TECHLINK
Associated International Engineers


# THERMOPLASTIC ON/OFF VALVES FOR CORROSIVE AND EROSIVE FLUIDS

## BALL VALVE TYPE

DN15(1/2") to DN150(6")

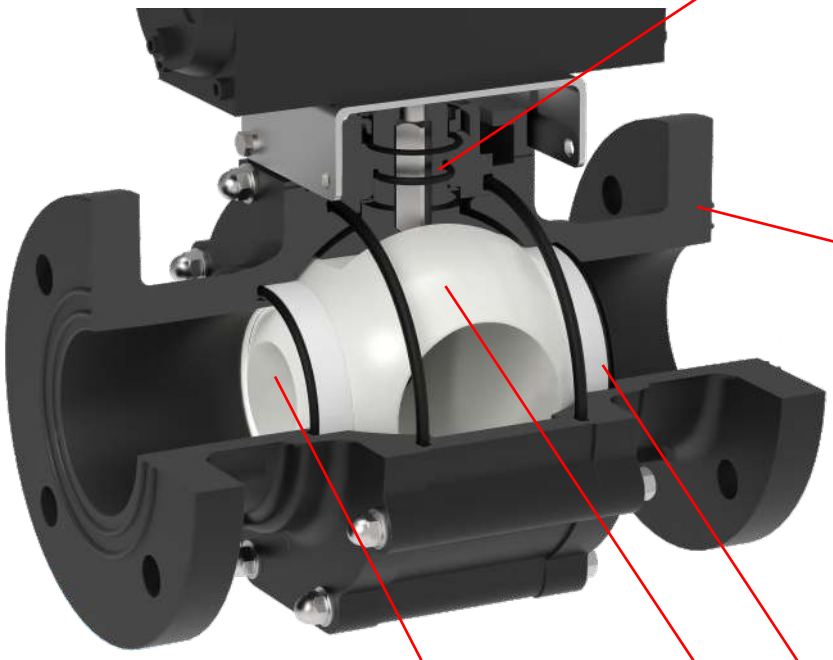
## FEATURES AND BENEFITS

**Our valves offer:**

- 100% positive shut-off
- Stem sealed TA-Luft VDI 2440 and ISO 15848-1
- 1/4 turn operation
- Full bore
- Reduced operating torque
- Special design for slurry

- PTFE thrust bearing
- Stainless steel inserted PPGF or PVDF
- Stem sealed TA-Luft VDI 2440, ISO 15848-1

- Integral flange ends
- Stainless steel plates reinforcement



DN80(3")-DN100(4")

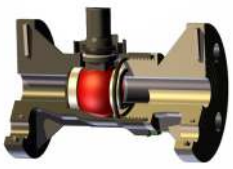
Seat with wide spherical sealing surfaces for a perfect contact with the ball, preventing crystal intrusion.

Precision machined PVDF or PPH/PPGF ball for Class VI zero bubble leaktight

Ball cut out prevents pressure build-up, and allow flowing fluid when the valve is actuated, to reduce the deposits in the dead zones (special for slurry application).

**An outstanding mechanical resistance**

This 6" valve holds a weight of 250kg at the end of 1m section of pipe. It does not break until the weight exceeds 960kg.



**DN15(1/2")-DN50(2")**

**DN150(6")**

# MATERIALS

## Body and Ball :

**Glass Reinforced Polypropylene** : The PP is reinforced with 20% chemically resistant borosilicate "C" glass, enhancing its mechanical strength, dimensional stability, and temperature resistance up to 100°C. UV resistance is further improved through the addition of carbon black and synthetic UV stabilizers.

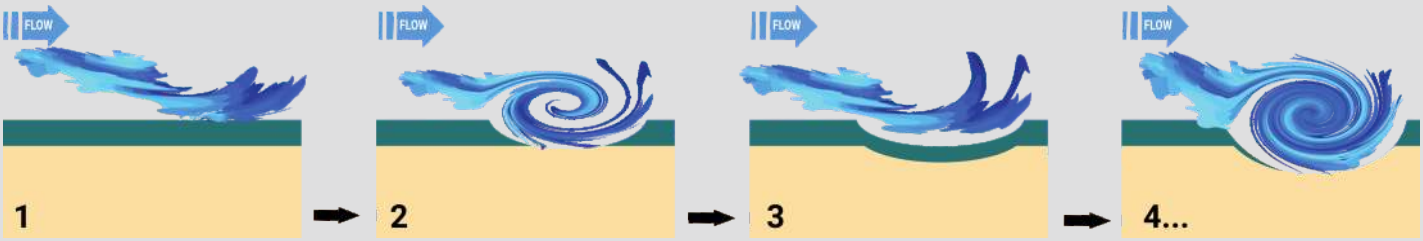
**Anti-static Polypropylene** : The material contains optional 20% carbon fibers, which significantly reduce its surface resistivity. This improved conductivity allows the material to be used in explosion-risk areas where anti-static equipment is mandatory.

**PPH :** It is used as a standard for balls up to DN50 (2").

**PVDF :** Made by suspension polymerization, this highly crystalline polyvinylidene fluoride (PVDF) grade demonstrates exceptional mechanical strength and long-term stability at elevated temperatures. PVDF also possesses exceptional abrasion resistance.

## WHY NOT STAINLESS STEEL OR DUPLEX STEEL?

Stainless steels, duplex steels and even high nickel alloys are resistant to acids because a thin invisible layer of nickel oxide. This layer shields the metal from the chemical and stops the corrosion.
However, the corrosion resistance is only true when the stainless steel is immersed in still liquid (without flow).
In case of fast flow, turbulence, or the presence of solid particles in the fluid , the fragile protective film is continuously taken away by the motion and the corrosion is continuous, and finally the metal are worn out.




**A protective layer prevent stainless steel from corroding**

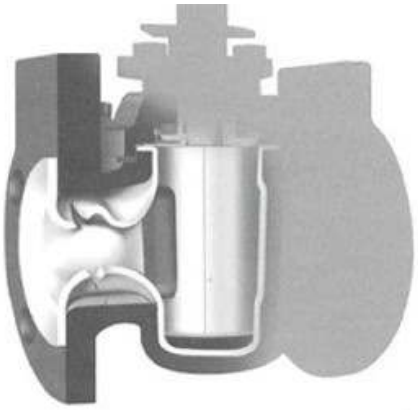
**Due to flow velocity, this layer is attacked leaving unprotected steel to corrosion**

**a new layer can form on the new steel surface**

**this layer will ultimately be eroded and more corrosion will occur.**

## WHY NOT PTFE OR PFA LINED METAL?

- PTFE and PFA liners have very poor abrasion resistance when fluids contain solids, causing the liners to wear out rapidly.
- If the liner breaks, the valve body corrodes quickly, forming leaks to the outside. This allows unwanted metal particles to contaminate the fluids.
- As valves age, the torque required to operate them increases. Excessive torque can cause stem leakage and valve damage.
- Thermoplastic valves are more cost-efficient than PTFE/PFA lined metal valves.



PTFE suffers 100 times more than PVDF.

# APPLICATION WITH EROSION AND ABRASION

Polymers resist erosion and chemical attack to varying degrees. A Taber Abraser test (ASTM D4060) measured the abrasion resistance of several polymers; lower numbers indicate better abrasion resistance.

PVDF exhibited the best abrasion resistance, significantly outperforming stainless steel 304.

PPH also showed good abrasion resistance. Further, glass fiber-reinforced PPGF (20% glass fibre) demonstrated better abrasion resistance than unreinforced PPH.

The choice of material as well as design features specific to erosion resistance, significantly improve longevity and performance of equipment in abrasive fluid processes.

| Material | Weight loss (mg/1000 rev.) ASTM D4060, wheel CS-10 |
|---|---|
| PVDF homopolymer (SOLEF®) | 5 - 10 ✓ |
| PVDF, SOLEF® 21508/31508 | 5 - 8 ✓ |
| PA 6 polyamid | 5 |
| ECTFE, Halar® | 13 ✓ |
| PP homopolymer | 15 - 20 ✓ |
| ~~PTFE~~ | ~~500 - 1000~~ ⚠ |
| 304 stainless steel | 50 |

Our valves have proven superior resistance to erosion and abrasion.

They are commonly used in phosphoric acid plants, waste water treatment, steel pickling lines and pigment factories to handle fluids with as much as **250g/L** of solids..

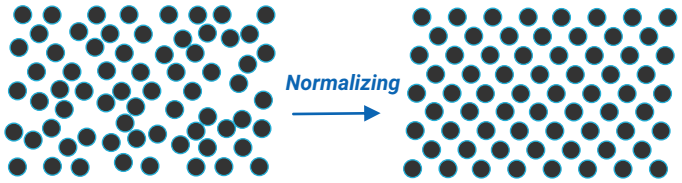
# MANUFACTURING

- **Moulding**

Valve components are symmetrically injected from the center. The central parts of hollow components are machined out after moulding. With this method, the part is perfectly symmetric, has no «junction line», and no tendency to distort.

- **Heat treatment**

Valve components are heat-treated after injection. Normalizing gives plastic material a higher resistance to internal stresses and makes a uniform structure. The material must heat to a specific temperature to change its properties. After heating, the polymer is cooled down at a controlled rate. This enhances the plastic's mechanical features and provide dimensional stability.




*Disordered structure creates weaknesses and potential deformations.*

*Ordered structure increase mechanical properties and stability.*

- **Machining**

All sealing surfaces are precisely machined, including 100% of the surface of the balls.

# TESTING

Every valve is individually tested for leaks and correct operation. Leak Tests are carried our under hydrostatic conditions, testing for leaks at the body and sealing surfaces. Our valves are initially tested at low pressures then at 6 bars. No bubble is allowed to ensure that valves are bubble tight and free from any leaks.

## BALL FEATURES

**Standard** — PPGF, DN80(3") - DN150(6")
PPH, DN15(1/2") - DN50(2")

**Standard** — PVDF, DN15(1/2") - DN150(6")

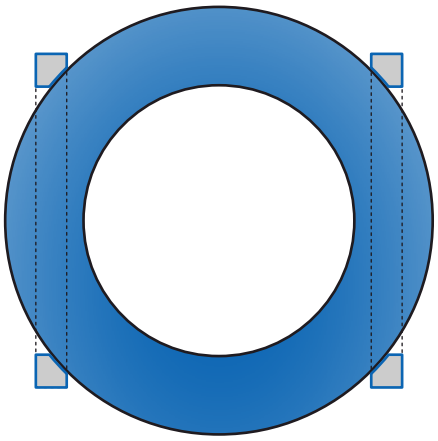
**Type O** — Ball with pressure relief hole

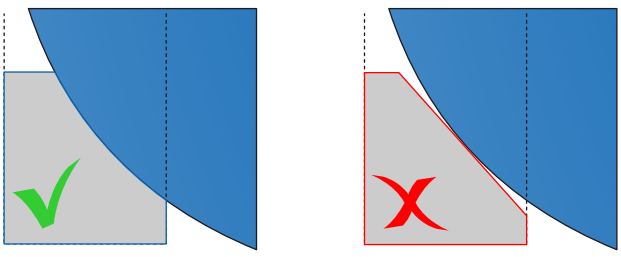
**Type C** — Ball with cut out, prevents pressure bulid-up, and allow a communication between the dead zones and flowing fluid when the valve is open, this is to reduce the deposits as less as possible in the dead zones.

## SEAT FEATURES

- **PTFE**: Standard
- **RPTFE**: Reinforced PTFE to improve strength and erosion resistance.
- **UPE**: For the highest abrasive application, with our special sealing technology and the smallest roughness of surface machining.

Our design of ball valves seats provides a **perfect surface contact** between the ball and the seat, preventing introductions of solids between the two surfaces, and reducing the effects of scratches.





## TECHNICAL DATA

| | |
|---|---|
| PRESSURE RANGE | VACUUM TO 1 Mpa G |
| TEMPERATURE RANGE | -5°C to 90°C (PPGF, PP-EL) 120°C (PVDF) |
| CONNECTION STYLE | FLANGED |
| CONNECTION SIZES | DN15(1/2") to DN150(6") |
| FLANGES STANDARDS | EN 1092-1 PN10 , or ASME B16.5 150# |
| FACE-TO-FACE LENGTH | EN 558-1 |
| BODY MATERIAL | PPGF (Glass reinforced) or PVDF or PP-EL |
| BALL MATERIAL | PPH or PPGF or PVDF |
| SEATS MATERIAL | PTFE or RPTFE or UPE |
| O-RINGS MATERIALS | EPDM/ FPM/ FFPM / FEP-FPM/ FEP-FFPM-FPM/ FEP-FFPM |
| BOLTING AND FITTINGS | 316 L |
| STEM SEAL | O-RING,² WITH ISO 15848 performance |
| ACTUATOR TYPE | RACK & PINION |
| ACTUATOR BODY MATERIAL | POLYARYLAMIDE OR ALUMINIUM |
| MIN. AIR PRESSURE REQUIRED | 0.45 Mpa |
| FAIL ACTION | OPEN, CLOSE, or DOUBLE ACTION |
| TIGHTNESS CLASS | CLASS VI (zero bubble) |

## VALVE TORQUES FOR ACTUATION

| Size | VALVE TORQUE FOR AC TUATION | |
|---|---|---|
| | PPGF/PP-EL | PVDF |
| DN15(1/2”) | 10 N.m | 8N.m |
| DN20(3/4”) | 10 N.m | 8N.m |
| DN25(1”) | 10 N.m | 10 N.m |
| DN32(1 1/4”) | 10 N.m | 10 N.m |
| DN40(1 1/2”) | 10 N.m | 10 N.m |
| DN50(2”) | 14 N.m | 16 N.m |
| DN80(3”) | 40 N.m | 40 N.m |
| DN100(4”) | 40 N.m | 60 N.m |
| DN150(6”) | | |

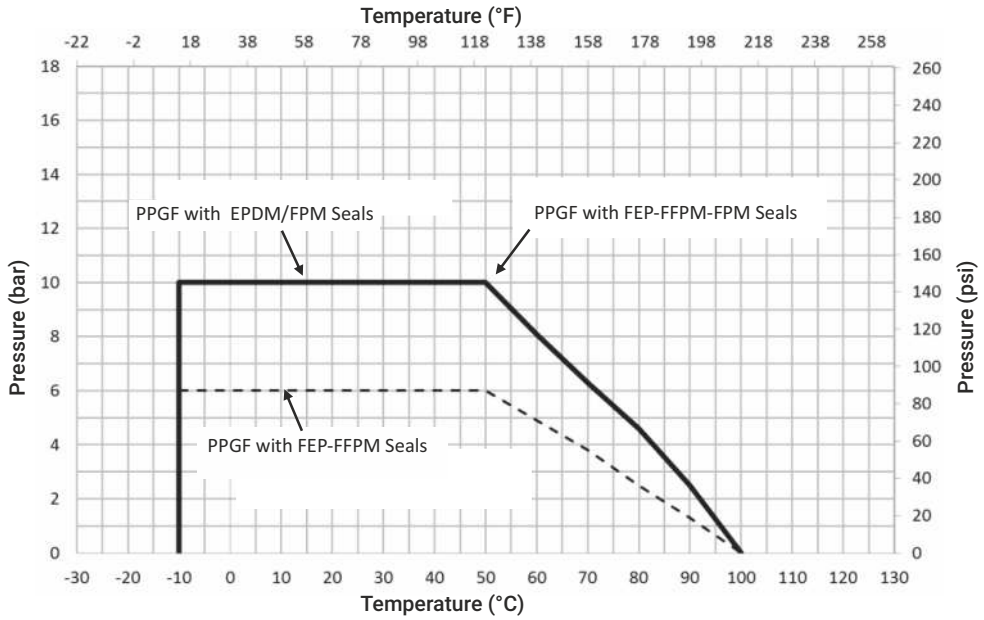
The « valve torque for actuation » is the required torque to open the valve when dP=PN and including a safety coefficient.

| Size | Maximum allowable stem torque | |
|---|---|---|
| | PPGF | PVDF |
| DN15(1/2”) | 30 N.m | 30N.m |
| DN20(3/4”) | 30N.m | 30N.m |
| DN25(1”) | 16 N.m | 40 N.m |
| DN32(1 1/4”) | 16 N.m | 40 N.m |
| DN40(1 1/2”) | 20 N.m | 40 N.m |
| DN50(2”) | 28 N.m | 48 N.m |
| DN80(3”) | 160 N.m | 160 N.m |
| DN100(4”) | 80 N.m | 160 N.m |
| DN150(6”) | 240 N.m | 400 N.m |

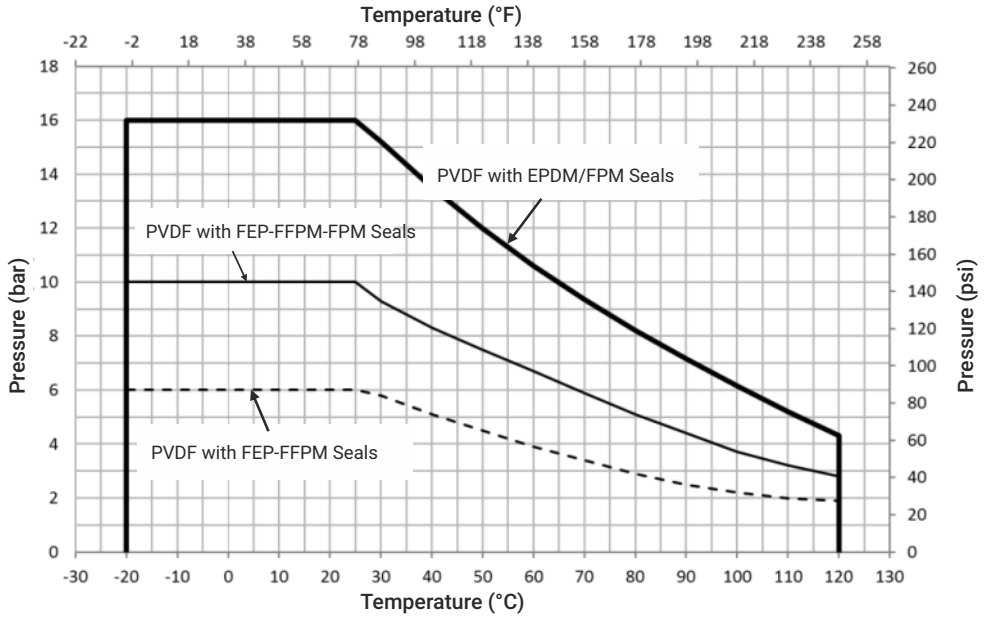
For slurry application, oversize actuator is recommended , but the torques should be smaller than maximum allowable .

## PRESSURE/TEMPERATURE RESISTANCE CURVES

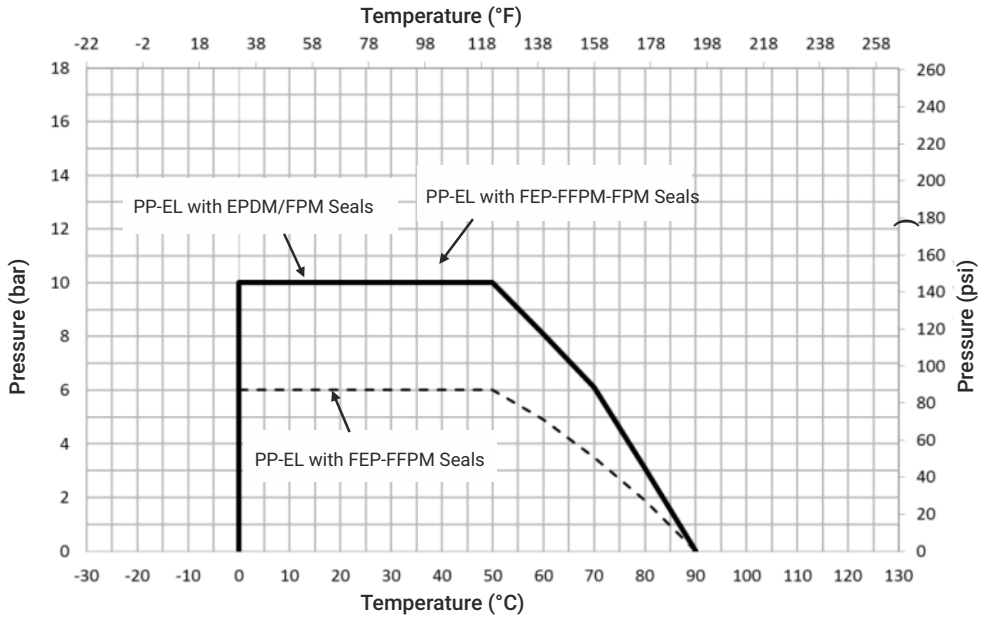
**Size: DN15(1/2")-DN50(2")**




**PPGF**



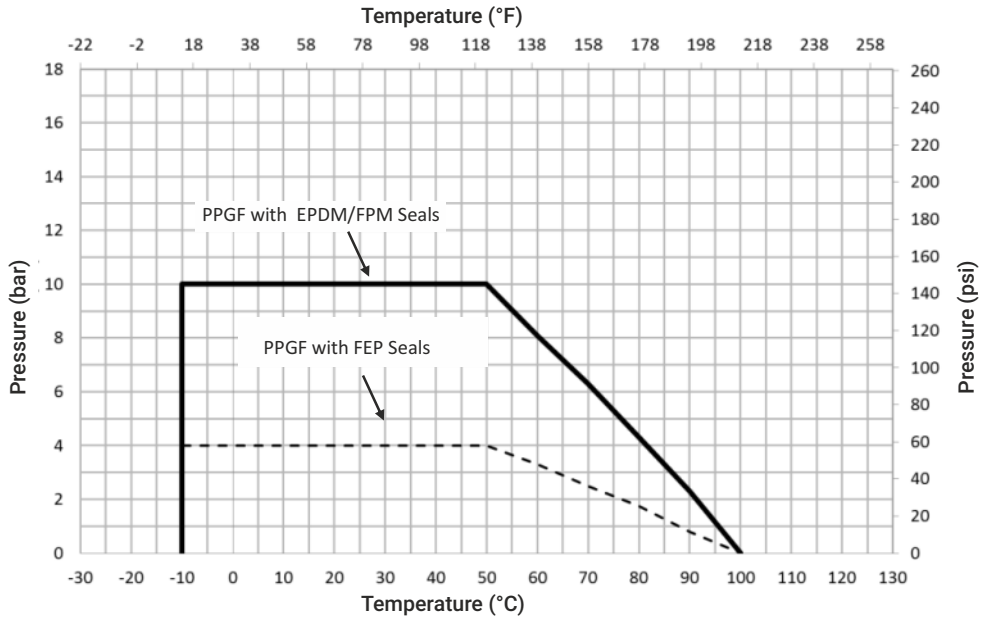

**PVDF**



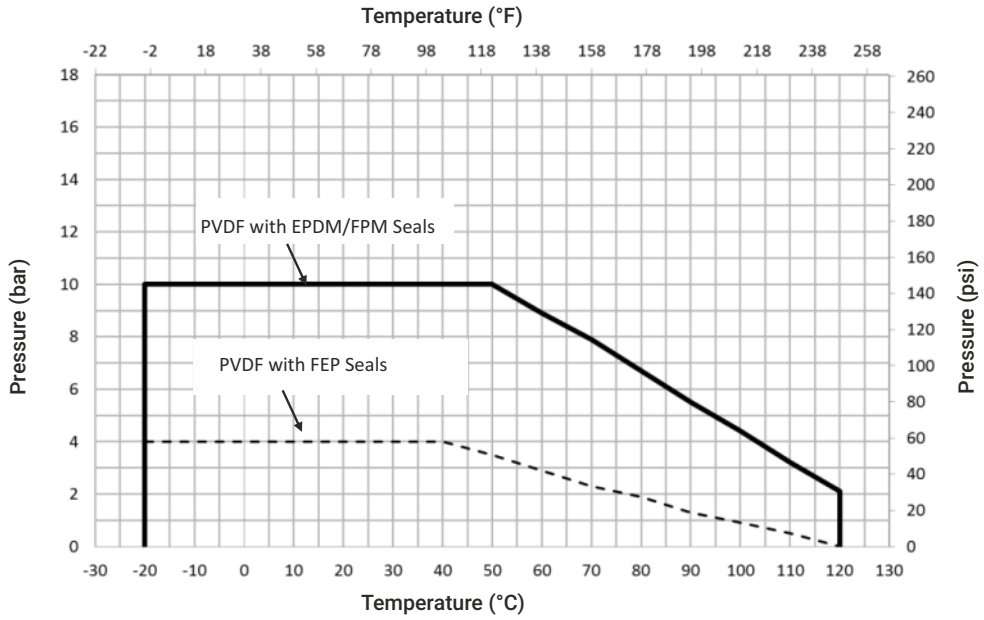

**PP-EL**

## PRESSURE/TEMPERATURE RESISTANCE CURVES

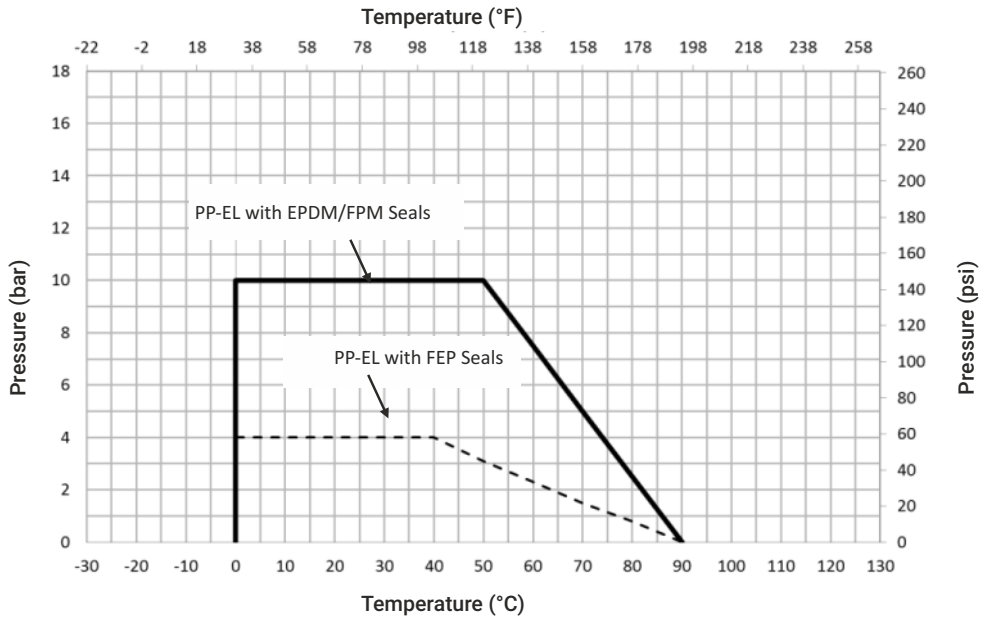
**Size: DN80(3")-DN150(6")**




**PPGF**



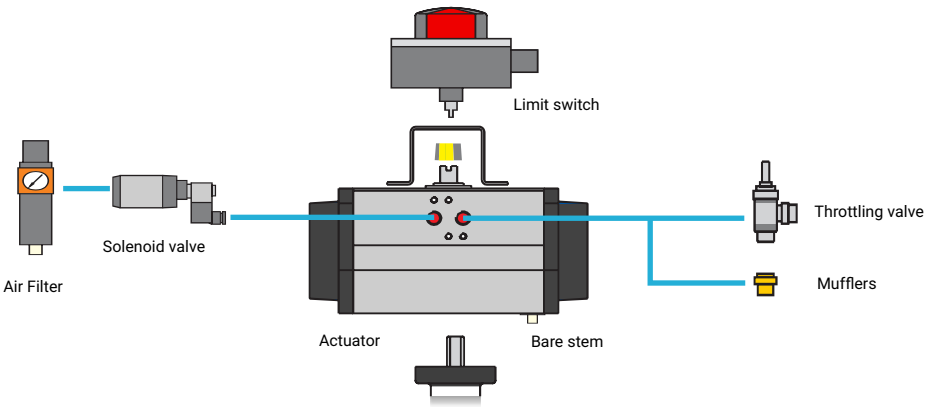

**PVDF**




**PP-EL**

# ACTUATION

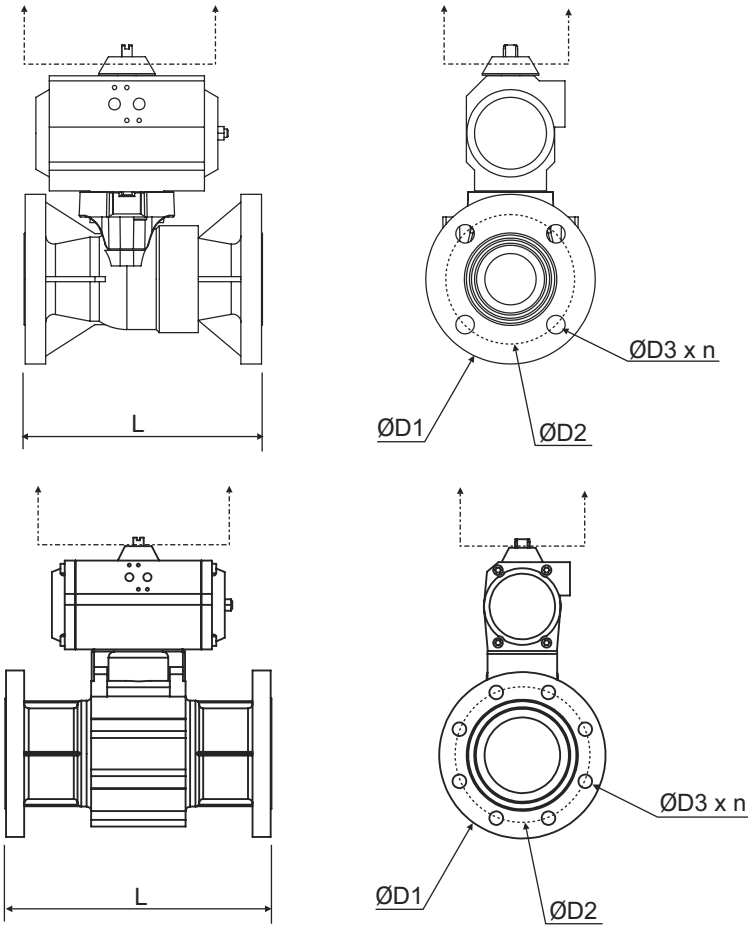
Our valves are actuated with highly reliable actuators (electric or pneumatic), normally quarter turn actuators, with a life time of 500,000 -1,000,000 cycles, depending on the frequency of motions of the valves.
Customers can also specify actuators, limit switch, solenoid valve, etc.




**Typical pneumatic actuation**

Throttling valve is used to slow down the motion of the valve, to avoid water hammer effect and protect valve and other process equipment on line.

# OVERALL DIMENSIONS

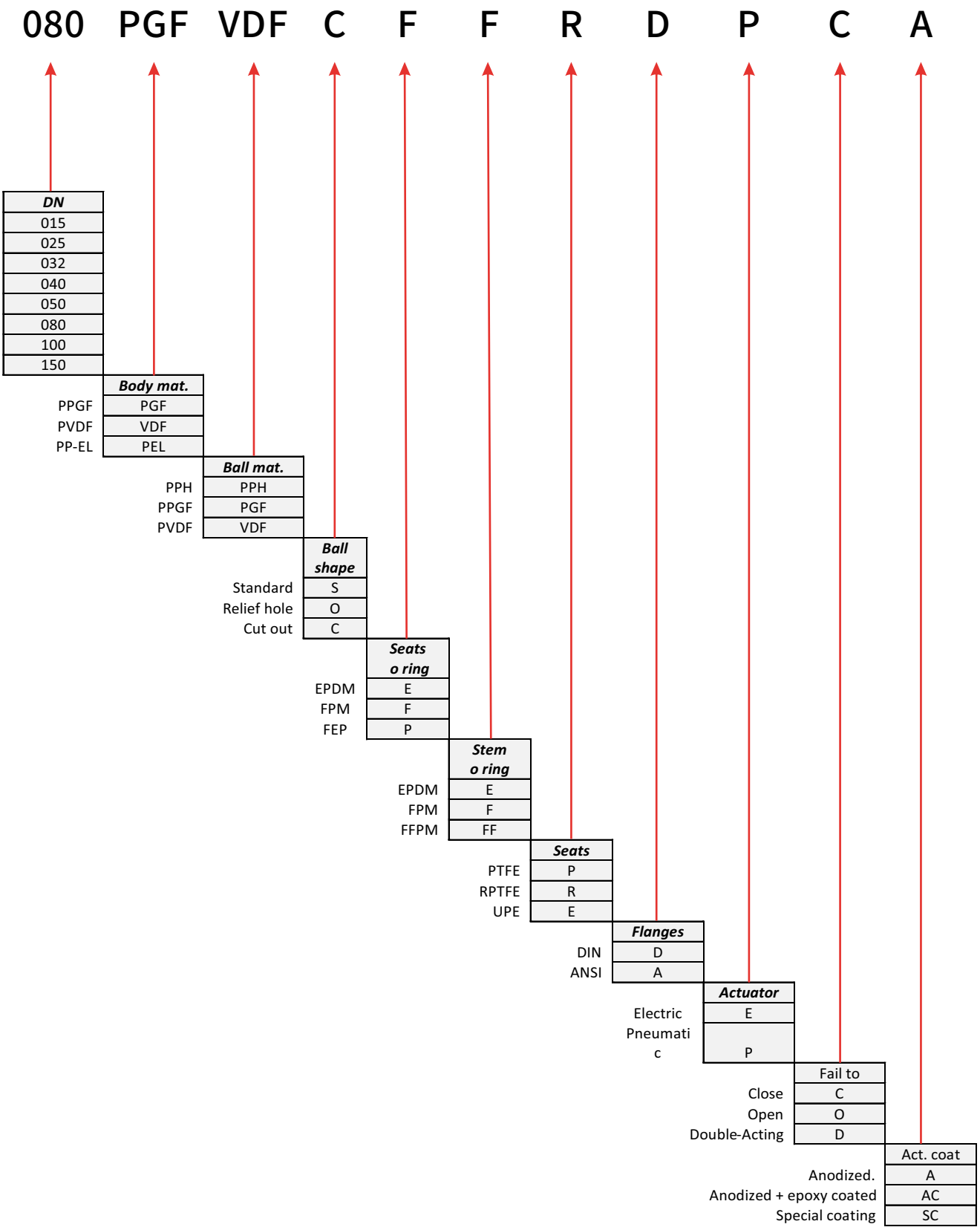



| Size | DIN | | | | ANSI | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | ΦD1 mm | ΦD2 mm | ΦD3 mm | n | ΦD1 mm | ΦD2 mm | ΦD3 mm | n | L mm |
| DN 15 | 95 | 65 | 14 | 4 | 95 | 60 | 16 | 4 | 130 |
| DN 20 | 105 | 75 | 14 | 4 | 105 | 70 | 16 | 4 | 150 |
| DN 25 | 115 | 85 | 14 | 4 | 115 | 79.5 | 16 | 4 | 160 |
| DN 32 | 140 | 100 | 18 | 4 | 140 | 89 | 16 | 4 | 180 |
| DN 40 | 150 | 110 | 18 | 4 | 150 | 98.4 | 16 | 4 | 200 |
| DN 50 | 165 | 125 | 18 | 4 | 165 | 120.6 | 19 | 4 | 230 |
| DN 80 | 200 | 160 | 18 | 8 | 200 | 152.4 | 19 | 4 | 310 |
| DN 100 | 220 | 180 | 18 | 8 | 229 | 190.5 | 19 | 8 | 350 |
| DN 150 | 285 | 240 | 22 | 8 | 285 | 241.3 | 22.22 | 8 | 480 |

**DIN = Drilling in accordance with EN 1092-1 PN10/PN16**
**ANSI = Drilling in accordance with EN1759-1/ASME B16.5 Class 150**

**Face to face dimensions as per ISO 5752-Series 1**

# ON OFF BALL VALVES PRODUCT CODES



## REFERENCES IN HEAVY PARTICLES SERVICES

1. Sibanye Gold, South Africa.
   Media: Lime slurry

2. LG-Chemical, Daesan, Korea (Integrated PVC plant)
   Media: dirty HCL with carbon black and trace EDC.

3. LS-Nikko, Ulsan, Korea (Copper refinery)
   Media: electro-refining sludge processing (Selenium recovery unit)

4. Jordan phosphate mine, Jordan
   Media: Phosphoric acid with many particles

5. Office cherifien des phosphates, Morroco
   Media: Phosphoric acid with many particles

6. Madden, Saudi Arabia
   Media: Phosphoric acid with many particles

7. SATERI, CHINA.
   Media: High slurry

8. CODELCO, CHILE.
   Media: Sulfuric acid with copper Ore

9. INDO BHARA RAYON, INDONESIA
   Media: Sulfuric Acid with Solid particles

10. Hanwha, Korea (Chlorine and CPVC manufacturer)
    Media: CPVC slurry

11. SIAM MITSUI PTA, THAILAND
    Media: Hydrobromic Acid ( HBr)

12. Steel Mill, ARCELOR MITTAL, France
    Media: HCL, 33% up to 90°C, including slurries
    with ferric chloride and ferric oxydes scales

13. Millenium – Than, France
    Media: Sulphuric acid with TiO2 slurry

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