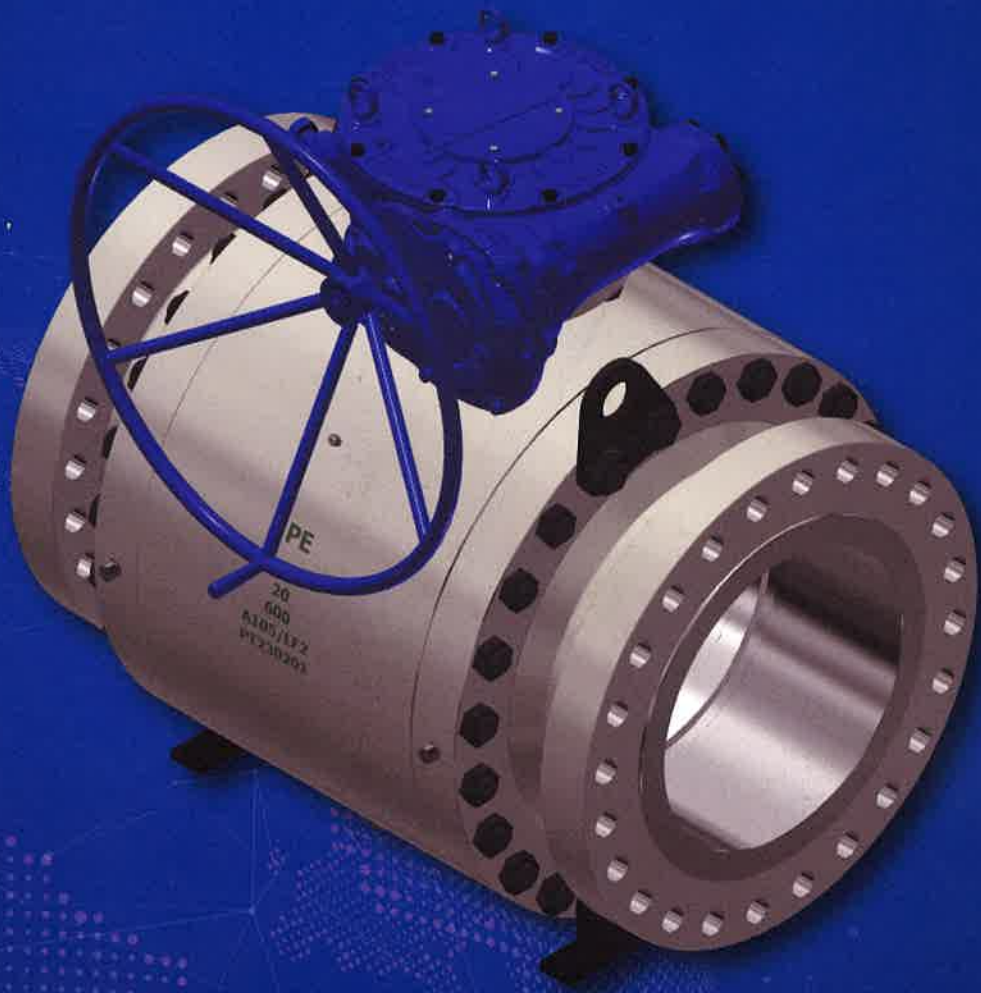




# FLOATING & TRUNNION MOUNTED BALL VALVES



**PEENG CO., LTD**

All About Ball Valves | 피이엔지

# FLOATING & TRUNNION MOUNTED BALL VALVES

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## 1. PE PRODUCTS AND SERVICE

PE Engineering Co., Ltd. is the fastest growing ball valve manufacturer in South Korea and is a modern dynamic company which produces industrial ball valves.

PE Ball Valves are available in a wide variety of materials and incorporate the most advanced technical features designed to satisfy even the most demanding customers.

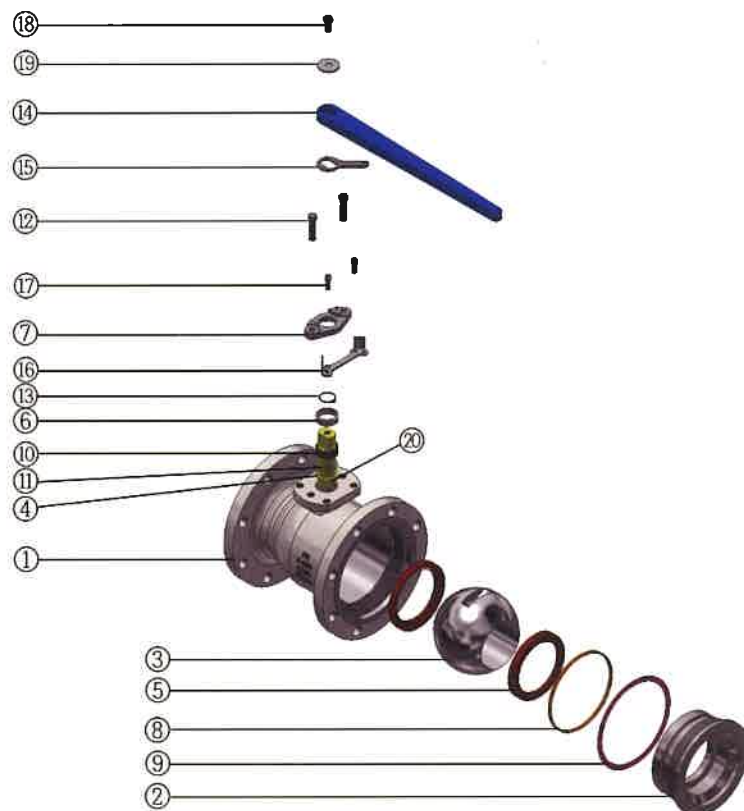
We are proud to introduce our products which are qualified under API Q1 quality program. Each and every PE Ball Valve is monogrammed under API 6D-2016.

We have the desire to design, engineering and manufacture a product specifically for the individual user's service. We always appreciate customer inquiries and will do our best to provide quality services.



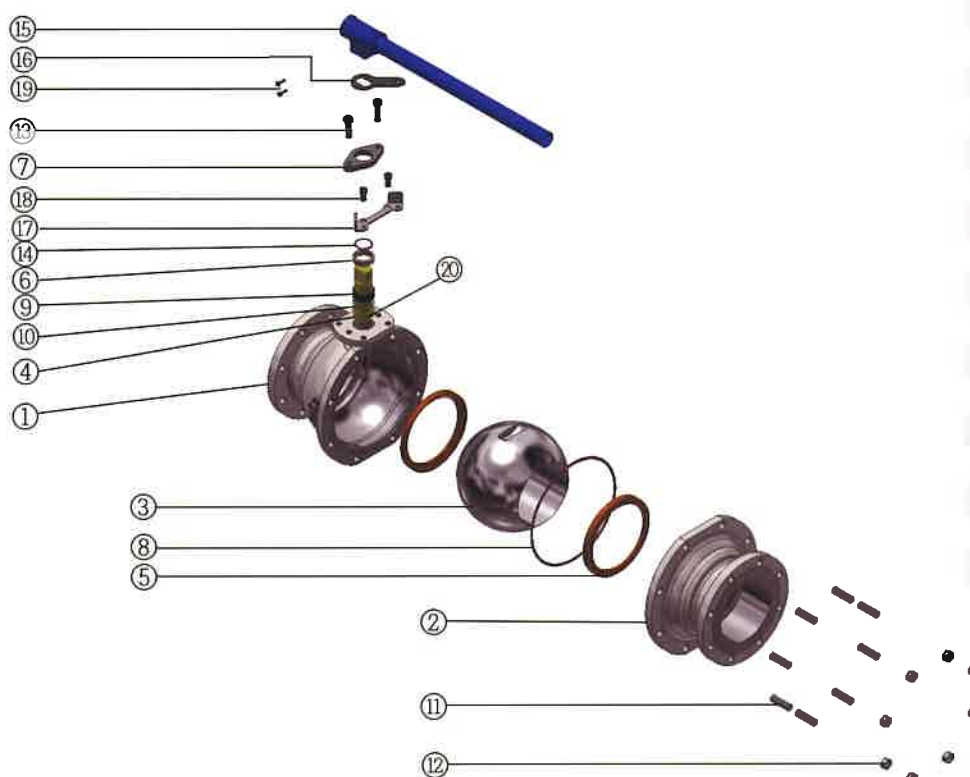
## 2. FLOATING BALL VALVES PART ANALYSIS

### Uni-body, Side-Entry Design, Reduce Port



- 1 BODY
- 2 INSERT
- 3 BALL
- 4 STEM
- 5 SEAT RING
- 6 GLAND RING
- 7 GLAND FLANGE
- 8 O-RING
- 9 GASKET
- 10 GLAND PACKING
- 11 THRUST WASHER
- 12 GLAND BOLT
- 13 SNAP RING
- 14 HANDLE
- 15 STOPPER
- 16 LOCKING PLATE
- 17 LOCKING BOLT
- 18 TOP BOLT
- 19 TOP WASHER
- 20 ANTI STATIC

### Three-piece, Side-Entry Designm Full Port (14" & Above)



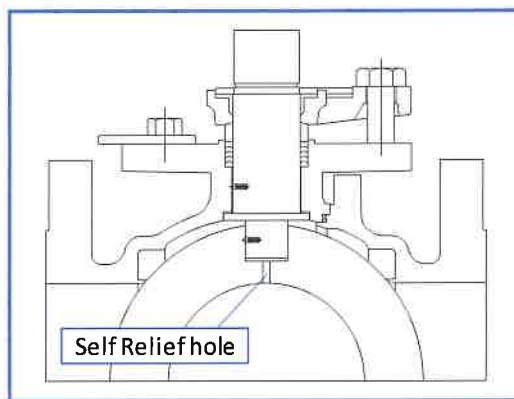
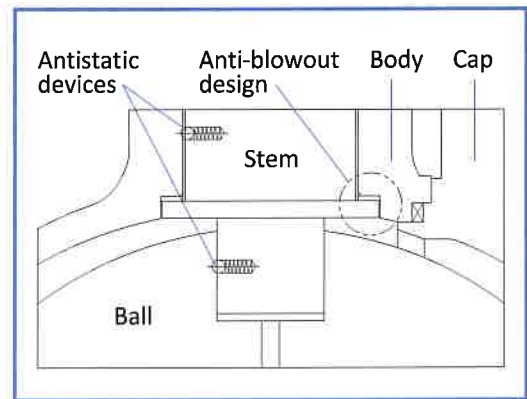
- 1 BODY
- 2 CAP
- 3 BALL
- 4 STEM
- 5 SEAT RING
- 6 GLAND RING
- 7 GLAND FLANGE
- 8 GASKET
- 9 GLAND PACKING
- 10 THRUST WASHER
- 11 CAP BOLT
- 12 CAP NUT
- 13 GLAND BOLT
- 14 SNAP RING
- 15 HANDLE
- 16 STOPPER
- 17 LOCKING PLATE
- 18 LOCKING BOLT
- 19 TOP BOLT
- 20 ANTI STATIC

## 2. FLOATING BALL VALVES FEATURES AND BENEFITS

### STEM CONSTRUCTION

The stem has an anti-blowout design. And an antistatic feature is provided to Ensure electrical continuity between ball, stem and body.

The pressure thrust on the stem is supported by a thrust washer in antifriction material.



### SEAT TO BALL SEALING

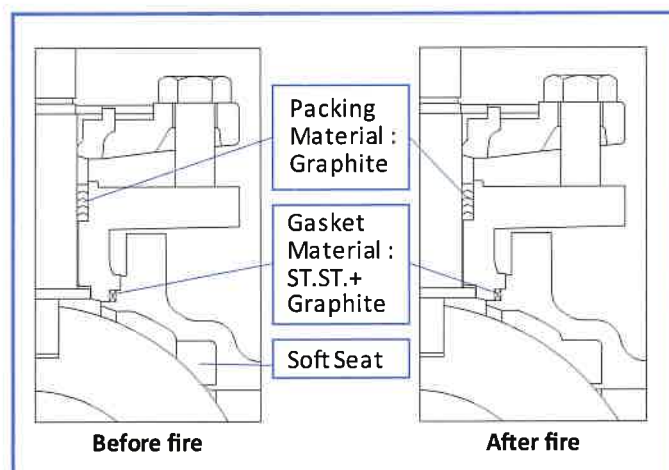
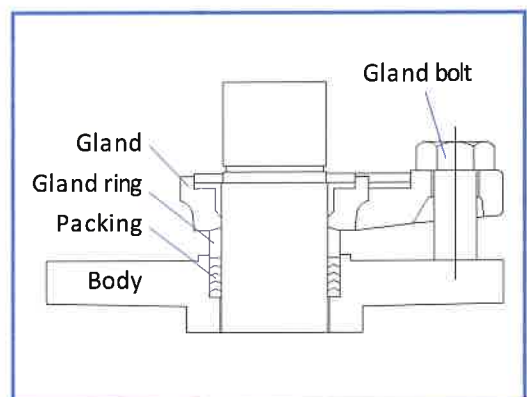
Soft seats are standard. Seat material are such as RTFE, DEVLON, and PEEK.

Some line fluid is usually left trapped inside the ball-cavity. This fluid can expand under the influence of high ambient or line temperature.

Floating ball valves offer self-relieving of excessive cavity pressure as a standard feature engineered in ball seats.

### LOW EMISSION SERVICE

The surface of stem and stuffing box, and interface clearance of stem to gland, stem to body and gland to stuffing box are precisely controlled on machining and assembly for low emission service.



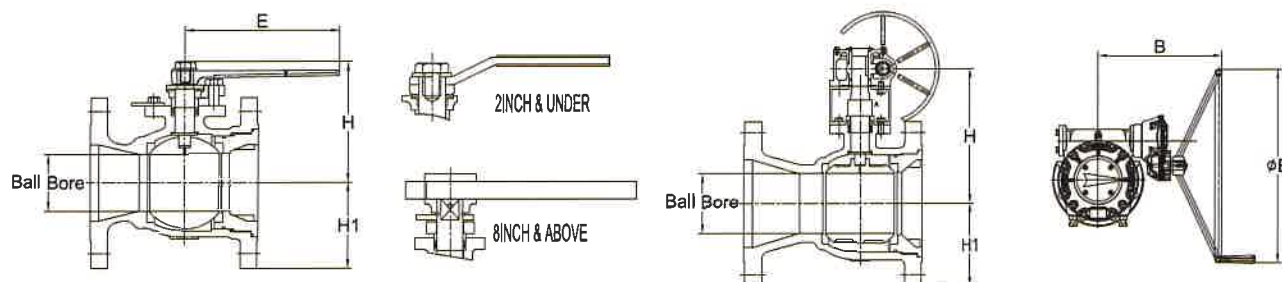
### FIRE SAFE DESIGN

PE ball valves have been designed to comply with the fire safety standards of API 607 and API6FA, and tested to ensure that the external and through bore maximum allowable leakage rates are maintained in the event of a fire.

When the seat are softened and burnt in case of fire or unusual temperature increase, ball will touch with valve shell and form a metal-to-metal contact, which can prevent internal leaks.

## 2. FLOATING BALL VALVES DIMENSIONAL DATA / DRAWING

### Uni-body, Side-Entry Design, Reduce Port

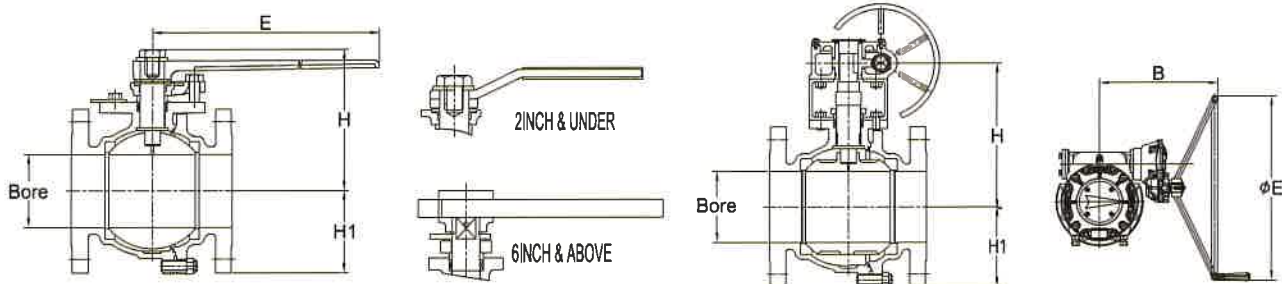


\* Larger class & sizes available on request

Class 150											
NPS	1 1/2	2	2 1/2	3	4	6	8	10	12		
DN	40	50	65	80	100	150	200	250	300		
Ball Bore	inch	1.00	1.50	2.00	2.32	3.00	4.01	5.67	7.40	8.66	
	mm	25	38	51	59	76	102	144	186	220	
H1	inch	2.50	3.00	3.50	3.75	4.50	5.50	6.75	8.00	9.50	
	mm	68.5	76	139	89	114.5	139.5	171.5	203	241.3	
operation		Lever				Lever Gear		Lever Gear		Gear	
H	inch	4.00	5.00	5.00	5.43	6.29	7.48	11.61	12.36	14	14.17
	mm	102	127	127	138	160	190	295	314	357	360
E	inch	6.0	9.0	9.0	14.7	14.7	17.7	23.6	11.81	31.5	15.75
	mm	152	230	230	380	380	450	600	300	800	400
B	inch	-	-	-	-	-	-	9.17	-	11.02	13.12
	mm	-	-	-	-	-	-	233	-	280.5	333.2

Class 300											
NPS		1 1/2	2	3	4	6	8		10		12
DN		40	50	80	100	150	200		250		300
Ball Bore	inch	1.00	1.50	2.32	3.00	4.01	5.67		7.40		8.66
	mm	25	38	59	76	102	144		186		220
H1	inch	3.06	3.25	4.15	5.00	6.25	7.50		8.75		10.25
	mm	77.5	82.5	105	127	159	190.5		222		260.5
operation		Lever					Lever	Gear	Lever	Gear	Gear
H	inch	4.00	5.00	5.43	6.29	7.48	11.61	12.36	14	14.17	17.28
	mm	102	127	138	160	190	295	314	357	360	439
E	inch	6.0	9.0	14.7	14.7	17.7	23.6	11.81	31.5	15.75	25.4
	mm	152	230	380	380	450	600	300	800	400	500
B	inch	-	-	-	-	-	-	9.17	-	11.02	13.12
	mm	-	-	-	-	-	-	233	-	280.5	333.2

### Two-piece, Side-Entry Design, Full Port



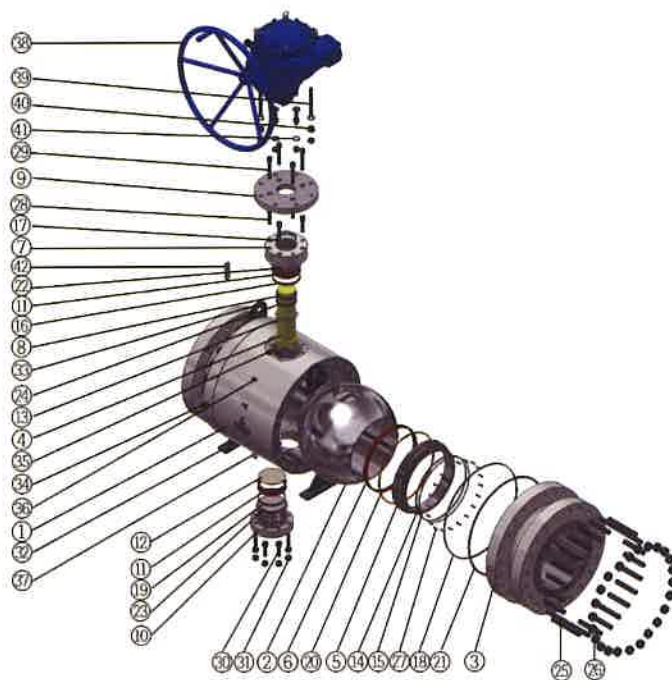
\* Larger class & sizes available on request

Class 150													
NPS	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	6	8	10	12
DN	15	20	25	32	40	50	65	80	100	150	200	250	300
Bore	inch	0.51	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	6.00	8.00	10.0
	mm	13	19	25	32	38	51	64	76	102	152	203	254
H1	inch	1.75	1.94	2.13	2.31	2.5	3	3.5	3.75	4.5	5.5	6.75	8
	mm	44.5	49	54	58.5	63.5	76	89	95	115	140	172	203
operation		Lever				Lever Gear		Lever Gear		Gear		Gear	
H	inch	3.7	3.89	4.01	4.4	5	5.9	5.7	6.29	7.55	12.2	13.0	14.6
	mm	94	99	102	112	127	150	145	160	192	310	330	376
E	inch	5.1	5.1	6.1	6.1	9.1	9.1	14.7	14.7	17.7	23.6	11.8	31.5
	mm	130	130	155	155	230	230	380	380	450	600	300	800
B	inch	-	-	-	-	-	-	-	-	-	9.17	-	11.0
	mm	-	-	-	-	-	-	-	-	-	233	-	281

Class 300													
NPS	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	6	8	10	12
DN	15	20	25	32	40	50	65	80	100	150	200	250	300
Bore	inch	0.51	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	6.00	8.00	10.0
	mm	13	19	25	32	38	51	64	76	102	152	203	254
H1	inch	1.875	2.31	2.44	2.63	3.06	3.25	3.75	4.13	5	6.25	7.5	8.75
	mm	47.5	58.5	62	66.5	77.5	82.5	95	105	127	159	191	222
operation		Lever				Lever Gear		Lever Gear		Gear		Gear	
H	inch	3.7	3.89	4.01	4.4	5.19	6.1	5.7	6.57	7.79	12.2	13.0	14.6
	mm	94	99	102	112	132	155	145	167	198	310	330	376
E	inch	5.1	5.1	6.1	6.1	9.1	9.1	14.7	14.7	17.7	23.6	11.8	31.5
	mm	130	130	155	155	230	230	380	380	450	600	300	800
B	inch	-	-	-	-	-	-	-	-	-	9.17	-	11.0
	mm	-	-	-	-	-	-	-	-	-	233	-	281

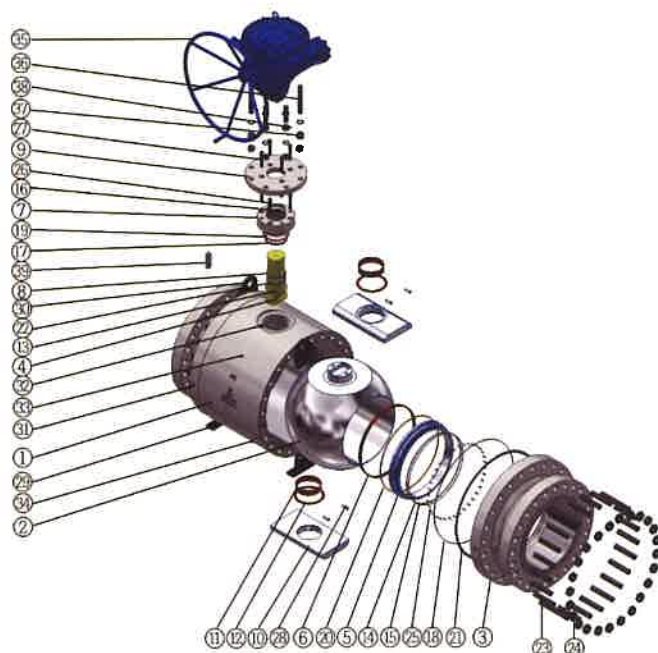
### 3. TRUNNION BALL VALVES PART ANALYSIS

#### Three-piece, Side-Entry Designm Full Port (12" & Under)



1 BODY	22 GLAND GASKET (SPW)
2 BALL	23 TRUNNION GASKET (SPW)
3 CAP	24 PACKING
4 STEM	25 CAP BOLT
5 RETAINER	26 CAP NUT
6 SEAT	27 SPRING
7 GLAND	28 GLAND BOLT
8 GLAND RING	29 MOUNTING BOLT
9 MOUNTING PLATE	30 TRUNNION BOLT
10 TRUNNION	31 TRUNNION NUT
11 BEARING	32 FOOT PLATE
12 TRUNNION BEARING	33 LIFT PLATE
13 THRUST WASHER	34 GREASE FITTING (CAP)
14 RETAINER O-RING-1	35 GREASE FITTING (GLAND)
15 RETAINER O-RING-2	36 VENT FITTING
16 GLAND O-RING-1	37 DRAIN PLUG
17 GLAND O-RING-2	38 GEAR BOX
18 CAP O-RING	39 GEAR BOX BOLT
19 TRUNNION O-RING	40 GEAR BOX NUT
20 RETAINER GASKET	41 GEAR BOX SPRING WASHER
21 CAP GASKET (SPW)	42 KEY

#### Three-piece, Side-Entry Designm Full Port (14" & Above)



1 BODY	21 CAP GASKET (SPW)
2 BALL	22 PACKING
3 CAP	23 CAP BOLT
4 STEM	24 CAP NUT
5 RETAINER	25 SPRING
6 SEAT	26 GLAND BOLT
7 GLAND	27 MOUNTING BOLT
8 GLAND RING	28 TRUNNION PIN
9 MOUNTING PLATE	29 FOOT PLATE
10 TRUNNION PLATE	30 LIFT PLATE
11 BEARING	31 GREASE FITTING (CAP)
12 SUPPORT BEARING	32 GREASE FITTING (GLAND)
13 THRUST WASHER	33 VENT FITTING
14 RETAINER O-RING-1	34 DRAIN PLUG
15 RETAINER O-RING-2	35 GEAR BOX
16 GLAND O-RING-1	36 GEAR BOX BOLT
17 GLAND O-RING-2	37 GEAR BOX NUT
18 CAP O-RING	38 GEAR BOX SPRING WASHER
19 GLAND GASKET (SPW)	39 KEY
20 RETAINER GASKET	

### 3. TRUNNION BALL VALVES FEATURES AND BENEFITS

#### BODY CONSTRUCTION

The body is made of three forged parts, and the bolted construction allows disassembly in the field for repairs. The body drain is located in the lowest part of the body cavity and consists of drain plug with safety plug.

Graphite gaskets are provided for compliance with API 607/ISO, fire safe standards.

#### STEM CONSTRUCTION

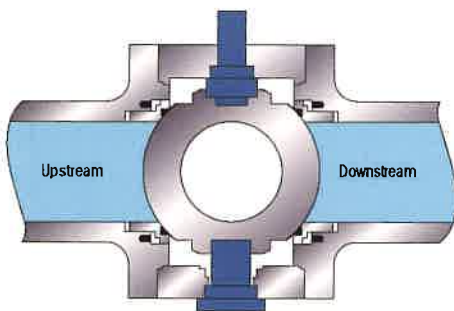
The stem function is to transmit torque and to absorb the line pressure thrust together with the trunnion. The stem has an anti-blowout design and incorporates a double-barrier system. The pressure thrust on the stem is supported by a thrust washer in antifriction material.



#### SEAT TO BALL SEALING

Soft seats are standard. Seat inserts of synthetic material such as RTFE, DEVLON, and PEEK are contained within a one piece metal seal ring. With no, or very low, line pressure, sealing between the seats and ball is achieved by the seat springs. As line pressure increases, it begins to work in conjunction with the seat springs to assure the integrity of the seat.

Two different types of seats are used to isolate the line pressure from the body cavity. Primary sealing is accomplished by an electrostatic seal such as HNBR, 90 Durometer Explosive Decompression resistant "ED" good to 5% H<sub>2</sub>S application and secondary fire-safe sealing is accomplished by a graphite sealing.



#### DOUBLE BLOCK AND BLEED

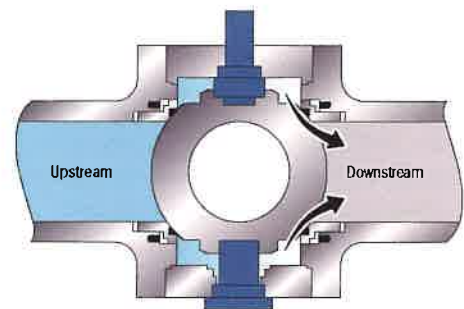
All PE trunnion mounted ball valves are designed and manufactured to facilitate block and bleed applications. The trapped cavity pressure can bleed out by vent fitting or drain plug when the valve is in fully open or fully closed position.

The fluid is intercepted by seats of upstream and downstream side. So, the stem packing or O-ring may be replaced under working pressure. The piston effect principle illustrated assures tight sealing simultaneously on both upstream and downstream sides of the ball.

#### VALVE CAVITY PRESSURE RELIEF (SELF-RELIEVING SEAT)

The standard feature is designed to prevent excessive pressure build-up within the valve by automatically relieving pressure when body cavity pressure exceeds the spring load on the seats. When a trunnion ball valve is in the closed position, media will be trapped in the body cavity. Unless this media is drained, it will be subjected to thermal expansion and contraction.

As the temperature rises, the trapped media desires to expand and the pressure increases in the area body cavity. In order to avoid excessive pressure build-up, the PE seats are designed to self-relieve, allowing the media in the body to escape to the pipeline. This self-relieving seat design feature is standard on all PE trunnion mounted ball valves.



### 3. TRUNNION BALL VALVES FEATURES AND BENEFITS

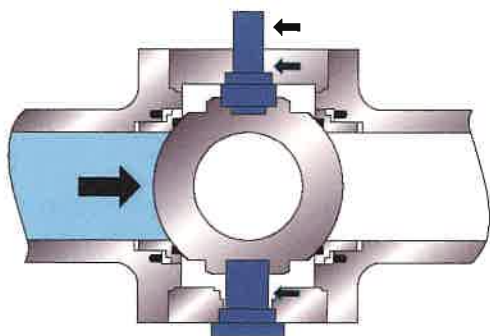
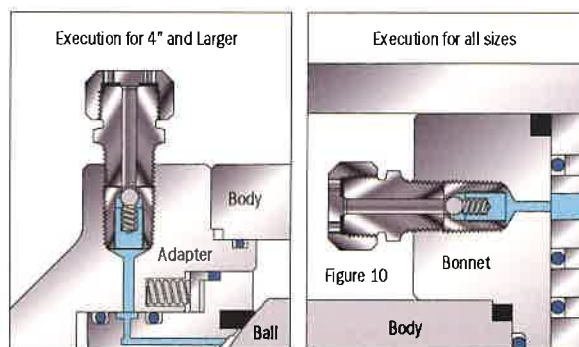
#### STEM SEALING

The stem is a free member and carries no side thrust. The absence of this side load and friction drag on the stem ensures lower operating torque and long service life. Precision machining of the stem which is rigidly supported between bearings, combined with hardness control between metallic parts and double O'rings backed up by a secondary graphite seal, ensures reliable operation with the highest levels of sealing integrity.

All seals can be replaced without the need to remove the stem from the valve or remove the valve from the pipeline. If leakage should ever occur through both stem seals, the outer O'ring can be replaced with the valve in the line, under pressure with the ball in the closed position.

#### SEAT & STEM EMERGENCY SEALANT INJECTION

A secondary sealant injection system for stem seals is standard feature on all PE trunnion ball valves. If the seat ring becomes damaged, this feature provides the user with an easy way to inject an emergency sealant to restore a tight seal. It also allows for the sealing surfaces of the ball and seat to be periodically flushed to clear away debris which may impair sealing.



#### DOUBLE SEALS AT ALL JOINTS

All connecting parts employ a double sealing design incorporating a O'ring and graphite/spiral wound 316SS-Graphite gasket to ensure positive sealing.

#### LOW FRICTION STEM / TRUNNION BEARING AND THRUST WASHERS

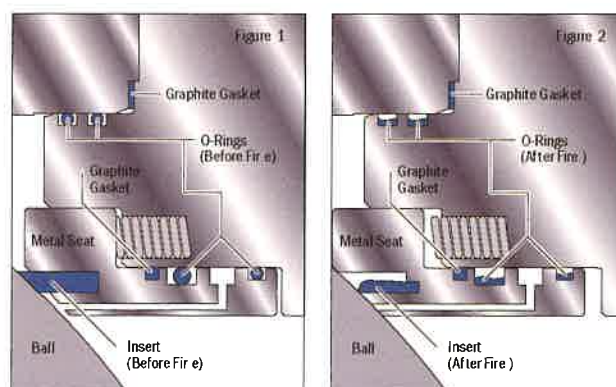
Heavy duty PTFE lined carbon or stainless steel bearing and thrust washers ensure durable and low torque operation.

#### FIRE SAFE DESIGN

PE ball valves have been designed to comply with the fire safety standards of API 607 and API 6FA, and tested to ensure that the external and through-bore maximum allowable leakage rates are maintained in the event of a fire.

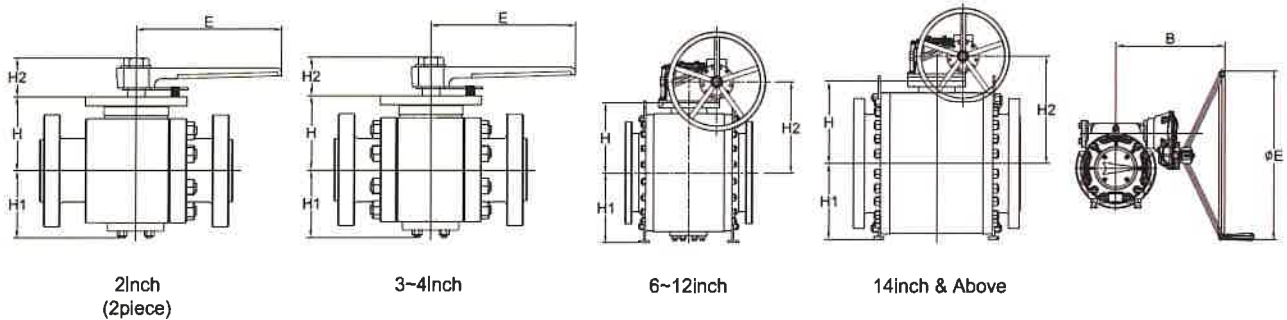
When the seat inserts of trunnion ball valve are softened and burnt in case of fire or unusual temperature increase, the seats retainer, under the duty of the spring, will touch with the ball and form a metal-to-metal contact, which can prevent internal leaks.

Meanwhile, the middle flange and upper part of and lower part of stem will form a metal-to-metal contact which can prevent external leaks and conform to API 607 / ISO 10497.



### 3. TRUNNION BALL VALVES DIMENSIONAL DATA / DRAWING

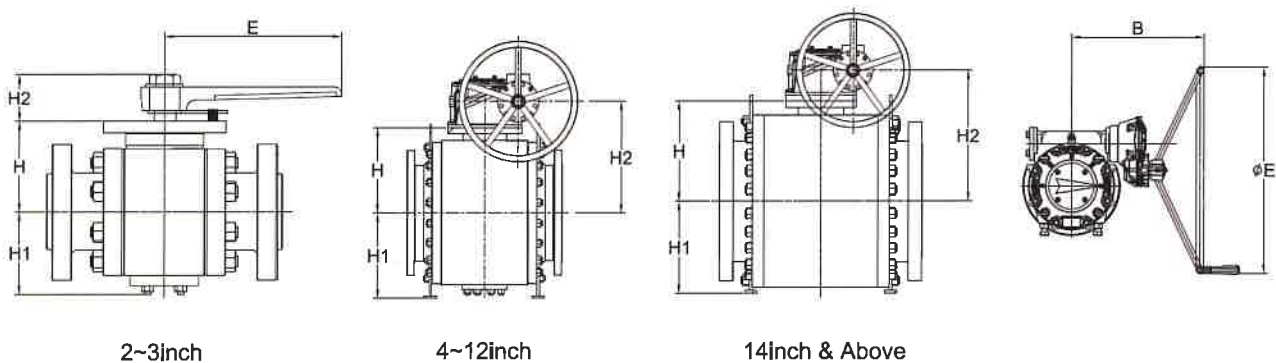
#### Three(Two)-piece, Side-Entry Design, Full Port (Class 150 & 300)



\* Larger class & sizes available on request

Class 150 / 300													
NPS		2	3	4	6	8	10	12	14	16	18	20	24
DN		50	80	100	150	200	250	300	350	400	450	500	600
H	inch	4.34	5.20	6.27	8.73	9.77	11.48	13.00	13.77	16.08	18.07	19.38	22.40
	mm	110	132	159	222	248	292	330	350	408	459	492	569
H1	inch	3.90	4.80	5.80	8.16	9.55	11.48	13.05	11.62	14.70	16.65	17.90	22.64
	mm	99	122	147	207	243	292	331	295	373	423	455	575
operation		Lever				Gear							
H2	inch	2.10	2.30	2.60	11.25	12.36	14.07	15.59	17.09	19.40	21.42	22.70	26.30
	mm	53	58	66	286	314	357	396	434	493	544	577	668
E	inch	9.85	14.58	17.72	19.69	22.05	22.05	22.05	24.80	24.80	24.80	24.80	27.96
	mm	250	370	450	500	560	560	560	630	630	630	630	710
B	inch	-	-	-	13.12	14.80	14.80	14.80	16.20	16.20	16.20	16.20	18.00
	mm	-	-	-	333	376	376	376	411	411	411	411	457

#### Three-piece, Side-Entry Design, Full Port (Class 600 & Above)



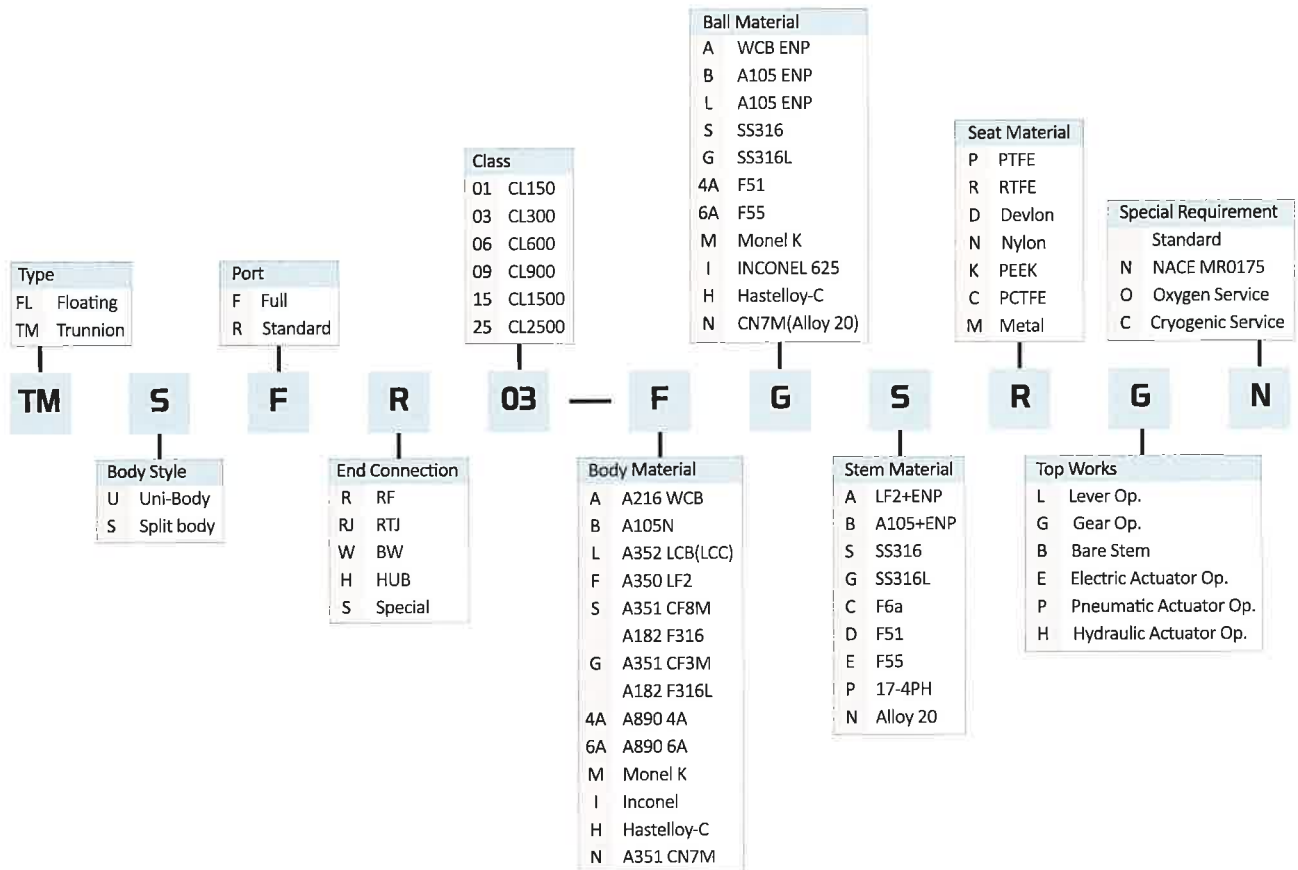
\* Larger class & sizes available on request

Class 600													
NPS		2	3	4	6	8	10	12	14	16	18	20	24
DN		50	80	100	150	200	250	300	350	400	450	500	600
H	inch	4.34	5.20	6.69	9.06	10.28	12.55	14.55	15.70	17.50	19.88	21.45	22.83
	mm	110	132	170	230	261	319	370	399	445	505	545	580
H1	inch	3.90	4.80	6.21	8.34	9.17	11.90	13.70	14.00	15.50	17.64	18.87	22.64
	mm	99	122	158	212	233	302	348	356	394	448	479	575
operation		Lever			Gear								
H2	inch	2.30	2.60	9.21	11.70	13.60	15.82	17.82	19.6	21.40	23.38	26.17	27.56
	mm	58	66	234	297	345	402	453	498	544	594	665	700
E	inch	9.85	14.58	19.69	22.05	22.05	24.80	24.80	27.96	27.96	27.96	31.50	31.50
	mm	250	370	500	560	560	630	630	710	710	710	800	800
B	inch	-	-	13.12	14.80	14.80	14.80	14.80	18.00	18.00	18.00	22.50	22.50
	mm	-	-	333	376	376	376	376	457	457	457	572	572

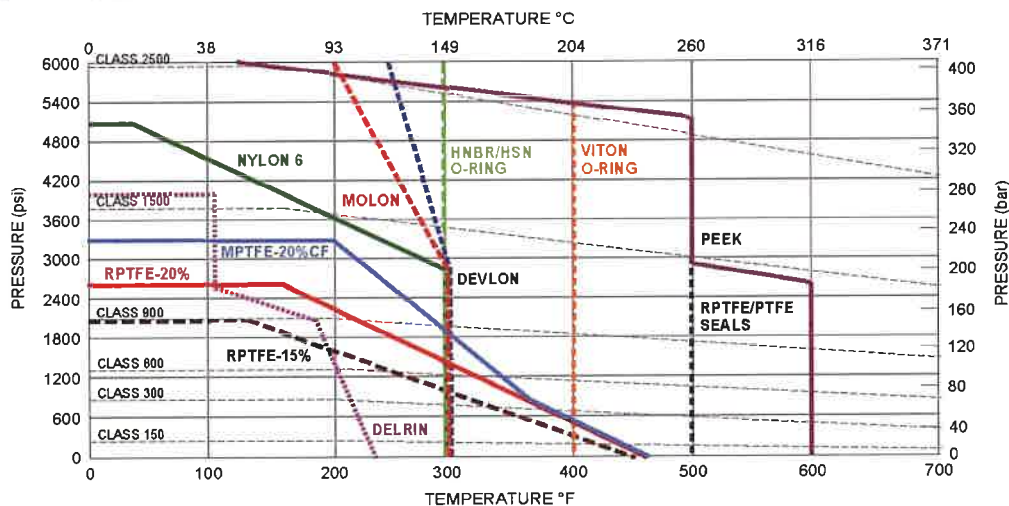
## 4. HOW TO SPECIFY PE BALL VALVES

PE Ball Valve coding system is as follows :

**Example :** 12" ASME CL300 RF, Full port, Split body, A350 LF2 Body, S316 Trim, RTFE Seats, in fire safety design as per API 607, Gear Op., for NACE MR0175 service, and Gear Operated is written **12" PE Figure No. TM-SFR03-FGSR-GN**



## 5. PRESSURE TEMPERATURE CHART



### Notes

The selection of the seat and sealing material is limited by characteristic of the service medium, working pressure, velocity, and operational frequency of the valve. The provided pressure temperature chart is for the most common seat/seal materials.

Please always discuss with us in case of special requirements or applications.

## 6. SEAT & SEAL MATERIAL SELECTION GUIDE

### SEAT MATERIALS

Material Name	Material Characteristics	Service Application
PTFE(Virgin TFE)	This material is the basic seat material used in most Ball Valves. Its chemical compatibility is excellent for almost all media service applications and it has low coefficient of friction. Temperature range – 80°C to 120°C.	General chemicals, low pressure services
RPTFE (Reinforced PTFE)	RTFE(Reinforced PTFE) is typically produced by adding 15% to 25% Fiber Glass to virgin PTFE. It has better pressure-temperature properties than PTFE, better resistance to wear and deformation under load. Not to be used in hydrofluoric acid. Suitable for temperatures – 80°C to 120°C.	For low and medium pressure services
RPTFE 25% Carbon-Graphite	25% Carbon Graphite with 75% PTFE, suitable for temperature – 20°C to 200°C, this material offers a wide temperature range with better wear resistance than standard RTFE, Good for steam and thermal applications.	For steam and thermal applications at low and medium pressure services
PEEK	Polyetheretherketone high temperature semi rigid elastomer. Best suited for high pressure and temperature applications. Also offers very good corrosion resistance. Temperature rating is –45°C to 260°C	For high pressure, high temperature services
DEVLON	Devlon is very rigid, suitable for high pressure up to 5000psi dependant on valve size and recommendable temperature range of -45 to 190°C.	For high pressure, high temperature offshore services
NYLON	Nylon(Polyamide) seats are commonly used for Class 600 valves, for higher pressure and lower temperature service. It's highly resistance to many chemicals and abrasions, and used in air, oil and other gas media, but is not suitable for strong oxidizing agents. Not recommended for water application. Temperature rating –34°C to 80°C.	For high pressure, low temperature services
PCTFE	PCTFE (Polychlorotrifluoroethylene) is a fluorocarbon based polymer. It offers a unique combination of physical and mechanical properties non-flammability, chemical resistance, and near zero moisture absorption. It is suitable for cryogenic applications such as liquid oxygen and liquid nitrogen handling. Temperature rating is -196°C to 120°C.	For low temperature, low pressure services
TUNGSTEN CARBIDE COATING	For liquid or gas services with high presence of solids or in any case where extreme hardness and wear resistance is required. Tungsten carbide itself is practically inert and extremely strong. Any attack is usually on the binder. Not suitable when small presence of caustic soda is expected.	For severe services
CHROME CARBIDE COATING	For liquid or gas services with small presence of solids. Not suitable when small presence of caustic soda is expected.	For severe services
GRAPHITE	Hard carbon with excellent heat resistance. Not suitable as seat material when presence of oxidized service is expected. Maximum Service Temperature 500°C.	For extremely high temperature services

### O-RING MATERIALS

Material Name	Material Characteristics	Operating Temperature
VITON	Standard material for O-RING which is the most common static seal. It performs well in mineral acids, salt solutions chlorinated hydrocarbons and petroleum oils. Temper rating is -22°C to 204°C. *AED(Anti-Explosive Decompression) O-rings are typically used in high pressure applications encountered in the oil and gas industry. Explosive Decompression(also known as Rapid Gas Decompression or RGD) is a failure mechanism of elastomer violently when the pressure is released, which in turn rapidly causes fissuring and seal failure.	-29 to 204°C
NBR	Buna-N(NBR) is an all purpose polymer with good resistance to water, solvents, oil and hydraulic fluids.	-46 °C to 80°C
EPDM	EPDM has good abrasion and tear resistance with excellent chemical resistance to a variety of acids and alkalines. It is susceptible to attack by oil, strong acids and strong alkalines and should not be used in compressed air lines.	-46 °C to 150°C



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