XOMOX®

Technische Dokumentation
Technical Documentation



High Performance Butterfly Valves
Type 800

XOMOX International GmbH & Co.
Von-Behring-Straße 15
D-88131 Lindau / Deutschland

Dok. Nr.: tdb_800_gb

Januar 2008

CRANE
ChemPharma Flow Solutions

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Design Features



An axially pliant seat represents the new design feature of the XOMOX High Performance Butterfly Valves, Series 800.

Advantages: **Long life**
Extreme tightness under high pressure and vacuum conditions

Documented tests show shutoff tightness up to 51 bar after more than 100 000 cycles. (For standard Teflon® seat).

Type 800 – The Alternative

Our team of technicians and engineers throughout the world have developed a butterfly valve design meeting all requirements of today's highly specialized industries.

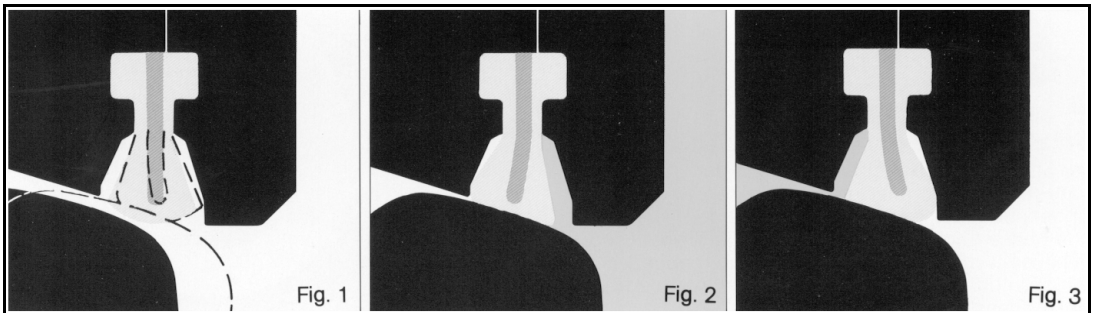
The XOMOX High Performance Butterfly Valve, Series 800 provides the same well established and internationally acknowledged XOMOX quality standard proven by extensive testing in our own R&D centers and practical experience in the Chemical Industry.

The design features are based on the following requirements:

- Extreme tightness under high pressure and vacuum conditions in both flow directions.
- Long life
- Standardized face-to-face dimensions
- Easy maintenance
- Low weight

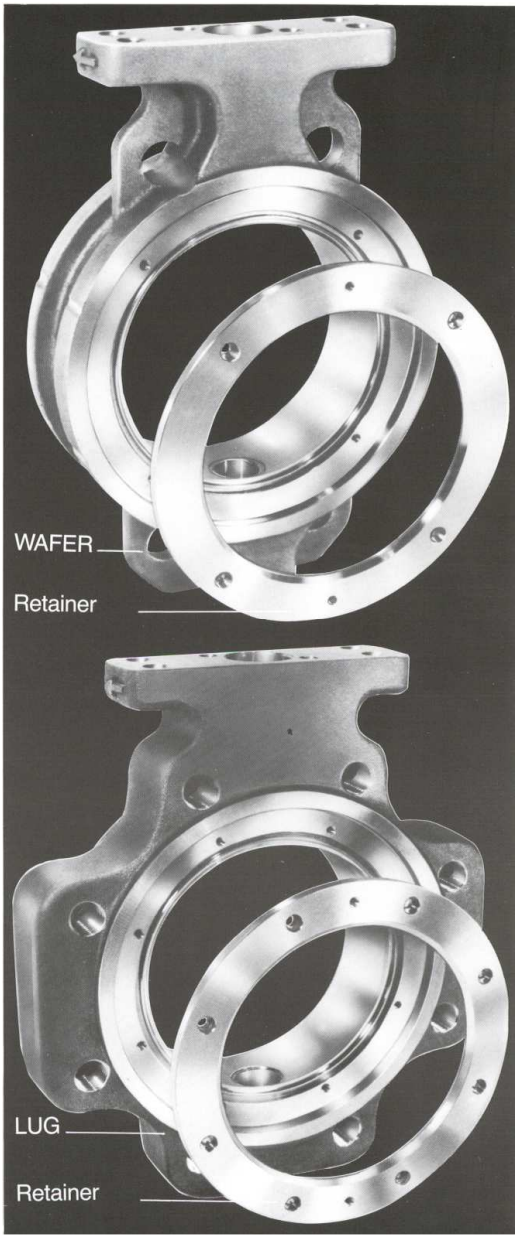
Sealing Principle:

Fig. 1
Normal position of the fatique-proof seat shortly before disc closing.
---disc closed, pressing against axially pliant seat (without additional help by fluid pressure)
After every valve opening, the seat returns to its original shape due to the stabilizing effect of the fibreglass membrane.
Fig. 2
Disc closed (normal flow)
The closing disc flexes the seat axially to the spherical sealing surface. Fluid pressure additionally tightens the seal.
Fig. 3
Disc closed (reverse flow)
The closing disc flexes the seat axially to the spherical sealing surface. Fluid pressure additionally tightens the seal.



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Design Features
Body, Retainer, Flange Seal



Body
All bodies are compact one-piece designs.
Available:

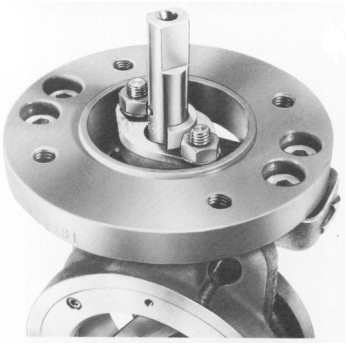
a) for FITTING BETWEEN FLANGES (WAFER TYPE) with four bore holes corresponding to the flange holes for easy mounting
b) with SINGLE FLANGE (LUG TYPE)
c) with DOUBLE FLANGE

The extra large rugged mounting pad provides a solid base for mounting actuators and accessories to all bodies.
On request also available with connection flange as per DIN/ISO 5211.

Bodies are available with following face-to-face dimensions:

WAFER/LUG
EN 558-1: Basic Series 25 / ISO 5752: medium (K2)
EN 558-1: Basic Series 20 / ISO 5752: short (K1)
EN 558-1: Basic Series 16 / ISO 5752: long (K3)
MSS-SP 68/API 609

DOUBLE FLANGE
EN 558-1: Basic Series 14 (F4) / ISO 5752 Tab. 4: long
Wall pressure retraining parts are calculated according to ASME B 16.34 and DIN 3840.
For pressure classes up to PN 16, the calculation basis of Class 150 (20 bar) and for PN 25/40, the calculation basis for Class 300 (51 bar) has been used.

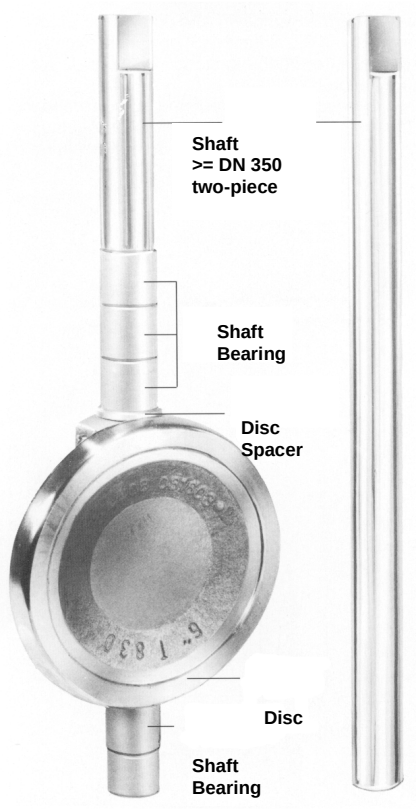


Connection flange
DIN ISO 5211

Retainer, Flange Seal
The retainer fixes the seat in its position and protects the seat from direct flow. Mounted into the body, both act together as a sealing surface.
The connection of retainer and body is covered by the flange seal.
Use gaskets only according to EN 1514-1 or ANSI B16.21 for flanges with RF according to ASME B16.5.

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Design Features
Disc
Shaft
Shaft Bearing
Disc Spacer

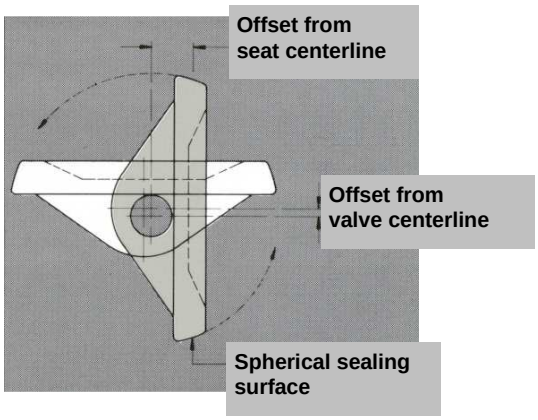


Shaft Bearing

The bearings are constructed of Teflon® and fibreglass with stainless steel backing.
(For FIRESAFE applications internally graphite coated).
They contact the total shaft length through the body preventing downstream movement and deflection of the disc.

Disc Spacer

The disc spacers are made of hardened stainless steel and prevent vertical movement of the disc.



Disc

The disc is contoured to provide high flow capacity. Sealing surface is spherical. Disc arrangement is double eccentric, that means

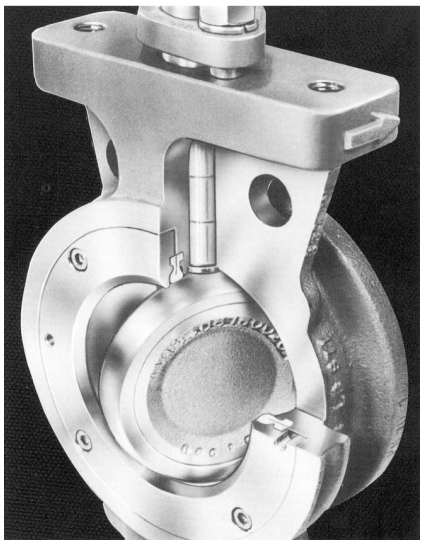
1x offset from seat centerline
1x offset from valve centerline

This design feature provides three important advantages:

- 360° sealing seat area
- long life of seat due to early disengagement of the disc from seat
- reduced torque figures compared to conventional butterfly valve designs.

Shaft

The large diameter shaft provides direct distortion free power transmission to disc and therefore excellent control characteristics (low hysteresis).

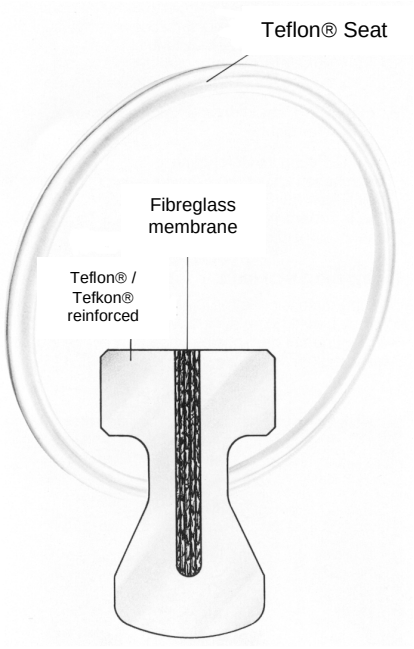


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Design Features
Teflon® Seat

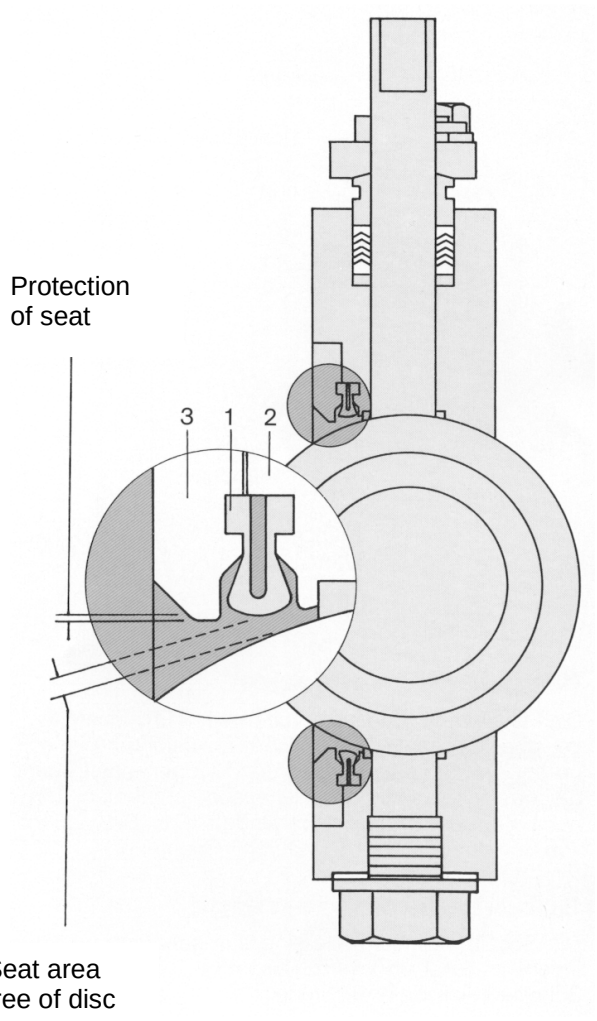
Seat made of durable Teflon®

Advantages: No springs to break
No rings to corrode
No O-rings to flow



The Teflon® seat with its integral pliant fibreglass membrane is also resistant to high corrosive flow media. While opening and closing the valve , the seat is axially displaced. In the open position, the seat is not in contact with the disc and will return to its original shape due to the stabilizing effect of the fibreglass membrane.
No permanent deformation of the Teflon® occurs. Due to the smaller inner diameter of the retainer, the seat is protected from direct flow.
These design features assure long life, even under extremely severe service conditions. Tightness acc. to DIN 3230-3 BO, Leakrate 1.

The symmetrical axially pliant seat (1) is locked by a groove into both the body (2) and retainer (3). Due to this design, the seat cannot be incorrectly mounted. The bolting arrangement simplifies eventual replacement of seat retainer and limits maintenance costs to a minimum.



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Design Features
FIRESAFE-Seat
Metal-Seat

For applications which require a tight shutoff for inflammable flow media, we can supply a FIRESAFE seat.

Both the XOMOX FIRESAFE seat and the metal seat possess the same quality elements:

- Identical symmetry
- interchangeablility

On request, the spherical sealing surface of the disc can be stellited.

FIRESAFE Seat (specific features):

- Combination Metal/ Teflon®
- Teflon® encapsulated
- Triple seal (Metal/ Teflon®/Metal)

Tightness according to DIN 3230 – 3 BO. Leakrate 1.

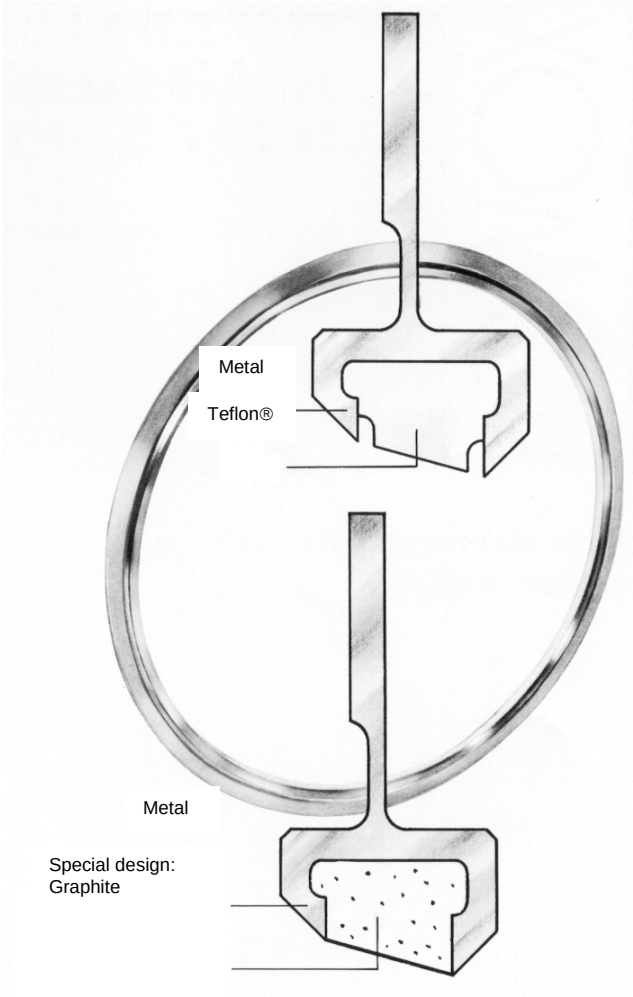
After the encapsulated Teflon® ring has been destroyed by fire, the metal double-lip seal remains in function.

Metal Seat (specific features):

- Double lip seal)

Tightness according to DIN 3230 – 3 BN
Leakrate 3, Leakrate 1 on request
for special applications triple seal
(metal / graphite / metal)

Temperature range up to K823 (+ 550℃)
Higher temperature solutions on request.



Sealing Principle – FIRESAFE seat and Metal seat.

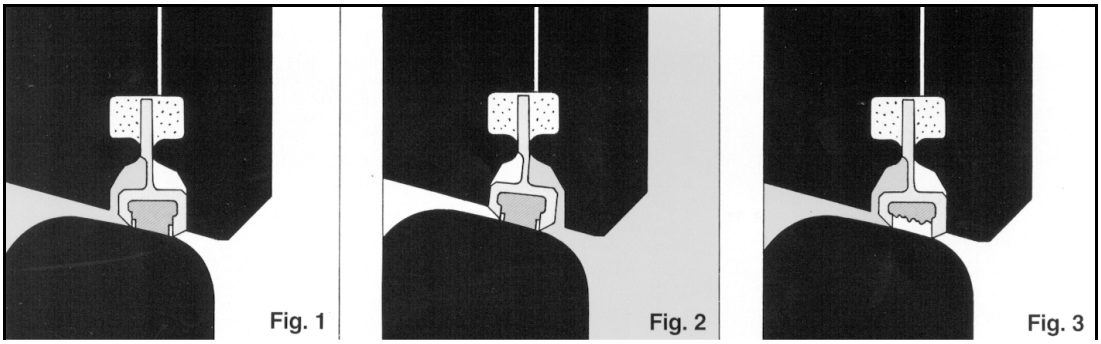


Fig. 1 and 2 show the sealing principle of the FIRESAFE seat (Metal/ Teflon®/Metal) during pressure loading alternately
from upstream and downstream side.
Fluid pressure additionally tightens the seal. Same principle applies for metal seat without Teflon® ring.
Fig. 3 shows FIRESAFE seat with damaged Teflon® ring after being destroyed by fire.
The double lip seal (metal / metal) remains in function.

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FIRESAFE-Type Approval



Firesafe seat ring
Material used for test::
Stainless Steel 1.4571 / Teflon®

Results of the leakage tests of a butterfly valve type 821 NPS 8 Class 150 acc. To “test report no. RT93-08 of 12.93.“
Test requirement API607 4.edition, May 1993.
Internal leakage during the fire:
allowable: 24000 ml
measured: 75 ml
Internal leakage during the function test::
allowable: 800 ml
measured: 260 ml
Leakage to atmosphere during the fire-and cooling period:
allowable: 8000 ml
measured:: 0 ml (no visible leakage)
Leakage to atmosphere during the function test::
allowable: 1000 ml
measured: 0 ml (no visible leakage)
The valve fulfils all requirements of the API607 4th ed. „Fire Test for Soft Seated Quarter-turn Valves“.

Tested Valver	Covered Valves
Butterfly valve NPS 8 Cl. 150	>=NPS 6 Cl. 150 and. 300

XOMOX Material Code

Material number	Standard	XOMOX-Material Code	Former / Alternative specifications
1.4309 G-X2CrNi19-11	DIN 10213-4	067G	A2 1.4306 G-X2CrNiN189
1.4409 G-X2CrNiMo10-11-2	EN 10213-4	031	A4 1.4404 G-X2CrNiMoN1810
1.4552 G-X5CrNiNb10-11	EN 10213-4	028	A2
1.4408 G-X5CrNiMo 18 10	EN 10213-4	025	A4
1.4361 Casting G-X6CrNiSi 1815	Not normed	030	A2 Argonit 1 FMC 131
Grade CD-4M Cu	ASTM A 743 A 744, A 351	413	Duplex
Grade CN7M	ASTM A 743 A 744, A 351	178	Alloy 20
Grade CF8C	ASTM A 743 A 744, A 351	036	A2
Grade CF3	ASTM A 743 A 744, A 351	037	A2
Grade CF8	ASTM A 743 A 744, A 351	040	A2
Grade CF3M	ASTM A 743 A 744, A 351	038	A4
Grade CF8M	ASTM A 743 A 744, A 351	035	A4
3.7031 G-Ti2	DIN 17865	054	unalloyed
3.7032	DIN 17865	054P	Titanium Casting with Pd
Grade C2	ASTM B 367	051	Titanium Casting

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XOMOX Material Code

Material number	Standard	XOMOX- Material Code	Former / Alternative specifications
EN-JS1049 EN GJSF- 400S-18S	EN 1563	003	Ductile Iron GGG 40.3 0.7043
0.7659 GGGNiCrNb 20 2	DIN 1694	004	Ductile Iron austenitic
1.0038 S235JRG2	EN 10025	059	Unalloyed rolled- and forged Steel RSt37-2
1.0425 P265GH	EN 10028-1	405	Unalloyed rolled- and forged Steel HII
1.0566 P355NL1	EN 10028T3	136	Unalloyed rolled- and forged Steel TstE355
1.0619 + QT GP240GH + QT	EN 10213- 1/2AD W5	010	High Temp. Cast Steel 1.0619.05 GS-C 25 V
WCB	ASTM A216	018	High Temp. Cast Steel
1.1138.05	SEW 685	199	Low Temp. Cast Steel GS-21Mn5V
2.4365.01 G-NiCu30Nb	DIN 17730	145	Monel Casting
2.4170.01 G-Ni 95	DIN 17730	042	Nickel Casting
Grade CW-2M	ASTM A 494	021	Casting C4
Grade N-7M2	ASTM A 494	0145	Casting B2
Grade CZ-100	ASTM A 494	050	Nickel Casting
Grade M-35-1	ASTM A 494	046	Monel Casting
2.0975	EN 1982	408/193	Alu-Bronze AB2 G-CuAl10Ni

There are different material combinations for body and disc possible.

Body and disc will be the same material, if not specified otherwise.

Equivalent rolled and forged materials for bodies on request.

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Delivery Program, Tightness Test, Type Approvals and Certificates

Delivery Program

Flange Standards:

DN 50-600 acc. to DIN 2631-2637 PN 6, 10, 16, 25, 40, 63, 100
NPS 2-24 acc. to ASME B16.5 Class 150, 300, 600
DN 700-1200 acc. to DIN 2631-2632 PN 6, 10
NPS 28-48 acc .to MSS-SP44 Class 150/150 psi.
JIS, BS, API and other pressure classes on request.

Mechanical Operators

DN 50-200 / NPS 2-8 are equipped as a standard with latching lever
DN 250-1200 / 10-48 are equipped as a standard-with worm gear

Temperature Range

Teflon®-Seat:
203 K – 477 K (-70℃ - +204℃)
Teflon®-Seat reinforced:
203 K – 505 K (-70℃ - +232℃)
FIRESAFE-Seat:
203 K – 573 K (-70℃ - +300℃)
Metal-Seat:
203 K – 823 K (-70℃ - +550℃)
Metal-Graphite:
203 K – 823 K (-70℃ - +550℃)
max. for gases Δ6 bar available up to DN 700
Metal-PEEK:
203 K – 533 K (-70℃ - +260℃)
Metal-PCTFE:
77 K – 323 K (-196℃ - +50℃)

Oxygen and Chlorine:

Valves for handling oxygen and chlorine are thoroughly cleaned, dried and assembled grease-free. After testing, the valves will be packed in hermetically sealed polyethylene bags.

Nuclear

Valves with sealings acc. to the requirements due to Radiation.
Fabrication and tests of valves acc. to specification.

Tightness Test

Valves with Teflon®, Teflon®-reinforced, PE or FIRESAFE seat acc to DIN 3230 -3 BO, Leakrate 1, Metal-seat acc. to DIN 3230 - 3 BN, Leakrate 3, in preferred flow direction.

Vacuum

XOMOX High Performance Butterfly Valves Series 800 Are suitable for vacuum services up to:

Valve Design	Vacuum Range[mbar] resp. [hPa]
Standard	$3{,}33 \times 10^{-2}$
Special (-Q1)	$1{,}33 \times 10^{-6}$
Upon request	
Test at	$1{,}33 \times 10^{-4}$

The max. admissible leakrate to atmosphere is <1 x 10 mbar x l/s.

Type Approvals and Certificates

Classification Society	Certificate
LLOYD`S REGISTER OF SHIPPING	96/20053 (FIRESAFE)
DET NORSKE VERITAS	P-10011
STOOMWEZEN B. V.	M 0809V

Plants subject to inspection acc. appliance safety law.

Scope of application:

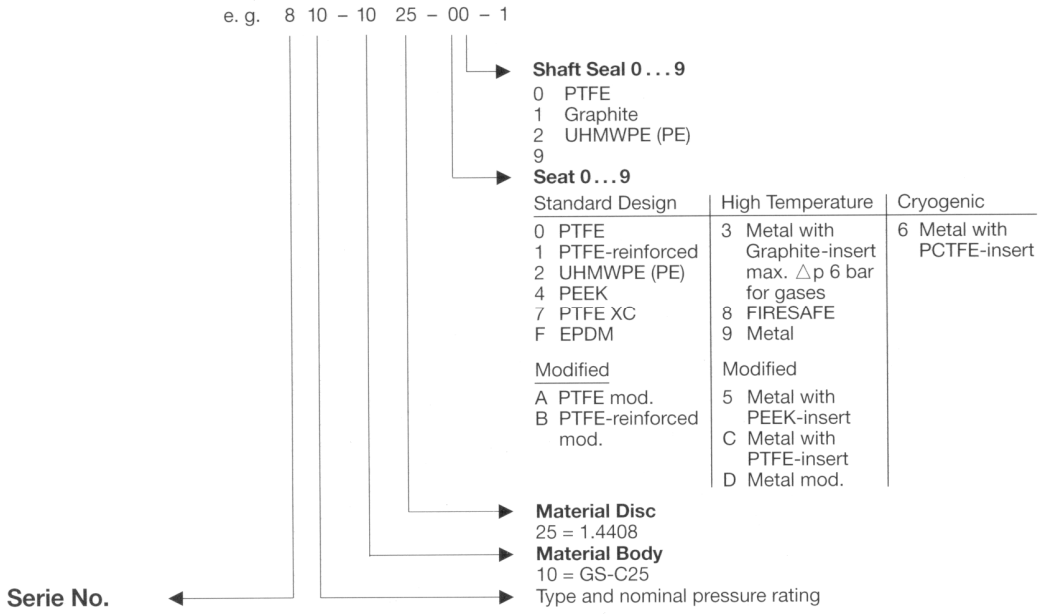
Rule	Dampfkv	DruckbehV	Gas HL-VO	VbF
Code	TRD	TRB/TRR	TRGL/DVGW	TRBF

Type Test Approval

VdTUEV-Merkblatt	Body Material Group
060-00	Ductile iron
	Cast steel high temp. low temp.
061-00	Cast steel austenitic
062-00	Non ferrous metal

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XOMOX Identification Code



Special Design

1 Leakage Drain Off
2 Extended Shaft Seal
3 Flanges to DIN ISO 5211 Actuator Mounting
4 Steam Traced Disc
5 Screwless Retainer Fixing (<DN 300)
6 Grooved Flange Faces DIN 2512*
7 With Internal Travel Stop
8 Full cryogenic max. - 196°C
9 Disc Spacer Seals
K Semi cryogenic max. - 100°C
L Longer Taper Pins
Q1 Single Quadring Seal
Q2 Double Quadring Seal
V Welded Plug
S Secondary seal
HR Steam Jacket with Threaded Connections
HJ Steam Jacket with Flanged Connections
6F Tongue DIN 2512
R13 Female-Faced Type R13-DIN 2513
RJ Ring Joint ASME B 16.5
LF Large Female ASME B 16.5
LG Large Groove ASME B 16.5
SG Small Groove ASME B 16.5
VD Plug with Safety Lock
EA Grounding Connection
SA Flushing Connection

* DN 50-100 and DN 150: Seat retainer fixed by roll pins.

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Construction and Pressure Rating

Type	Face-to-face dim.	Construction and Pressure Rating
801	ANSI	WAFER Class 150
803	ANSI	WAFER Class 300
806	ANSI	WAFER Class 600
810	K2	WAFER PN 10/16
811	K2	WAFER PN 10/16 drilled to Class 150
812	K2	LUG PN 10/16
813	K2	WAFER PN 10/16 drilled to Class 300
814	K2	LUG PN 10/16 drilled to Class 150
817	F4	Double Flange Butterfly Valve PN 10/16 ≤ DN 600
818	F4	Double Flange Butterfly Valve Class 150 ≤ DN 600
821	ANSI	LUG Class 150
823	ANSI	LUG Class 300
824	ANSI	LUG Class 600 Δp max. 51 bar
825	K2	WAFER PN 25/40 and Class 300 Δp max.25 bar
826	ANSI	LUG Class 600
827	ANSI	LUG Class 300 Δp max. 25 bar
830	K2	WAFER PN 25/40
831	K2	WAFER PN 25/40 drilled to Class 150
832	K2	LUG PN 25/40
833	K2	WAFER PN 25/40 drilled to Class 300
834	K2	LUG PN 25/40 drilled to Class 300
835	K2	LUG PN 25
837	F4	Double Flange Butterfly Valve PN 25/40 Δp max. 25 bar, ≤ DN 600
838	F4	Double Flange Butterfly Valve Class 300 Δp max.25 bar, ≤ DN 600
840	K3	WAFER PN 10/16
841	K3	WAFER PN 10/16 drilled to Class 150
842	K3	LUG PN 10/16
843	K3	WAFER PN 10/16 drilled to Class 300
844	K3	LUG PN 10/16 drilled to Class 150
845	K3	WAFER PN 25
846	K3	WAFER Class 600 Δp max. 51 bar
849	K3	Double Flange Butterfly Valve PN 10/16
850	K3	WAFER PN 25/40
852	K3	LUG PN 25/40
853	K3	WAFER PN 25/40 drilled to Class 300
854	K3	LUG PN 25/40 drilled to Class 300
855	K3	LUG PN 25
856	K3	LUG PN 63/100 Class 600
860	ANSI	WAFER Class 600 drilled to PN 63/100
861	K3	WAFER PN 63/100 Δp max. 51 bar
862	ANSI	LUG Class 600 drilled to PN 63/100
864	K3	LUG PN 63/100 Δp max. 51 bar
865	K3	WAFER PN 63/100
870	K1	WAFER PN 10/16
871	K1	WAFER PN 10/16 drilled to Class 150
872	K1	LUG PN 10/16
873	K1	WAFER PN 10/16 drilled to Class 300
874	K1	LUG PN 10/16 drilled to Class 150
875	K1	WAFER PN 25
876	K1	LUG PN 25/40
877	K1	WAFER PN 25/40
878	K1	LUG PN 25/40 drilled to Class 300
890		Flange-Flange PN 10/16 Class 150

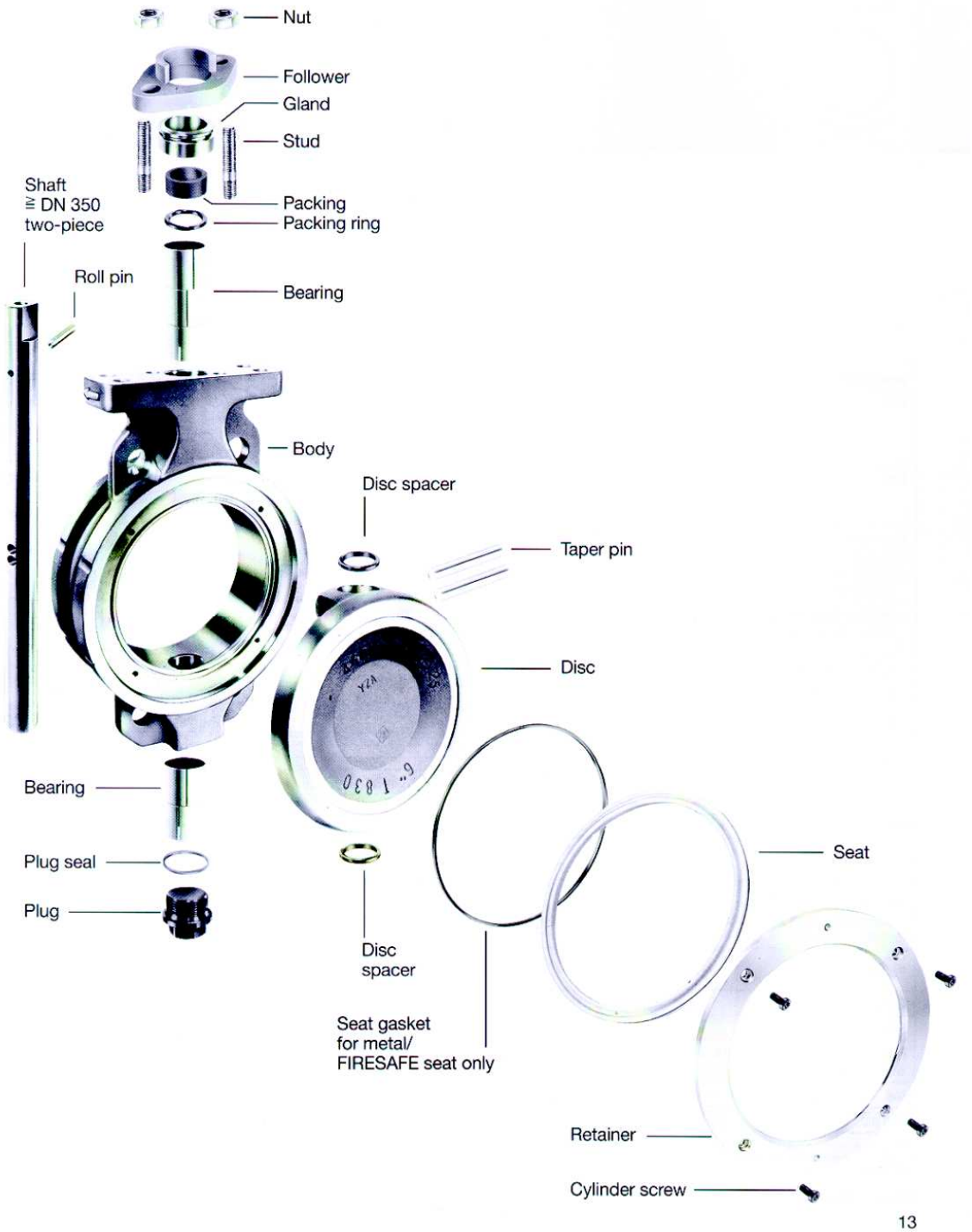
Face-to-face dimensions for DIN and ANSI Rated Valves

Face-to-face dimension	Valves acc. to DIN und ANSI	
EN 558 Series 25 **DIN 3202** K2 Face-to-face dimension **ISO 5752** middle	10 WAFER 11 WAFER 13 WAFER 25 WAFER 30 WAFER 31 WAFER 33 WAFER 12 LUG 14 LUG 32 LUG 34 LUG 35 LUG	PN 10/16 PN 10/16 drilled to ANSI Class 150 PN 10/16 drilled to ANSI Class 300 PN 25/40 Class 300 Δp max. 25 bar PN 25/40 PN 25/40 drilled to ANSI Class 150 PN 25/40 drilled to ANSI Class 300 PN 10/16 PN 10/16 drilled to ANSI Class 150 PN 25/40 PN 25/40 drilled to ANSI Class 300 PN 25
Non Standard Face-to-face dimensions on request **EN 558** Series 20 **DIN 3202** K1 Face-to-face dimension **ISO 5752** short	70 WAFER 71 WAFER 73 WAFER 75 WAFER 77 WAFER 72 LUG 74 LUG 76 LUG 78 LUG	PN 10/16 PN 10/16 drilled to ANSI Class 150 PN 10/16 drilled to ANSI Class 300 PN 25 PN 25/40 PN 10/16 PN 10/16 drilled to ANSI Class 150 PN 25/40 PN 25/40 drilled to ANSI Class 300
EN 558 Series 16 **DIN 3202** K3 Face-to-face dimension **ISO 5752** long	40 WAFER 41 WAFER 43 WAFER 45 WAFER 46 WAFER 50 WAFER 53 WAFER 61 WAFER 65 WAFER 42 LUG 44 LUG 52 LUG 54 LUG 55 LUG 56 LUG 64 LUG	PN 10/16 PN 10/16 drilled to ANSI Class 150 PN 10/16 drilled to ANSI Class 300 PN 25 Class 600 Δp max. 51 bar PN 25/40 PN 25/40 drilled to ANSI Class 300 PN 63/100 Δp max. 51 bar PN 63/100 PN 10/16 PN 10/16 drilled to ANSI Class 150 PN 25/40 PN 25/40 drilled to ANSI Class 300 PN 25 PN 63/100 Class 600 PN 63/100 Δp max. 51 bar
MSS-SP 68 API 609 ASME B16.10 Tab. 9, column 7-9	01 WAFER 03 WAFER 06 WAFER 60 WAFER 21 LUG 27 LUG 23 LUG 24 LUG 26 LUG 62 LUG	Class 150 Class 300 Class 600 drilled to PN 63/100 Class 600 drilled to PN 63/100 Class 150 Class 300 Δp max. 25 bar Class 300 Class 600 Δp max. 51 bar Class 600 Class 600 drilled to PN 63/100

Face-to face dimensions for butterfly valves with double flanges as per DIN 3202 F4/ISO 5752 Table 4 long.
With weld ends on request.

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Part List


Nut
Follower
Gland
Stud
Shaft
≧ DN 350
two-piece
Packing
Packing ring
Roll pin
Bearing
Body
Disc spacer
Taper pin
Disc
Bearing
Plug seal
Plug
Disc
spacer
Seat gasket
for metal/
FIRESAFE seat only
Seat
Retainer
Cylinder screw

13

Material List for Valves with Teflon® Seat or Reinforced Teflon® Seat

Description	Materials								
Body	EN-JS 1049 (0.7043) 1.0038 1.0619 A216 WCB		1.4408 CF8M	1.4552 CF8	CN7M (A20)	2.4365 A494- M35-1 (Monel)	2.4170 (Nickel) A494- CZ100 (Nickel)	A494- N7M2 (Alloy B2)	A494- CW-2M (Alloy C4)
Disc	EN-JS 1049 (0.7043) 1.0619	1.4408 CF8M	1.4408 CF8M	1.4552 CF8	CN7M (A20)	2.4365 A494- M35-1 (Monel)	2.4170 (Nickel) A494- CZ100	A494- N7M- (Alloy B2)	A494- CW-2M (Alloy C4)
Shaft and taper pin ≤ DN 300 PN 10/16 NPS 12 Cl. 150	1.4571	1.4571	1.4571	1.4541	N08020 (A20)	2.4375 (Monel)	2.4066 (Nickel)	2.4617 (Alloy B2)	2.4610 (Alloy C4)
≤ DN 300 PN 25-100 NPS 12 Cl. 300, Cl. 600	A564-630 17-4 PH	A564-630 17-4 PH	A564-630 17-4 PH	A564-630 17-4 PH					
≥ DN 350 PN 10-40 NPS 14 Cl. 150, Cl. 300 ≥ DN 350 zweiteilig	A564-630 17-4 PH	A564-630 17-4 PH	A564-630 17-4 PH	A564-630 17-4 PH					
Seat PN 10-16	Teflon®								
PN 25-40	Teflon®-reinforced								
Retainer	1.0038		1.4571	1.4541	N08020	2.4360	2.4066	2.4617	2.4610
Cylinder screw	A4-70		A4-70	A2-70	N08020 (A20)	2.4375 (Monel)	2.4066	2.4617 (Alloy B2)	2.4610
Disc spacer	1.4571 S4N		1.4571 S4N	1.4301 S4N	N08020 S4N	2.4360 (Monel)	2.4066 S4N	2.4617 S4N	2.4610 S4N
Bearing	1.4571/PTFE		1.4571/ Teflon®	1.4301/ Teflon®	N08020 Coated	2.4360 Coated	2.4066 Coated	2.4617 Coated	2.4619 Coated
Packing	Teflon®								
Packing ring	1.4571		1.4571	1.4301	N08020 (A20)	2.4360 (Monel)	2.4066 (Nickel)	2.4617 (Alloy B2)	2.4610 (Alloy C4)
Gland	Stainless steel								
Stud									
Follower with limit stop	Ferritic steel		Stainless steel						
Nut	Stainless steel								
Roll pin	1.0904 B2A								
Plug	5.6 B2A		1.4401	1.4301	N08020	2.4360	2.4066	2.4617	2.4610
Plug seal	Teflon®								

Other materials on request. Former / Alternative material specifications in brackets.

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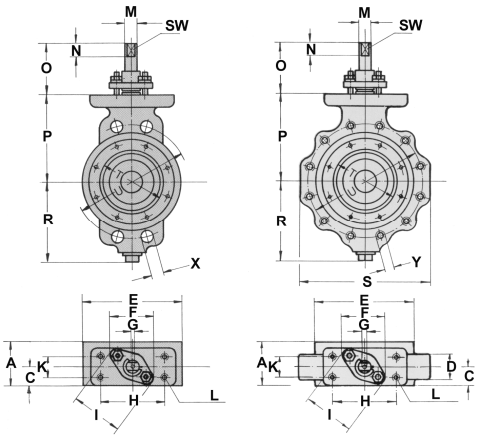
Material List for Valves with FIRESAFE-Seat or Metal Seat

Description		Materials			
Body		EN-JS1049 (0.7043) 1.0619 A216-WCB	EN-JS1049 (0.7043) 1.0619 A216-WCB	1.4408 CF8M	1.4552 CF8C
Disc		1.4408 CF8M	1.4552 CF8C	1.4408 CF8M	1.4552 CF8C
Shaft and taper pin Working temperature up to 350℃		A564-630 (17-4 PH)	A564-630 (17-4 PH)	A564-630 (17-4 PH)	A564-630 (17-4 PH)
Working temperature 350℃ up to 550℃		1.4980	1.4980	1.4980	1.4980
Seat FIRESAFE Metal	alter- natively	1.4571/PTFE 1.4571	1.4541/PTFE 1.4541	1.4571/PTFE 1.4571	1.4541/PTFE 1.4541
Seat gasket		Graphite			
Retainer		1.0038	1.4541	1.4571	1.4541
Cylinder screw		A4-70	A2-70	A4-70	A2-70
Disc spacer		1.4571 S4N	1.4541 S4N	1.4571 S4N	1.4541 S4N
Bearing		1.4571 coated	1.4541 coated	1.4571 coated	1.4541 coated
Packing		Graphite			
Packing ring		1.4571	1.4541	1.4571	1.4541
Gland		Stainless steel			
Stud					
Follower with limit stop		Ferritic steel		Stainless steel	
Nut		Stainless steel			
Roll pin		1.0904B2A			
Plug		5.6 B2A	1.4301	1.4401	1.4301
Plug seal		Graphite			

Other materials on request. Former / Alternative material specifications in brackets.

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Dimensions for bare Shaft Valves DN 50 up to 300 / NPS 2 up to 12



Left Fig.
WAFER Design

Right Fig.:
LUG Design

Sizes U, X, Y acc. to DIN 2632, 2633, 2634, 2635

NPS ≤ 24 acc. to ASME B16.5, NPS >24 acc. to MSS-SP44

Dimensions in mm

For weights see page 19, 20

Machined to face-to-face dimension acc. to K1 and ANSI

DN	NPS	PN	Face-to-face dimension A				C	D	E	F	G	H	I	K	L	M	N	O	P	R	S	T	SW
		Class	R20	R25	R16	ASME																	
50	2	10-40 150 300	43	43	43	43	20.5	40	106	60.5	M6	101.6	69	0	M12	15.9	25.4	82.6	98	92	170	55	11.1
65	2 ½	10-40 150 300	46	46	46		20.5	40	106	60.5	M6	101.6	69	0	M12	15.9	25.4	82.6	98	92	185	55	11.1
80	3	10-40 150 300	46	49	64	48	23	36	138	60.5	M6	101.6	69	0	M12	15.9	25.4	82.6	117	110	210	78.6	11.1
100	4	10-16 25-40 150 300	52	56	64	54	26	50	162	70	M6	127	73	25.4	M12	19.1	25.4	82.6	146	133	225	102	14.3
125	5	10-16 25-40 150 300	56	64	70	56	32	50	188	70	M6	127	73	25.4	M12	19.1	25.4	82.6	168	140	270	102	14.3
150	6	10-16 25-40 150 300	56	70	76	57 59	30	64*	218	70	M8	127	76	25.4	M12	25.4	25.4	82.6	178	165	300 310	146	17.5
200	8	10 16 25 40 150 300	60	71	89	64 73	33	57	270 285 270	82.6	M8	127	92	25.4	M12	31.8	25.4	82.6	210	200	340 380 340 380	190	20.6
250	10	10 16 25 40 150 300	68	76	114	71 83	39	62 64	324 335 324	98.4	M8	203	106	35	M16	38.1	38.1	88.9	229 254 229 254	215 263 215 263	424 431	235	25.4
300	12	10 16 25 40 150 300	78	83	114	81 92	45	58 70 58 70	378 395 378 395	101.6	M8	203	111	35	M16	44.5	38.1	88.9	254 280 280	241 287 287	480 520 480 520	281	28.6

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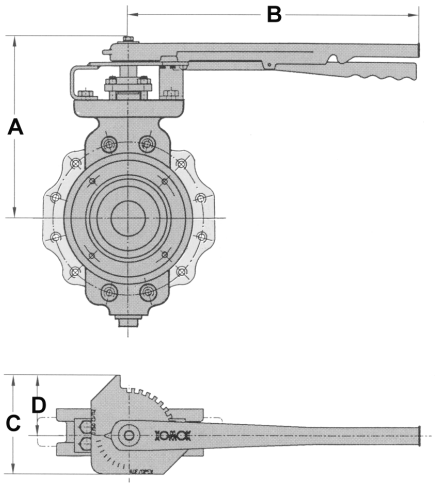
Dimensions for bare Shaft Valves DN 350 - 1200 / NPS 14 – 48

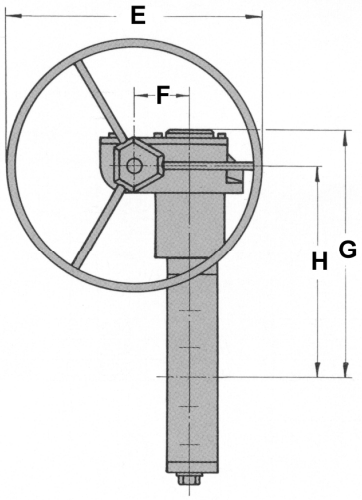
DN	NPS	PN Class	Face-to-face dimension A R20	R25	R16	ASME	C	D	E	F	G	H	I	K	L	M	N	O	P	R	S	T	SW
350	14	10	92*	92	127		41.8	73	438	98.4	M8	203	106	35	M16	38.1	38.1	88.9	305	287	530	331	25.4
		16																					
		25							450											320	555		
		40					55.4			139.7	M12	330.2		50.8	M24	50.8	50.8	146	346		580	331	38.1
		150	92*	92		92	41.8	73	438	98.4	M8	203	106	35	M16	38.1	38.1	88.9	305	287	530	331	25.4
		300				117	55.4		450	139.7	M12	330.2		50.8	M24	50.8	50.8	146	346	320	580	331	38.1
400	16	10	102	102	140		46.2	64	489	101.6	M8	203	111	35	M16	44.5	38.1	88.9	337	317	596	373	28.6
		16																					
		25							505											360	620		
		40					65			152.4	M12	330.2		50.8	M24	63.5	63.5	146	375		660	366	44.5
		150	102	102		102	46.2	64	489	101.6	M8	203	111	35	M16	44.5	38.1	88.9	337	317	596	373	28.6
		300				133	65		505	152.4	M12	330.2		50.8	M24	63.5	63.5	146	375	360	660	366	44.5
450	18	10	114	114	152		50.6	73	533	101.6	M8	203	111	35	M16	44.5	38.1	88.9	365	326	640	419	28.6
		16																					
		25							560											383			
		40					71.4			152.4	M12	330.2		50.8	M24	63.5	63.5	146	400		710	413	44.5
		150	114	114		114	50.6	73	533	101.6	M8	203	111	35	M16	44.5	38.1	88.9	365	326	640	419	28.6
		300				149	71.4		560	152.4	M12	330.2		50.8	M24	63.5	63.5	146	400	383	710	413	44.5
500	20	10	127	127	152		55	70	590	139.7	M12	330.2		50.8	M24	50.8	50.8	146	395	370	715	469	38.1
		16																					
		25							615											407	730		
		40					76			160		381		76		76.2	63.5	146	432		775	461	50.8
		150	127	127		127	55	70	590	139.7		330.2		50.8		50.8	50.8	146	395	370	715	469	38.1
		300				159	76		615	160		381		76		76.2	63.5	146	432	407	775	461	50.8
600	24	10	154	154	178		66.5	80	692	152.4	M12	330.2		50.8	M24	63.5	63.5	146	451	436	840	559	44.5
		16																					
		25							720											470	845		
		40					87			190.5		381		76		88.9	63.5	146	495		914	548	57.1
		150	154	154		154	66.5	80	692	152.4		330.2		50.8		63.5	63.5	146	451	436	840	559	44.5
		300				181	87		720	190.5		381		76		88.9	63.5	146	495	470	914	548	57.1
700	28	10	165		229		61	80	800	139.7	M12	330.2		50.8	M24	50.8	50.8	146	518	495	927	673	38.1
		16					82	77	800	160		381		76		76.2	63.5	146	523	501	927	673	50.8
		150/150				165	61	80	800	139.7		330.2		50.8		50.8	50.8	146	518	495	927	673	38.1
		150/285				165	82	77	800	160		381		76		76	63.5	146	523	501	927	673	50.8
750	30	10	190		230		72.8	80	863	152.4	M12	330.2		50.8	M24	63.5	63.5	146	541	528	984	715	44.5
		16					93	80	860	190.5		381		76		88.9	63.5	146	533	510	973	715	57.1
		150/150				190	72.8	80	863	152.4		330.2		50.8		63.5	63.5	146	541	528	984	715	44.5
		150/285				190	93	80	860	190.5		381		76		88.9	63.5	146	533	510	973	715	57.1
800	32	10	190		241		93	80	905	152.4	M12	330.2		50.8	M24	63.5	63.5	146	541	566	1015	715	44.5
		16					106	100	900	190.5		381		76		88.9	63.5	146	621	596	1060	715	57.1
		150/150				190	93	80	905	152.4		330.2		50.8		63.5	63.5	146	541	566	1015	715	44.5
		150/285				190	106	100	900	190.5		381		76		88.9	63.5	146	621	596	1060	715	57.1
900	36	10	203		241		72.8	90	1005	152.4	M12	330.2		50.8	M24	63.5	63.5	146	630	611	1168	872	44.5
		16					93	110	1000	190.5		381		76		88.9	63.5	146	642	607	1157	861	57.1
		150/150				203	72.8	90	1005	152.4		330.2		50.8		63.5	63.5	146	630	611	1168	872	44.5
		150/285				203	93	110	1000	190.5		381		76		88.9	63.5	146	642	607	1157	861	57.1
1000 900	40 / 36	10	216		300		94	120	1120	152.4	M12	330.2		50.8	M24	63.5	63.5	146	652	640	1290	872	44.5
		16																					
		150/150				216	94	120	1120	152.4		330.2		50.8		63.5	63.5	146	652	640	1290	872	44.5
		150/285																					
1050	42		251		300						M12												
		150/150				251	92	140	1194	160		381		76	M24	76.2	63.5	146	714	685	1346	1028	50.8
		150/285				251	101	140	1194	200		381		101.6	M30	101.4	88.9	190.5	714	685	1346	1028	69.7
1100 1050	44 / 42	10	216		350						M12												
		16																					
		150/150				216	105		1225	160		381		76	M24	76.2	63.5	146	714	685	1346	1028	50.8
		150/285																					
1200	48	10	254		350		101.5	120	1330	190.5	M12	381		76	M24	88.9	63.5	146	800	772	1511	1180	57.1
		16					133	120	1360	230		381		101.6	M30	114.3	88.9	190.5	800	772	1500	1180	76.2
		150/150				254	101.5	120	1330	190.5		381		76	M24	88.9	63.5	146	800	772	1511	1180	57.1
		150/285				254	133	120	1360	230		381		101.6	M30	114.3	88.9	190.5	800	772	1500	1180	76.2

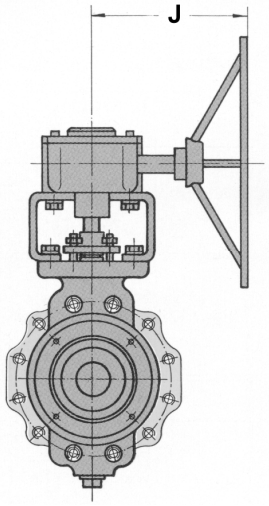
* Face-to-face DIN 3202 K1: 78 Available under Type 8.. K1

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Dimensions for Valves with Latching Lever or Worm Gear
DN 50 up to 300 / NPS 2 up to 12





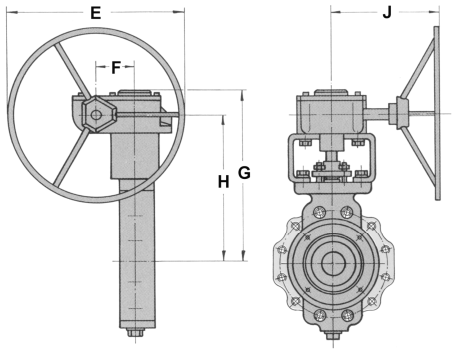


Dimensions in mm

DN / NPS	PN / Class	A	B	C	D	E	F	G	H	J	Weights for bare shaft valves in kg WAFER ASME R20	WAFER R25	WAFER R16	LUG ASME R20	LUG R25	LUG R16	Weights for operator in kg Latch. Lever	Gear
50 / 2 65 / 2 ½	10-40	190	356	146	89	200	52	280	248	163	6	6	6	6	6	6	2.5	10.5
	150																	
	300																	
80 / 3	10-40	210	356	146	89	200	52	299	267	163	6	6	7	7.5	8	10	2.5	10.5
	150																	
	300																	
100 / 4	10/16	240	432	146	89	200	52	328	296	163	10.5	11	12	14	15	16	3.2	10.5
	24/40																	
	150																	
	300																	
125 / 5	10/16	260	432	146	89	200	52	350	318	163	13	14	15	18	19	20	3.2	10.5
	25/40																	
	150																	
	300																	
150 / 6	10/16	272	432	146	89	200	52	360	328	163	15	17	18	21	23	24	3.2	10.5
	25/40																	
	150																	
	300																	
200 / 8	10	305	432	146	89	200	52	392	360	163	24	26	29	34	36	39	3.2	10.5
	16																	
	25										26	28	31	36	38	41		
	40					300	67	406	367	200	24	26	29	34	36	39		15.4
	150					200	52	392	360	163								10.5
	300					300	67	406	367	200	26	28	31	36	38	41		15.4
250 / 10	10					300	67	425	386	200	38.5	40	51	68	69	80		15.4
	16																	
	25							450	411		43.5	45	56					
	40					450	89.5	462.5	419	267								23.5
	150					300	67	425	386	200	38.5	40	51					15.4
	300					450	89.5	462.5	419	267	43.5	45	56					23.5
300 / 12	10					300	67	450	411	200	52	54	64	77	79	89		15.4
	16																	
	25							476	437		64	66	78	80	82	93		
	40					450	89.5	489	445	267								23.5
	150					450	89.5	489	445	200								23.5
	300					450	89.5	489	445	267		66	78					23.5

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Dimensions for Valves with Worm Gear DN 350 up to 1200 / NPS 14 up to 48



Available:

WAFER Design

LUG Design

DN/ NPS	PN Class	E	F	G	H	J	Weights for bare shaft valves in kg						Weights for gear in kg
							WAFER			LUG			
							R20	ASME R25	R16	R20	ASME R25	R16	Gear
350 / 14	10	300	67	501	462	200	64	71	91	82	96	116	15.4
	16							78	98		103	123	
	25	450	89.5	514	470	267							23.5
	40	600	123	567	511	352							36.8
	150	300	67	501	462	200	64	71	91	82	96	116	15.4
	300	600	123	567	511	352							36.8
								ANSI K1/K2	K3		ANSI K1/K2	K3	
400 / 16	10	450	89.5	546	502	267		90	115		134	159	23.5
	16												
	25	600	123	558	502	352							36.8
	40			596	540								
	150	450	89.5	546	502	267		90	115		134	159	23.5
	300	600	123	596	540	352							36.8
450 / 18	10	450	89.5	574	530	267		123	153		161	191	23.5
	16												
	25	600	123	586	530	352							36.8
	40	800	154	642	565	377							52.5
	150	600	123	574	530	267		123	153		161	191	23.5
	300	800	154	642	565	377							52.5
500 / 20	10	450	89.5	659	615	267		192	225		227	250	23.5
	16	600	123	670	615	352							36.8
	25			670	615	352							
	40	600	138	718	656	405							68.5
	150	450	89.5	659	615	267		192	225		227	250	
	300	600	138	718	656	405							68.5
600 / 24	10	600	123	753	695	452		274	314		319	359	38
	16	800	154	774	695	377							52.5
	25	600	138	809	729	405							68.5
	40	600	181	821	726	462							115
	150	800	123	774	698	377		274	314				52.5
	300	600	181	821	726	462							115
700 / 28	10	800	154	804	742	405		341	386				52.5
	16												
	150/150	800	154	804	742	405	306	341	386				52.5
	150/285												68.5
750 / 30	10	800	138	857	795	405							
	16												68.5
	150/150	600	138	857	795	405	391						
	150/285												
800 / 32	10	600	138	857	795	405		540	600				68.5
	16												
	150/150	600	138	857	795	405							68.5
	150/285												
900 / 36	10	600	138	946	884	405							68.5
	16												
	150/150	600	138	946	884	405	612						68.5
	150/285												
1050 / 42	10	600	237	1077	984	469							185
	16												
	150/150	600	237	1077	984	469	836						185
	150/285												
1200 / 48	10	600	237	1163	1070	593							190
	16												
	150/150	600	237	1163	1070	593	1056						190
	150/285												

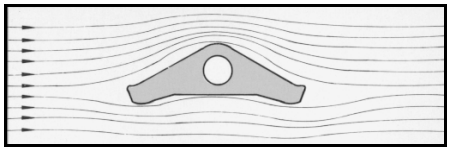
Dimensions for double flange butterfly valves and for valves with weld ends on request.

XOMOX International GmbH & Co.
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Flow Data

K_v Values, Free Sectional Area, ς1-Values

Flow Pattern of XOMOX
High Performance Butterfly Valves, Type 800



Flow data as per VDI/VDE 2176 and EN 60534

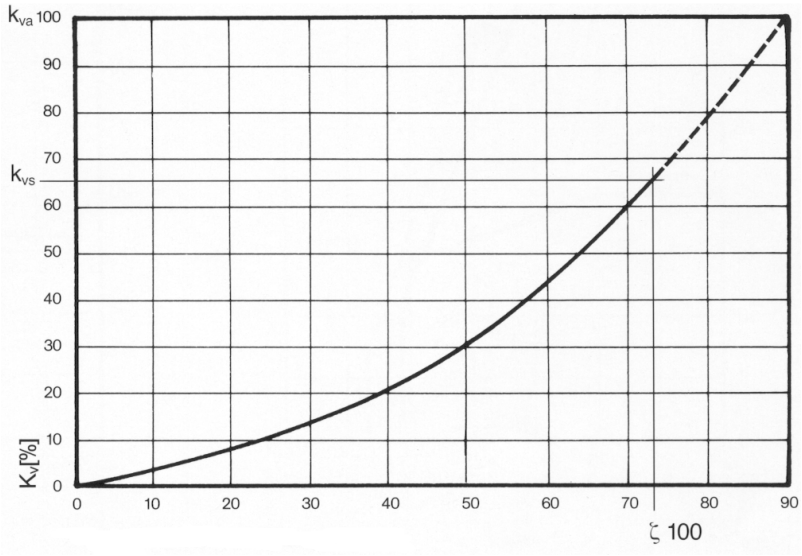
DN	NPS	PN	K_v values at angular stroke (m^3/h)						Free sect. area cm^2	ς1
			10°	18°	36°	54°	72°	90°	at 90°	90°
50 / 65	2 / 2 ½	PN 10, 16, 25 Cl. 150	1.0	2.5	12	31	56	92	14.7	1.18
80	3		5.1	13	37	79	144	222	26	1.33
100/125	4 / 5		9.4	24	66	144	264	406	47	0.97
150	6		26	64	178	376	689	1060	103	0.72
200	8		46	115	322	681	1247	1919	186	0.70
250	10		72	181	505	1068	1955	3006	292	0.70
300	12		104	262	732	1547	2833	4359	420	0.68
350	14		152	380	1063	2245	4111	6325	670	0.60
400	16		193	482	1350	2852	5222	8034	825	0.63
450	18		265	662	1852	3914	7167	11026	1065	0.54
500	20		330	826	2312	4865	8944	13760	1328	0.53
600	24		446	1164	3260	6888	12611	19402	1885	0.55
700	28	PN 10 Cl. 150 max. diff. press. 10 bar	714	1818	5088	10751	19685	30286	2834	0.41
750/800	30 / 32		784	1992	5577	11784	21575	33195		0.46
900	36		1176	2991	8373	17689	32389	49830		0.41
1050	42		1685	4285	11995	25342	46403	71390		0.38
1200	48		2224	5657	15834	33454	61256	94240		0.37
50 / 65	2 / 2 ½	PN 40 Cl. 300	1.0	2.5	12	31	56	92	14.7	1.18
80	3		5.1	13	37	79	144	222	26	1.33
100/125	4 / 5		9.4	24	66	144	264	406	47	0.97
150	6		26	64	178	376	689	1060	103	0.72
200	8		46	115	322	681	1247	1919	186	0.70
250	10		72	181	505	1068	1955	3006	292	0.70
300	12		104	262	732	1547	2833	4359	420	0.68
350	14		122	309	864	1826	3345	5145	546	0.90
400	16		159	405	1135	2397	4390	6753	722	0.90
450	18		205	519	1454	3071	5624	8652	917	0.88
500	20		267	679	1900	4015	7352	11310	1175	0.78
600	24		376	955	2675	5653	10351	15924	1644	0.82
			k_{vr}	K_v values as per. VDI/VDE 2176			k_{vs}	K_{va}		

K_{vr} = smallest useable k_v value
K_{vs} = k_v value at nominal stroke angle (72°)
K_{va} = max. possible k_v value for valve in open position (90°)
ς1 = resistant coefficient referring to pipe cross section

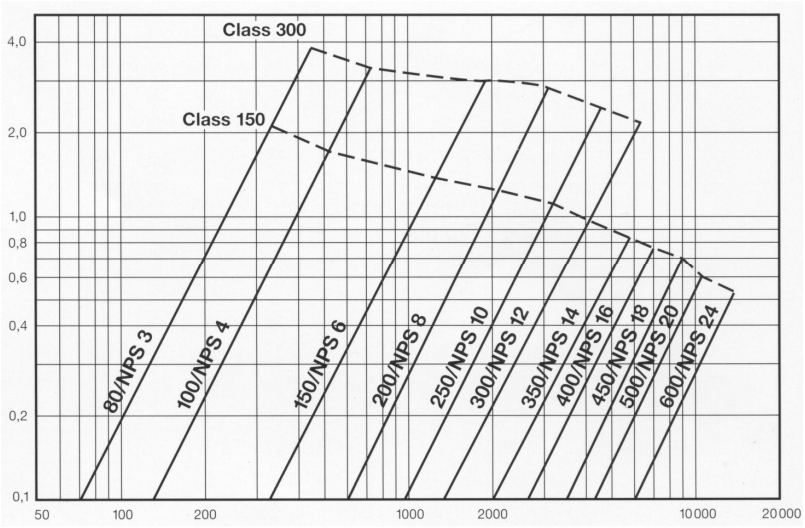
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Flow Data
Characteristic, Rangeability, Stroke, Pressure Loss

Rangeability:	**100 : 1**
Stroke:	**90° angular stroke**
Nominal stroke angle	**72°**
Basic flow characteristic:	**equal percentage**



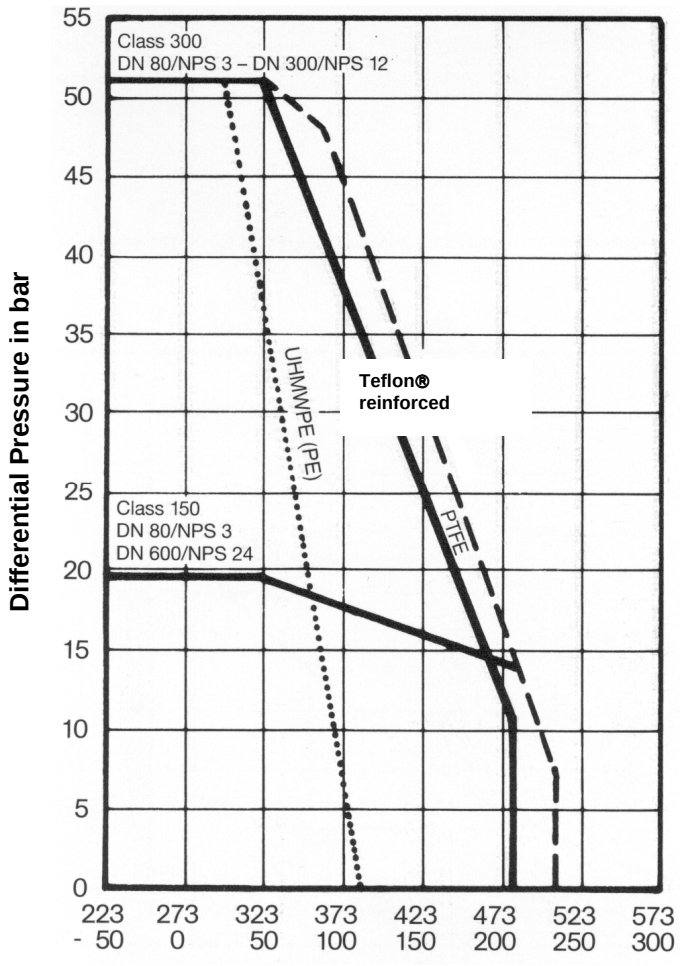
----- Differential pressure for open valve where the running torque is equivalent to the breakaway torque.



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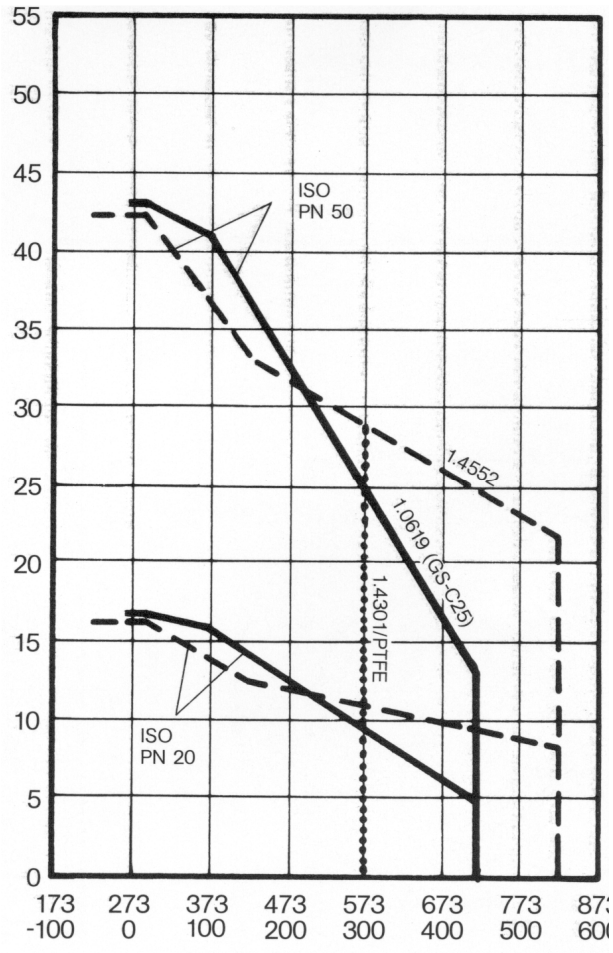
Mechanical Characteristics

Pressure-temperature range for Teflon®-, Teflon®-reinforced and PE-seats



Temperature (K) and (℃)

Pressure-temperature range for FIRESAFE and metal seats



Temperature (K) and (℃)

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Mechanical Characteristics
Torques Nm

Teflon®-. Teflon®-reinforced and PE-seats

Seat		Teflon®			Teflon®-reinforced / UHMWPE (PE) / FIRESAFE					
Diff. Pressure (in bar)		7	14	20	7	14	20	28	41	51
50 / 65	2 / 2 ½	15	21	27	18	24	32	39	53	60
80	3	24	31	37	29	36	43	52	70	80
100 / 125	4 5	39	50	61	46	60	72	90	115	137
150	6	96	120	146	115	140	175	225	305	365
200	8	181	226	277	217	270	330	425	590	705
250	10	289	352	443	346	435	530	690	960	1155
300	12	430	543	661	516	650	790	1032	1450	1740
350	14	588	735	900	625	850	1045	1350	1885	2260
400	16	803	1006	1246	950	1155	1710	2250	3185	3840
450	18	1006	1272	1590	1090	1590	2040	2695	3840	4635
500	20	1289	1640	2037	1500	2200	2840	3780	5410	6560
600	24	2046	2600	3210	2390	3385	4340	5785	8300	10060
700	28	2340			3120	4650	5950			
750 / 800	30 / 32	3120			4100	5900	7810			
900 / 1000	36 / 40	4365			5800	8310	10890			
1050 / 1100	42 / 44	6745			8970	13120	17350			
1200	48	9595			11900	17400	23000			

Metal and Metal-Graphite seats

Differential pressure (in bar)		3.5	7	14	20	28	41	51
DN	NPS							
50 / 65	2 / 2 ½	57	64	82	105	110	125	136
80	3	60	67	86	110	117	135	147
100 / 125	4 / 5	65	72	91	115	130	168	198
150	6	150	198	300	425	453	511	560
200	8	310	465	530	595	681	871	1040
250	10	470	610	815	1040	1129	1298	1424
300	12	720	935	1330	1780	1908	2121	2288
350	14	1350	1645	1745	1830	2755	3842	4605
400	16	1560	1900	2145	2310	4577	6490	7828
450	18	2550	2815	3020	3220	5492	7814	9440
500	20	3260	3605	3890	4180	7699	11027	13356
600	24	5170	5725	6210	6550	11786	16950	20498
700	28	5910	6550					
750 / 800	30 / 32	7880	8730					
900 / 1000	36 / 40	11035	12210					
1050 / 1100	42 / 44	17070	18880					
1200	48	24300	26800					

Other Design Options: Flanged, Welded End and Double-Flange Designs available on request.

Subject to technical modifications.

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