# UV800 Triple Offset Butterfly Valve

The UNIVALS UV800 butterfly valve is engineered with advanced innovation concepts. These unique design concepts, combined with high quality manufacturing processes, enable the UV800 butterfly valve to deliver a longer service life and better sealing performance.
It is designed to meet safety, emission, and higher performance requirements in the Oil & Gas, Petrochemical and Chemical industries.
These engineered valves can be configure with various stem options to accommodate both high-temperature and low-temperature applications. They also feature a special sealing ring design.

## Features

Below features enabled valve to operate with longer lifespan, lower leakage and lower operating torques in every tough application.

- Integral emission control system
  Fugitive emission packing kits
  Spring elastic loaded packing
- Metal composite elastic sealing ring
- Extended double bearings and isolation protection design
- Integral valve stem design
- Double shaft blowout protection
- Valve body surface welding
- Disc driven by key connection
- Low flow resistance disc

## Technical Summary

- Size: 3~48 inch
- Rating: Class 150 ~ Class 900
- Body: Carbon Steel, Alloy Steel, Stainless Steel
- Trim: Carbon Steel, Alloy Steel, Stainless Steel
- Seat: Hard Faced

Please consult with UNIVALS for more material options.

## Advantage

- No friction loss
- On site replacement of sealing rings
- Tight shut-off sealing
- Long service life
- Compact structure length
- Reliable safety
- Wide application coverage

## Design Standards

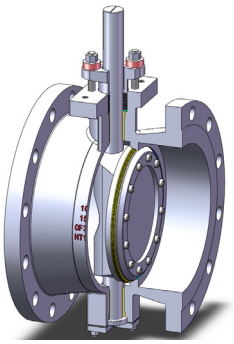
- **Design**
  API 609 or DIN EN 593
- **Pressure / Temperature Rating**
  ASME B16.34 or DIN EN 12516-1
- **Face-to-face Dimensions**
  ASME 609 or DIN EN 558
- **Flange End Dimensions**
  ASME B16.5, ASME B16.47 or DIN EN 1092
- **NACE**
  MR 0103 or MR 0175
- **Fugitive Emission**
  ISO15848, TA-LUFT
- **Fire-safe Type Test**
  API 607

## Available Configurations

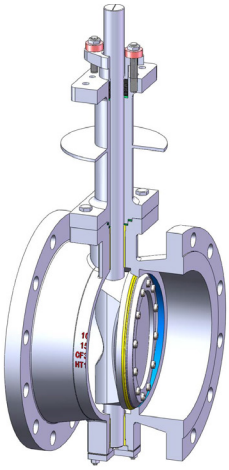
UV800 butterfly valves are easily adapted to a variety of standard in severe service applications, when steady tight shut-off and uncompromising sealing are required.
Configurable elements include:

- Low temperature
- High temperature
- Optional multiple sealing ring configurations
- Multiple end connection types
- Customized designs

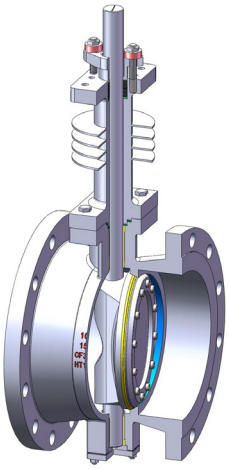
# Configurations



**STANDARD**



**LOW TEMPERATURE**



**HIGH TEMPERATURE**

### Size and Pressure Range

| Product Supply Scope for ASME B16.5 Flange | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASME | NPS | | | | | | | | | | | | | | | | |
| Class | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 |
| CL150 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| CL300 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| CL600 | X | X | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | * | * | * | * | * | * |
| CL900 | X | X | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | * | * | * | * | * | * |

NOTE: "✓" Standard products, "X"non-supply, "*"Please contact sales for relevant data.
Optional connection ends include Wafer Type, Double Flange Type and Lug Type.

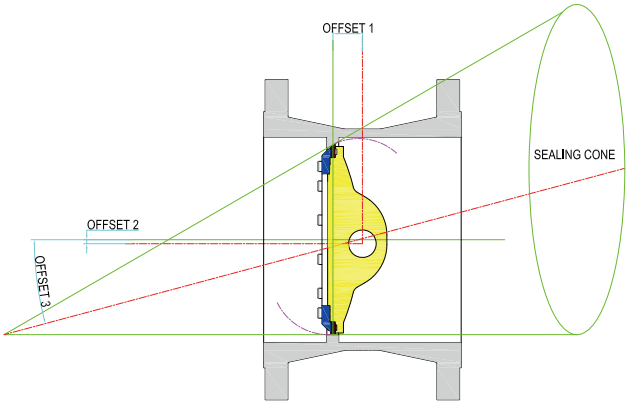
| Product Supply Scope for DIN-EN-1092 Flange | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DIN | DN | | | | | | | | | | | | | | | | |
| PN | 80 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
| PN10 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| PN16 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| PN25 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | * | * | * | * | * | * |
| PN40 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | * | * | * | * | * | * |
| PN63 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | * | * | * | * | * | * | * | * | * |
| PN100 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | * | * | * | * | * | * | * | * | * | * |

NOTE: "✓" Standard products, "X"non-supply, "*"Please contact sales for relevant data.
Optional connection ends include Wafer Type, Double Flange Type and Lug Type.

# Technical Specifications

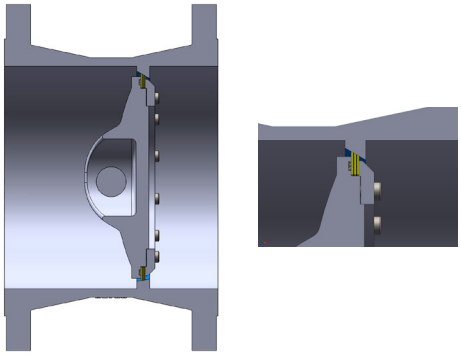
## 1. Triple Offset Design

**Offset 1:** The shaft is offset from seat plane, allowing a continuous seating surface.
**Offset 2:** The shaft centerline is offset from disc centerline to lift the disc rapidly off and away from the seat when the valve is open.
**Offset 3:** The cone axis is offset from seal centerline, eradicating discseat friction.



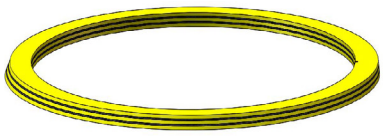

a) Triple offset design achieves the separation of the sealing ring and seat during valve operation, avoiding friction and wear on the sealing surface. Therefore, the reliable sealing and long service life of the valve can be achieved.
b) The triple offset butterfly valve has torque sealing characteristics, ensuring the sealing of the valve through the continuous torque provided by the actuator.

## 2. Design of Metal Flexible Sealing Ring



**Shut Off**
The sealing force applied by the stem is equal distribution to the sealing surface througth the flexible sealing ring, ensuring a tight seal.

**Solid Metal Sealing Ring Optional**



**LAMINATED SEAL RING**

**SOLID METAL SEALING RING**

## 3. Fugitive Emisssion Shaft Seal

On the basis of ensuring the roughness of the valve shaft and packing box, optional live load gland flange to compensate for the relaxation caused by temperature and pressure fluctuations during long-term service of the packing.

## 4. Long Bearings and Isolation Protection Design

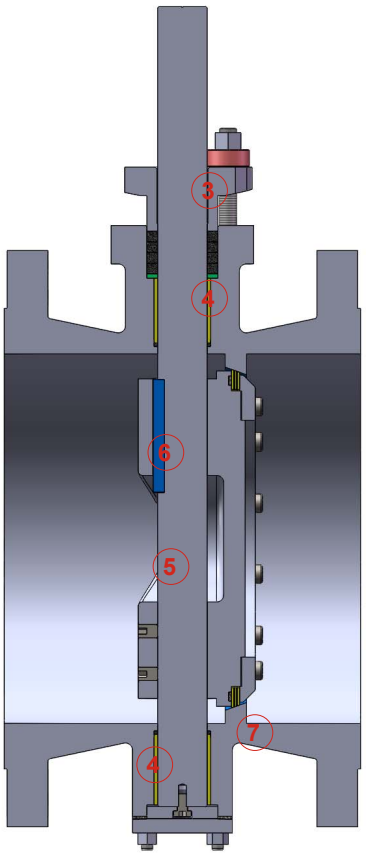
The surface hardened long bearing provides reliable support for the valve stem, with an internal surface roughness of Ra0.4, ensuring smooth and stable operation of the valve. Bearing isolation and protection design prevents sold powder media from entering the bearing.

## 5. Integral Shaft Design

The robust integral valve shaft has superior rigidity and effectively resists the influence of medium forces.

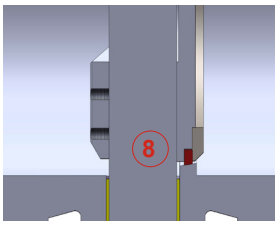
## 6. The Disc is Driven by Key Connection

The use of key connections has the following advantages: convenient installation, and high positioning accuracy.




## 7. Integral Welding Seat

The hard faced seat with integral welding can extend the service life of the valve and reduce maintenance.



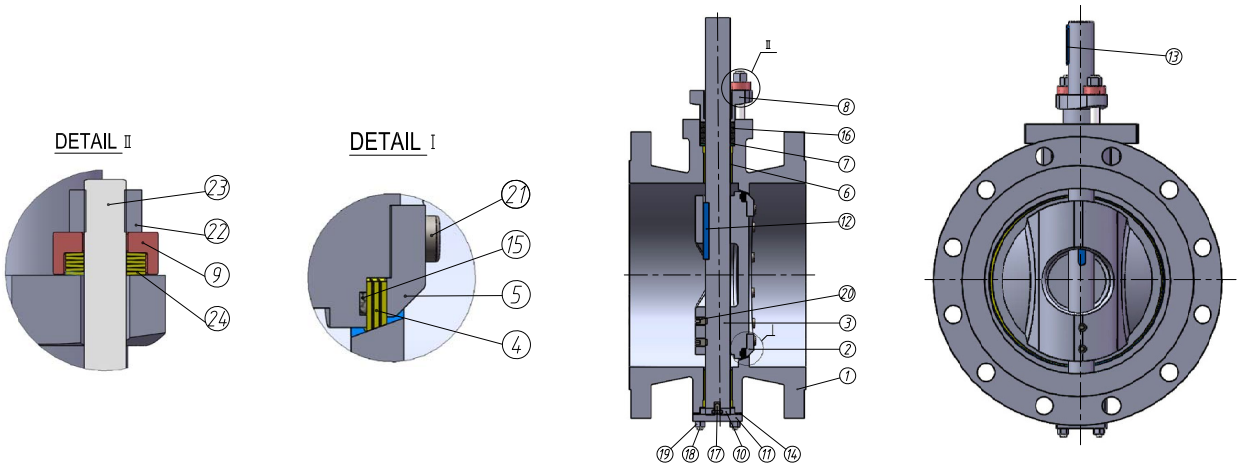

## 8. Anti-blowout Shaft

Anti-blowout design satisfies standard, Bottom of shaft: with tow bolts tightly locking the shaft and prevents stem blow-out.

## 9. Low Flow Resistance Disc

The streamline disc design has smaller flow resistance and better flow capacity.

# Section Drawing




| No. | Description | No. | Description |
|---|---|---|---|
| 1 | Body | 13 | Key |
| 2 | Disc | 14 | Flat Gasket |
| 3 | Shaft | 15 | Spiral-wound Gasket |
| 4 | Sealing Ring | 16 | Packing Ring |
| 5 | Clamping Ring | 17 | Hexagon Socket Screw |
| 6 | Bearing | 18 | Stud |
| 7 | Ring | 19 | Nut |
| 8 | Packing Grand | 20 | Bolt |
| 9 | Belleville Bushing | 21 | Socket Head Screw |
| 10 | Axial Washer | 22 | Stud |
| 11 | Cover | 23 | Nut |
| 12 | Key | 24 | Belleville Washer |

# Materials of Construction

| | | | |
|---|---|---|---|
| **Max. Temperature** | 340°C | 340°C | 340°C |
| **Min. Temperature** | -29°C | -46°C | -46°C |
| **Body** | A216 WCB | A351 CF8M | A351 CF3M |
| **Disc** | A216 WCB<br>A351 CF8M | A351 CF8M | A351 CF3M |
| **Shaft** | S17400 | S17400 | S20910 |
| **Sealing Ring** | S31803+Graphite | S31803+Graphite | S31803+Graphite |
| **Clamping Ring** | A276 316L | A276 316L | A276 316L |
| **Bearing** | A276 316L+Nitriding<br>STL6 | A276 316L+Nitriding<br>STL6 | A276 316L+Nitriding<br>STL6 |
| **Ring** | A276 316L | A276 316L | A276 316L |
| **Packing Grand** | A351 CF8M | A351 CF8M | A351 CF8M |
| **Belleville Bushing** | A276 316 | A276 316 | A276 316 |
| **Axial Washer** | A276 316L+Nitriding | A276 316L+Nitriding | A276 316L+Nitriding |
| **Cover** | A182 F316L | A182 F316L | A182 F316L |
| **Key** | S20910 | S20910 | S20910 |
| **Flat Gasket** | 316L+Graphite | 316L+Graphite | 316L+Graphite |
| **Spiral-Wound Gasket** | 316L+Graphite | 316L+Graphite | 316L+Graphite |
| **Packing Ring** | Graphite | Graphite | Graphite |
| **Hexagon Socket Screw** | A4-70 | A4-70 | A4-70 |
| **Bolt** | A4-70 | A4-70 | A4-70 |
| **Socket Head Screw** | A193 B8M | A193 B8M | A193 B8M |
| **Stud** | A193 B7 | A193 B8M | A193 B8M |
| **Nut** | A194 2H | A194 8M | A194 8M |
| **Belleville Washer** | Inconel x750 | Inconel x750 | Inconel x750 |

# Torque (Nm)

**Class 150, PN10, PN16**

| **Size** | | **Differential Pressure (bar)** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NPS | DN | 5 | | | 10 | | | 16 | | | 20 | | |
| | | BTO | RTO,RTC | ETC | BTO | RTO,RTC | ETC | BTO | RTO,RTC | ETC | BTO | RTO,RTC | ETC |
| 3 | 80 | 58 | 40 | 57 | 67 | 40 | 57 | 71 | 40 | 57 | 71 | 40 | 57 |
| 4 | 100 | 62 | 50 | 60 | 70 | 50 | 60 | 110 | 50 | 60 | 110 | 50 | 60 |
| 6 | 150 | 151 | 82 | 164 | 151 | 82 | 164 | 268 | 82 | 164 | 268 | 82 | 164 |
| 8 | 200 | 180 | 110 | 180 | 278 | 110 | 180 | 522 | 110 | 180 | 522 | 110 | 180 |
| 10 | 250 | 286 | 160 | 274 | 442 | 160 | 274 | 850 | 160 | 274 | 850 | 160 | 274 |
| 12 | 300 | 418 | 190 | 379 | 645 | 190 | 379 | 1222 | 190 | 379 | 1222 | 190 | 379 |
| 14 | 350 | 509 | 230 | 434 | 786 | 230 | 434 | 1646 | 230 | 434 | 1646 | 230 | 434 |
| 16 | 400 | 718 | 380 | 698 | 1108 | 380 | 698 | 2320 | 380 | 698 | 2320 | 380 | 698 |
| 18 | 450 | 918 | 470 | 897 | 1418 | 470 | 897 | 2971 | 470 | 897 | 2971 | 470 | 897 |
| 20 | 500 | 1145 | 570 | 1180 | 1767 | 570 | 1180 | 3703 | 570 | 1180 | 3703 | 570 | 1180 |
| 24 | 600 | 1672 | 850 | 1763 | 2581 | 850 | 1763 | 5405 | 850 | 1763 | 5405 | 850 | 1763 |
| 28 | 700 | 5116 | 1212 | 4258 | 6089 | 1212 | 4258 | 8036 | 1212 | 4258 | 9333 | 1212 | 4258 |
| 32 | 800 | 7551 | 2544 | 6129 | 9005 | 2544 | 6129 | 11913 | 2544 | 6129 | 13852 | 2544 | 6129 |
| 36 | 900 | 9344 | 3141 | 7638 | 11173 | 3141 | 7638 | 14829 | 3141 | 7638 | 17267 | 3141 | 7638 |
| 40 | 1000 | 11628 | 3462 | 9413 | 14052 | 3462 | 9413 | 18901 | 3462 | 9413 | 22134 | 3462 | 9413 |
| 44 | 1100 | 14986 | 4522 | 12275 | 18151 | 4522 | 12275 | 24485 | 4522 | 12275 | 28707 | 4522 | 12275 |
| 48 | 1200 | 17831 | 5308 | 14680 | 21667 | 5308 | 14680 | 29337 | 5308 | 14680 | 34451 | 5308 | 14680 |

**Class 300, PN25, PN40**

| Size | | Differential Pressure (bar) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NPS | DN | 10 | | | 20 | | | 30 | | | 51 | | |
| | | BTO | RTO,RTC | ETC | BTO | RTO,RTC | ETC | BTO | RTO,RTC | ETC | BTO | RTO,RTC | ETC |
| 3 | 80 | 67 | 40 | 57 | 71 | 40 | 57 | 130 | 40 | 57 | 148 | 40 | 57 |
| 4 | 100 | 70 | 50 | 60 | 110 | 50 | 60 | 152 | 50 | 60 | 235 | 50 | 60 |
| 6 | 150 | 151 | 110 | 192 | 268 | 110 | 192 | 368 | 110 | 192 | 606 | 110 | 192 |
| 8 | 200 | 278 | 190 | 260 | 522 | 190 | 260 | 678 | 190 | 260 | 1083 | 190 | 260 |
| 10 | 250 | 442 | 230 | 344 | 850 | 230 | 344 | 1081 | 230 | 344 | 1733 | 230 | 344 |
| 12 | 300 | 645 | 380 | 569 | 1222 | 380 | 569 | 1578 | 380 | 569 | 2542 | 380 | 569 |
| 14 | 350 | 786 | 470 | 674 | 1646 | 470 | 674 | 1921 | 470 | 674 | 3545 | 470 | 674 |
| 16 | 400 | 1108 | 850 | 1168 | 2320 | 850 | 1168 | 2709 | 850 | 1168 | 5498 | 850 | 1168 |
| 18 | 450 | 1418 | 990 | 1417 | 2971 | 990 | 1417 | 3469 | 990 | 1417 | 7105 | 990 | 1417 |
| 20 | 500 | 1767 | 1150 | 1760 | 3703 | 1150 | 1760 | 4323 | 1150 | 1760 | 9621 | 1150 | 1760 |
| 24 | 600 | 2581 | 1350 | 2263 | 5405 | 1350 | 2263 | 6312 | 1350 | 2263 | 16537 | 1350 | 2263 |
| 28 | 700 | 7986 | 2544 | 7189 | 11871 | 2544 | 7189 | 15756 | 2544 | 7189 | 23212 | 2544 | 7189 |
| 32 | 800 | 11589 | 3800 | 10518 | 17372 | 3800 | 10518 | 23156 | 3800 | 10518 | 34397 | 3800 | 10518 |
| 36 | 900 | 15574 | 5308 | 14695 | 23316 | 5308 | 14695 | 31060 | 5308 | 14695 | 46183 | 5308 | 14695 |
| 40 | 1000 | 19970 | 6931 | 19943 | 29811 | 6931 | 19943 | 39651 | 6931 | 19943 | 59632 | 6931 | 19943 |
| 44 | 1100 | 24174 | 7956 | 24410 | 36530 | 7956 | 24410 | 48885 | 7956 | 24410 | 74003 | 7956 | 24410 |
| 48 | 1200 | 28061 | 9052 | 28638 | 42665 | 9052 | 28638 | 57268 | 9052 | 28638 | 86994 | 9052 | 28638 |

**Class 600, PN63, PN100**

| Size | | Differential Pressure (bar) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NPS | DN | 25 | | | 50 | | | 75 | | | 100 | | |
| | | BTO | RTO,RTC | ETC | BTO | RTO,RTC | ETC | BTO | RTO,RTC | ETC | BTO | RTO,RTC | ETC |
| 6 | 150 | 743 | 452 | 743 | 915 | 452 | 743 | 1107 | 452 | 743 | 1322 | 452 | 743 |
| 8 | 200 | 1466 | 940 | 1466 | 2174 | 940 | 1466 | 2709 | 940 | 1466 | 3312 | 940 | 1466 |
| 10 | 250 | 1996 | 1137 | 1996 | 2869 | 1137 | 1996 | 3615 | 1137 | 1996 | 4454 | 1137 | 1996 |
| 12 | 300 | 3448 | 1985 | 3343 | 4795 | 1985 | 3343 | 6020 | 1985 | 3343 | 7396 | 1985 | 3343 |
| 14 | 350 | 3993 | 2303 | 3993 | 5332 | 2303 | 3993 | 6642 | 2303 | 3993 | 8115 | 2303 | 3993 |
| 16 | 400 | 5087 | 2643 | 5000 | 7354 | 2643 | 5000 | 9417 | 2643 | 5000 | 11739 | 2643 | 5000 |
| 18 | 450 | 8313 | 4833 | 8188 | 11924 | 4833 | 8188 | 15066 | 4833 | 8188 | 18602 | 4833 | 8188 |
| 20 | 500 | 11548 | 5967 | 10659 | 14279 | 5967 | 10659 | 17939 | 5967 | 10659 | 22056 | 5967 | 10659 |
| 24 | 600 | 14125 | 7220 | 13853 | 20833 | 7220 | 13853 | 26909 | 7220 | 13853 | 33745 | 7220 | 13853 |

**Class 900**

| Size | | Differential Pressure (bar) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NPS | DN | 25 | | | 75 | | | 100 | | | 154 | | |
| | | BTO | RTO,RTC | ETC | BTO | RTO,RTC | ETC | BTO | RTO,RTC | ETC | BTO | RTO,RTC | ETC |
| 6 | 150 | 1069 | 761 | 1069 | 1363 | 761 | 1069 | 1545 | 761 | 1069 | 1937 | 761 | 1069 |
| 8 | 200 | 1883 | 1137 | 1883 | 2455 | 1137 | 1883 | 2862 | 1137 | 1883 | 3741 | 1137 | 1883 |
| 10 | 250 | 3629 | 2303 | 3629 | 4610 | 2302 | 3629 | 5329 | 2302 | 3629 | 6882 | 2302 | 3629 |
| 12 | 300 | 4799 | 3819 | 4799 | 6091 | 3819 | 4799 | 7056 | 3819 | 4799 | 9141 | 3819 | 4799 |
| 14 | 350 | 7469 | 4833 | 7469 | 9299 | 4833 | 7469 | 10672 | 4833 | 7469 | 13637 | 4833 | 7469 |
| 16 | 400 | 8400 | 5967 | 8400 | 11227 | 5967 | 8400 | 13285 | 5967 | 8400 | 17730 | 5967 | 8400 |
| 18 | 450 | 12751 | 7220 | 12751 | 16900 | 7220 | 12751 | 19962 | 7220 | 12751 | 26574 | 7220 | 12751 |
| 20 | 500 | 15822 | 8592 | 15822 | 21150 | 8592 | 15822 | 25133 | 8592 | 15822 | 33735 | 8592 | 15822 |
| 24 | 600 | 20439 | 11355 | 20439 | 27948 | 11354 | 20439 | 33628 | 11354 | 20439 | 45898 | 11354 | 20439 |

## Assumptions:

- Seat ring: S31803+Graphite
- Operating temperature: −29 to 38°C
- Medium characteristic: Lubricating
- Cycle frequency: Daily
- Stem sealing: ISO 15848

Stem side installation is the preferred direction as the fluid pressure supports the contact force.
In case of torques for Bi-directional application please contact Univals technical staff.

# Torque — MAST (Ambient Temperature)

| NPS | Material | Class150 | Class300 | Class600 | Class900 |
|---|---|---|---|---|---|
| | | MAST(Nm) | MAST(Nm) | MAST(Nm) | MAST(Nm) |
| 3 | 17-4PH | 593 | 593 | / | / |
| 4 | 17-4PH | 593 | 593 | / | / |
| 6 | 17-4PH | 1285 | 1285 | 4883 | 7288 |
| 8 | 17-4PH | 2375 | 7288 | 10378 | 18947 |
| 10 | 17-4PH | 4883 | 14235 | 14235 | 24599 |
| 12 | 17-4PH | 7288 | 24599 | 24599 | 39062 |
| 14 | 17-4PH | 14235 | 24599 | 31275 | 83021 |
| 16 | 17-4PH | 14235 | 39062 | 39062 | 83021 |
| 18 | 17-4PH | 24599 | 58308 | 69938 | 196789 |
| 20 | 17-4PH | 24599 | 58308 | 97640 | 196789 |
| 24 | 17-4PH | 39062 | 113883 | 131833 | 312494 |
| 28 | 17-4PH | 58308 | 151578 | / | / |
| 32 | 17-4PH | 83021 | 196789 | / | / |
| 36 | 17-4PH | 113883 | 250200 | / | / |
| 40 | 17-4PH | 196789 | 466464 | / | / |
| 48 | 17-4PH | 312494 | 559506 | / | / |

# Leakage Rates

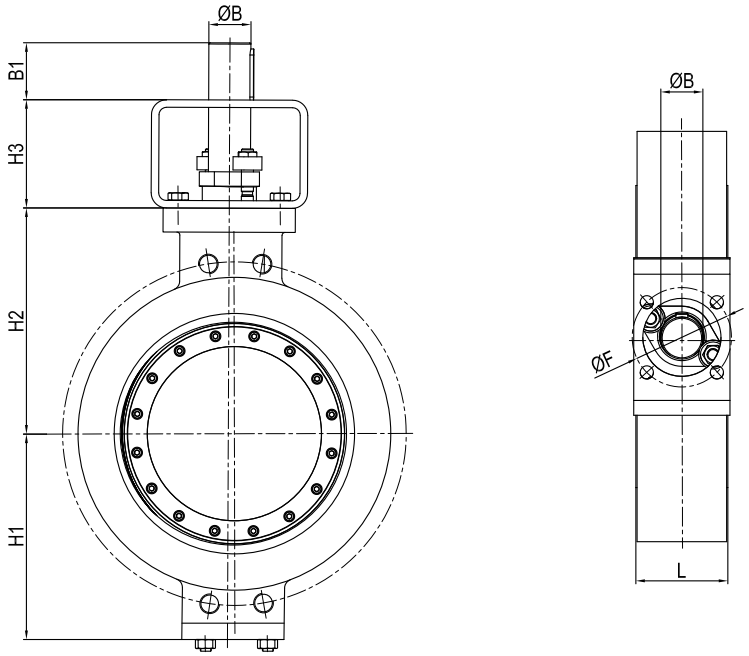
| Pressure Class | Size | | | FCI70-2 | | | API 598 | | |
|---|---|---|---|---|---|---|---|---|---|
| | NPS | DIN | Leakage Rate V(B) (ml/min) | Leakage Rate V(B1) (ml/min) | Leakage Rate VI (ml/min) | Testing Time (s) | Test Water (ml/min) | Test Gas (ml/min) | Testing Time (s) |
| Class 150 | 3 | 80 | 0.44 | 14 | 0.9 | 60 | 0.375 | 0.12 | 60 |
| Class 300 | 3 | 80 | 1.11 | 14 | 0.9 | 60 | 0.375 | 0.12 | 60 |
| Class 150 | 4 | 100 | 0.53 | 16.82 | 1.7 | 60 | 0.5 | 0.16 | 60 |
| Class 300 | 4 | 100 | 1.33 | 16.82 | 1.7 | 60 | 0.5 | 0.16 | 60 |
| Class 150 | 6 | 150 | 0.83 | 26.22 | 4 | 60 | 0.75 | 0.24 | 60 |
| Class 300 | 6 | 150 | 2.07 | 26.22 | 4 | 60 | 0.75 | 0.24 | 60 |
| Class 600 | 6 | 150 | 4.14 | 26.22 | 4 | 60 | 0.75 | 0.24 | 60 |
| Class 900 | 6 | 150 | 6.21 | 26.22 | 4 | 60 | 0.75 | 0.24 | 60 |
| Class 150 | 8 | 200 | 1.12 | 35.47 | 6.75 | 60 | 1 | 0.32 | 120 |
| Class 300 | 8 | 200 | 2.8 | 35.47 | 6.75 | 60 | 1 | 0.32 | 120 |
| Class 600 | 8 | 200 | 5.6 | 35.47 | 6.75 | 60 | 1 | 0.32 | 120 |
| Class 900 | 8 | 200 | 8.4 | 35.47 | 6.75 | 60 | 1 | 0.32 | 120 |
| Class 150 | 10 | 250 | 1.42 | 44.81 | 11.1 | 60 | 1.25 | 0.4 | 120 |
| Class 300 | 10 | 250 | 3.54 | 44.81 | 11.1 | 60 | 1.25 | 0.4 | 120 |
| Class 600 | 10 | 250 | 7.08 | 44.81 | 11.1 | 60 | 1.25 | 0.4 | 120 |
| Class 900 | 10 | 250 | 10.61 | 44.81 | 11.1 | 60 | 1.25 | 0.4 | 120 |
| Class 150 | 12 | 300 | 1.65 | 52.25 | 16 | 60 | 1.5 | 0.48 | 120 |
| Class 300 | 12 | 300 | 4.13 | 52.25 | 16 | 60 | 1.5 | 0.48 | 120 |
| Class 600 | 12 | 300 | 8.25 | 52.25 | 16 | 60 | 1.5 | 0.48 | 120 |
| Class 900 | 12 | 300 | 12.38 | 52.25 | 16 | 60 | 1.5 | 0.48 | 120 |

| Pressure Class | Size | | | FCI70-2 | | | API 598 | | |
|---|---|---|---|---|---|---|---|---|---|
| | NPS | DIN | Leakage Rate V(B) (ml/min) | Leakage Rate V(B1) (ml/min) | Leakage Rate VI (ml/min) | Testing Time (s) | Test Water (ml/min) | Test Gas (ml/min) | Testing Time (s) |
| Class 150 | 14 | 350 | 1.93 | 60.99 | 21.6 | 60 | 1.75 | 0.56 | 120 |
| Class 300 | 14 | 350 | 4.82 | 60.99 | 21.6 | 60 | 1.75 | 0.56 | 120 |
| Class 600 | 14 | 350 | 9.63 | 60.99 | 21.6 | 60 | 1.75 | 0.56 | 120 |
| Class 900 | 14 | 350 | 14.45 | 60.99 | 21.6 | 60 | 1.75 | 0.56 | 120 |
| Class 150 | 16 | 400 | 2.24 | 71.01 | 28.4 | 60 | 2 | 0.64 | 120 |
| Class 300 | 16 | 400 | 5.61 | 71.01 | 28.4 | 60 | 2 | 0.64 | 120 |
| Class 600 | 16 | 400 | 11.21 | 71.01 | 28.4 | 60 | 2 | 0.64 | 120 |
| Class 900 | 16 | 400 | 16.82 | 71.01 | 28.4 | 60 | 2 | 0.64 | 120 |
| Class 150 | 20 | 500 | 2.88 | 91.24 | / | 60 | 2.5 | 0.8 | 120 |
| Class 300 | 20 | 500 | 7.2 | 91.24 | / | 60 | 2.5 | 0.8 | 120 |
| Class 600 | 20 | 500 | 14.41 | 91.24 | / | 60 | 2.5 | 0.8 | 120 |
| Class 900 | 20 | 500 | 21.61 | 91.24 | / | 60 | 2.5 | 0.8 | 120 |
| Class 150 | 24 | 600 | 3.42 | 108.45 | / | 60 | 3 | 0.96 | 120 |
| Class 300 | 24 | 600 | 8.56 | 108.45 | / | 60 | 3 | 0.96 | 120 |
| Class 600 | 24 | 600 | 17.12 | 108.45 | / | 60 | 3 | 0.96 | 120 |
| Class 900 | 24 | 600 | 25.68 | 108.45 | / | 60 | 3 | 0.96 | 120 |
| Class 150 | 28 | 700 | 4.02 | 127.3 | / | 60 | 3.5 | 1.12 | 120 |
| Class 300 | 28 | 700 | 10.05 | 127.3 | / | 60 | 3.5 | 1.12 | 120 |
| Class 150 | 32 | 800 | 4.62 | 146.3 | / | 60 | 4 | 1.28 | 120 |
| Class 300 | 32 | 800 | 11.55 | 146.3 | / | 60 | 4 | 1.28 | 120 |
| Class 150 | 36 | 900 | 5.22 | 165.3 | / | 60 | 4.5 | 1.44 | 120 |
| Class 300 | 36 | 900 | 13.05 | 165.3 | / | 60 | 4.5 | 1.44 | 120 |
| Class 150 | 40 | 1000 | 5.82 | 184.3 | / | 60 | 5 | 1.6 | 120 |
| Class 300 | 40 | 1000 | 14.55 | 184.3 | / | 60 | 5 | 1.6 | 120 |
| Class 150 | 48 | 1200 | 6.96 | 220.4 | / | 60 | 6 | 1.92 | 120 |
| Class 300 | 48 | 1200 | 17.4 | 220.4 | / | 60 | 6 | 1.92 | 120 |

# Test Procedures

| | | | | |
|---|---|---|---|---|
| ANSI/FCI 70-2 | Rate V | Type B | Water | 1.0 PN |
| ANSI/FCI 70-2 | Rate V | Type B1 | Air—N2 | 3.5 bar |
| ANSI/FCI 70-2 | Rate VI | Type C | Air—N2 | 3.5 bar |
| API598 | Test water | | Water | 1.1 PN |
| API598 | Test gas | | Air-N2 | 1.1 PN or 5.5 bar |

# Triple Offset Butterfly Valve Dimensions



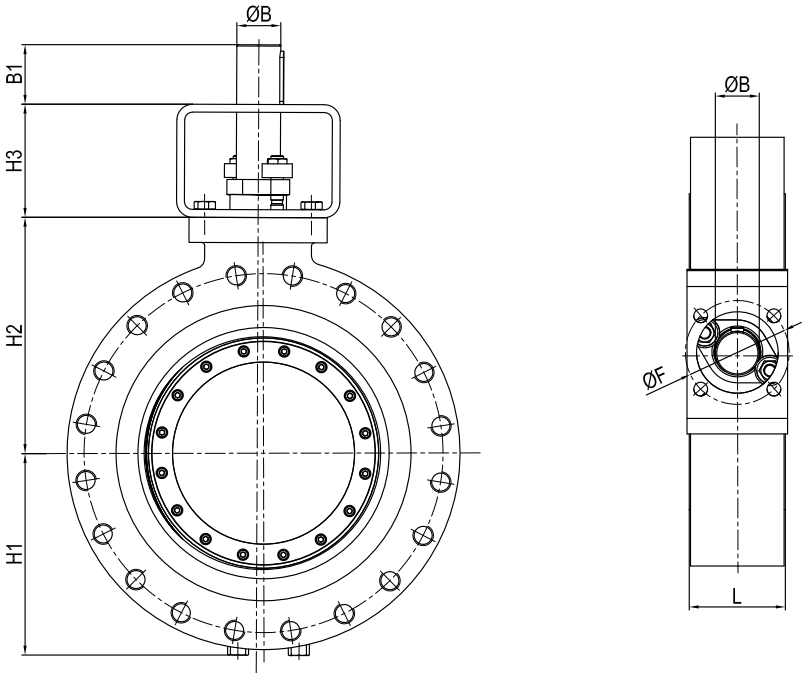

**ASME Class Series Approximate Dimensions**

| Size | | WAFER-Class150 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 3 | 80 | 90 | 120 | 80 | 18 | 17 | --- | F07 | 64 | 8 |
| 4 | 100 | 110 | 150 | 80 | 18 | 17 | --- | F10 | 64 | 13 |
| 6 | 150 | 135 | 165 | 80 | 23 | 22 | --- | F10 | 76 | 21 |
| 8 | 200 | 170 | 200 | 90 | 28 | 27 | --- | F12 | 89 | 34 |
| 10 | 250 | 215 | 220 | 90 | 65 | --- | 35 | F12 | 114 | 54 |
| 12 | 300 | 265 | 260 | 120 | 75 | --- | 40 | F14 | 114 | 80 |
| 14 | 350 | 265 | 295 | 120 | 85 | --- | 50 | F14 | 127 | 91 |
| 16 | 400 | 327 | 350 | 120 | 85 | --- | 50 | F14 | 140 | 137 |
| 18 | 450 | 355 | 370 | 140 | 95 | --- | 60 | F16 | 152 | 184 |
| 20 | 500 | 390 | 395 | 140 | 95 | --- | 60 | F16 | 152 | 212 |
| 24 | 600 | 445 | 440 | 140 | 95 | --- | 70 | F16 | 178 | 300 |
| 28 | 700 | 545 | 690 | 200 | 130 | --- | 80 | F25 | 165 | 430 |
| 32 | 800 | 575 | 730 | 200 | 170 | --- | 90 | F30 | 190 | 535 |
| 36 | 900 | 655 | 855 | 200 | 170 | --- | 100 | F30 | 203 | 708 |
| 40 | 1000 | 725 | 910 | 250 | 200 | --- | 120 | F35 | 216 | 1090 |
| 48 | 1200 | 860 | 1025 | 250 | 200 | --- | 140 | F35 | 254 | 1455 |

| Size | | WAFER-Class300 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 3 | 80 | 120 | 130 | 80 | 18 | 17 | --- | F10 | 64 | 12 |
| 4 | 100 | 110 | 150 | 80 | 18 | 17 | --- | F10 | 64 | 14 |
| 6 | 150 | 185 | 185 | 90 | 22 | 22 | --- | F12 | 76 | 31 |
| 8 | 200 | 225 | 235 | 120 | 75 | --- | 40 | F14 | 89 | 54 |
| 10 | 250 | 265 | 270 | 120 | 85 | --- | 50 | F14 | 114 | 90 |
| 12 | 300 | 305 | 310 | 140 | 95 | --- | 60 | F16 | 114 | 121 |
| 14 | 350 | 340 | 335 | 140 | 95 | --- | 60 | F16 | 127 | 159 |
| 16 | 400 | 370 | 375 | 180 | 95 | --- | 70 | F16 | 140 | 183 |
| 18 | 450 | 405 | 405 | 200 | 135 | --- | 80 | F25 | 152 | 253 |
| 20 | 500 | 430 | 435 | 200 | 135 | --- | 80 | F25 | 152 | 278 |
| 24 | 600 | 500 | 510 | 200 | 160 | --- | 100 | F30 | 178 | 445 |
| 28 | 700 | 570 | 755 | 250 | 170 | --- | 110 | F35 | 229 | 679 |
| 32 | 800 | 660 | 860 | 250 | 200 | --- | 120 | F35 | 241 | 817 |
| 36 | 900 | 725 | 900 | 280 | 200 | --- | 130 | F40 | 241 | 1133 |
| 40 | 1000 | 770 | 945 | 300 | 200 | --- | 160 | F48 | 300 | 1744 |
| 48 | 1200 | 920 | 1165 | 300 | 230 | --- | 170 | F48 | 350 | 2328 |

| Size | | WAFER-Class600 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 6 | 150 | 229 | 257 | 140 | 85 | --- | 35 | F16 | 78 | 77 |
| 8 | 200 | 268 | 241 | 180 | 105 | --- | 45 | F25 | 102 | 126 |
| 10 | 250 | 307 | 252 | 200 | 105 | --- | 50 | F25 | 117 | 209 |
| 12 | 300 | 366 | 267 | 200 | 115 | --- | 60 | F25 | 140 | 279 |
| 14 | 350 | 391 | 309 | 200 | 115 | --- | 65 | F30 | 156 | 319 |
| 16 | 400 | 436 | 340 | 200 | 115 | --- | 70 | F30 | 178 | 428 |
| 18 | 450 | 482 | 422 | 250 | 160 | --- | 85 | F35 | 200 | 619 |
| 20 | 500 | 515 | 621 | 280 | 160 | --- | 95 | F40 | 216 | 799 |
| 24 | 600 | 564 | 656 | 280 | 160 | --- | 105 | F40 | 232 | 911 |

# Triple Offset Butterfly Valve Dimensions



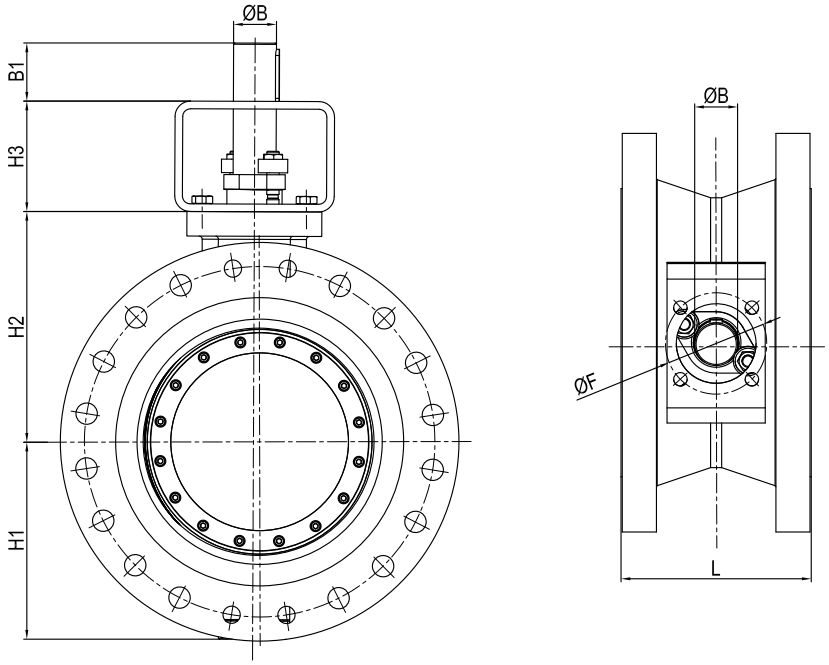

**ASME Class Series Approximate Dimensions**

| Size | | LUG-Class150 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 3 | 80 | 116 | 110 | 80 | 18 | 17 | --- | F07 | 64 | 14 |
| 4 | 100 | 135 | 140 | 80 | 18 | 17 | --- | F10 | 64 | 22 |
| 6 | 150 | 160 | 150 | 80 | 23 | 22 | --- | F10 | 76 | 32 |
| 8 | 200 | 194 | 186 | 90 | 28 | 27 | --- | F12 | 89 | 54 |
| 10 | 250 | 225 | 215 | 90 | 65 | --- | 35 | F12 | 114 | 88 |
| 12 | 300 | 270 | 255 | 120 | 75 | --- | 40 | F14 | 114 | 129 |
| 14 | 350 | 295 | 280 | 120 | 85 | --- | 50 | F14 | 127 | 168 |
| 16 | 400 | 335 | 310 | 120 | 85 | --- | 50 | F14 | 140 | 222 |
| 18 | 450 | 365 | 330 | 140 | 95 | --- | 60 | F16 | 152 | 263 |
| 20 | 500 | 390 | 395 | 140 | 95 | --- | 60 | F16 | 152 | 321 |
| 24 | 600 | 427 | 440 | 140 | 95 | --- | 70 | F16 | 178 | 467 |
| 28 | 700 | 545 | 690 | 200 | 130 | --- | 80 | F25 | 165 | 508 |
| 32 | 800 | 575 | 730 | 200 | 170 | --- | 90 | F30 | 190 | 632 |
| 36 | 900 | 655 | 855 | 200 | 170 | --- | 100 | F30 | 203 | 836 |
| 40 | 1000 | 725 | 910 | 250 | 200 | --- | 120 | F35 | 216 | 1286 |
| 48 | 1200 | 860 | 1025 | 250 | 200 | --- | 140 | F40 | 254 | 1717 |

| Size | | LUG-Class300 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 3 | 80 | 120 | 130 | 80 | 18 | 17 | --- | F10 | 64 | 19 |
| 4 | 100 | 150 | 160 | 80 | 18 | 17 | --- | F10 | 64 | 26 |
| 6 | 150 | 190 | 195 | 90 | 22 | 22 | --- | F12 | 76 | 47 |
| 8 | 200 | 225 | 235 | 120 | 75 | --- | 40 | F14 | 89 | 80 |
| 10 | 250 | 268 | 268 | 120 | 85 | --- | 50 | F14 | 114 | 125 |
| 12 | 300 | 310 | 305 | 140 | 95 | --- | 60 | F16 | 114 | 177 |
| 14 | 350 | 340 | 340 | 140 | 95 | --- | 60 | F16 | 127 | 230 |
| 16 | 400 | 375 | 375 | 180 | 95 | --- | 70 | F16 | 140 | 309 |
| 18 | 450 | 410 | 410 | 200 | 135 | --- | 80 | F25 | 152 | 410 |
| 20 | 500 | 450 | 450 | 200 | 135 | --- | 80 | F25 | 152 | 473 |
| 24 | 600 | 520 | 520 | 200 | 160 | --- | 100 | F30 | 178 | 746 |
| 28 | 700 | 570 | 755 | 250 | 170 | --- | 110 | F35 | 229 | 812 |
| 32 | 800 | 660 | 860 | 250 | 200 | --- | 120 | F35 | 241 | 1010 |
| 36 | 900 | 725 | 900 | 280 | 200 | --- | 130 | F40 | 241 | 1337 |
| 40 | 1000 | 770 | 945 | 300 | 200 | --- | 160 | F48 | 300 | 2058 |
| 48 | 1200 | 920 | 1165 | 300 | 230 | --- | 170 | F48 | 350 | 2747 |

| Size | | LUG-Class600 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 6 | 150 | 229 | 257 | 140 | 85 | --- | 35 | F16 | 78 | 92 |
| 8 | 200 | 268 | 241 | 180 | 105 | --- | 45 | F25 | 102 | 154 |
| 10 | 250 | 307 | 252 | 200 | 105 | --- | 50 | F25 | 117 | 264 |
| 12 | 300 | 366 | 267 | 200 | 115 | --- | 60 | F25 | 140 | 349 |
| 14 | 350 | 391 | 309 | 200 | 115 | --- | 65 | F30 | 156 | 419 |
| 16 | 400 | 436 | 340 | 200 | 115 | --- | 70 | F30 | 178 | 559 |
| 18 | 450 | 482 | 422 | 250 | 160 | --- | 85 | F35 | 200 | 919 |
| 20 | 500 | 515 | 621 | 280 | 160 | --- | 95 | F40 | 216 | 1199 |
| 24 | 600 | 564 | 656 | 280 | 160 | --- | 105 | F40 | 232 | 1394 |

# Triple Offset Butterfly Valve Dimensions




**ASME Class Series Approximate Dimensions**

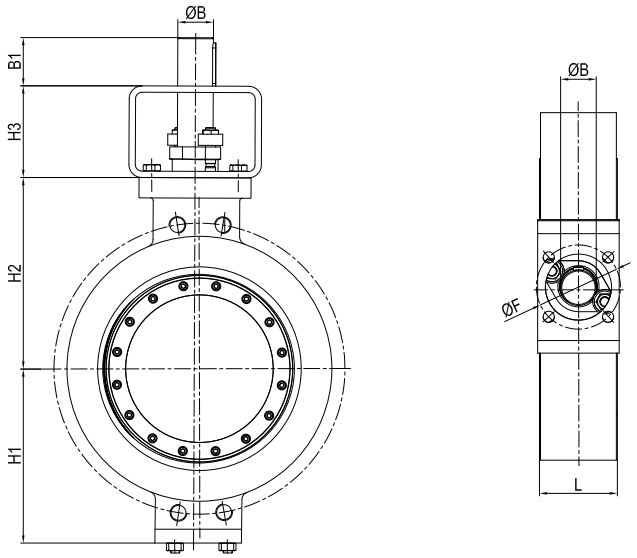
| Size | | DF-Class150 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 3 | 80 | 90 | 120 | 80 | 18 | 17 | --- | F07 | 180 | 16 |
| 4 | 100 | 115 | 150 | 80 | 18 | 17 | --- | F10 | 190 | 25 |
| 6 | 150 | 140 | 165 | 80 | 23 | 22 | --- | F10 | 210 | 37 |
| 8 | 200 | 172 | 200 | 90 | 28 | 27 | --- | F12 | 230 | 59 |
| 10 | 250 | 215 | 220 | 90 | 65 | --- | 35 | F12 | 250 | 81 |
| 12 | 300 | 242 | 260 | 120 | 75 | --- | 40 | F14 | 270 | 123 |
| 14 | 350 | 267 | 295 | 120 | 85 | --- | 50 | F14 | 290 | 162 |
| 16 | 400 | 297 | 325 | 120 | 85 | --- | 50 | F14 | 310 | 205 |
| 18 | 450 | 332 | 345 | 140 | 95 | --- | 60 | F16 | 330 | 250 |
| 20 | 500 | 360 | 375 | 140 | 95 | --- | 60 | F16 | 350 | 313 |
| 24 | 600 | 422 | 440 | 140 | 95 | --- | 70 | F16 | 390 | 434 |
| 28 | 700 | 545 | 720 | 200 | 130 | --- | 80 | F25 | 292 | 808 |
| 32 | 800 | 625 | 775 | 200 | 130 | --- | 90 | F30 | 318 | 1288 |
| 36 | 900 | 685 | 860 | 200 | 170 | --- | 110 | F35 | 330 | 1519 |
| 40 | 1000 | 755 | 935 | 250 | 170 | --- | 110 | F35 | 410 | 1787 |
| 48 | 1200 | 860 | 1055 | 250 | 200 | --- | 140 | F40 | 470 | 2510 |

| Size | | DF-Class300 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 3 | 80 | 105 | 120 | 80 | 18 | 17 | --- | F10 | 180 | 22 |
| 4 | 100 | 128 | 150 | 80 | 18 | 17 | --- | F10 | 190 | 33 |
| 6 | 150 | 160 | 180 | 90 | 22 | 22 | --- | F12 | 210 | 60 |
| 8 | 200 | 190 | 215 | 120 | 75 | --- | 40 | F14 | 230 | 96 |
| 10 | 250 | 223 | 260 | 120 | 85 | --- | 50 | F14 | 250 | 139 |
| 12 | 300 | 264 | 315 | 140 | 95 | --- | 60 | F16 | 270 | 210 |
| 14 | 350 | 293 | 330 | 140 | 95 | --- | 60 | F16 | 290 | 262 |
| 16 | 400 | 327 | 375 | 180 | 95 | --- | 70 | F16 | 310 | 346 |
| 18 | 450 | 359 | 400 | 200 | 135 | --- | 80 | F25 | 330 | 443 |
| 20 | 500 | 388 | 425 | 200 | 135 | --- | 80 | F25 | 350 | 524 |
| 24 | 600 | 460 | 495 | 200 | 160 | --- | 100 | F30 | 390 | 796 |
| 28 | 700 | 580 | 795 | 250 | 170 | --- | 110 | F35 | 430 | 1096 |
| 32 | 800 | 665 | 850 | 250 | 200 | --- | 120 | F40 | 470 | 1492 |
| 36 | 900 | 690 | 885 | 280 | 200 | --- | 130 | F40 | 510 | 2128 |
| 40 | 1000 | 755 | 960 | 300 | 200 | --- | 160 | F48 | 550 | 2502 |
| 48 | 1200 | 950 | 1235 | 300 | 230 | --- | 170 | F48 | 630 | 3514 |

| Size | | DF-Class600 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 6 | 150 | 229 | 257 | 140 | 85 | --- | 35 | F16 | 210 | 138 |
| 8 | 200 | 268 | 241 | 180 | 105 | --- | 45 | F25 | 230 | 228 |
| 10 | 250 | 307 | 252 | 200 | 105 | --- | 50 | F25 | 250 | 372 |
| 12 | 300 | 366 | 267 | 200 | 115 | --- | 60 | F25 | 270 | 442 |
| 14 | 350 | 391 | 309 | 200 | 115 | --- | 65 | F30 | 290 | 571 |
| 16 | 400 | 436 | 340 | 200 | 115 | --- | 70 | F30 | 310 | 693 |
| 18 | 450 | 482 | 422 | 250 | 160 | --- | 85 | F35 | 330 | 1164 |
| 20 | 500 | 515 | 621 | 280 | 160 | --- | 95 | F40 | 350 | 1389 |
| 24 | 600 | 575 | 656 | 280 | 160 | --- | 105 | F40 | 390 | 1973 |

| Size | | DF-Class900 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 6 | 150 | 239 | 272 | 140 | 105 | --- | 40 | F25 | 225 | 168 |
| 8 | 200 | 295 | 286 | 180 | 105 | --- | 55 | F25 | 275 | 302 |
| 10 | 250 | 348 | 320 | 200 | 115 | --- | 60 | F25 | 325 | 388 |
| 12 | 300 | 482 | 533 | 200 | 115 | --- | 70 | F30 | 375 | 589 |
| 14 | 350 | 489 | 483 | 200 | 115 | --- | 90 | F30 | 425 | 802 |
| 16 | 400 | 496 | 530 | 200 | 160 | --- | 90 | F35 | 475 | 1233 |
| 18 | 450 | 512 | 520 | 250 | 160 | --- | 120 | F40 | 500 | 1506 |
| 20 | 500 | 590 | 590 | 280 | 180 | --- | 120 | F40 | 575 | 2084 |
| 24 | 600 | 675 | 750 | 280 | 180 | --- | 140 | F48 | 675 | 2960 |

# DIN PN Series Approximate Dimensions




| Size | | WAFER-PN10 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 3 | 80 | 90 | 120 | 80 | 18 | 17 | --- | F07 | 64 | 8 |
| 4 | 100 | 110 | 150 | 80 | 18 | 17 | --- | F10 | 64 | 13 |
| 6 | 150 | 135 | 165 | 80 | 23 | 22 | --- | F10 | 76 | 21 |
| 8 | 200 | 190 | 200 | 90 | 28 | 27 | --- | F12 | 89 | 34 |
| 10 | 250 | 215 | 220 | 90 | 65 | --- | 35 | F12 | 114 | 54 |
| 12 | 300 | 265 | 260 | 120 | 75 | --- | 40 | F14 | 114 | 80 |
| 14 | 350 | 265 | 295 | 120 | 85 | --- | 50 | F14 | 127 | 91 |
| 16 | 400 | 327 | 350 | 120 | 85 | --- | 50 | F14 | 140 | 137 |
| 18 | 450 | 355 | 370 | 140 | 95 | --- | 60 | F16 | 152 | 184 |
| 20 | 500 | 390 | 395 | 140 | 95 | --- | 60 | F16 | 152 | 212 |
| 24 | 600 | 445 | 440 | 140 | 95 | --- | 70 | F16 | 178 | 300 |
| 28 | 700 | 545 | 560 | 200 | 130 | --- | 70 | F25 | 229 | 335 |
| 32 | 800 | 625 | 635 | 200 | 130 | --- | 80 | F30 | 241 | 405 |
| 36 | 900 | 685 | 705 | 200 | 130 | --- | 90 | F30 | 241 | 578 |
| 40 | 1000 | 750 | 760 | 200 | 170 | --- | 110 | F35 | 300 | 705 |
| 48 | 1200 | 860 | 1060 | 250 | 200 | --- | 120 | F35 | 350 | 1055 |

| Size | | WAFER-PN16 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 3 | 80 | 90 | 120 | 80 | 18 | 17 | --- | F07 | 64 | 8 |
| 4 | 100 | 110 | 150 | 80 | 18 | 17 | --- | F10 | 64 | 13 |
| 6 | 150 | 135 | 165 | 80 | 23 | 22 | --- | F10 | 76 | 21 |
| 8 | 200 | 190 | 200 | 90 | 28 | 27 | --- | F12 | 89 | 34 |
| 10 | 250 | 215 | 220 | 90 | 65 | --- | 35 | F12 | 114 | 54 |
| 12 | 300 | 265 | 260 | 120 | 75 | --- | 40 | F14 | 114 | 80 |
| 14 | 350 | 265 | 295 | 120 | 85 | --- | 50 | F14 | 127 | 91 |
| 16 | 400 | 327 | 350 | 120 | 85 | --- | 50 | F14 | 140 | 137 |
| 18 | 450 | 355 | 370 | 140 | 95 | --- | 60 | F16 | 152 | 184 |
| 20 | 500 | 390 | 395 | 140 | 95 | --- | 60 | F16 | 152 | 212 |
| 24 | 600 | 445 | 440 | 140 | 95 | --- | 70 | F16 | 178 | 300 |
| 28 | 700 | 545 | 560 | 200 | 130 | --- | 70 | F25 | 229 | 335 |
| 32 | 800 | 625 | 635 | 200 | 130 | --- | 80 | F30 | 241 | 405 |
| 36 | 900 | 685 | 705 | 200 | 130 | --- | 90 | F30 | 241 | 578 |
| 40 | 1000 | 750 | 760 | 200 | 170 | --- | 110 | F35 | 300 | 705 |
| 48 | 1200 | 860 | 1060 | 250 | 200 | --- | 120 | F35 | 350 | 1055 |

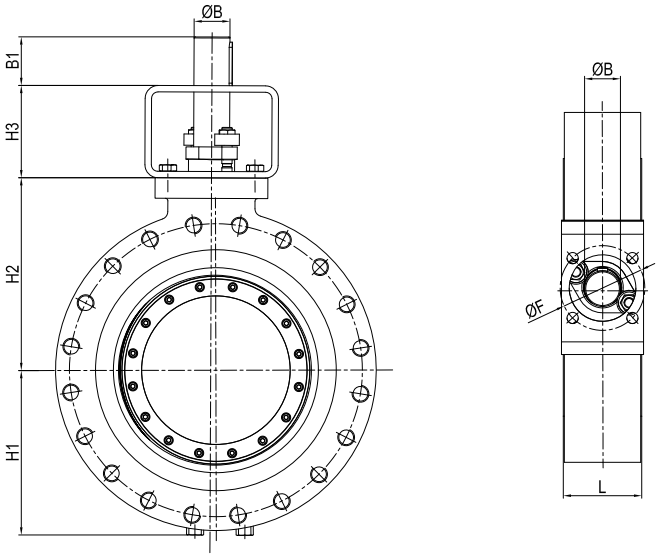
| Size | | WAFER-PN25 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 3 | 80 | 120 | 130 | 80 | 18 | 17 | --- | F10 | 64 | 11 |
| 4 | 100 | 110 | 150 | 80 | 18 | 17 | --- | F10 | 64 | 13 |
| 6 | 150 | 185 | 185 | 90 | 22 | 22 | --- | F12 | 76 | 30 |
| 8 | 200 | 225 | 235 | 120 | 75 | --- | 40 | F14 | 89 | 51 |
| 10 | 250 | 265 | 270 | 120 | 85 | --- | 50 | F14 | 114 | 88 |
| 12 | 300 | 305 | 310 | 140 | 95 | --- | 60 | F16 | 114 | 119 |
| 14 | 350 | 340 | 335 | 140 | 95 | --- | 60 | F16 | 127 | 155 |
| 16 | 400 | 370 | 375 | 180 | 95 | --- | 70 | F16 | 140 | 183 |
| 18 | 450 | 405 | 405 | 200 | 135 | --- | 80 | F25 | 152 | 251 |
| 20 | 500 | 430 | 435 | 200 | 135 | --- | 80 | F25 | 152 | 275 |
| 24 | 600 | 500 | 510 | 200 | 160 | --- | 100 | F30 | 178 | 440 |

| Size | | WAFER-PN40 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 3 | 80 | 120 | 130 | 80 | 18 | 17 | --- | F10 | 64 | 11 |
| 4 | 100 | 110 | 150 | 80 | 18 | 17 | --- | F10 | 64 | 13 |
| 6 | 150 | 185 | 185 | 90 | 22 | 22 | --- | F12 | 76 | 30 |
| 8 | 200 | 225 | 235 | 120 | 75 | --- | 40 | F14 | 89 | 51 |
| 10 | 250 | 265 | 270 | 120 | 85 | --- | 50 | F14 | 114 | 88 |
| 12 | 300 | 305 | 310 | 140 | 95 | --- | 60 | F16 | 114 | 119 |
| 14 | 350 | 340 | 335 | 140 | 95 | --- | 60 | F16 | 127 | 155 |
| 16 | 400 | 370 | 375 | 180 | 95 | --- | 70 | F16 | 140 | 183 |
| 18 | 450 | 405 | 405 | 200 | 135 | --- | 80 | F25 | 152 | 251 |
| 20 | 500 | 430 | 435 | 200 | 135 | --- | 80 | F25 | 152 | 278 |
| 24 | 600 | 500 | 510 | 200 | 160 | --- | 100 | F30 | 178 | 445 |

| Size | | WAFER-PN63 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 6 | 150 | 229 | 257 | 140 | 85 | --- | 35 | F16 | 78 | 68 |
| 8 | 200 | 268 | 241 | 180 | 105 | --- | 45 | F25 | 102 | 92 |
| 10 | 250 | 307 | 252 | 200 | 105 | --- | 50 | F25 | 117 | 107 |
| 12 | 300 | 366 | 267 | 200 | 115 | --- | 60 | F25 | 140 | 130 |
| 14 | 350 | 391 | 309 | 200 | 115 | --- | 65 | F30 | 156 | 146 |
| 16 | 400 | 436 | 340 | 200 | 115 | --- | 70 | F30 | 178 | 168 |

| Size | | WAFER-PN100 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 6 | 150 | 229 | 257 | 140 | 85 | --- | 35 | F16 | 78 | 73 |
| 8 | 200 | 268 | 241 | 180 | 105 | --- | 45 | F25 | 102 | 97 |
| 10 | 250 | 307 | 252 | 200 | 105 | --- | 50 | F25 | 117 | 112 |
| 12 | 300 | 366 | 267 | 200 | 115 | --- | 60 | F25 | 140 | 135 |
| 14 | 350 | 391 | 309 | 200 | 115 | --- | 65 | F30 | 156 | 151 |

# DIN PN Series Approximate Dimensions




| Size | | LUG-PN10 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 3 | 80 | 116 | 110 | 80 | 18 | 17 | --- | F07 | 64 | 14 |
| 4 | 100 | 135 | 140 | 80 | 18 | 17 | --- | F10 | 64 | 22 |
| 6 | 150 | 160 | 150 | 80 | 23 | 22 | --- | F10 | 76 | 32 |
| 8 | 200 | 194 | 186 | 90 | 28 | 27 | --- | F12 | 89 | 54 |
| 10 | 250 | 225 | 215 | 90 | 65 | --- | 35 | F12 | 114 | 88 |
| 12 | 300 | 270 | 255 | 120 | 75 | --- | 40 | F14 | 114 | 129 |
| 14 | 350 | 295 | 280 | 120 | 85 | --- | 50 | F14 | 127 | 168 |
| 16 | 400 | 335 | 310 | 120 | 85 | --- | 50 | F14 | 140 | 222 |
| 18 | 450 | 365 | 330 | 140 | 95 | --- | 60 | F16 | 152 | 263 |
| 20 | 500 | 390 | 395 | 140 | 95 | --- | 60 | F16 | 152 | 321 |
| 24 | 600 | 427 | 440 | 140 | 95 | --- | 70 | F16 | 178 | 467 |
| 28 | 700 | 510 | 540 | 200 | 130 | --- | 70 | F25 | 165 | 380 |
| 32 | 800 | 600 | 610 | 200 | 130 | --- | 80 | F30 | 190 | 500 |
| 36 | 900 | 655 | 665 | 200 | 130 | --- | 90 | F30 | 203 | 650 |
| 40 | 1000 | 715 | 725 | 200 | 170 | --- | 110 | F35 | 216 | 900 |
| 48 | 1200 | 860 | 1025 | 250 | 200 | --- | 140 | F40 | 254 | 1217 |

| Size | | LUG -PN16 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 3 | 80 | 116 | 110 | 80 | 18 | 17 | --- | F07 | 64 | 14 |
| 4 | 100 | 135 | 140 | 80 | 18 | 17 | --- | F10 | 64 | 22 |
| 6 | 150 | 160 | 150 | 80 | 23 | 22 | --- | F10 | 76 | 32 |
| 8 | 200 | 194 | 186 | 90 | 28 | 27 | --- | F12 | 89 | 54 |
| 10 | 250 | 225 | 215 | 90 | 65 | --- | 35 | F12 | 114 | 88 |
| 12 | 300 | 270 | 255 | 120 | 75 | --- | 40 | F14 | 114 | 129 |
| 14 | 350 | 295 | 280 | 120 | 85 | --- | 50 | F14 | 127 | 168 |
| 16 | 400 | 335 | 310 | 120 | 85 | --- | 50 | F14 | 140 | 222 |
| 18 | 450 | 365 | 330 | 140 | 95 | --- | 60 | F16 | 152 | 263 |
| 20 | 500 | 390 | 395 | 140 | 95 | --- | 60 | F16 | 152 | 321 |
| 24 | 600 | 427 | 440 | 140 | 95 | --- | 70 | F16 | 178 | 467 |
| 28 | 700 | 510 | 540 | 200 | 130 | --- | 70 | F25 | 165 | 380 |
| 32 | 800 | 600 | 610 | 200 | 130 | --- | 80 | F30 | 190 | 500 |
| 36 | 900 | 655 | 665 | 200 | 130 | --- | 90 | F30 | 203 | 650 |
| 40 | 1000 | 715 | 725 | 200 | 170 | --- | 110 | F35 | 216 | 900 |
| 48 | 1200 | 860 | 1025 | 250 | 200 | --- | 140 | F40 | 254 | 1217 |

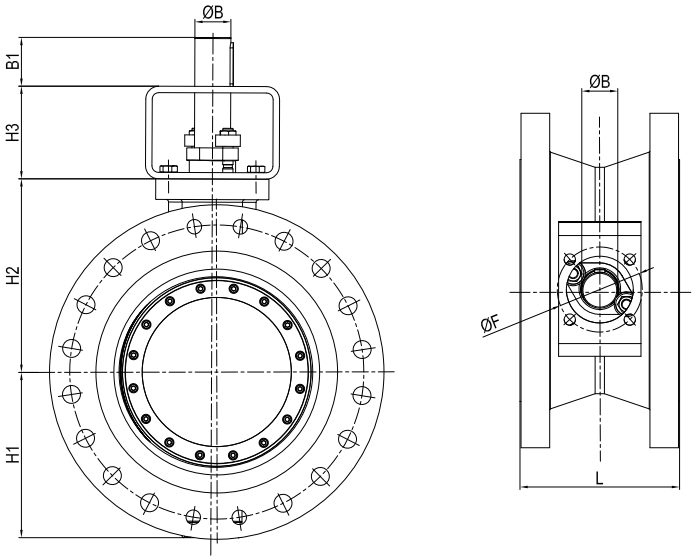
| Size | | LUG -PN25 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 3 | 80 | 120 | 130 | 80 | 18 | 17 | --- | F10 | 64 | 19 |
| 4 | 100 | 150 | 160 | 80 | 18 | 17 | --- | F10 | 64 | 26 |
| 6 | 150 | 190 | 195 | 90 | 22 | 22 | --- | F12 | 76 | 47 |
| 8 | 200 | 225 | 235 | 120 | 75 | --- | 40 | F14 | 89 | 80 |
| 10 | 250 | 268 | 268 | 120 | 85 | --- | 50 | F14 | 114 | 125 |
| 12 | 300 | 310 | 305 | 140 | 95 | --- | 60 | F16 | 114 | 177 |
| 14 | 350 | 340 | 340 | 140 | 95 | --- | 60 | F16 | 127 | 230 |
| 16 | 400 | 375 | 375 | 180 | 95 | --- | 70 | F16 | 140 | 309 |
| 18 | 450 | 410 | 410 | 200 | 135 | --- | 80 | F25 | 152 | 410 |
| 20 | 500 | 450 | 450 | 200 | 135 | --- | 80 | F25 | 152 | 473 |
| 24 | 600 | 520 | 520 | 200 | 160 | --- | 100 | F30 | 178 | 746 |

| Size | | LUG -PN40 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 3 | 80 | 120 | 130 | 80 | 18 | 17 | --- | F10 | 64 | 19 |
| 4 | 100 | 150 | 160 | 80 | 18 | 17 | --- | F10 | 64 | 26 |
| 6 | 150 | 190 | 195 | 90 | 22 | 22 | --- | F12 | 76 | 47 |
| 8 | 200 | 225 | 235 | 120 | 75 | --- | 40 | F14 | 89 | 80 |
| 10 | 250 | 268 | 268 | 120 | 85 | --- | 50 | F14 | 114 | 125 |
| 12 | 300 | 310 | 305 | 140 | 95 | --- | 60 | F16 | 114 | 177 |
| 14 | 350 | 340 | 340 | 140 | 95 | --- | 60 | F16 | 127 | 230 |
| 16 | 400 | 375 | 375 | 180 | 95 | --- | 70 | F16 | 140 | 309 |
| 18 | 450 | 410 | 410 | 200 | 135 | --- | 80 | F25 | 152 | 410 |
| 20 | 500 | 450 | 450 | 200 | 135 | --- | 80 | F25 | 152 | 473 |
| 24 | 600 | 520 | 520 | 200 | 160 | --- | 100 | F30 | 178 | 746 |

| Size | | LUG -PN63 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 6 | 150 | 229 | 257 | 140 | 85 | --- | 35 | F16 | 78 | 78 |
| 8 | 200 | 268 | 241 | 180 | 105 | --- | 45 | F25 | 102 | 130 |
| 10 | 250 | 307 | 252 | 200 | 105 | --- | 50 | F25 | 117 | 240 |
| 12 | 300 | 366 | 267 | 200 | 115 | --- | 60 | F25 | 140 | 325 |
| 14 | 350 | 391 | 309 | 200 | 115 | --- | 65 | F30 | 156 | 395 |
| 16 | 400 | 436 | 340 | 200 | 115 | --- | 70 | F30 | 178 | 535 |

| Size | | LUG -PN100 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 6 | 150 | 229 | 257 | 140 | 85 | --- | 35 | F16 | 78 | 93 |
| 8 | 200 | 268 | 241 | 180 | 105 | --- | 45 | F25 | 102 | 155 |
| 10 | 250 | 307 | 252 | 200 | 105 | --- | 50 | F25 | 117 | 265 |
| 12 | 300 | 366 | 267 | 200 | 115 | --- | 60 | F25 | 140 | 350 |
| 14 | 350 | 391 | 309 | 200 | 115 | --- | 65 | F30 | 156 | 420 |

# DIN PN Series Approximate Dimensions




| Size | | DF-PN10 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 3 | 80 | 90 | 120 | 80 | 18 | 17 | --- | F07 | 180 | 16 |
| 4 | 100 | 115 | 150 | 80 | 18 | 17 | --- | F10 | 190 | 25 |
| 6 | 150 | 140 | 165 | 80 | 23 | 22 | --- | F10 | 210 | 37 |
| 8 | 200 | 172 | 200 | 90 | 28 | 27 | --- | F12 | 230 | 59 |
| 10 | 250 | 215 | 220 | 90 | 65 | --- | 35 | F12 | 250 | 81 |
| 12 | 300 | 242 | 260 | 120 | 75 | --- | 40 | F14 | 270 | 123 |
| 14 | 350 | 267 | 295 | 120 | 85 | --- | 50 | F14 | 290 | 162 |
| 16 | 400 | 297 | 325 | 120 | 85 | --- | 50 | F14 | 310 | 205 |
| 18 | 450 | 332 | 345 | 140 | 95 | --- | 60 | F16 | 330 | 250 |
| 20 | 500 | 360 | 375 | 140 | 95 | --- | 60 | F16 | 350 | 313 |
| 24 | 600 | 422 | 440 | 140 | 95 | --- | 70 | F16 | 390 | 434 |
| 28 | 700 | 525 | 530 | 200 | 120 | --- | 70 | F25 | 292 | 615 |
| 32 | 800 | 605 | 610 | 200 | 130 | --- | 80 | F30 | 318 | 870 |
| 36 | 900 | 655 | 660 | 200 | 130 | --- | 90 | F30 | 330 | 1110 |
| 40 | 1000 | 715 | 720 | 200 | 130 | --- | 90 | F30 | 410 | 1366 |
| 48 | 1200 | 870 | 883 | 250 | 170 | --- | 120 | F35 | 470 | 1833 |

| Size | | DF-PN16 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 3 | 80 | 90 | 120 | 80 | 18 | 17 | --- | F07 | 180 | 16 |
| 4 | 100 | 115 | 150 | 80 | 18 | 17 | --- | F10 | 190 | 25 |
| 6 | 150 | 140 | 165 | 80 | 23 | 22 | --- | F10 | 210 | 37 |
| 8 | 200 | 172 | 200 | 90 | 28 | 27 | --- | F12 | 230 | 59 |
| 10 | 250 | 215 | 220 | 90 | 65 | --- | 35 | F12 | 250 | 81 |
| 12 | 300 | 242 | 260 | 120 | 75 | --- | 40 | F14 | 270 | 123 |
| 14 | 350 | 267 | 295 | 120 | 85 | --- | 50 | F14 | 290 | 162 |
| 16 | 400 | 297 | 325 | 120 | 85 | --- | 50 | F14 | 310 | 205 |
| 18 | 450 | 332 | 345 | 140 | 95 | --- | 60 | F16 | 330 | 250 |
| 20 | 500 | 360 | 375 | 140 | 95 | --- | 60 | F16 | 350 | 313 |
| 24 | 600 | 422 | 440 | 140 | 95 | --- | 70 | F16 | 390 | 434 |
| 28 | 700 | 535 | 550 | 200 | 130 | --- | 80 | F25 | 292 | 630 |
| 32 | 800 | 605 | 610 | 200 | 130 | --- | 90 | F30 | 318 | 900 |
| 36 | 900 | 655 | 660 | 200 | 130 | --- | 90 | F30 | 330 | 1219 |
| 40 | 1000 | 715 | 720 | 200 | 170 | --- | 110 | F30 | 410 | 1410 |
| 48 | 1200 | 875 | 888 | 250 | 200 | --- | 140 | F40 | 470 | 1930 |

| Size | | DF -PN25 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 3 | 80 | 105 | 120 | 80 | 18 | 17 | --- | F10 | 180 | 22 |
| 4 | 100 | 128 | 150 | 80 | 18 | 17 | --- | F10 | 190 | 33 |
| 6 | 150 | 160 | 180 | 90 | 22 | 22 | --- | F12 | 210 | 60 |
| 8 | 200 | 190 | 215 | 120 | 75 | --- | 40 | F14 | 230 | 96 |
| 10 | 250 | 223 | 260 | 120 | 85 | --- | 50 | F14 | 250 | 139 |
| 12 | 300 | 264 | 315 | 140 | 95 | --- | 60 | F16 | 270 | 210 |
| 14 | 350 | 293 | 330 | 140 | 95 | --- | 60 | F16 | 290 | 262 |
| 16 | 400 | 327 | 375 | 180 | 95 | --- | 70 | F16 | 310 | 346 |
| 18 | 450 | 359 | 400 | 200 | 135 | --- | 80 | F25 | 330 | 443 |
| 20 | 500 | 388 | 425 | 200 | 135 | --- | 80 | F25 | 350 | 524 |
| 24 | 600 | 460 | 495 | 200 | 160 | --- | 100 | F30 | 390 | 796 |

| Size | | DF -PN40 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 3 | 80 | 105 | 120 | 80 | 18 | 17 | --- | F10 | 180 | 22 |
| 4 | 100 | 128 | 150 | 80 | 18 | 17 | --- | F10 | 190 | 33 |
| 6 | 150 | 160 | 180 | 90 | 22 | 22 | --- | F12 | 210 | 60 |
| 8 | 200 | 190 | 215 | 120 | 75 | --- | 40 | F14 | 230 | 96 |
| 10 | 250 | 223 | 260 | 120 | 85 | --- | 50 | F14 | 250 | 139 |
| 12 | 300 | 264 | 315 | 140 | 95 | --- | 60 | F16 | 270 | 210 |
| 14 | 350 | 293 | 330 | 140 | 95 | --- | 60 | F16 | 290 | 262 |
| 16 | 400 | 327 | 375 | 180 | 95 | --- | 70 | F16 | 310 | 346 |
| 18 | 450 | 359 | 400 | 200 | 135 | --- | 80 | F25 | 330 | 443 |
| 20 | 500 | 388 | 425 | 200 | 135 | --- | 80 | F25 | 350 | 524 |
| 24 | 600 | 460 | 495 | 200 | 160 | --- | 100 | F30 | 390 | 796 |

| Size | | DF-PN63 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 6 | 150 | 229 | 257 | 140 | 85 | --- | 35 | F16 | 210 | 105 |
| 8 | 200 | 268 | 241 | 180 | 105 | --- | 45 | F25 | 230 | 195 |
| 10 | 250 | 307 | 252 | 200 | 105 | --- | 50 | F25 | 250 | 339 |
| 12 | 300 | 366 | 267 | 200 | 115 | --- | 60 | F25 | 270 | 409 |
| 14 | 350 | 391 | 309 | 200 | 115 | --- | 65 | F30 | 290 | 538 |
| 16 | 400 | 436 | 340 | 200 | 115 | --- | 70 | F30 | 310 | 660 |

| Size | | DF-PN100 Approximate Dimensions in mm | | | | | | | | Approx.Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | mm | H1 | H2 | H3 | B1 | Square | ΦB | **F | L | kg |
| 6 | 150 | 229 | 257 | 140 | 85 | --- | 35 | F16 | 210 | 115 |
| 8 | 200 | 268 | 241 | 180 | 105 | --- | 45 | F25 | 230 | 205 |
| 10 | 250 | 307 | 252 | 200 | 105 | --- | 50 | F25 | 250 | 349 |
| 12 | 300 | 366 | 267 | 200 | 115 | --- | 60 | F25 | 270 | 419 |
| 14 | 350 | 391 | 309 | 200 | 115 | --- | 65 | F30 | 290 | 548 |

# Bolting Torque

| Body Stud Torque (Nm) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MATERIAL ASTM | Stud Size | | | | | | | | | | | | | | |
| | M8 | M10 | M12 | M14 | M16 | M20 | M24 | M27 | M30 | M33 | M36×3 | M39×3 | M42×3[a] | M45×3[a] | M48×3[a] |
| A193 B7 | 20 | 38 | 64 | 103 | 157 | 305 | 527 | 768 | 1048 | 1409 | 1888 | 2425 | 3054 | 3783 | 4621 |
| A193 B8M Class 2 | 23 | 44 | 74 | 118 | 181 | 354 | 513 | 613 | 836 | 864 | 1162 | 1494 | 1420 | 1761 | 2153 |

| Body Stud Torque (Nm) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| MATERIAL ASTM | Stud Size | | | | | | | | |
| | 5/16UNC | 3/8UNC | 7/16UNC | 1/2UNC | 9/16UNC | 5/8UNC | 3/4UNC | 7/8 UNC | 1-8 UNC |
| A193 B7 | 19 | 33 | 53 | 79 | 112 | 154 | 269 | 429 | 640 |
| A193 B8M Class 2 | 23 | 38 | 61 | 91 | 130 | 178 | 311 | 417 | 510 |

| Body Stud Torque (Nm) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| MATERIAL ASTM | Stud Size | | | | | | | | |
| | 1-1/8 UNC | 1-1/4 UNC | 1-3/8 UNC | 1-1/2 UNC | 1-5/8 UNC[a] | 1-3/4 UNC[a] | 1-7/8 UNC[a] | 2UNC[a] | 3UNC[a] |
| A193 B7 | 962 | 1266 | 1728 | 2262 | 2895 | 3637 | 4495 | 5477 | 17158 |
| A193 B8M Class 2 | 739 | 789 | 1062 | 1392 | 1345 | 1691 | 2092 | 2552 | 8824 |

NOTE: [a] >40mm for A193 B8M Class1

# Flow Coefficients (Cv)

**Class 150, PN10, PN16**

| Size | | Disc Opening Angle | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| NPS | DN | 10° | 20° | 30° | 40° | 50° | 60° | 70° | 90° |
| 3” | 80 | 16 | 36 | 56 | 85 | 126 | 193 | 238 | 257 |
| 4” | 100 | 22 | 47 | 74 | 113 | 166 | 253 | 341 | 395 |
| 6” | 150 | 53 | 114 | 177 | 270 | 399 | 611 | 821 | 953 |
| 8” | 200 | 100 | 213 | 349 | 544 | 810 | 1136 | 1472 | 1741 |
| 10” | 250 | 153 | 329 | 532 | 821 | 1236 | 1767 | 2325 | 2818 |
| 12” | 300 | 223 | 533 | 856 | 1278 | 1855 | 2576 | 3335 | 3940 |
| 14” | 350 | 295 | 710 | 1180 | 1735 | 2475 | 3383 | 4346 | 5286 |
| 16” | 400 | 324 | 724 | 1200 | 1881 | 2847 | 4148 | 5760 | 7883 |
| 18” | 450 | 355 | 710 | 1220 | 2025 | 3219 | 4911 | 7175 | 10742 |
| 20” | 500 | 590 | 1141 | 1921 | 3153 | 4940 | 7538 | 10974 | 15412 |
| 24” | 600 | 826 | 1573 | 2621 | 4280 | 6660 | 10166 | 14774 | 20082 |
| 28” | 700 | 1078 | 2696 | 4044 | 5931 | 8627 | 12671 | 18870 | 26960 |
| 32” | 800 | 1408 | 3521 | 5281 | 7746 | 11261 | 16540 | 24640 | 35210 |
| 36” | 900 | 1730 | 4325 | 6488 | 9516 | 13840 | 20330 | 30280 | 43250 |
| 40” | 1000 | 2289 | 5724 | 8586 | 12590 | 18310 | 26903 | 40060 | 57240 |
| 48” | 1200 | 3259 | 8148 | 12222 | 17920 | 26070 | 38290 | 57040 | 81480 |

**Class 300, PN25, PN40**

| Size | | Disc Opening Angle | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| NPS | DN | 10° | 20° | 30° | 40° | 50° | 60° | 70° | 90° |
| 3” | 80 | 15 | 33 | 51 | 77 | 114 | 174 | 214 | 232 |
| 4” | 100 | 21 | 45 | 70 | 106 | 157 | 239 | 322 | 373 |
| 6” | 150 | 50 | 107 | 167 | 255 | 377 | 577 | 776 | 900 |
| 8” | 200 | 94 | 201 | 329 | 514 | 765 | 1073 | 1390 | 1644 |
| 10” | 250 | 144 | 310 | 502 | 776 | 1168 | 1669 | 2196 | 2661 |
| 12” | 300 | 211 | 503 | 809 | 1207 | 1752 | 2433 | 3150 | 3721 |
| 14” | 350 | 278 | 697 | 1115 | 1639 | 2337 | 3195 | 4104 | 4992 |
| 16” | 400 | 306 | 724 | 1200 | 1881 | 2847 | 4148 | 5760 | 7883 |
| 18” | 450 | 335 | 670 | 1153 | 1912 | 3040 | 4638 | 6777 | 10145 |
| 20” | 500 | 557 | 1078 | 1814 | 2978 | 4665 | 7120 | 10365 | 14556 |
| 24” | 600 | 701 | 1337 | 2228 | 3638 | 5661 | 8641 | 12558 | 17069 |
| 28” | 700 | 942 | 2354 | 3534 | 5179 | 7533 | 11064 | 16478 | 23540 |
| 32” | 800 | 1312 | 3280 | 4919 | 7215 | 10495 | 15414 | 22957 | 32800 |
| 36” | 900 | 1670 | 4175 | 6262 | 9185 | 13360 | 19622 | 29224 | 41750 |
| 40” | 1000 | 2008 | 5020 | 7530 | 11044 | 16064 | 23594 | 35140 | 50200 |
| 48” | 1200 | 2978 | 7444 | 11167 | 16378 | 23822 | 34989 | 52111 | 74440 |

**Class 600, PN63, PN100**

| Size | | Disc Opening Angle | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | DN | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |
| 6 | 150 | 23 | 70 | 116 | 203 | 267 | 348 | 406 | 522 | 580 |
| 8 | 200 | 43 | 130 | 216 | 378 | 497 | 648 | 907 | 994 | 1080 |
| 10 | 250 | 69 | 206 | 344 | 602 | 791 | 1032 | 1445 | 1582 | 1720 |
| 12 | 300 | 102 | 307 | 512 | 896 | 1178 | 1536 | 2150 | 2355 | 2560 |
| 14 | 350 | 165 | 494 | 824 | 1442 | 1895 | 2472 | 3461 | 3790 | 4120 |
| 16 | 400 | 216 | 648 | 1080 | 1890 | 2484 | 3240 | 4536 | 4968 | 5400 |
| 20 | 500 | 394 | 1182 | 1970 | 3448 | 4531 | 5910 | 8274 | 9062 | 9850 |
| 24 | 600 | 598 | 1795 | 2992 | 5236 | 6882 | 8976 | 12566 | 13763 | 14960 |

**Class 900**

| Size | | Disc Opening Angle | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| NPS | DN | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |
| 6 | 150 | 19 | 56 | 94 | 165 | 216 | 282 | 395 | 432 | 470 |
| 8 | 200 | 36 | 108 | 180 | 315 | 414 | 540 | 756 | 828 | 900 |
| 10 | 250 | 56 | 168 | 280 | 490 | 644 | 840 | 1176 | 1288 | 1400 |
| 12 | 300 | 84 | 252 | 420 | 735 | 966 | 1260 | 1764 | 1932 | 2100 |
| 14 | 350 | 124 | 372 | 620 | 1085 | 1426 | 1860 | 2604 | 2852 | 3100 |
| 16 | 400 | 173 | 520 | 866 | 1516 | 1992 | 2598 | 3637 | 3984 | 4330 |
| 20 | 500 | 300 | 899 | 1498 | 2622 | 3445 | 4494 | 6292 | 6891 | 7490 |
| 24 | 600 | 419 | 1258 | 2096 | 3668 | 4821 | 6288 | 8803 | 9642 | 10480 |

## SINGAPORE

UNIVALS PTE LTD
Address: 1 Kaki Bukit Road 1, #02-12 Enterprise One,
Singapore 415934
Tel. +65 65808388  Fax +65 65808399

## SHANGHAI CHINA

UNIVALS (SHANGHAI) CO., LTD
Address: Building 1, No.1239, Shuhai Road, Songjiang District,
Shanghai, China 201612
Tel. +86 21 67757703

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