CE-PED

OHSAS 18001:2007

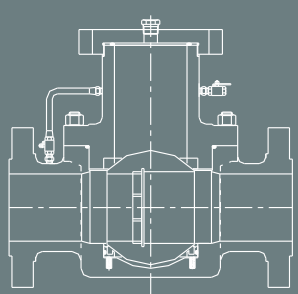
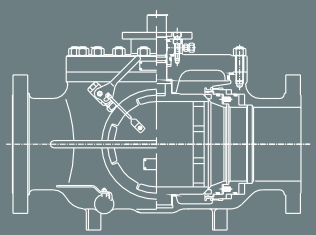
ISO 9001:2008

RUV API6D PIG BALL VALVE



GDR-5 Pig Ball Valve / Pipeline Luncher and Receiver

CAB-17-01


ROCKY UNION

RUV PIG BALL VALVE

ROCKY UNION

Pig Ball Valve

Rocky Union is committed to enhancing our customers' working site safety, system stability, and convenient operations through our valve product offerings. Our diverse and innovative valves will have more safety design, longer working life and more reliable operation.

Located in the city with a more than forty years' history to make industrial valve, RUV has carried on the mature valve manufacturing tradition of Zigong city. By our advanced seat design and special workmanship, we are making high quality ball valve, through conduit gate valve and pigging valve, range from complete size and pressure for petroleum, chemical, and energy industrial use. To be a professional API6D valve company, we are making for reliability.

APPLICABLE STANDARD

The following list contains the most important applicable standards for ball valve, RUV valves will be designed, manufactured and tested in accordance with other international standards on request.

ANSI-American National Standard Institute

ASME B 1.20.1 Pipe threads, general purpose
ASME B 16.5 Steel pipe flanges and flanged fittings
ASME B16.10 Face-to-face and end-to-end dimensions of ferrous valves.
ASME B 16.25 Butt welding ends
ASME B16.34 Steel valves-flanged and butt welding ends
ASME B16.47 Larger diameter steel flange(26" ~ 60"）
ASME B31.3 Technics pipeline
ASME Boiler and Pressure Vessel Code, Section VIII, Division 1, rules for construction of pressure vessel
MESC SPE 76/001 Surface roughness degree of flange gasket interface
MESC SPE 77/130 Ball Valve to API SPEC. 6D
MESC SPE 77/302 Material Acceptance Requirements for Valves in General Service
MESC SPE 77/315 Electroless Nickel Plating

British Standard

BS 1503 Pressure-containing forged parts (including semi finished) specification
BS 6755-2 Valve test, section 2: fire test requirement specification
BS 5351 Industrial valve, shell thickness, and bore dimension
BS 1560 End flange dimensions and Flange gasket facing
BS 5146 Pressure test

ISO9001-International Organization for Standardization

ISO9001 Quality systems-model for quality assurance in design, development, production, installation and servicing.
ISO15156 Materials for use in H2S containing environment in oil & gas production.
ISO 5211-1 Executive institution accessories of quarter-turn valves, section1: flange dimension
ISO 5211-2 Executive institution accessories of quarter-turn valves, section2: capability character of flange and connector.
ISO 5211-3 Executive institution accessories of quarter-turn valves, section3: the dimension of drive parts
ISO 10479 Valve test: fire-proof test requirement

API-American Petroleum Institute

API 6A Specification for wellhead valves
API 6D Specification for pipeline valves
API 6FA Specification for fire testing of valves
API 607 Fire test for soft seated quarter-turn valves
API Q1 Quality program
API 5B EUE External upset tubing threads

MSS-Manufacturers Standardization Society

MSS SP-6 Standard finishes for contact faces of pipe flanges and connecting-end flanges of valves and fittings.
MSS SP-25 Standard marking system for valves, fittings, flanges and unions.
MSS SP-55 Quality standard for steel castings.
MSS SP-45 Bypass, and drain connections standard
MSS SP-53 Cast steel quality standard of valve, flange, fitting and pipeline accessories -- Magnetic-particle testing
MSS SP-54 Cast steel quality standard of valve, flange, fitting and pipeline accessories ---Radiographic testing
MSS SP-93 Cast steel and forged steel quality standard of valve, flange, fitting and pipeline accessories ---Liquid Penetrant Testing

PrEN 12116 Industry valve, executive institution accessories of quarter-turn valves
DEP 31.38.01.11-GEN Standard of pipeline
DEP 31.40.70.30-GEN Quarter-turn open/close executive institution
DEP 32.36.01.17-GEN Control valves' choice, specification and standard

NACE-National Association of Corrosion Engineers

MR0175 Sulfide stress cracking resistant metallic materials for oil field equipment (Superseded by ISO15156)

RANGE OF PRODUCT

Valve Size (INCH)	PRESSURE CLASS ANSI150	ANSI300	ANSI600	ANSI900	ANSI1500
2					
3					
4					
6					
8					
10					
12					
14					
16					
18					
20					
22					
24					
26					
28					
30					
32					
36					

APPLICATIONS

A wide variety of body designs, materials, and trim make RUV Pig Ball Valves exceptionally versatile and suitable for a multitude of liquid and gas fluid applications.

Petroleum Refining
Hydrogen
Cracking
Steam
Crude Oil
Gasoline
Visbreakers
Naptha
Sulfur

Chemicals
Chlorine
Phosgene
Aromatics
Polymers
Acids
Air Separation
Cauctics

Oil and Gas Production
Oil/Steam Separation
Gas/Oil Gathering Systems
Flowlines
Wellheads

Steel/Primary Metals
Quench Lines
De-Scaling
Continuous Casters
Steam
Condensate
Strippers
Electro-Galvanizing

Pulp and Paper
Bleaching Lines
Black Liquor
Green Liquor
White Water
Steam
Chemical Recovery

Power Generation
Steam
Condensate
Boiler Feed Pumps
Cooling Towers
Service Water Recirculators
River Water Intake

Petrochemicals
Ethylene
Propylene
Steam
Reboilers
Gases

RUV PIG BALL VALVE FEATURE

General Design Features

Design Features

- Spring energized seats
- Metal or soft seated
- Double Block and Bleed
- Full or reduced bore
- Flanged or welded ends
- Anti blow out trunnion stem design
- Corrosion resistant low friction bearing
- Sealant injection fittings for emergency stem or seal sealing
- ISO5211 Mounting pad for actuator or gear operator
- Removable stem seals under full line pressure in fully opened or closed position
- Antistatic device for grounding of the ball, stem and body
- Self lubricated bearings
- In accordance with API 6D, API 6FA, BS 6755 and NACE 01-75 (latest edition)
- One piece body design

- Trunnion supported design reduces operating torque
- 8" & larger valves are equipped with lifting lugs
- Trunnion supported design reduces operating torque
- Two sets of O-rings plus firesafe stem packing prevents leakage
- Reduced space requirements compared to fabricated pig launchers.
- Launching/ receiving operation is a safe, quickly performed operation.
- Pig cage is installed in the ball for all shut-off style valves and in the body for the bypass style reciever

FUNCTIONS & FEATURES

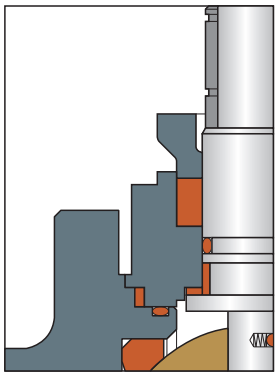
1.Double block & bleed
2.Safe release
3.Reliable seal
4.Fire safe
5.Cleaning pipe
6.Emergency seal
7.Special seat
8.Bonnet combined seal
9.Draining
10.Extended stem
11.Various operations
12.Various end connections
13.Diversity of body materials
14.Diversity of seat materials
15.Various kinds of control systems
16.Reliable operation
17.Bearing pipe stress safety
18.Online maintenance

RUV PIG BALL VALVE FEATURE

Design Features

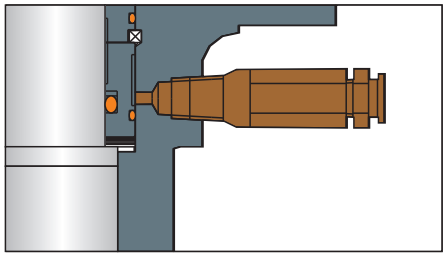
Anti-Blowout Stem Design

Stem seal integrity is achieved by the use of three o-rings (or two o-rings and a graphite gasket). Upper o-ring (or graphite gasket) can be replaced with the valve in line and under pressure.



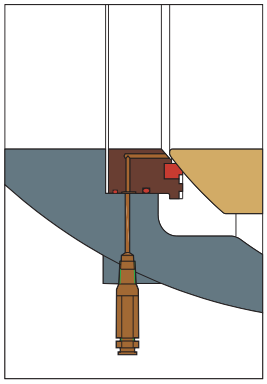
Emergency Sealant Injection System

The Sealant Injection System located on the Bonnet can be utilized in case of emergencies, o-ring damage, or if stem leakage occurs.



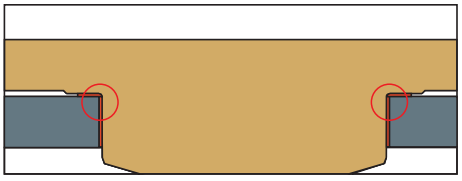
Emergency Seat Seal

Special sealants may be injected thru fittings that are located on the adapter flanges to restore sealing integrity if damaged. A second internal check valve provides backup to the fitting.



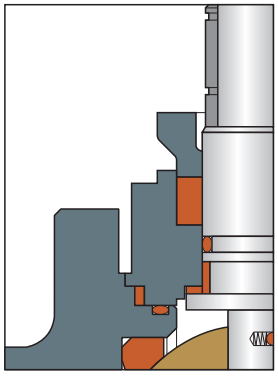
Heavy Duty Bearings

Trunnion are supported by heavy duty Teflon coated Steel Bearings. Thrust load on the ball is supported by large trunnions mounted within captured trunnion blocks, resulting in low operating torque and seat wear.



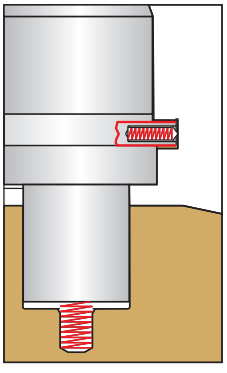
Double Sealed Envelope Connections

Double o-rings or a combination of an o-ring and fire safe gasket on body/adapter connections to ensure positive sealing. This makes the P3 suitable for above or below ground service.



Antistatic Device

A spring between the trunnion and the ball or between the stem and the gland plate permits electrical continuity between all valve components.

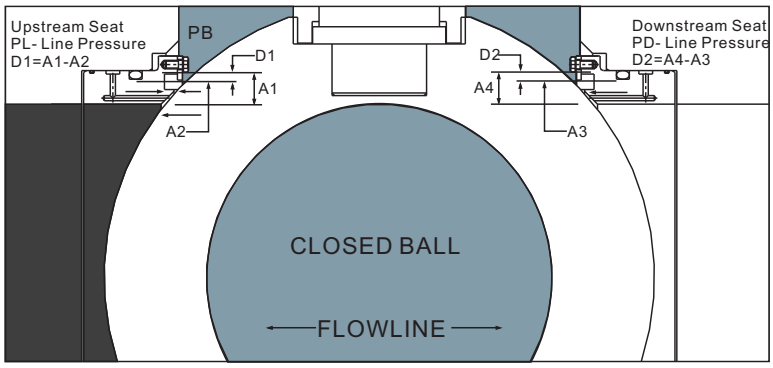


TECHNICAL SEATING FEATURES

Technical Seating Features

Double Piston Seat Design

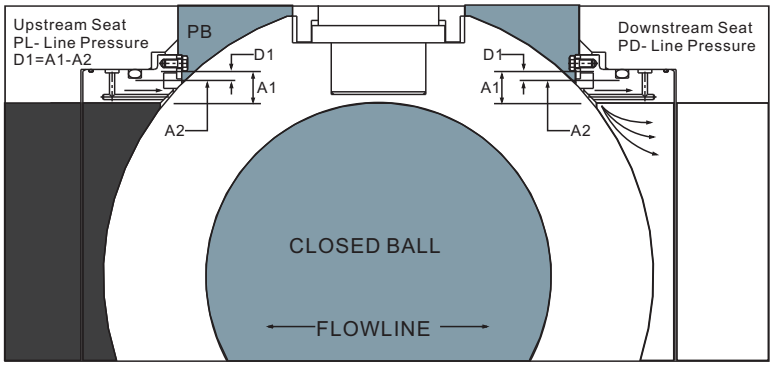
Upstream Seat:
Line Pressure acting on the seat area (A1) does not equalize against the line pressure acting on the seat area (A2). The difference in the area (D1) times the line pressure creates "piston effect" force which pushes the seat against the ball surface resulting in a tight effective seal.



PB=Body Cavity Pressure

Downstream Seat:
When the body cavity pressure is greater than the downstream pressure, the body cavity pressure acts on the seal area (A4). The net pressure difference, acting over area (D2), pushes the downstream seat tightly against the ball creating a positive seal.

THE ULTIMATE BENEFIT OF USING THE " DOUBLE PISTON SEAT" DESIGN:
In case of upstream seat leakage, the downstream seat maintains a pressure assisted tight shut off by sealing against the ball surface.



PB=Body Cavity Pressure

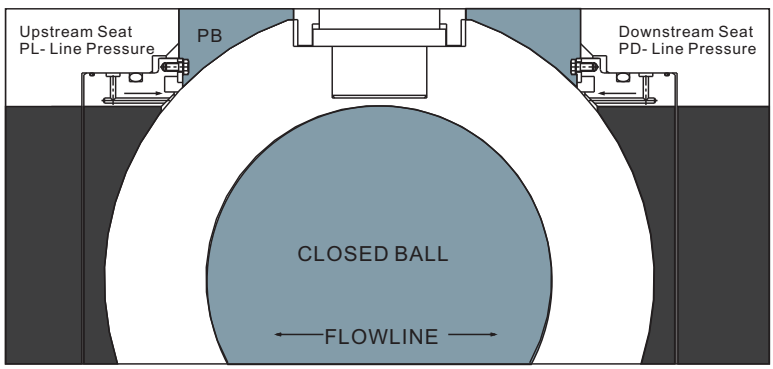
Self Relieving Seat Design

Upstream Seat:
The difference in the area (D1) times the line pressure creates a "piston effect" which forces the seat against the ball surface. Also the springs behind the seat adds the force to the seat which keeps the seat in contact with the ball surface by providing the tight seal.

Downstream Seat:
When the body cavity pressure exceeds the spring pressure, automatic pressure relief will occur by relieving the body cavity pressure past the downstream seat. This eliminates the need for the body relief valve.

Double Block and Bleed

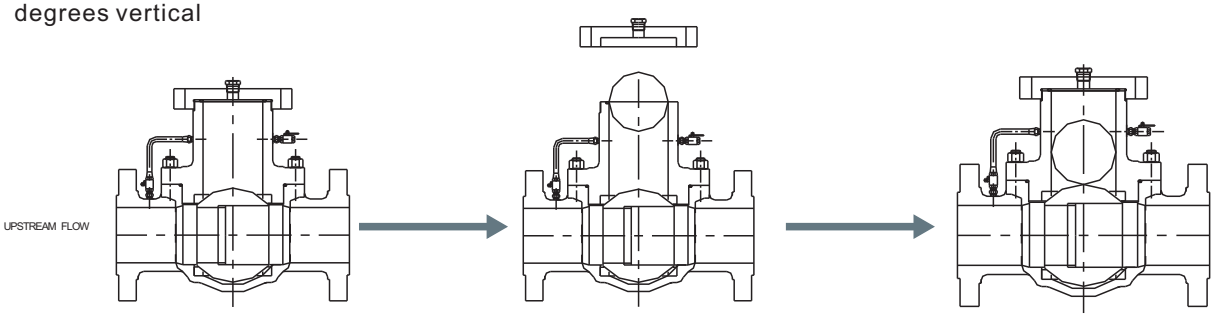
The double block and bleed condition is available in all seat design configurations. When the ball is in the closed position the body cavity pressure may be drained down to 'zero' by opening the bleed valve and draining the fluid by removing the drain plug. Each seat works independently assuring tight shut off seal against ball on the upstream and downstream side.



PB=Body Cavity Pressure is Zero
Cavity Pressure is Drained or Vented to Atmosphere

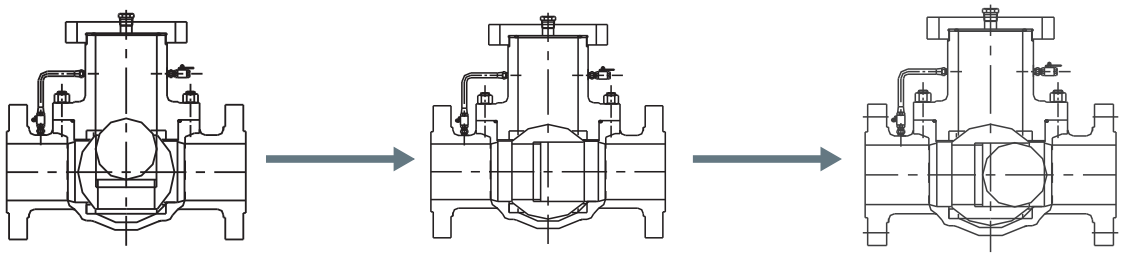
PIG LAUNCHING & RECEIVING SEQUENCE

OPERATING PROCEDURES
LAUNCHING
The launching valve is installed in the flow line with the pig chamber facing vertically upward within a maximum of 20 degrees vertical



Remove cap and load pig into chamber

Replace cap and open equalizing valve

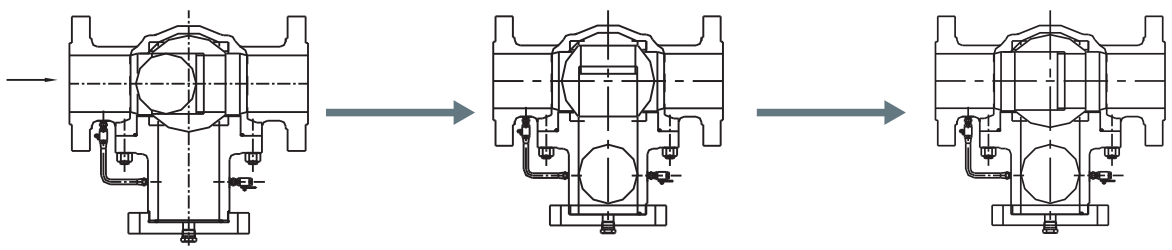


Rotate ball as shown so the pig drops into the ball

Open vent fitting to vent pig chamber. Close vent fitting

Close equalizing valve and rotate ball as shown. Pig is launched downstream

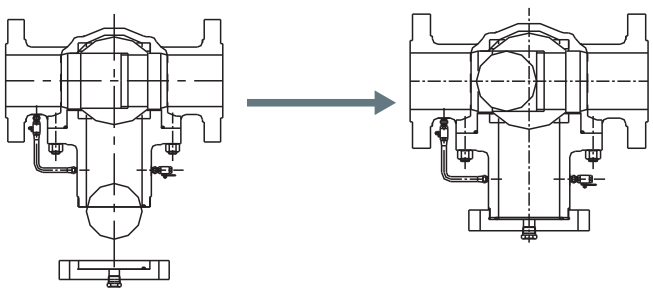
RECEIVING
The receiving valve is installed in the flow line with the pig chamber facing vertically download within a maximum of 20 degrees vertical



After pig is received open equalizing valve.

Rotate ball as shown. Pig drops into the cap. Close equalizing valve

Rotate ball as shown. Open vent fitting and vent chamber, close vent fitting.



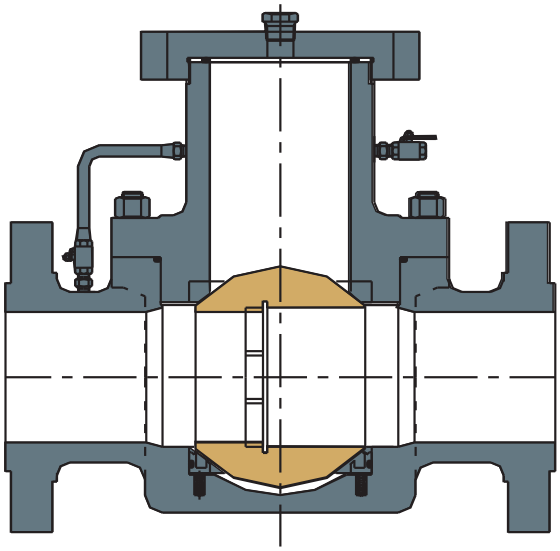
Remove cap carefully and remove pig and debris.

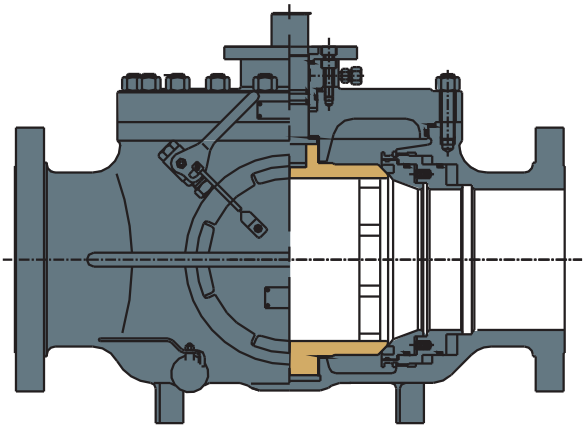
Remove cap. Valve is ready to receive the next pig.

RUV PIG BALL VALVE ASSEMBLY DRAWING

- Nominal Size (DN): 2 inches (50mm) up to 36 inches (900mm)
- Pressure Class (PN): ANSI 150 up to ANSI 1500
- Bore: full & reduced (Venturi type)
- Ends: butt weld, flanged, ring joint, butt weld by flanged
- Various configurations

Pig Ball Valve





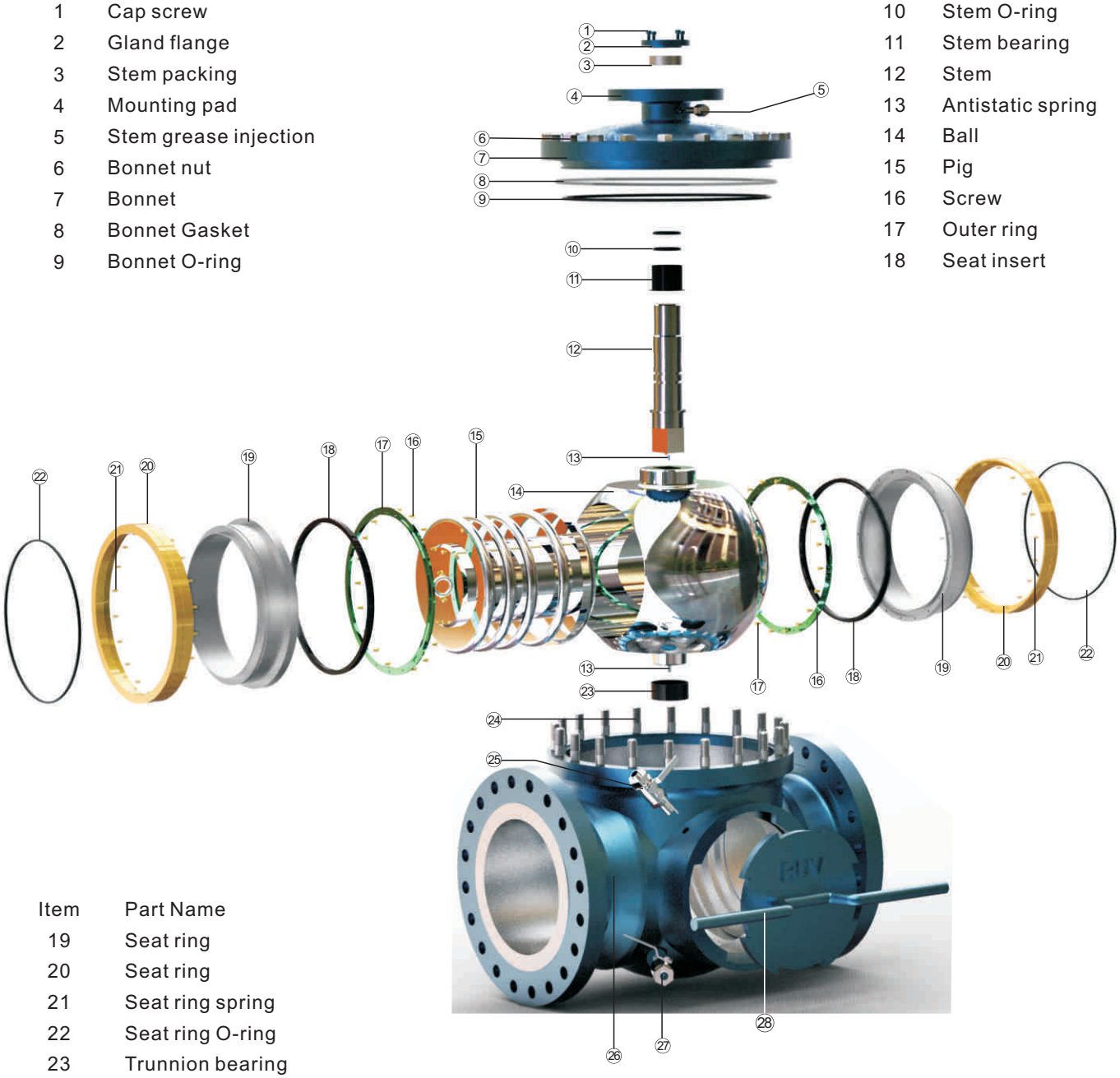
◆ Assembly drawing

DYNAMIC DRAWING

RUV API6D PIG BALL VALVE

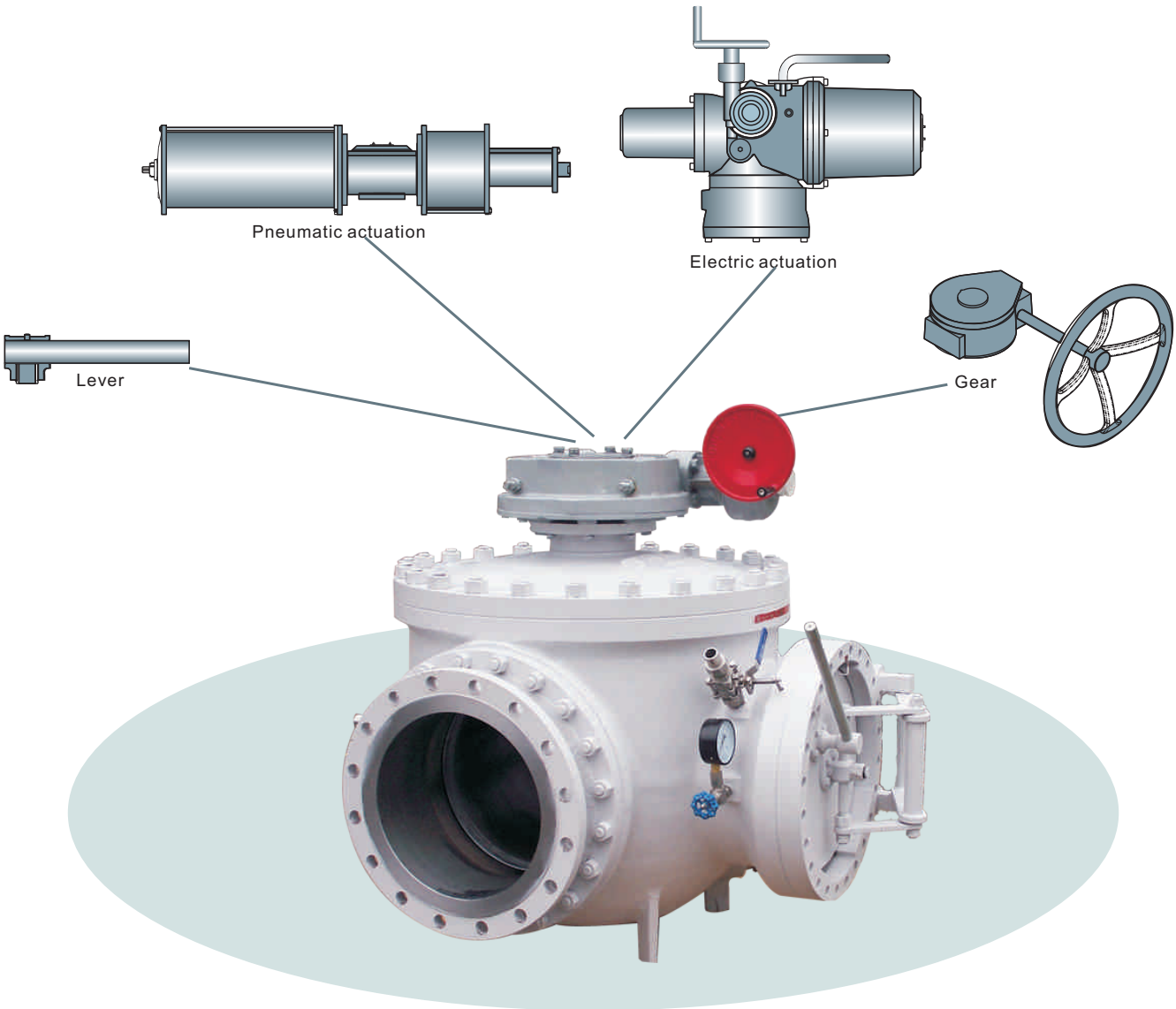
Item	Part Name
1	Cap screw
2	Gland flange
3	Stem packing
4	Mounting pad
5	Stem grease injection
6	Bonnet nut
7	Bonnet
8	Bonnet Gasket
9	Bonnet O-ring

Item	Part Name
10	Stem O-ring
11	Stem bearing
12	Stem
13	Antistatic spring
14	Ball
15	Pig
16	Screw
17	Outer ring
18	Seat insert



Item	Part Name
19	Seat ring
20	Seat ring
21	Seat ring spring
22	Seat ring O-ring
23	Trunnion bearing
24	Bonnet bolt
25	Relief valve
26	Body
27	Seat grease injection
28	Lever operator

VARIOUS OPERATORS



MATERIALS FOR MAIN PARTS

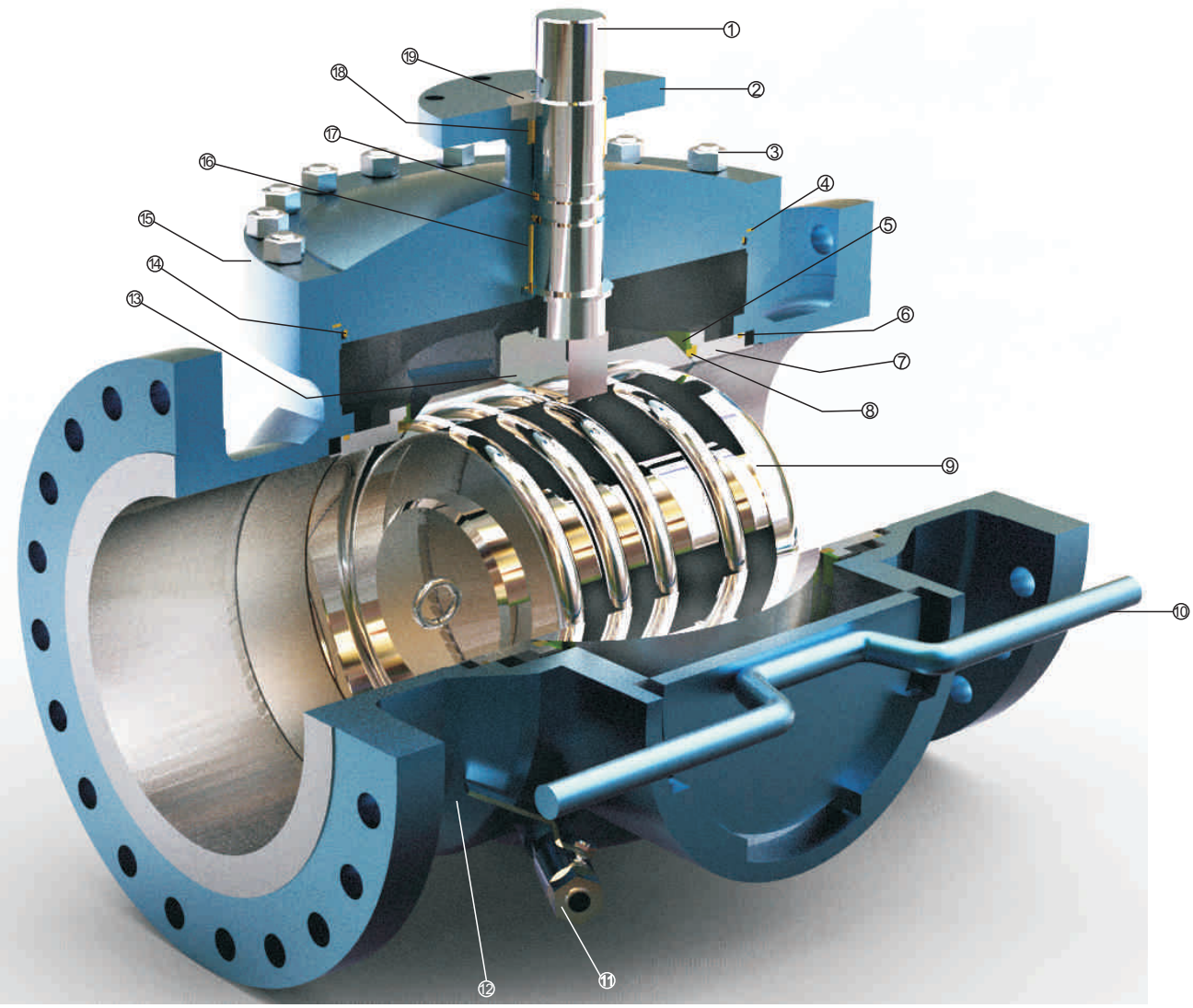
MATERIALS FOR MAIN PARTS

Parts	C.S Series	NACE	S.S Series NACE		LCB、LCC Series
Body	WCB	WCB	CF8、CF3	CF8M、CF3M	LCB、LCC
	A216-WCB	A216-WCB	A135-CF8,CF3	A351-CF8M,CF3M	A352-LCB,LCC
Packing Gland	A105-1025	A105-1025	A182-F304,F304L	A182-F316,F316L	A182-F304
Ball	A105+ENP				
	A105+HCr				
	A182-F6a+HCr	A182-F6a+ENP	A182-F304,F304L+ENP	A182-F316,F316L+ENP	A182-F304+ENP
	A216-WCB+HCr	A216-WCB+ENP	A351-CF8,CF3+ENP	A351-CF8M,CF3M+ENP	A352-LCB,LCC+ENP
Stem	A182-F6a	A182-410+ENP	A182-F304,F304L	A182-F316,F316L	A182-F304
Seat Insert	PTFE/PPL/NYLON/VITON/PEEK/EPDM/DEVLON				
	PTFE for 150#, 300#; Nylon for 600#, 900#, 1500#,2500#; PPL/PEEK for high temperature				
Seat Retainer	A105-1025+Zn	A105-1025+ENP	A182-F304,F304L	A182-F316,F316L	A182-F304
Packing	PTFE/PPL/Graphite				
Gasket	PTFE/PPL/Graphite				
Bearing	PTFE/PPL				
Spring	316SS/Inconel X-750/17-4PH/35-CrMo				
Stud	A193-B7	A193-B7M	A193-B8,B8M	A193-B8,B8M	A320-L7
Nut	A194-2H	A194-2HM	A194-8,8M	A194-8,8M	A194-7M

REMARKS:

1. All materials conform to ASTM standard.
2. Materials above conform to general standard. We can apply other materials according to valve working condition or customer's requirement. We also reserve the rights to improve the valve material according to relating standard.
3. Zn-Galvanized ENP-Electroless Nickel Plated Hcr-Electroless Hard Chrome Plated
4. Under-30℃(-22°F), working condition, the valve stem need to be extended.
5. For NACE working requirements, spring strength ≤HRC28, body hardness≤HRC22.

STRUCTURE



Item	Part Name	Item	Part Name	Item	Part Name
1	Stem	8	Seat insert	14	Bonnet O-ring
2	Mounting pad	9	Pig	15	Bonnet
3	Bonnet bolt & nut	10	Lever operator	16	Stem bearing
4	Bonnet gasket	11	Seat grease injection	17	Stem O-ring
5	Seat ring	12	Body	18	Stem gasket
6	Seat ring o-ring	13	Ball	19	Gland flange
7	Seat ring				

P-T RATING

The following table indicates rated values of temperature and pressure for main materials of valves. These valves are determined according to American standard ASME/ANSI B 16.34.

Temp.		Maximum Working Pressure																			
		150Lb				300Lb				400Lb				600Lb				900Lb			
℃	°F	A105,LF2		ASTM A182 F316		A105,LF2		ASTM A182 F316		A105,LF2		ASTM A182 F316		A105,LF2		ASTM A182 F316		A105,LF2		ASTM A182 F316	
Up to	Up to	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi
38	100	19.7	285	19	275	51	740	49.6	720	68.3	990	66.2	960	102	1480	99.3	1440	153.1	2220	148.9	2160
93	200	17.9	260	16.5	240	46.5	675	42.7	620	62.1	900	56.9	825	93.1	1350	85.5	1240	139.6	2025	128.2	1860
149	300	15.9	230	14.8	215	45.2	655	38.6	560	60.3	875	51.4	745	90.7	1315	77.2	1120	135.8	1970	115.8	1680
204	400	13.8	200	13.4	195	43.8	635	35.5	515	58.3	845	47.2	685	87.6	1270	71.0	1030	131	1900	106.2	1540
264	500	11.7	170	11.7	170	41.4	600	33.1	480	55.2	800	43.8	635	82.7	1200	65.8	955	123.8	1795	98.9	1435

Notes:

(1) Nominal P-T formula for CLASS 300 or higher pressure rating:

$$p_t = \frac{C_1 S_1}{9750} p_r \leqslant p_c$$

In this formula:

p_t-----Norminal working pressure, the specified materials in temperature t (bar) (psi);

p_c-----In temperature t, the maximum pressure specified in the standard (bar) (psi);

p_r----- Nominal Pressure Rated. To Pressure ⩾ Class 300, p_r=Pressure Class Rate (for example: Class 300, p_r=300);

C_1-----When S_1 is Mpa, C_1 is 10; when S_1 is psi, C_1 is 1;

S_1-----In temperature t, the chosen stress value of specified materials (Mpa) (psi).

(2) ASME B16.34---2004, it is including the flanged valve's nominal P-T rating in ASME B16.5---2003. In this standard, the way to fix the flanged valve's nominal P-T rating is basically similar to the ASME B16.5---2003, but it has a special pressure class formula.

$$p_{sp} = \frac{C_2 S_2}{7000} p_r \leqslant p_{cb}$$

In this formula:

p_{sp}---- Nominal working pressure of special pressure rating, the specified materials in temperature t (bar) (psi);

p_{cb}---- The Maximum Pressure of special pressure rating, in the specified temperature t according this standard (bar) (psi);

p_r---- Nominal Pressure rating. To Pressure⩾ Class 300, p_r=Pressure Class Rate , for example, Class 300, p_r= 300, Class 150, p_r=155, to the pressure between Class 150 to Class 300, need use Class 150 p_r=115 to replenish.

C_2---- When S_2 is Mpa, C_2 is 10, when S_2 is psi, C_2 is 1;

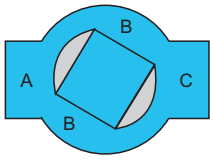
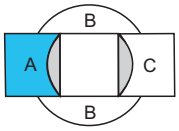
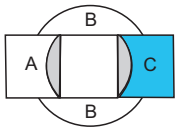
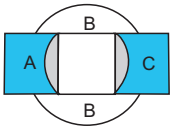
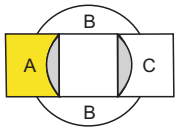
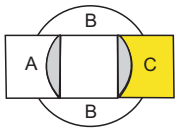
S_2---- In temperature t, the chosen stress value of specified materials (Mpa)

MAXIMUM WORKING TEMPERATURE OF SHELL MATERIALS

Materials	Standard No.	Max. Working Temperature/℃	Materials	Standard No.	Max. Working Temperature/℃
LCB	ASTM A352	340	WC6	ASTM A217	593
LC3	ASTM A352	340	WC9	ASTM A217	649
M35-1	ASTM A494	400	CF8M	ASTM A351	649
WCB	ASTM A216	425	CF8	ASTM A351	649
CN7M	ASTM A351	425	CW6M	ASTM A494	649
CF3M	ASTM A351	454	C5	ASTM A217	649
C12	ASTM A487	482	N7M	ASTM A494	649
CA6NM	ASTM A487	482	CA15	ASTM A217	704

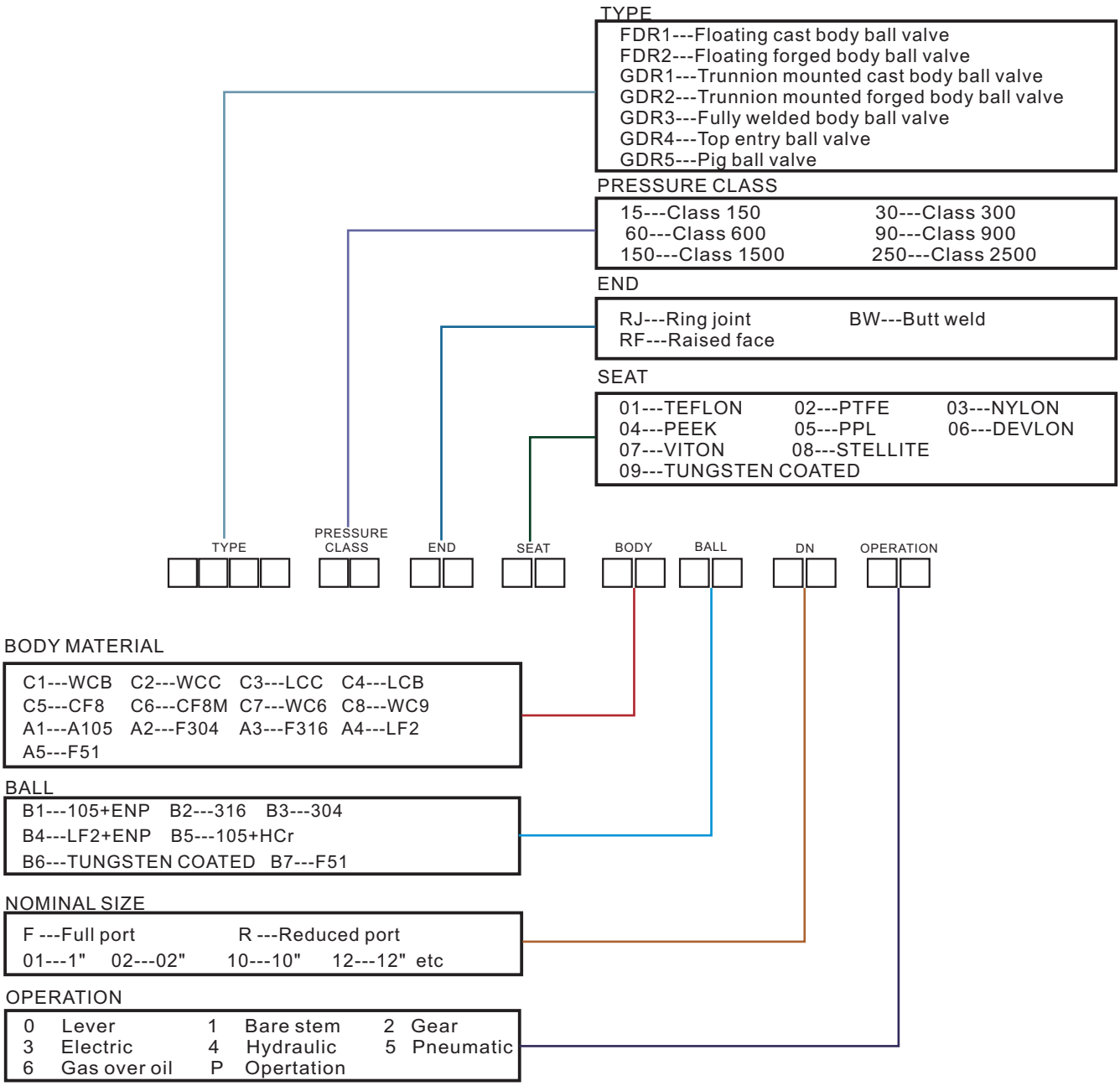
TEST PROCEDURE

ROCKY UNION PIG BALL VALVE TEST PROCEDURE

HYDROSTATIC SEAL TEST API6D 10.3 and 10.4						
Sequence		Area Pressure		Duration(min)		Description
SHELL TEST		A	1.5x PN	6 " -10 "	5	1. Valve in partial open. 2. Set the pressure to 150% PN. 3. Reduce the pressure to 50% PN. 4. Reset the pressure to 150% PN. 5. Hold the pressure for the duration of testing.
		B	1.5xPN	12 " -18 "	15	
		C	1.5xPN	20 " -60 "	30	
SEAT TEST		A	1.1xPN	5		Seat hydro seal test at A end toawrds body B
		B	Atmospheric			
		C	Atmospheric			
		A	Atmospheric	5		Seat hydro seal test at C end toawrds body B
		B	Atmospheric			
		C	1.1xPN			
		A	1.1xPN	5		Seat hydro seal test for both A and C DBB
		B	Atmospheric			
		C	1.1xPN			
AIR SEAL TEST API6D 10.4						
SEAT TEST		A	Atmospheric	5		Seat air seal test at A end toawrds body B
		B	Atmospheric			
		C	80PSIG(5.5bar)			
		A	80PSIG(5.5bar)	5		Seat air seal test at C end toawrds body B
		B	80PSIG(5.5bar)			
		C	Atmospheric			

PN=Nominal Pressure Blue=Liquid Yellow=Air

HOW TO SPECIFY RUV BALL VALVES



EXAMPLES

F	D	R	1	1	5	R	F	0	4	A	1	B	1	F	02	P	0

Floating ball valve, Class 150, Raised face, with seat of PEEK and body materials constructed using A105, Ball constructed with 105+ENP, full port, nominal size 2 inch, operated by lever.

G	D	R	5	6	0	R	F	0	2	C	1	B	3	F	08	P	2

Pig ball valve, Class 600, Raised face, with seat of PTFE and body materials constructed using WCB, Ball constructed with materials of 304, Full port, nominal size 8 inch, operated by gearbox.

WE MAKE FOR RELIABILITY

ROCKY UNION VALVE CO.,LTD

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Special Statement

ROCKY UNION is always committed to provide high quality products and efficient service to our customers, At the same time, we have always strictly abided by the provisions of the state; abided by the relevant international rules. And we also abide by the business and professional ethics, making effort to providing employees safety, healthy, environmental work environment.