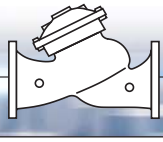


700-ES Series

Model WD-720-ES-NVI

Pressure Reducing Valve

- Flow and leakage reduction
- Cavitation damage protection
- Throttling noise reduction
- Burst protection
- System maintenance savings

The Model WD-720-ES-VNI Pressure Reducing Valve is a hydraulically operated, diaphragm actuated control valve that reduces higher upstream pressure to lower constant downstream pressure regardless of fluctuating demand or varying upstream pressure.

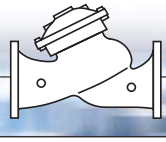
Features and Benefits

- **Designed to** stand up to the toughest conditions
  - Excellent anti-cavitation properties
  - Silent operation suitable for urban and high rise applications
  - Wide flow range
  - High stability and accuracy
- **Double chamber design**
  - Moderated valve reaction
  - Protected diaphragm
- **Flexible design** – Easy addition of features
- **Obstacle free, full bore** – Free flow pass
- **V-Port Throttling Plug** – Very stable at low flow
- **Complies with EN-10-74 standards**
  - High quality materials
  - Stainless steel trim components
  - 5 year warranty
- **In-line serviceable** – Easy maintenance

Major Additional Features

- Solenoid control – **WD-720-55-ES-VI**
- Check valve – **WD-720-20-ES-VI**
- Solenoid control & check valve – **WD-720-25-ES-VI**
- Proportional – **WD-720-PD-ES-VI**
- High sensitivity pilot – **WD-720-12-ES-VI**
- Downstream over pressure guard – **WD-720-48-ES-VI**
- Electrically selected multi-level setting – **WD-720-45-ES-VI**
- Electronic multi-level setting, Type 4T – **WD-720-4T-ES-VI**
- Electronic pressure reducing valve – **728-03-ES-VI**

See relevant BERMAD publications.

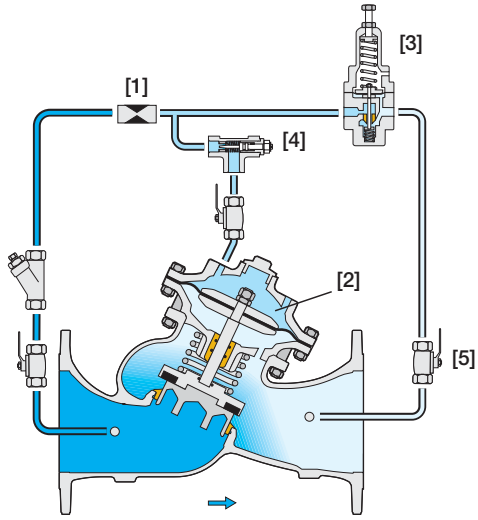


700-ES Series

Model WD-720-ES-NVI

Operation

The Model WD-720-ES-VNI is a pilot controlled valve equipped with an adjustable, 2-way pressure reducing pilot. The restriction [1] continuously allows flow from the valve inlet into the upper control chamber [2]. The pilot [3] senses downstream pressure.
Should this pressure rise above pilot setting, the pilot throttles, enabling pressure in the upper control chamber to accumulate, causing the main valve to throttle closed, decreasing downstream pressure to pilot setting.
Should downstream pressure fall below pilot setting, the pilot releases accumulated pressure, and the main valve modulates open.
The integral orifice between the lower control chamber and valve outlet moderates valve reactions.
The one-way flow control needle valve [4] stabilizes the valve's reaction in hard regulation conditions, by restricting the flow out of the control chamber.
The downstream cock valve [5] enables manual closing.



Engineer Specifications

The pilot controlled Pressure Reducing Valves shall reduce higher upstream pressure to lower, preset, constant downstream pressure regardless of fluctuating demand or varying upstream pressure.
The desired downstream pressure shall be easy to set at site, by turning the pilot adjusting screw.

1. Main Valve

1.1 The main valve shall be diaphragm actuated oblique (Y) pattern design, PN25 rated. Valve "flange to flange" length shall be according to EN 558-1.
1.2 The valve shall have an unobstructed flow path, with no stem guides, bearings, or supporting ribs.
1.3 The valve body shall consist of a replaceable, raised, stainless steel seat ring.
1.4 The actuator assembly shall be double chambered, center guided by a bearing in the separating partition.
1.5 The diaphragm shall not be used as a sealing surface.
1.6 The replaceable radial seal disk assembly shall include a resilient seal and a V-Port throttling plug.
1.7 The valve shall consist of a visual valve position indicator for observing its seal disk opening level.
1.8 Valve flange shall be with flats for vertical support.

2. Construction Materials

The main valve construction material shall be:
2.1 Body, cover and separating partition: Cast Ductile Iron
2.2 Seat ring, seal disk (closure), shaft, spring, diaphragm washers: Stainless Steel
2.3 Bearing: Bronze
2.4 Diaphragm: Nylon Fabric reinforced Synthetic Rubber
2.5 Seals: Synthetic Rubber
2.6 Bolts and nuts: Stainless Steel

3. Coating

Valve body, cover and separating partition shall have a protective fusion bonded epoxy coating. Coating specification shall be according to ASTM D 1654 or to ISO 9227. Coating color shall be Blue according to RAL 5005 and its thickness shall be 250-350 µ.

4. Control System

4.1 The valve shall be controlled in a 2-way system without a water bleed the atmosphere.
4.2 The complete valve shall be capable of accepting a Multi-Setting Pneumatic Controlled (MSPC) unit, without removing the pilot from the valve or changing the tubing.
4.3 The pilot body shall be stainless steel 316, pilot setting range shall be 1.0-16.0 bar.
4.4 The control system shall be equipped with isolating cock valves on upstream, downstream, and control chamber ports, a one-way flow control device and an external "Y" shape filter. Washing the filter shall not require isolating the main valve.
4.5 All tubing and tube fittings shall be Stainless Steel.

5. Service

All valve components shall be accessible and serviceable without removing the valve from the pipeline. The entire actuator assembly (seal disk to top cover) shall be removable from the valve as one integral unit.

6. Hydraulic Test and Calibration

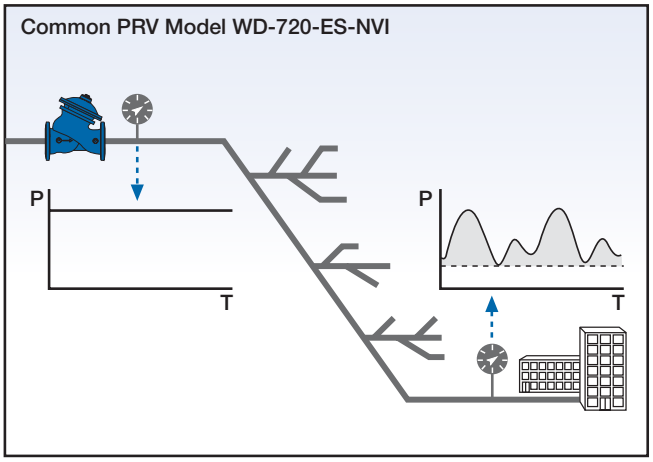
Prior to shipment, the valve shall undergo a complete functional test performed under dynamic conditions similar to the project specification.

7. Approvals and Certifications

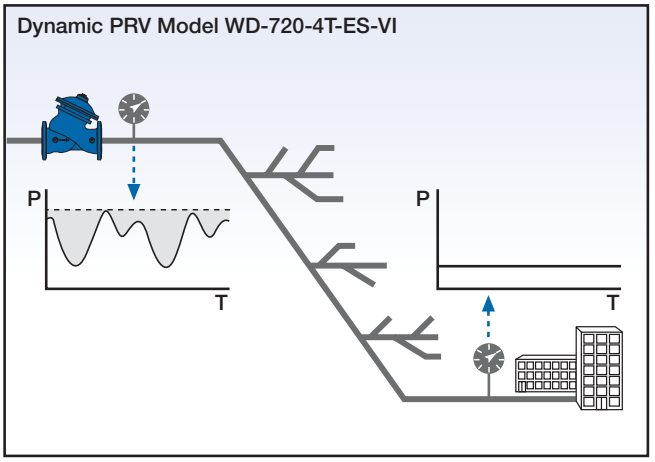
7.1 The valve maunufacturer quality shall be certified to ISO 9001-2000.
7.2 The main valve shall be certified for use with drinking water by WRAS, DVGW, ACS, OVGW, GOST, BELGAQUA and NSF 61.

Pressure Management

A well-planned pressure management program can significantly reduce not only volumes of real loss, but also maintenance costs by reducing occurrence of bursts and thereby extending the life of the system.



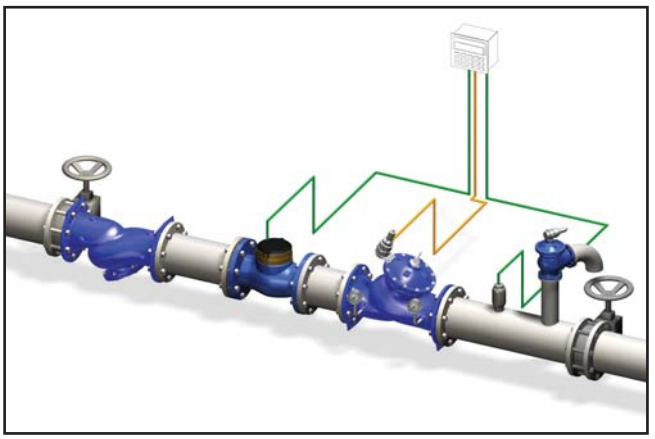
Common PRVs are set to maintain a constant low downstream pressure, ensuring sufficient pressure at the system's critical point during peak demand (when line friction head loss is highest). The shaded area represents the hours and levels when pressure is higher than required.



The dynamic PRV - Model WD-720-ES-4T-V, integrated with a PR controller, is designed to continuously correct its set value based on the momentary demand and/or minimum required pressure at the system critical point. As a result, the average network pressure dramatically decreases, reducing system leakage, bursts, maintenance, and energy costs. The shaded area represents the hours and levels of reduced leakage.

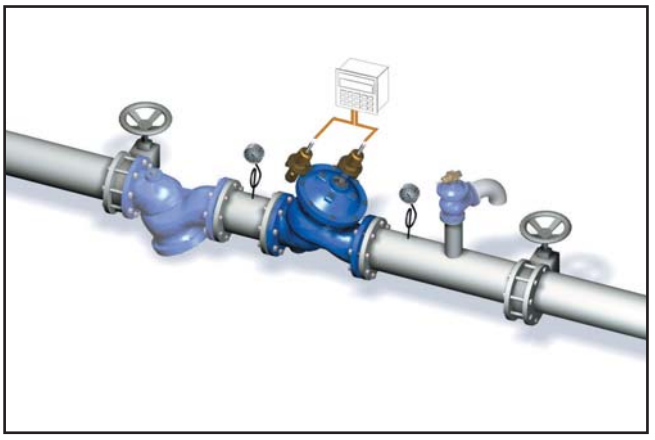
Flow Function Control

Data logging, and analysis of the distribution network parameter values, enable establishment of a function for real time adjustment of pressure per system demand. The flow and pressure transducers continuously transmit to the controller, which reacts by adjusting the Model WD-720-4T-ES-VI according to the pre-established function. The controller's program can be changed either through a laptop computer or a pocket PC, SMS, or any other communication method available.

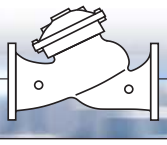


Time Function Control

The PRV model WD-720-45-ES-VI integrated with the BE-PRV-DL controller, is designed to maintain two pressure reducing set-point values. The BE-PRV-DL controller is programmed to switch between the two pilot valves and therefore change the pressure reducing set-point. The BE-PRV-DL control program can adapt to special days, or seasons of the year, as well as log pressure and flow data.



BERMAD Waterworks



700-ES Series

Model WD-720-ES-NVI

Pressure-Reducing Systems in Hi-Rise Buildings

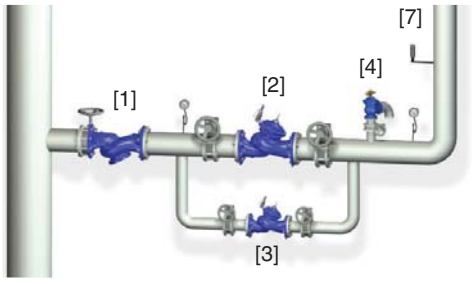
Water supply system design requirements for hi-rise buildings present unique issues:

- Supply cut-off is unacceptable and single-source supply is common.
- Valves are located in areas where water damage can be extremely expensive.
- Pressure-reducing systems are often located next to prestigious residential and office space. Extraneous noise and maintenance activities are to be avoided.
- The main supply line of hi-rise buildings is exposed to greater head at lower zones while pressure for the consumer must be kept within recommended levels. As a result, lower zone pressure reducing systems deal with greater differential pressure.

The Model WD-720-ES-NVI Pressure Reducing Valve together with BERMAD'S accumulated experience, address these issues and provide appropriate solutions.

Higher-Zone Installation A

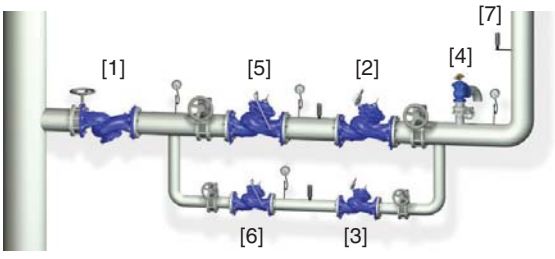
In addition to the standard pressure reducing system, for a hi-rise building, BERMAD recommends the system also include Pressure Switches to signal a control panel of excessive downstream pressure.



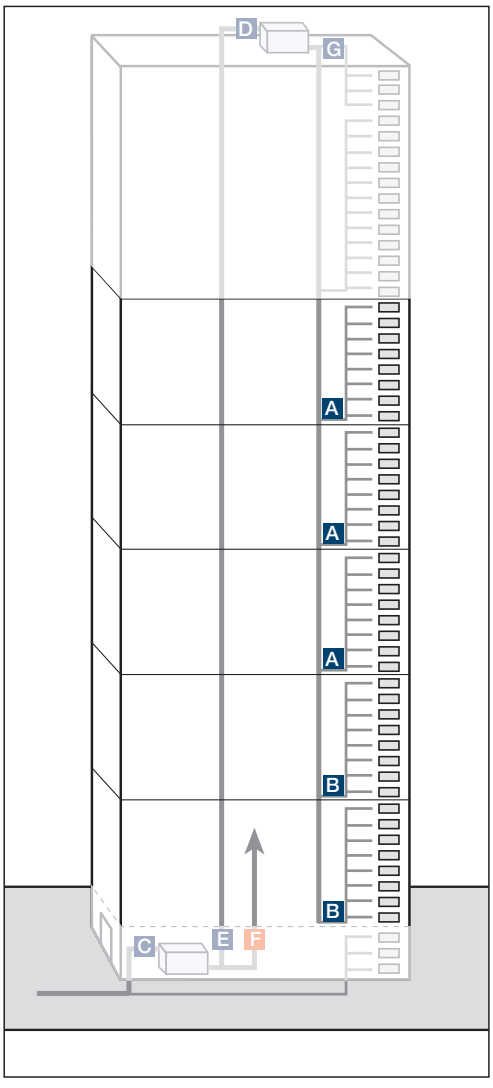
Lower Zone (Two-Stage) Installation B

When dealing with high differential pressure systems in lower zones of a hi-rise building, BERMAD recommends a two-stage pressure reducing system. In addition to the typical higher zone installation, this high differential pressure system also includes:

Proportional Pressure Reducing Valve Model WD-720-ES-PD-VI, as the first pressure reducing stage, absorbs part of the high differential pressure. By spreading the load of pressure reduction onto two components, cavitation damage and noise are reduced.



[1] Strainer Model WD-70F-EN
[2] Pressure Reducing Valve Model WD-720-ES-NVI
[3] By-pass Pressurel Reducing Valve Model WD-720-ES-NVI
[4] Relief Valve Model WD-73Q
[5] Proportional Pressure Reducing Valve Model WD-720-PD-ES-VI
[6] By-Pass Proportional Pressure Reducing Valve Model WD-720-PD-ES-VI
[7] Pressure Switch

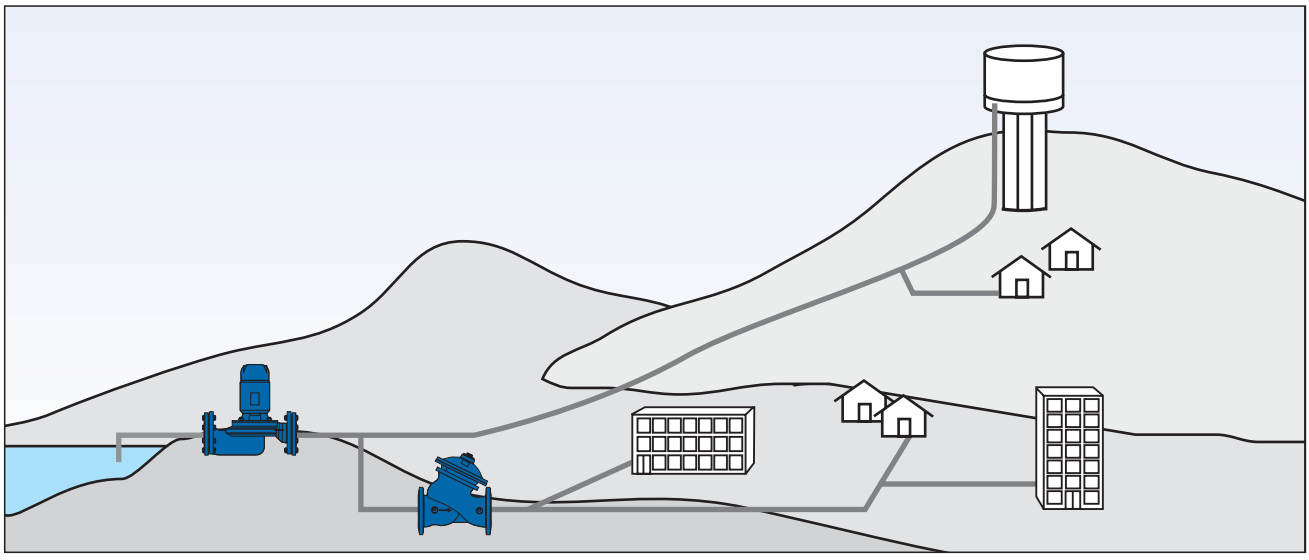


- **A** Higher zone pressure reducing system installation
- **B** Lower zone pressure reducing system (two-stage) installation
- **C** Bottom reservoir level control system
- **D** Roof reservoir level control system
- **E** Potable water pumping system
- **F** Fire protection pumping system
- **G** Upper floors pumping system

Typical Applications

Pressure Reducing System for Municipal Networks

Network design requires establishing various pressure zones due to topography, distances, demands, energy costs, reservoir availability, etc.



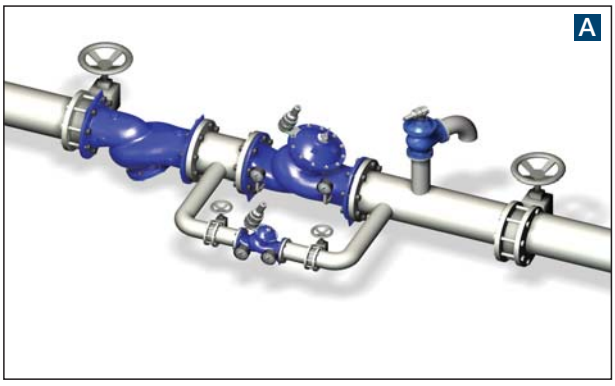
The pump supplies water to the network and to the reservoir. System pressure is too high for the residential neighborhood, requiring a pressure reducing system.

Pressure Reducing System – Typical Installations

Standard Pressure Reducing System A

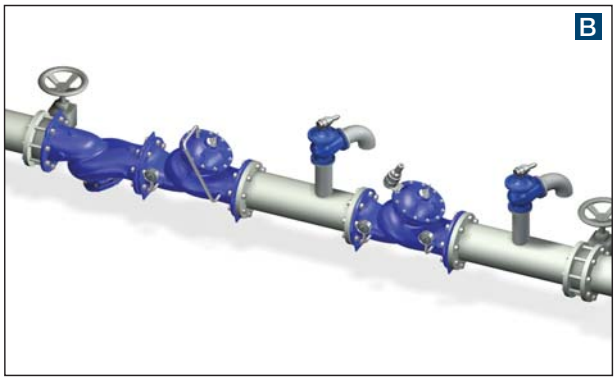
In addition to the **Model 720-ES-NVI Pressure Reducing Valve**, BERMAD recommends that the system also include:

- **Strainer** Model 70F-EN prevents debris from damaging valve operation
- **Relief Valve** Model WD-73Q provides:
  - Protection against momentary pressure peaks
  - Visual indication of need for maintenance
- **By-Pass Pressure Reducing Valve** saves on maintenance costs. The larger (more costly to maintain) valve operates during peak demand. The smaller by-pass valve cuts operating hours of the larger valve, achieving greater return on investment.

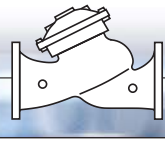


High Differential Pressure Reducing Systems B

First stage reduction is achieved by using the proportional pressure reducing valve model 720-PD-ES-VI. This reduces cavitation damage and noise level by distributing the load of the high differential pressure.



BERMAD Waterworks



700-ES Series

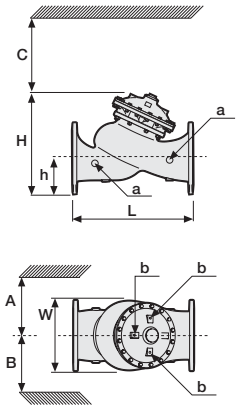
Model WD-720-ES-NVI

Technical Data

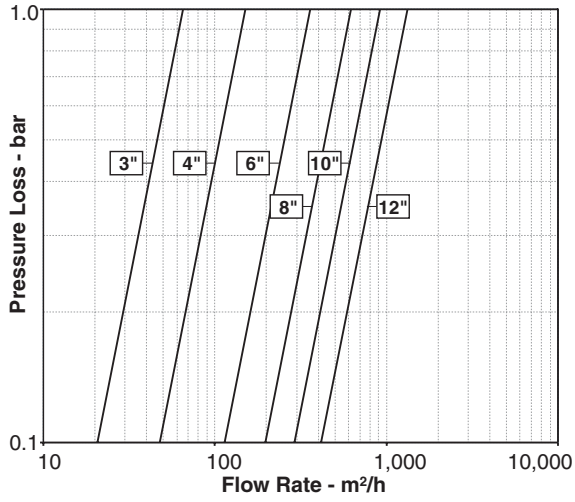
Dimensions and Weights

Size		L	W	h	H	A,B	C	a	b	V
mm	inch	mm	mm	mm	mm	mm	mm	inch	inch	lit
80	3”	310	196	106	257	370	180	3/8”	1/4”	0.12
100	4”	350	234	123	320	395	230	3/8”	1/4”	0.30
150	6”	480	296	157	390	430	275	3/8”	1/4”	0.45
200	8”	600	356	183	507	475	385	3/8”	1/4”	2.15
250	10”	730	412	215	597	520	460	1/2”	1/2”	4.50
300	12”	850	480	243	710	545	580	1/2”	1/2”	8.50

V = Control chamber displacement volume of liquid pushed when valve opens.
C = Enables removing the actuator in one unit.
a,b = NPT threaded ports



Flow Chart



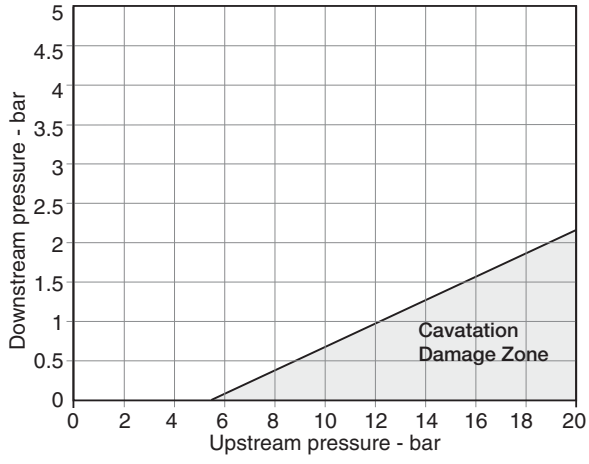
Main Valve

Valve Patterns: “Y” (globe)
Size Range: DN80, 100, 150, 200, 250 & 300
End Connections (Pressure Ratings):
Flanged: ISO 7005-2: 10, 16 & 25
Pressure Rating: PN25
Working Temperature:
Water up to 80°C (180°F)
Standard Materials:
Body & Actuator: Ductile Iron
Internals:
Stainless Steel, Bronze & coated Steel
Diaphragm:
Nylon fabric reinforced Synthetic Rubber
Seals: Synthetic Rubber
Coating:
Fusion Bonded Epoxy, RAL 5005 (Blue)

Control System

Standard Materials:
Accessories:
Stainless Steel 316, Chromium coated Brass and Synthetic Rubber elastomers
Tubing: Stainless Steel 316
Fittings: Stainless Steel 316
Pilot Standard Materials:
Body: Stainless Steel 316
Elastomers: Synthetic rubber
Springs: Galvanized Steel or Stainless Steel

Cavitation Chart



How to Order

Please specify the requested valve in the following sequence: (for more options, refer to Ordering Guide)

Sector	Size	Primary Feature	Additional Feature	Sub-Series	Pattern	Body Material	End Connections	Coating	Voltage & Position	Tubing & Fittings	Additonal Attributes
WD		720	00	ES	Y	C		EB		NN	NVI

- **Sector:** Waterworks Drinking Water
- **Size:** DN 80 3”; DN 100 4”; DN 150 6”; DN 200 8”; DN 250 10”; DN 300 12”
- **Primary Feature:** Pressure Reducing
- **Additional Feature:** No Additional Feature 00; Electronic Multi-Level Setting 4T; High sensitivity pilot 12; Check Valve 20; Solenoid Controlled & Check Valve 25; Multi-Setting Levels - Electrically Selected 45; Downstream Over Pressure Guard 48; Solenoid Controlled 55; Electric Override 59
  Multiple choices permitted
- **Sub-Series:** ES
- **Pattern:** Y = Oblique
- **Body Material:** C = Ductile Iron
- **End Connections:** ISO-10 10; ISO-16 16; ISO-25 25
- **Coating:** EB = Epoxy FB Blue
- **Voltage & Position:** 24VAC/50Hz - N.C. 4AC; 24VAC/50Hz - N.O. 4AO; 24VDC - N.C. 4DC; 24VDC - N.O. 4DO; 24VDC - L.P. 4DP; 220VAC/50-60Hz N.C. 2AC; 220VAC/50-60Hz N.O. 2AO
  Use when additional electric control feature is selected
- **Tubing & Fittings:** NN = St. St. 316 Tubing & Fittings
- **Additonal Attributes:** Valve Position Indicator I; V-Port Throttling Plug V; Large Control Filter F; St. St. 316 Control Accessories N; St. St. 316 Internal Trim (Closure & Seat) T; St. St. 316 Actuator Internal Assembly D; Delrin Bearing R; Pressure Gauge 6
  Multiple choices permitted

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