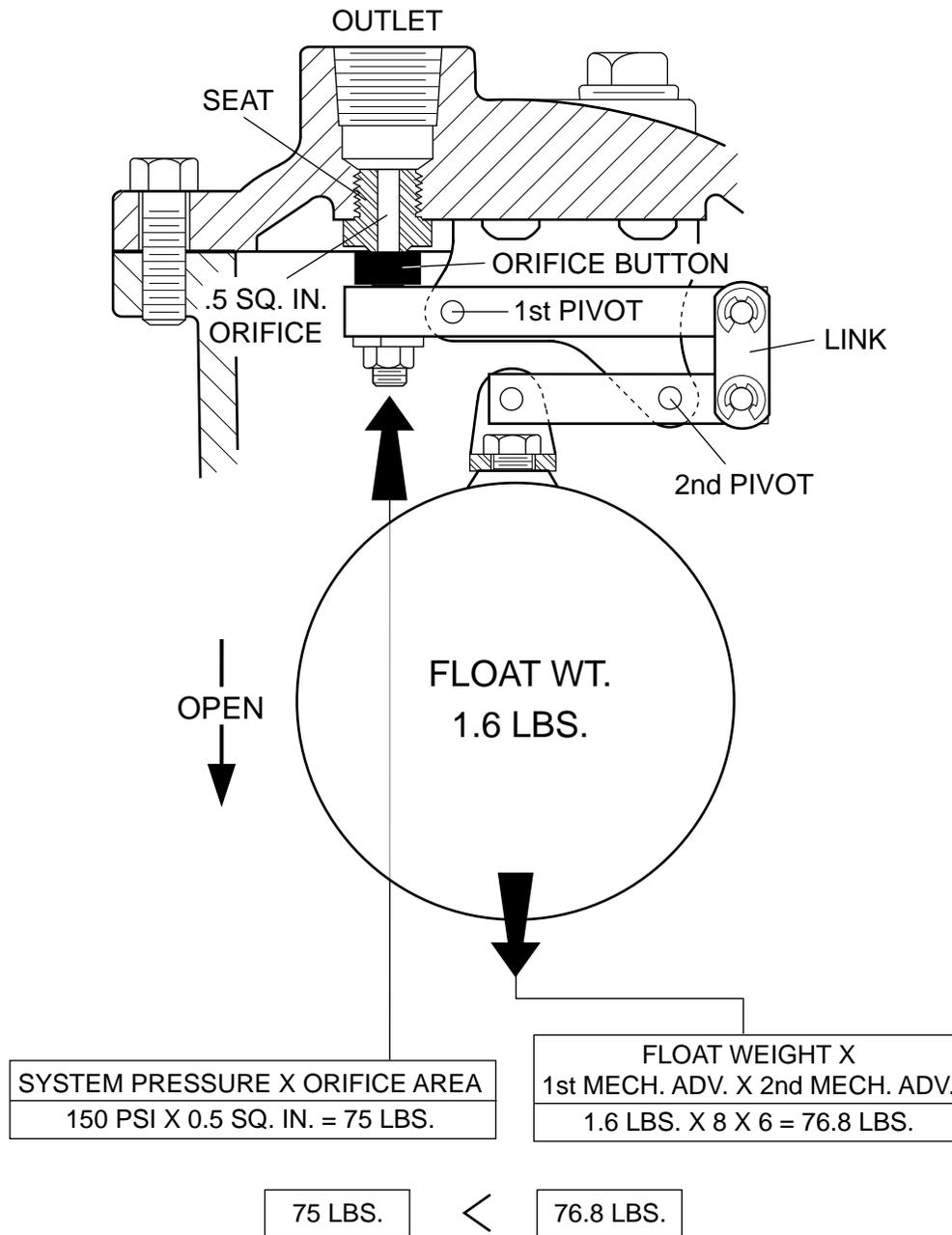


WHY AN AIR RELEASE VALVE OPENS DURING SYSTEM OPERATION

COMPOUND LEVER TYPE



CONCLUSION: VALVE WILL OPEN AND VENT ACCUMULATED AIR.

WHY AN AIR RELEASE VALVE OPENS DURING SYSTEM OPERATION

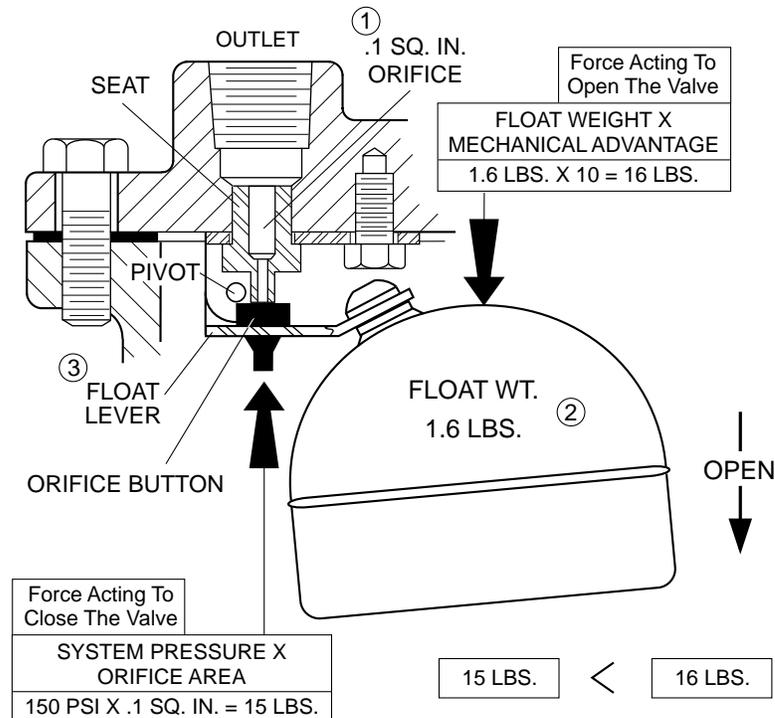
DATE 7-23-98

VAL-MATIC[®] VALVE AND MANUFACTURING CORP.

DRWG. NO.

SS-1513

SIMPLE LEVER TYPE AIR RELEASE VALVE



CONCLUSION: VALVE WILL OPEN AND VENT ACCUMULATED AIR.

This is intended to explain how an Air Release Valve functions when water in the valve has been displaced by accumulated air. It should be noted that when water is present in the valve it raises the buoyant float closing the valve orifice.

An Air Release Valve opens during system operation because forces acting to open the valve are greater than forces acting to hold the valve closed.

Forces acting to hold the valve closed.

In the absence of water, the only force acting to hold the valve closed is the system's working pressure. This is multiplied by the total area of the valve's opening (the orifice^①) to atmosphere. The orifice of an Air Release valve is very small, typically 1/16" - 3/16".

Example:	System pressure:	150 psi
	X total Orifice Area:	.1 sq. in.
		= 15 lbs. Acting to raise the float and close the valve orifice.

Forces acting to open the valve

The forces acting to open the valve are the weight of the valve float^② and the mechanical advantage provided by the float lever^③. The effect of atmospheric pressure on the valve is minimal due to the size of the orifice.

Example:	Valve float weight:	1.6 lbs.
	X mechanical advantage provided by lever:	10 lbs.
		= 16 lbs. Acting to lower the float and open the orifice.

Because the forces acting to open the valve (16 lbs.) is greater than the force to close the valve (15 lbs.), the valve will open during system operation. Again, these forces are negated when water is present in the valve raising the buoyant float and closing the valve orifice.

WHY AN AIR RELEASE VALVE OPENS DURING SYSTEM OPERATION

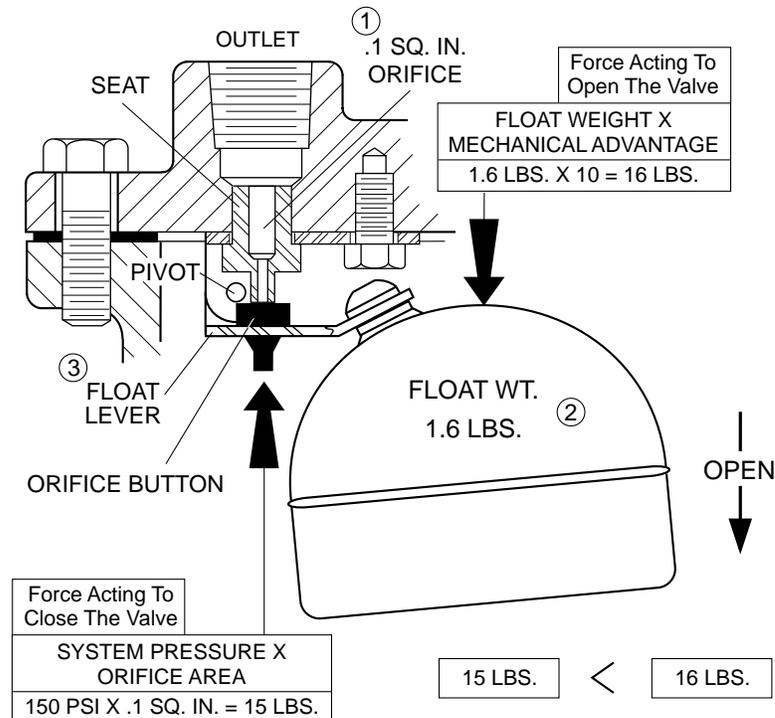
DATE 7-23-98

VAL-MATIC[®] VALVE AND MANUFACTURING CORP.

DRWG. NO.

SS-1514

SIMPLE LEVER TYPE AIR RELEASE VALVE



CONCLUSION: VALVE WILL OPEN AND VENT ACCUMULATED AIR.

This is intended to explain how an Air Release Valve functions when water in the valve has been displaced by accumulated air. It should be noted that when water is present in the valve it raises the buoyant float closing the valve orifice.

An Air Release Valve opens during system operation because forces acting to open the valve are greater than forces acting to hold the valve closed.

Forces acting to hold the valve closed.

In the absence of water, the only force acting to hold the valve closed is the system's working pressure. This is multiplied by the total area of the valve's opening (the orifice^①) to atmosphere. The orifice of an Air Release valve is very small, typically 1/16" - 3/16".

Example:	System pressure:	150 psi
	X total Orifice Area:	.1 sq. in. = 15 lbs. Acting to raise the float and close the valve orifice.

Forces acting to open the valve

The forces acting to open the valve are the weight of the valve float^② and the mechanical advantage provided by the float lever^③. The effect of atmospheric pressure on the valve is minimal due to the size of the orifice.

Example:	Valve float weight:	1.6 lbs.
	X mechanical advantage provided by lever:	10 lbs. = 16 lbs. Acting to lower the float and open the orifice.

Because the forces acting to open the valve (16 lbs.) is greater than the force to close the valve (15 lbs.), the valve will open during system operation. Again, these forces are negated when water is present in the valve raising the buoyant float and closing the valve orifice.

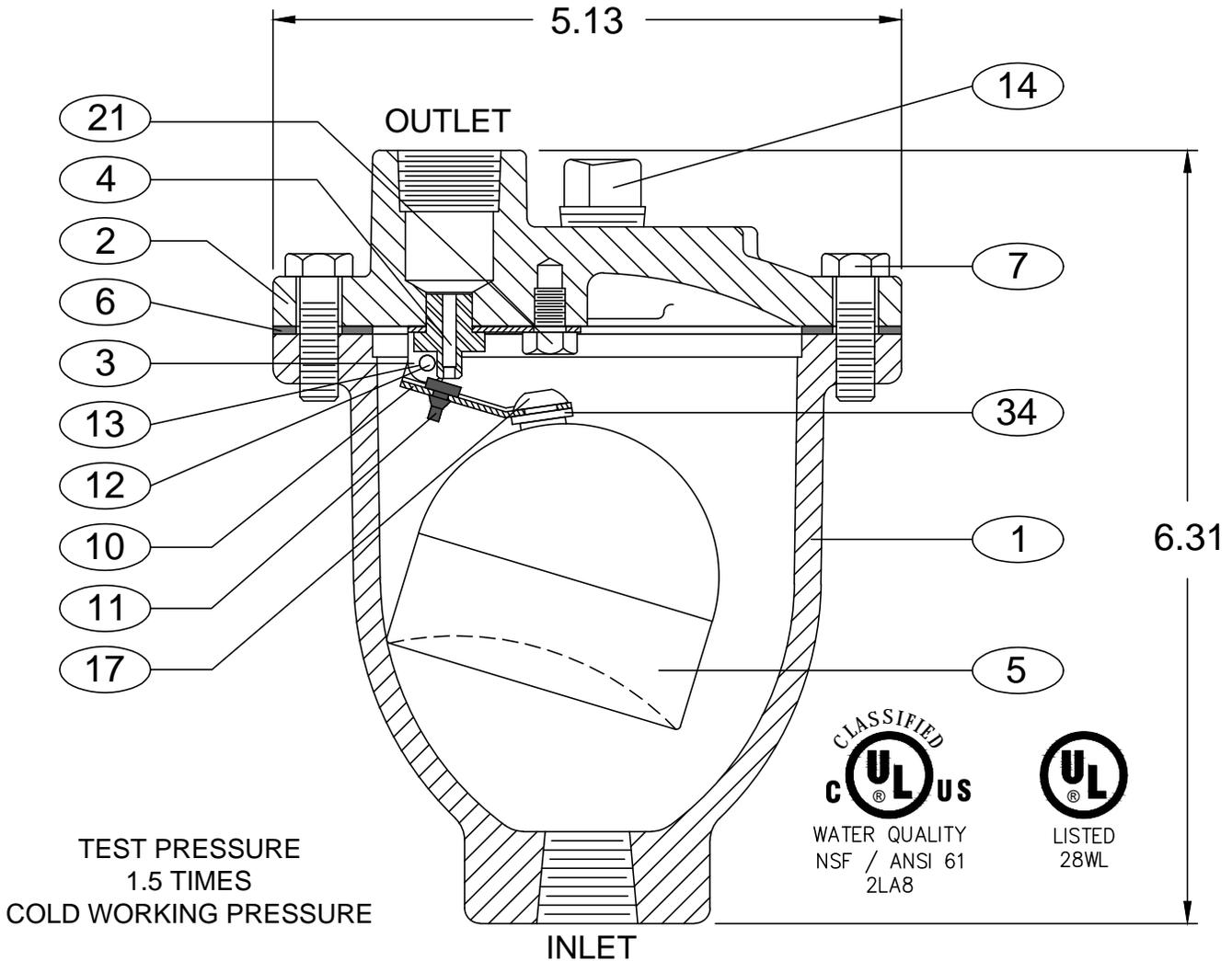
WHY AN AIR RELEASE VALVE OPENS DURING SYSTEM OPERATION

DATE 7-23-98

VAL-MATIC[®] VALVE AND MANUFACTURING CORP.

DRWG. NO.

SS-1514



SEE DRAWING NO. VM-22-M FOR STANDARD MATERIALS OF CONSTRUCTION

VALVE SIZE	MODEL NUMBER	INLET SIZE	OUTLET SIZE	MAX. W.P. P.S.I.	ORIFICE SIZE
1/2" - 3/4"	22.4 *	3/4" NPT	1/2" NPT	175	3/32"
1"	22.3	1" NPT	1/2" NPT	175	3/32"
1/2"	22.7	1/2" NPT	1/2" NPT	300	1/16"
3/4"-1"	22.9 *	1" NPT	1/2" NPT	300	1/16"

* THE VALVE BODY IS THREADED FOR THE INLET NOTED AND REDUCER BUSHINGS ARE PROVIDED FOR THE SMALLER VALVE SIZES INDICATED.



- | | | | |
|----|-------------|----|----------------------------|
| 1 | BODY | 11 | ORIFICE BUTTON |
| 2 | COVER | 12 | PIVOT PIN |
| 3 | LEVER FRAME | 13 | RETAINING RING (NOT SHOWN) |
| 4 | SEAT | 14 | PIPE PLUG |
| 5 | FLOAT | 17 | FLOAT RETAINER |
| 6 | GASKET | 21 | LOCATOR |
| 7 | COVER BOLT | 34 | LOCK WASHER |
| 10 | FLOAT ARM | | |

Revised 8-6-15 (Rev 3)

AIR RELEASE VALVE

DATE 1-18-11

VAL-MATIC

VALVE AND MANUFACTURING CORP.

DRWG. NO.

VMC-22

AIR RELEASE VALVE

SERIES NO. 22

STANDARD MATERIALS OF CONSTRUCTION

<u>PART NO.</u>	<u>PART NAME</u>	<u>MATERIAL</u>
1	BODY	CAST IRON ASTM A126, CLASS B
2	COVER	CAST IRON ASTM A126, CLASS B
3	LEVER FRAME	STAINLESS STEEL T316, ASTM A240
4	SEAT	STAINLESS STEEL T316, ASTM A276
5	FLOAT	STAINLESS STEEL T316, ASTM A240
6	GASKET	COMPRESSED NON-ASBESTOS FIBER
7	COVER BOLT	ALLOY STEEL SAE, GRADE 5
10	FLOAT ARM	STAINLESS STEEL T316, ASTM A240
11	ORIFICE BUTTON	VITON
12	PIVOT PIN	STAINLESS STEEL T316, ASTM A479
13	PIN RETAINER	STAINLESS STEEL PH 15-7 MO
14	PIPE PLUG	STEEL
17	FLOAT RETAINER	STAINLESS STEEL T316, ASTM F879
21	LOCATOR	STAINLESS STEEL T316, ASTM F593
34	LOCK WASHER	STAINLESS STEEL T316, ASTM A240

NOTE: ALL SPECIFICATIONS AS
LAST REVISED.

Revised 1-29-03

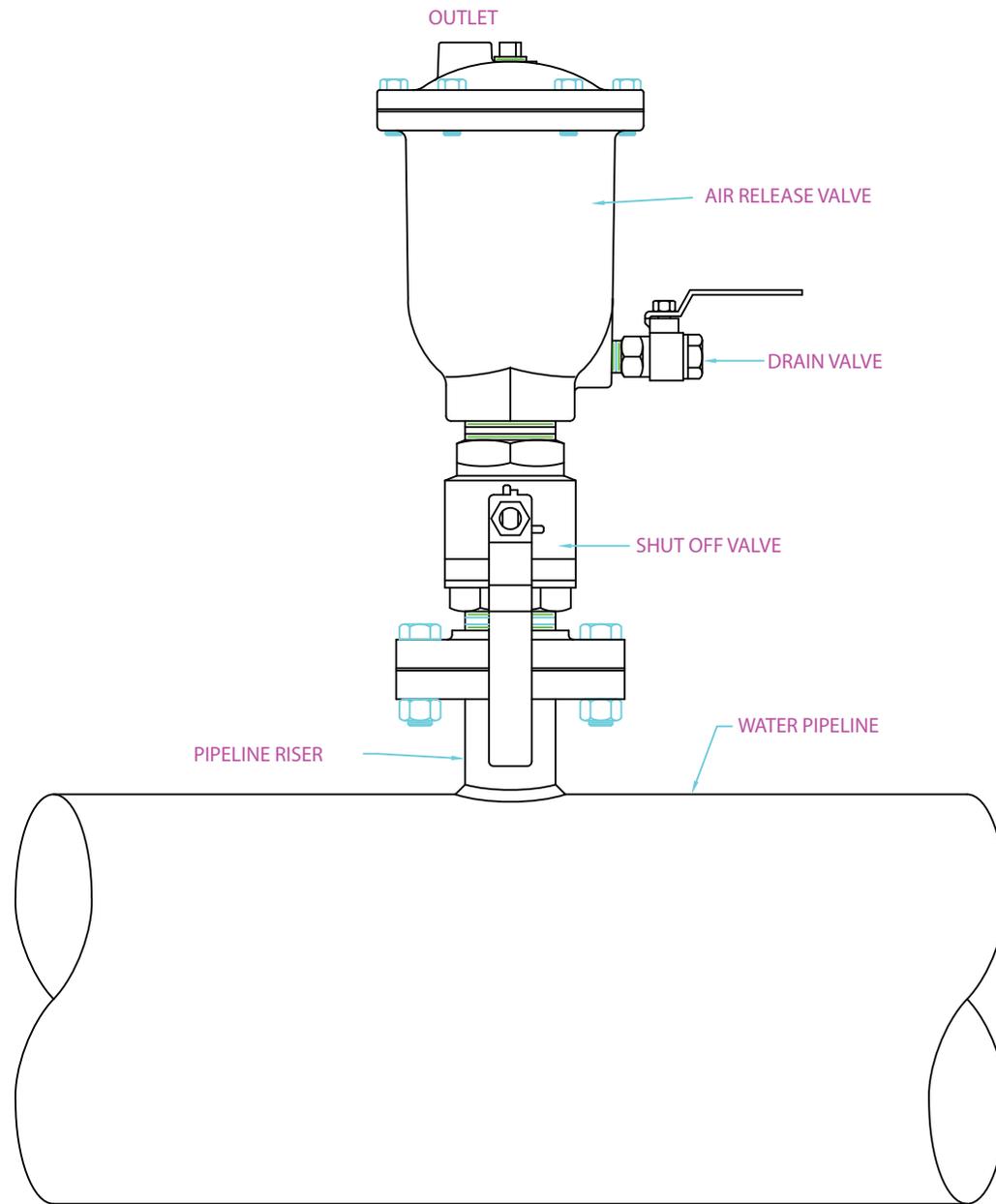
MATERIALS OF CONSTRUCTION

DATE 5/8/69

VAL-MATIC[®] VALVE AND MANUFACTURING CORP.

DRWG. NO.

VM-22-M



AIR RELEASE VALVE DETAIL

NO SCALE

VM-AV01-001-0

RECOMMENDED AIR RELEASE VALVE SIZING

The following recommendations may be used for pipeline and in-plant systems and are based on field experience. For a theoretical methodology on air release valve sizing, see Val-Matic white paper entitled ***Theory, Application and Sizing of Air Valves***. The model numbers indicated are minimum sizes. Larger sizes may be used when abnormal amounts of air are expected or in waste-water applications where gases are present. When possible, Air Release Valves should be specified with the largest inlet size available. The larger inlet flow area yields the most efficient exchange of air and water.

Valves should be installed at all high points in the piping system where air can accumulate.

VALVE SELECTION

1. Determine system capacity in G.P.M. and operating pressure.
2. Enter your G.P.M. and pressure into chart and read the required model number and orifice size.

The 1 - 150 pressure is the standard valve and does operate through the full pressure range

MAX. CAPACITY G.P.M.	SYSTEM PRESSURE P.S.I.					
	1 TO 75		1 TO 150		1 TO 300	
	MODEL	ORIFICE SIZE	MODEL	ORIFICE SIZE	MODEL	ORIFICE SIZE
800	N/A		* 15A	1/16	N/A	
2200	N/A		* 22.4	3/32	22.9	1/16
5200	N/A		25.5	1/8	25.6	3/32
50000	38.2	3/16	38.2	3/16	38.6	5/32
150000	45	23/64	45	23/64	45.5	7/32

NOTE: Above 150,000 G.P.M. valve clusters may be considered.

* Model Numbers 15A and 22.4 are rated for 175 P.S.I.

Revised 12-16-15

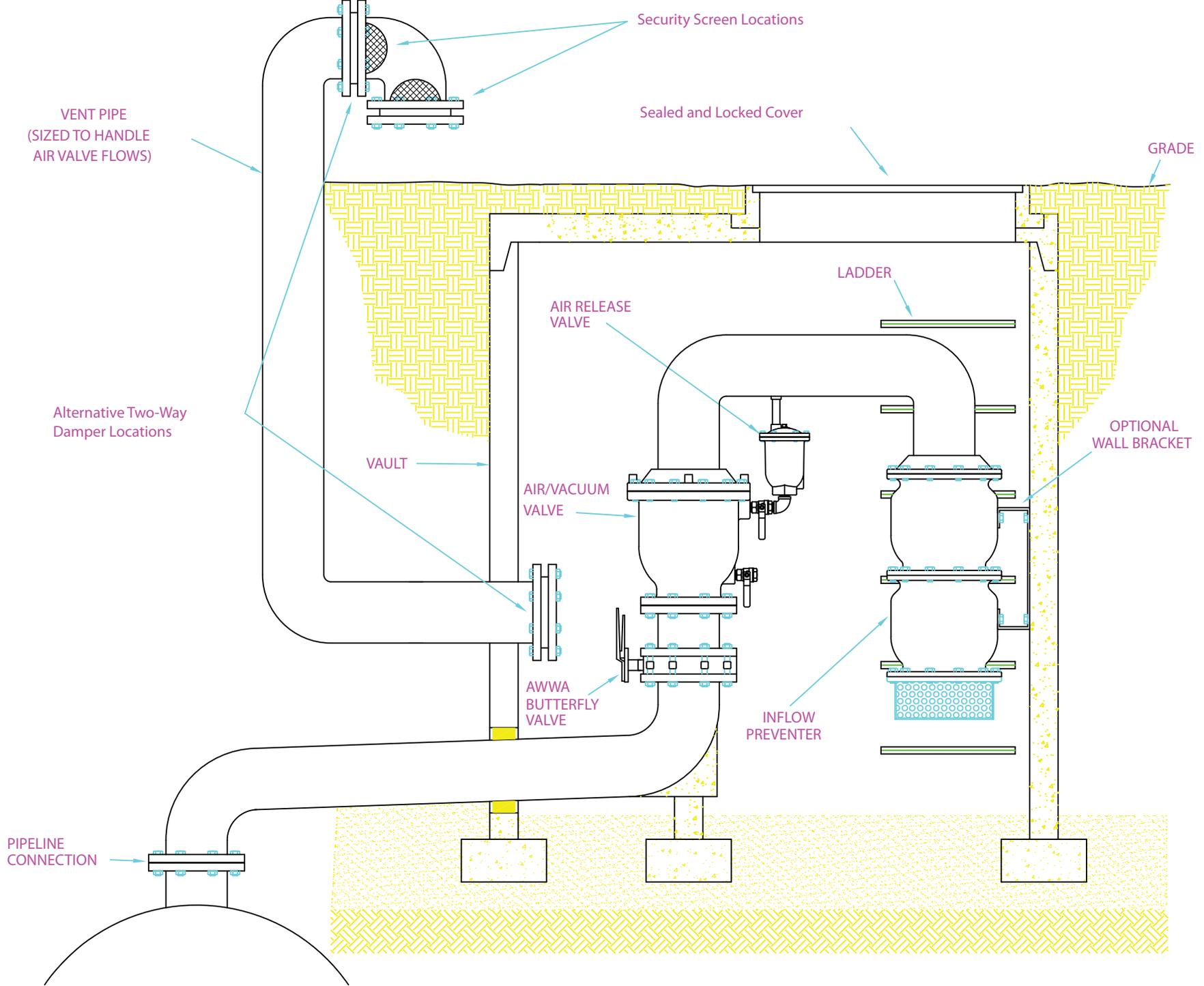
AIR RELEASE VALVE SIZING

DATE 2-20-78

VAL-MATIC® VALVE AND MANUFACTURING CORP.

DRWG. NO.

SS-116



AIR VALVE VAULT INSTALLATION

(NO SCALE)

VM-VS01-001

AIR VALVES (AIR VENT VALVES)

APPLICATIONS & FUNCTIONS

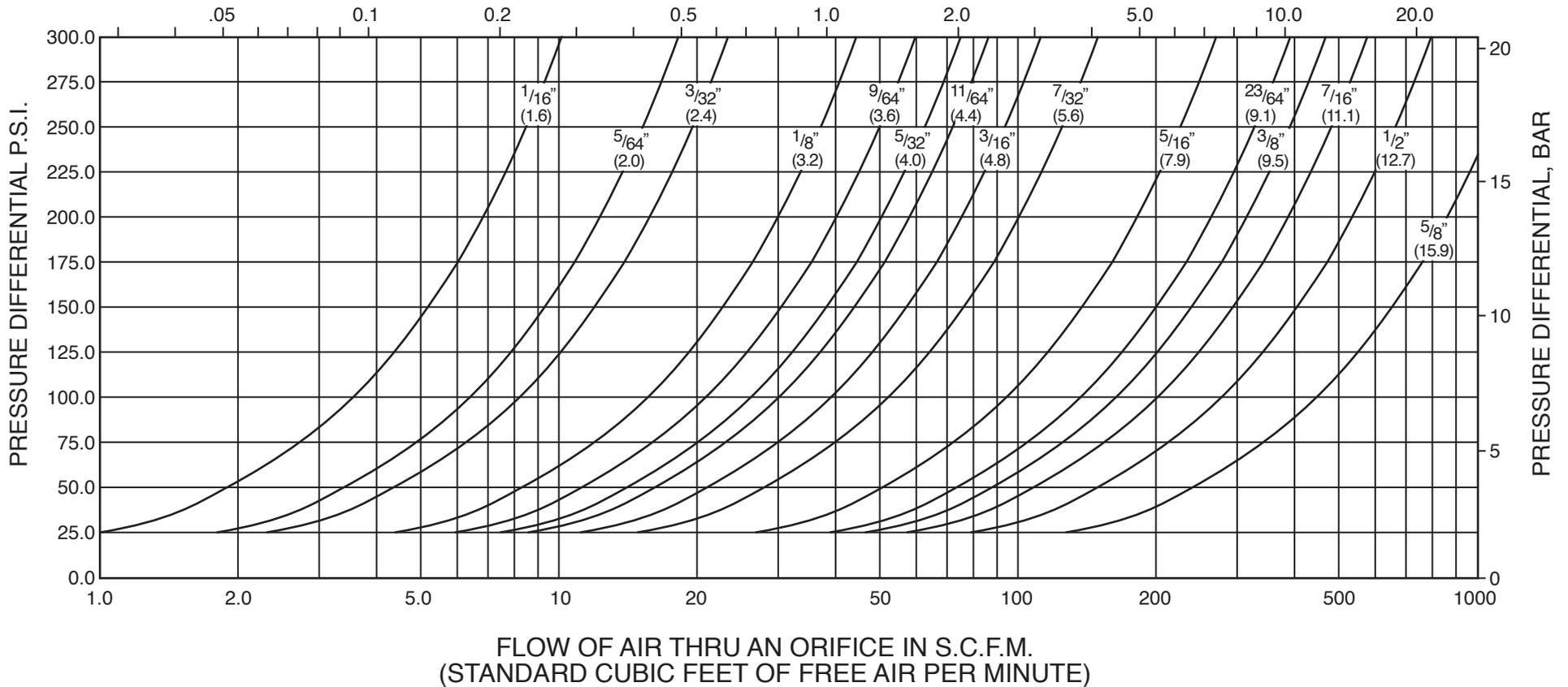
Air Release Valve	Air/Vacuum Valve	Combination Air Valve	Surge-Suppression Air Valve	Vacuum Breaker Priming Valve	Vacuum Breaker Valve	Wastewater Air Release Valve	Wastewater Air/Vacuum Valve	Well Service Combination Air Valve
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APPLICATIONS									
Booster Pump Station	x		x	x					
Centrifugal Pump Volute	x					x	x		x
Filter Backwash Piping	x		x	x	x		x		
Fire Pumps (FM Approved, UL Listed)	x								x
Force Main				x	x		x	x	x
High Points	x	x	x	x	x		x	x	x
Hydropneumatic Tanks	x								
Industrial Process Water	x	x	x	x	x		x	x	x
Lift Station						x	x	x	x
Municipal Wastewater Collection							x	x	x
Penstock					x				
Pressure Filters	x		x	x	x				
Pulp/Paper	x	x	x	x	x		x	x	x
Pump Station High Points	x	x	x	x	x				
Slurries, Mining, Bottom Ash	x	x	x	x	x		x	x	x
Storage Tank Valves			x	x	x				
Turbine Well Pump Discharge									x
Venturi Meters	x		x				x		x
Water Distribution and Transmission	x	x	x	x	x				

FUNCTIONS										
Admitting Large Volumes of Air During Shut Down and Draining Operations (Power Failure)		x	x	x	x			x	x	x
Air Bound Pump Protection	x					x				
Air Related Head Loss Protection (Efficiency)	x		x	x			x		x	
Air Related Surge Protection		x	x	x	x		x	x	x	x
Column Separation		x	x	x	x			x	x	x
Control Air Valve Exhaust				x						x
Maintain Pipeline Efficiency	x		x	x			x		x	x
Maintain Pump Prime						x				
Regulated-Exhaust of Large Volumes of Air During Start-Up and Filling Operations				x						x
Vacuum Protection (Pipe Joints, Gaskets, Packing, Etc.)		x	x	x	x			x	x	x
Venting of Accumulated Air During System Operation	x		x	x		x	x		x	



FLOW OF AIR IN STANDARD CUBIC METERS PER MINUTE



Revised 3-4-13

VENTING CAPACITY FOR AIR RELEASE VALVES, IN. (mm)

DATE 4-30-02



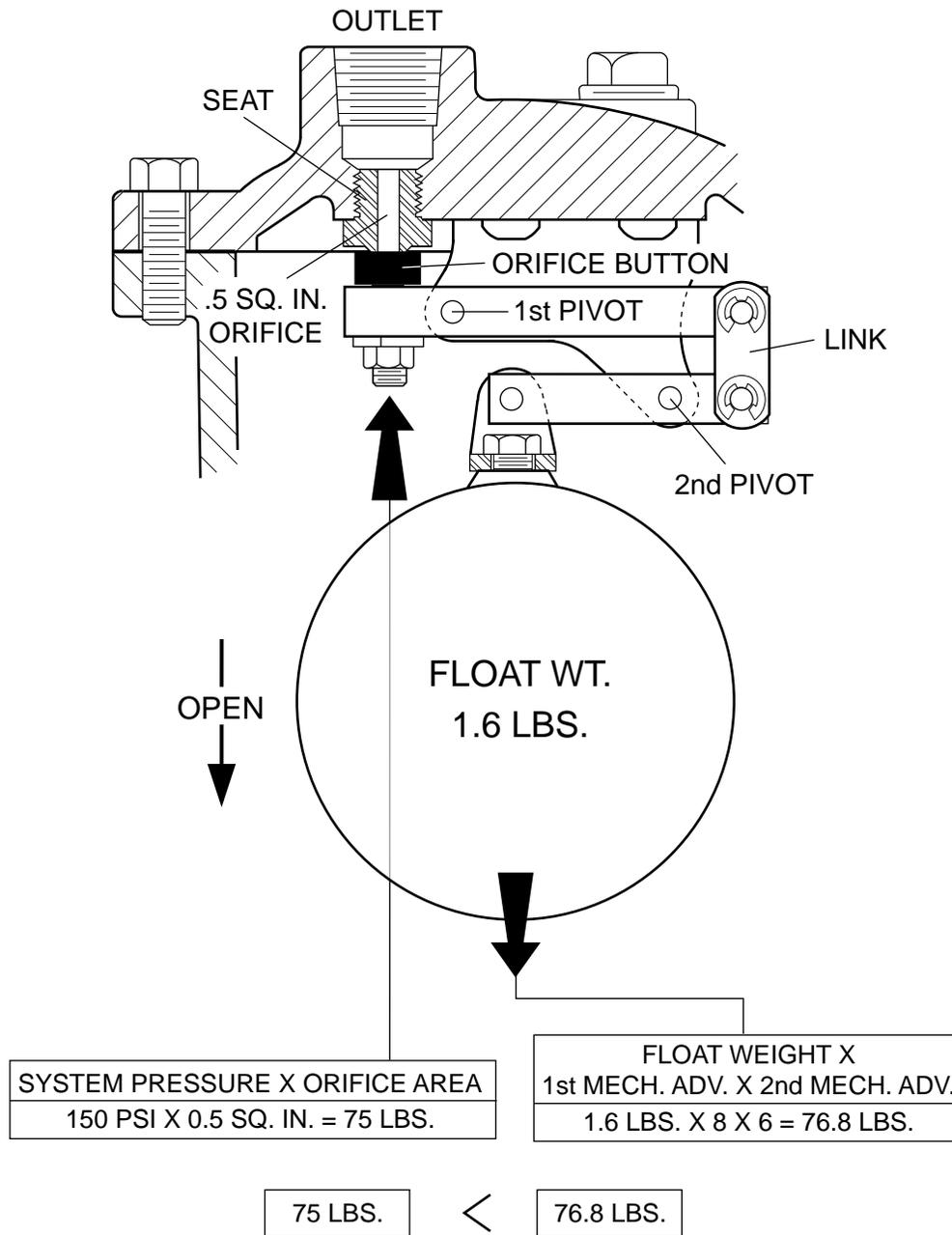
VALVE AND MANUFACTURING CORP.

DRWG. NO.

SS-461

WHY AN AIR RELEASE VALVE OPENS DURING SYSTEM OPERATION

COMPOUND LEVER TYPE



CONCLUSION: VALVE WILL OPEN AND VENT ACCUMULATED AIR.

WHY AN AIR RELEASE VALVE OPENS DURING SYSTEM OPERATION

DATE 7-23-98

VAL-MATIC[®] VALVE AND MANUFACTURING CORP.

DRWG. NO.

SS-1513