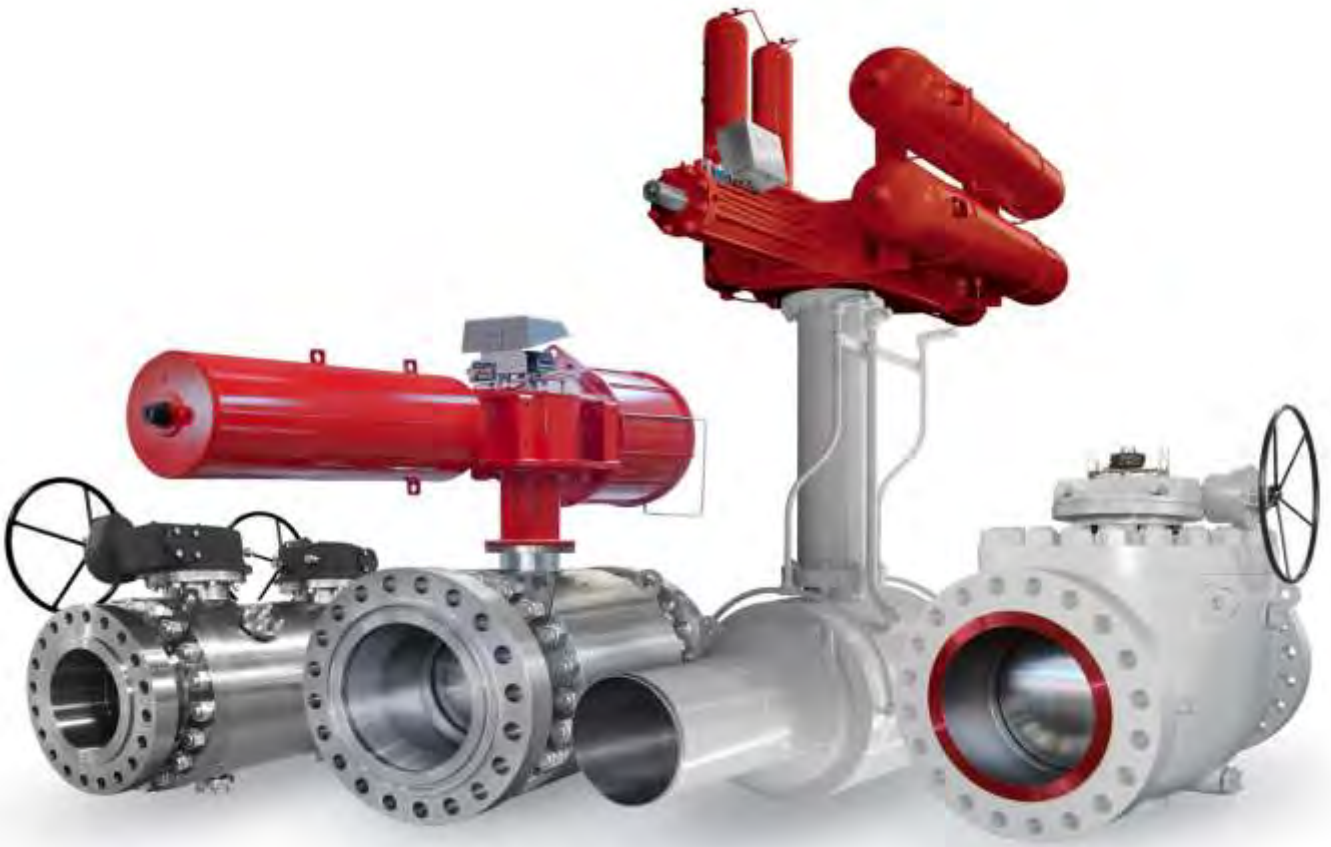
Presentation for

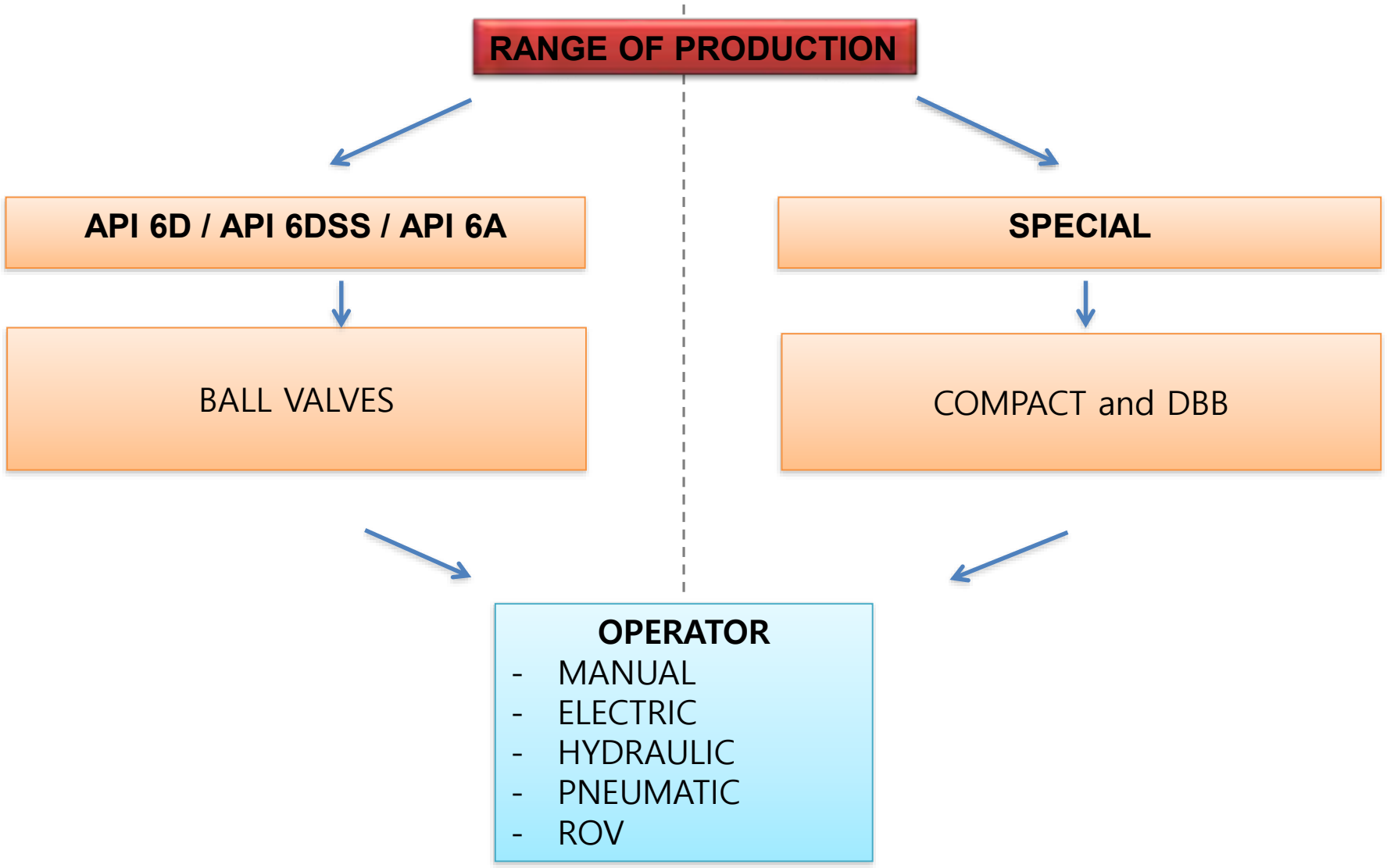
Ball Valves, Double Block & Bleed

IDK-LOK
Fittings & Valves

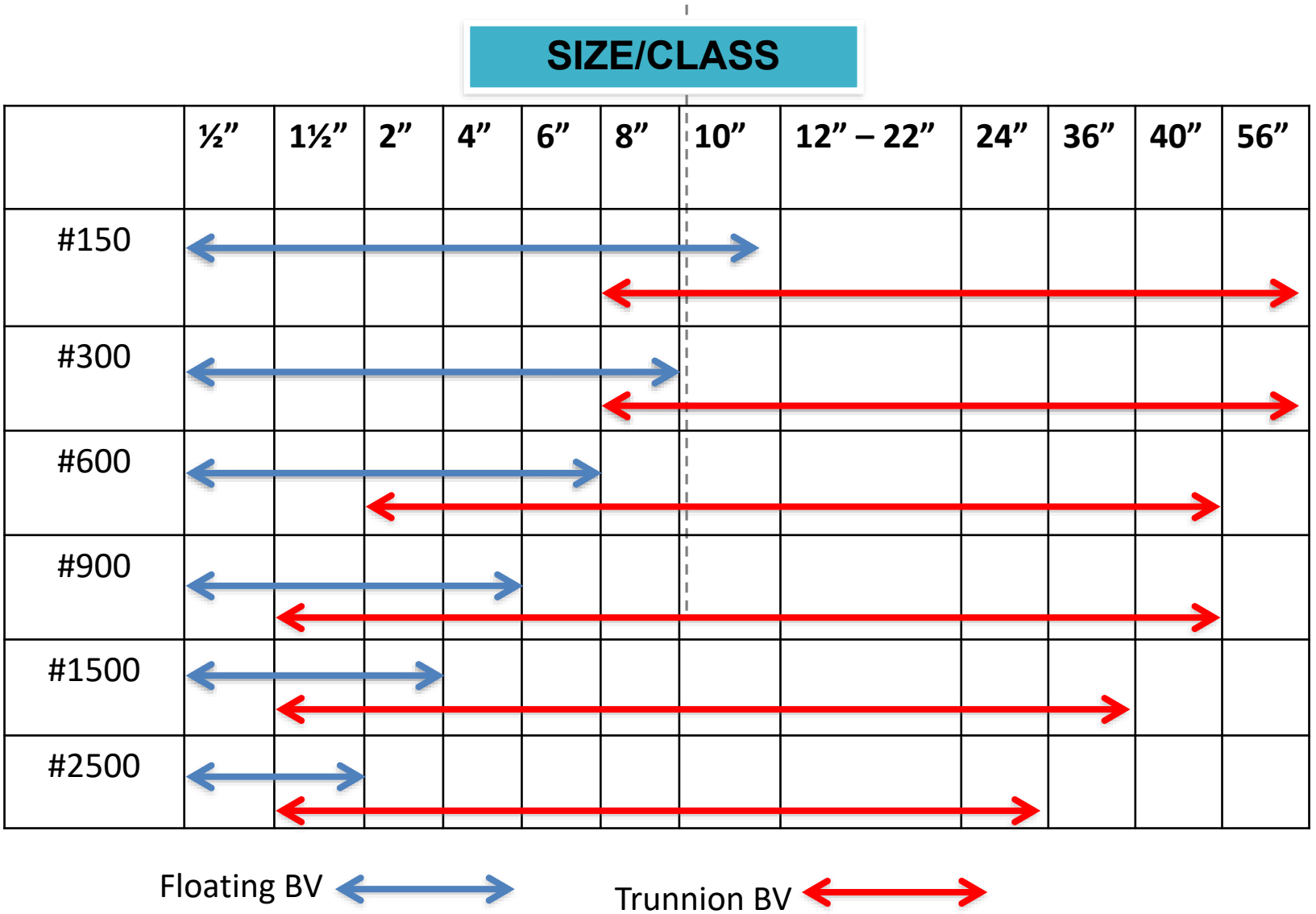
Process Ball Valves



Process Ball Valves

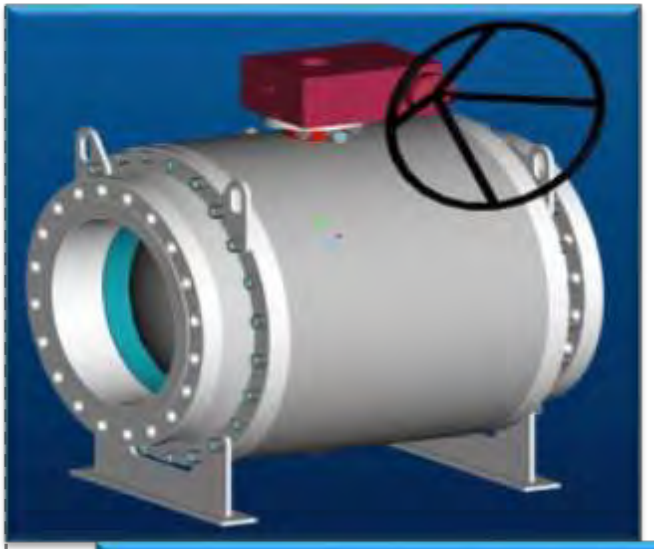


Ball Valves Product Range



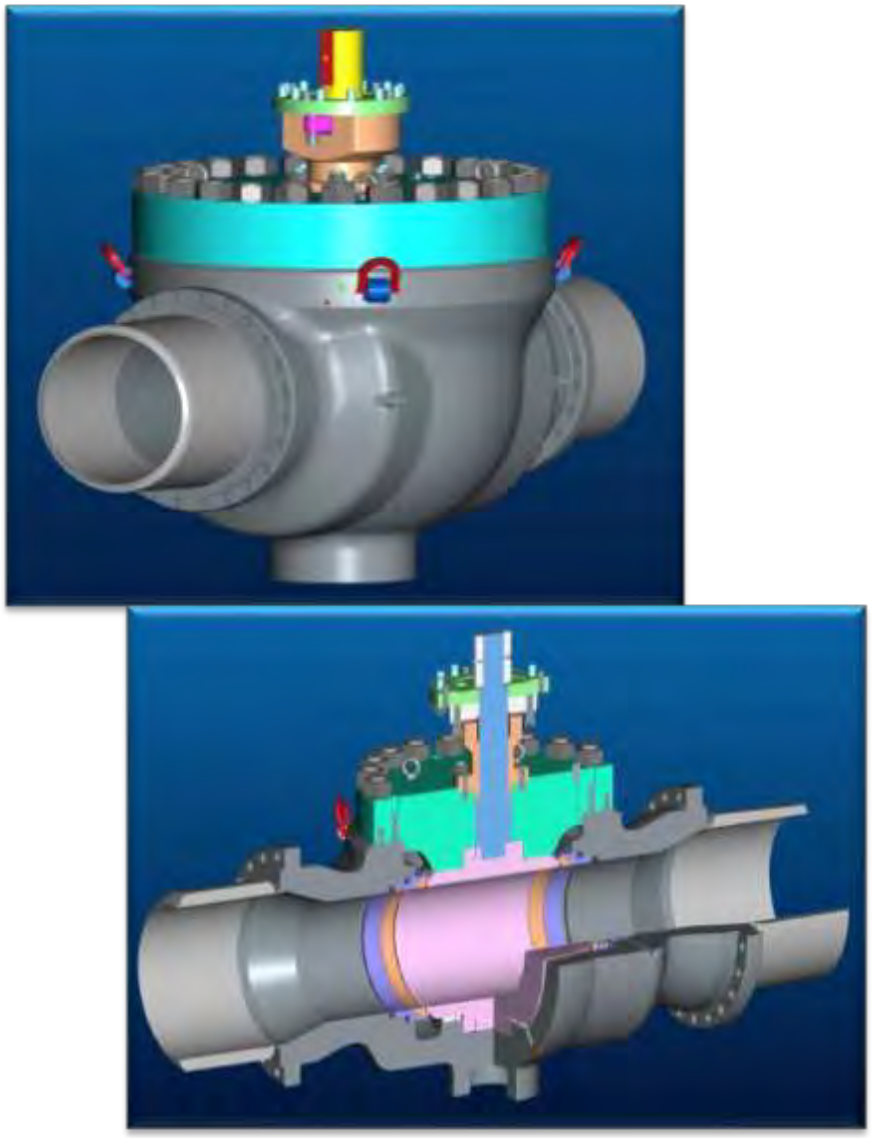
Trunnion Side Entry Split Body

- Bolted Body – All Forged Construction
- Soft / Metal Seated
- Self Relieving or Double Piston Effect Seat
- Anti Blow-Out Stem
- Double Block & Bleed
- Fire Safe API 6FA - API 607 – ISO 14097
- Antistatic Device
- Emergency Sealant Injection to Stem & Seats
- Materials in Accordance to NACE MR 01.75
- Above / Below Ground Installation



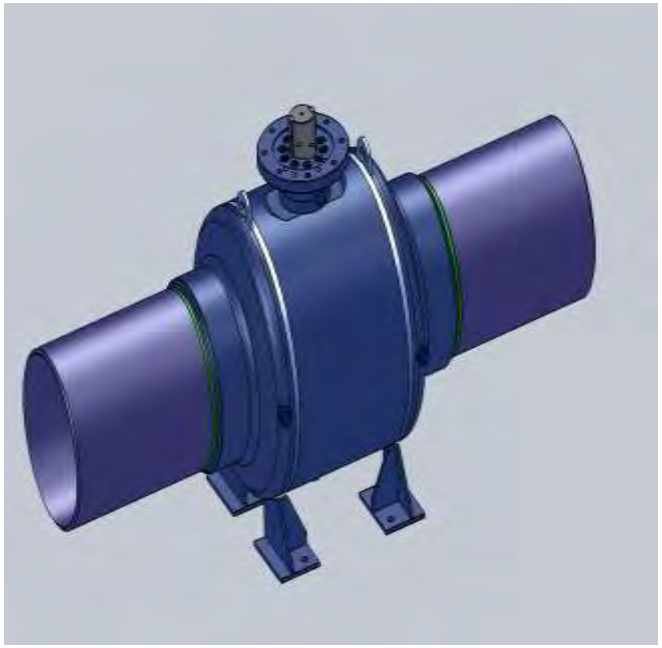
Trunnion Top Entry

- Bolted Bonnet – Cast Body/Forged Bonnet and Trim
  (forged body available on request)
- Soft / Metal Seated
- Self Relieving or Double Piston Effect Seat Anti
- Anti Blow-Out stem
- Double Block & Bleed
- Fire Safe API 6FA - API 607 – ISO 14097
- Antistatic device
- Emergency sealant injection to stem & seats
- Materials in accordance to NACE MR 01.75
- Above / below ground installation
- Full in-line maintenance, either with
  vertical and horizontal stem



Fully Welded

- Welded Body – Cast or Forged body and closure
- Soft / Metal Seated
- Self Relieving or Double Piston Effect Seat Anti
- Anti Blow-Out stem
- Double Block & Bleed
- Fire Safe API 6FA - API 607 – ISO 14097
- Antistatic device
- Emergency sealant injection to stem & seats
- Materials in accordance to NACE MR 01.75
- Above / below ground installation

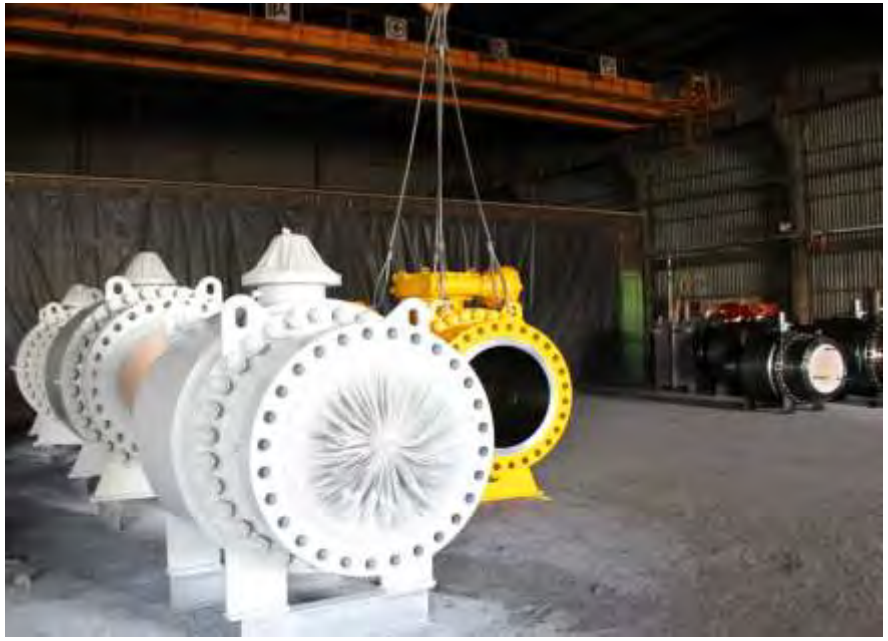


Compact

- Split body construction and DBB
- All forged construction
- Soft Seated or Metal Seated
- Self Relieving or Double Piston Effect Seat
- Anti Blow-Out stem
- Fire safe API 6FA - API 607 – BS 6755 Part.2
- Antistatic device
- Materials in accordance to NACE MR 01.75
- Short face-to-face dimension to suit special needs such as on vessels or platforms where weight and physical dimensions are critical.

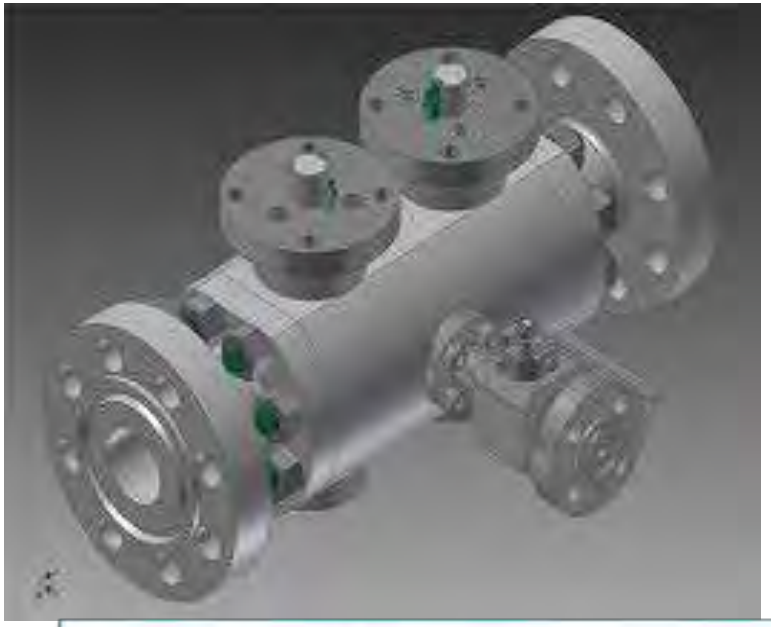
6” to 14” #900
Metal-to-Metal
CARIMIN / PETRONAS CARIGALI
8 weeks delivery

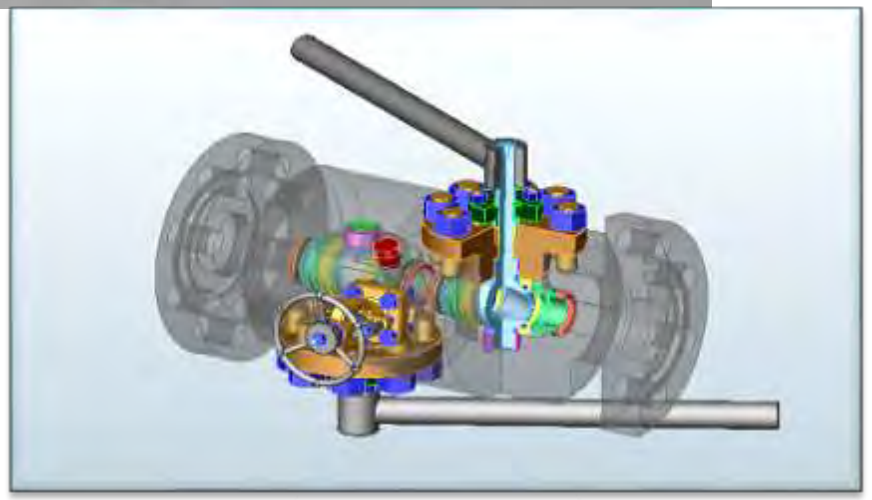
30” & 36” #600
Metal-to-Metal (leakage A) and Soft Seated
ENI INDONESIA
11 weeks delivery



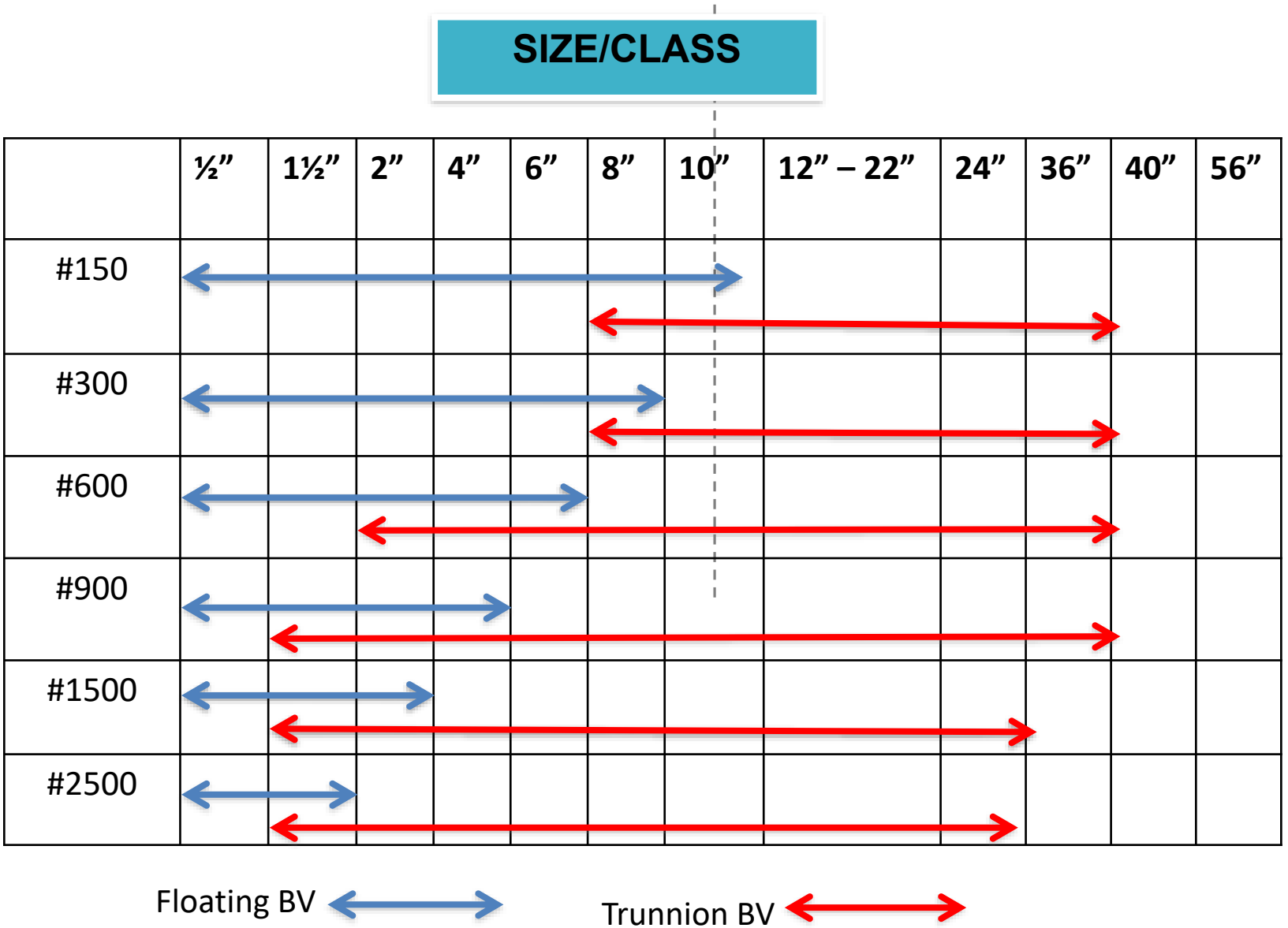
Process Double Block and Bleed

- Body / Forged Bonnet and Trim
- Split Body or Top Entry
- Soft / Metal Seated
- Self Relieving or Double Piston Effect Seat
- Anti Blow-Out stem
- Double Block & Bleed
- Fire safe API 6FA - API 607 – ISO 14097
- Antistatic device
- Emergency sealant injection to stem & seat
- Materials in accordance to NACE MR 01.75
- Above / below ground installation
- Full In-Line Maintenance either with vertical and horizontal stem (when Top Entry)

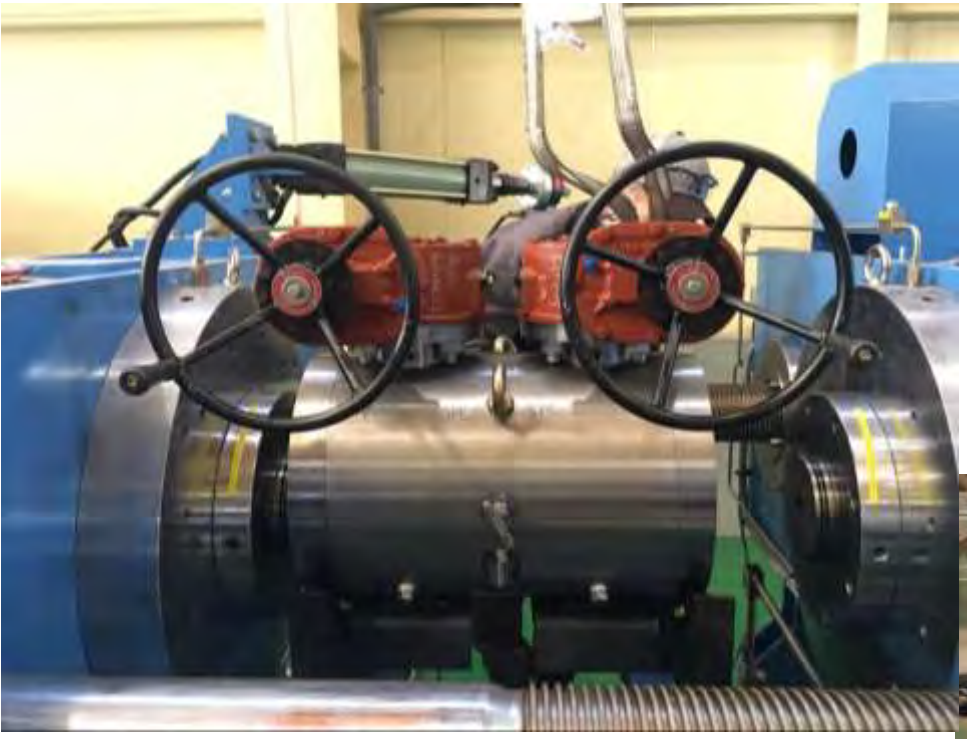




Process DBB Valves Product Range



DBB COMPACT 6” #600



Soft Seated with TCC coating
PETROBRAS FPSO-68
10 weeks delivery

2” #1500 Metal Seated
REPSOL
6 weeks delivery

Ball Valves and DBB Valve Construction Materials

- CARBON STEEL
- STAINLESS STEEL
- DUPLEX AND SUPERDUPLEX
- HASTELLOY
- INCOLLOY
- INCONEL
- TITANIUM
- ANY CRA CLADDING

We are ready to supply any product to suit our client's specific requirements in all service conditions

Ball Valves and DBB Valve Seat Configuration

Self Relieving or Single Piston Effect Seat

Independent floating spring loaded seats are in contact with the ball when the pressure comes for m the line to provide an effective tight seal even at low differential pressures. When there is an ov er pressurization into the body (due to thermal effects or leakage) one or both the seats release th e overpressure into the line avoiding the body blow up.

Double Piston Effect Seat

Independent floating spring loaded seats are always in contact with the ball to provide an effective tight seal even at low differential pressures. Body cavity over pressure in this case can be released through a relief valve to atmosphere.

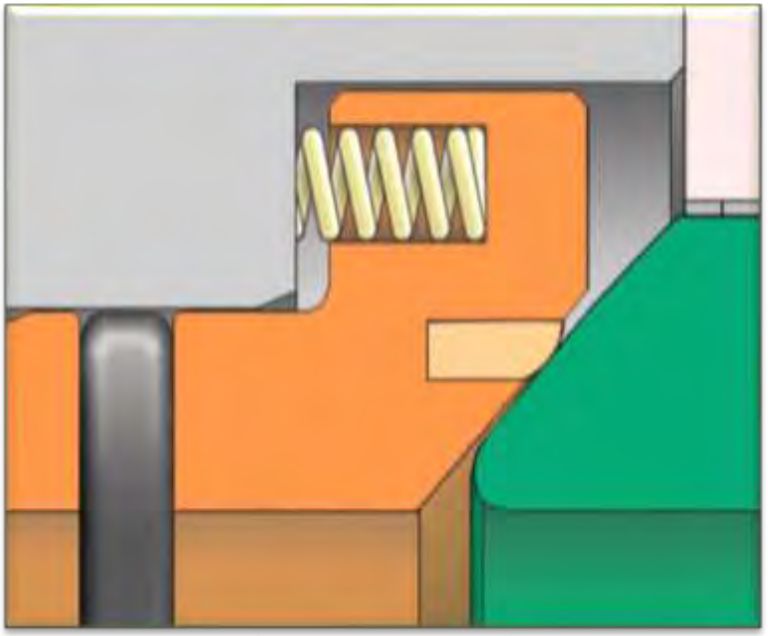
Upstream Seat Self Relieving and Downstream Seat Double Piston Effect

A combination of double piston effect seat on the downstream side and single piston effect on the upstream seat is available on request. This configuration maintains the sealing capacity of the valv e in case of failure of the up stream seat and release of the body cavity over pressure through the up stream seat.

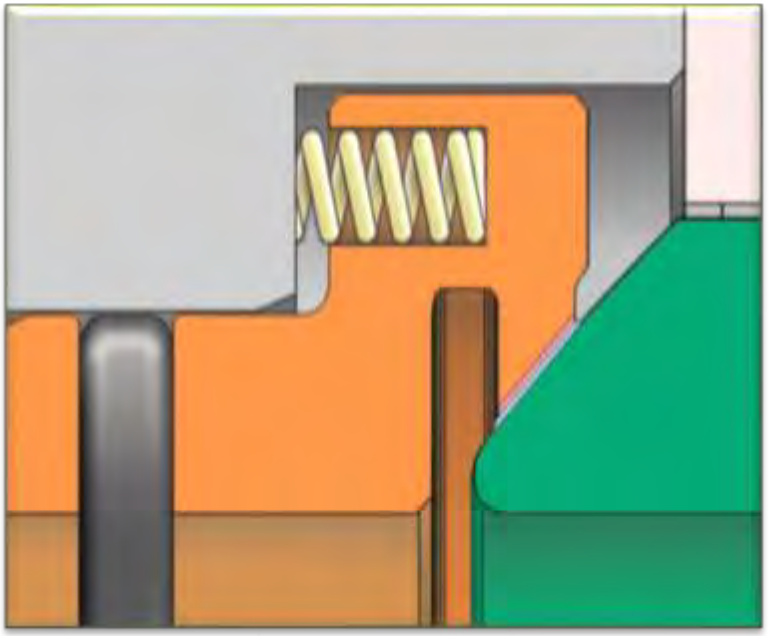
Ball Valves and DBB Valve Seat Configuration

SOFT & METAL SEATED DETAIL

Soft Seated Design



Metal Seated Design



Features and Advantages

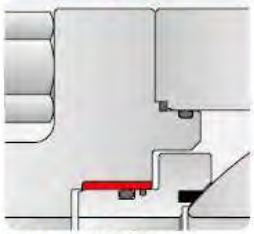
DK-LOK in order to comply with the latest market requirements and always looking for meeting most stringent services which are now arising in development of new fields, is now able to offer, in addition to Ball Valves for standard service, special design to suit the new challenges such as:

- SUBSEA VALVES: designed in accordance with API 6DSS suitable for installation up to 5.000 meters depth. The valves are equipped with subsea actuators and/or ROV interface to allow operation while on sea-bed.
- VERY HIGH TEMPERATURE (up to 538° C or 1000° F): developed to suit the most demanding services like: hot oil, steam, hot condensate, coke, ash, petrochemical, etc. The design foresees use of bellows to seal and energise seats, extended bonnets to allocate adjustable packing, Graphite seals and metallic bearings. Materials for surface hardening are at the forefront of the industry technology (e.g. metallic carbides, Ceramics, metallic nitrides etc.)
- CRYIOGENIC SERVICE (up to -196° C): developed to suite requirement for LNG plants and ships, the valves have special features such as stem extension for easy operation and special sealing such as KEL-F or similar.
- CLADDED VALVES: designed for sour environment and able to reduce cost impact without compromising on quality and technical performance. Cladded valves are basically supplied in lieu of solid CRA materials (Nickel Alloys such Inconel and Incolloy) manufacturing valves in Carbon Steel with a CRA weld overlay of 3mm thickness (or more in case of special requirements.

Weld Overlay

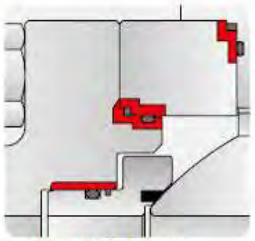
Weld Overlays / Cladding and Internal Lining

Trunnion Type Only

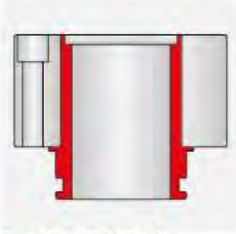


Seat Pocket Welded Overlay
3 mm finished thickness Dynamic seal area.

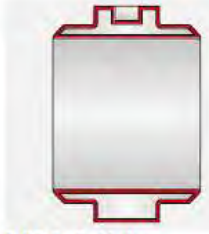
Stem Pocket Welded Overlay
3 mm finished thickness Dynamic seal area.



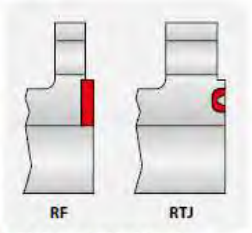
Seals Area Welded Overlay
3 mm finished thickness Dynamic and static seals area.



Gland Plate Weld Overlay
On All Wetted Parts
3 mm finished thickness.

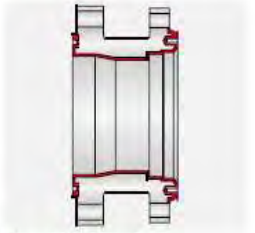


Ball Fully Cladded
3 mm finished thickness.



End Flange Welded Overlay
3 mm finished thickness Static seal area.

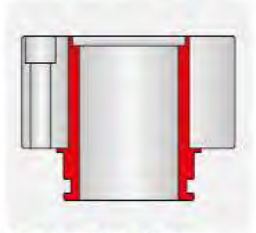
Body Weld Overlay
On All Wetted Parts
3 mm finished thickness.



Closure Weld Overlay
On All Wetted Parts
3 mm finished thickness.

Body Internal Lining
On All Wetted Parts
min. 300 microns thickness.

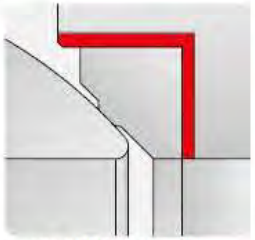
Closure Internal Lining
On All Wetted Parts
min. 300 microns thickness.



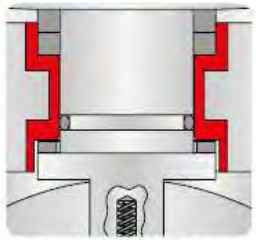
Gland Plate Internal Lining
On All Wetted Parts
min. 300 microns thickness.

Cladding is designed for sour environment and is able to reduce cost impact without compromising on quality and technical performance. Cladded valves are basically supplied in lieu of solid CRA (Corrosion Resistant Alloy) materials (Nickel Alloys such as Inconel and Incoloy) If requested, we can manufacture valves in Carbon Steel with a CRA weld overlay of 3 mm thickness (or more in case of special requirements).

Floating Type Only



Seat Pocket Welded Overlay
3 mm finished thickness Static seal area.

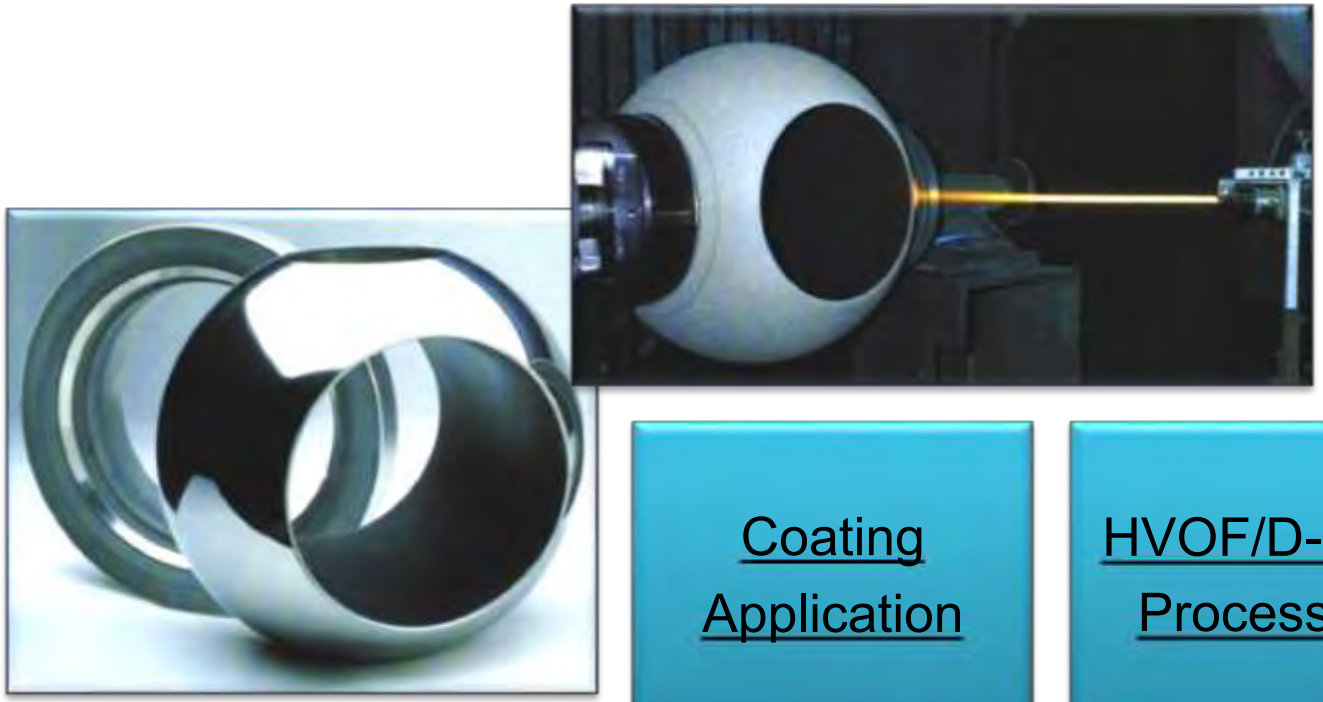


Stem Pocket Welded Overlay
3 mm finished thickness Static seal area.

Tungsten and Chromium Carbide Coatings

Applied Thickness :

- Tungsten Carbide : 150 ÷ 400 μ (wear, corrosion)
- Chromium Carbide : 150 μ (wear, corrosion, temperature)



Coating Application

HVOF/D-Gun Processes

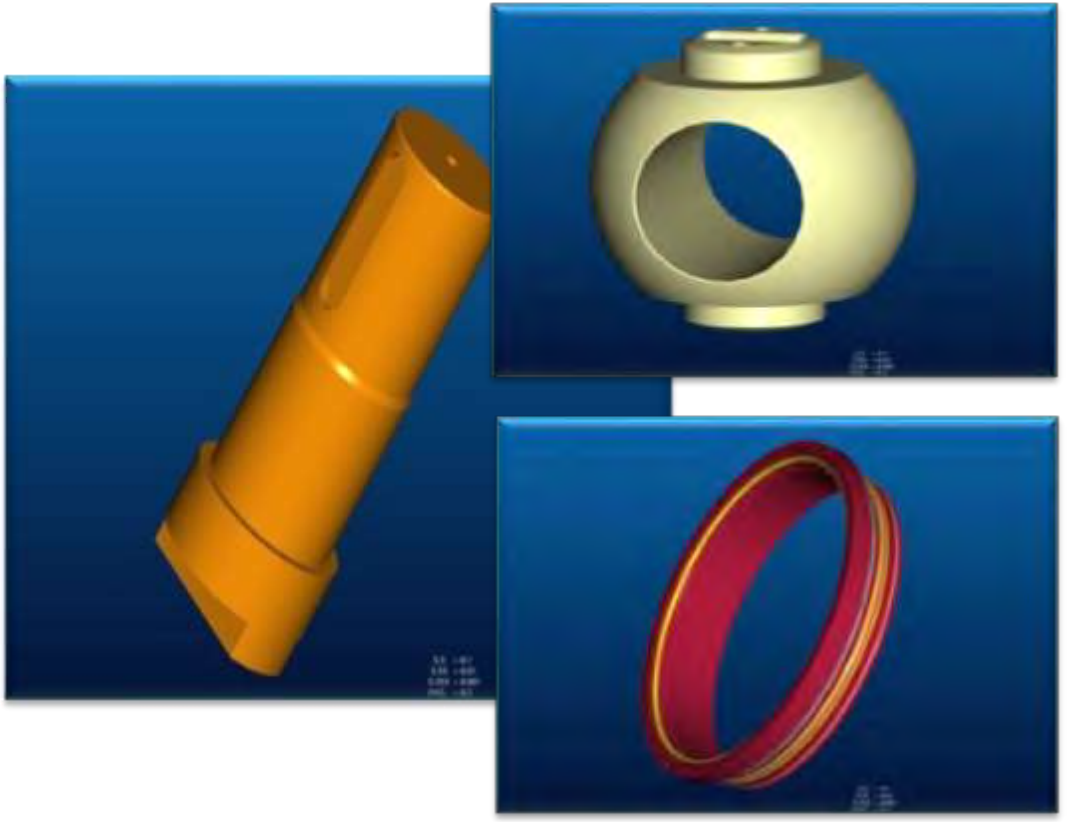
Electrloess Nickel Plating

E.N.P. is Normally Applied to Obtain

- Wear Resistance
- Corrosion Resistance
- Low Friction

Applied Thickness :

- 0.025 mm.
- 0.050 mm.
- 0.075 mm.
- HV (64 HRC) with 520 ° C H.T.
- 950 HV (68 HRC) with 400 ° C H.T



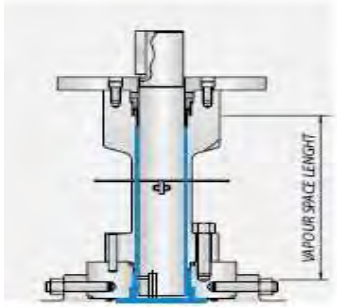
Stem Extensions for Special Applications

Extended Bonnet & Stem Extension

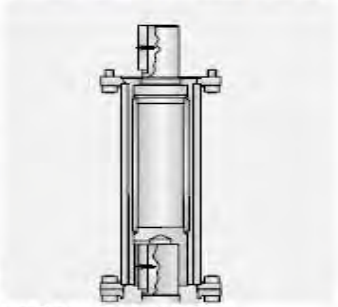
nsulated Extended Stem
& Underground Stem Extension
can be provided making the valve
suitable for inaccessible areas
or buried service.

The piping of the grease injection system and of the vent and drain connections are extended to the top of the extension to ease their access.
Cryogenic Extended Bonnet With Drip Collar & High Temperature Extended Bonnet Live Load Packing

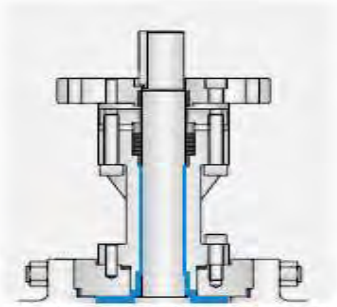
can be provided making the valve suitable for extreme temperature according to customer requirements.



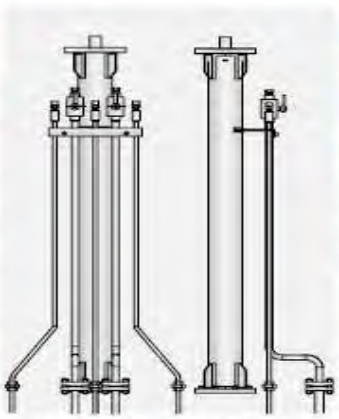
Cryogenic Extended Bonnet
With Drip Collar



Insulation Extended Stem



High Temperature Extended Bonnet
Live Load Packing



Underground Stem Extension

Operators

Manual

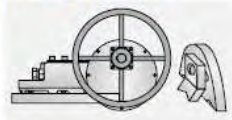
Floating Type Only

Lever with Locking Device

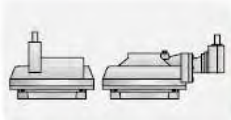
Handwheel with Locking Device

T - Lever with Locking Device

Floating & Trunnion

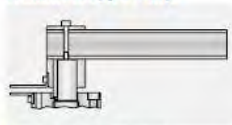


Gearbox with Handwheel & Locking Device

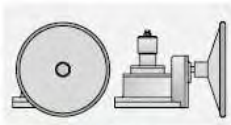


Gearbox Turn to 90°

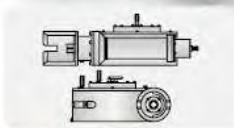
Trunnion Type Only



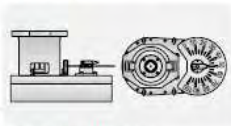
Lever with Locking Device



Subsea Manual Gearbox + Handwheel



Subsea Manual Gearbox + Horizontal ROV



Subsea Manual Gearbox + Vertical ROV

Actuated

Pneumatic

Single Effect, Spring Return.
Double Effect, with Hydraulic Manual Override Double Effect, with Mechanical Manual Override.

Linear Hydraulic

Hydraulic

Single Effect, Spring Return.
Hydraulic Double Acting.

Subsea

Actuators customised to meet the different conditions depending on the sea depth or special interface to allow rov connection.

Electric Actuator

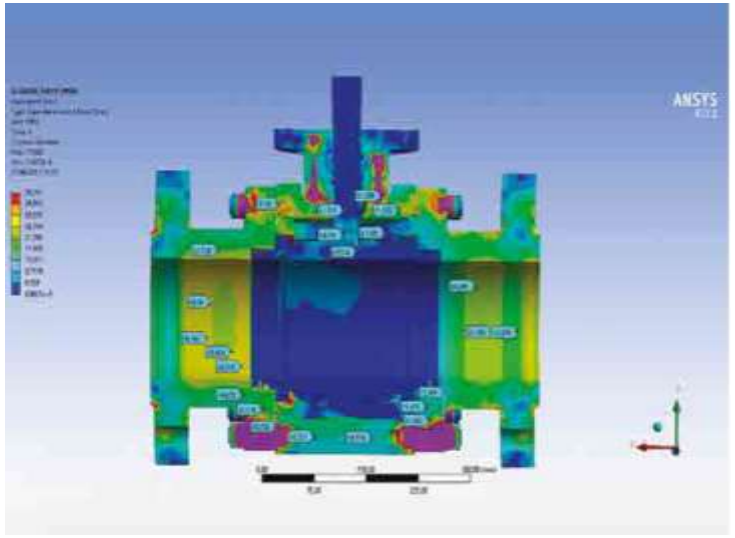
- Directly mounted.
- Underground valve, with extended stem, reduction gear and motor above groung level.
- Underground valve, with directly mounted reduction gear, extended handwheel spindle, motors above ground level.

Gas Over Oil

Actuation power provided by line pressure.

Quality Assurance

ANSYS



Mechanical tests

- Tensile Test
- Hardness Survey
- Impact Test
- Bend Test

Other test

- Dimensional and Surface Coating Check
- Ultrasonic & Radiographic Inspection (UT & RT)
- Liquid Penetration Control (PT)
- Magnetic Particle Control (MP)
- Other Non-Destructive Examinations (NDT)
- Hydraulic, air, gas and fugitive emission (FET) test

Special Requests

- NACE Certificate For Sour Service
- Fire Safe Test According To API 6FA, API 607

API 6D Certificate

American Petroleum Institute

2018-151 | Digital

Certificate of Authority to use the Official API Monogram

License Number: 6D-1742 **ORIGINAL**

The American Petroleum Institute hereby grants to

DK-LOK CORPORATION
1465, Seobu-ro Juchon-myeon
Gimhae, Gyeongsangnam-do
South Korea

the right to use the Official API Monogram® on manufactured products under the conditions in the official publications of the American Petroleum Institute entitled API Spec Q1® and **API-6D** and in accordance with the provisions of the License Agreement.

In all cases where the Official API Monogram is applied, the API Monogram shall be used in conjunction with this certificate number: **6D-1742**

The American Petroleum Institute reserves the right to revoke this authorization to use the Official API Monogram for any reason satisfactory to the Board of Directors of the American Petroleum Institute.

The scope of this license includes the following: Ball Valves

QMS Exclusions: Servicing

Effective Date: JUNE 5, 2020
Expiration Date: JULY 26, 2023

To verify the authenticity of this license, go to www.api.org/compositelist.

Vice President of Global Industry Services

API 6DSS Certificate

American Petroleum Institute

Certificate of Authority to use the Official API Monogram

License Number: 6DSS-0077 **ORIGINAL**

The American Petroleum Institute hereby grants to

DK-LOK CORPORATION
1465, Seobu-ro Juchon-myeon
Gimhae, Gyeongsangnam-do
South Korea

the right to use the Official API Monogram® on manufactured products under the conditions in the official publications of the American Petroleum Institute entitled API Spec Q1® and **API-6DSS** and in accordance with the provisions of the License Agreement.

In all cases where the Official API Monogram is applied, the API Monogram shall be used in conjunction with this certificate number: **6DSS-0077**

The American Petroleum Institute reserves the right to revoke this authorization to use the Official API Monogram for any reason satisfactory to the Board of Directors of the American Petroleum Institute.

The scope of this license includes the following: Subsea Ball Valves

QMS Exclusions: Servicing

Effective Date: JUNE 5, 2020
Expiration Date: JULY 26, 2023

To verify the authenticity of this license, go to www.api.org/compositelist.

Vice President of Global Industry Services

Sample of ISO TAT Certificate

DNV·GL

Cert. No. DNV_GL-2018- DKLK_FET-003

Client : **DK-Lok Corporation**
Location of test : Via Ponte Febbro 104/106, 25033 Cologne (BS) ITALIA
Date of test : From 29 January to 06 February 2018

We hereby declare that,
at request of Messrs **DK-Lok Corporation** the undersigned GLIS Surveyor did attend at the Testing Plant CMD S.r.l. – Via Ponte Febbro 104/106, 25033 Cologne (BS) ITALIA on date From 29 January to 06 February 2018, for the purpose of witnessing the following :

PROTOTYPE TEST FOR VALVE
ACCORDING TO ISO 15848-1 2nd Edition 2015

1-) Valve Specification :

Customer :	DK-Lok Corporation
Valve size & type :	16" Ball Valve Side-Entry Trunnion FB RF
Material of Valve :	ASTM A 350 LF2
Valve class :	600 lbs
Model number :	VBST-FE-16-600-01
Valve tag :	//
Stem diameter :	Ø 80 mm
Body - Closure Seal :	1 + 1 O-ring VITON-B AED + Graphite
Body - Cover Seal :	1 + 1 O-ring VITON-B AED + Graphite
Trunnion Seal :	1 + 1 O-ring VITON-B AED + Graphite
Stem Seal :	1 + 1 O-ring VITON-B AED + Graphite

2-) Test Condition :

Test pressure :	102.1 Low Temp. barg + 102.1 RT barg + 97.6 High Temp. barg
Test medium :	Helium gas of 97 % minimum purity
Test temperature :	-46 + RT + 200°C (RT qualifies the valve in the range -29°C + +40°C)
Test equipment :	Oerlikon Leybold PHOENIX L 300 EQUIPMENT SERIAL NR.: 90001081504

DNV·GL

Cert. No. DNV_GL-2018- DKLK_FET-003

3-) Condition for Cycling Test :

Testing Cycle for Class CO2	
Number of step test cycles RT :	4 + 2 (For CO1) + 2 (For CO2)
Number of cycles at room temperature (RT) :	200 + 10 (For CO1) + 1590 (For CO2)

Testing Cycle for Class CO2	
Number of step test cycles High Temp. :	2 (For CO1) + 1 (For CO2)
Number of cycles at High temperature :	100 (For CO1) + 500 (For CO2)

Testing Cycle for Class CO2	
Number of step test cycles Low Temp. :	2 (For CO1) + 1 (For CO2)
Number of cycles at Low temperature :	100 (For CO1) + 500 (For CO2)

4-) Documentation Used :

Industrial Valves – Measurement test and qualification procedures for fugitive emission-Spec. ISO 15848-1 2nd Edition 2015

Conversion factor in accordance of EN 1779 annex B.

5-) Test Results :

In view of the results shown on the test report n° **VBST-FE-16-600-01** and regarding the test method described above, the tested valve can be considered conform at the ISO 15848-1 according to the following description:

	Tightness Class	Endurance Class	Temperature Class	Test Pressure
ISO FE	**BH**	**CO2**	**-46°C ÷ 200°C**	**600 lbs**

Inspector by Germanischer Lloyd
R. Mastantuono
32-111

Sample of Fire-safe Certificate

DNV·GL

Cert. No. DNV_GL-2017-DKLK_FTC-020-A

Client : **DK-Lok Corporation**
Location of test : **CMD S.r.l.** - Via Ponte Fabbro 104/106, 25033 Cologne (BS) ITALY
Date of test : 11 September 2017

We hereby declare that,
at request of Messrs **DK-Lok Corporation** the undersigned GLIS Surveyor did attend at the Plant deputed for the tests **CMD S.r.l.** located in Via Ponte Fabbro 104/106, 25033 Cologne (BS) - ITALY on date 11 September 2017, for the purpose of witnessing the FIRE TEST on the following valve according to API 6FA Ed.1999.

BALL VALVE SIDE ENTRY TRUNNION
16" Class 600lbs - Carbon Steel

Enclosed is a sectional drawing of the valve under test complete with a list of materials :
Drawing / Figure N° : **DK-FS-API6FA-20**

The following tests were carried out:

1-) The valve was subjected to full hydrostatic (water) and gas tests at ambient temperature with Satisfactory results.
Tests were in accordance with API 6D 24th Edition 2014.

2-) The valve was fire tested according to API 6FA Ed.1999.

3-) The valve was completely disassembled and all components were found in good conditions with exception of the Soft Seat and Soft Seals that were damaged.

4-) Herewith attached and duly endorsed the following documents :
Fire Test Report N° : **FS-20-API6FA**
Drawing / Figure N° : **DK-FS-API6FA-20**

CONCLUSION :
On the basis of test results the **BALL VALVE SIDE ENTRY TRUNNION 16" Class 600lbs - Carbon Steel** passed satisfactorily the fire safe test.

Inspector to Germanischer Lloyd
(printed, signature, stamp)
R. Mastantuono

DNV GL Headquarters, Veritasveien 1, P.O.Box 300, 1322 Høvik, Norway. Tel: +47 67 57 99 00 www.dnvgl.com

Germanischer Lloyd Industrial Services Italia Srl
Sede legale: Via Energy Park 14 - Vimercate (Italia)
Capitale Sociale € 99.000,00 i.v.
Registro Imprese di Milano, P.I. e C.F. 11360150152, R.E.A. 1464493
Direzione e Coordinamento di Germanischer Lloyd Industrial Services GmbH

DK-LOK Corporation

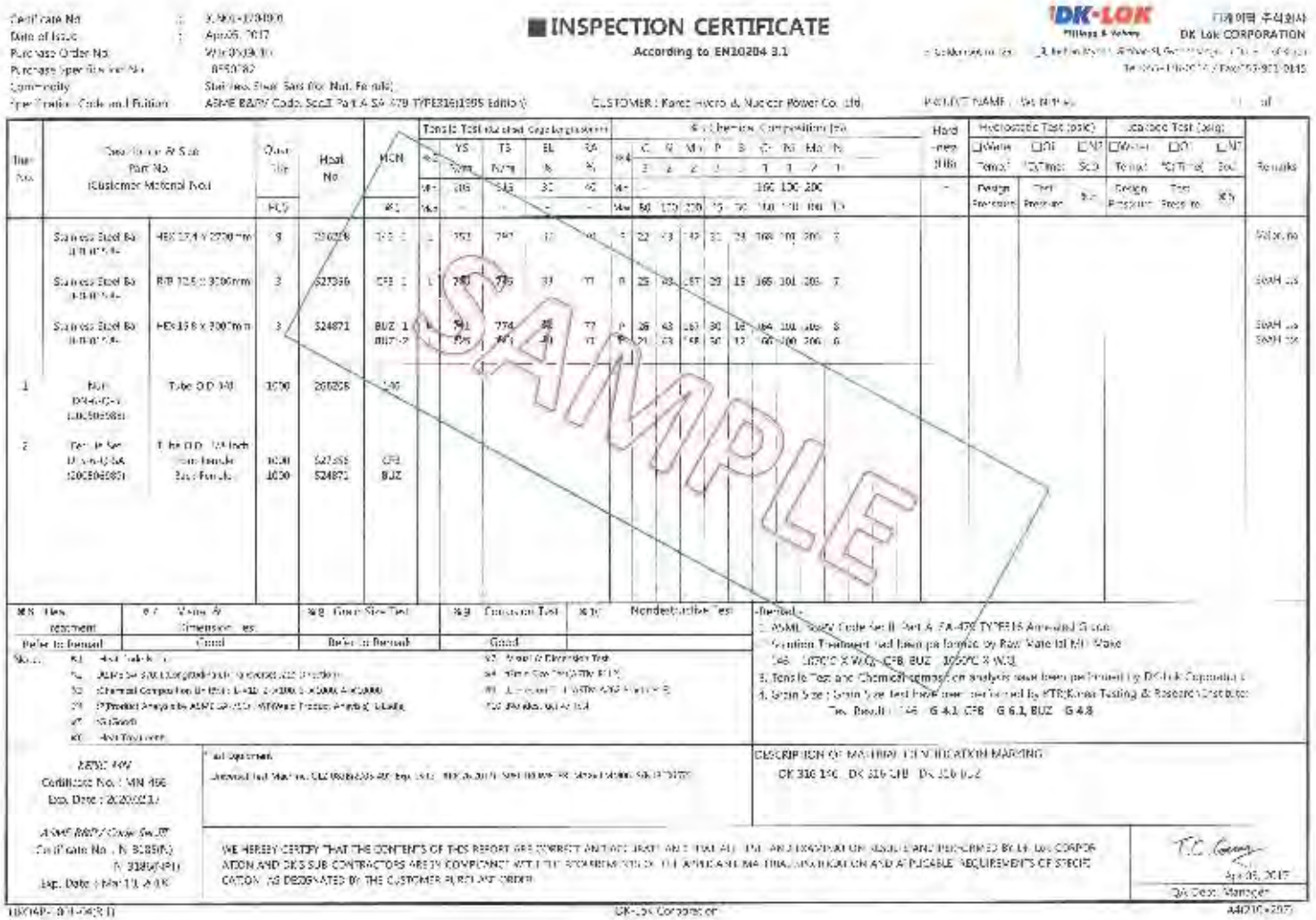
FIRE-SAFE CERTIFICATES BY DNV-GL

DK-LOK BALL & BUTTERFLY VALVES FIRE SAFE CERTIFICATES

TYPE OF VALVE	MATERIAL	SEAT MATERIAL	RATING	SIZE
BALL VALVE TRUNNION 3 PIECES	FERRITIC	PTFE	150#	2"
				6"
				14"
				16"
			600#	2"
				6"
				14"
				16"
			1500#	2"
				6"
				14"
				16"
		DEVLON	150#	2"
				6"
				14"
				16"
			600#	2"
				6"
				14"
				16"
			1500#	2"
				6"
				14"
				16"
	DUPLEX	PEEK	150#	2"
				6"
				14"
				16"
			600#	2"
				6"
				14"
				16"
			1500#	2"
				6"
				14"
				16"
	STAINLESS STEEL	METAL	150#	2"
				6"
				14"
				16"
			600#	2"
				6"
				14"
				16"
			1500#	2"
				6"
				14"
				16"
BALL VALVE TRUNNION TOP ENTRY	FERRITIC	METAL	600#	16"
BUTTERFLY VALVE	FERRITIC	METAL	600#	8"

* Other Sizes upon Request

Sample of Material Certificate 3.1



■ INSPECTION CERTIFICATE

According to EN10204 3.1

DK-LOK Pillings & Valves

DK Lok CORPORATION

SAMPLE

Hydrostatic Test

Testing

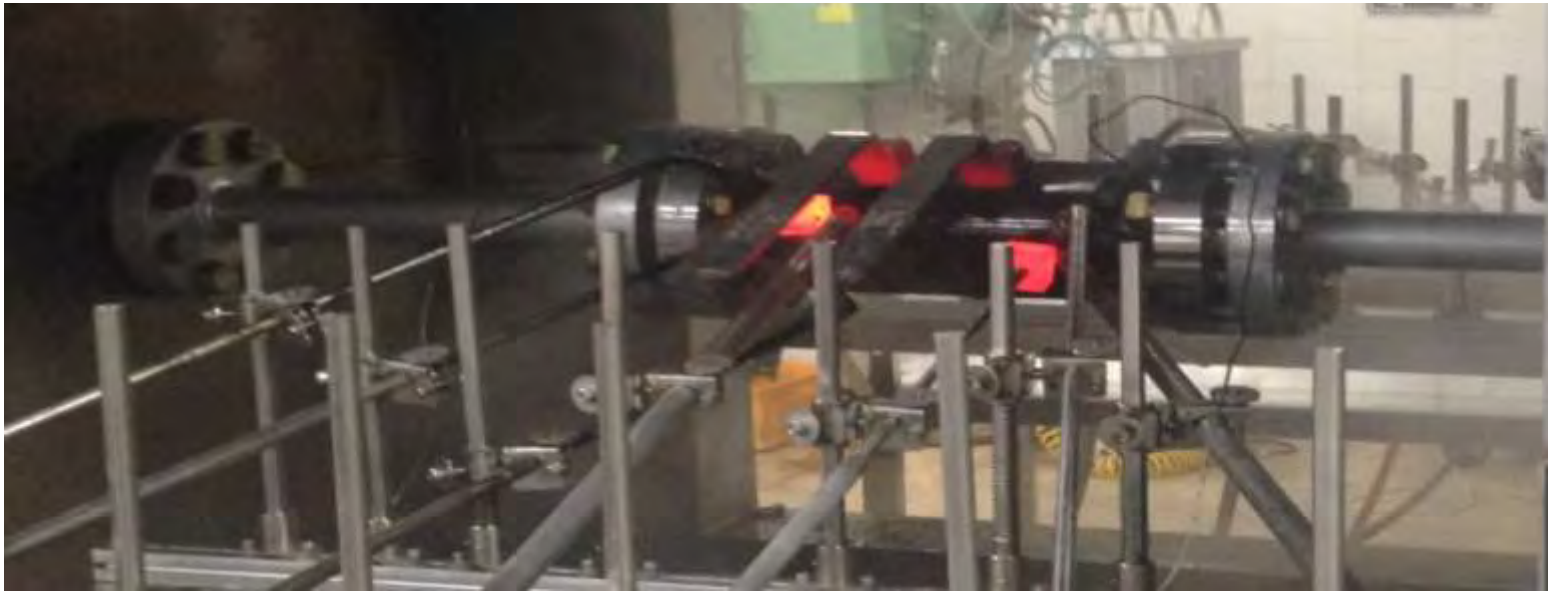
- Factory Test (Hydro Test)
  - Shell Test: Max. Working Pressure X 1.5
  - Seat Test: Max. Working Pressure X 1.1

- If Required
  - API 598 / API6D / ISO 5208 / BS 6755-1

450 Tons Test Bench

1200 Tons Test Bench

Fire Safe Test



Sales References

NO.	CLIENT	PROJECTS	END USER	ITEMS	SIZE	CLASS	DELIVERY FROM DRAWING APPROVAL
1	Mavain Energy SDN BHD	PTSC YARD FACILITIES PROJECT	PETRO VIETNAM	CRY BALL Valves	½"	800	10 weeks
				CRY BALL Valves	1"	150	
2.1	PT EAST INFINITA	ENI PROJECT (SUPPLY GOODS OF HOT TAP)	ENI MUARA BAKAU B.V.	BALL Valves	30"	600	11 weeks
				BALL Valves	36"	600	
2.2	PT MITRA GALPERTI	ENI PROJECT (GOODS SUPPLY OF VALVES FOR BEM)		BALL Valves	30"	600	11 weeks
				BALL Valves	36"	600	
				BALL Valves	36"	600	
				BALL Valves	36"	600	
				BUTTERFLY Valves	30"/36"	600	
				CHECK Valves	30"/36"	600	
3	ALIOGAZ KUKUH SDN BHD	REPSOL PETROLEUM PROJECT	REPSOL PETROLEUM	DBB Valves	2"	2500	6 weeks
4	NTA-Prom Ltd.	VYSOTSK LNG TERMINAL PROJECT	GAZPROM	CRY BALL Valves	2"	150	10 weeks
				HT BALL Valves	2"	150	
5	ACCUTECH	FPSU P68 PROJECT	PETROBRAS	COMPACT DBB Valves	6"	600	10 weeks
6	ALIOGAZ KUKUH SDN BHD	Dulang Piping Upgrade Project	PETRONAS	BALL Valves	6"	900	6 weeks
				BALL Valves	10"	300/900	
				BALL Valves	12"	300/900	
				BALL Valves	14"	900	
7	PT MITRA GALPERTI	ENI PROJECT (BEM)	ENI MUARA BAKAU B.V.	BALL Valves	¾"	800	4 weeks

Sales References

NO	CLIENT	PROJECTS	END USER	ITEMS	SIZE	CLASS	DELIVERY FROM DRAWING APPROVAL
8	ACCUTECH	FPSU P68 PROJECT	PETROBRAS	BALL Valves	1"/ 1-½"	6000psi	12 weeks
				CHECK Valves	1-1/2"	6000psi	
9	ACCUTECH	FPSU P68 PROJECT	PETROBRAS	BALL	1"	10000psi	12 weeks
10	TRANSWATER	SAINT MAINTANCE & UPGRADE PROJECT	PETRONAS	BALL	10"	600	12 weeks
11	TRACE_ADCO	NEB PRODUCTION FACILITIES	ADNOC	TOP ENTRY 8 ITEMS	5-1/8"~20"	600~10000psi	24 weeks
				BALL - 61 ITEMS	1/2"-24"	150~900	
12	NTA-Prom Ltd.	VYSOTSK LNG TERMINAL PROJECT	GAZPROM	BALL Valves	2"	300	8 weeks
13	Rectus Polska	ZM-06/H1695-18	HPE8 Poland	DBB Valves	1" & 1 ½"	600	10 weeks
14	ACCUTECH	FPSU P68 PROJECT	PETROBRAS	COMPACT DBB Valves	4" & 10"	150~1500	14 weeks
15	TRANSWATER	SAINT MAINTANCE & UPGRADE P ROJECT	PETRONAS	BALL Valves	20"&24"	600	10 weeks

Sales References

NO	CLIENT	PROJECTS	END USER	ITEMS	SIZE	CLASS	DELIVERY FROM DRAWING APPROVAL
16	ALIOGAZ KUKUH	Dulang Piping Upgrade Project	PETRONAS	BALL Valves	6~14"	900	10 weeks
17	NTA-Prom Ltd.	VYSOTSK LNG TERMINAL PROJECT	GAZPROM	DBB Valves	1"	150	8 weeks
18	ACCUTECH	FPSU P68 PROJECT	PETROBRAS	DBB	1"	2500	8 weeks
19	ALIOGAZ KUKUH	Dulang Piping Upgrade Project	PETRONAS	BALL Valves	6~14"	150/300	8 weeks
20	TRANSWATER	SAINT MAINTANCE & UPGRADE PROJECT	PETRONAS	BALL Valves	2" x 1 ½	900	12 weeks
21	ALIOGAZ KUKUH	Dulang Piping Upgrade Project	PETRONAS	BALL Valves	6"	300	6 weeks
22	NTA-Prom Ltd.	JSC Yamal LNG Project	YAMGAZ	DBB	2"	600	10weeks
23	BE INDUSTRIES INC.	ICHALKIL PROJECT	ICA/FLUOR	BALL Valve	2″/10″	API 10000	10weeks
24	TRACE_ADNOC	ADCO Bu Hasa replacement	ADNOC	ACTUATED BALL Valve	12"/18"	300/900	24weeks
				BALL Valve	12"/16"	150/300	12weeks


Q & A