Crispin Air Valves

THE DL SERIES: Deep Well Air & Vacuum Valve

AWWA C512

- Sizes 1/2”-6" Available (NPT Screwed or ANSI Class Flanges)
- Fully Adjustable Exhaust Control

CRISPIN VALVE

SINCE 1905

600 FOWLER AVENUE,
BERWICK, PA 18603

(800) 247-8258
TEL. (570) 752-4524
FAX (570) 752-4962

WWW.CRISPINVALVE.COM
INFO@CRISPINVALVE.COM

DL SERIES DEEP WELL AIR VALVE

DL SERIES ADVANTAGES

- Available in Sizes 1/2"-6"
- AWWA C512 Compliant
- NSF 61 and NSF 372 Certified
- Fully Adjustable Exhaust Control
- Prevents Chatter and Premature Closure
- Peripheral Guide System for Unobstructed Closure
- Drip Tight Closure Beyond 4-5 PSIG

DL SERIES OPTIONS

- Both NPT Screwed and ANSI Flanges Available
- Available in AIS, BA, BAN and BB Configurations
- Fusion Bonded Epoxy
- Cast Iron or Ductile Iron Body
- 3 Pressure Ranges Offered
- Stainless Steel or Bronze Trim

The Crispin Deep Well Air Valve, with its fully adjustable, in-the-field exhaust control, is designed to vent air from the pump column at the discharge point ahead of the check or control valve. The air flow is controlled by screwing down the stem on the Deep Well top to a point where the float ceases to flutter. In the event of excessive water spillage or slamming of the float into its seat, further adjustment may be necessary. After the correct setting has been found, the lock nut is tightened.

Crispin Valve provides the same unique design in the Deep Well Valve as with its Air and Vacuum Valve. That is, the float is peripherally guided to the seat, which permits the float to self center and tightly seal the orifice. There are no shafts to bend or deform, which would prevent a drip tight seal.

All Crispin Air and Vacuum Valves have standard Buna-N seating material with a Shore durometer of 70-80. This standard seat allows drip tight closure beyond 4-5 PSIG. Occasionally, however, a gravity system operates at pressures less than 10 PSIG. These applications require a soft seating material which will prevent leakage down to 2 PSIG. This soft seating material should not be applied to systems with operating pressures greater than 50 PSIG, or high pressure leaks may occur around the seat.

All Crispin valves are designed for a cold water working pressure of 300 PSIG, and are tested to 150% of their maximum working pressure. The DL Series is available in sizes 1/2" thru 6", and all sizes are available with a screwed discharge connection. Where pipe line water velocities exceed 10 feet per second, a Crispin SC Series Surge Check Valve should be applied instead of a DL Deep Well Series. These are available in sizes 3" through 16." (Please see Crispin's Surge Check Brochure, AL/SC Series.)

Materials and prices are subject to change without notice. Metric and special class flange ratings are available.

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CRISPIN KNOWS AIR VALVES, FOUR FAMILY-OWNED GENERATIONS AND COUNTING.

Company founder Clarence Crispin, with sons Fred & Ben

An industry tradeshow in New York, circa 1907

Circa 1940, a Crispin Air Valve installed on the Hoover Dam

An advertisement for valves installed in 1913

The year was 1905. Theodore Roosevelt was in the White House. Ty Cobb was playing his rookie season in the National Baseball League; and in Berwick, PA, a young man named Clarence Crispin gambled that a product he called the "Crispin Air Valve" could revolutionize the fledgling waterworks industry.

Fresh from the Engineering School at Cornell University, Clarence wanted to find a way to boost output at the family-owned Berwick Water Company. Early attempts sought to pump water through a wood stave pipe that ran along the bed of the local Susquehanna River. However, the pipe kept collapsing, destroyed by an excessive vacuum that formed as the pipe drained.

Clarence designed a valve that could release air from a water line while water was running through it, and admit air when the water line drained, all without leaks or breaks in the water's flow. His patented fluid valve became the foundation of the Multiplex Manufacturing Company, known today throughout the waterworks industry as Crispin Valve.

Within 5 years, Crispin Air Valves were solving vacuum problems on the Panama Canal, history's greatest waterworks project. Over 115 years later, they can be found in nearly every country on earth.

Today, Crispin is still family-owned, with Clarence's great-great-grandson, Darren, at the helm.

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DEEP WELL AIR & VACUUM VALVE SIZING

The sizing of an air valve is based on the resultant criteria of two operating conditions, that is, filling and draining the pipeline. Each grade must be independently considered in order to determine the most appropriate valve size. Air will be exhausted from the valve at the same rate at which the pipeline fills with a pressure differential maximum of 2psi across the valve.

TO CORRECTLY SIZE A DL SERIES VALVE:

1. Determine liquid flow capacity in the pipeline.
2. Determine the exhaust flow capacity using the formula at top right.
3. Refer to curves with CFM and pressure differential for valve size required when filling the line.
4. Determine the valve size required to relieve a vacuum by admitting air through the valve. Chezy's formula at right determines the flow of water in a pipe due to gravity.
5. It may be necessary to consider the collapsing pressure of the pipe being vented due to vacuum formation. The steeper of the two grades should be used. For the Collapsing Pressure of Pipe Formula at right, a safety factor of 4 is used due to inconsistencies in the manufacture of pipe.
6. Refer to the curve with the required air capacity through the valve to relieve the vacuum and collapsing pressure of the pipe or 5 psi, whichever is lower. Pick off valve size.
7. Compare the valve sizes obtained for the exhaust flow and vacuum relief conditions, and select the larger valve size for the application.

PUMP CAPACITY IN GALLONS PER MINUTE		
PUMP CAP/GPM	VALVE SIZE	MODEL NUMBER
200	1/2"	DL5
201-800	1"	DL10
801-3700	2"	DL20
3701-7000	3"	DL30
7001-14000	4"	DL40
14001-29000*	6"	DL61

* For capacity over 29000, use an AL/SC Series valve

EXHAUST FLOW CAPACITY FORMULA

$$CFM = \frac{Q}{7.48 \text{ gallons/cu. ft.}}$$

Q = Flow in gallons per minute
CFM = Cubic feet per minute of exhaust air

CHEZY'S FORMULA

$$Q = \frac{C}{21.27}\sqrt{SD^5}$$

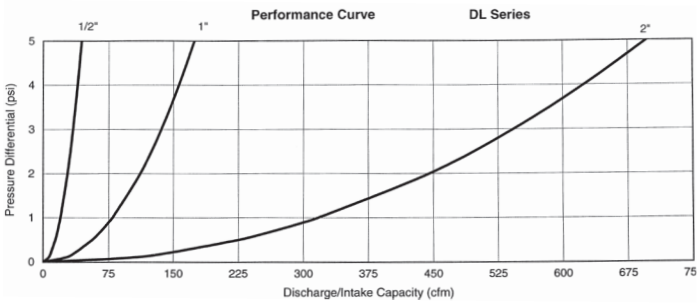
Q = Water flow in cu. ft. per minute
(flow of water due to gravity = air flow thru valve
C = Chezy's coefficient *(110 most commonly used)*
S = Slope of pipe *(% expressed as decimal)*
D = Diameter of the pipe in inches

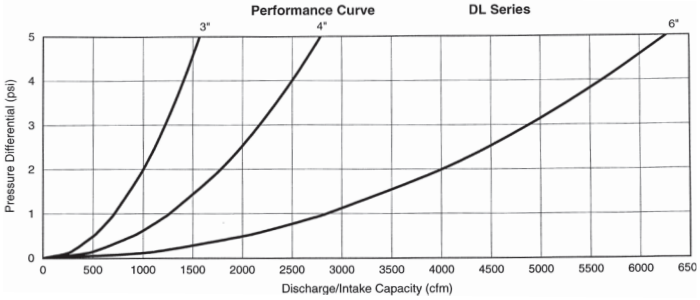
COLLAPSING PRESSURE OF PIPE FORMULA

$$P = 16{,}250{,}000\left(\frac{T}{D}\right)^3$$

P = Collapse Pressure (psi)
C = Pipe Wall Thickness in inches
D = Diameter of the pipe in inches

DL SERIES PERFORMANCE CURVES





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DL Series Air & Vacuum Valve, Sizes 1/2"-6"

DL Series Dimensional Data						
MODEL	INLET	OUTLET	TRIM	HT (B)	WD (A)	WT (LBS)
DL5	1/2" NPT	1/2" NPT	IBBT	7.25"	4.80"	4
DL10	1" NPT	1" NPT	S/S	9"	6.19"	18
DL20	2" NPT	2" NPT	S/S	14.5"	8.75"	50
DL21	2" 125# flg	2" NPT	S/S	17.25"	8.75"	55
DL22	2" 250# flg	2" NPT	S/S	16.18"	8.75"	50
DL30	3" NPT	3" NPT	S/S	18.75"	11.50"	92
DL31	3" 125# flg	3" NPT	S/S	24"	11.50"	114
DL32	3" 250# flg	3" NPT	S/S	24.25"	11.50"	119
DL40	4" NPT	4" NPT	S/S	24.50"	14"	187
DL41	4" 125# flg	4" NPT	S/S	27.50"	14"	195
DL42	4" 250# flg	4" NPT	S/S	27.75"	14"	204
DL61	6" 125# flg	6" NPT	S/S	32.25"	15.50"	252
DL62	6" 250# flg	6" NPT	S/S	32.50"	15.50"	269

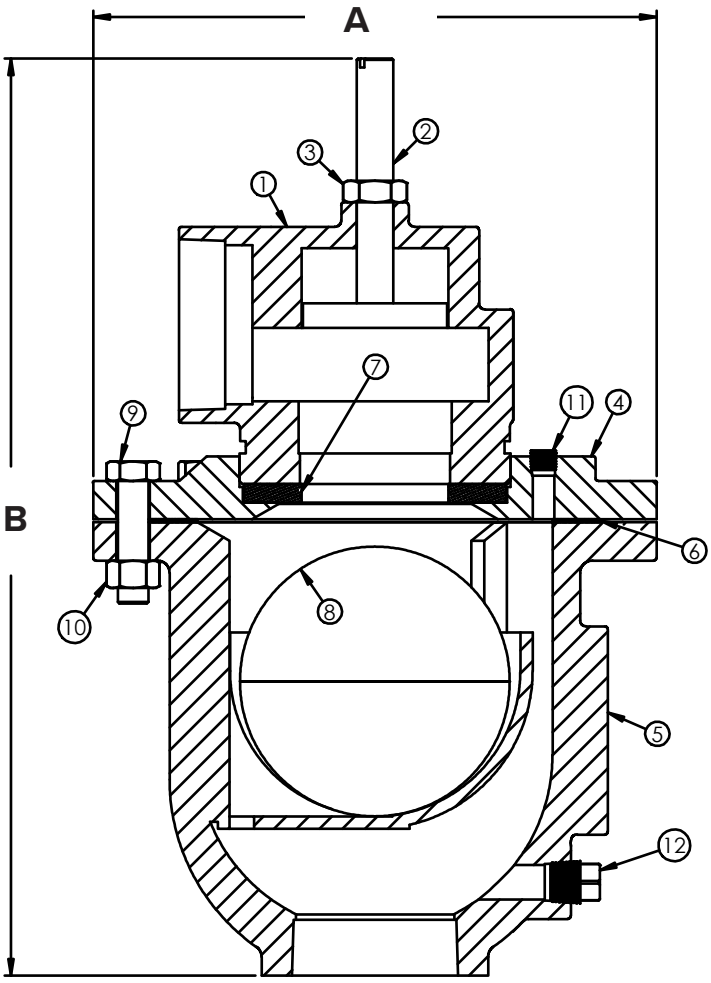
Certified dimensions are available upon request.

DL Series Parts List*		
ITEM	DESCRIPTION	MATERIAL
1	DEEP WELL TOP	Cast Iron (A126 Cl. B)
2	DEEP WELL STEM	Steel
3	LOCK NUT	Steel
4	COVER FLANGE	Cast Iron (A126 Cl. B)
5	BODY	Cast Iron (A126 Cl. B)**
6	COVER GASKET	Armstrong
7	SEAT	Buna-N Rubber
8	FLOAT	Stainless Steel
9	COVER BOLT	Steel
10	COVER NUT	Steel
11	HEX SOCKET PLUG	Brass
12	BODY PLUG	Brass***

* Includes Steel Eye Nut and Lug Nut on Sizes DL32 and up

** Body also available in Ductile Iron (ASTM Gr 65-45-12)

** Body Plug is Cast Iron on Sizes DL61 and DL62



Crispin's DL Series Deep Well Valves are available in pressure ratings of 2-40psi, 20-150psi or 151-300psi.

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CRISPIN DL SERIES SPECIFICATIONS BY SIZE

The Deep Well Air Release Valve(s) shall be installed on the discharge side of the pump, so that the volume of air exiting the system can be easily vented and controlled without hampering the operation of the Air Release Valve. This shall be accomplished by means of a throttling device on the discharge side of the valve.

The valve(s) shall operate by sealing the Buna-N rubber orifice with a peripheral guided ball float as the air exits the valve at an adjustable and controlled rate, and the liquid enters the chamber to raise the float. All Crispin Valves are hydrostatically tested to 150% of their maximum working pressure.

The valve(s) shall be Crispin Model_____ Deep Well Air Valves as manufactured by Crispin-Multiplex Manufacturing Co., Berwick, PA

1/2 SIZE ADDENDUMS AND OPTIONS

The valve(s) shall be _____" NPT screwed inlet and outlet connection with cast iron body and top, stainless steel trim.

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

1"-6" SIZE ADDENDUMS AND OPTIONS

The valve(s) shall be _____" NPT screwed inlet and outlet or ANSI Class (125, 250) flanged inlet connection with a (cast iron or ductile iron) and top, with stainless steel trim.

Option: [Where pressures are greater than 300 PSIG} the valves shall be ANSI Class _____ flanged inlet connection, and shall have a (steel, stainless steel or ductile iron) body, top and inlet flange.

Standard operating pressure for Crispin DL Series 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.

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

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