

COMBINATION AIR RELEASE DEGASSING (CARD) VALVES

INSTALLATION AND MAINTENANCE MANUAL

SPECIFICATIONS:

The CARD series air valves are available in 3 pipe sizes, 1", 2" and 4" NPT or socket.

Maximum inlet pressure is 150 PSIG

Maximum Hydrostatic test pressure is 225 PSIG

The minimum Specific Gravity of the fluid shall be greater than or equal to 0.9

Optional cover for outlet to prevent debris from entering valve.

1. MATERIALS:

A. **WETTED PARTS:** Either PVC or CPVC plastic, and EPDM or FKM elastomer.

There are no metals in the valves. All parts of the valves are wetted while in service.

B. **CAUTION:** Plastic materials will degrade in ultra-violet (UV) light or sunlight.

INSTALLATION:

NOTE: There are many places in a pipeline where air valves are needed. An excellent source of information regarding placement of air valves can be found in the American Water Works Association (AWWA) Manual M51, chapter 3. In the absence of this specification manual the valve is usually installed in the highest section of the pipeline.

The Combination Air Release Degassing (CARD) valves are available in threaded NPT or socket connections. When solvent cementing the valve into a pipeline use extreme caution to avoid allowing solvent cement or primer to get inside of the valve. If it does, it could cause the valve to malfunction. The CARD valves **MUST** be oriented in the vertical position with the inlet on the bottom. If not oriented this way the valve will not perform its duty. Occasionally, small amounts of liquid may be released from either the large or small port. This may happen just as the orifice is closing. The cap is provided with a threaded NPT port in case this needs to be piped to a safe location.

Threaded Connections: A suitable thread sealant (e.g. PTFE tape) should be applied to male tapered threads to assure a "leak-tight" seal. The assembly need only be made "hand-tight" followed by a quarter (1/4) turn with a strap wrench. Do not over tighten or use pipe wrenches on plastic pipe and components.

Caution: PTFE tape will "string" as pipe threads are joined. Loose "strings" could lay across the seating surface and prevent the valve from completely closing. To avoid this problem, clean out the old tape, and do not apply tape to the first thread.

Caution: Connection should be made only to plastic fitting; metal pipe should only be installed with an intervening plastic nipple. Metal pipe and straight threaded pipe tend to cut, stretch, and distort the plastic bodies, which could result in failure.

BASIC OPERATION:

The Combination Air Release Degassing (CARD) valves serve three basic functions. The three functions are known as “Air Valve”, “Vacuum Valve”, and “Air Release” (also known as “degassing”) valves. The “Air Valve” will allow air to escape from a pipeline as it is being filled with liquid. The “Vacuum Valve” will allow air to enter the pipeline if the pipeline pressure drops below atmospheric pressure. This will prevent the pipeline from collapsing under vacuum conditions. The “Air Release” portion allows accumulating air to escape the pipeline even when the pipeline is pressurized. This is also known as “degassing”. The CARD valves are Normally Open, i.e. in the absence of pressure or liquid the valve remains open.

AIR VALVE: the air valve is also known as a large orifice valve. It will remain open while the pipeline is being filled with liquid, allowing the air in the line to escape. PLAST-O-MATIC valves are designed such that all fluid flow paths in the valve are as large as the corresponding pipe internal flow area. Thus the flow of air through the valve is not restricted. The valve is designed to work as recommended by the American Water Works Association. The filling rate should be approximately 1 ft/sec. The area of the pipe interior (ft³) multiplied times 1 ft/sec will yield the ft³/sec. fill rate which can be converted to GPM. At this fill rate the differential pressure across the orifice of the valve will be about 2 psi. NOTE: there is no “anti-slam” feature in these valves. Therefore it is important to adhere to the filling rate mentioned above.

When the pipe is filled with liquid, that liquid will enter the valve chamber. Inside of this chamber is a high buoyancy float. The float will rise in that liquid until it shuts off the large orifice in the valve. Neither air nor liquid can escape through the valve. As long as the pressure inside of the pipeline and valve is above atmospheric, the large orifice will remain closed even if air enters the valve causing the float to drop. This is where the small orifice “air release” or “degassing” portion of the valve takes over.

AIR RELEASE VALVE: This is also known as a small orifice valve or degassing valve. If air or gas enters the valve, it will displace the liquid inside of the valve causing the float to drop. As long as there is pressure in the valve the large orifice will not open. However, the small orifice will open allowing the gas to escape. Once the gas has escaped the liquid will fill the valve causing the float to rise and close the small orifice. This small orifice action is made possible by a lever and properly weighted float in the valve that allows the small orifice to open even while there is pressure inside the valve.

VACUUM RELEASE VALVE: If a break occurs in the pipeline, and fluid escapes rapidly, there is a great possibility that vacuum could occur in the pipeline. In this case when the pressure in the valve falls below atmospheric, the large orifice will open allowing air to enter the valve and pipeline, thus preventing a vacuum condition in the pipeline.

MAINTENANCE: Plast-O-Matic recommends keeping a spare seal kit available for repairs. Seal life will vary in applications due to cycles, temperatures, pressures, chemicals and concentration. Based on the application, a periodic inspection and maintenance plan should be established.

Important Note on use with Salt Solutions & Other Liquids that may Precipitate Solids:

Should the CARD valve be installed in liquids which have the possibility of precipitating solids out of solution, it is recommended to periodically clean the CARD in warm or cold water to remove debris and/or precipitated salts from the orifice and the seat. To disassemble use an appropriate spanner wrench inserted into the three holes in the top of the valve, unscrew and remove the float/seat assembly. Then clean and re-assemble the CARD.

It is further recommended to keep a spare seal kit on hand. When the CARD is disassembled for cleaning, examine the small and large elastomer seats, and the O-rings for elasticity and general overall condition. If lack of elasticity or general wear is evident, replace the seals.

REPLACEMENT OF THE SEAL KIT:

The CARD valves have (4) elastomeric seals inside. There are (2) O-rings, a small seat disc, and a large seat disc. These can be replaced in the field if necessary.

CAUTION; Never attempt to open the valve while it is pressurized. This could result in injury or death. Always make certain the system is de-pressurized, before servicing the valve. Also be certain that maintenance personnel will not be subjected to chemicals which may be in the valve or pipeline.

Refer to the illustration below.

1. Opening the cover of the CARD valve requires the use of a tool which can be purchased from Plast-O-Matic Valves, Inc. Once the cover is removed (item 10), the poppet (item 5) can be lifted out of the valve.

2. Within this poppet is the large seat disc (item 6). This must be very carefully pried out of the poppet. Because the poppet and other parts are made of plastic which can be permanently damaged by a metal screwdriver, it is recommended that the seats be removed by the use of an wooden "orange stick" or other softer than metal material. The large elastomer seat is held in place in the poppet by a ledge around the poppet. To install a new seat simply lay it into the poppet and work the edges of the disc under the ledge with your finger nail or a wooden stick.

3. The remains of the inner parts can be removed from the valve by lifting out the main seat holder (item 2). All of the rest of the parts are attached to it. The small seat disc (item 7) is simply removed from the lever (item 4) and replaced with a new one. The small O-ring (item 9) does not perform a sealing function but simply keeps the float (item 11) from falling off of the lever (item 4). It is recommended that this be replaced when replacing the other seals.

4. Inspect all of the parts for damage and it is recommended that the parts be rinsed in water especially if any crystallization of chemical has occurred. Shake the float to assure it has no leaks, whereby liquid may be inside. If so, it **MUST** be replaced.

5. The inner parts can be replaced into the valve as they were removed. Replace the large O-ring (item 12) on the cap of the valve. The cover must be tightened enough that it will not come loose from vibration etc. Tighten it "hand tight" and then one more half turn.

SERIES CARD SIZING CHART FOR PIPELINE FILLING

These charts show the maximum fill rate for various pipe sizes, with a fill rate not exceeding a velocity of 1 ft/sec.

CARD100

The CARD100 will flow up to 5 SCFM air.

SCHD 80 PIPE SIZE	MAX. FILL RATE GPM	SCFM AIR FLOW RATE
1"	2.1	0.3
1.5"	5.3	0.7
2"	9.0	1.2
2.5"	12.8	1.7
3"	20.1	2.7
4"	35.1	4.7

CARD200

The CARD200 will flow up to 19 SCFM air.

SCHD 80 PIPE SIZE	FILL RATE GPM	SCFM AIR FLOW RATE
2"	9.0	1.2
2.5"	12.8	1.7
3"	20.1	2.7
4"	35.1	4.7
5"	55.6	7.4
6"	79.8	10.7
8"	140.1	18.7

CARD400

The CARD400 will flow up to 100 SCFM air

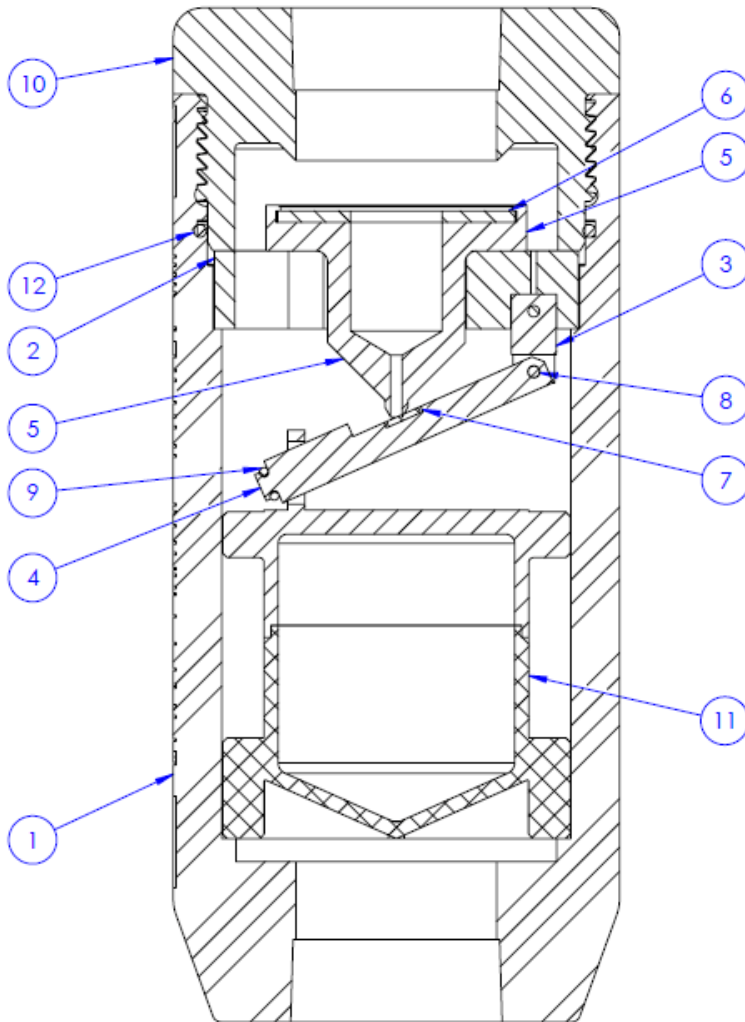
SCHD 80 PIPE SIZE	FILL RATE GPM	SCFM AIR FLOW RATE
4"	35.1	4.7
5"	55.6	7.4
6"	79.8	10.7
8"	140.1	18.7
10"	220.5	29.5
12"	312.2	41.7
14"	376.9	50.4
16"	494.5	66.1
18"	627.6	83.9

AIR CAPACITY TABLE FOR AIR RELEASE FUNCTION OF SERIES CARD

INLET PRESSURE PSIG	CARD100	CARD200	CARD400
10	2.0	3.6	14.5
15	2.6	4.6	18.5
20	3.0	5.4	21.7
25	3.4	6.2	24.8
30	3.9	7.0	27.9
35	4.3	7.8	31.0
40	4.7	8.5	34.1
45	5.2	9.3	37.3
50	5.6	10.1	40.4
55	6.0	10.9	43.5
60	6.5	11.7	46.6
65	6.9	12.4	49.8
70	7.3	13.2	52.9
75	7.7	14.0	56.0
80	8.2	14.8	59.1
85	8.6	15.6	62.2
90	9.0	16.3	65.4
95	9.5	17.1	68.5
100	9.9	17.9	71.6
110	10.8	19.5	77.8
120	11.6	21.0	84.1
130	12.5	22.6	90.3
140	13.4	24.1	96.6
150	14.2	25.7	102.8

Instructions: The table above shows the air flow rate in SCFM through the card valve. This is air released while the pipeline is operating under normal flowing conditions, pressurized.

Select your inlet pressure for the valve. Go to the column for your valve (e.g. Card200). The flow in SCFM is given at the appropriate pressure for your valve. For example; with a CARD200 valve operating at 50 PSIG, the valve can vent up to 10.1 SCFM.



ITEM NO.	DESCRIPTION	QTY.
1	THREADED BODY	1
2	MAIN SEAT HOLDER	1
3	PIN	1
4	LEVER	1
5	POPPET	1
6	LARGE SEAT DISK	1
7	SMALL SEAT DISK	1
8	HINGE PIN	2
9	O-RING	1
10	CAP	1
11	FLOAT ASSY	1
12	O-RING	1