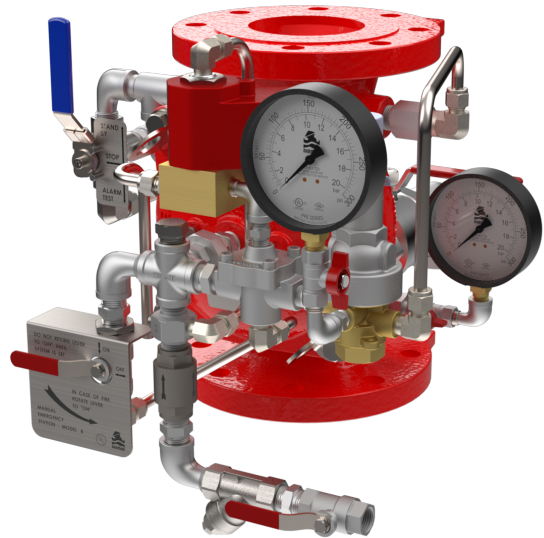


ELECTRIC PRESSURE CONTROL ON-OFF DELUGE VALVE

Model FP-400E-3DC

The BERMAD model 400E-3DC is an elastomeric, hydraulic, line pressure operated deluge valve, designed specifically for advanced fire protection systems and the latest industry standards. The 400E-3DC is activated by a 3-way solenoid valve by which opening and closing of the deluge valve may be controlled remotely.

An integrated pressure control pilot ensures a precise and stable pre-set downstream water pressure. The 400E-3DC is ideal for open-nozzle systems with a high pressure water supply and is available with electric components to suit any hazardous location. The optional valve position indicator can include a limit switch suitable for Fire & Gas monitoring systems.



Features & Benefits

- Safety and reliability
 - Time proven, simple design with a fail safe actuation
 - Single piece, rugged elastomeric diaphragm seal - VRSD technology
 - Obstacle-free, uninterrupted flow path
 - No mechanical moving parts
 - UL429A Listed 3-Way Solenoid Valve
 - Valve position limit switches (optional)
 - Meets the requirements of the industry standards

Approvals



UL-Listed
Special System Water Control
Valves, Deluge Type (VLFT)
Sizes 1½" - 10"



ABS
American Bureau of Shipping
Type Approval
Sizes 1½" - 12"



Det Norske Veritas
Type Approval
Sizes 1½" to 12"



Lloyd's Register
Type Approval
Sizes 1½" - 10"

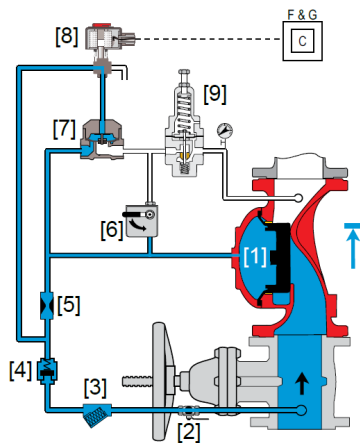
Typical Applications

- Automatic water spray systems
- Electric fire detection systems with control panels
- Foam applications
- Remote Control Monitors

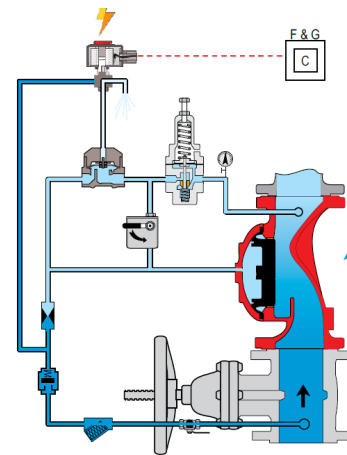
Additional Features

- Valve position limit switches
- Alarm pressure switch
- Seawater compatibility
- Corrosion resistant zinc based high build epoxy coating

Operation



Valve Closed (normal conditions)



Valve Open (fire conditions)

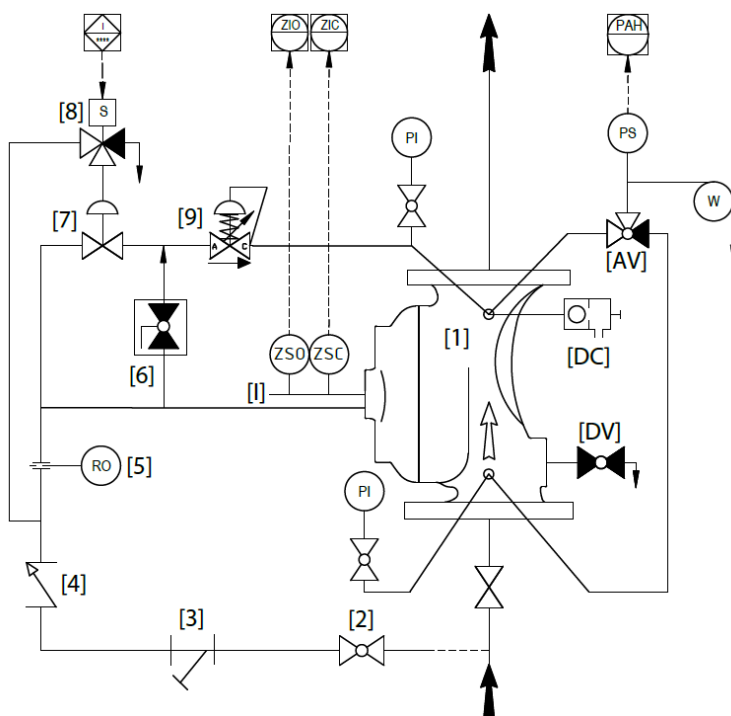
The BERMAD model 400E-3DC is held closed by water pressure in the control chamber [1]. Upon release of pressure from the control chamber, the valve opens.

Under NORMAL conditions, water pressure is supplied to the control chamber via the priming line [2] restriction orifice [5], and strainer [3], and is then trapped in the control chamber by a check valve [4], manual emergency release [6], and a relay valve (HRV) [7] that is held closed by hydraulic pressure supplied through a three-way solenoid valve [8]. The water pressure trapped in the main valve control chamber holds the diaphragm against the valve seat, sealing it drip-tight and keeping the system pipes dry.

Under FIRE conditions, water pressure is released from the control chamber, either with the manual emergency release, or by the HRV opening in response to either the solenoid valve being activated by the fire & gas control system [C] or the by remote release. This opens the 400E-3DC deluge valve, allowing water to flow into the system piping and to the alarm devices.

The pressure-control pilot valve [9] senses changes in outlet pressure and, modulates the main valve to maintain the set downstream pressure.

System P&ID



Components	
1	BERMAD 400E Deluge Valve
2	Priming Ball Valve
3	Priming Strainer
4	Check valve
5	Restriction Orifice
6	Manual Emergency Release
7	HRV-2 Hydraulic Relay Valve
8	3-Way Solenoid Valve

Optional System Items	
ZS	Limit Switch Assembly
W	Water Motor Alarm
PS	Pressure Switch
I	Visual Valve Position indicator
PI	Pressure Gauge*
DV	Drain Valve*
DC	Automatic Drip Check Valve*
AV	3-way Alarm Test Valve*

* Included with suffix A in valve code (drain and indicating components)
See code designations and "factory supplied additional items" on page 4

System Installation

The BERMAD model 400E-3DC typical installation features actuation via a hydraulic relay valve and a three-way solenoid valve, triggered by a fire & gas control system or an on-site emergency pushbutton.

The pressure control pilot valve in the control trim ensures accurate and stable pre-set downstream water pressure.

Additionally, when equipped with a limit switch, the valve can provide status feedback to a remote valve position monitoring system.

Optional System Items



Water Motor Alarm



Pressure Gauge



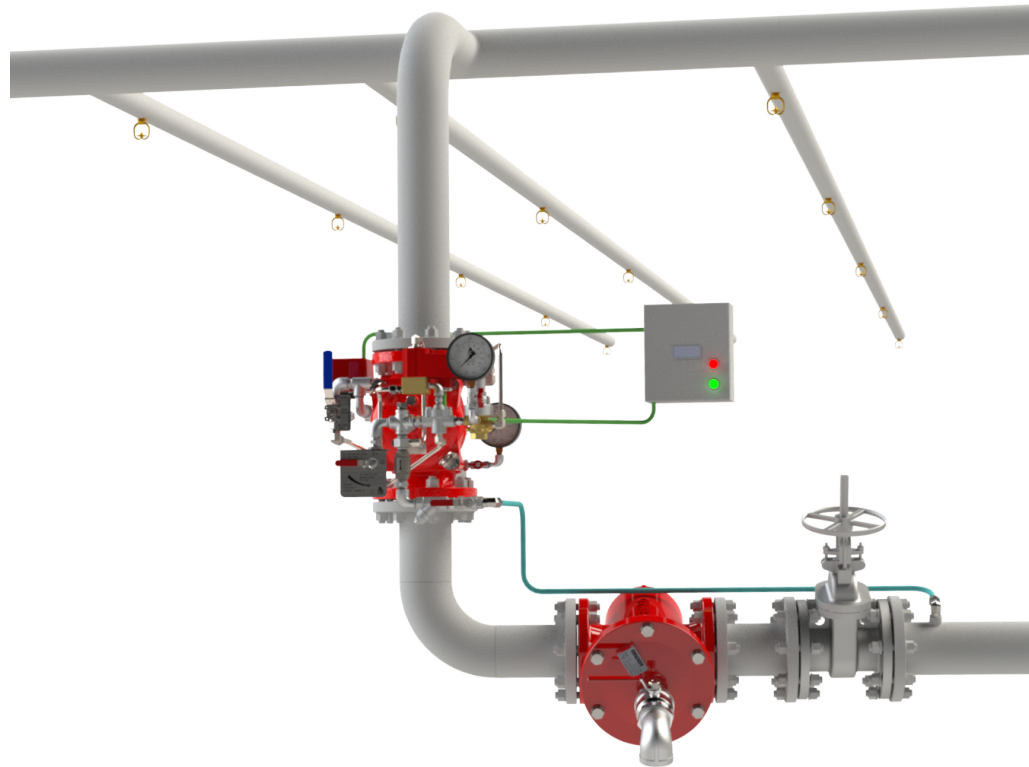
Exd Pressure
Switch - Stainless
Steel Enclosure for
Harsh
Environments



Proximity S.S.316
Limit Switch



Basket Strainer -
60F



Suggested Specifications

The deluge valve shall be UL-listed, 250 psi/17.2 bar rated.

The valve shall have an unobstructed flow path, with no stem guide or supporting ribs.

The deluge valve shall have no mechanical moving parts, and the actuation shall utilize a single-piece diaphragm assembly of VRSD technology.

The valve shall be coated internally and externally with UV protection. Optional: C5-VH grade of ISO-12944 standard against corrosive conditions.

The solenoid valve shall be a 3-way FM and UL429A-listed for 365 psi/25 bar with 65% of the rated voltage.

The control trim shall include a pressure control pilot valve, an auxiliary relay valve, a manual emergency release unit, a Y-type strainer, two 4-inch pressure gauges, and an automatic drip-check with manual override.

A valve position indicator shall be provided, and equipped with two proximity limit switches.

Removing the valve cover for full inspection and maintenance shall be in-line, and not require removal of the valve from the pipeline.

The deluge valve and control trim shall be pre-assembled and hydraulically tested by a UL/FM and ISO 9000, 9001 certified factory.

Technical Data

Available Sizes:

Flanged- 1½, 2, 2½, 3, 4, 6, 8, 10 & 12"

Grooved- 2, 3, 4, 6, & 8"

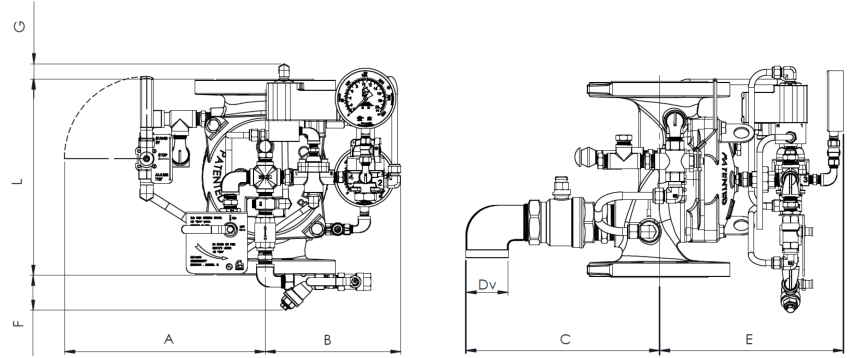
Pressure Rating:

ANSI#150 - 17.2 bar | 250 psi

Grooved - 17.2 bar | 250 psi

Elastomer:

HTNR with VRSD - Fabric Reinforced High Temperature Compound - See Engineering Data



Valve Size	L #150 mm in	L Grooved mm in	A mm in	B mm in	C mm in	øD in	E mm in	F mm in	G mm in	Weight #150 kg lb
DN40 1½"	205 8.1	-	313 12.3	221 8.7	199 7.8	¾"	245 9.6	115 4.5	50 2	18 40
DN50 2"	205 8.1	205 8.1	313 12.3	221 8.7	199 7.8	¾"	245 9.6	115 4.5	50 2	19 42
DN65 2½"	205 8.1	-	325 12.8	221 8.7	253 10	1½"	247 9.7	115 4.5	50 2	22 49
DN80 3"	257 10.1	250 9.8	345 13.6	221 8.7	266 10.5	1½"	280 11	89 3.5	49 2	30 66
DN100 4"	320 12.6	320 12.6	328 12.9	221 8.7	316 12.4	2"	300 11.8	57 2.2	18 0.7	44 97
DN150 6"	415 16.3	415 16.3	349 13.7	190 7.4	347 13.7	2"	377 14.8	10 0.4	-	88 194
DN200 8"	500 19.7	500 19.7	383 15.1	220 8.7	364 14.3	2"	427 16.8	-	-	150 331
DN250 10"	605 23.8	-	396 15.6	230 9	384 15.1	2"	425 16.7	-	-	167 368
DN300 12"	725 28.5	-	438 17.2	283 11.1	422 16.6	2"	522 20.6	-	-	255 562

IMPORTANT: Dimensions for the trim envelope or extents refer to a vertical orientation and may vary with specific component positioning - Apart from the "L" dimension, allow a tolerance of at least ±15%

Valve Code Designations

FP	6"	400E-3DC	03	V	C	A5	ER	4DC	NN	N6nW																																																																																													
<table><tr><th>Category</th><th>Code</th></tr><tr><td>Standard</td><td>FP</td></tr><tr><td>Seawater</td><td>FS</td></tr><tr><td>Foam</td><td>FC</td></tr></table>		Category	Code	Standard	FP	Seawater	FS	Foam	FC	<table><tr><th>Installation</th><th>Code</th></tr><tr><td>Vertical</td><td>V</td></tr><tr><td>Horizontal</td><td>H</td></tr></table>		Installation	Code	Vertical	V	Horizontal	H	<table><tr><th>Coating</th><th>Code</th></tr><tr><td>High Build Epoxy</td><td>ER</td></tr><tr><td>Zinc Based High Build Epoxy ⁽⁵⁾</td><td>ZR</td></tr><tr><td>Uncoated</td><td>UC</td></tr></table>		Coating	Code	High Build Epoxy	ER	Zinc Based High Build Epoxy ⁽⁵⁾	ZR	Uncoated	UC	<table><tr><th>Voltage - Main Valve N.O or N.C *</th><th>Code</th></tr><tr><td>24VDC - N.C.</td><td>4DC</td></tr><tr><td>24VDC - N.O.</td><td>4DO</td></tr><tr><td>110VDC - N.C.</td><td>5DC</td></tr><tr><td>24VDC - Latch</td><td>4DS</td></tr><tr><td>110VDC - N.O.</td><td>5DO</td></tr><tr><td>110 - 120/AC - N.C.</td><td>5AC</td></tr><tr><td>110 - 120/AC - N.C.</td><td>5AO</td></tr><tr><td>220 - 240/AC - N.C.</td><td>2AC</td></tr><tr><td>221 - 240/AC - N.C.</td><td>2AO</td></tr></table>		Voltage - Main Valve N.O or N.C *	Code	24VDC - N.C.	4DC	24VDC - N.O.	4DO	110VDC - N.C.	5DC	24VDC - Latch	4DS	110VDC - N.O.	5DO	110 - 120/AC - N.C.	5AC	110 - 120/AC - N.C.	5AO	220 - 240/AC - N.C.	2AC	221 - 240/AC - N.C.	2AO	<table><tr><th>Factory Supplied Additional Items</th><th>Code</th></tr><tr><td>General Purpose NEMA-4 Pressure Switch</td><td>P</td></tr><tr><td>Ex Proof NEC, Div.1 Pressure Switch ⁽³⁾</td><td>P7</td></tr><tr><td>Ex d ATEX Pressure Switch ⁽³⁾</td><td>P9</td></tr><tr><td>Ex d Pressure Switch, SS316 Enclosure ⁽³⁾</td><td>P9Jn</td></tr><tr><td>Ex d Pressure Switch, SS316 Enclosure, Monel Sensor⁽³⁾</td><td>P9mJn</td></tr><tr><td>Single Limit Switch, General Purpose</td><td>S</td></tr><tr><td>Single Ex d Proximity limit Switch</td><td>S9</td></tr><tr><td>Double Ex d Proximity Limit Switch</td><td>SS9</td></tr><tr><td>Double Ex d Proximity Limit Switch with SS316 Junction Box</td><td>SS9Jn</td></tr><tr><td>Pressure Gauge Assembly ⁽³⁾</td><td>6</td></tr><tr><td>S.S Glycerin Pressure Gauge Assembly ⁽³⁾</td><td>6n</td></tr><tr><td>Monel Pressure Gauge Assembly ⁽³⁾</td><td>6m</td></tr><tr><td>Ex Proof NEC Class 1 Div 1 Solenoid</td><td>7</td></tr><tr><td>Ex. d Atex Solenoid</td><td>9</td></tr><tr><td>Stainless steel 316 Solenoid Valve</td><td>K</td></tr><tr><td>Magna Latch Solenoid</td><td>H2</td></tr><tr><td>Drain Valve</td><td>DV</td></tr><tr><td>Water Motor Alarm Assembly ⁽³⁾</td><td>W</td></tr><tr><td>Special Elastomer</td><td>E</td></tr><tr><td>Large Control Filter</td><td>F</td></tr><tr><td>Valve Position Indicator</td><td>I</td></tr><tr><td>S.S 316 Trim Accessories</td><td>N</td></tr><tr><td>S.S Solenoid Valve</td><td>K</td></tr><tr><td>Pressure Transmitter ⁽³⁾</td><td>Q</td></tr><tr><td>Drain and Indicating Components</td><td>A</td></tr></table>		Factory Supplied Additional Items	Code	General Purpose NEMA-4 Pressure Switch	P	Ex Proof NEC, Div.1 Pressure Switch ⁽³⁾	P7	Ex d ATEX Pressure Switch ⁽³⁾	P9	Ex d Pressure Switch, SS316 Enclosure ⁽³⁾	P9Jn	Ex d Pressure Switch, SS316 Enclosure, Monel Sensor ⁽³⁾	P9mJn	Single Limit Switch, General Purpose	S	Single Ex d Proximity limit Switch	S9	Double Ex d Proximity Limit Switch	SS9	Double Ex d Proximity Limit Switch with SS316 Junction Box	SS9Jn	Pressure Gauge Assembly ⁽³⁾	6	S.S Glycerin Pressure Gauge Assembly ⁽³⁾	6n	Monel Pressure Gauge Assembly ⁽³⁾	6m	Ex Proof NEC Class 1 Div 1 Solenoid	7	Ex. d Atex Solenoid	9	Stainless steel 316 Solenoid Valve	K	Magna Latch Solenoid	H2	Drain Valve	DV	Water Motor Alarm Assembly ⁽³⁾	W	Special Elastomer	E	Large Control Filter	F	Valve Position Indicator	I	S.S 316 Trim Accessories	N	S.S Solenoid Valve	K	Pressure Transmitter ⁽³⁾	Q	Drain and Indicating Components	A
Category	Code																																																																																																						
Standard	FP																																																																																																						
Seawater	FS																																																																																																						
Foam	FC																																																																																																						
Installation	Code																																																																																																						
Vertical	V																																																																																																						
Horizontal	H																																																																																																						
Coating	Code																																																																																																						
High Build Epoxy	ER																																																																																																						
Zinc Based High Build Epoxy ⁽⁵⁾	ZR																																																																																																						
Uncoated	UC																																																																																																						
Voltage - Main Valve N.O or N.C *	Code																																																																																																						
24VDC - N.C.	4DC																																																																																																						
24VDC - N.O.	4DO																																																																																																						
110VDC - N.C.	5DC																																																																																																						
24VDC - Latch	4DS																																																																																																						
110VDC - N.O.	5DO																																																																																																						
110 - 120/AC - N.C.	5AC																																																																																																						
110 - 120/AC - N.C.	5AO																																																																																																						
220 - 240/AC - N.C.	2AC																																																																																																						
221 - 240/AC - N.C.	2AO																																																																																																						
Factory Supplied Additional Items	Code																																																																																																						
General Purpose NEMA-4 Pressure Switch	P																																																																																																						
Ex Proof NEC, Div.1 Pressure Switch ⁽³⁾	P7																																																																																																						
Ex d ATEX Pressure Switch ⁽³⁾	P9																																																																																																						
Ex d Pressure Switch, SS316 Enclosure ⁽³⁾	P9Jn																																																																																																						
Ex d Pressure Switch, SS316 Enclosure, Monel Sensor ⁽³⁾	P9mJn																																																																																																						
Single Limit Switch, General Purpose	S																																																																																																						
Single Ex d Proximity limit Switch	S9																																																																																																						
Double Ex d Proximity Limit Switch	SS9																																																																																																						
Double Ex d Proximity Limit Switch with SS316 Junction Box	SS9Jn																																																																																																						
Pressure Gauge Assembly ⁽³⁾	6																																																																																																						
S.S Glycerin Pressure Gauge Assembly ⁽³⁾	6n																																																																																																						
Monel Pressure Gauge Assembly ⁽³⁾	6m																																																																																																						
Ex Proof NEC Class 1 Div 1 Solenoid	7																																																																																																						
Ex. d Atex Solenoid	9																																																																																																						
Stainless steel 316 Solenoid Valve	K																																																																																																						
Magna Latch Solenoid	H2																																																																																																						
Drain Valve	DV																																																																																																						
Water Motor Alarm Assembly ⁽³⁾	W																																																																																																						
Special Elastomer	E																																																																																																						
Large Control Filter	F																																																																																																						
Valve Position Indicator	I																																																																																																						
S.S 316 Trim Accessories	N																																																																																																						
S.S Solenoid Valve	K																																																																																																						
Pressure Transmitter ⁽³⁾	Q																																																																																																						
Drain and Indicating Components	A																																																																																																						
<table><tr><th>Valve Size</th><th></th></tr><tr><td>1½"</td><td>40 mm</td></tr><tr><td>2"</td><td>50 mm</td></tr><tr><td>2½"</td><td>60 mm</td></tr><tr><td>3"</td><td>80 mm</td></tr><tr><td>4"</td><td>100 mm</td></tr><tr><td>6"</td><td>150 mm</td></tr><tr><td>8"</td><td>200 mm</td></tr><tr><td>10"</td><td>250 mm</td></tr><tr><td>12"</td><td>300 mm</td></tr></table>		Valve Size		1½"	40 mm	2"	50 mm	2½"	60 mm	3"	80 mm	4"	100 mm	6"	150 mm	8"	200 mm	10"	250 mm	12"	300 mm	<table><tr><th>Material Body & Cover ⁽¹⁾</th><th>Code</th></tr><tr><td>Ductile Iron A356 ⁽²⁾</td><td>C</td></tr><tr><td>Steel ASTM A216 WCB ⁽²⁾</td><td>S</td></tr><tr><td>Stainless Steel 316</td><td>N</td></tr><tr><td>Nickel Al Bronze C95800</td><td>U</td></tr><tr><td>Super Duplex Grade 5A</td><td>D</td></tr></table>		Material Body & Cover ⁽¹⁾	Code	Ductile Iron A356 ⁽²⁾	C	Steel ASTM A216 WCB ⁽²⁾	S	Stainless Steel 316	N	Nickel Al Bronze C95800	U	Super Duplex Grade 5A	D	<table><tr><th>End Connections</th><th>Code</th></tr><tr><td>ANSI#150RF</td><td>A5</td></tr><tr><td>ANSI#150FF</td><td>a5</td></tr><tr><td>ISO PN16</td><td>16</td></tr><tr><td>Grooved ANSI</td><td>VI</td></tr></table>		End Connections	Code	ANSI#150RF	A5	ANSI#150FF	a5	ISO PN16	16	Grooved ANSI	VI	<table><tr><th>Additional Feature</th><th>Code</th></tr><tr><td>Closing Speed Control</td><td>01</td></tr><tr><td>Opening Speed Control</td><td>02</td></tr><tr><td>Opening & Closing Speed Control</td><td>03</td></tr><tr><td>None</td><td>-</td></tr></table>		Additional Feature	Code	Closing Speed Control	01	Opening Speed Control	02	Opening & Closing Speed Control	03	None	-	<table><tr><th>Tubing & Fittings</th><th>Code</th></tr><tr><td>Stainless Steel 316</td><td>NN</td></tr><tr><td>Monel 400</td><td>MM</td></tr><tr><td>Super Duplex</td><td>DD</td></tr></table>		Tubing & Fittings	Code	Stainless Steel 316	NN	Monel 400	MM	Super Duplex	DD																																		
Valve Size																																																																																																							
1½"	40 mm																																																																																																						
2"	50 mm																																																																																																						
2½"	60 mm																																																																																																						
3"	80 mm																																																																																																						
4"	100 mm																																																																																																						
6"	150 mm																																																																																																						
8"	200 mm																																																																																																						
10"	250 mm																																																																																																						
12"	300 mm																																																																																																						
Material Body & Cover ⁽¹⁾	Code																																																																																																						
Ductile Iron A356 ⁽²⁾	C																																																																																																						
Steel ASTM A216 WCB ⁽²⁾	S																																																																																																						
Stainless Steel 316	N																																																																																																						
Nickel Al Bronze C95800	U																																																																																																						
Super Duplex Grade 5A	D																																																																																																						
End Connections	Code																																																																																																						
ANSI#150RF	A5																																																																																																						
ANSI#150FF	a5																																																																																																						
ISO PN16	16																																																																																																						
Grooved ANSI	VI																																																																																																						
Additional Feature	Code																																																																																																						
Closing Speed Control	01																																																																																																						
Opening Speed Control	02																																																																																																						
Opening & Closing Speed Control	03																																																																																																						
None	-																																																																																																						
Tubing & Fittings	Code																																																																																																						
Stainless Steel 316	NN																																																																																																						
Monel 400	MM																																																																																																						
Super Duplex	DD																																																																																																						

Notes:

(1) Other materials available see engineering data

(2) Coated internally and externally

(3) Supplied loose

(4) Consult BERMAD for availability

(5) For valves up to and including 10"

Notes:
 (1) Other materials available see engineering data
 (2) Coated internally and externally
 (3) Supplied loose
 (4) Consult BERMAD for availability
 (5) For valves up to and including 10"