	A240
6	Valve Lever	Stainless Steel	A240
7	Link	Stainless Steel	A240
8	Ball Fulcrum	Stainless Steel	A582
9	Ball Float	Stainless Steel	A240
10	Ball Lever	Stainless Steel	A240
11	Bearing Pin	Stainless Steel	A582
12	Bearing Pin	Stainless Steel	A582
13	Bearing Pin	Stainless Steel	A582
15	Cotter Pin	Stainless Steel	A313
17	Bolt	Steel	A307
18	Nut	Steel	A563
19	Top	Cast Iron	A126CL.B
20	Flange	Cast Iron	A126CL.B
21	Body	Cast Iron	A126CL.B
22	Fulcrum Washer	Fiber	N/A
22A	Fulcrum Washer	Fiber	N/A
23	Seat Gasket	Buna-N Rubber	D2000
24	Flange Gasket	Armstrong N-8092	A193
25	Bolt	Stainless Steel	A193
29	Plug	Brass	B505

(*) Parts are interchangable and optional at customers’ request.

Size Specifications

MODEL	INLET SIZE	OUTLET SIZE	A	B	WGHT.
VR41/PL10	4” 125# FLG.	4” Hooded	13.50	11.25	93
VR42/PL10	4” 250# FLG.	4” Hooded	13.50	11.50	105
VR61/PL10	6” 125# FLG.	6” Hooded	17.50	14.50	99
VR62/PL10	6” 250# FLG.	6” Hooded	17.50	15.00	139
VR81/PL10	8” 125# FLG.	8” Hooded	20.75	18.25	127
VR82/PL10	8” 250# FLG.	8” Hooded	20.75	18.75	144
VR101/PL10	10” 125# FLG.	10” Hooded	23.75	22.25	137
VR102/PL10	10” 250# FLG.	10” Hooded	23.75	22.75	190

Vacuum Relief Parts List

ITEM	DESCRIPTION	MATERIAL	ASTM
1FH	Body	Cast Iron	A126/CL.B
2R	Resilient Seat	Cast Bronze/Buna-N	B62/D2000
3	Disc	Cast Bronze	B62
4	Spring	Stainless Steel	A313
5	Bushing	Bronze	B62
6	Screw	Stainless Steel	A193
9	Hood Assembly	Steel	N/A
11	Bolt	Steel	A307
12	Nut	Steel	A563
24	Flange Gasket	Armstrong N-8092	N/A
30	Shaft	Bronze	B62

Connecting Parts

ITEM	DESCRIPTION	MATERIAL	ASTM
CP1	1 x 3 Nipple	Steel	A312
CP2	1 x CL. Nipple	Steel	A312
CP3	1/2”—90˚ Elbow	Malleable Iron	N/A
CP4	1” Gate Valve	Brass	N/A

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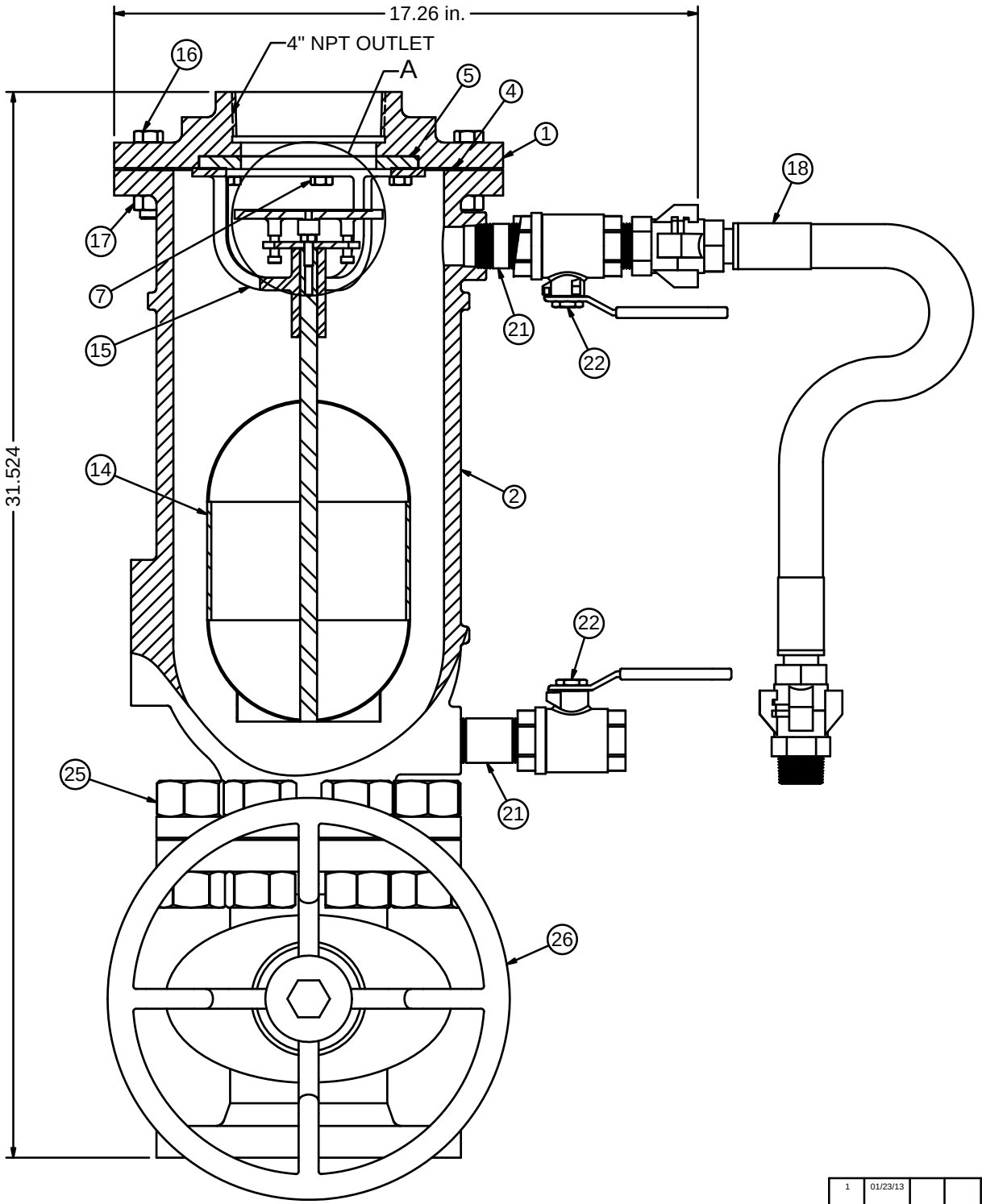
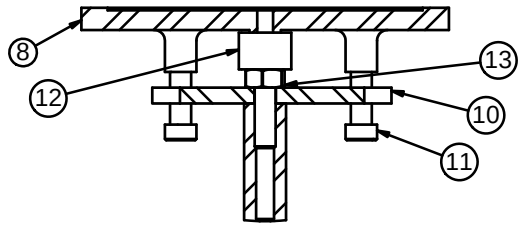


PARTS LIST				
KEY	DWG. NO.	DESCRIPTION	MATERIAL	QTY.
1	36-A4X-2	COVER	CAST IRON	1
2	36-A4-3F	BODY	CAST IRON, ASTM A126	1
4	36-A4-4	COVER GASKET	BUNA-N, ASTM D2000	1
5	36-A4X-5	SEAT	BUNA-N, ASTM D2000	1
7	AC4-15	SEAT RETAINER BOLT	18-8 S. S.	6
8	29-15x	VALVE	304 SST, ASTM A351-CF8M	1
10	36-A6X-16	VALVE GUIDE PLATE	304 SST, ASTM A240	1
11	36-A6X-18	SHOULDER BOLT	18-8 S. S.	3
12	13-4N	PLUNGER ASSEMBLY	BUNA-N/SST	1
13	13-3N	PLUNGER NUT	18-8 S. S.	1
14	36-A4X-9	FLOAT ASSEMBLY	304 SST, ASTM A276/240	1
15	29-16X	FLOAT GUIDE STAND	304 SST, ASTM A351-CF8M	1
16	36-A4-17	COVER BOLT	STEEL	8
17	3-12	COVER NUT	STEEL	8
18	HA1X5	BACKFLUSH HOSE ASSY	RUBBER/STEEL	1
21	NPL1X3	1 X 3 PIPE NIPPLE	STEEL	2
22	BV-1	1" BALL VALVE	BRASS	2
23	36-A4-15	STUD	STEEL	8
24	4-12	NUT	STEEL	8
25	404-24	GASKET	ARMSTRONG	1
26	GV-4F	GATE VALVE	PURCHASED	1

ORIFICE DATA	
ORIFICE DIA.	0.188
MAX. WORKING PRESSURE	150 PSIG

4" CLASS 125 FLANGE DATA	
OUTSIDE DIAMETER	9.000
BOLTING	(8) .750
BOLT CIRCLE	7.500



DETAIL A
SCALE 0.875 : 1

REV	DATE	BY	APPD	REVISION
1	01/23/13			REMOVED ITEMS 3, 6, 9, 19 & 20. ITEM 7 WAS 36-A4X-7. QTY ITEM 5 WAS 3

DO NOT SCALE DRAWING

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED:

FINISHED LINEAR TOLERANCES: ±0.015
UNFINISHED LINEAR TOLERANCE: +0.050 -0.020
FINISHED ANGULAR TOLERANCE: ±2°

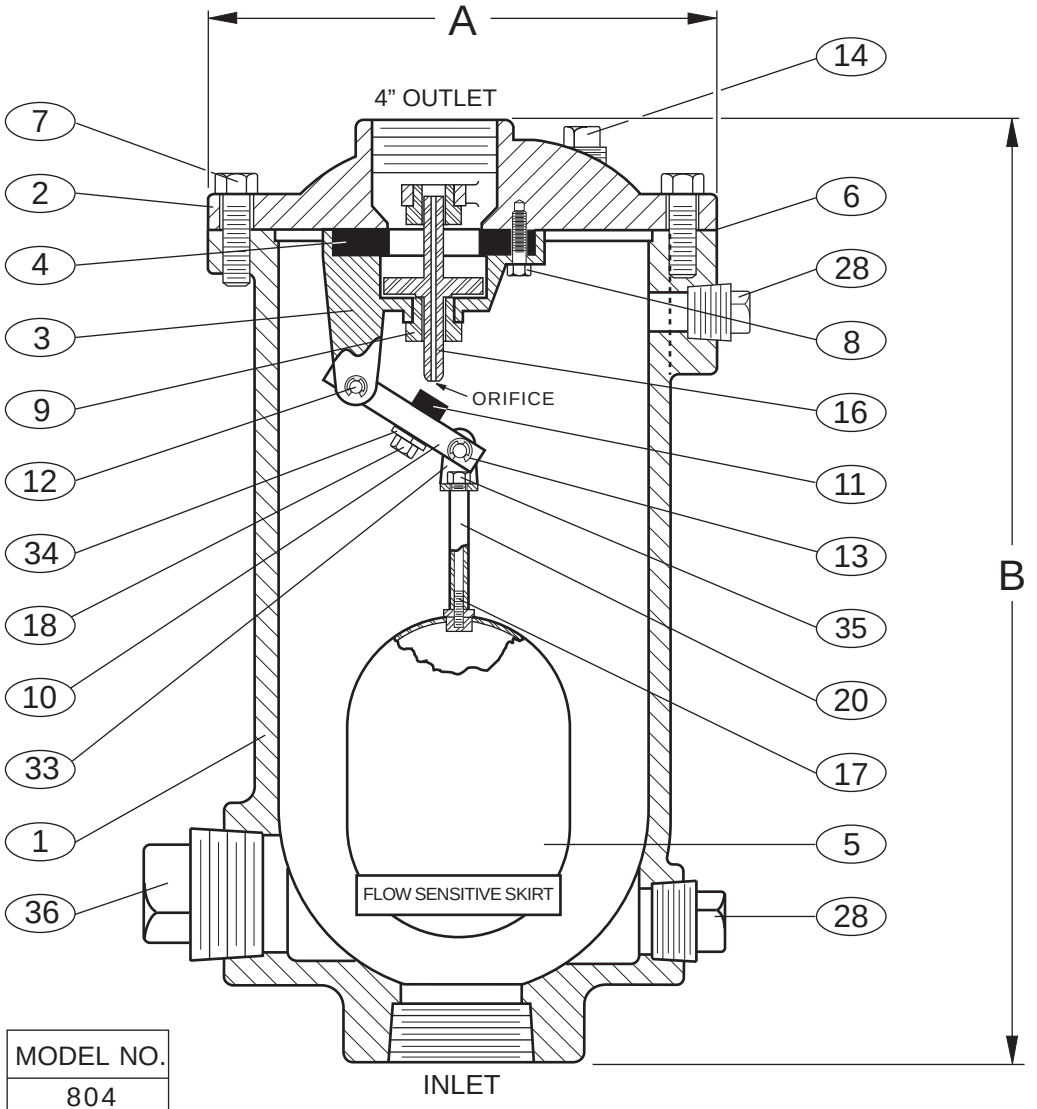
REDRAWN: DATE:
CHECKED:
DRAWN: C. GEARY 07/30/13

CRISPIN VALVES

4" NPT AIR RELEASE VALVE -W- BACK FLUSH

SIZE	DWG. NO.	REV
C	US41B-X	1

SCALE: 0.437:1 SHEET 1 OF 1



	MODEL NO.
	804
A	11"
B	23 1/2"
ORIFICE SIZE	11/64"
INLET	4" NPT
OUTLET	4" NPT

WORKING PRESSURE
150 P.S.I. COLD WORKING PRESSURE-C.W.P.

TEST PRESSURE
1.5 TIMES COLD WORKING PRESSURE-C.W.P.

1. BODY
2. COVER
3. BAFFLE
4. SEAT
5. FLOAT
6. GASKET
7. COVER BOLT
8. RETAINING SCREW
9. BUSHING
10. FLOAT ARM
11. ORIFICE BUTTON
12. PIVOT PIN
13. RETAINING RING
14. PIPE PLUG
16. PLUG
17. FLOAT RETAINER
18. LOCK NUT
20. GUIDE SHAFT
28. PIPE PLUG
33. CLEVIS
34. LOCK WASHER
35. GUIDE SHAFT RETAINER
36. PIPE PLUG

SEE DRAWING NO. VM-801A-M FOR STANDARD MATERIALS OF CONSTRUCTION.

Revised 12-19-07

WASTEWATER COMBINATION AIR VALVE

DATE 9-8-86

VAL-MATIC® VALVE AND MANUFACTURING CORP.

DRWG. NO. VM-804