

Trunnion Mounted Ball  
Class 600/ NPS 12"  
Split body, Side entry, Bolted  
Metal seated Casting ball valve



**FORCE**<sup>®</sup>



#### Construction :

Split body, side entry, bolted, full/reduced port, trunnion mounted ball, "Fire-safe" designed to API 607/ ISO 10497, anti-blow out proof stem, self relieving seats, double seal design, double block and bleed, anti-static device,

Design according to API 6D, ASME B 16.34 and ISO 17292/ BS 5351 specifications.

#### Range :

Pipeline Ball valves for Petroleum and natural gas industries  
ASME Rating Class 150 to Class 2500  
NPS 2" (DN 50) to NPS 48" (DN 1200)

#### Dimensions :

Face-to-face API 6D/ ASME B16.10  
End flanged ASME B16.5  
Min. dia. of port API 6D  
Min. wall thickness ASME B16.34



**Dongsan Valve Co., Ltd**  
**Company Profile**

## Social Responsibility of Force valve is the balance of People, Planet and Profit.

It is our actual expectations regarding compliance with international standards for environmental management, safety and Business ethics. In essence this means treating business & people fairly, preserving natural resources and protecting the environment.

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To reach this, we shall do 3 principles:

- **Social Responsibility:** the social network people live in
- **Safety Responsibility:** Incident prevention & danger elimination
- **Business Responsibility:** the way we do our job

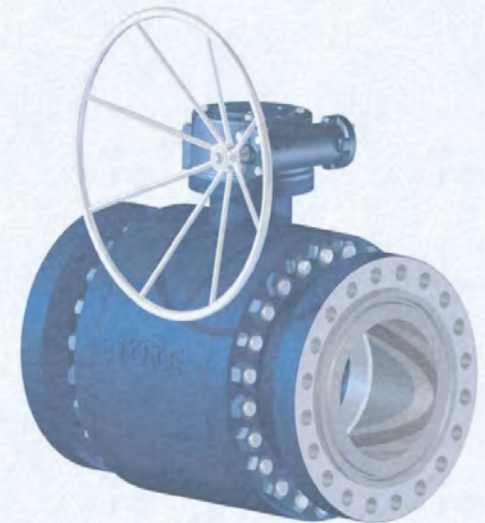
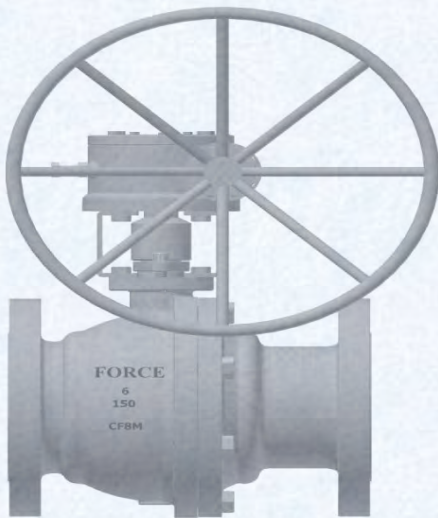


Company Identification

**Dongsan Valve**

Product Identification (Brand)

**FORCE<sup>®</sup>**



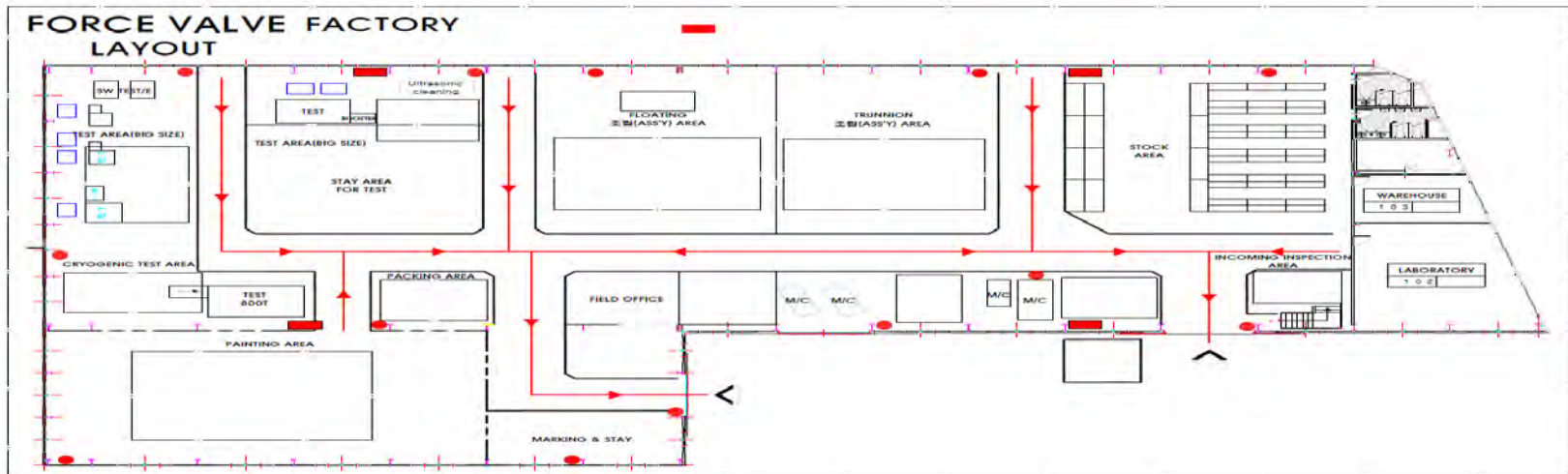
| ITEM                    |  | DESCRIPTION  |
|-------------------------|--|--|
| <b>GENERAL</b>          | Company Name                               | <b>DONGSAN VALVE CO., LTD</b>  |
|                         | President & CEO                            | Myung-Chu CHUNG  |
|                         | Company Foundation                         | May, 1983  |
|                         | Factory Location (1 <sup>st</sup> Factory) | 167-2, Gomo-ro, 324Beonan-gil, Jillye-myeon, Gimhae City, Gyeongnam, Korea   |
|                         | Tel.                                       | +82.55.346.0173  |
|                         | Website                                    | www.force-valves.com   |
| <b>PRODUCTION</b>       | Main Products                              | <b>CASTING &amp; FORGING BALL VALVES</b>   |
|                         | Factory<br>(Machining & Assembly)          | Floor Base : 8,264 m <sup>2</sup> (2,500pyeong) – 1 <sup>st</sup> Factory<br>Floor Base : 3,354 m <sup>2</sup> (1,070pyeong) – 2 <sup>nd</sup> Factory |
| <b>MONTHLY CAPACITY</b> | Casting                                    | 300 tons   |
|                         | Production                                 | <b>5,000 EA / MONTH</b>  |
|                         | Basis Description                          | <b>Ball Valve WCB 150LB 6"</b>   |



**FACTORY (1<sup>ST</sup>)**

Total : 8,264 m<sup>2</sup> (2,500 pyung)

- Service: Assembly,
- Machining
- Test
- Painting
- Packing
- Delivery





**FACTORY (2nd)**

Total : 3,354 m<sup>2</sup> (1,070 pyung)

Service: Assembly (Cryogenic)

Test

Machining

Warehouse (Patterns)



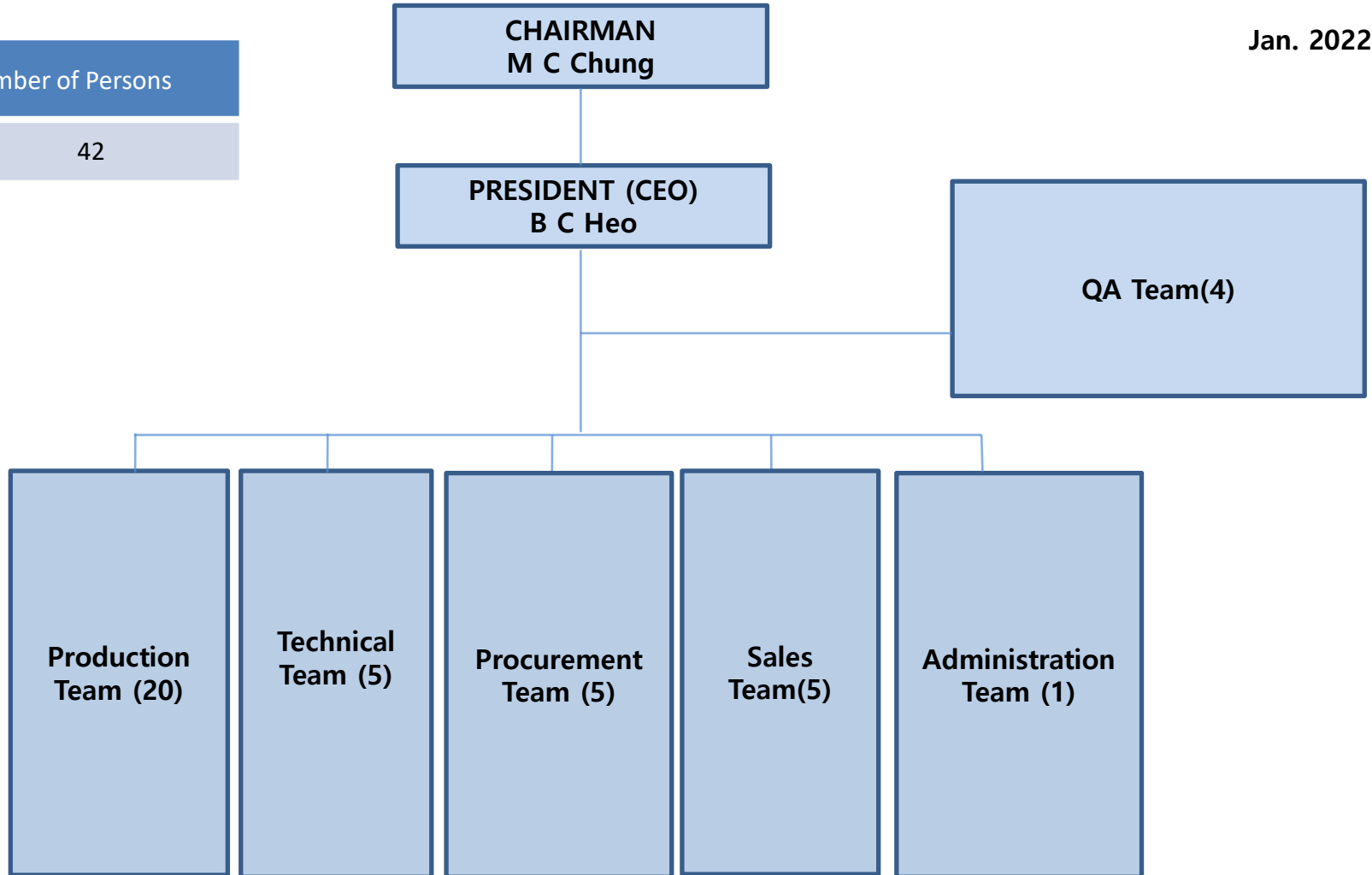
**FACTORY (3rd)**

Service: Machining

Jan. 2022

Number of Persons

42



## 1990~2000

- Expanded Foundry
- Obtained ISO 9001
- Obtained API 6D
- Obtained **Fire safety from LOYD'S**

## 1983

- Established Dongsan Valve
- Vendor Registration of **LG Chemical Co., Ltd**

## 2006~2010

- Registered for **Korea Midland Power co. Ltd.**

## 2001~2005

- Obtained **CE PED from B.V.**
- Registered Ball valve patent
- Registered Trade Mark 'FORCE' in Korea, USA

## 2011~2020

- Obtained **TRCU** of RUSSIA
- Obtained **TAT** for Shell
- Obtained **ISO 15848 & 14001**
- Obtained **OHSAS 18001**
- Obtained **CE PED**
- Registered **KGS**
- Registered **KOGAS**
- Registered **PTT GC, IRPC, EGAT (Thailand)**
- Registered **PETRONAS & SBM (Malaysia)**
- Registered **PETRO-VIETNAM**
- Registered **HESS, MURPHY OIL**
- Registered **HANHWA TOTAL, S-OIL, SK ENERGY, LG CHEMICAL**

## 2021~2022

- Obtained **Approval for Cryogenic by KOGAS (All range and All sizes)**
- Renewal **API 6D**
- Renewal **Petronas License**
- Obtained **ISO 15848-1**
- Obtained **API 641**
- Obtained **TAT(to Large size)**
- Obtained **SIL3**





**Ultrasonic Cleaning**



**MCT Machine**



**CNC Machine**



**Painting Facility**



**MCT Machine**



**CNC Machine (Vertical)**

| No. | FACILITIES NAME         | SIZE        | Q'TY | REMARKS | No. | FACILITIES NAME               | SIZE               | Q'TY | REMARKS        |
|-----|-------------------------|-------------|------|---------|-----|-------------------------------|--------------------|------|----------------|
| 1   | LATHE                   | 480 X 1000  | 1    | WHACHUN | 19  | TAPPING UPRIGHT DRILLING M/C  | STD 410            | 1    | SAMCHUNLI      |
| 2   | LATHE                   | 580 X 1000  | 1    | WHACHUN | 20  | UPRIGHT DRILLING MACHINE      | DUV 560            | 1    | WOOCHANG       |
| 3   | LATHE                   | 710 X 1000  | 1    | WHACHUN | 21  | UPRIGHT DRILLING MACHINE      | DUA 540            | 1    | DONGYANG       |
| 4   | LATHE                   | 400 X 1060  | 1    | WHACHUN | 22  | MILLING MACHINE               | HMTH 1100          | 1    | WHACHUN        |
| 5   | LATHE                   | 710 X 1000  | 1    | WHACHUN | 23  | MILLING MACHINE               | WMV 1100           | 1    | WHACHUN        |
| 6   | LATHE                   | 1100 X 2000 | 1    | JAPAN   | 24  | ULTRASONIC WASHING M/C        |                    | 1    |                |
| 7   | CNC LATHE               | PUMA 10S    | 1    | WHACHUN | 25  | TIG WELDING MACHINE           | DWT 500            | 1    |                |
| 8   | CNC LATHE               | PUMA 12L    | 1    | DAEWOO  | 26  | ARC WELDING MACHINE           |                    | 1    |                |
| 9   | CNC LATHE               | H1EC031     | 1    | DAEWOO  | 27  | SPOT WELDING MACHINE          |                    | 1    |                |
| 10  | VERTICAL CNC LATHE      | PUMA V550   | 1    | DAEWOO  | 28  | CRANE                         | 20 TON             | 1    |                |
| 11  | VERTICAL CNC LATHE      | PUMA V850   | 1    | DOOSAN  | 29  | CRANE                         | 10 TON             | 1    |                |
| 12  | MCT (MACHINING CENTER)  | 650         | 1    | DOOSAN  | 30  | CRANE                         | 7.5 TON            | 1    |                |
| 13  | MCT (MACHINING CENTER)  | HM630       | 1    | DOOSAN  | 31  | CRANE                         | 3 TON              | 1    |                |
| 14  | MCT (MACHINING CENTER)  | ACE-VC500   | 1    | DOOSAN  | 32  | MACHINING CENTER              | 2100 X 1250 X 1250 | 1    | DOOSAN         |
| 15  | MCT (MACHINING CENTER)  | MYNX650/50  | 1    | DOOSAN  | 33  | VERTICAL NC                   | 650 X Ø 770        | 1    | S&T            |
| 16  | MCT (MACHINING CENTER)  | MYNX7500/50 | 1    | DOOSAN  | 34  | METAL SEAT MACHINING FACILITY |                    | 2    | BALL & SEARING |
| 17  | RADIAL DRILLING MACHINE | DRD 1100    | 2    | DOOSAN  | 35  | PAINTING & DRY FACILITY       |                    | 1    | JUNGIL PLANT   |
| 18  | RADIAL DRILLING MACHINE | NRD 1100    | 1    | NAMBUK  |     |                               |                    |      |                |

Horizontal Pressure Test Bench (800ton)



Vertical Pressure Test Bench (50~170ton, 5EA)

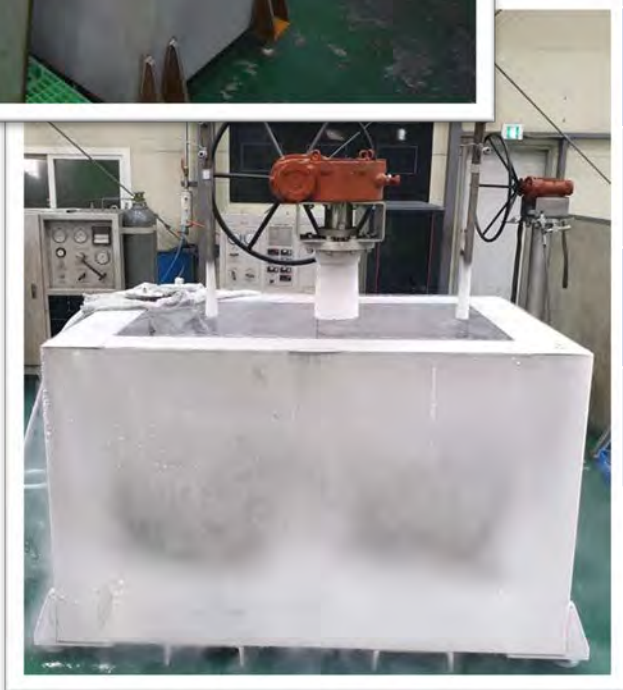


Vertical Pressure Test Bench (50~170ton, 5EA)



Leakage Detector(Helium)





## Cryogenic Insulation Tanks

| No. | Dimension   | Size      |
|-----|---|-----------|
| 1   | 1200 x 900 x 1100H<br>(1.188 m <sup>3</sup> / 1,188 kg) | Up to 20" |
| 2   | 1500 x 900 x 950H<br>(1.2825 m <sup>3</sup> / 1,283 kg) | Up to 16" |
| 3   | 900 x 600 x 800H<br>(0.432 m <sup>3</sup> / 432 kg)     | Up to 12" |
| 4   | 1400 x 800 x 450H<br>(0.504 m <sup>3</sup> / 504 kg)    | Up to 3"  |
| 5   | 850 x 450 x 400H<br>(0.153 m <sup>3</sup> / 153 kg)     | Up to 2"  |
| 6   | 480 x 380 x 500H<br>(0.0912 m <sup>3</sup> / 92 kg)     | Up to 3"  |



3D Coordinate Measuring machine



Digital Sharp Impact Tester



Universal Testing Machine



Hydraulic Bolting Torque Wrench



PMI



| No. | FACILITIES NAME  | SIZE         | Q'TY | REMARKS  | No. | FACILITIES NAME                                   | SIZE            | Q'TY  | REMARKS  |
|-----|--|--------------|------|----------|-----|---|-----------------|-------|----------|
| 1   | HYDRO TEST FACILITY,HORIZONTAL                           | 800 TON      | 1    | Korea    | 18  | HEIGHT GAGE                                       | 600 mm          | 1     | MITUTOYO |
| 2   | HYDROSTATIC TESTER                                       | 100 TON      | 1    | Korea    | 19  | DEPTH GAGE  | 300 mm          | 2     | MITUTOYO |
| 3   | HYDROSTATIC TESTER                                       | 50 TON       | 1    | Korea    | 20  | MICROMETER  | 300 mm          | 8     | MITUTOYO |
| 4   | NITROGEN TEST TANK(SUB-MERGED)                           |              | 2    | Korea    | 21  | PITCH GAGE  | 50~250 mm       | 1     |          |
| 5   | AIR TESTER   | 10 TON       | 1    |          | 22  | SURFACE ROUGHNESS GAGE                            |                 | 1     |          |
| 6   | UTM  | 30 TON       | 1    | SINKANG  | 23  | PRESSURE GAGE                                     |                 | 3     |          |
| 7   | HARDNESS TESTER  |              | 1    | ROCKWELL | 24  | FIRE SAFE TEST M/C                                |                 | 1 SET |          |
| 8   | BRINEL HARDNESS TESTER                                   | DAEKYUNG     | 1    | Korea    | 25  | MICROJET DIGITAL RECORDER                         | FUJI            | 1     | JAPAN    |
| 9   | WALL THICKNESS GAGE                                      |              | 2    | PEACOCK  | 26  | PORTABLE SURFACE ROUGHNESS TESTER (30TON)         | MITUTOYO        | 1     | JAPAN    |
| 10  | COATING THICKNESS GAGE                                   | DIAL         | 1    | JAPAN    | 27  | PMI   | OXFORD          | 2     | Germany  |
| 11  | HYDRAULIC BOLTING TORQUE WRENCH (FOR BIG SIZE UNTIL 46") | TORCUP       | 1    | USA      | 27  | UNIVERSAL TESTING MACHINE (UTM)                   | DAEKYUNG        | 1     | KOREA    |
| 12  | TORQUE WRENCH - DIAL                                     | 1800 Kgf/cm  | 2    | JAPAN    | 28  | X-RAY TUNE METAL ANALYZER                         | OXFORD          | 1     | U.K      |
| 13  | TORQUE WRENCH - DIAL                                     | 15000 Kgf/cm | 2    | USA      | 29  | DIGITAL CHARPY IMPACT TESTER                      | DAEKYUNG        | 1     | KOREA    |
| 14  | VERNIER CALIPERS   | 300 mm       | 10   | MITUTOYO | 30  | CRYOGENIC TEST FACILITY (WITH GAS BOOSTER SYSTEM) | KOREA HYDRAULIC | 1     | KOREA    |
| 15  | VERNIER CALIPERS   | 600 mm       | 2    | MITUTOYO | 31  | 3D COORDINATE MEASURING MACHINE.                  | HEXAGON         | 1     | USA      |
| 16  | VERNIER CALIPERS   | 1000 mm      | 1    | MITUTOYO | 32  | RT ROOM (NDE FACILITY)                            |                 | 1     |          |
| 17  | HEIGHT GAGE  | 600 mm       | 1    | MITUTOYO | 32  | RT ROOM (NDE FACILITY)                            |                 | 1     |          |

**Oil & Gas (Up & Mid)**



**Petrochem & Chem**



**Water & Desalination**



**Power Plant**



**Offshore & Shipbuilding**



| TYPE   | GENERAL CODE  | SUB CODE                                      | PRODUCTION RANGE   |
|--------|---|---|--|
| BALL   | API 6D, API 608, ISO 17292, <b>ASME B16.34</b>  | ASME  |  |
| COMMON | <b>BS 6364</b> for Cryogenic Service<br><b>API 6FA / API 607</b> for fire Safe Design | B16.5<br>B16.10<br>B16.15<br>B16.25<br>B16.47 | 150LB : 2" ~ 48"<br>300LB : 2" ~ 48"<br>600LB : 2" ~ 36"<br>900LB : 2" ~ 36"<br>1500LB : 2" ~ 20"<br>2500LB : 2" ~ 12" |
| REMARK | Dongsan Valve's Standard  |   |  |



Finite Element Analysis  
- ANSYS 17.2



3D by Inventor 2016 (4 copies)



Autodesk Mechanical 2016



Autodesk AutoCAD 2016



**PRESSURE TEST**

- API 598
- API 6D
- B16.34
- BS 6755
- MSS SP-61**
- ISO 5208
- EN 12266-1

**NDE**

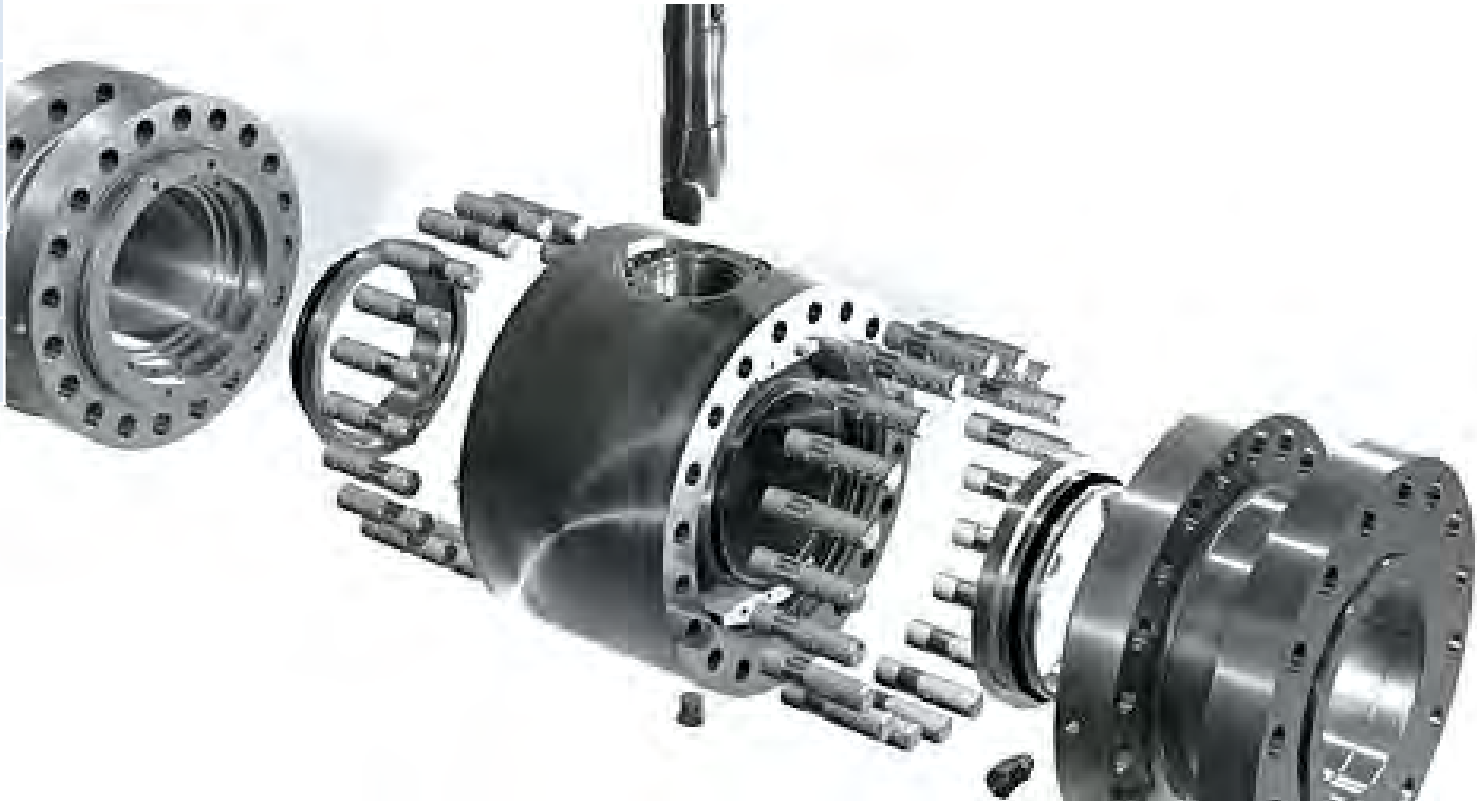
- ASME B16.34

**FIRE TEST**

- API 607
- API 6FA

**NACE**

- MR-0103
- MR-0175



| Carbon Steel    | Stainless Steel  | Super Stainless Steel | Alloy Steel             | Monel                   |
|-----------------|------------------|-----------------------|-------------------------|-------------------------|
| A216 WCB        | A351 CF8         | API 607               | A217 WC1                | A494 M35-1              |
| A216 WCC        | A351 CF3         | API 6FA               | A217 WC5                |                         |
| <b>A352 LCB</b> | A351 CF10        |                       | A217 WC6                | <b>High Alloy Monel</b> |
| A352 LCC        | A351 CG6MMN      | <b>Duplex</b>         | <b>A217 WC9</b>         | A494 N-12MV             |
| A352 LC3        | A351 CK20        | A890 CD6MN            | A217 C5                 | A494 CW-2M              |
|                 | <b>A351 CF8M</b> | A890 CE8MN            | A217 C12                | A494 CW-12MW            |
|                 | <b>A351 CF3M</b> | A995 CD4MCuN          | A217 C12A               |                         |
|                 | A351 CF3MN       | A995 CD3MN            |                         |                         |
|                 | A351 CF10M       | <b>Super Duplex</b>   | <b>High Alloy Steel</b> |                         |
|                 | A351 CG8M        | A890 CD3MCuN          | A494 CZ100              |                         |
|                 | A351 CG3M        | A890 CE3MN            | A494 CY40               |                         |
|                 | A351CF8C         | A890 CD3MWCuN         | A494 CW6MC              |                         |
|                 | A351 CN7M        |                       | A351 CT15C              |                         |
|                 |                  |                       | <b>A494 CU5MCuC</b>     |                         |

And Other Equivalent International Materials including Forged Material Codes

| Type                           | Size       |
|--------------------------------|------------|
| Side Entry Floating Ball Valve | 1/2" ~ 12" |
| Side Entry Trunnion Ball Valve | 2" ~ 48"   |
| Top Entry Ball Valve           | 2" ~ 40"   |
| Metal Seated Ball Valve        | 1/2" ~ 40" |
| Cryogenic Ball Valve           | 1/2" ~ 40" |
| 3-Way Ball Valve               | 2" ~ 24"   |





# MANUFACTURING SCOPE - CRYOGENIC BALL VALVE



# Cryogenic Service Ball Valves

## SIZE RANGE OF PRODUCT(CRYOGENIC SERVICE)

| Pressure Rating | Valve Size (NPS) |      |    |        |    |    |    |    |    |     |     |     |     |     |     |     |     |
|-----------------|------------------|------|----|--------|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
|                 | 1/2"             | 3/4" | 1" | 1 1/2" | 2" | 3" | 4" | 6" | 8" | 10" | 12" | 14" | 16" | 20" | 24" | 30" | 40" |
| ASME Class 150  |                  |      |    |        |    |    |    |    |    |     |     |     |     |     |     |     |     |
| ASME Class 300  |                  |      |    |        |    |    |    |    |    |     |     |     |     |     |     |     |     |
| ASME Class 600  |                  |      |    |        |    |    |    |    |    |     |     |     |     |     |     |     |     |
| ASME Class 900  |                  |      |    |        |    |    |    |    |    |     |     |     |     |     |     |     |     |
| ASME Class 1500 |                  |      |    |        |    |    |    |    |    |     |     |     |     |     |     |     |     |
| ASME Class 2500 |                  |      |    |        |    |    |    |    |    |     |     |     |     |     |     |     |     |

- : Socket Welding/ Threaded end/ Side Entry
- : Flanged/ Welding end/ Top Entry/ Side Entry

## AVAILABLE PRODUCT

|                |  |
|----------------|--|
| TYPE           | Floating type, Trunnion mounted type, Uni-body type, Split-body type |
| PRODUCT        | Cryogenic Service Line<br>Manual valve, MOV/ ROV valve               |
| END CONNECTION | Flanged, Threaded, Welding End                                       |

## AVAILABLE MATERIAL

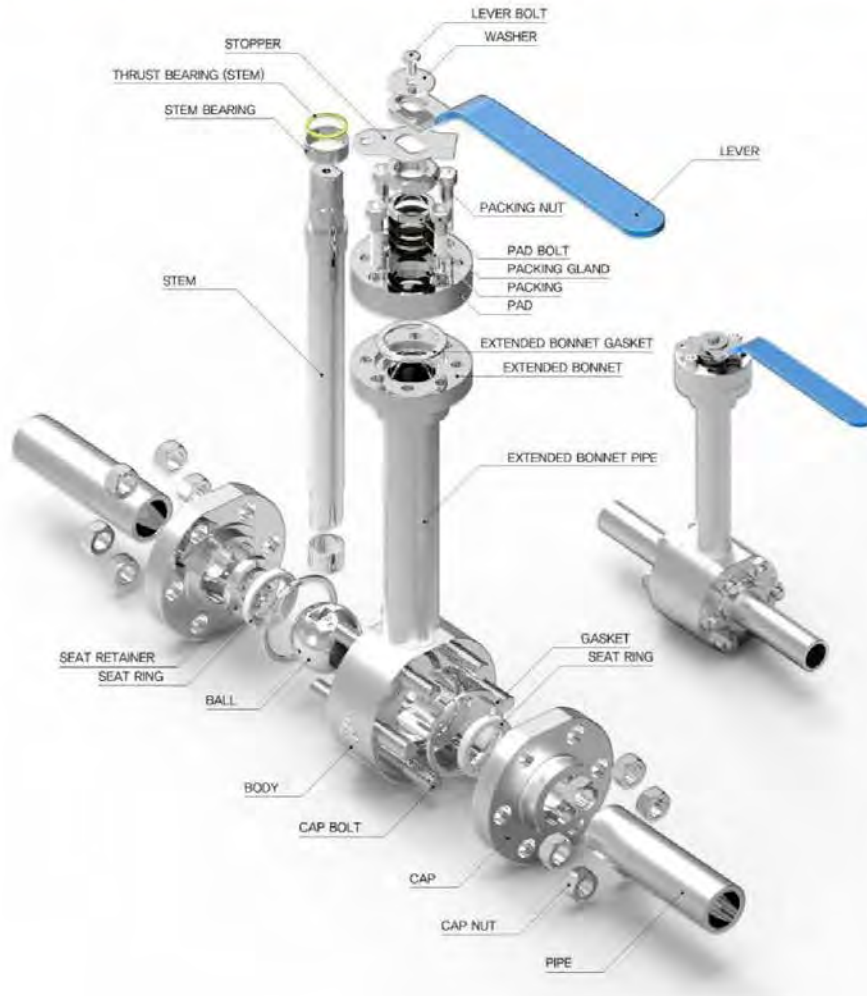
|          |   |
|----------|---|
| FORGINGS | CF8/ CF8M/ CF3/ CF3M -Casting<br>F316/F16L/ F304/F304L -Forging |
| OTHERS   | Available upon customer's requirements.                         |

## PRODUCTION CAPACITY

100 EA/ Monthly (NPS 6 inch)

## Cryogenic Service Ball Valves

## Floating Type, Side Entry



### Specification

#### Construction :

Split body (3-piece), Side entry, bolted, full / reduced port, Free floating ball, "Fire-safe" designed to API 607/ISO 10497 Anti-blow out proof stem, cavity relieving seated.

Designed to API 6D, BS 6364, ASME B16.34, API 608 and ISO 17292/ BS 5351 specification.

#### Note :

Manufactured and conforms to NACE standard MR 0175

#### Dimensions :

|                          |                           |
|--------------------------|---------------------------|
| face-to-face/ End-to-end | Manufacturer standard     |
| End Connections          | ASME B16.11/ ASME B1.20.1 |
| Min. diameter of port    | API 6D                    |
| Min. wall thickness      | ASME B16.34               |

| Type        | End Connection             | PORT    | CLASS       | SIZE         |
|-------------|----------------------------|---------|-------------|--------------|
| Forged Body | ASME B 1.20.1 (Screwed)    | Reduced | #150/ #2500 | 1/2" ~2"     |
|             |                            | Full    | #150/ #2500 | 1/2" ~1 1/2" |
|             | ASME B 16.11 (Socket Weld) | Reduced | #150/ #2500 | 1/2" ~2"     |
|             |                            | Full    | #150/ #2500 | 1/2" ~1 1/2" |
| End to End  | Dongsan Valve Standard     |         |             |              |
| Test        | API 598/ API 6D/ BS 6364   |         |             |              |

## Cryogenic Service Ball Valves

## Trunnion Type, Top Entry

### Specification

#### Construction :

Uni body (1-piece), Top Entry, bolted, full / reduced port, Trunnion mounted ball, Double seal design, Double block & bleed, "Fire-safe" designed to **API 607/ISO 10497**, Anti-blow out proof stem, cavity relieving seated.

Designed to **API 6D, BS 6364, ASME B16.34** and **ISO 17292 /BS 5351** specification.

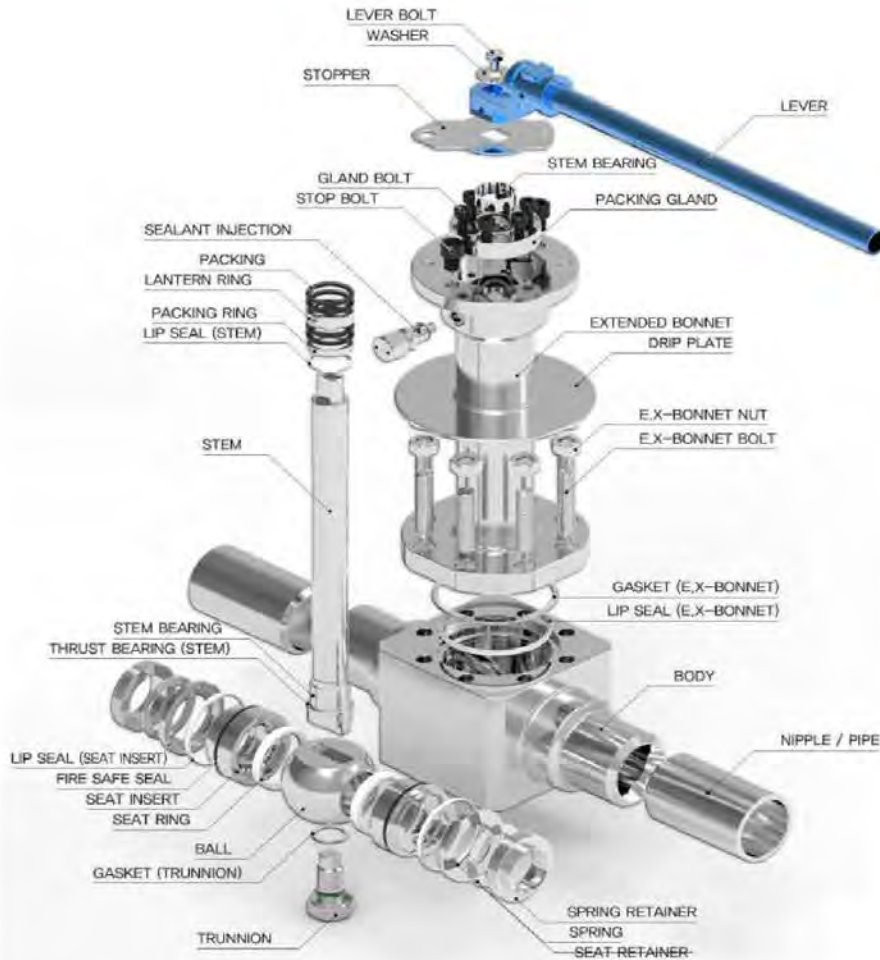
#### Note :

Manufactured and conforms to **NACE** standard **MR 0175**

#### Dimensions :

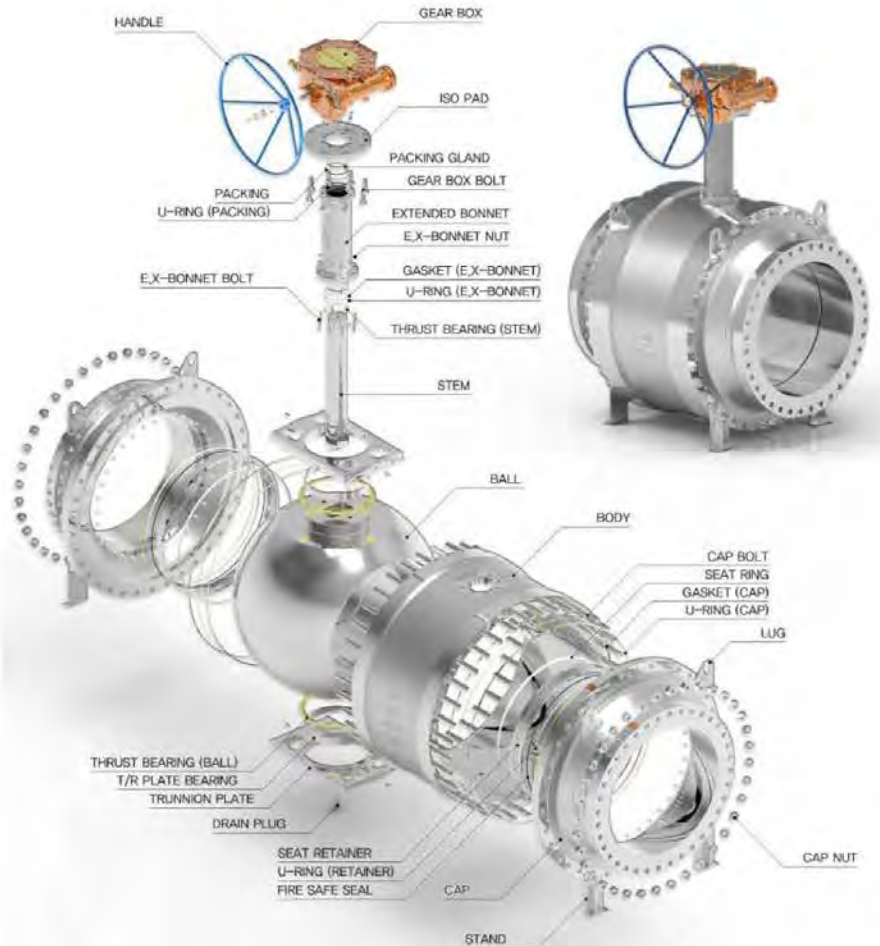
|                          |                                |
|--------------------------|--------------------------------|
| face-to-face/ End-to-end | <b>API 6D/ ASME B16.10</b>     |
| End Connections          | <b>ASME B16.5/ ASME B16.47</b> |
| Min. diameter of port    | <b>API 6D</b>                  |
| Min. wall thickness      | <b>ASME B16.34</b>             |

| Type                     | End Connection                                      | PORT    | CLASS       | SIZE     |
|--------------------------|---|---------|-------------|----------|
| Forged Body (3" & below) | ASME B 1.20.1 (Screwed)<br>ASME B 16.25 (Butt-Weld) | Reduced | #150/ #2500 | 2" ~ 40" |
| Cast Body (4" & above)   | ASME B 16.5 (Flanged)                               | Full    | #150/ #2500 | 2" ~ 40" |
| End to End               | API 6D/ ASME B16.10                                 |         |             |          |
| Test                     | API 598/ API 6D/ BS 6364                            |         |             |          |



## Cryogenic Service Ball Valves

## Trunnion Type, Side Entry



### Specification

#### Construction :

Split body(2/3-piece), Side Entry, bolted, full/ reduced port, Trunnion mounted ball, Double seal design, Double block & bleed, "Fire-safe" designed to **API 607/ ISO 10497**, Anti-blow out proof stem, cavity relieving seated.

Designed to **API 6D, BS 6364, ASME B16.34** and **ISO 17292 /BS 5351** specification.

#### Note :

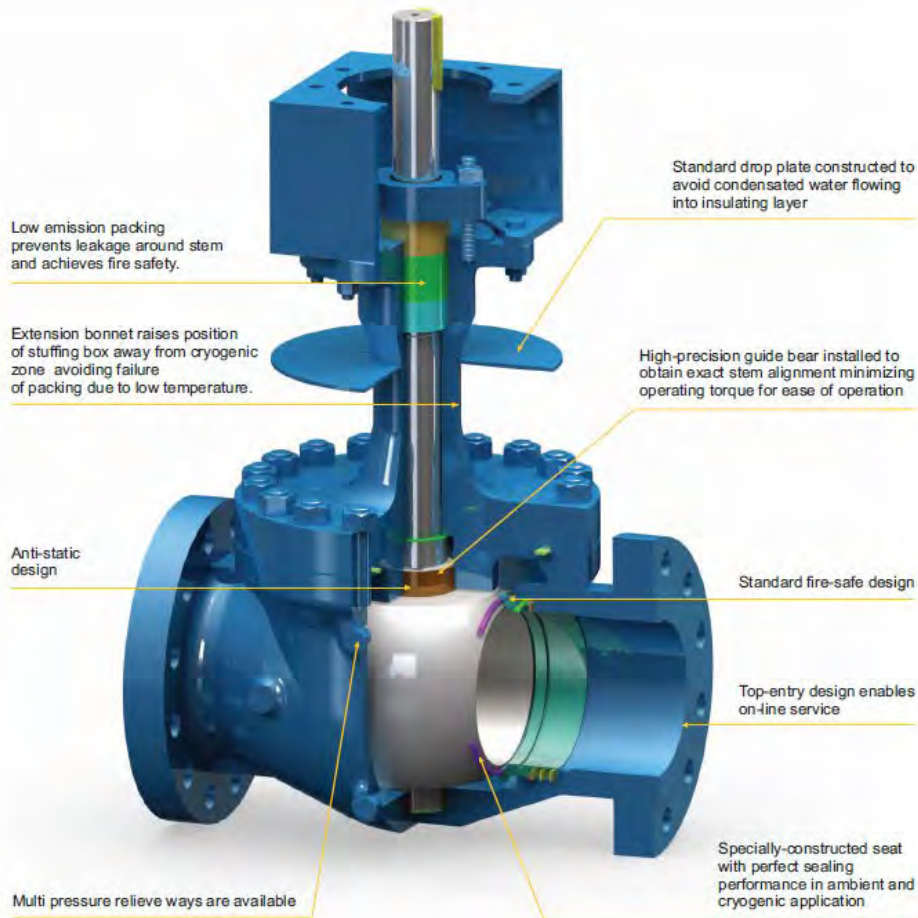
Manufactured and conforms to **NACE standard MR 0175**

#### Dimensions :

|                          |                                |
|--------------------------|--------------------------------|
| face-to-face/ End-to-end | <b>API 6D/ ASME B16.10</b>     |
| End Connections          | <b>ASME B16.5/ ASME B16.47</b> |
| Min. diameter of port    | <b>API 6D</b>                  |
| Min. wall thickness      | <b>ASME B16.34</b>             |

| Type                     | End Connection                     | PORT    | CLASS       | SIZE     |
|--------------------------|------------------------------------|---------|-------------|----------|
| Forged Body (2" & above) | ASME B 16.25 (Butt-Weld)           | Reduced | #150/ #2500 | 2" ~ 40" |
| Cast Body (2" & above)   | ASME B 16.5 ASME B 16.47 (Flanged) | Full    | #150/ #2500 | 2" ~ 40" |
| Face to Face             | API 6D/ ASME B16.10                |         |             |          |
| Test                     | API 598/ API 6D/ BS 6364           |         |             |          |

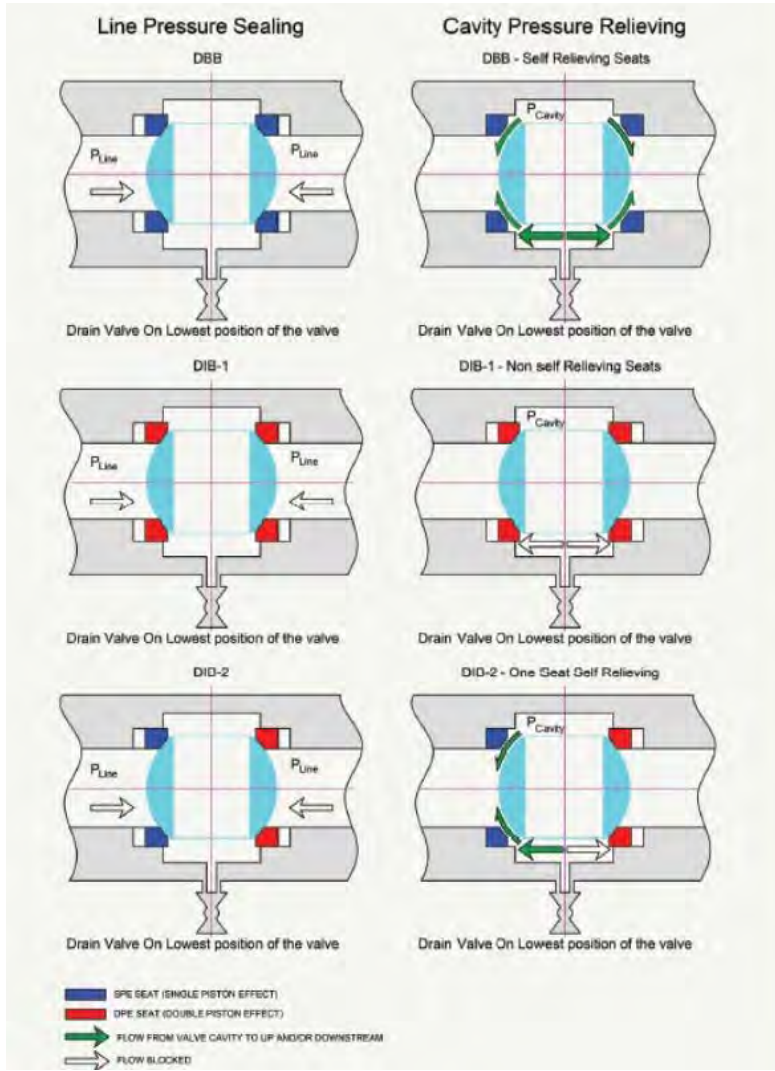




## DESIGN FEATURES AND BENEFITS

- Various Body Design: Three Pieces, Two Pieces, One Piece
- Blowout Proof, Low Torque Guided Stem Design
- Low Emission Packing for Fugitive Emission ISO 15848 and API641
- Fire Safe Design API 607
- One Piece Extended Stem
- 100% tested at  $-196^{\circ}\text{C}$  ( $-320^{\circ}\text{F}$ ) As per BS6364, KOGAS
- Energized Lip Seal
- Drop Plate
- Cavity Pressure self Relief : DBB, DIB-I, DIB-II Configuration

## Details of DBB, DIB-I, DIB-II Configuration



|                     | DBB<br>(Double Block and Bleed)           | DIB-I<br>(Double Isolation and Bleed type1) | DIB-II<br>(Double Isolation and Bleed type2) |
|---------------------|---|---|--|
| <b>Upstream</b>     | SPE                                       | DPE   | SPE  |
| <b>Downstream</b>   | SPE                                       | DPE   | DPE  |
| <b>Relief</b>       | To Both from Ball                         | Relief Valve                                | To SPE from Ball                             |
| <b>Directional</b>  | Bi-Directional                            | Bi-Directional                              | Uni-Directional                              |
| <b>Applications</b> | Common, 85%                               | Full Welded Body                            | Not allow leakage to downstream              |
| <b>Remarks</b>      | When First seal leaks, Second Seal Leaks. | Seat maintenance not required               | Pig Launchers, Receivers                     |

## 1) Before cryogenic test ( Ambient Temperature Test )

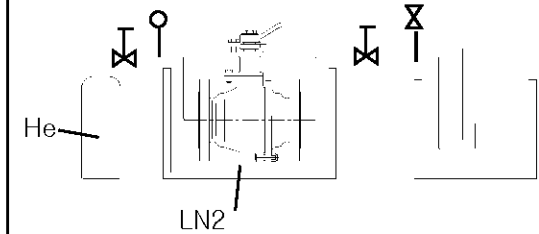
- 1) Hydrostatic test : Shell test
- 2) Air or gas seat leak test
- 3) The component part (seating, ball, stem,,) of ball valve shall be thoroughly cleaned

## 2) Cryogenic leak test

- 1) Temperature : The cryogenic test temperature shall be  $-196^{\circ}\text{C}$
- 2) Medium : Helium
- 3) Pressure : 6.9 bar g  
In case of BS 6364 standard,  
Raise the pressure in increments, as given in the tabulated data below  
Nominal pressure PN : 20, 50, 64, 100  
Increment : 3.5, 7.5, 10, 20
- 4) Soak the valve at the temperature for at least 1hr until all temperatures have stabilized.
- 5) Before and after cryogenic test, valves shall be operated 5times at ambient temperature.  
In case of BS 6364 standard,  
Open the valve and close it 20 times.  
Measure the open and close forces for at least the first and last operation.
- 6) After cryogenic leak test, maintain valve open at 12bar g helium and at  $-196^{\circ}\text{C}$ .  
Check packing and body/bonnet tightness during 10minutes. (No leak)

## 3) Cryogenic leak test later (Ambient Temperature Test)

- 1) Ambient temperature condition :  
Carry out Helium leak test



**1. Soak** the valve at the Temperature( $-196^{\circ}\text{C}$ ) for at least 1hr

### 2. Torque test :

Open the valve and close it 20 times.

First open/close torque: Nm  
Last open/close torque : Nm

**3. Seat test** : Raise the pressure in increments

**4. Shell test** :

## Certificate

| No | Contents               |
|----|------------------------|
| 1  | ISO9001                |
| 2  | API 6D                 |
| 3  | ISO 14001              |
| 4  | ISO 45001              |
| 5  | CE-PED                 |
| 6  | SIL 3 CERT             |
| 6  | TYPE APPROVAL BY DNV   |
| 7  | FIRE SAFE CERT         |
| 8  | TAT CERT (SHELL, MESC) |
| 9  | TRCU FOR RUSSIA        |
| 10 | ISO 15848, API 641     |
| 11 | APPROVAL LETTERS       |



# ABS Quality Evaluations

## Certificate Of Conformance

This is to certify that the Quality Management System of:

**Dong San Valve Co., Ltd.**  
 167-2, Gomo-ro 324beonan-gil, Jillye-myeon, Gimhae-si  
 Gyeongsangnam-do  
 Korea

has been assessed by ABS Quality Evaluations, Inc. and found to be in conformance with the requirements set forth by:

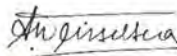
**ISO 9001:2015**

The Quality Management System is applicable to:

**DESIGN AND MANUFACTURE OF VALVES**

This certificate may be found on the ABS QE Website ([www.abs-qe.com](http://www.abs-qe.com)). For certificates issued in the People's Republic of China information may also be verified on the CNCA website ([www.cnca.gov.cn](http://www.cnca.gov.cn)).

|                     |                 |
|---------------------|-----------------|
| Certificate No:     | 32789           |
| Certification Date: | 09 October 2006 |
| Effective Date:     | 19 July 2018    |
| Expiration Date:    | 16 July 2021    |
| Issue Date:         | 19 July 2018    |



Alex Weissberg, President



Validity of this certificate is based on the successful completion of the periodic surveillance audits of the management system defined by the above scope and is contingent upon prompt/written notification to ABS Quality Evaluations, Inc. of significant changes to the management system or components thereof.

ABS Quality Evaluations, Inc. 16855 Northchase Drive, Houston, TX 77060, U.S.A.  
 Validity of this certificate may be confirmed at [www.abs-qe.com/cert\\_validation](http://www.abs-qe.com/cert_validation).

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**American  
Petroleum  
Institute**



2018 111 | 01/18

**Certificate of Authority to use the Official API Monogram**  
**License Number: 6D-0299** **ORIGINAL**

---

The American Petroleum Institute hereby grants to

**DONGSAN VALVE CO., LTD.**  
 #167-2 Gomo-ro, 324 Beonan-gil  
 Jillye-Myun  
 Gimhae, GyungSang Nam-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-0299**

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: JULY 13, 2020**  
**Expiration Date: NOVEMBER 23, 2022**

To verify the authenticity of this license, go to [www.api.org/compositelist](http://www.api.org/compositelist).



Vice President of Global Industry Services



Bureau Veritas Services SAS is a



Notified Body under the number 0062



## ATTESTATION D'APPROBATION DE SYSTÈME DE QUALITÉ CERTIFICATE OF QUALITY SYSTEM APPROVAL

N° CE-0062-PED-H-KCL 001-20-KOR

Bureau Veritas Services SAS, agissant dans le cadre de sa notification (numéro d'organisme notifié 0062), atteste que le système de qualité appliqué par le fabricant pour la conception, la fabrication, l'inspection des produits finis et les essais des équipements sous pression identifiés ci-après, a été examiné selon les prescriptions du module H de l'annexe III de la directive "Équipements sous pression" N° 2014/68/UE et est conforme aux dispositions correspondantes de la directive.

Bureau Veritas Services SAS, acting within the scope of its notification (notified body number 0062), attests that the quality system operated by the manufacturer for design, manufacture, final product inspection and testing of the pressure equipment identified hereunder has been examined against the provisions of annex III, module H, of the Pressure Equipment Directive n° 2014/68/EU, and found to satisfy the provisions of the directive which apply to it.

|  |   |
|--|---|
| Fabricant (Nom) / Manufacturer (Name):   | Dongsan Valve Co., Ltd  |
| Adresse / Address:   | 167-2, Gomo-ro 324beon-gil, Daman-ri, Gimhae-si<br>50875, Gyeongsangnam-do, Korea |
| Marque commerciale / Trading Name - Mark:  | FORCE   |
| Description des équipements / Equipment description:   | Casting and forged ball valve   |
| Identification des équipements concernés (ou liste au verso ou en annexe le cas échéant) / Identification of equipment concerned (or list on the back or attached, where necessary): | See list of the concerned equipment   |

Cette attestation est valable jusqu'au (jj/mm/aaaa) : 02/06/2023  
This certificate will expire on (dd/mm/yyyy):

Le maintien de l'approbation est soumis à la réalisation par l'entité Bureau Veritas locale ayant signé le contrat avec le fabricant des audits, visites, essais et vérifications conformément aux termes de ce contrat.  
The approval is conditional upon the surveillance audits, visits, tests and verifications to be carried out by the local Bureau Veritas entity that entered into a contract with the manufacturer, pursuant to the provisions of such contract.

Cette attestation est présumée nulle et le fabricant supportera seul les conséquences de son utilisation, si les assurances - données par le fabricant lors de la demande d'intervention - en matière (a) d'application de son système qualité approuvé et (b) d'inspection et d'essais des produits finis se révèlent inexactes et, de manière générale, si le fabricant ne respecte pas l'une ou l'autre des obligations mises à sa charge par la directive n° 2014/68/UE du 15 mai 2014 telle que transposée dans les (s) droit(s) national(aux) applicable(s).

This certificate shall be deemed null and void and the manufacturer shall bear sole responsibility for its use, where the manufacturer does not comply with the conditions set out in the equipment's approval or the equipment is not used in accordance with the approved conditions. The manufacturer will be responsible for any consequences arising from the application of this certificate in the applicable law(s).

| Établi à / Made at | Le (jj/mm/aaaa) / On (dd/mm/yyyy) | Approuvé et Enregistré en / Approved and Registered in | Signé par / Signed by | Signature autorisée par Organisme Notifié 0062 / Signature Authorized by Notified Body No 0062 |
|--------------------|-----------------------------------|--|-----------------------|--|
| Seoul              | 03/06/2020                        | France   | KWANGHO<br>KIM        |              |

Code d'enregistrement / Registration Code: 2020001077CE-0062-PED

Le présent document est soumis aux Conditions Générales de Service jointes à la demande d'intervention signée par le demandeur.

The present document is subject to the General Conditions of Service attached to the signed intervention request by the applicant.

This present document may not be reproduced or used in any way without the prior written consent of Bureau Veritas local entity and the manufacturer.



CERTIFICATE NO FS/71/220/22/ 0865

PAGE 1/1  
(Seite 1/1)

CERTIFIKAT NR.:

LICENCE HOLDER  
GEMISUNG/SINHABER

Dong San Valve Co., Ltd.  
167-2, Gomo-ro 324beon-gil, Jillye-myeon, Gimhae-si, Gyeongsangnam-do, Korea

MANUFACTURING PLANT  
FERTIGUNGSGÄTTE

Dong San Valve Co., Ltd.  
167-2, Gomo-ro 324beon-gil, Jillye-myeon, Gimhae-si, Gyeongsangnam-do, Korea

PROJECT NO./ID  
PROJEKT-NR./ID

S1LF

LICENSED TEST MARK  
GEMISUNGES PRÜFZEICHEN



CERT. REPORT NO.  
ZERTIFIKATSBERICHT NR.

S1LF0001

Tested according to  
geprüft nach

IEC 61508:2010 Ed.2

Certified product(s)  
Zertifizierte Produkt(e)

FORCE® Floating Ball / Trunnion Ball Valves

Model(s)  
Modell(e)

Valve Size 1/2" to 42", ASME CL150 to CL2500

Technical Data and Parameter  
Technische Daten und Parameter

The products fulfil systematic capability requirements of functional safety acc. to IEC 61508 up to SIL 3, SC 3.

Specific Requirements  
Spezifische Anforderungen

This certificate confirms the achievement of the requirements of functional safety based on the following proofs:

- Proof of systematic safety integrity for defined phases of the life cycle
  - Proof of the required safety-related parameters (failure rate, PFD and SFF by means of FMEDA)
- Proofs that processes and methods are established at the manufacturer guaranteeing that unexceptional processes in terms of risk analysis, design, production, validation, change management and quality management comply with the safety-related standard (see S1LF0001)

Certification Body  
for Functional Safety  
SGS-TÜV Saar GmbH  
Zertifizierungsstelle für Funktionale Sicherheit

Munich, 2022-04-13



Robert Sammer

The test mark regulation is an integral part of this certificate.  
Das Prüf- und Zertifizierungszeichen ist integraler Bestandteil des Zertifikats.

SGS-TÜV Saar GmbH, Holmenstraße 50, 81379 München

Website: www.sgs-tuv-saar.com E-mail: fs@sgs.com



## Type Approval

•

## DNV GL Cryogenic Ball Valve



Certificate No:  
**TAP00000VZ**

### TYPE APPROVAL CERTIFICATE

---

**This is to certify:**  
**That the Ball Valve**

with type designation(s)  
**Cryogenic Ball Valve**

Issued to  
**Dongsan Valve Co., Ltd.**  
**Gimhae-si Gyeongsangnam-do, Republic of Korea**

is found to comply with  
**DNV GL rules for classification – Ships Pt.5 Ch.7 Liquefied gas tankers**  
**DNV GL class programme DNVGL-CP-0186 – Type approval – Valves**

**Application :**  
**Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**

**Temperature range:** -196°C to +65°C  
**Max. working press.:** Class 150  
**Sizes:** 3", 6" and 8"

Issued at **Høvik** on **2017-09-25**

This Certificate is valid until **2022-09-24**.  
DNV GL local station: **Busan**

Approval Engineer: **Adel Samiei**



for **DNV GL**  
Digitally Signed By: **Marianne Spæren Marveng**  
Location: **DNV GL, Høvik, Norway**

**Marianne Spæren Marveng**  
**Head of Section**

This Certificate is subject to terms and conditions overlaid. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.




Form code: TA 251

Revision: 2016-12

www.dnvgl.com

Page 1 of 3

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Certificate No: **TAP00000VZ**

Id: **262.1-024463-1**  
Certificate No: **TAP00000VZ**

| Stem |  |
|------|--|
| H    | A276/479 304, 304H, 316, 316H<br>A276/479 304L, 316L |

board DNV GL classed ships and

remote control of the valves.

dated 2015-06-05  
dated 2016-11-01  
T1-A15-F-150-RF-CFBM-GO-CRY &  
v.0  
issued by DNV GL surveyor  
150 & NPS2,4,8 class 600)

sizes greater than 4" (DN>100) and  
all be delivered with work certificate  
in an approved manufacturer by the

temperature below -55 °C shall be  
manufacturer's certificate is required.

conformance with DNV GL Ship Pt.4 Ch.6.  
manufactured in a foundry approved by

0 mm and design pressure ≥ 16 bar,  
curve. For other valves manufacturer's

5 times the design pressure  
the design pressure for valves.  
conform with EN 12266-1.

verification for a minimum of 10% of  
at a working temperature below -55°C.

www.dnvgl.com

Page 2 of 3



Certificate No: **TAP00000VZ**

Id: **262.1-024463-1**  
Certificate No: **TAP00000VZ**

product certificate, shall be

issued with:

periodical assessment every  
at the conditions for the TA are not

www.dnvgl.com

Page 3 of 3





Page: 1 of 1

| Report No. | Project No. | Date          | Office |
|------------|-------------|---------------|--------|
| 3914725-01 | 3914725     | APR. 29, 2017 | Busan  |

### Certificates of Witness of Fire Test

**Activity No. :** 3914725-01  
**Customer:** DongSan Valve Co., Ltd.  
**Applicable Model/Type:** Side & Top Entry Floating and Trunnion Type Ball Valve  
**Description of Test:** Witness of Fire Test

**THIS IS TO CERTIFY THAT** the undersigned representative of ABSG Consulting Inc., Korea, did at the request of **DongSan Valve Co., Ltd.**, attend at their plant located at 167-2, Gomo-ro, 324 Beonan-gil, Jillye-Myun, Gimhae-Si, Gyeongnam, Korea in order to witness of fire testing of valves in accordance with the requirement of API 607/ API 6FA as Independent Third Party

- Description of Equipment: Side Entry/Floating, Full Bore Austenitic Steel Ball Valve
- Code or Specification: API Standard 607 7<sup>th</sup> Edition & API 6FA 3<sup>rd</sup> Edition "Testing of Valves"
- Type of tested Valves: Floating 150 # B" Cast Austenitic Steel, RTFE Ball Valve
- Type of qualified Valves: Cast Carbon, Austenitic & Duplex of Side & Top Entry Floating and Trunnion Ball Valve Class 150, 300, 600, 900, 1500 & 2500 / NPS 8 and Larger
- Applicable Ranges of Model applied: Marine, Offshore, Oil field and Industrial application of valves requiring Fire Test
- Test Date witnessed: April 29, 2017

The following tests were assessed and found to be in compliance with the above the applicable standard.

- Witness of Fire Test in accordance with the Test Control Procedure ( WI-42 Rev 1)
- Witness of Pressure test

- The valid durations of certificate: three (3) years from witnessed date of fire test



J.C. Ahn / Authorized Inspector Supervisor ABS Consulting, Korea

16 TOWER 4F, 942-4, DAECHE-DONG, GANGAM-GU, SEOUL, 130-845 KOREA Tel: (82-2)352-4661 Fax: (82-2)352-4720  
 WEB SITE: <http://www.absconsulting.com>

SAFETY • QUALITY • ENVIRONMENT

## CERTIFICATE OF FIRE SAFETY TEST



(Attestation)

TÜV SÜD Korea Ltd. 29F, Two IFC, 10 Gukjegeumyung-ro, Yeongdeungpo-gu, Seoul, 07326, Korea

Choose certainty. Add value.

**Certificate No. :** TSK-IS-7495786-005  
**Manufacturer Name / Address:** DONGSAN VALVE CO., LTD. / 167-2, Gomo-ro 324 Beonan-gil, Jillye-Myeon, Gimhae-si, Gyeongnam, KOREA  
**Date of Test :** 15-Mar-2021 (1day)  
**Kind of Test :** Witness of Fire Safety Test

| Test Valve: 2"-1500# 1pcs, TRUNNION, FB, RTJ, SIDE ENTRY BALL VAVLE |  |
|---|--|
| Type of Test Valve  |  |
| Description of Test Valve   | TRUNNION, FB, RTJ, SIDE ENTRY BALL VALVE |
| Valve Size (Bore), NPS  | 2 Inch                                   |
| Pressure Rating (ANSI Class)  | Class 1500                               |
| Material (Body/Seat)  | FERRITIC (ASTM A105N) / PEEK             |
| Body Joint / Stem Seal  | Graphite / Graphite                      |

**Test Standard :** API 607 Seventh Edition, June 2016

**Applicable drawing :** DTS-F51-HBKRG-0-0 Rev.0

**Qualified Range of Valves :**

|                            |                              |
|----------------------------|------------------------------|
| Qualified Sizes            | 2" and below, 2-1/2", 3", 4" |
| Qualified Pressure Ratings | 1500, 2500                   |

### Conclusion

The undersigned, Inspector to TÜV SÜD, certifies that the above type meets the applicable requirements.  
 The details of the test condition and data are as per manufacturer's Test Report No. DSV-F-210315-01 which were verified and endorsed by TÜV SÜD Korea.

Note: "In accordance with Client's instructions, the Company's involvement has been limited to witnessing/observing a third party's intervention(s) at the third party's laboratory/test house or other facilities and installations used for the intervention(s). The Company's sole responsibility was to be present at the time of the third party's intervention(s) to forward the results, or confirm the occurrence of the intervention(s). The Company is not responsible for the condition or calibration of apparatus, instruments and measuring devices used, the analysis methods applied the qualifications, actions or omissions of the third party's personnel or the analysis results.

Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law."

Business registration number in Korea: 116-81-66264 (Head Office)

04016-10000000000000000000

Seoul Office  
 Tel: +82 (0)2 3215-1100  
 Fax: +82 (0)2 3215-1110  
[www.tuv-sud.kr](http://www.tuv-sud.kr)

TÜV SÜD

TÜV SÜD Korea Ltd.  
 HQ of Region Korea  
 29F, Two IFC, 10 Gukjegeumyung-ro,  
 Yeongdeungpo-gu, Seoul, 07326,  
 Korea



Page: 1 of 1

| Report No. | Project No. | Date          | Office |
|------------|-------------|---------------|--------|
| 4114967-01 | 4114967     | June 22, 2018 | Seoul  |

**Certificates of Witness of Type Acceptance Test(TAT)**  
**Activity No.:** 4114967-01  
**Customer/Manufacturer:** DongSan Valve Co., Ltd.  
**Applicable Model/Type:** Floating / Side Entry Type Ball Valve

**THIS IS TO CERTIFY THAT** the undersigned representative of ABSG Consulting Inc., Korea, did at the request of DongSan Valve Co., Ltd., attend at their plant located at 167-2, Gomo-ro, 324 Beoran-gil, Jillye-Myun, Gimhae-Si, Gyeongnam, Korea in order to witness of Type Acceptance Test(TAT) of valves in accordance with the requirement of MESG SPE 77/300 as an Independent Third Party

- Description of Equipment:** Floating / Side Entry 600# 1" Ball Valve
- Code or Specification:** MESG SPE 77/300 Feb. 2016
- Type of tested Valve(s):** Floating / Side Entry 600# 1" Full Bore Flanged End / RF Split Body(3 pieces) Lever operated  
 - Body : A182 Gr. F316  
 - Ball : A182 Gr. F316  
 - Stem : A182 Gr. F51  
 - Sealing : Metal (ASTM A276 Gr. 316 + T.C.C)
- Drawing No. Model Designation:** BFM-F60-EDMRL-0-0-BK / FL FB 600# - 1
- Design Standard:** ISO 14313 / API 6D
- Test Temperature :** -29°C ~ +200°C
- FE Tightness class:** B
- Test Report number:** TAT-6001-S-M-01
- Type of qualified Valve(s):** Floating /Side Entry Full Bore Flanged End / RF Split Body(3 pieces) Lever operated  
 - Size : NPS 1/2, 3/4, 1, 1-1/2 and 2  
 - Class : #150, 300, 600 and #800
- Applicable Ranges** Marine, Offshore, Oil field and industrial application of valves
- Test Date witnessed** 12 & 13 Jun. 2018

The tests were assessed and found to be in compliance with the above the applicable standard.



J.C. Ahn / Authorized Inspector Supervisor ABS Consulting, Korea

6Floor, 434 Seomseong-ro, Gyeongnam-Gu, Seoul, 06178, Korea  
 WEB SITE: <http://www.absconsulting.com>

Tel: (82-2)552-4661 Fax: (82-2)552-4760

SAFETY • QUALITY • ENVIRONMENT



Page: 1 of 1

| Report No. | Project No. | Date          | Office |
|------------|-------------|---------------|--------|
| 4114967-02 | 4114967     | June 22, 2018 | Seoul  |

**Certificates of Witness of Type Acceptance Test(TAT)**  
**Activity No.:** 4114967-02  
**Customer/Manufacturer:** DongSan Valve Co., Ltd.  
**Applicable Model/Type:** Floating / Side Entry Type Ball Valve

**THIS IS TO CERTIFY THAT** the undersigned representative of ABSG Consulting Inc., Korea, did at the request of DongSan Valve Co., Ltd., attend at their plant located at 167-2, Gomo-ro, 324 Beoran-gil, Jillye-Myun, Gimhae-Si, Gyeongnam, Korea in order to witness of Type Acceptance Test(TAT) of valves in accordance with the requirement of MESG SPE 77/300 as an Independent Third Party

- Description of Equipment:** Floating / Side Entry 1500# 1" Ball Valve
- Code or Specification:** MESG SPE 77/300 Feb. 2016
- Type of tested Valve(s):** Floating / Side Entry 1500# 1" Full Bore Flanged End / RF Split Body(3 pieces) Lever operated  
 - Body : A182 Gr. F316  
 - Ball : A182 Gr. F316  
 - Stem : A182 Gr. F51  
 - Sealing : Metal (ASTM A276 Gr. 316 + T.C.C)
- Drawing No. Model Designation:** BFM-F51-EDMRL-0-0-BK / FL FB 1500# - 1"
- Design Standard:** ISO 14313 / API 6D
- Test Temperature :** -29°C ~ +200°C
- FE Tightness class:** B
- Test Report number:** TAT-6101-S-M-01
- Type of qualified Valve(s):** Floating / Side Entry Full Bore Flanged End / RF Split Body(3 pieces) Lever operated  
 - Size : NPS 1/2, 3/4, 1, 1-1/2 and 2  
 - Class : #900 and 1500
- Applicable Ranges** Marine, Offshore, Oil field and industrial application of valves
- Test Date witnessed** 13 & 14 Jun. 2018

The tests were assessed and found to be in compliance with the above the applicable standard.



J.C. Ahn / Authorized Inspector Supervisor ABS Consulting, Korea

6Floor, 434 Seomseong-ro, Gyeongnam-Gu, Seoul, 06178, Korea  
 WEB SITE: <http://www.absconsulting.com>

Tel: (82-2)552-4661 Fax: (82-2)552-4760

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## - CERTIFICATE

### TRCU

- **Application:**
- Ball Valves
- Gate Valves
- Globe Valves
- Check Valves

**ЕВРАЗИЙСКИЙ ЭКОНОМИЧЕСКИЙ СОЮЗ**

**СЕРТИФИКАТ СООТВЕТСТВИЯ**

**EAES**

№ EAЭС RU C-KPA.Ж38.B.00248/20  
Серия **RU** № **0214230**

**ОРГАН ПО СЕРТИФИКАЦИИ** Общество с ограниченной ответственностью «Международный центр испытаний и сертификации "ЕвроСерг"», Место нахождения: 121351, Российская Федерация, город Москва, ул. Молодого/Армейская, д. 31, корпус 1, помещенные IX, комната 1. Адрес места осуществления деятельности: 121359, РОССИЯ, город Москва, ул. Маршала Тимохина, д. 4, помещенные 1, комната 1; помещенные 2, комната 2.3. Телефон: +74952390138. Адрес электронной почты: info@euro-cert.ru. Регистрационный номер аттестата аккредитации: RA.RU.11AJ38; дата регистрации аттестата: 19.05.2017 года.

**ЗАЯВИТЕЛЬ** Общество с ограниченной ответственностью «АЗИЯ-ВОСТОК». Основной государственный регистрационный номер: 1161690116928. Место нахождения (адрес юридического лица) и адрес места осуществления деятельности: 420049, Россия, Республика Татарстан, город Казань, ул.но Г.завая 2-я, дом 1, офис 6. Телефон: +7 (843) 210-24-26, адрес электронной почты: mail@azia-vostok.ru

**ИЗГОТОВИТЕЛЬ** Dongan Valve Co., Ltd. Место нахождения (адрес юридического лица) и адрес места осуществления деятельности по изготовлению продукции: КОРЕЯ РЕСПУБЛИКА, 167-2, Gupo-ro 324Beosa-dil, Ilshu-yeon, Gimhae-si, Gyeongsangnam-do

**ПРОДУКЦИЯ** Арматура промышленных трубопроводов с торговым знаком FORCE: задвижки; клапаны обратные; краны шаровые; клапаны (вентили); согласно приложению (бланк № 0693013). Продукция изготовлена в соответствии со стандартами согласно приложению (0693013). Серийный выпуск

**КОД ТН ВЭД EAЭС** Согласно приложению (бланк № 0693013)



**СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ** Технического регламента Таможенного союза ТР ТС 032/2013 «О безопасности оборудования, работающего под избыточным давлением»

**СЕРТИФИКАТ СООТВЕТСТВИЯ ВЫДАН НА ОСНОВАНИИ** протоколов испытаний №№ 2020.02/D190176001001, 2020.02/D19179002001, 2020.02/D190177001002, 2020.02/D190178002001 от 11.02.2020 года. Испытательной лабораторией дилетов Общества с ограниченной ответственностью «Центр испытаний и сертификации», регистрационный номер аттестата аккредитации № РОСС RU.0001.27.0339. Аттестация выполнена в соответствии с ЕАС0121943 от 17.01.2020 года, органами по сертификации продукции Общества с ограниченной ответственностью «Международный центр испытаний и сертификации "ЕвроСерг"», регистрационный № RA.RU.11AJ38. Документы, предоставляемые заявителем, подтверждающие соответствие заявленной продукции требованиям регламента: согласно приложению (бланк № 0693014).  
Схема сертификации: 1с.

**ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ** Начальник станции, в распоряжении которой оборудовано оборудование, применяемое в соответствии с ГОСТ 5762-2002 «Арматура трубопроводная прокатная. Изделия на номинальное давление не более PN 250. Общие технические условия»; ГОСТ 11345-2009 «Краны шаровые, краны и вентили на номинальное давление не более PN 250. Общие технические условия»; ГОСТ 5762-2005 «Клапаны на номинальное давление не более PN 250. Общие технические условия». Условие критерия conformity в соответствии с ГОСТ 11554-04. Срок действия (сроки, условия) выдачи и применения в процедурах взаимораспределения задач лабораторий: документация. Выдан в соответствии с ЕАС0121943 от 12.02.2020.

**СРОК ДЕЙСТВИЯ С** 27.02.2020 **ПО** 11.02.2025

**ВКЛЮЧИТЕЛЬНО**

Руководитель (уполномоченное лицо) органа по сертификации:  и/или Николай Владимирович (И.О.)  
Эксперт (эксперт-аудитор) (эксперты (эксперты-аудиторы)):  Роман Веселов Александрович (И.О.)

**ЕВРАЗИЙСКИЙ ЭКОНОМИЧЕСКИЙ СОЮЗ**



**ПРИЛОЖЕНИЕ**

**К СЕРТИФИКАТУ СООТВЕТСТВИЯ № EAЭС RU C-KPA.Ж38.B.00248/20 лист 1**

Серия **RU** № **0693013**

Перечень продукции, на которую распространяется действие сертификата соответствия

| КОД ТН ВЭД (EAЭС)  | Наименование, типы, марки, модели однородной продукции, составные изделия или комплексы  | Обозначение документации, в соответствии с которой выпускается продукция  |
|--|--|---|
| 8481 80 639 0,<br>8481 80 690 0,<br>8481 80 610 0,<br>8481 80 631 0,<br>8481 30 910 8,<br>8481 30 990 8,<br>8481 80 819 9,<br>8481 80 811 0,<br>8481 80 812 0,<br>8481 80 599 0. | Арматура промышленная трубопроводная с торговым знаком FORCE:<br>Задвижки серии AP-GA, модели: AP-GA-FL, AP-GA-BW, AP-GA-SW, AP-GA-SWT с номинальным диаметром от 100 до 1400 мм, максимально допустимым рабочим давлением от 1,0 МПа до 42 МПа, температурой рабочей среды от минус 196 до плюс 850 градусов Цельсия;<br>Клапаны обратные серии AP-CH, модели: AP-CH-FL, AP-CH-BW, AP-CH-SW, AP-CH-SWT, AP-CH-WF с номинальным диаметром от 100 мм до 900 мм, максимально допустимым рабочим давлением от 1,0 МПа до 42 МПа, температурой рабочей среды от минус 196 до плюс 850 градусов Цельсия;<br>Краны шаровые серии AP-BA, модели: AP-BA-BW, AP-BA-FL, AP-BA-SW, AP-BA-SWT с номинальным диаметром от 100 мм до 1400 мм, максимально допустимым рабочим давлением от 1,0 МПа до 42 МПа, температурой рабочей среды от минус 196 до плюс 850 градусов Цельсия;<br>Клапаны (вентили) серии AP-GL, модели: AP-GL-BW, AP-GL-FL, AP-GL-SW, AP-GL-SWT с номинальным диаметром от 100 мм до 450 мм, максимально допустимым рабочим давлением от 1,0 МПа до 42 МПа, температурой рабочей среды от минус 196 до плюс 850 градусов Цельсия. | Стандарт ASME B16.34<br>«Арматура фланцевая, резьбовая и под приварку»;<br>Стандарт API 6D «Спецификация на трубопроводную арматуру»;<br>Стандарт ISA-75.19.01<br>«Газостатическое испытание регулирующих клапанов»;<br>Стандарт ASME B16.5 «Фланцы для труб и фланцевые фитинги»;<br>Стандарт ANSI/FCI 70-2-2006 «Уточка из седла регулирующих клапанов»;<br>Стандарт ASME B16.10 «Габаритные и присоединительные размеры кранов». |

Руководитель (уполномоченное лицо) органа по сертификации:  и/или Николай Владимирович (И.О.)  
Эксперт (эксперт-аудитор) (эксперты (эксперты-аудиторы)):  Роман Веселов Александрович (И.О.)

## CERTIFICATE OF FUGITIVE EMISSION TEST



### (Attestation)

TÜV SÜD Korea Ltd. 25F, Two IFC, 10 Gukgeunmyung-ro, Yeongdeungpo-gu, Seoul, 07326, Korea  
 TÜV SÜD Korea Ltd. 13F, Two IFC, 10 Gukgeunmyung-ro, Yeongdeungpo-gu, Seoul, 07326, Korea

Certificate No. : TSK-IS74957686-010

Manufacturer Name / Address : DONGSAN VALVE CO., LTD. / 167-2, Gomo-ro 324 Beonan-gil, Jillye-Myeon, Gimhae-si, Gyeongnam, KOREA

Date of Test : 22~26-Mar-2021  
 Kind of Test : Witness of Fugitive Emission Test

Test Valve : 4"(DN100)-600# RF 1pc, ASTM A352 LCC, Floating Ball Valve

| Valve Type | Class | Size          | Stem         |               | Quantity | Body Seals                  | Packing Seals | Design Standard |
|------------|-------|---------------|--------------|---------------|----------|-----------------------------|---------------|-----------------|
|            |       |               | Type         | Diameter (mm) |          |                             |               |                 |
| BALL       | 600   | 4 inch (DN25) | Quarter Turn | 45            | 1        | Spiral Wound (316+Graphite) | Graphite      | ASME B16.34     |

Test Standard : ISO 15848-1 - Second Edition, June 2015

Applicable drawing : BFS-F60-KKVR-L-D-0 Rev. 0

Test Condition :

| Test Fluid | Tightness Class | -46°C (Bar) | Ambient (Bar) | 200°C (Bar) | Cycle | Number of thermal Cycles | Stem Seal Adjustment |
|------------|-----------------|-------------|---------------|-------------|-------|--------------------------|----------------------|
| Helium     | BH              | 104         | 104           | 98          | 1500  | 2                        | SSA1                 |

Performance class : ISO FE BH-CO2-SSA 1-t(-46°C, 200°C)-CL600-ISO 15848-1

Extension of Qualification : As per Para 8 of ISO 15848-1

### Conclusion

The undersigned, Inspector to TÜV SÜD, certifies that the above type meets the applicable requirements.

The details of the test condition and data are as per manufacturer's Test Report No. FET-2021-01 which were verified and endorsed by TÜV SÜD Korea.

Note: "In accordance with Client's instructions, the Company's involvement has been limited to witnessing/observing a third party's intervention(s) at the third party's laboratory/test house or other facilities and installations used for the intervention(s). The Company's sole responsibility was to be present at the time of the third party's intervention(s) to forward the results, or confirm the occurrence, of the intervention(s). The Company is not responsible for the condition or calibration of apparatus, instruments and measuring devices used, the analysis methods applied the qualifications, actions or omissions of the third party's personnel or the analysis results.

Business registration number in Korea  
1868146204 (Head Office)

061-801-7918-8 (Branch)

Seoul Office  
Tel: +82 (02) 2215-1100  
Fax: +82 (02) 2215-1110  
www.tuv.com



TÜV SÜD Korea Ltd.  
HQ of Region Korea  
25F, Two IFC, 10 Gukgeunmyung-ro,  
Yeongdeungpo-gu, Seoul, 07326,  
Korea

## Yarmouth Research and Technology, LLC

### API 641 TEST CERTIFICATE

Certificate Number: 220067A

Test Start Date: 8-Apr-20

Test End Date: 14-Apr-20

#### Customer Information

Customer: CNC Flow Control

Web Address: www.cncflowcontrol.com

Manufacturer Location: 167-2, Gomo-ro, 324 Beonan-gil, Jillye-myeon, Gimhae City, Gyungnam South Korea

#### Valve Information

Valve Size: 3 inch Valve Pressure Class: 1500

Valve Description: FORCE 3" CL 1500 TRUNNION BALL VALVE FB RF WCB/

ENP/DEVLON/HNBR GEAR OP

Product Code: 3-BTN15-AAJ1G-3

Assembly Drawing No.: BTS-F51-H JAVRL-0-0

API/ASME Design Standards: API 6D / ASME B16.34 / 16.10 / 16.5 / API 607

Stem Seal Description: O-Rings/HNBR-90/Graphite fire safe seal

Body Seal Description: O-Rings & Gasket / HNBR-90 & 316 Graphite

#### Test Results

Test Specification: API 641, First Edition, 2016

Max. Allowable Stem Seal Leakage: 100 PPMv Methane

Number of Mechanical Cycles: 610

High Temperature: 300 deg. F

Test Pressure at Ambient Temp.: 600 psig

Test Pressure at High Temp.: 600 psig

Did valve pass test requirements? YES

Valves of the same quarter-turn design as the test valve may be deemed to be qualified subject to paragraph 11 of the test specification.



Matthew J. Wasielewski, PE  
 President and Manager  
 Yarmouth Research and Technology, LLC  
 434 Walnut Hill Road  
 North Yarmouth, ME 04097 USA



www.yarmouthresearch.com

등록번호: KOGAS-2020-024  
Certificate No.

공급업체등록증  
CERTIFICATE OF REGISTRATION

상 호: (주)동신밸브  
Company Name

대 표 자: 정영주  
Chief Executive

사업자등록번호: 343-87-00634  
Certificate of Taxpayer's I.D.

공 장 주 소: 경상남도 김해시 진례면 고모로324  
번안길 187-2  
Factory Location

등록 품 목 : 밸브류 : 초저온 볼밸브(생선기지용)  
Item Description Valve : Cryogenic Ball Valve(For LNG Terminals)

해 당 규 격 : 2" 이하  
Purchase Spec. up to 2"

상기 업체는 위의 등록 품목(해당규격)에 대하여  
한국가스공사의 공급업체로 등록되었음을 증명합니다.

This is to certify that this company is qualified and  
eligible to supply the above item to Korea Gas Corporation

KOGAS

유효 기간: 2023.12.31  
Period of Validity

 한국가스공사 사 장  
KOREA GAS CORPORATION



발행 일: 2021.01.01  
Issue date

등록번호: KOGAS-2020-026  
Certificate No.

공급업체등록증  
CERTIFICATE OF REGISTRATION

상 호: (주)동신밸브  
Company Name

대 표 자: 정영주  
Chief Executive

사업자등록번호: 343-87-00634  
Certificate of Taxpayer's I.D.

공 장 주 소: 경상남도 김해시 진례면 고모로324  
번안길 187-2  
Factory Location

등록 품 목 : 밸브류 : 초저온 볼밸브(생선기지용)  
Item Description Valve : Cryogenic Ball Valve(For LNG Terminals)

해 당 규 격 : 3" 이상  
Purchase Spec. Over 3"

상기 업체는 위의 등록 품목(해당규격)에 대하여  
한국가스공사의 공급업체로 등록되었음을 증명합니다.

This is to certify that this company is qualified and  
eligible to supply the above item to Korea Gas Corporation

KOGAS

유효 기간: 2023.12.31  
Period of Validity

 한국가스공사 사 장  
KOREA GAS CORPORATION



발행 일: 2021.01.01  
Issue date

## 2.01.14 Ball Valves - CRA (SS, DSS, SDSS, etc.), > 300#

|                           |     |  |   |  |               |           |  |  |
|---------------------------|-----|--|---|--|---------------|-----------|--|--|
| Crane ChemPharma & Energy | USA | 4444 Cooper Road, Cincinnati, Ohio 45242 | <a href="https://www.cranecpe.com">https://www.cranecpe.com</a> | <a href="mailto:measales@cranecpe.com">measales@cranecpe.com</a> | +019362716554 | Crane Co. | Beth Ainsworth<br>Inside Sales Representative<br>+019362716555<br><a href="mailto:BAinsworth@CraneCPE.com">BAinsworth@CraneCPE.com</a> | Alok Ambadkar<br>Senior Sales Engineer<br>+97148165800<br><a href="mailto:ALAmbadkar@CraneCPE.com">ALAmbadkar@CraneCPE.com</a> |
|---------------------------|-----|--|---|--|---------------|-----------|--|--|

|                         |             |  |   |  |                |    |  |   |
|-------------------------|-------------|--|---|--|----------------|----|--|---|
| Dongsan Valve Co., Ltd. | South Korea | 167-2, Gomo-ro, 324Beon-gil, Jillye-myeon, Gimhae City, Gyeongnam, Korea<br><a href="mailto:Ko@nhaeGyungnam50876">Ko@nhaeGyungnam50876</a> | <a href="http://www.force-valves.com">http://www.force-valves.com</a> | <a href="mailto:dsforce@dsforce.co.kr">dsforce@dsforce.co.kr</a> | 82 55 346 0173 | NA | O-chul Park<br>General Manager<br>82 55 346 0173<br><a href="mailto:dsforce@dsforce.co.kr">dsforce@dsforce.co.kr</a> | Dosik Kim<br>Senior Manager<br>82 55 346 0173<br><a href="mailto:dosik.kim@dsforce.net">dosik.kim@dsforce.net</a> |
|-------------------------|-------------|--|---|--|----------------|----|--|---|

## 2.01.26 Cu-Cu Alloys Valves (All types & sizes)

|                           |     |  |   |  |               |           |  |  |
|---------------------------|-----|--|---|--|---------------|-----------|--|--|
| Crane ChemPharma & Energy | USA | 4444 Cooper Road, Cincinnati, Ohio 45242 | <a href="https://www.cranecpe.com">https://www.cranecpe.com</a> | <a href="mailto:measales@cranecpe.com">measales@cranecpe.com</a> | +019362716554 | Crane Co. | Beth Ainsworth<br>Inside Sales Representative<br>+019362716555<br><a href="mailto:BAinsworth@CraneCPE.com">BAinsworth@CraneCPE.com</a> | Alok Ambadkar<br>Senior Sales Engineer<br>+97148165800<br><a href="mailto:ALAmbadkar@CraneCPE.com">ALAmbadkar@CraneCPE.com</a> |
|---------------------------|-----|--|---|--|---------------|-----------|--|--|

|                            |                |  |   |  |              |           |   |  |
|----------------------------|----------------|--|---|--|--------------|-----------|---|--|
| Crane Limited / Hattersley | United Kingdom | Head Office: Epsilon Terrace, West Road, Ipswich IP3 9FJ, United Kingdom | <a href="https://www.hattersley.com/">https://www.hattersley.com/</a> | <a href="mailto:jkeown@hattersley.com">jkeown@hattersley.com</a> | +97148165846 | Crane Co. | Manishaan Bose<br>Internal Sales Supervisor<br>+97148165912<br><a href="mailto:mbose@e-sportbsu.com">mbose@e-sportbsu.com</a> | James Keown<br>Regional Sales Leader<br>+97148165946<br><a href="mailto:jkeown@hattersley.com">jkeown@hattersley.com</a> |
|----------------------------|----------------|--|---|--|--------------|-----------|---|--|

|                         |             |  |   |  |                |    |  |   |
|-------------------------|-------------|--|---|--|----------------|----|--|---|
| Dongsan Valve Co., Ltd. | South Korea | 167-2, Gomo-ro, 324Beon-gil, Jillye-myeon, Gimhae City, Gyeongnam, Korea<br><a href="mailto:Ko@nhaeGyungnam50876">Ko@nhaeGyungnam50876</a> | <a href="http://www.force-valves.com">http://www.force-valves.com</a> | <a href="mailto:dsforce@dsforce.co.kr">dsforce@dsforce.co.kr</a> | 82 55 346 0173 | NA | O-chul Park<br>General Manager<br>82 55 346 0173<br><a href="mailto:dsforce@dsforce.co.kr">dsforce@dsforce.co.kr</a> | Dosik Kim<br>Senior Manager<br>82 55 346 0173<br><a href="mailto:dosik.kim@dsforce.net">dosik.kim@dsforce.net</a> |
|-------------------------|-------------|--|---|--|----------------|----|--|---|

|                           |       |  |   |  |               |                           |   |
|---------------------------|-------|--|---|--|---------------|---------------------------|---|
| Forward Alloys & Castings | India | Plot No. F-7, MIDC Industrial Area, Anandnagar, Additional Ambemath, Thane - 421506, Maharashtra | <a href="http://www.forwardalloys.com">http://www.forwardalloys.com</a> | <a href="mailto:noel@forwardalloys.com">noel@forwardalloys.com</a> | +912225964076 | Forward Alloys & Castings | Adnan Shaikh<br>Sales Executive<br>+91222596175<br><a href="mailto:sales@forwardalloys.com">sales@forwardalloys.com</a> |
|---------------------------|-------|--|---|--|---------------|---------------------------|---|

|                                    |             |  |   |  |             |    |   |  |
|------------------------------------|-------------|--|---|--|-------------|----|---|--|
| OK KWANG ENGINEERING CO.,LTD (OKV) | South Korea | 59, Hakjang-ro 169beon-gil, Sasang-gu, Busan, Korea<br><br>Date of Manufacturing Plant Establishment: April, 1988<br><br>Address of Registered / Head Office: Same as above. | <a href="http://www.okv.co.kr">http://www.okv.co.kr</a> | <a href="mailto:pj02@okv.co.kr">pj02@okv.co.kr</a> | 82513287751 | NA | Suyeon Gu<br>Company Representative<br>82-51-328-7751<br><a href="mailto:pj02@okv.co.kr">pj02@okv.co.kr</a> | Hyun cheol Kim<br>Manager<br>+82-51-328-7741<br><a href="mailto:pk@okv.co.kr">pk@okv.co.kr</a> |
|------------------------------------|-------------|--|---|--|-------------|----|---|--|

|                            |                |  |   |  |                |          |
|----------------------------|----------------|--|---|--|----------------|----------|
| Pegler Yorkshire Group Ltd | United Kingdom |  | <a href="https://www.pegleyorkshire.co.uk/en/home">https://www.pegleyorkshire.co.uk/en/home</a> | <a href="mailto:export@aalberts-ips.com">export@aalberts-ips.com</a> | +4401302856656 | Aalberts |
|----------------------------|----------------|--|---|--|----------------|----------|



**PTT Global Chemical Public Company Limited**

Registration No. 010755-4000267  
 Head Office : 555/1 Energy Complex, Building A.,  
 14th-16th Floor, Vibhavadi Rangsit Road,  
 Chatuchak, Chatuchak, Bangkok 10900 Thailand.  
 Tel: +66(0)2226-8400 Fax: +66(0)2226-8300  
 Rayong Office : 99, Rajinikom Road, Nongphre,  
 Muang Rayong, Rayong 31150 Thailand.  
 Tel: +66(0)3899-4000  
 Fax: +66(0)32899-4111

**To: DONGSAN VALVE CO., LTD. (FORCE Brand)**  
 167-2, Gomo-Ro, 324 Beonan-Gil, Jillye-Myeon,  
 Gimhae City, Gyeongnam, Korea

9 November 2016

**Attn:** Mr. Chung, Myung Chu  
 CEO

**Subject:** Letter of Registration on AVL assessment of Ball Valves Brand "FORCE"

Dear Mr. Chung

With reference to valve manufacturer assessment of PTT Global Chemical Public Company Limited (PTTGC), we hereby approve Ball Valves, brand name "FORCE" of DONGSAN VALVE CO., LTD. which are produced at the below Foundry and with the below Process, Material, Type and Class;

**Plant #1 :** Dongsan Valve Co., Ltd.  
 167-2, Gomo-Ro, 324 Beonan-Gil, Jillye-Myeon, Gimhae City, Gyeongnam, Korea  
**Process :** Forging Material  
**Material :** Carbon Steel (A105N, A350-LF2, LF3)  
 Stainless Steel (A182-F304L, F316L, F321)  
**Class :** 150 - 1500

**Plant #2 :** Samjung Superalloys Co., Ltd.  
 49-22 Jangu-Ro, 115 Beon-Gil, Gimhae Si, Gyeongsangnam-Do, Korea  
**Process :** Casting Material  
**Material :** Carbon Steel (A216-WCB, WCC, A352-LCB, LCC)  
 Stainless Steel (A351-CF3, CF3M, CF8, CF8M, CF8C)  
**Class :** 150 - 1500

The approval is granted provided that all specified products above are intended to be used for the PTT Global Chemical's all plants.

The technical approval will be valid for two years from the date of issue, and from now on the manufacturer will be registered into the PTTGC's Approved Vendor List (AVL) system.

Yours sincerely,

PTT Global Chemical Public Company Limited

  
 (Somsuk Kiattisarnsakul)  
 QA, Inspection Division Manager  
 Ref. No. 008-2016

| Approved Manufacturer List (AML) |  |                       |                            |      |   |   |                       |
|----------------------------------|--|-----------------------|----------------------------|------|---|---|-----------------------|
| ฉบับที่ 1/2561                   |  |                       |                            |      |   |   |                       |
| หมวด Mechanical                  |  |                       |                            |      |   |   |                       |
| Piping Bulk MATERIAL - 1/4       |  |                       |                            |      |   |   |                       |
| ITEM                             | SYSTEM / EQUIPMENT                               | MANUFACTURER LIST     |                            | TIRP |   |   | REMARK                |
|                                  |  | NAME OF AML           | ACCEPTED COUNTRY OF ORIGIN | 1    | 2 | 3 |                       |
| 18                               | TUBING   |                       |                            |      |   |   |                       |
|                                  | TUBING : MATERIAL: HIGH ALLOY STEEL (AUSTENITIC) | AVESTA SANDVIK TUBE   | NETHERLANDS / SWEDEN       |      |   |   |                       |
|                                  |  | AVESTA SHEFFIELD      | USA                        |      |   |   |                       |
|                                  |  | DMV STAINLESS         | FRANCE / ITALY             |      |   |   |                       |
|                                  |  | FINE TUBES            | UK                         |      |   |   |                       |
|                                  |  | SALZGITTEK MANNESMANN | FRANCE                     |      |   |   |                       |
|                                  |  | SOSTA                 | GERMANY                    |      |   |   |                       |
|                                  |  | TPS TECHNITUBE        | GERMANY                    |      |   |   |                       |
| 19                               | VALVE  |                       |                            |      |   |   |                       |
| 19.1                             | VALVE (For all services)                         | ARI ARMATUREN         | GERMANY                    | X    |   |   |                       |
|                                  | VALVE TYPE: BALL / GATE / GLOBE / CHECK          | ARFLU                 | SPAIN                      | X    |   |   |                       |
|                                  |  |                       | CHINA                      |      | X |   |                       |
|                                  |  | BABCOCK               | SPAIN                      | X    |   |   |                       |
|                                  |  | BONETTI               | ITALY                      | X    |   |   |                       |
|                                  |  | BONNEY FORGE          | ITALY                      | X    |   |   |                       |
|                                  |  | BRAY (FLOW-TEK, RITE) | USA / CANADA               | X    |   |   |                       |
|                                  |  |                       | CHINA / BRAZIL             |      | X |   |                       |
|                                  |  | BVMC                  | CHINA                      |      | X |   |                       |
|                                  |  | CALOBRI               | ITALY                      | X    |   |   |                       |
|                                  |  | CAMERON               | UK                         | X    |   |   |                       |
|                                  |  | CONVAL                | USA                        | X    |   |   |                       |
|                                  |  |                       | AUSTRALIA / USA / UK       | X    |   |   |                       |
|                                  |  | CRANE                 | CHINA                      |      | X |   |                       |
|                                  |  | CURTISS-WRIGHT        | GERMANY                    | X    |   |   |                       |
|                                  |  | DELTA PACIFIC         | USA                        | X    |   |   |                       |
|                                  |  | DHV                   | USA                        | X    |   |   |                       |
|                                  |  |                       | CHINA                      |      | X |   |                       |
|                                  |  | FLUICON               | ITALY                      | X    |   |   |                       |
|                                  |  | FMC                   | KOREA                      |      | X |   |                       |
|                                  |  | FORCE                 | KOREA                      |      | X |   |                       |
|                                  |  | HEATON                | CHINA                      |      | X |   |                       |
|                                  |  | KF                    | CHINA                      |      | X |   |                       |
|                                  |  | GOODWIN               | ENGLAND                    | X    |   |   | DUAL PLATE CHECK ONLY |
|                                  |  |                       | USA                        | X    |   |   |                       |
|                                  |  | GWC                   | ITALY / UAE                |      | X |   |                       |
|                                  |  | HP VALVE              | NETHERLAND                 | X    |   |   |                       |
|                                  |  | JDV                   | TAIWAN                     |      | X |   | BALL VALVE ONLY       |
|                                  |  | KITZ                  | GERMANY / JAPAN / SPAIN    | X    |   |   |                       |
|                                  |  |                       | CHINA / TAIWAN / THAILAND  |      | X |   |                       |
|                                  |  | KJS                   | KOREA                      |      | X |   |                       |
|                                  |  | KSB                   | FRANCE / ITALY             | X    |   |   |                       |
|                                  |  |                       | INTERNATIONAL              |      | X |   |                       |
|                                  |  | KTM                   | AUSTRALIA / JAPAN          | X    |   |   |                       |
|                                  |  |                       | CHINA / TAIWAN             |      | X |   |                       |
|                                  |  | KVC                   | JAPAN / UK                 | X    |   |   |                       |
|                                  |  |                       | KOREA                      |      | X |   |                       |
|                                  |  | MOGAS                 | USA                        | X    |   |   |                       |
|                                  |  |                       | USA                        | X    |   |   |                       |
|                                  |  | MUELLER               | KOREA                      |      | X |   |                       |
|                                  |  |                       | USA                        |      | X |   |                       |
|                                  |  | MUELLER               | USA                        | X    |   |   |                       |

(Con.1 next page)



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In exercising the powers conferred by Section 7, Petroleum Development Act 1974 and in accordance to Regulation 5 of the Petroleum Regulation 1974, delegated to me by the Prime Minister of Malaysia, I hereby issue the license under Regulation 3 of the Petroleum Regulation for the purpose of the above to:

Printed Date: 16.06.2015

ESQUIRE PETROLEUM SDN BHD (1049850-U)  
NO 142 JALAN ANGERIK VANILLA W31/W KOTA KEMUNING  
40400 SHAH ALAM  
SELANGOR

Details of License are as follows:

Company's No : 1049850-U  
Type of Company : LICENSE  
Duration of License : 16.04.2015 - 15.04.2018  
License Fee : RM 750  
Categories of Product/Service : As attached in 'CATEGORIES OF LICENSE / REGISTRATION'.

Special Conditions impose onto this license:

Subject to the special conditions as attached.

General requirements of this License are as stated in the next page.

*Remark: License Must Apply For Renewal 3 Months Before The Expiry Date.*

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  - Failed to perform a contractual obligation or any other obligation under the law to partners, principals, agents, sub-contractors and others.
  - Received gamishes order.
  - Factual history/ copy action.
  - Cannot be traced through the last address.
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- Entering or accepting contract or tender during the license suspension period.
- Provide false, inaccurate or misleading information.
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  - The company either by itself, through its employees, directors, agents or its employees:
    - Not allow to use the logo of the PETRONAS's oil drop or the word "PETRONAS" or any any mark, logo or words or wearing, preference, font, which resembles the appearance or colour trademarks owned or used by PETRONAS or its subsidiaries ("the PETRONAS trademarks") in any form whether in printing, materials, websites or hand boards; and
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COMPANY'S NAME : ESQUIRE PETROLEUM SDN BHD (1049850-U)  
LICENSE NO : 1049850-U  
LICENSE PERIOD : 16.04.2015 - 15.04.2018

| CATEGORIES OF LICENSE / REGISTRATION |   |                   |        |                                |                      |                    |
|--------------------------------------|---|-------------------|--------|--------------------------------|----------------------|--------------------|
| LICENSE/PROFESSIONAL                 | Service/Supplier Code   | Mode of Operation | Agency | Principal Name (If Applicable) | Approval Date / Term | Expiry Date / Term |
| LICENSE                              | PV10010 VALVES- BALL VALVES- BALL VALVES LESS THAN 50 MM (FURNISHED)        | AGENT             | AGENT  | DONGSAN VALVE CO., LTD. KOREA  | 09.03.2015 01:35:40  | 15.04.2018         |
| LICENSE                              | PV10010 VALVES- BALL VALVES- BALL VALVES LESS THAN 50 MM (PREPARED)         | AGENT             | AGENT  | DONGSAN VALVE CO., LTD. KOREA  | 09.03.2015 01:35:40  | 15.04.2018         |
| LICENSE                              | PV10010 VALVES- BALL VALVES- BALL VALVE 50 MM AND LARGER (FURNISHED)        | AGENT             | AGENT  | DONGSAN VALVE CO., LTD. KOREA  | 21.04.2015 15:09:04  | 15.04.2018         |
| LICENSE                              | PV10010 VALVES-BALL VALVES GREATER THAN 50 MM (PREPARED)                    | AGENT             | AGENT  | DONGSAN VALVE CO., LTD. KOREA  | 22.04.2015 15:22:05  | 15.04.2018         |
| LICENSE                              | PV10010 VALVES- GATE VALVES- GATE VALVES LESS THAN 50 MM                    | AGENT             | AGENT  | DONGSAN VALVE CO., LTD. KOREA  | 09.03.2015 01:35:40  | 15.04.2018         |
| LICENSE                              | PV10010 VALVES- GATE VALVES- GATE VALVES 50 MM AND LARGER                   | AGENT             | AGENT  | DONGSAN VALVE CO., LTD. KOREA  | 21.04.2015 15:09:04  | 15.04.2018         |
| LICENSE                              | PV10010 VALVES- GATE VALVES- THROUGH CONDUIT FLANGE AND DISCONNECTABLE TYPE | AGENT             | AGENT  | DONGSAN VALVE CO., LTD. KOREA  | 09.03.2015 01:35:41  | 15.04.2018         |
| LICENSE                              | PV10010 VALVES- CHECK VALVES- SWING TYPE CHECK VALVE                        | AGENT             | AGENT  | DONGSAN VALVE CO., LTD. KOREA  | 09.03.2015 01:35:41  | 15.04.2018         |
| LICENSE                              | PV10010 VALVES- CHECK VALVES- DIAPHRAGM TYPE CHECK VALVE                    | AGENT             | AGENT  | DONGSAN VALVE CO., LTD. KOREA  | 09.03.2015 01:35:41  | 15.04.2018         |
| LICENSE                              | PV10010 VALVES- CHECK VALVES- DUAL FLANGE CHECK VALVES                      | AGENT             | AGENT  | DONGSAN VALVE CO., LTD. KOREA  | 09.03.2015 01:35:41  | 15.04.2018         |
| LICENSE                              | PV10010 VALVES- CHECK VALVES- NON-SLANT CHECK VALVES                        | AGENT             | AGENT  | DONGSAN VALVE CO., LTD. KOREA  | 09.03.2015 01:35:41  | 15.04.2018         |
| LICENSE                              | PV10010 VALVES- GLOBE VALVES- GLOBE VALVES LESS THAN 50 MM                  | AGENT             | AGENT  | DONGSAN VALVE CO., LTD. KOREA  | 09.03.2015 01:35:41  | 15.04.2018         |
| LICENSE                              | PV10010 VALVES- GLOBE VALVES- GLOBE VALVES 50 MM AND LARGER                 | AGENT             | AGENT  | DONGSAN VALVE CO., LTD. KOREA  | 09.03.2015 01:35:41  | 15.04.2018         |
| LICENSE                              | PV10010 VALVES- BUTTERFLY VALVES- CONCENTRIC BUTTERFLY VALVE (FURNISHED)    | AGENT             | AGENT  | DONGSAN VALVE CO., LTD. KOREA  | 09.03.2015 01:35:41  | 15.04.2018         |

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COMPANY'S NAME : ESQUIRE PETROLEUM SDN BHD (1049850-U)  
LICENSE NO : 1049850-U  
LICENSE PERIOD : 16.04.2015 - 15.04.2018

| CATEGORIES OF LICENSE / REGISTRATION |  |                   |        |                                |                      |                    |
|--------------------------------------|--|-------------------|--------|--------------------------------|----------------------|--------------------|
| LICENSE/PROFESSIONAL                 | Service/Supplier Code  | Mode of Operation | Agency | Principal Name (If Applicable) | Approval Date / Term | Expiry Date / Term |
| LICENSE                              | PV10010 VALVES- BUTTERFLY VALVES- DOUBLE OFFSET BUTTERFLY VALVES (FURNISHED) | AGENT             | AGENT  | DONGSAN VALVE CO., LTD. KOREA  | 09.03.2015 01:35:43  | 15.04.2018         |
| LICENSE                              | PV10010 VALVES- BUTTERFLY VALVES- HALF OFFSET BUTTERFLY VALVES (FURNISHED)   | AGENT             | AGENT  | DONGSAN VALVE CO., LTD. KOREA  | 09.03.2015 01:35:43  | 15.04.2018         |
| LICENSE                              | PV10010 VALVES- BUTTERFLY VALVES- DOUBLE OFFSET BUTTERFLY VALVES (PREPARED)  | AGENT             | AGENT  | DONGSAN VALVE CO., LTD. KOREA  | 11.04.2015 12:01:34  | 15.04.2018         |

\*\*\* END \*\*\*

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Mitsubishi Hitachi  
Power Systems

Certificate No.  
7894-00

## Certificate of Qualification

This is to certify that

Dongsan Valve Co.,Ltd.

is a qualified partner of Mitsubishi Hitachi Power Systems, Ltd. for supplying the below stated item(s) produced in accordance with the quality assurance system which passed the evaluation.

167-2, Gomo-ro 324beonan-gil, Jillye-myeon, Gimhae-si,

**Address** : Gyeongsannam-do, Korea 50875

**Item(s)** : Design and Manufacture of Ball Valve (excluding for nuclear facilities).

You are requested to supply the above items in accordance with our general purchase specification "Quality Assurance General Requirement".

**Date of Expiration** : 31 October 2021

**Date of Authorization** : 15 October 2018

**Authorized by** : 

Hiroaki Goto  
General Manager  
Quality Management Department  
Quality Management Division  
Mitsubishi Hitachi Power Systems, Ltd.

Alberta Municipal Affairs



## STATUTORY DECLARATION Registration of Fittings

I, S.H. Won Sales Manager  
(name of applicant) (position title) (must be in a position of authority)  
of Dongsan Valve Co., Ltd.  
(name of manufacturer)  
located at 167-2, Gomo-ro, 324Beonan-gil, Jillye-myeon, Gimhae, Gyeongnam, Korea  
(plant address)

In this space, show facsimile of manufacturer's logo or trademark as it will appear on the fitting.



do solemnly declare that the fittings listed hereunder, which are subject to the Safety Codes Act (check one)

- comply with the requirements of ASME/ANSI B16.34, API6D which specifies the dimensions, (title of recognized North American Standard)  
materials of construction, pressure/temperature ratings and identification marking of the fittings, or  
 are not covered by the provisions of a recognized North American standard and are therefore manufactured to comply with \_\_\_\_\_ as supported by the attached (title of code of construction or other applicable document)  
data which identifies the dimensions, materials of construction, pressure/temperature ratings and the basis for such ratings, and the marking of the fittings for identification.

I further declare that the manufacture of these fittings is controlled by a quality control program which has been verified by the following authority, ISO 9000/ API Certificate as being suitable for the manufacture of these fittings to the stated standard. The fittings covered by this declaration, for which I seek registration, are

Ball valves  
(brief description of fittings)

In support of this application, the following information, calculations and/or test data are attached:

See attached catalog

DECLARED before me at Gimhae in the KUM-GANG LAWY MOTARY OFFICE of Gyeongsang nam-do  
(city) (province or state)

this 24th day of August, 2019  
(Month) (Year)

(print) BAEK, SEUNG-MYUNG  
(a Commissioner of Oaths or Notary Public)

(sign)   
(a Commissioner of Oaths or Notary Public)

  
(signature of applicant)

For ABSA Office Use Only:

NOTES:

To the best of my knowledge and belief, the application meets the requirements of the Safety Codes Act and CSA Standard B51, Clause 4.2, and is accepted for registration in Category \_\_\_\_\_

Registration Number: OC07982-2   
(Signature of the Administrator/SCD)

Date Registered: SEP 14 2017 Expiry Date: 2022 Sep 14

The information you provide is necessary only for the administration of the programs as required by the Alberta Safety Codes Act and Regulations in the Pressure Equipment Discipline.









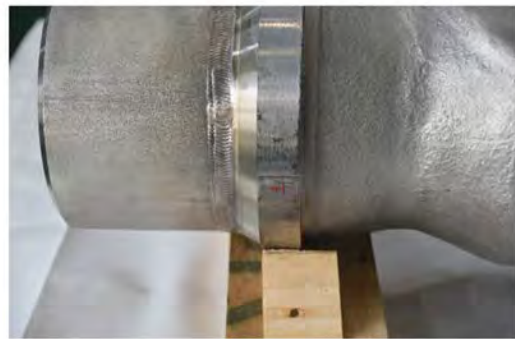
PTSC M&C



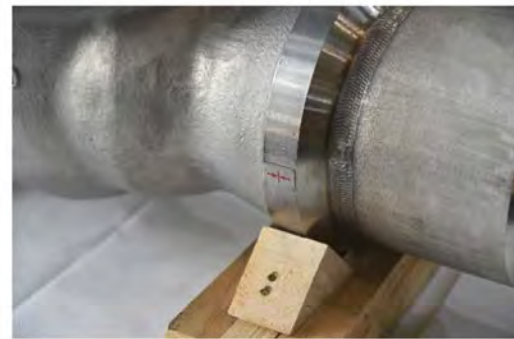
|                          |  |
|--------------------------|--|
| <b>PROJECT:</b>          | <b>SK408W JERUN FIELD DEVELOPMENT (MALAYSIA)</b> |
| <b>END-USER:</b>         | <b>SAPURA OMV</b>                                |
| <b>EPC(CONTRACTOR):</b>  | <b>MMHE</b>                                      |
| <b>VALVE TYPE:</b>       | <b>FLOATING, TRUNNION, 3PCS BALL VALVE</b>       |
| <b>SIZE &amp; RATING</b> | <b>150~1500#, 1/2"~28"</b>                       |
| <b>OPERATOR:</b>         | <b>MANUAL</b>                                    |
| <b>Q'TY:</b>             | <b>440 EA</b>                                    |
| <b>DELIVERY:</b>         | <b>2022</b>                                      |
| <b>LEAK CLASS</b>        | <b>API 6D, MESC SPE 77/302</b>                   |



|                          |   |
|--------------------------|---|
| <b>PROJECT:</b>          | <b>JEJU AEWOL LNG TERMINAL</b>                      |
| <b>END-USER:</b>         | <b>KOGAS</b>  |
| <b>EPC(CONTRACTOR):</b>  | <b>POSCO E&amp;C</b>                                |
| <b>VALVE TYPE:</b>       | <b>CRYOGENIC BALL VALVE<br/>(TOP ENTRY, DIB-II)</b> |
| <b>SIZE &amp; RATING</b> | <b>600# / 8"</b>                                    |
| <b>OPERATOR:</b>         | <b>MANUAL</b>                                       |
| <b>Q'TY:</b>             | <b>1 EA</b>   |
| <b>DELIVERY:</b>         | <b>2022</b>   |
| <b>LEAK CLASS</b>        | <b>KOGAS(5 Normal cm<sup>3</sup>/(min-inch))</b>    |



**DPE**



**SPE**



|                          |  |
|--------------------------|--|
| <b>PROJECT:</b>          | <b>TURBO EXPANDER PROJECT</b>                        |
| <b>END-USER:</b>         | <b>BLACK SWAN ENERGY</b>                             |
| <b>EPC(CONTRACTOR):</b>  | <b>ALCO GAS &amp; OIL</b>                            |
| <b>VALVE TYPE:</b>       | <b>CRYOGENIC BALL VALVE<br/>(SIDE ENTRY, DIB-II)</b> |
| <b>SIZE &amp; RATING</b> | <b>600# / 4", 6", 8"</b>                             |
| <b>OPERATOR:</b>         | <b>MANUAL</b>  |
| <b>Q'TY:</b>             | <b>11 EA</b>   |
| <b>DELIVERY:</b>         | <b>2021</b>  |
| <b>LEAK CLASS</b>        | <b>BS6364(150 Normal cm<sup>3</sup>/(min-inch))</b>  |





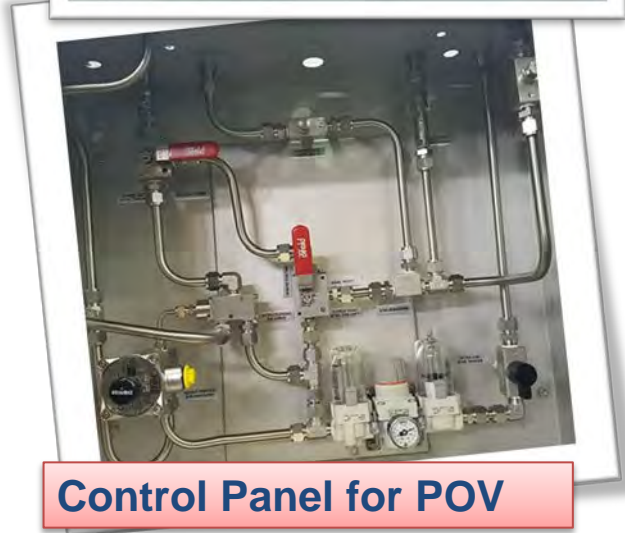
|                          |  |
|--------------------------|--|
| <b>PROJECT:</b>          | <b>X-RELI PROJECT</b>  |
| <b>END-USER:</b>         | <b>SAMSUNG HEAVY INDUSTRIES</b>                              |
| <b>EPC(CONTRACTOR):</b>  | <b>HYLOK KOREA</b>   |
| <b>VALVE TYPE:</b>       | <b>CRYOGENIC BALL VALVES<br/>(SIDE &amp; TOP ENTRY, DBB)</b> |
| <b>SIZE &amp; RATING</b> | <b>150#, 600# / 4" ~ 10"</b>                                 |
| <b>OPERATOR:</b>         | <b>MANUAL</b>  |
| <b>Q'TY:</b>             | <b>8 EA</b>  |
| <b>DELIVERY:</b>         | <b>2021</b>  |
| <b>LEAK CLASS</b>        | <b>KOGAS(5 Normal cm<sup>3</sup>/(min·inch))</b>             |



|                          |   |
|--------------------------|---|
| <b>PROJECT:</b>          | <b>GIHEUNG PLANT</b>                                |
| <b>END-USER:</b>         | <b>AIR PRODUCTS KOREA</b>                           |
| <b>EPC(CONTRACTOR):</b>  | -   |
| <b>VALVE TYPE:</b>       | <b>CRYOGENIC 3 WAY BALL VALVE (SIDE ENTRY, DBB)</b> |
| <b>SIZE &amp; RATING</b> | <b>150#~600# / 1 1/2"~6"</b>                        |
| <b>OPERATOR:</b>         | <b>MANUAL</b>                                       |
| <b>Q'TY:</b>             | <b>18 EA</b>  |
| <b>DELIVERY:</b>         | <b>2021</b>   |
| <b>Leak Class</b>        | <b>BS6364(150 Normal cm<sup>3</sup>/(min-inch))</b> |

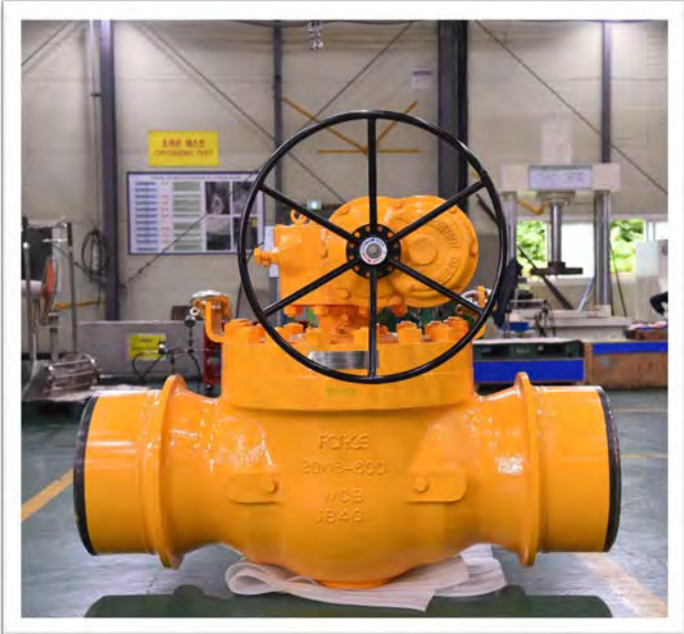


|                          |  |
|--------------------------|--|
| <b>PROJECT:</b>          | <b>INCHEON LNG TERMINAL</b>                              |
| <b>END-USER:</b>         | <b>KOGAS</b>   |
| <b>EPC(CONTRACTOR):</b>  | <b>GS E&amp;C</b>  |
| <b>VALVE TYPE:</b>       | <b>CRYOGENIC BALL VALVES (SIDE &amp; TOP ENTRY, DBB)</b> |
| <b>SIZE &amp; RATING</b> | <b>800#~1500# / 1/2"~2"</b>                              |
| <b>OPERATOR:</b>         | <b>MANUAL, POV, MOV</b>                                  |
| <b>Q'TY:</b>             | <b>391 EA</b>  |
| <b>DELIVERY:</b>         | <b>2017</b>  |
| <b>LEAK CLASS</b>        | <b>KOGAS(5 Normal cm<sup>3</sup>/(min·inch))</b>         |



**Control Panel for POV**

|                          |                                     |
|--------------------------|-------------------------------------|
| <b>PROJECT:</b>          | <b>GWANGYANG 4 TANK</b>             |
| <b>END-USER:</b>         | <b>POSCO ENERGY</b>                 |
| <b>EPC(CONTRACTOR):</b>  | <b>POSCE E&amp;C</b>                |
| <b>VALVE TYPE:</b>       | <b>NG TOP ENTRY TYPE BALL VALVE</b> |
| <b>SIZE &amp; RATING</b> | <b>600# / 20"</b>                   |
| <b>OPERATOR:</b>         | <b>MANUAL / MOV</b>                 |
| <b>Q'TY:</b>             | <b>2 EA</b>                         |
| <b>DELIVERY:</b>         | <b>2021</b>                         |



|                          |   |
|--------------------------|---|
| <b>PROJECT:</b>          | <b>MARGHERA LEVANTE BROWNFIELD</b>                    |
| <b>END-USER:</b>         | <b>ANSALDO ENERGIA</b>                                |
| <b>EPC(CONTRACTOR):</b>  | <b>AC BOILERS</b>                                     |
| <b>VALVE TYPE:</b>       | <b>3 PIECE SIDE ENTRY BALL VALVE (FOR HIGH PRESS)</b> |
| <b>SIZE &amp; RATING</b> | <b>900# / 4", 2500# / 6"</b>                          |
| <b>OPERATOR:</b>         | <b>POV</b>  |
| <b>Q'TY:</b>             | <b>8 EA</b>   |
| <b>DELIVERY:</b>         | <b>2021</b>   |



|                          |  |
|--------------------------|--|
| <b>PROJECT:</b>          | <b>GED &amp; GSRC 2500MW PLUAK DAENG/SIRIRACHA POWER</b> |
| <b>END-USER:</b>         | <b>EGAT / GULF SRC (THAILAND)</b>                        |
| <b>EPC(CONTRACTOR):</b>  | <b>MHPS</b>  |
| <b>VALVE TYPE:</b>       | <b>3 PIECE SIDE ENTRY BALL VALVE (FOR HIGH PRESS)</b>    |
| <b>SIZE &amp; RATING</b> | <b>150# ~ 900# / 1" ~ 12"</b>                            |
| <b>OPERATOR:</b>         | <b>MANUAL, MOV, POV</b>                                  |
| <b>Q'TY:</b>             | <b>207 EA</b>  |
| <b>DELIVERY:</b>         | <b>2017 ~ 2021</b>                                       |



『High Pressure Ball V/V』 - Reference Pictures



Rabigh Project Saudi Arabia (2012)



2500-6"



1500-16"

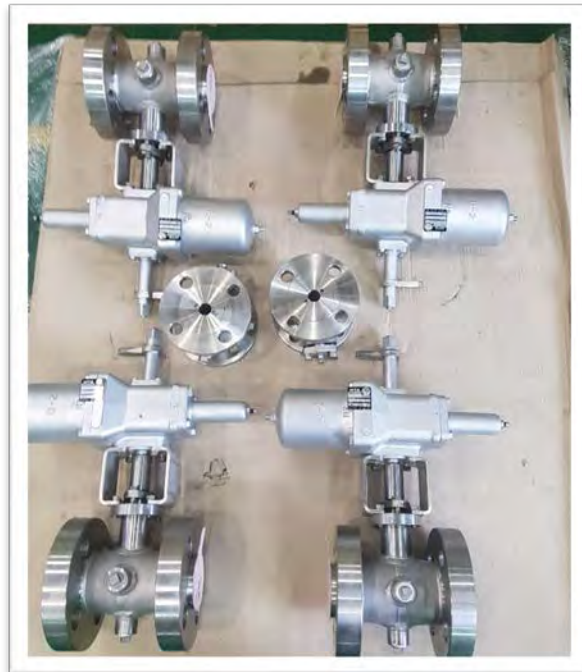


2500-10"



2500-6"

|                          |                                     |
|--------------------------|-------------------------------------|
| <b>PROJECT:</b>          | <b>KAO OLEOCHEMICAL PLANT</b>       |
| <b>END-USER:</b>         | <b>KAO OLEOCHEMICAL SDN BHD</b>     |
| <b>EPC(CONTRACTOR):</b>  | <b>ELMAX</b>                        |
| <b>VALVE TYPE:</b>       | <b>FULL JACKETED BALL VALVE</b>     |
| <b>SIZE &amp; RATING</b> | <b>150# ~ 1500# / 1/2" ~ 1 1/2"</b> |
| <b>OPERATOR:</b>         | <b>MANUAL, POV</b>                  |
| <b>Q'TY:</b>             | <b>24 EA</b>                        |
| <b>DELIVERY:</b>         | <b>2016 ~ 2021</b>                  |

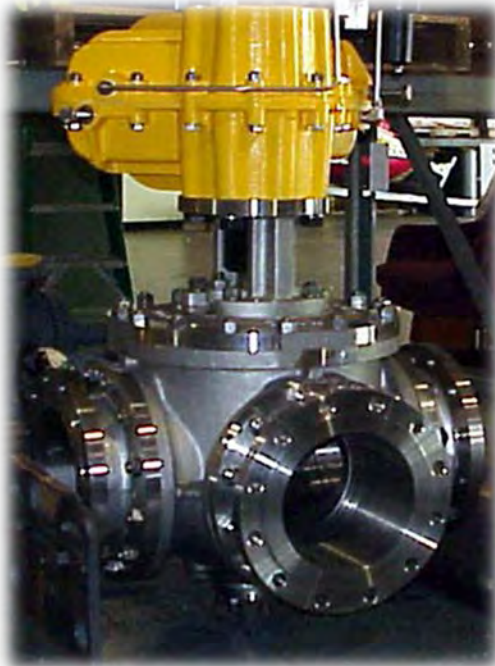




|                           |   |
|---------------------------|---|
| <b>PROJECT:</b>           | PEGAGA PJT - MUBADALA<br>BK18A WHP PJT - PETROVIETNAM<br>SK20 PJT - MUBADALA<br>SVDN - PETROVIETNAM |
| <b>VALVE TYPE:</b>        | AL BRONZE (NI AL-BRONZE)<br>BALL VALVE  |
| <b>SIZE &amp; RATING:</b> | 150# / 1/2" ~ 10"   |
| <b>OPERATOR:</b>          | MANUAL  |
| <b>APPLICATION:</b>       | SEA WATER   |



# 『3 Way Ball Valve』 - Reference Pictures



Y type & T type 3 Way Ball Valve



Sriranka, Colombo Port Expansion Pjt,  
HHI, Metal Seat 150-36"



SEC (Saudi Electricity Company)  
300-30" (A105/F304/410ENP)





**Pneumatic Actuated** Ball Valve  
Sam Nam Petrochemical  
K3 Chemical Reactor GAS OUT



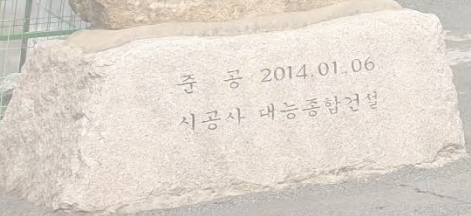
**Cryogenic Ball Valve**  
**LNG Terminal**  
**(Incheon, Jeju, Samcheok, Pyeongtaek, Tongyeong)**



**THANK YOU**



**FORCE**<sup>®</sup>  
등산밸브(주)  
www.force-valves.com



준 공 2014.01.06  
시공사 대능종합건설