

UV790 Soft Seated Floating Ball Valve

The UV790 ball valve from Univals is designed with an advanced innovation concept, which includes unique design and high quality manufacturing processes. The UV790 ball valve is capable of delivering a longer service life and better sealing performance to meet safety, emission, and performance requirements in the Oil & Gas, Petrochemical and Chemical industries.

UV790 ball valve is suitable for a wide range of applications, such as emergency shutdown valves (ESDV), high frequency operation, and cryogenic service.



Features

Proven features provide long service life, low leakage and low operating torques in tough applications.

- Integral emission control system
 - Fugitive emission packing kits
 - Double packing design
 - Design of Spring Elastic Loaded packing
- Unique long-lasting seat sealing
 - Double contacting surface seat
 - Double Elastic seat
- Optimized ball design
- Fire safe structure design
- Anti-blowout stem design
- Anti-static design

Technical Summary

- Size: 0.5~4 inch
- Rating: Class 150 ~ Class 300
- Body: Carbon Steel, Alloy Steel, Stainless Steel
- Trim: Stainless Steel, Alloy Steel
- Seat: PTFE

Please consult with UNIVALS for more material options.

Advantage

- Tight shut-off sealing
- Long service life
- Heavy-duty
- Reliable safety

Design Standards

- **Design**
 - API 608 or ISO17292
- **Pressure / Temperature Rating**
 - ASME B16.34 or DIN EN 12516-1
- **Face-to-face Dimensions**
 - ASME B16.10 or DIN EN 558
- **Flange End Dimensions**
 - ASME B16.5 or DIN EN 1092
- **NACE**
 - MR 0103 or MR 0175
- **Fugitive Emission**
 - ISO15848, TA-LUFT
- **Fire-safe Type Test**
 - API 607

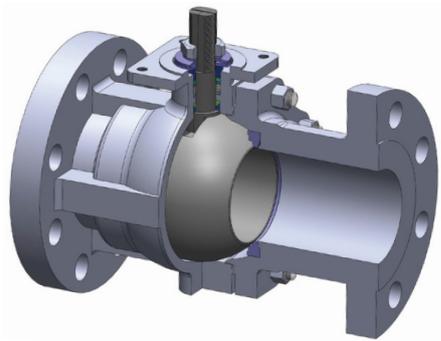
Available Configurations

UV790 ball valves are easily adapted to a variety of standard and severe service applications.

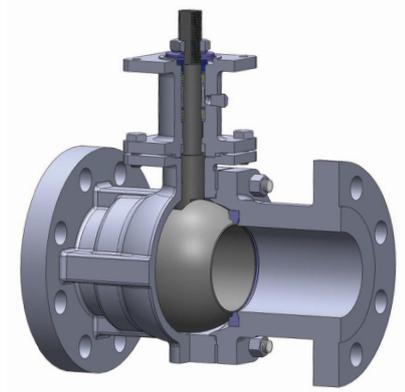
Configurable elements include:

- Extended stem
- Cryogenic
- Multi-way
- Customized design

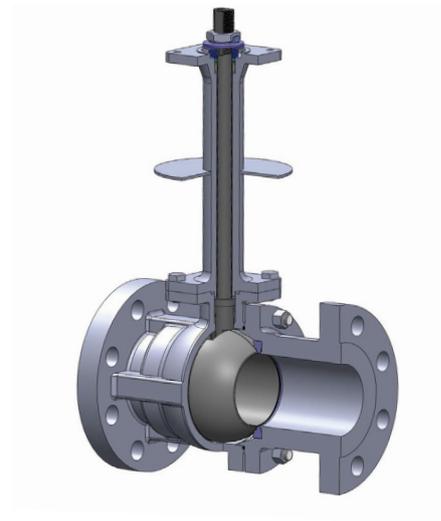
Configurations



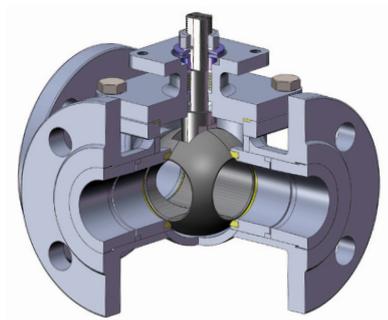
STANDARD



EXTENDED STEM



CRYOGENIC



MULTI-WAY

Size and Pressure Range

Product Supply Scope for ASME B16.5 Flange									
ASME	NPS								
Class	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4
150Lb	✓	✓	✓	✓	✓	✓	✓	✓	✓
300Lb	✓	✓	✓	✓	✓	✓	✓	✓	✓

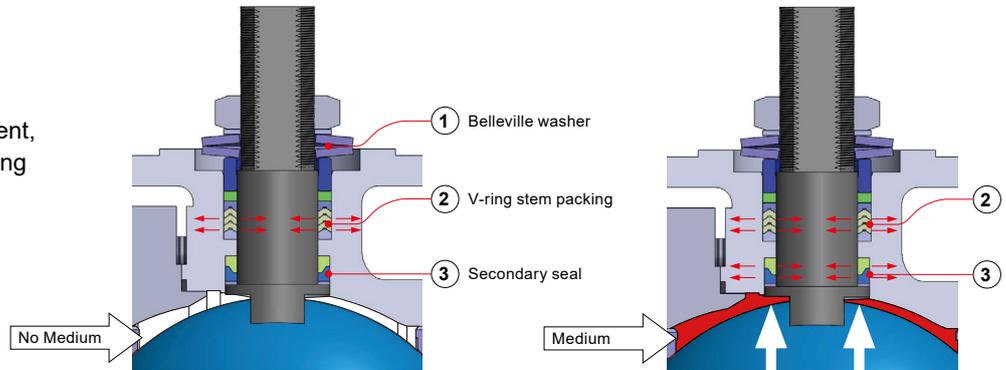
Product Supply Scope for DIN-EN-1092 Flange									
DIN	DN								
PN	15	20	25	32	40	50	65	80	100
10	✓	✓	✓	✓	✓	✓	✓	✓	✓
16	✓	✓	✓	✓	✓	✓	✓	✓	✓
25	✓	✓	✓	✓	✓	✓	✓	✓	✓
40	✓	✓	✓	✓	✓	✓	✓	✓	✓

Technical Specifications

Integral Emission Control System - Stem Sealing

Benefit

With integral emission control system design, UV790 can meet tough fugitive emission requirement, meanwhile offer longer tight sealing performance.

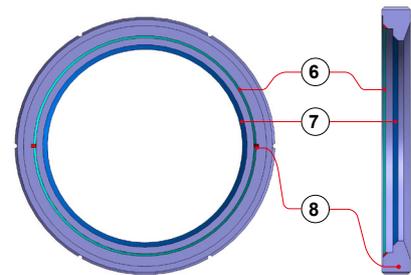


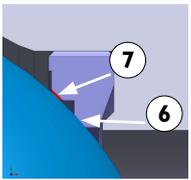
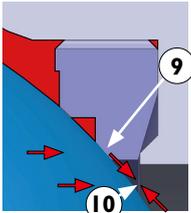
With the pressure of medium, the stem will generate extra force against the secondary seal and V-ring packing, which can offer extra tight sealing. while, when medium pressure relieved, stem packing back to pre-tight condition, which avoid over pressurizing on packing, also avoid extra torque force.

Seat Designs - Unique Long-lasting Seat

Benefit

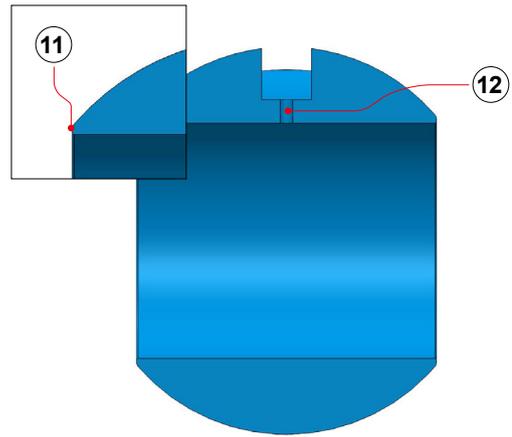
This unique design can provide excellent torque performance, tight sealing performance and long-lasting service life.



Medium Status		⑥ First ball-seat Contacting Surface	⑦ Secondary Ball – seat Contacting Surface	⑧ Pressure Relief Hole	⑨ Elastic Support Surface	⑩ Body Support Boss	Details
Before		Contacting with ball. Sealing	No contacting No elastic	/	Slight elastic deformation force	/	/
Pressurizing		Contacting with ball. Pressurized sealing	Contacting with ball. Offering extra supporting force to ball	Relief medium from relief hole	Fully elastic deformation under pressurized medium	Offer support to fully elastic deformed seat	Secondary ball-seat contacting surface support ball Body support boss offer support force to seat to avoid destructive deformation
Pressure relief		Contacting with ball. Pre-tight sealing	No contacting with ball No elastic deformation	/	Back to slight elastic deformation by pre-tight force	/	Seat back to pre-tight status.

Optimized Ball Designs

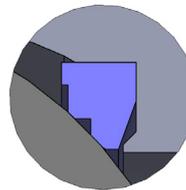
- ⑪ Specially designed bi-angles rounded ball can improve seat usage.
- ⑫ Pressure balanced hole design, to avoid over pressure in bore area.



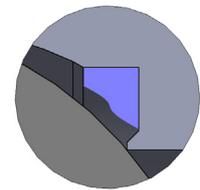
Fire Tested API 607 Edition

Univals UV790 ball valve is designed to minimize both external and internal fluid leakage after plant fires due to contact between ball and fire-safe lip for through leakage prevention. After a fire, the soft seats burn out, and the ball moves downstream then comes into contact with the downstream end cap, a metal sealing occurred. This lip is an integral part of both the cap and body which have very tight clearance with the ball. See figure 1 and 2.

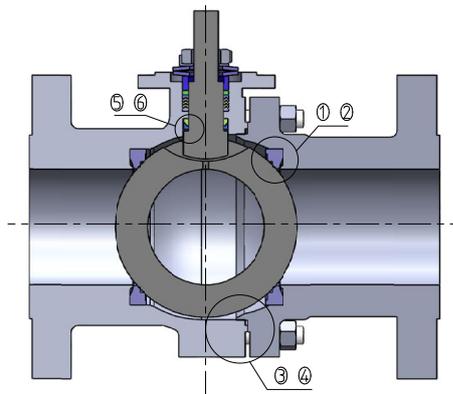
Fire Safe Seats



Before Fire
Figure 1.



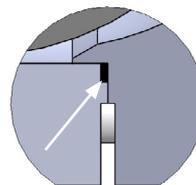
After Fire
Figure 2.



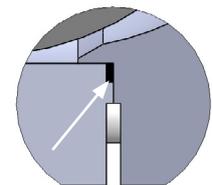
Cross section view for fire safe

Fire Safe Body

To maintain the integrity between end cap and body, the independent flange bolts or studs are screwed to body. It eliminates the joint from thermal expansion and contraction resulted from the fire and make fire resistance encapsulated grafoil body gasket to function as the way it should be and prevent the line fluid permeation and resultant leakage to external. See figure 3 and 4.



Before Fire
Figure 3.



After Fire
Figure 4.

Stem Packing for Fire Safe

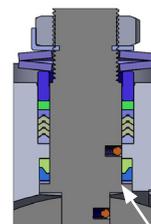
Stem packing, seal arrangement remain unaffected due to Grafoil fire resistance property.

Anti-blowout Stem Design

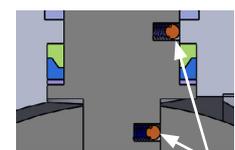
Designed with anti flying steps stem. See figure 5

Anti-static Design

This structure is very important in the working conditions of flammable media. See figure 6

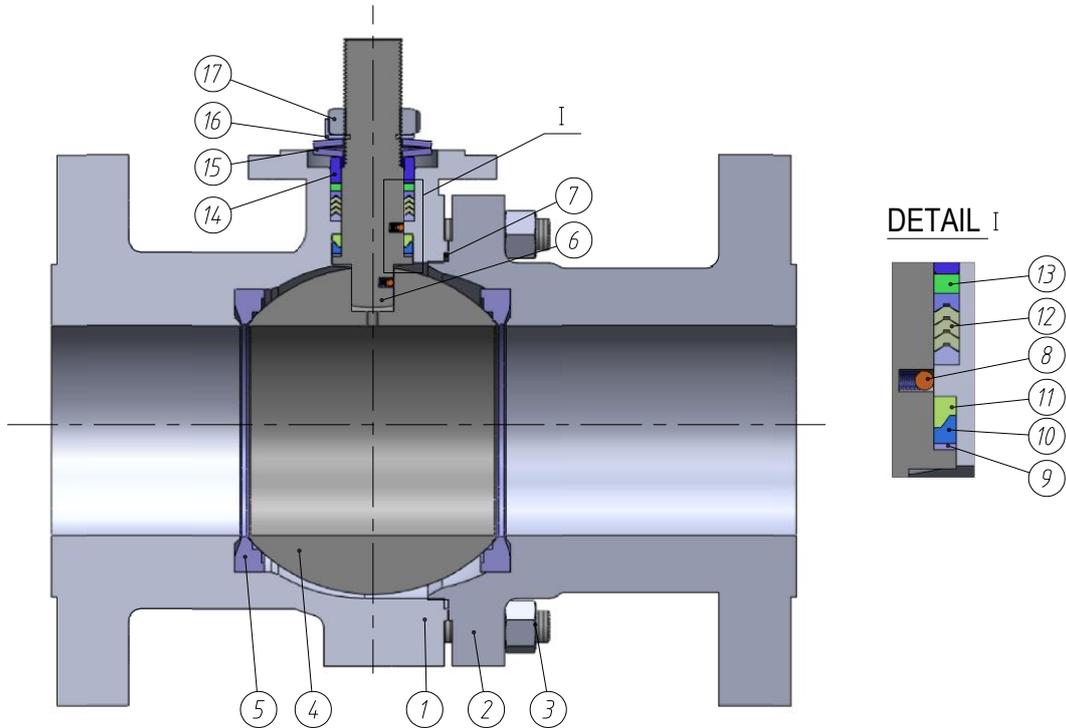


Blowout prevention
Figure 5.



Antistatic device
Figure 6.

Section Drawing



No.	Description	No.	Description
1	Body	10	Compress Ring
2	End Connection	11	Upper Stem Seal
3	Stud and Nut	12	Packing Ring
4	Ball	13	Top Stem Bearing
5	Seat	14	Packing Bushing
6	Stem	15	Belleville Washer
7	Body / Bonnet Gasket	16	Lock Saddle
8	Antistatic Device	17	Stem Nut
9	Below Stem Seal Bearing		

Materials of Construction

Max. Temperature	180°C	180°C	180°C
Min. Temperature	-29°C	-45°C	-45°C
Body	A216 WCB	A 351 CF8M	A 351 CF3M
End Connection	A216 WCB	A 351 CF8M	A 351 CF3M
Stud and Nut	A193 B7 A194 2H	A193 B8M A194 8M	A193 B8M A194 8M
Ball	A182 F316	A182 F316	A182 F316L
Seat	PTFE ^a	PTFE ^a	PTFE ^a
Stem	A182 F51	A182 F51	A182 F51
Body/Bonnet Gasket	PTFE ^b Graphite	PTFE ^b Graphite	PTFE ^b Graphite
Antistatic Device	A276 316	A276 316	A276 316
Below Stem Seal Bearing	PTFE	PTFE	PTFE
Compress Ring	A276 316	A276 316	A276 316
Upper Stem Seal	PTFE ^b Graphite	PTFE ^b Graphite	PTFE ^b Graphite
Packing Ring	PTFE ^b Graphite	PTFE ^b Graphite	PTFE ^b Graphite
Top Stem Bearing	PTFE ^b Graphite	Graphite Graphite	Graphite Graphite
Packing Bushing	A276 316	A276 316	A276 316L
Belleville Washer	Inconel x750	Inconel x750	Inconel x750
Lock Saddle	Stainless Steel	Stainless Steel	Stainless Steel
Stem Nut	A4-50	A4-50	A4-50

NOTE: ^a RPTFE, PEEK, PPL, etc. are optional

^b "PTFE" Only applicable to non fire rated valves

Class 150/300(PN10/PN40) Operating Torque

NPS	BTO	ETO	BTC	ETC
1/2	100%	100%	100%	100%
3/4	100%	100%	100%	100%
1	100%	100%	100%	100%
1-1/4	100%	100%	100%	100%
1-1/2	100%	100%	100%	100%
2	100%	100%	100%	100%
2-1/2	100%	75%	75%	100%
3	100%	75%	75%	100%
4	100%	75%	75%	100%

NOTES: There is little correlation between the opening and closing positions of torque values less than or equal to 2 inches

Torque—MAST(Ambient temperature)

NPS	Material	Class150	Class300
		MAST (Nm)	MAST (Nm)
1/2	F51	33	33
3/4	F51	95	95
1	F51	95	95
1-1/4	F51	95	95
1-1/2	F51	160	160
2	F51	283	283
2-1/2	F51	511	511
3	F51	511	511
4	F51	877	877

Torque (Nm)

Class 150

Size	Differential Pressure (bar)			
	0	5	10	20
NPS	0	5	10	20
1/2	7	9	9	9
3/4	8	12	13	13
1	9	16	16	16
1-1/4	22	22	23	23
1-1/2	24	24	25	25
2	33	33	33	33
2-1/2	39	46	50	52
3	50	60	60	70
4	60	70	70	80

Class 300

Size	Differential Pressure (bar)						
	0	10	20	25	30	40	50
NPS	0	10	20	25	30	40	50
1/2	7	9	9	9	10	13	14
3/4	8	13	13	13	14	15	16
1	9	16	16	16	16	18	22
1-1/4	22	23	23	25	25	28	30
1-1/2	24	25	25	26	26	30	33
2	33	33	33	38	41	46	55
2-1/2	39	50	52	58	65	72	78
3	50	60	70	80	81	98	105
4	60	70	80	95	125	152	177

PN10

Size	Differential Pressure (bar)		
	0	5	10
DN	0	5	10
15	7	9	9
20	8	12	13
25	9	16	16
32	22	22	23
40	24	24	25
50	33	33	33
65	39	46	50
80	50	60	60
100	60	70	70

PN16

Size	Differential Pressure (bar)			
	0	5	10	16
DN	0	5	10	16
15	7	9	9	9
20	8	12	13	13
25	9	16	16	16
32	22	22	23	23
40	24	24	25	25
50	33	33	33	33
65	39	46	50	52
80	50	60	60	70
100	60	70	70	80

PN25

Size	Differential Pressure (bar)				
	0	5	10	20	25
DN	0	5	10	20	25
15	7	9	9	9	9
20	8	12	13	13	13
25	9	16	16	16	16
32	22	22	23	23	25
40	24	24	25	25	26
50	33	33	33	33	38
65	39	46	50	52	58
80	50	60	60	70	80
100	60	70	70	80	95

PN40

Size	Differential Pressure (bar)					
	0	10	20	25	30	40
DN	0	10	20	25	30	40
15	7	9	9	9	10	13
20	8	13	13	13	14	15
25	9	16	16	16	16	18
32	22	23	23	25	25	28
40	24	25	25	26	26	30
50	33	33	33	38	41	46
65	39	50	52	58	65	72
80	50	60	70	80	81	98
100	60	70	80	95	125	152

Assumptions:

- Seat sealing: PTFE
- Operating temperature: -29 to 38°C
- Medium characteristic: Lubricating
- Packing ring: PTFE
- Cycle frequency: Daily
- Stem sealing: ISO 15848

Bolting Torque

Torque (Nm)						
MATERIAL ASTM	Stud Size					
	M10×1.5	M14×1.5	M16×1.5	M18×1.5	M22×1.5	M27×1.5
A193 B8M Class 2	6	15	20	22	25	30

Body Stud Torque (Nm)								
MATERIAL ASTM	Stud Size							
	M8	M10	M12	M14	M16	M20	M24	M27
A193 B7	20	38	64	103	157	305	527	768
A193 B8M Class 2	23	44	74	118	181	354	513	613

Flow Rates (Cv and Kv) - Full Bore

NPS	DN	Cv 90°	Kv 90°
1/2	15	25	21
3/4	20	50	43
1	25	80	68
1-1/2	40	240	204
2	50	460	391
2-1/2	65	820	697
3	80	1250	1062
4	100	2230	1896

Data for Calculation of Flow

The coefficient of flow Cv expresses the rate of flow in gallons per minute at 60°F water with a pressure drop 1 psig across the valve. The Cv coefficients for the various types and sizes. Shown in the tables, have been determined from actual flow tests.

NOTE: The relationship between Cv and Kv can be express as: $Cv=1.156Kv$

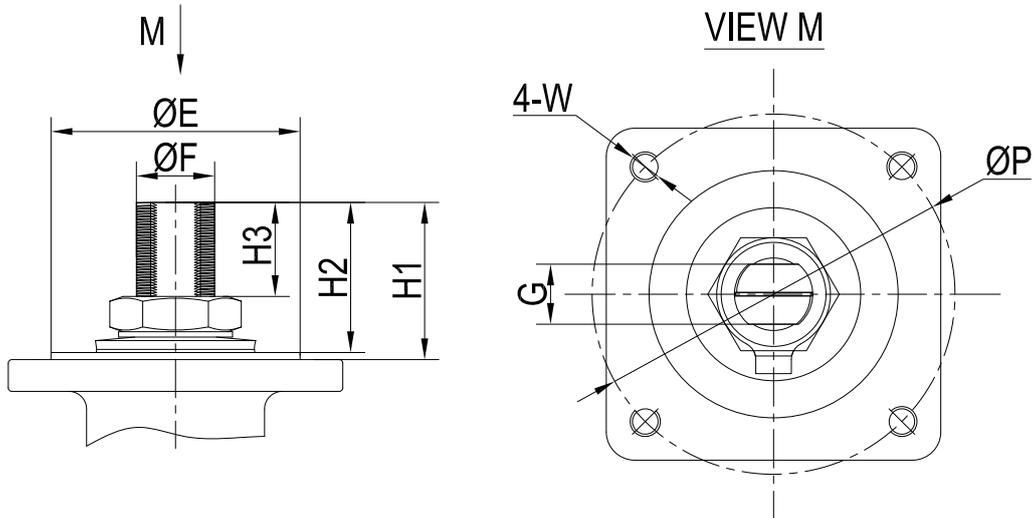
Leakage Allowable

Size		ISO 5208			API 598		
NPS	DN	Rate A Water (ml/min)	Rate A Gas (ml/min)	Testing Time(s)	Test Water (ml/min)	Test Gas (ml/min)	Testing Time(s)
1/2	15	0	0	15	0	0	15
3/4	20	0	0	15	0	0	15
1	25	0	0	15	0	0	15
1-1/4	32	0	0	15	0	0	15
1-1/2	40	0	0	15	0	0	15
2	50	0	0	15	0	0	15
2-1/2	65	0	0	60	0	0	60
3	80	0	0	60	0	0	60
4	100	0	0	60	0	0	60

Test Procedures

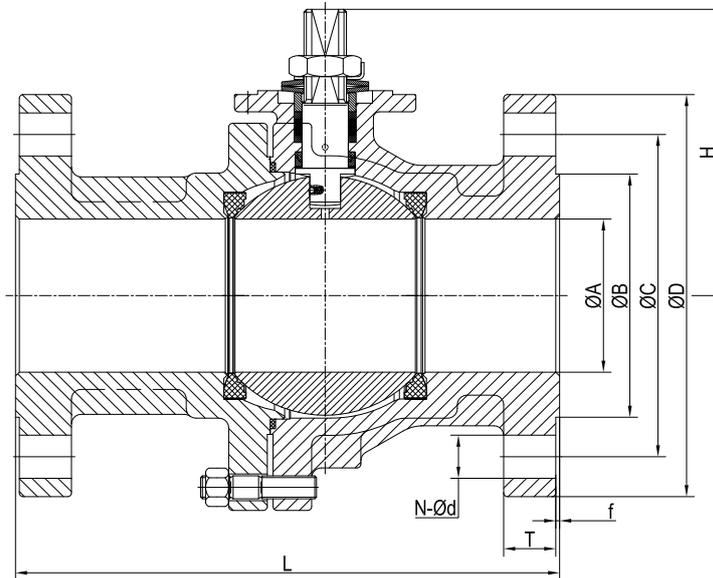
ISO 5208	Rate A water	Water	1.1 PN
ISO 5208	Rate A gas	Air-N2	1.1 PN or 5.5 bar
API 598	Test water	Water	1.1 PN
API 598	Test gas	Air-N2	1.1 PN or 5.5 bar

Ball Valve Dimensions



Size		Dimensions for Mounting Pad in mm							
NPS	DN	G	ΦF	W	ΦE	ΦP	H1	H2	H3
1/2	15	6.3	10	M5	30	42	19.5	17.5	8
3/4	20	6.3	10	M5	30	42	19.5	17.5	8
1	25	9	14	M6	35	50	20.5	19.5	8.5
1-1/4	32	9	14	M6	35	50	20.5	19.5	8.5
1-1/2	40	11	16	M8	55	70	31.5	30	17.5
2	50	14	18	M8	55	70	34.5	33	17.5
2-1/2	65	17	22	M10	70	102	46.5	44.5	26
3	80	17	22	M10	70	102	46.5	44.5	26
4	100	20	27	M10	70	102	56.5	54.5	32

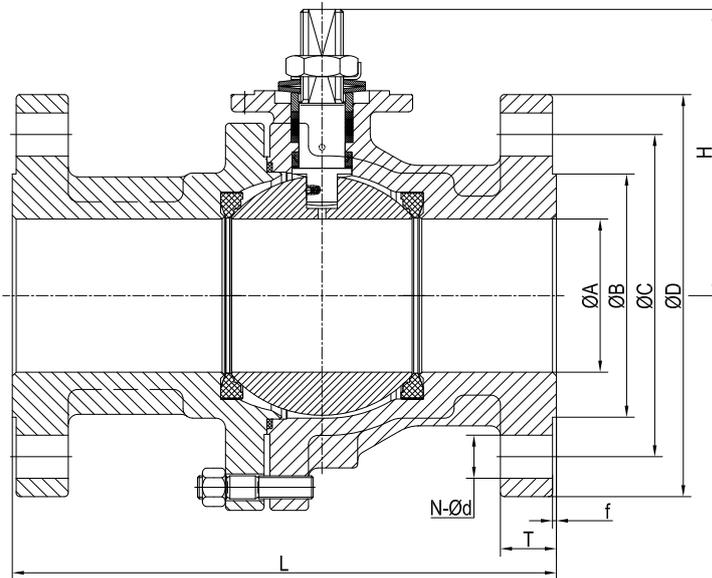
Ball Valve Dimensions



Size	ASME Class 150 Approximate Dimensions in mm										Weight (kg)
	NPS	ØB	ØD	L	N	T	Ø d	ØC	Ø A	f	
1/2	35.1	89	108	4	9.7	16	60.5	15	1.6	59	1.82
3/4	42.9	99	117	4	11.2	16	69.8	20	1.6	66	2.12
1	50.8	108	127	4	12.7	16	79.2	25	1.6	77	3.04
1-1/4	63.5	117	140	4	14.2	16	88.9	32	1.6	82	4.45
1-1/2	73	127	165	4	15.9	16	98.6	38	1.6	96	5.8
2	91.9	152	178	4	17.5	19	120.6	50	1.6	108	8.36
2-1/2	104.6	178	190	4	20.6	19	139.7	65	1.6	135	15
3	127	190	203	4	22.4	19	152.4	76	1.6	150	19.92
4	157.2	229	229	8	22.4	19	190.5	100	1.6	183	32.9

Size	ASME Class 300 Approximate Dimensions in mm										Weight (kg)
	NPS	ØB	ØD	L	N	T	Ø d	ØC	Ø A	f	
1/2	35.1	95	140	4	12.7	16	66.5	15	1.6	59	2.2
3/4	42.9	117	152	4	14.2	19	82.6	20	1.6	66	3.25
1	50.8	124	165	4	15.7	19	88.9	25	1.6	77	4.48
1-1/4	63.5	133	178	4	17.5	19	98.6	32	1.6	82	5.8
1-1/2	73	155	190	4	19	22	114.3	38	1.6	96	8.7
2	91.9	165	216	8	20.6	19	127	50	1.6	108	11.2
2-1/2	104.6	190	241	8	23.9	22	149.4	65	1.6	135	19
3	127	210	283	8	26.9	22	168.1	76	1.6	150	28
4	157.2	254	305	8	30.2	22	200.2	100	1.6	183	43.7

Ball Valve Dimensions



Size	DIN-EN PN10/PN16 Approximate Dimensions in mm										Weight (kg)
DN	ØB	ØD	L	N	T	Ø d	ØC	ØA	f	H	
15	45	95	115	4	16	14	65	15	2	59	2.46
20	58	105	120	4	18	14	75	20	2	66	3.08
25	68	115	125	4	18	14	85	25	2	77	4.18
32	78	140	165	4	18	18	100	32	2	82	5.62
40	88	150	140	4	18	18	110	38	3	96	7.95
50	102	165	150	4	18	18	125	50	3	108	10.5
65	122	185	170	8	18	18	145	65	3	135	17
80	138	200	180	8	20	18	160	80	3	150	21.5
100	158	220	190	8	20	18	180	100	3	183	34

Size	DIN-EN PN25/PN40 Approximate Dimensions in mm										Weight (kg)
DN	ØB	ØD	L	N	T	Ø d	ØC	Ø A	f	H	
15	45	95	115	4	16	16	65	15	2	59	2.46
20	58	105	120	4	18	18	75	20	2	66	3.08
25	68	115	125	4	18	18	85	25	2	77	4.18
32	78	140	165	4	18	18	100	32	2	82	5.62
40	88	150	140	4	18	18	110	38	3	96	7.95
50	102	165	150	4	20	18	125	50	3	108	10.5
65	122	185	170	8	22	18	145	65	3	135	18.3
80	138	200	180	8	24	20	160	80	3	150	24.9
100	162	235	190	8	24	22	190	100	3	183	37.2

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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

www.univals.com