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# ADNOC GROUP PROJECTS AND ENGINEERING

## MANUAL PIPING AND PIPELINE VALVES

### Specification

APPROVED BY:

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**GROUP PROJECTS & ENGINEERING FUNCTION/ PT&CS DIRECTORATE**

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This document will be reviewed and updated in case of any changes affecting the activities described in this document.

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a) The following are inter-relationships for implementation of this Specification:

- i. ADNOC Upstream and ADNOC Downstream Directorates and
- ii. ADNOC Onshore, ADNOC Offshore, ADNOC Sour Gas, ADNOC Gas Processing, ADNOC LNG, ADNOC Refining, ADNOC Fertilisers, Borouge, Al Dhafra Petroleum, Al Yasat

b) The following are stakeholders for the purpose of this Specification:

ADNOC PT&CS Directorate.

c) This Specification has been approved by the ADNOC PT&CS is to be implemented by each ADNOC Group company included above subject to and in accordance with their Delegation of Authority and other governance-related processes in order to ensure compliance

d) Each ADNOC Group company must establish/nominate a Technical Authority responsible for compliance with this Specification.

## Definitions:

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**‘CEO’** means chief executive officer.

**‘Group Company’** means any company within the ADNOC Group other than ADNOC.

**‘Standard’** means normative references listed in this specification.

**‘COMPANY’** means ‘Abu Dhabi National Oil Company or any of its group companies. It may also include an agent or consultant authorized to act for, and on behalf of the COMPANY’.

**‘CONTRACTOR’** means the party which carries out the project management, design, engineering, procurement, construction, commissioning for ADNOC projects.

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# GENERAL

## 1 INTRODUCTION

This Specification covers technical requirements of valves intended to be used on ADNOC group of companies' facilities.

### 1.1 Purpose

This Specification provides the minimum requirements for the design, materials, construction, inspection and testing of manual piping valves for process and utility services. This specification also includes pipeline valves used within COMPANY facilities.

### 1.2 Scope

The requirements of this specification shall apply to all valves within ADNOC Group of Companies facilities irrespective of contractual or purchasing requirements for individual projects.

Valves covered are intended for application under the jurisdiction of ASME B31.3 for piping valves and ASME B31.4 & ASME B31.8 and other applicable codes for pipeline valves.

This specification supplements the Codes and Standards listed in Appendix 'A' of Section 'D' of this document and should be read in conjunction with the Piping Material Specification AGES-SP-09-002, purchase description on the Requisition and Valve Data Sheets.

This specification is also applicable to the On/Off valves with actuator (i.e. valves with Pneumatic / Hydraulic / Electrical actuators for example ESD, MOV, HIPPS valves etc.), however for technical requirements of actuator, relevant instrumentations specification (AGES-SP-04-005 ) for actuator shall be referred.

1.2.1 This specification covers following types of valves but not limited to following below.

- Gate type
  - a) Solid wedge
  - b) Flexible wedge
  - c) Split wedge
  - d) Parallel slide
  - e) Through conduit gate valve
- Ball type
  - a) Trunnion mounted and Floating
  - b) Soft seated & Metal seated
  - c) Integral Double block & Bleed, (IDBB)
- Butterfly type
  - a) Single offset
  - b) Double offset
  - c) Triple offset
  - d) Rubber lined



- Check Type
  - a) Piston lift
  - b) Ball Lift
  - c) Disk
  - d) Swing
  - e) Dual Plate
  - f) Non Slam Axial flow
- Globe type
  - a) Straight pattern
  - b) Y pattern
  - c) Angle pattern
  - d) Diaphragm valve
- Plug type
  - a) Lubricated & Non-lubricated
  - b) Jacketed etc.

#### 1.2.2 The following types of valves are excluded from this Specification:

- a) Wellhead & Christmas Tree valves which are covered by ADNOC Group of Companies Specification.
- b) Subsea Valves
- c) Cast iron valves.
- d) Non-metallic valves.
- e) Valves for the instrumentation tubing.
- f) Valves for Heating, plumbing, ventilation and similar piping inside buildings.
- g) Relief valves
- h) Special valves (as noted on the Process and Instrumentation Diagrams (P&IDs)
- i) Control Valves

### 1.3 Valve Data Sheet

The Valve Data Sheet is a critical document which defines all the technical requirements for each type of valve. Valve Data Sheets shall be created for individual projects to meet specific process or facility requirements and the requirements of this specification. Refer Appendix C for sample datasheet of valves. The same shall be further developed during the project stage based on project specific data.

### 1.4 Technical Terms - Definitions

**Cap Screw** - A headed bolt designed to secure two components together by engagement in a drilled and tapped hole (similar but not identical to a machine bolt).

**Cryogenic** – Valves identified as “Cryogenic” in the valve description are intended for service where design temperature is below -50 °C with continuous operating temperature typically below -46°C.

**Dead End Service** - A valve that shall be suitable for pressurized service during which the downstream piping is removed for equipment maintenance. The valve shall be designed such that no downstream flange is required to be installed during service, and the closure shall be leak tight.

**ITP** - Inspection & Test Plan prepared by the CONTRACTOR/ MANUFACTURER, reviewed and approved by COMPANY, highlighting the principal hold and witnessing points during and after the process of the product realization (i.e.: manufacturing, fabrication, construction, installation), to ensure that the quality level of the product is within the acceptable design standards and requirements

**"MANUFACTURER / SUPPLIER / VENDOR"** means the party (parties) which manufactures and / or supplies equipment, technical documents and / or drawings, and / or services to perform the duties specified by COMPANY and CONTRACTOR

**Pressure Containing Parts** - Parts, such as the body, bonnet, cover, bolting and stem or shaft whose failure to function as intended results in a release of contained fluid into the environment.

**Pressure Controlling Parts** - Parts, such as obturator (ball, plug or disc) and seat, intended to prevent or permit the flow of fluids.

**[PSR]** indicates a mandatory Process Safety Requirement

**Fire Safe** - Means compliance with API 607 ISO 10497 or API 6FA unless otherwise specified.

**Wafer Body** - Describes a valve, which is installed between mating pipe flanges and held in place by the compressive force produced by the mating flange bolt forces.

**Lug Body** - Described "single flange" valve where all the flange bolts are covered by the valve body material. The valve is held in place either by the compressive force produced by the mating flange bolt forces (drilled-thru), or by the use of cap screws threaded into the valve body (drilled and tapped).

**Flanged** - Valve is a double-flanged valve that is installed in the piping system with two sets of stud bolts. Some flanged valves have a few drilled and tapped holes due to the valve design (e.g., butterfly valves).

**NACE** - Where specified, means that materials and valves are required to be in accordance with the requirements of NACE MR0175/ISO 15156 & NACE MR0103/ISO 17945 as applicable

**Full Port (Bore)** - The port shall meet the minimum full opening requirements of the design standard or as specified ASME B16.34 Annex A where no port size is defined.

**Standard Port** - Industry terms with varying meanings depending on the design standard. Usually used in conjunction with API 602 valves where a minimum port size is defined but no descriptive term is used. When used with ASME B16.34, API 600 or API 603 valves, these terms mean the port sizes as defined by those standards (i.e., full port per ASME B16.34 Annex A).

**Reduced (Bore) Port** - A port smaller than full port, sometimes defined by the industry standard specified for the valve. For example, API 602 defines port sizes which are reduced port but does not specify a defining term. API 608 lists Reduced Port minimum diameters for each size valve.

**Regular Port** - A port smaller than full port, but larger than reduced port, defined by the industry standard specified for the valve. For example, API 608 lists regular port diameters for each size valve.

**Venturi** - A substantially reduced port valve with a smooth transition from the valve ends to the reduced opening.

## 1.5 Abbreviations

Abbreviation / Acronym	Description
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
AYS	Average yield strength
BW	Butt Weld
CA	Corrosion Allowance
CE	Carbon Equivalent
CNAF	Compressed Non-Asbestos Fibre
COMPANY	Either ADNOC or ADNOC Group Company
CRA	Corrosion Resistant Alloy
CS	Carbon Steel
Cv	Valve Coefficient
DBB	Double Block And Bleed
DIB	Double Isolation And Bleed
DPE	Double Piston Effect
DPT	Dye-penetrant Testing
DSS	Duplex Stainless Steel
ENP	Electro less Nickel Plating
ESD	Emergency Shutdown
Ext WE	Extended Weld End
FF	Flat Face
FKM	Fluorocarbon Elastomer
GALV	Galvanised
GEAR	Gear Operated

Abbreviation / Acronym	Description
H <sub>2</sub> S	Hydrogen Sulphide
HB	Brinell Hardness Number Symbol per ASTM E10
HBNR	Hydrogenated Nitrile Butadiene Rubber
HDSG	Hot Dip Spun Galvanised
HIC	Hydrogen Induced Cracking
HVOF	High Velocity Oxygen Fuel
ISO	International Organization for Standardization
ITP	Inspection And Test Plan
IDBB	Integral Double Block And Bleed
LA	Low Alloy Steel
LTCS	Low Temperature Carbon Steel
MOV	Motor Operated Valve
MSS SP	Manufacturers Standardization Society-- Standard Practice
MT	Magnetic Particle Testing
NACE	National Association of Corrosion Engineers
NBR	Nitrile Butadiene Rubber
NDE	Non-Destructive Examination
NPS	Nominal Pipe Size
NPT	National Pipe Thread
OS&Y	Outside Screw and Yoke Type
PCD	Pitch Circle Diameter (If Referring To Bolting Pattern)
PCTFE	Polychlorotrifluoroethylene
PEEK	Polyetheretherketones
PMI	Positive Material Identification

Abbreviation / Acronym	Description
PQR	Procedure Qualification Records
PT	Liquid Penetrant Testing
PTFE	Polytetrafluoroethylene
RF	Raised Face
RPTFE	Reinforced Polytetrafluoroethylene
RT	Radiographic Testing
RTJ	Ring Type Joint
SDSS	Super Duplex Stainless Steel
SDV	Shut Down Valve
SPE	Specifications Document
SPIR	Spare Parts Interchangeability Report
SMYS	Specified Minimum Yield Strength
TPA	Third Party Agency
TSO	Tight Shut Off
SS	Stainless Steel
SSC	Sulphide Stress Cracking
UNS	Unified Numbering System
QA	Quality Assurance
QC	Quality Control
QMS	Quality Management Systems
UT	Ultrasonic Testing
WPS	Welding Procedure Specification
VDRL	Vendor Document Requirement List

# SECTION A

## 2 NORMATIVE REFERENCES

International Code(s) and Standards are listed in Appendix 'A' Section 'D'

## 3 REFERENCE DOCUMENTS

Reference documents are listed in Appendix 'A' Section 'D'

## 4 DOCUMENTS PRECEDENCE

It shall be the CONTRACTOR's responsibility to be, or to become, knowledgeable of the requirements of the referenced Codes and Standards.

The CONTRACTOR shall notify the COMPANY of any apparent conflict between this Specification, design drawings, the related data sheets, the Codes and Standards and any other Design General Specifications noted herein. Resolution and/or interpretation of precedence shall be obtained from the COMPANY in writing before proceeding with the design/manufacture.

In the event of a conflict between documents, the following hierarchy of adherence shall be followed:

- a. UAE Statutory requirements
- b. ADNOC HSE Standards
- c. Equipment datasheets and drawings
- d. Project Specifications and standard drawings
- e. COMPANY Specifications
- f. National / International Standards

In case of conflict between documents in the same level of hierarchy, the most stringent requirement shall apply. Such interpretation of the most stringent requirement shall be subject to COMPANY's approval utilizing a technical query sheet. In all such cases of conflict, COMPANY's decision shall be final.

## 5 TECHNICAL DEVIATION CONTROL

Deviations from this specification are only acceptable where the MANUFACTURER has listed in his quotation the requirements he cannot, or does not wish to comply with, and the COMPANY/CONTRACTOR has accepted in writing the deviations before the order is placed.

In the absence of a list of deviations, it will be assumed that the MANUFACTURER complies fully with this specification.

Any technical deviations to the Purchase Order and its attachments including, but not limited to, the Data Sheets and Narrative Specifications shall be sought by the VENDOR only through Concession Request Format. Concession requests require CONTRACTOR'S and COMPANY'S review/approval, prior to the proposed technical changes being implemented. Technical changes implemented prior to COMPANY approval are subject to rejection.

## 6 DESIGN BASIS

This specification provides the design basis for the specifications and requirements of Manual Piping and Pipeline valve types.

## **6.1 Design Parameters**

- 6.1.1 The design parameters required for each valve shall comply with the requirements stated in the Index of Piping Classes, associated Piping Material Class documents and individual Valve Data Sheets.

## **6.2 Design Philosophy/Guidelines**

This specification provides the basis of design for manual and pipeline valves used in all ADNOC Group of Company facilities. The design requirements shall be used as guidelines for the development of service and facility dependent Valve Data Sheets and Purchasing documentation.

## **6.3 Environmental / Site Data**

Specific environmental requirements of individual sites / facilities are given within individual project 'Basis of Design' documentation.

## **6.4 Area Classification**

There are no requirements given within this document for specific Area Classifications. However, considerations of individual area classifications are an integral part of the criticality s for all valves.

## **6.5 Minimum Design Requirements**

The requirements for valves provided in this document and associated Valve Data Sheets, shall be considered 'the minimum' to be provided.

## **6.6 Design Life**

Valves shall have a design life of 30 years and be suitable for continuous service in the environment specified

## SECTION B

### 7 VALVE DESIGN

#### 7.1 General

General design requirement of valves shall be as specified below.

#### 7.2 Pressure Temperature

- 7.2.1 Pressure classes shall be specified in accordance with the applicable tables for material groups in ASME B16.34. All valves, including soft seated valves, shall be designed for full pressure temperature class specified in datasheet. Intermediate rated valves shall not be considered. Design and calculations for pressure-containing elements, shall be in accordance with ASME B16.34. Pressure containing bolting design shall be consistent with the chosen valve design code. Materials that are not listed in ASME B16.34, the pressure-temperatures of valves shall be determined in conformance to Appendix B of ASME B16.34 and shall be subject to agreement by COMPANY
- 7.2.2 API 5000 and API 10000 rated valves shall be designed and fully rated in accordance with API 6A/ ISO 10423.
- 7.2.3 For unlisted material (not covered in ASME B16.34) when specifically requested in valve datasheet, vendor shall submit the valve body and the valve seat pressure-temperature along with the quotation. Related calculation shall be submitted by the Vendor during the drawing review stage.
- 7.2.4 Non-metallic materials used as sealing components shall be suitable for use for the full range between the minimum and maximum design temperature at full rated pressure and other applicable design considerations.
- 7.2.5 For Ni-Al-Br valves, valve body and the valve seat pressure-temperature shall be submitted by the VENDOR along with the quotation.
- 7.2.6 Valves with ASTM A494 CW6MC material shall be designed for valve pressure temperature in accordance with ASTM B564 UNS N06625 material pressure temperature. (ASME B16.34, Table 2-3.8).

#### 7.3 Corrosion Allowance

- 7.3.1 Unless specified otherwise on the valve data sheets, the minimum corrosion allowance for carbon and low alloy steel valves shall considered 3 mm, for valves used in Piping Material Classes with CA values 3 mm and below. For valves used in Piping Material Classes with CA values of 4.5 mm or 6 mm the valve design shall comply with that value. Some non-CS/LTCS Piping Material Classes specify CA values. Valves used in such piping material classes shall be designed and supplied with CA allowances to match the individual piping material class requirements.
- 7.3.2 The required corrosion allowance shall be in addition to the minimum thicknesses specified in the valve design code and ASME B16.34.
- 7.3.3 Additional thickness due to weld overlay cladding shall not be considered as a part of pressure retaining thickness of the valve.

#### 7.4 Valve Face to Face or End to End Dimensions

- 7.4.1 The face-to-face dimensions for flanged end (flat face, raised face or ring joint) valves and end-to-end dimensions for butt-weld end valves shall conform to ASME B16.10/API 6D or other international standards as applicable.



- 7.4.2 Valves in larger sizes not covered by ASME B16.10/API 6D (or as per applicable international code/standard) shall be to the VENDORS standard and the face to face dimension shall be submitted as a part of technical bid documents for COMPANY review/approval.
- 7.4.3 Valves with sizes higher than the standard code limits, design rules for the valves shall be submitted by the VENDOR during the bid stage itself and agreed with COMPANY. Such valves shall be subject to FEA study or equivalent by the VENDOR.
- 7.4.4 Valves in API 5000 and API 10000 class shall be to API Spec 6A/ ISO 10423.
- 7.4.5 For double flanged pattern valves, vendor shall ensure nut space between flanges is adequate to allow for at least two threads to protrude beyond the nut (heavy series nuts ASME B18.2.2) without contacting each other.
- 7.4.6 IDBB valves end to end dimensions shall be as per Manufacturer standard and with agreement with COMPANY

## **7.5 Valve End Connections**

- 7.5.1 The valve flanged ends shall be integral with the valve body or end closure forging or casting. Flanged end valves with welded on flanges are not permitted.
- 7.5.2 Flanged end dimensions, tolerance, face finishes, drilling templates, and flange facing including gasket surface finish, shall be in accordance with the following:
  - 7.5.2.1 ASME B16.5 for NPS 24 and smaller.
  - 7.5.2.2 ASME B16.47 Series A for flanges larger than NPS 24
  - 7.5.2.3 Ring joint grooves shall be in accordance with ASME B16.20.
  - 7.5.2.4 For Flanges not covered in ASME B 16.5 / ASME B16.47, the flanges shall be designed as API 6A, ASME Sec VIII, Compact flanges as per BS EN ISO 27509 or Hub connections as specified in the Valve datasheet
  - 7.5.2.5 Gasket contact faces of valves shall receive the same finish machining as the contact faces of the piping flanges between which these valves will be installed. This flange face finish shall be in accordance with Piping Material specification AGES-SP-09-002
- 7.5.3 The back faces of flanges shall be machined flat, either as spot facings at the nut positions or machined over the entire back flange area. The nut seating area shall not present an "as cast" or "as forged" surface for the nuts. Additionally, the valve end connections shall be designed to allow heavy series nuts (ASME B18.2.2) to be used for the piping connections, allowing for at least two threads to protrude beyond the nut with a minimum of 5mm gap to other valve body parts or bolting.
- 7.5.4 For valves with FF flanges (ASME Class 150 & 300), VENDOR shall provide the full thickness of flange. Removing the 2mm raised face is not acceptable and the valve shall be considered as non-standard.
- 7.5.5 Socket Welded ends shall be as per ASME B16.11 and ASME B31.3. Socket welded (SW) end valves with soft seats like ball valve shall be provided with integral nipple.
- 7.5.6 Threaded ends shall be as per ASME B1.20.1, Taper
- 7.5.7 Butt Welded End Valves ; The following additional requirements are applicable

- 7.5.7.1 The material and wall thickness for the pipe extension spools shall be stated on the Valve Data Sheet.
- 7.5.7.2 Unless specified otherwise on the valve data sheets, weld end valves that contain elastomer or polymer seals or seats shall have extension spools (pipe pups) as specified below. For soft-seated valves, the pup pieces shall be welded to the valve before the valve internals are installed.

Valve Size	Pup Length ( Excluding transition piece length if required)
NPS 2 to NPS 8	200 mm
NPS 10 to NPS 20	Minimum 1D or Maximum 500 mm
NPS 24 and above	800 mm
NOTE 'D' being NPS	

- 7.5.7.3 The manufacturer shall provide the pup pieces as forgings equal to the highest material grade specified, that being the valve body or the associated piping/pipeline. The pup pieces shall be considered as an integral part of the valve. Valves requiring welded ends shall be supplied complete from manufacturer. This is to ensure welding compatibility and body or seal performance
- 7.5.7.4 Requirement of transition piece between valve body and pup piece to be reviewed by the Valve vendor. Generally, it is recommended to provide transition piece where the valve body thicker is thicker than 1.5 times pup piece wall thickness. Transition tapers shall not be steeper than 1:4 and comply with ASME B31.3, Figure 328.4.3.
- 7.5.7.5 Pup-pieces material shall be supplied in accordance with the relevant piping or pipeline material class.. Outside diameter, wall thickness, material grade and composition of the pup pieces shall be as specified in the Valve datasheet. Vendor shall provide test rings (500mm long) from pup piece material for field weld procedure qualification in case pup piece is of forged execution.
- 7.5.7.6 Butt welding end valves manufactured by machining the flanges off a flanged end valve shall not be used.
- 7.5.7.7 Heat treatment shall be performed if required by the applicable material specification and applicable piping design code. Additional requirements for heat treatment to ensure suitability for service conditions shall be as specified on the valve data sheets. Final heat treatment shall be performed after forging and before machining
- 7.5.7.8 Post weld heat treatment, if required, shall be performed prior to final valve assembly.
- 7.5.7.9 Pipe pups shall permit hydrostatic shell testing of the valve after welding. When the test pressure is limited by pup pieces, the manufacturer shall highlight it to the purchaser in order to establish adequate testing procedures and manufacturing sequence.
- 7.5.7.10 Valves requiring extension (pup) pieces welded to the valve body, shall be supplied complete from the manufacturer or their designated sub-contractor to ensure seal performance and welding compatibility with the body.
- 7.5.7.11 An intermediate adaptor to match pipe thickness to valve body thickness shall be provided where necessary, to allow for transition between the valve body (material grade and thickness) and the adjacent pipe (material grade and thickness) to which the valve is intended to be connected. Transition tapers shall not be steeper than 1:4 and shall comply with ASME B31.3, Figure 328.4.3 (ASME B31.8, Figure I 5 or ISO 13847, 7.7).
- 7.5.7.12 The heat and heat-treatment batch number shall be clearly marked on the pup piece.

#### 7.5.8 Compact Flange End Valves

When compact flanges specified in the valve datasheet, below shall be complied with.

- a) Compact Flanges as per BS EN ISO 27509 and additional requirements specified in AGES-SP-09-002 and AGES-SP-09-013
- b) For sizes not covered in BS EN ISO 27509, Compact Flanges shall be as per manufacturer's standard and valve VENDOR shall coordinate with compact flange VENDOR to properly integrate the compact flange design into the valve body design and shall get the necessary flange details from compact flange VENDOR to incorporate the compact flanges at the valve ends.
- c) Valve shall be supplied along with mating compact flanges, if compact flange size not covered in standard BS EN ISO 27509. Such flange joint shall be subject FEA analysis. Calculation report shall be submitted.

#### 7.5.9 Hub End Valves

- a) For case of hub ended valves when specified in datasheet, the hubs shall be integral part of the body and shall be of Graylok or Techlok or approved equivalent type. The valve shall be supplied with clamp assembly, seal ring, bolting and two mating hubs with BW ends to match pipe dimensions (OD x wall thickness) and metallurgy specified in the valve data sheet.
- b) Hub connector shall meet the requirements specified in AGES-SP-09-002 and AGES-SP-09-013

### 7.6 Valves in Steam Service

- 7.6.1 For isolation service, gate valves shall be used for steam service.
- 7.6.2 Globe valves shall be Y type pattern to reduce pressure drop and erosion damage.
- 7.6.3 Gate valves in steam and condensate service will be subject to temperature changes, and any liquid trapped within the valve cavity will expand and cause excessive cavity pressure. To avoid binding of wedge and seat, flexible wedge/parallel wedge type gate valves shall be used for sizes NPS 2 and above.
- 7.6.4 The welded seat and backseat shall be designed to minimize possible erosion damage between seating elements and the body.
- 7.6.5 In steam and condensate systems the body cavity relief (pressure equalization) provisions shall be given in valves for NPS 2 and above.
- 7.6.6 For steam services, valves NPS 6 and larger in ASME class 600 and higher shall have a bypass valve for preheating and pressure balancing.
- 7.6.7 For high pressure applications ( $\geq 900\#$ ) Pressure seal Gate valves designed to API 600 & ASME B16.34 is acceptable for steam service. The body to bonnet gasket shall be made of die-formed flexible graphite
- 7.6.8 For metal seated rising stem valves in sizes  $\geq$  NPS 3, the body seat(s) and back seat shall be integral or fully welded in.

### 7.7 Auxiliary Connection of Valves.

- 7.7.1 Valve bodies specified with tapped openings shall be bossed, drilled and tapped in accordance with ASME B16.34. Threads shall be internally taper threaded in accordance with ASME B1.20.1.
- 7.7.2 Number of auxiliary connections on the valve body shall be minimized.
- 7.7.3 The valve body cavity drain, and vent connection shall be at the lowest and the highest point respectively. The projection of all auxiliary connections beyond valve body shall be minimized to avoid damage during valve handling. Positions for vent & drain connections shall be in accordance with ASME B16.34.
- 7.7.4 Vent and drain connections if provided, minimum sizes shall comply with MSS SP-45. For sizes NPS 26 and above, the minimum size of connection shall be NPS 2.

- 7.7.5 For valve sizes NPS 8 and above, auxiliary body connection for drain and vent shall be terminated in a flange and blind flange. The flange shall have pressure class and facing equal to that of the valve body flange. The flange shall be integral or welded to the valve body. A full penetration welded and sufficiently braced flanged design; or a pad type flanged connection, fitted with a blind flange are acceptable. If a pad type flanged connection is applied, it may be integrally machined with the valve body. The bolt and gasket material shall be same as that of valve and as specified in respective valve datasheets.
- 7.7.6 Valves with a bore of NPS 3 and smaller may have a single drain and vent connection, at the lowest possible position on the valve body cavity.
- 7.7.7 Plugs at the body vent and drain shall be anti-blow out type and shall be with double O-ring with one fire safe seal. The plug shall have a primary seal inboard of the thread as that ( of same material as primary static seal of valve) , in order to protect the thread against crevice corrosion. Bleed plugs shall be protected and secured against any involuntary or undue operation. Seal welding of plugs to valve body is not permitted. Material construction of the plug assembly shall be minimum equal to the valve trim material indicated in the valve datasheet.
- 7.7.7.1 The plug shall be securely locked to prevent loosening by a grade 316 stainless steel locking ring secured to the body.
- 7.7.7.2 All fittings shall be rated to at least the hydrostatic shell test pressure of the valve.
- 7.7.7.3 Threaded connections shall have a parallel profile in accordance with ISO 228-1 and fitted with a parallel threaded plug.
- 7.7.8 For corrosion resistant alloy (CRA) clad valve, the area where drain and vent ports breach the CRA layer shall be suitably weld over-laid to avoid exposure of base material to the service fluids. In case the drain ports are fitted with a welded Inconel insert, it shall have an integral shoulder on the valve cavity side to prevent blow out in case of attachment weld failure.
- 7.7.9 The sealant injection fittings shall incorporate a giant button head connection which is protected by a threaded cap. The protective cap shall have seal-off the button head connection by plugging the sealant port and shall allow any entrapped pressure to be released by the provision of a vent hole. The outer threaded connections shall have a parallel profile in accordance with ISO 228-1 and fitted with a parallel threaded plug.
- 7.7.10 Injection devices shall be designed in accordance with ASME VIII Div 2 or a similar recognized industry design code.
- 7.7.11 Seat and stem sealant injection points shall have two non-return valves, each with a tungsten carbide ball and UNS N06625 spring, where one of the non-return valves shall be placed in a separate fitting inside the valve body. Material of construction of all auxiliaries related to sealant injections shall be minimum equal to valve trim. The non-return valve in the body wall shall be secured independent of the injection fitting. The internal check valve size shall be NPS 1/4 minimum. The threads shall be protected from the process fluid by seal and there shall be at least one fire safe seal.
- 7.7.12 Stem injection point shall be located above the primary sealing barrier inboard of the thread to prevent crevice corrosion. The connection between plug and body shall provide a fire safe secondary seal outboard of the thread, in order to protect the thread against atmospheric corrosion. Graphite fire safe seal shall not be considered as a primary sealing barrier.
- 7.7.13 Design of the seat injection points to the seat shall enable cleaning and injection of sealant, to the ball and seat sealing surfaces.

- 7.7.14 The design of seat injection facility shall incorporate a sufficient number of injection fittings and canals to the seat area, to ensure good distribution of sealant or cleansing agent. A minimum of two injection fittings per seat shall be provided for valves NPS 16 (DN 400) and above. Injection fittings shall be equally spaced around the perimeter starting from the horizontal axis.
- 7.7.15 The requirement for auxiliary connection for ball and IDBB valves shall be as shown in the below table as applicable.

Type Of Connection / Accessory	
Vent / Drain	YES
Sealant injection facility of upper stem for size NPS 6 and above	YES
Sealant injection facilities of seat for size NPS 6 and above for soft seated ball valves	YES

## 7.8 Additional Design Features

- 7.8.1 Valves supports (legs or saddles) shall be supplied and installed by the valve Manufacturer on valves of nominal mass of 250 kg and above. These supports shall only intend for shop testing, inspection, maintenance, storage & transportation. These valve supports are designed for the valve full of water, equipped with its actuator and gear box, excluding any other kind of loading. Such supports are not intended to be used as line support unless otherwise specifically indicated and approved by VENDOR. In such cases piping load at support point shall be furnished to valve vendor to design valve/support accordingly. Support design documents shall be submitted for approval including calculation notes.
- 7.8.2 Valve body shall withstand a compressive axial thrust equal to the design pressure times the maximum valve area. The thrust load shall not cause excessive distortion of the valve body, loss of sealing at the stem or between the closure member and the seats or affect the free movement of the closure member.
- 7.8.3 Valves with a closed body cavity shall have a means for relieving overpressure caused by thermal expansion of fluids.
- 7.8.4 Valves shall be clean and free of moisture and grease and assembled in clean conditions
- 7.8.5 Valves design shall minimize fugitive emissions. Particular attention shall be paid to have high integrity valve stem and seals with no leakage to the environment. All such valves shall meet fugitive emissions test tightness as per BS EN ISO 15848 Part 1 & Part 2 with leakage class as per Section 11.1.1 unless otherwise specified in datasheet.
- 7.8.6 Soft seated valves shall be equipped with an anti-static feature/device as per applicable valve code/standards to ensure electrical continuity between ball, stem and body of valves. For this purpose, graphite seals are not considered to offer satisfactory electrical continuity. Anti-static device test shall be as per BE EN 12266-1 & 2
- 7.8.7 Cryogenic Service and Low Temperature Service Valves
- 7.8.7.1 Cryogenic service valves i.e., design temperature below - 50°C and with continuous operating temperature below - 46°C shall have extended bonnets (to meet vapour space requirement ) and

cryogenic acceptance testing in accordance with the requirements of BS 6364. The length of the extension shall be sufficient to maintain the stem packing at a temperature high enough to permit operation within the normal temperature range of the packing material.

7.8.7.2 However if the valves are only operating for short term low temperature excursion below  $-50^{\circ}\text{C}$  ( with normal operating temperature above  $-10^{\circ}\text{C}$ ) then non-extended bonnet is acceptable provided the valve seals and packing are designed for minimum design temperature. Typical example of such cases are non-operable valves during depressurization and/or non-insulated valves. In addition Cryogenic Valves with a closed body cavity shall have a means for relieving overpressure caused by thermal expansion of fluids.

7.8.7.3 Valves in pipe class with minimum design temperature of  $-46^{\circ}\text{C}$  (non cryogenic pipe class) and if they are operating in continuous operating temperature between  $-10^{\circ}\text{C}$  and  $-46^{\circ}\text{C}$  then extended bonnet valves to meet vapour space requirement in line with requirements of EEMUA 192. The length of the extension shall be sufficient to maintain the stem packing at a temperature high enough to permit operation within the normal temperature range of the packing material. .

7.8.7.4 The backseat of rising stem valves shall be located at the top of the extended bonnet. A stem guide bushing shall be applied at the lower end of the extended bonnet. Quarter turn valves having a primary stem seal shall have it located just below the packing box.

7.8.7.5 Pipe or tubing for extension bonnets shall be seamless. Unless specified otherwise, the extended bonnet shall be constructed from the same material as the valve body.

#### 7.8.8 Fire Safe Requirements

7.8.8.1 Regardless of the valve type, all valves containing polymeric/elastomeric materials/installed on hydrocarbon/ flammable fluid lines shall have a "fire safe and fire type-tested certified design" in accordance with ISO 10497 or API 6FA or API 607 and shall include minimum a graphite fire safe barrier in the valve bonnet and stem sealing arrangement

7.8.8.2 Fire safe test shall be as per BS EN ISO 10497 or API 6FA or API 607 as applicable. All valves offered shall have qualified Fire test certification, details of which shall be available for PURCHASER review. The material of construction of valves in the certificate shall not be different/ vary from the material in data sheet.

7.8.8.3 Pre-existing design already qualified in conformance to ISO 10497, API STD 6FA or API 607 is also be used. The validation of the qualification will be limited to valves of the same design, showing same sealing materials as identified by ISO 10497 and same sealing arrangement as the "fire-tested" valve

7.8.8.4 Fire type test shall be conducted and witnessed by an independent agency.

7.8.8.5 When fire type-testing certification of the design is required, graphitic or metallic seals shall be provided to protect the valve against leakage in case of a fire.

#### 7.8.9 Lethal Service and Category M Service requirements

7.8.9.1 Fugitive emissions test for valves in lethal services shall be as per ISO 15848 Part-1 and 2. All valves shall confirm to fugitive emission Class A as per ISO 15848. (Refer Section 11.1.1 below)

7.8.9.2 Requirements and recommendations of ASME B31.3 Chapter M307.2 and Appendix F shall be met.



#### 7.8.10 High Temperature Service Valves

- 7.8.10.1 Valves for temperatures above 450 °C shall be supplied with heat dissipation bonnets, meeting the minimum length requirement for heat dissipation to minimise the potential for oxidation of graphite which can affect the performance of valve.
- 7.8.10.2 The backseat of rising stem valves shall be located at the top of the heat dissipation bonnet. A stem guide bushing shall be applied at the lower end of the heat dissipation bonnet. Quarter turn valves having a primary stem seal shall have it located just below the packing box
- 7.8.10.3 Unless specified otherwise, the heat dissipation bonnet shall be constructed from the same material as the valve body. All chemical composition, inspection, testing and certification requirements for the valve body apply to the heat dissipation bonnet

### 7.9 Valve Internal Components Design Features

#### 7.9.1 Gland Packing /Seals, Associated Housing and Gaskets

- 7.9.1.1 Stem Packing and stem seals shall take into account the requirement for low emission, low maintenance service and shall be specifically engineered to achieve low emission.
- 7.9.1.2 The stem housing shall be overlaid with CRA material equivalent to valve trim to prevent corrosion between stem and housing. Depending on the design, the housing may be the bonnet, seal carrier and/or gland adjuster.
- 7.9.1.3 The gland follower shall be designed to protrude into the stuffing box by at least 2 mm before compressing the packing rings.
- 7.9.1.4 Threaded glands shall not be used.
- 7.9.1.5 The gland flange shall be one-piece. Split type gland flanges are not permitted.
- 7.9.1.6 Valve shall be supplied with the gland flange 90° to the stem.
- 7.9.1.7 Materials which are highly toxic to the environment or potentially carcinogenic shall not be used
- 7.9.1.8 The packing selected shall be non-Asbestos, compatible with the stem material, impregnated with sacrificial corrosion inhibitor.
- 7.9.1.9 Uninhibited graphite or carbon-type packing is not permitted, especially where in contact with stainless steels. Buna-N and Polyurethane are not permitted.
- 7.9.1.10 Graphite packing (excluding end rings) shall be low to medium density upper limit of 1.6 gm/cc and of high purity with a non-metallic, inorganic, phosphorous based, passivating, and corrosion inhibitor. Corrosion inhibitor shall be impregnated prior to die forming.
- 7.9.1.11 Graphite based valve stem packing, corrosion inhibited, die-formed flexible graphite with anti-extrusion rings, shall be used for proper sealing and further shall be adequate to control fugitive emission for appropriate services as specified.
- 7.9.1.12 Stem packing shall be serviceable / replaceable under full pressure, with valve open on stream. Metallic body gasket shall have corrosion resistance equal, at least, to that of the body and bonnet materials and shall be suitable for the process design conditions.
- 7.9.1.13 CNAF jointing shall generally comply with BS 7531 Grade X or DIN 3754. The face shall be treated with graphite or graphite compound, except when in contact with Austenitic Stainless Steel where an aqueous solution is likely to be present.
- 7.9.1.14 Graphite packing shall not be used when the service medium contains seawater.

- 7.9.1.15 Split packing arrangements that incorporate a lantern ring shall be provided only if specified on the valve data sheets. For a split packing arrangement, lantern ring shall be a one-piece bushing of a material that is compatible with packing material and service conditions.
- 7.9.1.16 No gasket compounds shall be used on any flanged component other than a light application of either graphite and oil or light petroleum grease.
- 7.9.1.17 New gaskets shall be installed in valve bonnet and cover joints that were opened for any reason during the course of testing.
- 7.9.1.18 Any valve gland packing or stem seal that leaked during testing shall be replaced with new material following thorough drying of the gland and packing cavity. Shell and Seat hydrostatic testing shall then be repeated for these valves.
- 7.9.1.19 The type or style of valve stem packing, or stem seals used during pressure testing shall be the same as that specified to be supplied with the valve.
- 7.9.1.20 All gasket surfaces shall be thoroughly cleaned and dried prior to preparation for packing and shipment.

#### 7.9.2 Resilient (Soft) Seat Inserts

- 7.9.2.1 Soft seated valves shall have a thermoplastic seat insert as specified on the valve data sheets.
- 7.9.2.2 The soft seat and seal materials specified in the valve data sheet are COMPANY preference and indicative only. Valves manufacturer and sealing manufacturer shall jointly validate the soft seat & seal materials for suitability for design, size and service condition
- 7.9.2.3 Soft seat shall withstand repeated open-close cycling without damage, cold flow, etc.
- 7.9.2.4 The following polymers shall be recommended and shall be confirmed by the valve Vendor & Sealing manufacturer: for the Design pressure and temperature limits, size and service condition (example sour service, etc.). Soft seat materials listed in below table should be limited to 150 °C.

Class	Type
600 and below	RPTFE / Modified RPTFE
Class 900 and above	PEEK
Cryogenic Service	PCTFE

- 7.9.2.5 For wedge gate valves that employ soft seats:
  - a) Wear travel shall not be less than that required for the metal backup seat plus 2.3 mm (0.09 in), minimum.
  - b) Seat width shall be 2.4 mm to 6.4 mm (0.094 in to 0.25 in). The total remaining metal seat shall be no less than the width of the soft seat.

#### 7.9.3 Elastomers for Valve Sealing

- 7.9.3.1 Elastomers used in valves, shall be compatible with:
  - Operating conditions.
  - Fluid Service / Product.
  - Test fluid.
  - Specified injected fluids.



- 7.9.3.2 Electrometric (elastomers) materials for seal shall be resistant to Explosive Decompression and shall be suitable for long term exposure to the transported fluid at design conditions. MANUFACTURER of seal material shall provide historic test, or qualification test or service data proving compatibility of their product in Sour environment in accordance to either NORSOK M710 / ISO 23936 / NACE TM0187. (Refer AGES-SP-07-003)
- 7.9.3.3 Rapid gas decompression resistant grades shall be used for all classes 150 and above
- 7.9.3.4 For seals at risk from rapid gas decompression in Class 300 and above, the O-ring section shall be limited to 0.275 in (6.99mm), unless specified otherwise. In addition, seals shall be fitted with groove fill of at least 85% for explosive decompression resistant O-rings
- 7.9.3.5 Seal rings shall be fully contained to minimise the extrusion.
- 7.9.3.6 Vendor to propose the suitable sealing system when datasheet or purchase description specifies the vacuum design condition.
- 7.9.3.7 Stem seals shall be self-energizing. Alternatives shall be subjected to Company approval.
- 7.9.3.8 Arrangements consisting of only a single O-ring or lip seal shall not be permitted for the stem sealing on Class 600 and above, instead there shall be two seals. It shall not be assumed that graphite “fire seals” provide an effective additional seal.
- 7.9.3.9 The housing design of elastomeric O-rings shall prevent risk of extrusion by use of thermoplastic back-up rings on both sides (PEEK or RPTFE) for valves in piping class 900 and above.
- 7.9.3.10 For service temperature below up to -29°C, acceptable seal material are JW Elast-O-Lion series, JW-Aflas, Kalrez, Chem-O-Lion or approved equivalent. (with prior approval from Company). Service suitability of the selected seal materials are to be endorsed jointly by the Valve Vendor and seal supplier.
- 7.9.3.11 Seal material for chemical injection line shall be Kalrez or approved superior equivalent. Sufficient mixing length shall be provided for the first isolation valve downstream of the chemical injection point, otherwise selection of the seal materials shall be reviewed case by case for these locations.
- 7.9.4 Lip Seals
  - 7.9.4.1 Lip seals shall be used in lieu of elastomeric seals (O-rings) for design rated pressures and temperatures below -20 °F (-29 °C) or where specified on the Valve Data Sheet.
  - 7.9.4.2 Lip seals shall have an anti-collapse design incorporating RPTFE (limited to a maximum of class 600), PEEK or metal support ring, to prevent crushing against backpressure in the reverse direction. The jacket and spring design of lip seals shall be capable of accommodating these requirements.
  - 7.9.4.3 Lip seals and V-packing (chevron) seals shall only be used on metallic surfaces of corrosion resistant material or with corrosion resistant overlay minimum equal to valve trim material (both at the dynamic and static sealing areas such as body joint).
  - 7.9.4.4 Wherever valves with PTFE lip seal stem sealing, associated with sealant injection requirement, the seal shall be of anti-collapse design so that the injection of fluid does not compromise the integrity of the PTFE lip seal.
  - 7.9.4.5 Vendor shall confirm lip seals are designed for service, with consideration to avoid dirt accumulation at the lip seal.
  - 7.9.4.6 Backing ring at the lip seal is Elgiloy or approved equivalent.
  - 7.9.4.7 Polymeric sheath at the seal shall be preferably RPTFE or PEEK.

- Secondary back packing at the stem seal shall be chevron type V Pack followed by graphite packing.
- Lip seal housing shall be designed for anti-ingress of solid particle.
- Springs used in lip seals shall be UNS R30003 or UNS R30008.

#### 7.9.5 Valve Stem

- 7.9.5.1 Stem shall be designed such that in the event of failure, it shall occur outside the valve pressure boundary.
- 7.9.5.2 Unless approved otherwise by the Purchaser, ball valve stems and plug valve/butterfly valve shafts shall be blow-out proof. "Blow-out proof" shall mean that no portion of the stem or shaft can be ejected from the valve due to internal pressure from the following causes: failure of the stem, shaft, stem-to-disc attachment or shaft-to-disc attachment; removal of the stem nut from the yoke; removal of the packing gland; removal of the handle. The anti-blow-out stem retention configuration shall be located internally in the valve to ensure stem ejection is impossible when external non-body/bonnet fasteners are removed.
- 7.9.5.3 Valve stems shall be designed such that the weakest section (thus the location which will fail preferentially) is outside of the pressure boundary. The stem or shaft retainer ring or collar shall be integral with the stem. Screwed connection between stem and closure member is not acceptable.
- 7.9.5.4 Stem design shall prevent galling potential between similar corrosion resistant materials.
- 7.9.5.5 Sealing surfaces (including packing area) on the stem shall have surface finish in conformance to the seal and packing material supplier's recommendation.
- 7.9.5.6 For all other valves where the stem and obturator/plug are separate components, stem shall be manufactured from wrought material (such as forgings or hot rolled bar) to a defined ASTM standard (or equivalent). Welded fabrication is not allowed.
- 7.9.5.7 Rising stem designs shall include feature(s) that minimise the risk of rubbing or galling of the stem on either the seal/gland packing bore and/or gland packing retainer/cover. The stem shall be suitably supported and have clearances sufficient that with all anticipated side loads it does not make rubbing contact with the adjacent static metallic components (e.g., bonnet, gland ring).
- 7.9.5.8 Stems of valves in emergency shutdown applications and/or fast operating conditions (faster than 1 second per inch of bore) should have stem rubbing prevented by the use of tungsten carbide coating.

#### 7.10 Design Requirements for Specific Valve Type

##### 7.10.1 Gate Valves

- 7.10.1.1 Unless otherwise noted in Datasheet of respective gate valve type, following valve design code and gate valve type shall be applied

Valve Body material.	Size NPS	Design Standard	Wedge Design (Note- 3, 4)	Face to Face Dimension (Note-2, 3, 4)	Flange standard (Note 3, 4)
Carbon steel, LTCS and Stainless Steel	≤ 1 1/2	API 602 + ASME B16.34	Solid Wedge	ASME B16.10	ASME B16.5/ B16.47
	≥ 2 up to NPS 42	API 600 + ASME B16.34	Flexible Wedge ( with “tapered H” cross section) / Parallel wedge ( spring-loaded type closure member ) (Note1)		
	> 2 up to NPS 36	API 6D	Through Conduit Gate		
CRA Body (Including fully CRA clad Valve)	≤ 1 1/2	API 602 + ASME B16.34	Solid Wedge		
	≥ 2 up to NPS 42	API 600/603 + ASME B16.34	Flexible Wedge		

Note-1: For steam service, parallel slide gate valve/flexible wedge should be used

Note-2: For sizes not listed, dimensions shall be as agreed with COMPANY during the Enquiry stage itself.

Note-3: API 5000 and API 10000 rated valves shall be designed and fully rated in accordance with API 6A

Note-4: Beyond the applicable standard sizes, Manufacturer Standard will be applicable unless specified otherwise.

#### 7.10.1.2 Specific Requirements

- Gates, in wedge gate valves shall be forged or cast. Welded fabrication is not acceptable.
- Gate Valves shall be Outside Screw and Yoke (OS&Y), bolted bonnet, gland, rising stem, non-rising operator and provided with back seats. Valve wedge and back seat shall be hard faced. Seat and Seat rings shall be renewable and hard faced. Hard facing shall be with Stellite 6 or equivalent unless otherwise specified.
- Wedge for gate valves NPS 2 and larger shall be flexible type unless otherwise specified. A disc and stem connection shall be designed in such a way that the disc and the stem cannot be separated when the valve is oriented in any position or any loading the connection may see during valve operation.
- All through conduit gate valves shall be of double block and bleed design.
- All gate valve shall be provided with back seats features. Backseat material shall be same as that of valve trim.

- f) Unidirectional valves shall have the direction of flow marked by an arrow pointing downstream. The arrow shall be an integral part of the valve body, positioned at a prominent place so as to be easily visible.
- g) Valves shall be designed to seal in both directions i.e. bi-directional against full pressure requirements for the relevant ASME 16.34 pressure class.
- h) Unless noted otherwise in the valve data sheets, valves shall be provided with renewable seats.
- i) Bonnet gaskets for the valves shall be suitable for the service conditions specified in the data sheets.
- j) Class 2500 gate valves designed to API 602, shall have same equivalent flow passageway as specified for class 1500
- k) Seat rings either shall be integral or fully welded for sizes < NPS 2.
- l) Renewal seats (for sizes > NPS 1 ½), which are threaded, rolled or pressed in place, shall be positively secured against loosening by mechanical deformation, typically swaging.
- m) If body cavity relief is specified, it shall be a pressure equalizing hole with a diameter of at least 3 mm, drilled in the closure member outside the seat facing area. The pressure relief hole shall connect the valve body cavity with the High Pressure (HP) side of the closure member when this is in the closed position. This renders the valve as unidirectional. Other pressure relief provisions (e.g., a machined groove in one of the seat rings) shall not be used.
- n) The (flexible) wedge and body of gate valves shall have guide surfaces:
  - covering the full travel of the wedge,
  - integral cast or made of separate components and fully welded into position.
  - engaged with the guide slots or lugs of the closure member
- o) The wear travel of body and gate seating surfaces of gate valves shall comply with API 600 Clause 2.3.9 and Figure 3. The guide slots or lugs of the closure member shall be of ample length, provide proper guiding throughout the entire travel and minimize wear of the seats.
- p) The design of gate and body guides shall be optimized with respect to chamfers, clearances, machining and hard facing to ensure valves operate smoothly in all orientations without self-locking, seizure, internal wear or galling effects in the absence of any form of lubrication
- q) For gate valves the seating surfaces of the wedge shall not touch the body seat rings until near the point of closure
- r) Separate back seat materials shall have the same material composition as either the trim
- s) Gate valves with a flexible wedge:
  - Flexible wedges shall be made from a solid piece of material (mono block).
  - Rolled-in closure member seat facing rings shall not be used.
  - Wedges with a button-form connection for the stem are not acceptable.
- t) Parallel slide gate valves with spring loaded type closure member shall consist of independent discs, which shall be connected to the stem by a disc carrier.

## 7.10.2 Ball Valves

### 7.10.2.1 Applicable Codes/standards

- Flanged and butt weld end valves NPS 1 ½ and below shall be to API 6D
- Socket weld, threaded end and extended welded end valves NPS 2 and below shall be to API 608
- Flanged and Butt weld end valves NPS 2 and above shall be to API 6D
- API 5000 and API 10000 rated valves shall be designed and fully rated in accordance with API 6A.

### 7.10.2.2 Specific Requirements

- Soft (resilient) seals should be used up to a design temperature of 150 Deg C subject to confirmation of Vendor of suitability of their seal design for required size and pressure temperature limits ( refer Section 7.9.2). At temperatures higher than 150 °C, the manufacturer shall specify the design pressure for valves containing polymeric seat or sealing materials.
- The ball shall be of a trunnion mounted design in the following sizes; however individual material requisition / data sheets shall prevail. All other valves shall be Floating design.

Ball Valve type	Class	Size
Reduced bore	150	NPS 8 and above
Full bore	150	NPS 6 and above
Reduced bore	300	NPS 4 and above
Full bore	300	NPS 3 and above
Full and reduced bore	600, 900, 1500 and 2500	NPS 2 and above
Full and reduced bore	API 5000 & API 10000	All

- All actuated Ball Valves shall be trunnion mounted type.
- Trunnion mounted valves shall be provided with protection against accumulation of ingress particles in the trunnion house.
- Seat rings of trunnion mounted ball valves shall be spring-energized. The seat ring and body shall be designed so that entrapment of solids will not obstruct free movement of the seat rings
- Ball, stem and trunnion shall be one-piece solid construction. Welded construction is not acceptable. Ball shall be one piece casting or forging.
- All ball valves in wet sour service shall be provided with upper and lower trunnion bearings of equivalent trim material. The bearing shall be self-lubricating type Torque calculations shall consider the friction coefficient of bearing material.
- Bore for Ball Valves shall be 'Reduced Bore' unless otherwise specified either in the valve data sheet or P&ID. The bore size of the reduced bore valves shall be corresponding to that of full-bore valve of one size reduction up to nominal size NPS 12 and two size reductions for nominal size NPS14 and up to NPS 24. Valves above NPS 24: three sizes below nominal size of valve with full bore.
- Beyond the limits of API 6D Table 1, the minimum valve bore shall be agreed with COMPANY. In this case, the minimum and maximum internal bore dimensions shall be stated in the contract

documentation. Full bore valve selection shall only for process engineering, pigging or safety requirements.

- j) Ball Valves shall be of full bore up to NPS 1 ½ size
- k) A pressure relief hole or equalizing pressure hole in the ball is not allowed, whether on floating ball or on trunnion mounted valves
- l) All Trunnion mounted valves sealing shall be with Double Block and Bleed seats with inline (body cavity over pressure) relieving capability to prevent over-pressurization of the valve body when valve is closed. Sealing capability of these seats/seals shall be independent of line pressure.
- m) Self-relieving type seats (single piston effect - SPE) shall be supplied in accordance with API 6D unless specifically requested otherwise in the datasheet. With SPE design, both seats are self-relieving hence cavity over-pressure can be relieved up or/and downstream side. Ball valves having combination of both a single and a double piston effect seating in the same valve, shall internally relieve the excessive cavity pressure via the single-piston effect seat (SPE) side.
- n) Double Isolation and Bleed (DIB with reference to API 6D) seats shall be selected only with approval or when specifically indicated in the Valve datasheet. Ball valves having double-piston effect seating (DPE) are not self-relieving and shall be fitted with an external cavity relief valve unless specifically agreed with COMPANY. Sealing system shall avoid the requirements body cavity pressure relief PSV/TSV on valve body.
- o) Stem design shall be blow out proof type.
- p) For metal seated ball valves, the ball and seat sealing faces shall be coated with a hard faced with Tungsten carbide (unless specifically indicated otherwise in datasheet) to achieve a minimum hardness of 1050 Vickers. The thickness of the coating must be a minimum of 400 micron (thickness of finished/machined surface). These shall be individually paired and lapped together for efficient sealing. Coating process shall be HVOF (High Velocity Oxygen Fuel process).
- q) The design of valve seal / seat arrangement shall be such that the soft seal shall not displace or get out of shape both under pressure and during the depressurization of the piping system.
- r) All ball valves shall be with position indicator to indicate the position of closure member.
- s) Valve body design shall be of split body / end entry type unless specifically indicated as top entry type in the valve data sheet.
- t) On top entry valves, the seat design shall be such as to allow for easy trim removal; this shall be based on the use of split seats. Specific designs such as "seat push-back" devices are subject to the Company prior approval. The seat design shall be such that the seat to ball tightness and the seat relief functionality can be easily recoverable after site re-assembly.
- u) Valves shall be equipped with an anti-static feature/device as per API 6D to ensure electrical continuity between ball, stem and body of valves.
- v) The ball port shall be cylindrical.
- w) Ball valves shall be designed to seal in both directions, i.e. bi-directional, against all pressures up to the maximum service pressure for the class unless specified otherwise.
- x) Two- or three-piece bodied valves shall be designed so that body joint gaskets and bolting can safely withstand piping loads without any leakage or affecting valve seat leakage performance. Body bolting studs shall be fully enclosed within the body components.



- y) Ball valve designs with end entry body components that are retained by external body bolting shall be subject to COMPANY approval.
- z) Short pattern ball valves are not acceptable.
- aa) Wherever ball valve is intended to be used for the throttling application (example kicker line at the pig traps), these valves shall be identified as specialty valve. Separate valve datasheet to be prepared for these valve and seat design feature to be reviewed and guaranteed by the vendor for the intended design condition.
- bb) For top entry ball valves, the special tool for ball removal shall be part of the technical proposal, including the 3D cut-away drawing showing all assembly clearances and how these tools would be used.
- cc) The valve shall withstand vacuum drying at pressures of 500 Pa (0.07 psia).

### 7.10.3 Integral Double Block and Bleed Valves (IDBB)

#### 7.10.3.1 Applicable Codes

- a) IDBB valve shall be designed and manufactured as per API 6D + Manufacturer standard.
- b) API 5000 and API 10000 rated valves shall be designed and fully rated in accordance with API 6A.
- c) IDBB valves supplied for process isolation purpose for sizes greater than NPS 2 (other than process to instrument isolation) in place of separate block valve and bleed valves, shall be based on approval of COMPANY and when specified in datasheet. Typically, these are used in Offshore applications and in areas where there is space constraint.

#### 7.10.3.2 Specific Requirements

Refer to specific requirements of Ball valve above. Additionally, following should be complied.

- a) The design, size and material requirements shall be as specified in the valve data sheets.
- b) The double block and bleed valve shall be of integral design as single piece with two ball valves for isolation & bleed valve (type as indicated in datasheet). Bleed side shall be supplied with blind flange for sour service. Padded blinds are not acceptable.
- c) Trunnion / Floating mounted ball type construction shall be adopted as defined in Section 7.10.2.2 (b)
- d) Minimum bore for Instrument to piping IDBB valve shall be minimum 14 mm
- e) Handles / wrenches for primary and secondary isolation valve shall be in line with the pipe centreline when valves are open. Handles / wrenches or levers shall be sufficiently robust to avoid excessive elastic or plastic distortion against the valve opening and closing forces
- f) Unless specifically requested, handles / wrench position for primary isolation and secondary isolation valve shall be on the same side and direction.
- g) The design, size, bore and material of construction shall be as specified in the valve data sheets.
- h) All IDBB valves shall be 'Fire Safe' in accordance with API 607 / API 6FA / BS EN ISO 10497 and have anti-static device fitted and tested in accordance with BS EN ISO 17292 / API 6D as specified in valve datasheets
- i) Valve ends shall be as per datasheet i.e. both sides flanged or one side flanged & other side threaded. Valve ends shall have standard flanges. Ends with studded flanges are not permitted.
- j) In sour and lethal service, internal threading in the IDBB valve body is not permitted.
- k) In case ball type bleed valve is specified, design feature of the bleed valve shall be identical to the main valve construction. Unless specifically agreed, bleed ball valve shall be full bore type.
- l) When needle type bleed valve is specified in the datasheet, it shall be provided with the following design features:
  - OS&Y needle type globe valve.
  - Packed gland bolted bonnet.

- Metal to metal seat.
- Adjustable gland flange.
- Stuffing box with self-centring and non-rotating tip.

#### 7.10.4 Check Valves

##### 7.10.4.1 Applicable Codes

Unless otherwise noted in Data sheet of respective valve type, following valve design code shall be applied for non-API 6A check valves:

Valve Type	Design Standard for Size, NPS		Face to Face dimension/Flange Design	Flange standard
	< 1½	> 2		
Spring loaded Lift Check Valve (Piston and Ball lift)	BS 1868 +ASME B16.34	BS 1868 +ASME B16.34	ASME B16.10	ASME B16.5/B16.47
Swing Check Valve	-	API 6D	ASME B16.10	ASME B16.5/B16.47
Dual plate Check Valve	-	API 594-Type A	API 594-Type A (Table 2 & 3)	ASME B16.5/B16.47

- Swing Check valve & non-slam check valve shall be designed and supplied in accordance with API 6D.
- Valves in API 5,000 and API 10,000 classes shall be to API Spec 6A (including face to face dimension compliance and Pressure Temperature conditions).

##### 7.10.4.2 Specific Requirements

- Valve construction feature shall be as per purchase description/valve datasheet.
- Below is the generally preferred valve construction.

Size	First preference	Alternate
NPS 1 ½ and below	Spring loaded piston Lift Check Valve	Spring loaded Ball Lift Check valve
NPS 2 and above	Dual plate check Valve	Swing Check Valve

- Wafer type dual plate check valves which are connected between flanges with long bolts or tie rods shall not be used in hydrocarbon service as these are prone to leakage during fire.
- The end connection of Dual plate check valves to API 594 shall be double flanged type complying with Table 2 & Table-3 of API 594 for Hydrocarbon service. Wafer check valves (without lug) shall not be used for Hydrocarbon service. Wafer Lug type valves, if used in Hydrocarbon service (prior approval from COMPANY) shall be of solid lug type (full encirclement) design with studs' length covering the entire length of the valve
- For double flanged pattern check valves, vendor shall ensure nut space between flanges is adequate to allow for at least two threads to protrude beyond the nut (heavy series nuts ASME B18.2.2) without contacting each other.
- The ends of "Wafer" check valves shall comply with API standard 594. The contact faces of check valves for which gaskets are specified shall receive the same machining finish as the



contact faces of the flanges between which these valves will be installed. This flange finish facing is as specified in the relevant piping material class/ valve data sheets.

7. Check valve seat rings either shall be integral or fully welded for NPS 1 ½ and below.
8. Renewable seats where specified for sizes NPS 2, which are threaded, rolled or pressed in place, shall be positively secured against loosening by mechanical deformation, typically swaging.
9. Check valves shall be designed for improved Cv. VENDOR shall submit flow characteristic and Cv for Check Valves along with quotation for the offered check valves.
10. VENDOR shall state the minimum flow velocity required for keeping check valve fully open condition.

#### 7.10.4.3 Dual plate check valve

1. The body of dual plate check valve shall be of a “retainer less” type design.
2. Plates and springs shall be replaceable type.
3. VENDOR shall ensure that there is no intrusion into gasket sealing element surface by the retaining mechanism on dual plate check valve design.
4. Lifting lugs for the dual plate check valve shall be oriented in the direction parallel to the disc stem so as verify the stem orientation during valve installation.
5. Reduction in valve throat area shall be minimized to obtain minimum pressure drop in fully open condition (improved CV).
6. Internal fastener materials (studs, nuts, washers and pins), hinge pin, disc seat and body seat shall be considered as trim
7. Designed for scrub free opening and low friction. The Valve shall be designed to have independent spring to allow higher torque to be exerted against each plate with independent closing in response. It shall have independent plate support design to reduce friction forces
8. The plates shall be renewable type.

#### 7.10.4.4 Swing Check Valve

1. For Swing check valve, Seat rings shall be replaceable type. These seat rings shall not be rolled-in or threaded on to the body and shall be positively secured against loosening.
2. For swing check valve, body seat ring shall be inclined, or the hinge shall have an offset.
3. The angle of the seat with the vertical axis of the valve shall be minimum 5 degrees, to prevent chatter.
4. Unless specifically requested in the purchase description/datasheet, Swing check valve shall be metal to metal seated type.
5. Closing and opening the disc shall not result in any slamming action.
6. Swing type check valves shall be suitable for horizontal and vertical upward flows.
7. If a hinge pin retaining disc is installed, the thread of the pin shall protected against exposure to the medium and a locking ring is required for the hinge pin
8. If a shaft retaining plug is installed, the thread of the plug shall be protected against exposure to the medium by a seal. Graphite seals shall have a stainless steel 316L back up ring.
9. The clapper and disc shall be positively secured against loosening. Acceptable methods are by applying a retaining tab or by tack welding. Unacceptable methods are the application of spring tension, split or cotter pins, without additional tack welding

10. For low pressure drop valves, when specified in datasheet, manufacturer shall provide maximum pressure drop across the fully opened disc, at all design conditions (including minimum and maximum flow).
11. The disc of the swing type shall have a flat seating face
12. Closing and opening the disc shall not result in any slamming action.

#### 7.10.4.5 Lift Check Valve.

1. Piston/ball lift check valve shall be bolted cover, standard bore and straight pattern type.
2. Piston/ball Lift Check Valves shall be spring loaded and shall be suitable for vertical and horizontal Installation.
3. Valves shall be designed such that the valve obturator shall be guided over the full length of their travel. The guide and disk combination shall be designed in such a way that a damping of the movement occurs towards the top end of disk travel. The guiding mechanism shall ensure perfect seating of the piston disk over the valve seat during valve closure.
4. Unless otherwise specified, valve seats shall be hard faced with Stellite 6 or equivalent.
5. Unless specifically requested in the purchase description/valve datasheet, Piston type check valve shall be bolted cover, standard bore and straight pattern.
6. Thickness of the cover shall not be less than that of the body.

#### 7.10.4.6 Non-Slam Check Valve

1. When specified in P&ID as Non-Slam Check Valve it shall be Axial flow Non-Slam Check Valve.
2. Axial flow non-slam check valve shall be designed and supplied in accordance with API 6D
3. Axial Flow Non-Slam Check Valve shall have following features:
  - Short stroke length to reduce closure time and eliminate water hammer
  - Seat shall be self-aligning and provide tight shut off
  - Shall be designed for minimum pressure drop loss and designed for excellent dynamic performance
  - Shall be metal seated until and unless specified otherwise.
  - Face to Face dimension shall be in accordance with API 6D.

#### 7.10.5 **Butterfly Valves**

##### 7.10.5.1 Applicable Codes

Unless otherwise noted in Data sheet of respective valve type, following valve design code shall be applied for Butterfly Valves:

Valve type	Class	Valve size /size range	Design Code	Face to face dimension	Flange standard/templat e
Lug-Category A/B	150, 300, 600	NPS 24 and below	API 609	API-609	ASME B16.5
	150, 300, 600	NPS 26 to NPS 48	API 609	ISO 5752 Table1 series 14	ASME B16.47
	150, 300, 600	NPS 50 and above	BS EN 593	ISO 5752 Table1 series 14	ASME B16.47
Double Flanged –Short pattern	150	NPS 48 and below	API 609	ISO 5752 Table1 series 13	ASME B16.5/B16.47
	300	NPS 48 and below	API 609-	ISO 5752 Table1 series 14	ASME B16.5/B16.47
	600	NPS 24 and below	API 609-	ISO 5752 Table1 series 14	ASME B16.5/B16.47
	150, 300	NPS 48 and above	BS EN 593	ISO 5752 Table1 series 14	ASME B16.47
	600	NPS 26 and above	BS EN 593	ISO 5752 Table1 series 14	ASME B16.47

#### 7.10.5.2 Specific Requirements

- When Butterfly valves are specified for Hydrocarbon and critical services (refer AGES-SP-09-001 for definition of Critical service), it shall be of Triple offset type. For utility services double offset butterfly is acceptable.
- When Butterfly are specified for end of line or with spectacle blind/Spade, in such cases long pattern valves shall be selected
- Vendor shall specify the valve CV along with his offer.
- Valve shall be suitable for installation in horizontal and vertical line
- Triple offset valve when used in critical services as isolation valve shall
  - Meet all requirements of High performance as per API 609 Category B
  - Metal seated with bi-directional zero leakage (Class A as per API 598)
  - Metal-to-metal torque seating
  - Double flanged construction
- Concentric disc butterfly valves shall be used only for lined butterfly valves
- Unless specified in the datasheet/purchase description, double flange short pattern butterfly valves shall be preferred. Valves shall be provided with either double flanged-short pattern or fully flanged/lugged end connections as indicated in the valve data sheet.

8. All butterfly valves shall be designed for use in throttling and the valve shall be designed to lock at any intermediate position.
9. Valves shall be bi-directional, designed to seal against the maximum class rated service pressure in either direction. However, in case the design requires a preferred direction of flow, an arrow pointing downstream shall indicate the same.
10. The Valve disk shall be capable of withstanding the maximum differential pressure, in either flow direction, as per the appropriate pressure designation.
11. Butterfly valves shall be provided with integral shouldered shaft to prevent shaft/stem blowout and to ensure precise positioning of the disc.
12. The valves shall be anti-static. The design shall ensure electrical continuity between the stem, disk and the body. For this purpose, graphite seals are not considered to offer satisfactory electrical continuity.
13. Valve shall be able to open and close against a differential pressure equal to the maximum rated pressure of the valve, unless specified otherwise on the valve data sheets.
14. Valves shall be equipped with adjustable mechanical stop limiting devices to prevent travel of the valve disc in open and closed position.
15. Tapped holes in body lugs for through bolting are not acceptable. Tapped holes where necessary because the valve design does not allow through bolts shall be subject to Contractor/COMPANY approval and these bolts shall be part of the valve supply. These tapped holes and bolts shall be identified, with the diameter and effective thread length, quantity on the relevant Vendor drawing for each valve where required. Part list in the vendor drawing shall include the design code of the bolts at tapped holes.
16. The disc shall not interfere with the bore of the connecting pipe specified on the valves data sheet including any lining or coating, at any point of shaft rotation. Pipe ID details shall be available in the purchase description.
17. Valve gasket seating surface area shall not contain any interruptions (screw holes or retainer edge) within the effective sealing area of an ASME B16.20 spiral wound gasket.
18. Screwed connection between stem and closure member is not acceptable.
19. The stem shall be furnished with two bearings one at the top and the other at the bottom of the disc. MOC of bearings shall be of equivalent trim material. The bearing shall be self-lubricating type. Torque calculations shall consider the friction coefficient of bearing material.
20. The shaft shall be a through shaft of one-piece construction.
21. Bottom flange shall be a bolted design having at least 4 bolts.
22. Valves that require stem extensions will be indicated on the valve datasheet with the length. Stems shall be constructed of one piece.
23. Valve Operator: Butterfly valves in size NPS 3 and above in wet fire water service shall be mandatorily provided with low efficient (e.g., worm and Wheel type) gear operator.
24. Internal fastener materials (studs, nuts, washers, etc.), disc seat, body seat, retainers, retainer plates and bearings shall be considered part of trim (material of construction shall be minimum equal to trim material).
25. For replaceable seat ring suitable gasket shall be provided between the seat ring and the body or disc
26. Unless specifically agreed or indicated in the purchase description/datasheets, minimum requirement of seat ring and disc seal ring shall be as per below table.

Sealing component	Utility service (Double offset valve)	Hydrocarbon service (Triple offset valve)
Seat ring	Solid CRA Ring	Solid CRA Ring. Seat ring harder than the seal ring assembly.
Seal ring (Body/Disc)	PEEK / RPTFE	Laminated: CRA material and Graphite Or metal to metal seated with hard facing when specifically required) Note: For temperature > 400 deg. C and class 600 and above only solid metal seal rings

27. Separate removable valve parts and seat rings shall be positively secured against loosening. The application of spring tension pins is not allowed
28. Face-to-face dimensions for double-flanged valves; For sizes not covered in the API 609 tables, the following sizes shall be used
  - Class 600, sizes NPs 26 to 48 ISO 5752 table 1, Series 14.
  - Class 900, sizes NPS 6 to 18 ISO 5752 table 1, Series 8.
  - Class 900, sizes NPS 20 to 48 manufacturer's Standard
29. Two-piece shafts shall ensure stem blow out cannot take place when the disc to shaft connection has failed. The anti-blow-out stem retention configuration shall be located internally in the valve to ensure stem ejection is impossible when external non-body/cover fasteners are removed
30. Resilient Lining for Concentric Butterfly Valve:
  - a. The liner shall not bulge or extrude due to compressive forces exerted by the flange bolts or the piping system. In addition, the liner shall be capable of handling the bolt stresses and repeated dismantling and installation
  - b. The design shall ensure complete and proper sealing for both raised and flat face connecting flanges.
  - c. The liner shall be capable of withstanding vacuum down to 1 Torr (133 Pa).

#### 7.10.6 Globe Valves

##### 7.10.6.1 Applicable Codes

Unless otherwise noted in Datasheet of respective valve type, following valve design code shall be applied for Globe valves:

Valve Type	Design Standard for Size NPS		Testing code	Face to Face dimension	Flange standard
	< 1 1/2	> 2 up to NPS 12			
Globe Valve	API 602 + ASME B16.34	API 623 + ASME B16.34	API 598	ASME B16.10	ASME B16.5 / B16.47

Valve Type	Design Standard for Size NPS		Testing code	Face to Face dimension	Flange standard
	< 1 1/2	> 2 up to NPS 12			
Note: For sizes not listed, dimensions shall be as agreed with COMPANY during the Enquiry stage itself.					

#### 7.10.6.2 Specific Requirements.

- Valve design shall be suitable for the process design / operating conditions as per applicable valves data sheets.
- Globe Valves shall be Outside Screw and Yoke (OS&Y), bolted bonnet, gland, rising stem, non-rising operator, Straight pattern/angle/Y-pattern and provided with back seats. Valve wedge and back seat shall be hard faced.
- All globe valves shall be provided with back seats features. Backseat material shall be same as that of valve trim.
- Valves shall generally be designed in accordance with applicable portion of ASME B16.34.
- Valves in size NPS 2 and above, seat rings shall be renewable and hard faced. Hard facing shall be with Stellite 6 or equivalent unless otherwise specified...
- Seat rings either shall be integral or fully welded for valves for NPS 1 ½ and below
- Globe valves shall be provided with guided plug type disc for classes 600 and higher and for sizes NPS 4 and higher unless otherwise specified.
- All globe valves shall be suitable for throttling duties. An arrow to indicate the correct flow directions shall be part of the body casting or forging or shall be embossed on the valve body. Gear operated valves shall have operators of a design that will allow the valve to be set in intermediate throttling positions for long periods without having lash down the hand wheel.
- Globe valves shall be designed for improved CV. VENDOR shall submit flow characteristic and Cv for Globe Valves along with quotation for the offered Globe Valves.
- Valve plug/piston shall be non-integral with the stem however the disc-to-stem design shall be such that the disc cannot become detached from the stem as a result of vibration emanating from either flow through the valve or attached piping movement.
- Valve pattern shall be as specified in the datasheet/purchase description.
- The disc type shall be plug disc / ball disc and hard faced.
- If a separate bonnet backseat bushing is provided it shall have same material composition of either trim, it shall be tack welded to the bonnet to prevent loosening or unscrewing.
- Threaded seat rings, if specified, shall be secured in place to prevent loosening in service. This may be done by tack welding.
- Class 2500 globe valves designed to API 602, shall have same equivalent flow passageway as specified for class 1500
- Discs with a plug or spherical seating surface shall be used.
- Consideration shall be given to minimize disc vibration of valves subject to a high pressure drop.

#### 7.10.7 Plug Valves

##### 7.10.7.1 Applicable Codes

- Plug valves shall be designed to API 599

#### 7.10.7.2 Specific Requirements

1. Valves shall be pressure balanced and tapered inverted plug type.
2. Valves NPS 1/2 inch (nominal) and larger, shall comply with this specification and API 599.
3. Unless otherwise specified the valve pattern and operation for the lubricated and non-lubricated plug valves shall be in accordance with API 599
4. Only the taper with rectangular ports is acceptable. However valves NPS 1/2 and NPS 3/4 may have round ports full bore.
5. The port shall have a dimensional ratio, between height and width, not exceeding 3:1
6. Round-port full bore pattern shall be used when required by the process and so defined in valve datasheet for pipeline and low pressure drop applications.
7. Stem retention: when stem/plug is separate pieces, stem shall be of blowout-proof type.
8. Shouldered stem design is required. Stem retention shall not depend on the packing gland. Refer to ASME B16.34, section 6.5.1.
9. Plug may be provided with pressure balanced hole or equivalent feature
10. Plug valve application shall be limited to 175 Deg.C
11. Soft seats to achieve a seal between plug and body are not permitted.
12. Plug valves shall be capable of opening and closing under full differential line pressure
13. Valves shall be provided with a suitable stop for the plug assembly to enable locking in both open and close positions
  - Open: In line of flow
  - Close: Perpendicular to the flow
14. Valve shall incorporate an antistatic feature that ensures electrical continuity between the plug and the body. This continuity shall be verified by testing a new, dry valve that has been pressure tested and cycled at least five times.
15. Additional supplementary test F22 (Antistatic design test) shall be performed by the MANUFACTURER for TSO plug valves in accordance with BS EN 12266-2
16. TSO valves shall comply with leakage Rate A only in accordance with ISO 5208.

#### 7.10.7.3 Lubricated Plug Valves (Metal Seated)

1. For valves that are supplied with a lubricant screw or a combination of sealant fitting and lubricant screw, steel check valve with minimum of two independent check elements are required. For valves supplied with a sealant fitting, steel check valves with one check element can be used provided the lubricant fitting has a separate checking element.
2. The material of check valve, including the check elements and the housing shall be at least as corrosion resistant as the metal of the valve trim.
3. Valves shall be provided with secondary sealant injection connections.
4. Lubricant / sealant shall protect internals of the valve against corrosion and wear as well as reducing the valve torque. Vendor / Supplier shall furnish the minimum and maximum torque values to operate (open/close) and maintain the valve sealing integrity
5. Vendor shall review & advise the compatibility & working of the sealant with design/operating temperature of the valve and fluid in service (e.g., hydrocarbon etc.).
6. Lubricated plug valves shall be furnished with hydrocarbon resistant lubricating sealant that has a temperature range from -29 Deg C through 107 Deg C. This sealant shall have both



proper plasticity for tight sealing and lubricity for ease of operation. Fluid operating temperature shall be specified in the data sheet for the selection of lubricant

7. Vendor shall advise the frequency of lubrication based on the valve service and type of lubricant for maintaining the valve. Vendor shall supply the necessary tools/gun for lubrication and lubricant kits with storage conditions and their expiry date if any
8. Valve body-to-cover seals or non-metallic diaphragms or gaskets shall be suitable for the service conditions and the valve's pressure temperature s.
9. Valves shall have bottom entry design.
10. For lubricated plug valves, the stem and plug shall not be one integral piece
11. Body Drain and vent connections shall not be specified for lubricated plug valves.

#### 7.10.7.4 Non-Lubricated Plug Valves (Soft Seated)

1. If approved by COMPANY, in sleeved, lined and soft-seated plug valves, a means shall be provided to adjust, either manually or automatically, the position of the plug as wear occurs.
2. Sleeve shall be mechanically locked in the valve body.
3. Non lubricated plug valves shall be used for liquid Sulphur service.

#### 7.10.7.5 Jacketed Valve

Jacketed valves shall be provided with 3 number flanged connections 2 for steam and 1 for condensate) for connection to steam jacket. The Tapping size shall be NPS  $\frac{3}{4}$  for valve size up to NPS 3 and NPS1 for valve size above NPS 3. The end flanges of steam jacketed valves shall be oversized to match with the corresponding jacket size in order to achieve a full jacket. Flange size shall be as per below table. (also refer AGES-SP-09-10 for details on jacketed piping).

Valve Size (NPS)	Flange size for Jacketed Valve (NPS)
1	2
2	3
3	4
4	6
6	8
8	10
10	12
12	16
14	16

### 7.11 Valve Operator Mounting Flange

- 7.11.1 Mounting flanges of ball, butterfly and plug valves shall conform to ISO 5211. Alternatives shall be subject to agreement by COMPANY. Torque values of ISO 5211 shall be used.



- 7.11.2 Top mounting flanges of gate valves & globe shall conform to ISO 5210. i.e. the yoke shall have provisions for an actuator/gearbox attachment, which is integral with the valve. Alternatives shall be subject to agreement by COMPANY. Thrust values of ISO 5210 shall be used.
- 7.11.3 Top flange shall be rated for a minimum of twice the valve break torque.
- 7.11.4 Bolting securing the top flange to the valve body shall have, as a minimum, the same value of torque/thrust as the mounting flange.
- 7.11.5 Valves supplied with the capability of mounting actuators or gear operators shall be capable of doing so without removal of any pressure containing parts (e.g., body bolts, bonnet bolts, flange bolts, packing gland bolts, packing retaining stem nut, etc.,)
- 7.11.6 Provisions for lubrication of yoke of gate and globe valve shall be made in all classes and nominal sizes

## **7.12 Body-Bonnet and Cover Gaskets**

- 7.12.1 Gaskets shall be in accordance with the standard to which the valve is manufactured, Piping Material specification AGES-SP-09-002 and Valve datasheet unless otherwise specified.
- 7.12.2 Metallic and non-metallic bonnet and cover gaskets shall have corrosion resistance equal, at least, to that of the body and bonnet material.
- 7.12.3 Valves body to cover seals or non-metallic diaphragms or gaskets shall be suitable for the service conditions and the valve's pressure temperatures
  - a) Cover shall be bolted to the valve body and screwed connections are not acceptable.
  - b) Valves design shall ensure repair of gland packing under full line pressure.

## **7.13 Valve Operation**

- 7.13.1 Manual valves shall be lever, hand wheel or gear operated as specified on the valve data sheets.
- 7.13.2 Operation of valves by means of actuator (pneumatic, hydraulic, or electric motor) are outside the scope of this specification. Actuated part of the Valve (i.e., valves with Pneumatic/Hydraulic/Electrical Actuators) are not covered in this specification and is to be read in conjunction with the relevant specification for Actuator (AGES-SP-04-005). However, the mechanical valve part shall fully conform to this specification. For actuated valves, bonnets, mounting flange, stems, stem extensions etc. shall be designed and calculated to withstand the maximum torque delivered by the actuator at the maximum allowable actuator power (i.e., pressure or otherwise). Operation shall be smooth at all times. Valve operators shall be capable of opening and closing valves against one of the following:
  - a) Maximum specified pressure differential that can occur across the valve in service.
  - b) All valves and all manual operators (lever, wrench or handwheel) and all gearboxes shall be capable of opening and closing against differential pressure equal to the pressure rating of the valves for material at 38 °C
  - c) Gear operators, actuators and their mounting bracketry shall not be attached to any part of the valve that would result in Loss of Primary Containment if the attachment bolting is loosened or removed.
- 7.13.3 Valves shall function normally with the stem in any orientation between vertical and the horizontal, unless specified otherwise.
- 7.13.4 For valves operated manually, the maximum cracking force required to turn manual valves under design and test conditions, when applied at the rim of the hand-wheel or lever, shall not exceed 360 N. For smaller valves which are intended for one hand operation (below NPS 2) the maximum cracking force shall not exceed 66N. This applies to seating, unseating, and operating at maximum pressure differential at both

minimum operating temperature and ambient temperatures. Also refer Human Factor Engineering Specification AGES-SP-03-004

7.13.5 Valve operator shall be non-rising type.

#### 7.13.6 Lever Operation

- 7.13.6.1 Levers lengths for ball and plug valves shall not exceed the lesser of 500 mm, twice the face-to-face, or the end-to-end dimension of the valve, whichever is lower. For butterfly valves it shall not exceed 600 mm. Levers shall be parallel to the pipe axis with the valve in the open position. Design shall ensure incorrect orientation relative to the position of the ball, plug, or disc, etc. cannot occur.
- 7.13.6.2 Valve stem shall protrude a minimum of 1" above the top of the lever and shall have a robust connection with the Wrench/Lever.
- 7.13.6.3 Lever operated valve stem heads shall be circular with a keyway for attaching the lever in one and only one position. Circular stem heads with one or two flats are acceptable, but in either case the design shall be such that the lever cannot be installed in a manner that would permit the valve to move through more than 90 degrees. Square stem heads are not acceptable.
- 7.13.6.4 Lever operated valves shall be fitted with stops at the full open and full closed positions to prevent over travel of the valve obturator. These stops shall be in the form of raised bosses, integrally cast or forged with the valve body or welded to the valve body. Removable stops and/or spring-loaded pins which drop into holes at the full open or full closed positions, are not acceptable
- 7.13.6.5 As a positive protection against valve operation when the wrench/lever is removed, the plate or pin that strikes these stops shall be permanently affixed to the valve stem and shall not be a feature of the lever operator.
- 7.13.6.6 Lever shall be made from solid material, suitable for the environmental conditions. Hollow components shall not be allowed. Wrenches and hand wheels shall be rigidly constructed of carbon steel or ductile iron. Flat bar levers are NOT acceptable on valve sizes over NPS 1.
- 7.13.6.7 Valves installed in insulated lines will have box type insulation. Hand wheel or lever for such valves shall be outside the insulation for all quarter turn valves. The maximum insulation thickness which can be applied without interfering with the lever or gear hand wheel shall be shown in the drawing along with the bid/after bid.

#### 7.13.7 Hand wheel Operation

- 7.13.7.1 The hand wheel shall be of a solid construction for both gear operator and directly stem mounted operator. Hollow components shall not be allowed.
- 7.13.7.2 The hand wheel diameter shall not exceed the end-to-end length of the valve for classes 300 and above.
- 7.13.7.3 Hand wheel dimensions for Class 150 valves shall not exceed twice the end to end dimensions or 800 mm, whichever is the smaller.

#### 7.13.8 Gear Operation

- 7.13.8.1 Gear box design shall be in accordance with BS EN ISO 5210.
- 7.13.8.2 Valves with sizes equal to or greater than those specified in table below shall have gearboxes. Alternatives shall be subject to agreement by COMPANY

Class	Ball Valve Bore Size (a)	Gate Valve Size	Globe valve Size	Plug Valve Size	Butterfly Valve size (Note c, d)
150	≥ NPS 6	≥ NPS 14	≥ NPS 8	≥ NPS 8 (2)	≥ NPS 8
300	≥ NPS 6	≥ NPS 10	≥ NPS 8	≥ NPS 8 (2)	
600	≥ NPS 6	≥ NPS 8	≥ NPS 6	≥ NPS 6	≥ NPS 6
900	≥ NPS 4	≥ NPS 6	≥ NPS 4	≥ NPS 6	-
1500	≥ NPS 3	≥ NPS 4	≥ NPS 3	≥ NPS 6	-
2500	≥ NPS 2	≥ NPS 4	≥ NPS 3	≥ NPS 2	-
API 5000 & 10000	≥ NPS 2	≥ NPS 2	≥ NPS 2	≥ NPS 2	-
<b>Note:</b> <ul style="list-style-type: none"> <li>a) For ball valve the above is based on bore size and not the valve size</li> <li>b) For lined plug valves class 150 and 300, NPS 6 and above, shall have gear operator</li> <li>c) Butterfly valves in size NPS 3 and above in wet fire water service shall be with low efficient (e.g., worm and Wheel type) gear operator.</li> <li>d) Triple offset butterfly valve shall be gear operated</li> </ul>					

- 7.13.8.3 Hand wheel rotation for gear operated valves shall be minimized; VENDOR shall furnish data for number of hand wheel turns to full stroke. Number of gear hand wheel turns shall not exceed 80 turns to full stroke unless specific prior approval is taken from COMPANY.
- 7.13.8.4 Gear operator hand wheel on valves that require more than 50 turns to full stroke, shall be fitted with a 25.4mm male square drive for the use of a pneumatic wrench unless specifically agreed otherwise.
- 7.13.8.5 The gearbox output torque shall be at least 1.5 times the maximum required operating torque of the valve. The gearbox is selected based on the valve maximum operating torque and not on the drive train/stem strength safety factor. Design rules for all parts of the drive train shall include a minimum 2.0 times safety factor. The stem strength shall match the gearbox; by inference the stem shall be oversized to accommodate the safety factor of the gearbox. Safety factors of stem design and gearbox are not cumulative.
- 7.13.8.6 Valve design shall be such that damage due to malfunctioning of the operator or its control will only occur in the operator gear train or power cylinder and that damaged parts can be replaced without the valve cover being removed.
- 7.13.8.7 Body/bonnet closure bolting shall not be used to directly mount a gearbox to the valve. Gearboxes shall allow orientation at 180° increments.
- 7.13.8.8 Hand wheels on gearboxes shall be securely fastened to the shaft with expansion pins or through bolted connections. Friction grip and grub screw (set screw) retainers shall not be used.

- 7.13.8.9 Manual gear operators shall be mounted with the pinion shaft perpendicular to the flow through the valve, with the plane of the hand wheel parallel to the valve stem and to the pipe axis, unless specified otherwise by COMPANY.
  - 7.13.8.10 Operators and stem extension assemblies shall have a means to prevent pressure build-up in the mechanism that results from stem seal leakage.
  - 7.13.8.11 Gear operator drive shall connect with the yoke bush or sleeve.
  - 7.13.8.12 Gearbox operated valves shall have rolling element thrust bearings.
  - 7.13.8.13 Gear operator for valves shall be the "Self-Locking" Gear Type, completely housed within a weatherproof and dust proof enclosure suitable for the environmental conditions equivalent to IP65. The connection between the valve body and the gearbox shall be vented so that any product leakage from the stem cannot penetrate into the gearbox housing.
  - 7.13.8.14 The gear box shall be fitted with one or more easily accessible standard grease nipples, completely housed in a covered grease-case, to enable the "lifetime" lubrication using oil which can be renewed while the valve and gearbox are in service. The SUPPLIER's drawing for each gear operator shall show and identify the grease nipples and shall include the name(s) and type(s) of lubricant that can be used. There shall be sufficient air volume to allow the lubricating oil to expand in service and not force leakage.
  - 7.13.8.15 Lubricants used with gear operators shall be suitable for use at site ambient temperatures in addition to the valve design temperature stated on the Valve Data Sheet.
  - 7.13.8.16 Gearbox material shall be suitable for the environmental conditions of use (maximum and minimum temperature, etc.) specified. All internal parts of gearbox shall be metallic except for seals and gaskets. Gearbox bolting shall be coated to prevent corrosion and enable maintenance. Material of the gearbox housing shall be nodular cast iron, carbon steel or equivalent to the valve body material as minimum.
  - 7.13.8.17 Gear operators shall be supplied complete with hand wheels and shall be permanently marked within the word "OPEN" or "CLOSE" with a permanent arrow indicating the direction of rotation. Gear operators on valves with ASME class 600 or higher shall be supplied with impact type hand wheels i.e. hand wheel resistant to impact loading. All hand wheels must be turned anti-clockwise to open valves.
- 7.13.9 Position Indicator
- 7.13.9.1 All valves shall be supplied with position indicators. The design shall be such that the component(s) of the indicator and the wrench cannot be assembled to falsely indicate the valve position.
  - 7.13.9.2 The position indicators shall be clearly graduated to indicate intermediate position of the valve obturator and direction of closure.
  - 7.13.9.3 Position switches indicating the open and or closed position shall be provided when specified in valve data sheet
  - 7.13.9.4 Indicators on the valve and/or gearbox shall be positively fixed to the valve / gearbox shaft. Grub screws, set screws or similar, which can permit loss of position shall not be used.
  - 7.13.9.5 Indicators on the valve and/or gearbox shall have symmetric bolt securing arrangements. To provide additional position assurance additional location dowels shall be used.

- 7.13.9.6 On completion of final valve assembly and test, two pins/rivets shall be installed in line on the valve and gearbox flanges, to indicate the “as manufactured” condition for the valve, as shown in Fig.1:

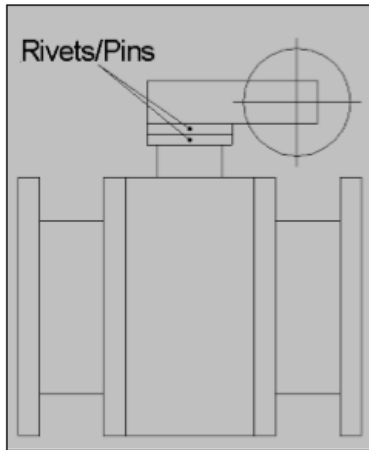


Figure 1 - Rivets/Pins installed location

#### 7.13.10 Locking Device Provision

Manually operated valves shall be supplied with brackets, locking plates or other devices to allow the valves to be locked in the open or closed position, using padlocks supplied by others.

#### 7.14 Lifting Requirements for Valves

- 7.14.1 Lifting lugs shall be provided for valves over 250 kg weight (including accessories). In additions all requirements of Human factor Engineering AGES-SP-03-004 shall be met.
- 7.14.2 Valves requiring lifting lugs shall be provided with permanent lift lugs or screwed in proprietary lifting devices rated for the weight of the valve with at least a 4:1 safety factor.
- 7.14.3 Positions of lifting lugs on valves shall allow for safe handling operations of the valve fully equipped with its gearbox or hand-wheels from the installed orientation.
- 7.14.4 The orientation of the lifting lugs on the valves shall be suitable for lifting the valve from the installed location/orientation.
- 7.14.5 Lifting lugs shall be proof tested by the Manufacturer.
- 7.14.6 Welded on lifting lugs shall be subjected to 100% visual inspection and 100% surface examination (MT or DPT). If integrally cast, they shall be subjected to 100% volumetric (RT or UT).
- 7.14.7 Valves shall be marked to indicate the mandatory safe lifting points and each lifting lug shall designed for full SWL. The SWL shall be specified on the general arrangement drawings.
- 7.14.8 MOC of the Lifting lugs and valve support attachment shall be same material type as valve body, except that 316 may be used on valves of duplex stainless steel and nickel alloys.
- 7.14.9 Proprietary screwed type lugs and shackles shall be provided with certified load test certificates. These shall be replaced, retested or revalidated as required by HSE requirements/regulations.

#### 7.15 Weld Overlay requirement

- 7.15.1 Weld overlay requirement if specified in valve data sheets, shall be in accordance with AGES-SP-09-015.
- 7.15.2 Unless specified on the Valve Data Sheets, weld overlay shall be applied to the following as minimum:

- a) Dynamic sealing areas like seal housing and related contact surfaces at seat to body and stem seals, stem packing areas, etc.
- b) Other areas where corrosion of carbon steel will prevent required sealing like Body seat pockets, Trunnion cavity, etc.
- c) Static sealing areas in contact with Lip seals
- d) Areas to be welded overlayed (overlay thickness included) and dimensional tolerances shall be shown on valve general arrangement drawings, which shall be approved by the COMPANY
- e) The maximum allowable hardness at any location on welded surfaces, after final machining, shall be in accordance to ISO 15156 / NACE MR 01-75).
- f) Heat Affected Zone (HAZ) thickness shall be minimized
- g) Minimum two-layer cladding with minimum 3 mm weld overlay is required
- h) Where ALLOY 825 trim is specified, Components made from weld overlay shall use INCONEL 625 welding consumables

## 7.16 Hard Facing

- 7.16.1 Hard facing shall be by using High Velocity Oxygen Fuel" (HVOF) type or equivalent process. All thermal spraying shall be carried out under optimal conditions. The component shall be coated immediately after heating and grit blasting while the component still is a temperature well above dew point. All seating areas of the valves shall be coated as a minimum. However, for ball valves, the complete spherical part of the ball in contact with the seat along the full travel shall be coated
- 7.16.2 For tungsten carbide hard facing, hard facing material shall be 83% tungsten carbide and 17% cobalt as metallic binder.
- 7.16.3 Tungsten carbide to achieve a minimum hardness of 1050 Vickers. The thickness of the coating must be a minimum of 400 micron (thickness of finished/machined surface).
- 7.16.4 For Stellite hard facing, sprayed deposit thickness shall be 0.25 mm minimum, for finish ground minimum thickness of 0.13 mm.
- 7.16.5 All the coated parts shall be ground and lapped as part of finishing.
- 7.16.6 The surface sealing contact between ball or gate and seats will be integral, without any circumferential failure or scratch.
- 7.16.7 All the coated surfaces shall be 100% visually examined and shall be free from pores and cracks. In addition, all the coated surfaces and substrate areas 12.5 mm beyond coating shall be 100% liquid penetrant examined

## 8 VALVE MATERIALS

### 8.1 General

- 8.1.1 Material construction of valve components shall be as stated in the Valve Purchase Descriptions or Valve data sheet as applicable.
- 8.1.2 All material shall meet the mandatory requirements specified in the ASTM/ASME standards. Restrictions in chemical composition including carbon content, carbon equivalent and other requirements including testing etc. shall be fully in compliance to Piping Material Specification AGES-SP-09-002, "Material Selection Guidelines" AGES-GL-07-001 and Requirements for Materials in Sour Service", AGES-SP-07-003 In addition for refer AGES-SP-09-013 for additional requirements related to applicable ASTM materials



- 8.1.3 Valves up to and including size NPS 1.5 shall be from forged body material.
- 8.1.4 Valve bodies, end adapters, extended bonnets and other valve components, if manufactured from forged materials, shall be forged close to their final Shape and incorporate a 20% minimum size reduction from the billet. Each forging shall be hot worked, and heat treated to produce uniform grain size and mechanical properties in the finished product.
- 8.1.5 Valve bodies manufactured from bar stock are not acceptable.
- 8.1.6 The use of forgings for valve bodies are acceptable in place of castings, subject to approval, however, castings are not an acceptable alternative to forgings.
- 8.1.7 Material of construction for all auxiliary connection (material related to assemblies of vent/drain, sealant/grease injection etc.) shall be in CRA metallurgy with minimum equal to valve trim material (in solid CRA metallurgy).
- 8.1.8 The CONTRACTOR shall provide full details of all components materials and material condition including procedures and qualification for overlay and any other surface treatment. For weld overlay requirements refer AGES-SP-09-015. Weld overlay of ball in ball valve instead of solid CRA is acceptable for NPS 6 and above provided it is used for corrosion mitigation and not for low temperature applications.
- 8.1.9 Carbon steel parts are not permitted on stainless steel valves.
- 8.1.10 VENDOR shall verify all the materials to avoid galvanic corrosion between dissimilar materials.
- 8.1.11 Where applicable, bearing material shall be supplied with material of construction minimum equal to valve trim material.
- 8.1.12 Stem and sliding elements, including threaded components particularly in stainless steel, should have a minimum 50 HBW hardness difference between contacting surfaces and an appropriate surface finish to prevent galling.
- 8.1.13 VENDOR to note that ENP coating on carbon steel surfaces is not accepted as an acceptable method to protect valve components from corrosion.
- 8.1.14 Vendor to note that use of castings for bodies, bonnets and flanges is prohibited for API 6A compliant valves.
- 8.1.15 Material class and Temperature for API 6A valves shall be as specified in valve datasheets in accordance to API 6A. All API 6A valves shall be made with Manufacturers written specification which shall include the minimum requirements to meet API 6A Table 7 and Table 8, including impact strength (Table 9), hardness (Table 20), chemical composition (Table 11 & 12) and design stress intensity (as defined in API 6A 6.3.1.2) or from equivalent 60K material(s) in order to comply with API 6A as well as PSL 3 requirements or PSL 3G requirements in Gas Service.
- 8.1.16 Bolt material selected for API 6A valves shall comply with API 6A clause 8.2.3.
- 8.1.17 The size of bolting and size of ligaments shall be confirmed by Vendor as being sufficient for effective trim sealing including the seat to body or to end closure sealing for the various loadings/loading combinations
- 8.1.18 All materials in contact with sour service shall, as a minimum, meet the requirements of NACE MR0175 / ISO 15156 (latest edition), Piping Material Specification, Material selection Guidelines AGES-GL-07-001 and "Requirements for Materials in Sour Service", AGES-SP-07-003
- 8.1.19 For sour service, Vendor shall conduct hardness test on finished components to ensure that the hardness requirements of NACE MR0175 / ISO 15156 and AGES-SP-07-003 are met. Where hardness values in excess of the requirements of NACE / ISO Standard are obtained, the part shall be rejected.

- 8.1.20 For material requirements, chemical composition, heat treatment, impact testing, corrosion testing, welding & hard facing and NDE requirements, SUPPLIER shall refer to applicable material standard, additional requirements specified in this specification in addition to AGES-SP-13-002
- 8.1.21 All materials in carbon and low alloy steel shall have maximum Carbon content and sulphur content as per below table

	Non-Sour		Sour	
	Carbon Content %	Sulphur Content %	Carbon Content %	Sulphur Content %
Forgings ASTM A105 and to ASTM A350 Grade LF2 Class 1 ( Note b)	23	As per applicable Standard	23	0.02
Castings ASTM A216 Grades WCB and WCC and to ASTM A352 Grade LCC (Note a)	25	0.02	21	0.02

Note

- a) In addition, the Phosphorus content shall not exceed 0.025%
- b) The Silicon content of ASTM A105 shall not be lower than 0.15 %wt.

- 8.1.22 Forgings furnished to Grade F316, the carbon content shall not exceed 0.03 %.
- 8.1.23 The Carbon Equivalent (CE) based on the Product Analysis for CS & LTCS Valves shall not exceed 0.43, for both sour and non-sour materials calculated by the following formula ( all values in weight %):

$$CE = C + \left[ \frac{Mn}{6} \right] + \left[ \frac{Cr + Mo + V}{5} \right] + \left[ \frac{Ni + Cu}{15} \right]$$

- 8.1.24 Carbon content of 5% Cr, 1/2% Mo steel shall not exceed 0, 15% (by weight).
- 8.1.25 All carbon steel forgings shall be supplied in the normalized condition. Casting shall be the normalized or quenched and tempered condition.
- 8.1.26 Cr-Mo forgings of flanged-end valves shall be furnished in the normalised and tempered condition
- 8.1.27 All cold worked items subjected to greater than 5% Fibre Strain shall be stress relieved
- 8.1.28 Impact testing shall be as per applicable ASTM Standards, in compliance with ASME B 31.3 Para 323.3. The "Charpy V-notch Testing" shall be in accordance with ASTM A370. All pressure-containing parts in valves (forging and casting) shall meet the toughness test requirements
- a) LTCS Materials: Low temperature carbon steel valves shall be impact tested at a temperature of minus 46 °C. Impact test results as an average of three tests shall be at least 27 J for standard size specimens (10 mm x 10 mm). Only one result may be lower than 27 J, but it shall be at least 21 J
- b) Austenitic Stainless Steel: Where XM-19 materials are offered for parts of valves with a minimum design temperature lower than -29 °C (-20 °F), these parts shall be subject to impact tests in accordance with ASTM A370 at the minimum design temperature. Impact test results as an average of three tests shall be at least 27 J for standard size specimen.



- c) Super and Duplex stainless steel: Charpy impact testing shall be carried out in accordance with ISO 17781.
  - d) Martensitic stainless steel: Impact testing is required for pressure containing parts of steel forgings to ASTM A182 Grade F6NM and steel castings to ASTM A487 Grade CA6NM and ASTM A743 Grade CA6NM.
  - e) As a minimum, impact testing shall be carried out for the qualification of procedures for welding on valves with a design temperature below -29 °C (-20 °F) and for welding on valves of duplex stainless steel or martensitic stainless-steel material
- 8.1.29 SS316 metallurgy shall be from a dual certified grade (e.g. 316/316L) steel and shall be supplied in solution annealed condition.
- 8.1.30 Duplex and Super Duplex Stainless Steel shall be in solution annealed and water quenched condition.
- 8.1.31 Forgings furnished to ASTM A182 Grades F44, F62, F304, F304H, F304L, F316, F321, F321H or F347, F347H shall be solution heat-treated.
- 8.1.32 Inconel 625 and Incolloy 825 forging shall be in shall be in annealed condition. Inconel 625 and Incolloy 825 casting shall be in solution annealed condition.
- 8.1.33 Austenitic stainless steel, including Alloy 20, shall be supplied in the stabilised annealed and water quenched condition.
- 8.1.34 If alloy 718 forgings and bar is used for the valve stem, it shall be supplied in accordance with API 6ACRA.
- 8.1.35 All Duplex and Super duplex stainless steel material shall meet the requirements specified in applicable standards and this specification. In addition, The PREN values respectively shall be not less than 34 and 40.
- 8.1.36 Stainless steel material (316/316L), Duplex Stainless Steel (22%Cr), Super Duplex Stainless Steel (25%Cr) and Inconel 625 shall undergo pickling and passivation as per ASTM A380.
- 8.1.37 Alloy N08825 (Alloy 825) shall be supplied with Nickel content greater than 39% and a PREN greater than 30.
- 8.1.38 Cast Ni-Al Br valve body to ASTM B148 (UNS C95800) shall be given temper anneal heat treatment before machining.
- 8.1.39 All austenitic stainless-steel forgings shall be 100% liquid penetrate examined as per ASTM A -182 supplementary requirements S5, with acceptance criteria to ASME B 16.34, ANNEX D.
- 8.1.40 Positive Material Identification (PMI) shall be conducted 100% for all SS / CRA material (body & trim) as specified in AGES-GI-13-002
- 8.1.41 All bearings shall be of a self-lubricating design (anti-friction material is acceptable) and shall be minimum equal to valve trim material.
- 8.1.42 "Free cutting" (re-sulfurized) steels shall not be used for the following:
- a) Pressure boundary parts
  - b) Parts in contact with the process fluid.
  - c) Parts that are welded.
- 8.1.43 Where sour service is specified, process-wetted and pressure-containing parts that are manufactured, fabricated or formed from plate shall be resistant to hydrogen-induced cracking (HIC) in accordance to AGES-SP-07-003.

- 8.1.44 Castings to ASTM A487-CA6NM and ASTM A743-CA6NM shall have a carbon content of 0.03 % maximum.
- 8.1.45 Castings to ASTM A351-CN7M, ASTM A743-CN7M and ASTM A744-CN7M shall have a carbon content of 0.03 % maximum and a sulphur content of 0.02 % maximum.
- 8.1.46 All heat treatment procedures shall be subject to a statistical process control to ensure that the final material properties comply with the applicable material standard and this specification. Statistical process control is not required for heat treatment records that are supported by a type 3.1 certificate.
- 8.1.47 Post-weld heat treatment (PWHT) shall be performed as required in the applicable material standard and ASME B31.3. Unless specified otherwise, PWHT only applies to all welds affecting the integrity of the pressure retaining boundary and does therefore not necessarily apply to tack welds, seal welds or attachment welds such as those for backseat bushings, seat rings, lifting lugs and auxiliary connections.
- 8.1.48 Internal valve parts of 13Cr shall not be tack welded or seal welded.

## 8.2 Bolting for Valve Body/Bonnet

Bolting material shall be minimum in accordance with materials specified in piping materials classes and as per valve datasheet. In addition, refer Specification for Fasteners and Gasket, AGES-SP-09-005

Bolting and other valve components shall not be cadmium plated

## 9 VALVE MATERIAL TESTING / INSPECTION REQUIREMENTS

- 9.1 All items shall be tested and inspected in full accordance with their referenced product specification and applicable standards as per valve data sheet.
- 9.2 Inspection level and certification shall be as stated in COMPANY Quality system requirements and Criticality Rating specification.
- 9.3 Unless specifically requested, valves designed to API 6A, shall be Inspected and Tested as per API 6A PSL 3, PR1 unless specifically specified otherwise. PSL 3G requirements shall be applicable for Gas service
- 9.4 NDT and NDE acceptance shall be in accordance with applicable material standards (ASTM, ASME, MSS, API, BS codes), this specification, Piping Material Specification AGES-SP-09-002, "Requirements for Materials in Sour Service", AGES-SP-07-003 and Procurement Inspection Requirement and Certification Requirements AGES-SP-13-002. Refer section 9.9 below for further details on NDE requirements
- 9.5 All mechanical tests shall be performed on material after final heat treatment
- 9.6 All valves in sour service shall be tested in accordance with NACE MR0175/ISO 15156), with additional requirements of AGES-SP-07-003.
- 9.7 Vendor shall ensure that Austenitic and Nickel alloy materials used in the valve manufacturing process shall meet the relevant material specification requirements through in house quality control.
- 9.8 All SS and CRA material shall subjected to 100% PMI (body and trim). In case of CS/LTCS valve, PMI shall be conducted for trim material. PMI shall be based on AGES-GL-13-002.
- 9.9 COMPANY reserves the right to conduct 100% 'Positive Material Identification (PMI)' on Austenitic and Nickel alloy materials upon delivery of the valves as a part of receiving inspection process. Materials not

accepted in PMI because of indications of incorrect or No Match conditions, shall be rejected and returned unless otherwise proved negative through further testing at an independent test house by vendor.

## 9.10 NDE Requirements

9.10.1 As a minimum, valves shall be subject to RT/ UT/ PT/ MT as called out in below table. NDE requirements stipulated in the valve code, if any, over and above those listed in the table, shall also apply. In the event of conflict, the more stringent requirement shall prevail.

Minimum NDE Requirements (RT/UT/PT/MT)				
Material	Rating & Size	NDE Requirements	Procedure	Acceptance Criteria
Forgings & castings magnetic & non-magnetic material	Class 150-300 (NPS< 6")	Manufacturer's standard QC procedure, subject to Company's approval	Manufacturer's standard QC procedure, subject to Company's approval.	Manufacturer's standard QC procedure, subject to Company's approval.
Castings: Magnetic Material	Class 150-300 (NPS> 8") and >Class 600 (All Sizes)	100% MT 100% RT (critical areas per ASME B16.34 sec.8)	ASME B16.34 ASME B16.34	ASME B16.34 Appendix II ASME B16.34 Appendix I
Forgings: Magnetic Material	Class 150-300 (NPS> 8") and >Class 600 (All Sizes)	100% MT 100% UT/ RT (as per ASME B16.34 sec.8)	ASME B16.34 ASME B16.34	ASME B16.34 Appendix II ASME B16.34 Appendix IV/ I
Castings: Non-magnetic Material	Class 150-300 (NPS> 8") and >Class 600 (All Sizes)	100% PT 100% RT (critical areas per ASME B16.34 sec.8)	ASME B16.34 ASME B16.34	ASME B16.34 Appendix III ASME B16.34 Appendix I
Forgings: Non-magnetic Material	Class 150-300 (NPS> 8") and >Class 600 (All Sizes)	100% PT 100% UT/ RT (as per ASME B16.34 sec.8)	ASME B16.34 ASME B16.34	ASME B16.34 Appendix III ASME B16.34 Appendix IV/ I
Non-Ferrous Hard Facing	All	100% PT	ASTM E 165	No indications
Ring Joint grooves	All	100% PT	ASTM E 165	<ul style="list-style-type: none"> <li>No Indications in Ring Contact Area</li> <li>No Linear Indications (Sour service valves)</li> <li>No Linear Indications &gt; 2 mm (non-sour service valves)</li> <li>No Rounded Indications in excess of 2 mm</li> <li>No Rounded Indication Clusters</li> </ul>

Minimum NDE Requirements (RT/UT/PT/MT)				
Material	Rating & Size	NDE Requirements	Procedure	Acceptance Criteria
				in excess of 10 sq. mm
Welds (including weld overlays)	All Butt welds All Other Welds	100 % RT, 100% MT / PT, 100% UT (as applicable)	ASME B16.34 ASME B16.34	ASME B16.34 ASME B16.34
RT : RADIOGRAPHIC EXAMINATION PT : LIQUID OR 'DYE' PENETRANT TEST UT : ULTRASONIC TESTING MT : MAGNETIC PARTICLE TEST			Notes: Requirements stipulated in the valve code, if any, over and above those listed in the table, shall also apply. In the event of conflict, the more stringent requirement shall prevail.	

## 10 PRESSURE TESTING

- 10.1 Unless specifically requested, valves designed to API 6A, shall be Inspected and Tested as per API 6A PSL 3, PR1 unless specifically specified otherwise. PSL 3G requirements shall be applicable for Gas service.
- 10.2 Valves designed to code other than API 6A shall be subject to below mandatory tests (including supplementary tests) as per API 6D, API 598 (or other Testing code when specifically agreed with COMPANY).
- 10.3 The valve hydro test pressure shall be as per ASME B 16.34 based on Material Group and Class.
- 10.4 Pressure testing for valves shall be carried out at the factory in the fully assembled condition (including auxiliary components, fittings, and gland packing's) and before coating or painting.
- 10.5 Pressure test shall be carried out in accordance with the referenced codes and product specifications called out in the valve data sheet.
- 10.6 Valve body castings shall not be impregnated with sodium silicate or any other material to prevent leakage during pressure testing.
- 10.7 For valves NPS 10 (DN 250) and larger, the valve shall be tested in the orientation specified in the purchasing documentation. If no orientation is specified, the valve shall be tested with horizontal flow bore and stem vertical upward.
- 10.8 After the valve has been successfully pressure tested and accepted, at least 75% of the gland adjustment travel shall be available for use in service.
- 10.9 Before testing valve internals and test equipment/system shall be dry, thoroughly cleaned, de-greased, dust, oil and sealant free and unpainted. After testing is completed, valve internals shall be thoroughly cleaned and dried, and the surfaces especially valve body cavities ensured to be free from test fluids, cleaning agents, loose particles and organic substances. Then prepared for preservation and shipment as detailed in section 16.7.
- 10.10 Test fluid used for hydrostatic testing of valves shall be hydraulic oil or an emulsion of water with a water-soluble oil to prevent rust. A maximum of 10 % glycol corrosion inhibitor or a molecular level inhibitor

additive shall be added to liquid test media. The water temperature shall not be greater than 38 °C during the testing period.

- 10.11 Pressure testing of valves containing stainless steel/ Nickel alloy parts, shall ensure only water containing less than 30 ppm (30 mg/litre) chloride ion shall be used for pressure testing
- 10.12 Whenever TSO (tight Shut off) requirement is stated in the purchase, unless otherwise specifically agreed below seat leakage shall be applicable per seat of the valve.
- a) Metal seats shall be in accordance with API 6D (ISO 5208) Leakage Rate B.
  - b) Soft seated valve shall be accordance with API 6D (ISO 5208) Leakage Rate A.
- 10.13** Valves designed to code other than API 6A shall be subject to below mandatory tests (including supplementary tests) as per applicable design/testing codes.
- a) Shell test (test media-Water) –Each valve and all type of valve.
  - b) Stem Backseat Test (test media air or water) when specified in data sheet for Gate valve & Globe valve having back seat feature. All gate and globe valves (including designed to API 6D) shall be back seat tested at 1.5 times pressure rating
  - c) High pressure closure test (test media-Water)-Each Valve and all type of valve. Valves with a gear operator or actuator shall be seat tested after assembly of the operating mechanism
  - d) Low pressure closure test (with air or nitrogen)-Each valve and all type of valve & globe valve in sour service
  - e) Double block and bleed test (test media-Water)-Each valve (For Valve with DBB feature).
  - f) High pressure closure test (with air or nitrogen) When specified in the Datasheet/Purchase or as per applicable code -Each valve. (Ball & Gate valve for valves in gas service only with sour toxic & lethal application).
  - g) Seat relief test (test media-Water)-For valves with DBB feature-Each Valve.
  - h) Fugitive emission testing - -As per ISO-15848 part 2. (For Ball, Gate, Butterfly, Plug & Globe valve)
  - i) Cryogenic valve testing – For each valve when specified.
  - j) Functional test-Each valve and all type of valve.
  - k) Anti-static test-One valve of each unique design/size//material (valves with Non-metallic inserts)
  - l) Torque test test-One valve of each unique design/size//material (for Ball, Gate Globe & Plug valve).
- 10.14 Acceptance Criteria for Seat Leakage Rates shall be as follows:

Valve Type	Hydro Seat Test (Note 1) Maximum Leak Rate	LP Gas Seat Test 6±1 bar. Maximum Leak Rate	HP Gas Seat Test 1.1 x Rated Pressure. Maximum Leak Rate
Ball	Soft Seat: A Metal Seat: B	Soft Seat: A Metal Seat: C	Soft Seat: A Metal Seat: 2 x C
Butterfly	Soft Seat: A Metal Seat: As per API598/ /BS EN 12266-1 as applicable	Soft Seat: A Metal Seat: As per API598/ /BS EN 12266-1 as applicable	Soft Seat: A Metal Seat: As per API598/ /BS EN 12266-1 as applicable
Lubricated, Balanced Plug	A	A	B

Valve Type	Hydro Seat Test (Note 1) Maximum Leak Rate	LP Gas Seat Test 6±1 bar. Maximum Leak Rate	HP Gas Seat Test 1.1 x Rated Pressure. Maximum Leak Rate
Check (Swing & Dual Plate Check Valve)	Metal Seat: F	Metal Seat: E	Metal Seat: E
Check (Lift Check Valve)	Metal Seat: Ras C as BS 1868	-	-
Gate	Metal Seat: As per API598	Metal Seat: As per API598	Metal Seat: As per API598
Globe	Metal Seat: As per API598	Metal Seat: As per API598	Metal Seat: As per API598
Note: 1. The leakage rate for the backseat test on gate and globe valves shall be the same as that of the leakage rate for the hydrostatic seat test. 2. Class A, B, C are as per ISO 5208			

10.15 Drains, vents and sealant points, which may have been included for testing, shall be blanked off.

## 11 ADDITIONAL SPECIFIC REQUIREMENTS

Following additional specific requirements shall be applied for valves in general as applicable and if specified in Valve Data Sheets or Purchase requisitions.

### 11.1 Fugitive Emission Testing

11.1.1 Valves design shall minimize fugitive emissions. Particular attention shall be paid to have high integrity valve stem and seals with no leakage to the environment. All such valves shall meet fugitive emissions test tightness as per BS EN ISO 15848 Part 1 & Part 2 with leakage class as per below table unless otherwise specified in datasheet.

Service conditions	Emission leakage Class
Lethal service	Class AH ( Note 2)
Sour, Toxic and other Hydrocarbon services	Class BH
<i>Note 1: The specific details of service severity and emission leakage rate and valve requirements should be determined and confirmed for each project based on HSE requirements and specified on associated valve data sheets.</i>	
<i>Note 2: IDBB valves the fugitive leakage rate of the integral valve shall be minimum Class BH.</i>	

11.1.2 For Emission class AH, swing check valve shaft shall be of retainer less design where the hinge bracket is internally assembled, or the clapper arm is hung from cover.

- 11.1.3 The manufacturer shall liaise specialist packing vendor and implement the required packing box tolerances and surface roughness in order to meet the applicable Fugitive Emission class.

#### **11.2 Cryogenic Valves Testing**

- 11.2.1 Valves for cryogenic applications shall be designed and tested in conformance to requirements of BS 6364
- 11.2.2 Valves shall be clean and free of moisture and grease and assembled in clean conditions.
- 11.2.3 If the service is non-lubricating, materials shall be selected to prevent galling between mating parts.

#### **11.3 Vacuum Application Valve Testing**

- 11.3.1 Valves for vacuum service requirement, if applicable, shall be as specified on the valve data sheets.
- 11.3.2 Valves shall be designed for a vacuum level of 100 mbar (1.45 psi) unless specified otherwise on the valve data sheets.
- 11.3.3 The test procedure shall be submitted for approval by COMPANY.
- 11.3.4 Valves shall not have protective coating applied prior to the vacuum testing.

#### **11.4 Functional Test**

- 11.4.1 One valve per size and per batch of valves shall be subject to the test described in API 6D and as below:
- a) The valve shall be cycled close-open-close with rated pressure in the valve.
  - b) End stops and position indicators/switches shall be shown to function correctly and give correct alignment of the obturator.
  - c) Hand wheel force required to operate the valve (open or closed) against design differential pressure shall be measured and shown to be not greater than 360N.
  - d) Input torque of the gear box shall be measured and verified by torque wrench or torque tool.
- 11.4.2 For actuated valves, the valve shall be opened and closed by its own actuator for 6 cycles to prove its function.

#### **11.5 Field Testing of Valves**

- 11.5.1 Vendor to note that all valves may be subject to additional testing by CONTRACTOR/COMPANY prior to installation / commissioning. Tests may include nitrogen gas seat leak testing at 1.1 x design pressure and low-pressure nitrogen seat test at 7 barg. Valves shall be supplied to facilitate field testing.
- 11.5.2 Vendor to confirm that all the valves shall withstand these tests without any leakage or failure. Any subsequent repairs required as an outcome of site testing shall be carried out by Vendor.
- 11.5.3 Vendor need to arrange repair of valves locally in COMPANY approved workshop under their warrantee in case of failure of field testing of valves.

#### **11.6 Repair/Repair by Welding**

- 11.6.1 No major repair welds to valve bodies shall be permitted. However minor weld repairs are permissible with prior approval of COMPANY. Any minor weld repair as defined in ASME, and ASTM standard shall be mapped and submitted to COMPANY for review and approval prior commencing any repairs. WPS & PQR along with NDE and PWHT shall be submitted for approval. All minor repairs shall be subjected to PWHT.
- 11.6.2 Requirements for weld repair shall be in accordance with ASME B16.34, Section 8.4. Welds or Weld Repairs (on fabricated body) shall be subject to a Stress Relieving (PWHT) as per ASME B16.34 and shall be certified.



11.6.3 The welding procedures and qualifications of the welding procedures and welders to be employed in making the repairs must be in accordance with ASTM A488 or ASME section IX.

#### 11.7 Drive Train Strength Test:

11.7.1 The drive train strength test for ball, gate or plug valves shall be measured when specified. The test torque shall be the greater of:

- a) twice the manufacturer's predicted breakaway torque/thrust; or
- b) twice the measured breakaway torque/thrust.

11.7.2 In case the order consists of multiple fully identical actuated valve assemblies, only one unit shall be subjected to the stall test. The stall test is done by blocking movement of the valve from its fully open position by inserting a test plug into the valve.

#### 11.8 Corrosion Testing:

11.8.1 Corrosion testing shall be as per requirements of AGES-SP-07-003 & AGES-GL-07-001

11.8.2 The method for Intergranular Corrosion (IGC) and Pitting testing shall be in accordance with below table. Weld overlays, welds, pressure and non-pressure retaining, shall be IGC tested in accordance with below standards. (Refer Table below)

11.8.3 All SS material (forged or cast) shall be tested for IGC and shall be capable of passing IGC test as per ASTM A262 Practice E or ISO 3651-2 method A.

11.8.4 Where a service corrosion test is conducted it shall follow the requirements of EFC 17 and NACE MR0175/ISO 15156.

11.8.5 For other materials the corrosion testing shall be as below

STEEL GRADE	CORROSION TEST	TEST CONDITIONS	ACCEPTANCE CRITERIA
UNS N08904 (F 904L)	ASTM G48 Method A	Test temperature 25°C Test duration:24 hours	No pitting at 20X magnification. Weight loss shall be less than 4.0g/m <sup>2</sup>
UNS S31254 (F 44) UNS N08367 (F62) UNS N08926	ASTM G48 Method A	Test temperature:50°C Test duration:48 hours	No pitting at 20X magnification. Weight loss shall be less than 4.0g/m <sup>2</sup>
UNS S32205 (F 60)	ASTM G48 Method A	As per ISO 17781	As per ISO 17781
UNS S32750 (F 53)	ASTM G48 Method A	As per ISO 17781	As per ISO 17781
UNS S32760 (F 55)	ASTM G48 Method A	As per ISO 17781	As per ISO 17781
UNS N8020 Alloy 20	ASTM A262 Method E	As per ASTM A262	As per ASTM A262
UNS N08810	ASTM G 28 Test Method A	As per ASTM 28	48 mpy (1.22 mm/y) maximum
UNS N08825	ASTM G28 Method A	Test temperature 120°C Test duration:120 hours	No preferential attack in grain boundaries at 50 X magnification Weight loss shall be less than 36 mpy (0.914 mm/y)



			maximum
UNS N06625	ASTM G28 Method A	Test temperature 120°C Test duration:120 hours	No preferential attack in grain boundaries at 50 X magnification Weight loss shall be less than 36 mpy (0.914 mm/y) maximum
UNS N10276	ASTM G28 Method B	As per ASTM G28	100 mpy (2.54 mm/y)

## SECTION C

### 12 QUALITY CONTROL AND ASSURANCE

- a. SUPPLIER's Quality Management Systems shall comply with all the requirements of ISO 9001 "Quality Management Systems – Requirements" and ISO 9004 "Quality management - Quality of an organization - Guidance to achieve sustained success".
- b. Materials and services shall only be procured from and supplied by MANUFACTURERS and CONTRACTORS approved by COMPANY.
- c. To ensure that all work is being performed consistently and accurately and to the requirements of the Project Specifications, CONTRACTOR shall ensure that the SUPPLIER shall have in effect, at all times, a QA program which clearly establishes the authorities and responsibilities of those responsible for the Quality System. Persons performing Quality functions shall have sufficient and well-defined authority to enforce Quality requirements that they initiate or identify and to recommend and provide solutions for Quality problems and thereafter verify the effectiveness of the corrective action.
- d. Quality System and Quality Control requirements shall be identified and included in the CONTRACTOR's Purchase Documentation. Based on these requirements the SUPPLIER will develop a QA/QC program which shall be submitted to the CONTRACTOR for review and approval. The SUPPLIER's QA/QC program shall extend to SUB-CONTRACTORS and SUB-SUPPLIERS.
- e. On request, the SUPPLIER shall provide objective evidence of QA/QC surveillance for all levels of the SUPPLIER activity.
- f. COMPANY/ CONTRACTOR reserves the right to inspect materials and workmanship at all stages of manufacture and to witness any or all tests. The SUPPLIER shall provide the CONTRACTOR with a copy of its manufacturing Inspection and Test Plan and with copies of all related/ referenced procedures for review and approval in accordance with the agreed document schedule.
- g. SUPPLIER Inspection and Test Plan will be reviewed by COMPANY for inclusion of any mandatory COMPANY/ CONTRACTOR witness or hold points."
- h. The CONTRACTOR'S Quality Manual shall provide details for the preparation of a Quality Plan in accordance to AGES-GL-13-001-Contractor QA/QC Requirements, which shall include provisions for the QA/QC activities. The Quality Plan shall be submitted to COMPANY for approval. Moreover, in case of any revision in the Quality Plan due to change in Quality Management System, then the revised QP shall be submitted for COMPANY approval before initiating any service activities.
- i. The level of detail required in the Quality Plan shall be commensurate with the scope of services provided.
- j. During services / activities, Quality Assurance / Quality Control issues are the responsibility of the SUPPLIER and shall be approved and certified by the Third-party Authority (TPA).
- k. All Conflicts among CONTRACTOR, SUPPLIER & TPA shall be reported in writing to COMPANY for resolution

#### 12.1 SUBCONTRACTORS / SUBVENDORS

- 12.1.1 Valves shall only be purchased from Vendors approved by ADNOC Category Management. This approval indicates that the VENDOR has an approved Quality management system and a proven track record in supply of this valve type.
- 12.1.2 The VENDOR shall assume unit responsibility and overall guarantee for the valves
- 12.1.3 The VENDOR shall transmit all relevant purchase order documents including specifications to his SUBVENDORS and SUBCONTRACTORS.

- 12.1.4 It is the VENDOR'S responsibility to enforce all Purchase Order and Specification requirements on his SUBVENDORS and SUBCONTRACTORS.
- 12.1.5 The VENDOR shall submit all relevant SUBVENDOR and SUBCONTRACTOR drawings and engineering data to the CONTRACTOR.
- 12.1.6 The VENDOR shall obtain and transmit all SUBVENDOR and SUBCONTRACTORS warranties to the CONTRACTOR/COMPANY, in addition to the system warranty.

## **13 TESTING QUALITY REQUIREMENTS**

### **13.1 INSPECTION AND TEST PLAN**

Vendor shall submit a detailed Inspection and Test Plan (ITP) for approval based on COMPANY Quality System requirement. Purchaser will complete the ITP with scheduling of tests, scope of test, standard followed for test, acceptance criteria, their review, witness and hold points. Purchaser or its authorized representatives shall be permitted at all times free access to all parts of Vendor's workshops that concern the construction, inspection and testing of the valve.

### **13.2 SPECIFIC INSPECTION REQUIREMENTS**

Quality requirements, including inspection, testing, surveillance, material certification and traceability for the Valves shall be in conformance to the Purchase Order Quality Requirements.

## **14 SPARE PARTS**

- 14.1 The vendor shall recommend and submit, within the tender package, the priced spare list. This shall be strictly in accordance with COMPANY Spare Parts Procedure and cover the commissioning, start up and first and quote for two-year (minimum) operation spare parts.
- 14.2 Manufacturer shall recommend and quote for two-year (minimum) operation spare parts along with the tender package strictly in accordance with COMPANY Spare Parts Procedure including Standard Form for "Spare Parts" referred in the Purchase Requisition
- 14.3 The vendor shall identify (part of bid) and supply any commissioning spares and special tool requirement if required along with the valve.
- 14.4 Spare parts list shall indicate clearly the following:
  - a) Parts serial/manufacturing Number
  - b) Parts materials specification
  - c) Availability limitation of these spares
  - d) Any special tool requirements
  - e) Any special training required

## **15 CRITICALITY RATING**

- 15.1 Criticality rating are comparative indications of the 'importance' of a given item with respect to factors relating to service conditions and the consequences of failure. This is then used as a guide in determining the level of inspection to be applied to vendors, and the extent of documentation to be supplied by them. Criticality Rating System shall be as per "Criticality Specification" AGES-SP-13-001.

## 16 CERTIFICATION REQUIREMENTS

- 16.1 Certification requirements shall be in accordance to Project specification and as per AGES-SP-13-002
- 16.2 For items intended for sour service, the manufacturer shall provide a statement of compliance with NACE MR 0175/ISO 15156 in addition to the other material certificates required with all additional requirements of COMPANY specification.
- 16.3 For valves designed to API Standards (API 6A, API 6D, API 599, API 600, API 602, API 603 API 608, API 609, API 623 etc.), manufacturer shall hold valid API license and all valves shall be supplied with respective API Monogram.
- 16.4 All certifications shall be in English language
- 16.5 The requirements for certification, reports & any other documents shall be in accordance with the specifications and "Vendor Document Requirement List" (VDRL) attached with the material requisition.
- 16.6 As a minimum, the Material Test Certificates (MTC) shall contain the following data:
- a) Project Number, PO Number & Item Number.
  - b) Item Description, Size and Quantity.
  - c) Standard & Material Grade.
  - d) Heat/Melt/Manufacturing Number.
  - e) Heat Treatment Details.
  - f) Chemical Analysis for all components.
  - g) Mechanical Tests Result (Along with values required by specification) for all components.
  - h) Hardness Test Result (Along with values required by specification).
  - i) Pressure Test Result.
  - j) Cryogenic test results (if applicable)
  - k) Results of Supplementary Test(s) as called out in the Purchase Order (along with values required by specification).
  - l) NDE Results (as applicable).
  - m) HIC Test Results: CSR, CLR, CTR values (where applicable).
  - n) Ferrite test results (if applicable)
  - p) Radiography report (where applicable).
  - q) NACE Compliance Statement (where applicable).
  - r) Dimensional Check Report.
  - s) WPS and PQR (for welds including weld repairs & overlays).
  - t) Valve painting report.
  - u) Certificate of compliance for valve operator.
- 16.7 All materials shall have their chemical analysis certified by Product Check Analysis.
- 16.8 Material Test Certificates (MTC) shall be furnished covering each heat supplied.
- 16.9 Where applicable all certificates shall be original or authenticated mill certificates.

- 16.10 All certificates shall state the manufacturer's name, location. Forging, casting and plate certificates shall be from original steel manufacturers

## 17 PAINTING

- 17.1 All non-moving exposed surfaces shall have a protective coating in accordance with COMPANY specific Painting and Coating Specification (AGES-SP-07-004).
- 17.2 The finish coating of the paint provided on the valves shall be such that, field application of re-painting can be done without the requirement for any surface preparation on top of the full-cured factory-finished coat. Finish colour of the coating shall be as specified in the valve datasheet/Purchase description.
- 17.3 When painting is required for protection of the valve(s), it shall only be applied after all tests and examinations have been carried out. The flange contact faces and various valve identifying markings shall not be painted.
- 17.4 Colour coding of valves shall be done in line with the COMPANY Painting specification (AGES-SP-07-003) unless specifically indicated in Valve datasheet.

## 18 MARKING AND TAGGING

- 18.1 Marking shall be designed to be clearly legible for the valve design life.
- 18.2 The nameplate rivet holes shall be pre-drilled prior to FAT.
- 18.3 Marking shall be as per relevant ASME, ASTM, MSS or other standards as mentioned on the Purchase Description. Unless noted otherwise, the location, style, symbols, abbreviations etc. of markings shall be in accordance with MSS-SP-25. Carbon steel material shall be marked by cold stamping using low stress round nosed stamps or manufacturer's rolling stamp method.
- 18.4 Marking for stainless steels (Austenitic and Duplex), Titanium and 90/10 Cu Ni components shall be by vibro-etching on rim on each item.
- 18.5 Galvanized items shall be marked by stencilling in letters not less than 20mm high with a water-proof material that is not injurious to the coating.
- 18.6 Heat number for the castings or material specification for the forgings shall be permanently marked on the valve body.
- 18.7 An identification nameplate, made from 316 SS material, shall be fixed securely to the valve body with type 316 stainless steel fasteners after coating is complete.
- 18.8 As a minimum, the following data shall be indicated on the nameplate, in bold (uppercase) lettering, a minimum of 3 mm in height
- 18.9 All valves shall be equipped with a proper identification name plate, which is made by SS or nickel alloy sheet and shall report following as minimum:
- Project number & Purchase order number
  - Item no
  - Name of valve manufacturer
  - Supplier serial number.
  - Nominal size
  - Valve Rating
  - Valve type
  - Valve datasheet number
  - Valve Tag no (in case these are indicated on valve data sheet/ purchase description).

- j) Valve design pressure and temperature
  - k) Hydrostatic / Pneumatic test type and pressure
  - l) Body, trim and seat material specifications
  - m) Material stock code number (if applicable).
  - n) NACE compliance details
  - o) Fire safe compliance.
  - p) Year of manufacture
  - q) Paint system
- 18.10 In case the above information cannot be accommodated on the valve manufacturer's standard nameplate, the following information may be provided in bold uppercase lettering at least 6mm in height, on a separate plate. The additional plate shall be made from 316 SS material, shall be fixed securely to the valve body with type 316 stainless steel fasteners after coating is complete.
- a) Project Number & PO Number.
  - b) Item Number.
  - c) Valve datasheet number.
  - d) Valve tag number. (in case these are indicated on valve datasheet / PO)
  - e) Valve serial number.
- 18.11 In addition to Valve Name Plate (detailed above), each valve shall be supplied with an additional 316 SS tag plate permanently fixed to the valve with SS316L flexible wire. This additional plate shall be marked in 6mm high uppercase lettering with the valve V-number if indicated in the P&ID (unique number as per PID) stamped or engraved (For EPC projects, this activity may be performed by the EPC contractor).
- 18.12 When applicable, Valves, which are "type tested or gas tested", shall be tagged accordingly
- 18.13 One additional name plate shall be supplied loosely together with valve for insulated valves.
- 18.14** For Trunnion ball valves as applicable
- a) Each flange shall be provided with a 'SPE' mark on the side that contains a single piston effect seat and with a 'DPE' mark on the side that contains a double piston effect seat.
  - b) Valves fitted with double-piston effect seats shall also be provided with an 'HP' mark on the high-pressure side.
- 18.15** Butterfly valves: Valves having a preferred installed direction, shall be clearly and permanently marked High Pressure Side in an appropriate location

## 19 PACKING AND PRESERVATION

### 19.1 General

- 19.1.1 Vendor shall submit their standard packing procedure together with packing, protective coatings and preservation materials to COMPANY for approval in accordance to Preservation & export Packing specification AGES-SP-07-011. Once agreed this procedure and details shall be followed consistently. Any intended changes shall be notified for approval by COMPANY before use.
- 19.1.2 Each box or crate shall be marked with identical data to that of the name plate and shall be provided with a list of parts, assembly method and transmittal papers in a waterproof envelope firmly attached to it.
- 19.1.3 Material Certificates shall accompany each lot or part lot to each delivery location.
- 19.1.4 Lifting-lug points shall be clearly indicated on the containers.
- 19.1.5 Valves supplied shall be dry, clean and free from moisture, dirt, grease, oil and loose foreign material of any kind.
- 19.1.6 Valves shall be packed in a manner which allows easy handling and prevents damage using materials suitable for all type of transport (Sea, Rail and Road).
- 19.1.7 All valves shall be shipped in suitable containers to give sufficient protection during transit and storage. Valves shall be packed, boxed securely and crafted in the containers such that valve movement during shipment is prevented.
- 19.1.8 All types of Crates, boxes etc. used, shall be lined internally with waterproof plastic, minimum 150 µm thickness, with sufficient weep/vent holes to prevent internal condensation.
- 19.1.9 Valves (Internal components, Spindle, Flange faces, holes for flange stud bolts, bolts, nuts and gaskets) shall be supplied with suitable protective coating for protection against rust, corrosion and mechanical damage during transportation and storage within open and internal areas in onshore and offshore environments.
  - a) All valves shall be stored in their own vapour barrier envelope with desiccant satches, inside the original boxes or containers
  - b) Valve preservation shall be guaranteed by the manufacturer for outdoor storage for at least one year.
- 19.1.10 Waterproof barrier material shall be used for stainless steel valves to protect against chlorine attack by exposure to saltwater atmosphere.
- 19.1.11 Carbon steel and stainless-steel valves shall be packed separately and shall not be stored together.
- 19.1.12 Open ends of valves shall be protected with heavy duty plastic end caps.
- 19.1.13 Hand wheels and Levers 350mm or longer shall be removed and packed in the valve crate firmly attached to the valve to prevent movement and damage during shipment. Any associated small items shall be packed within a waterproof plastic envelope and attached by plastic tie wrap to the valve.
- 19.1.14 Threaded ends shall be greased and fitted with a plastic cap or plastic thread protector to ensure adequate thread protection. SW or BW ends shall be fitted with plastic end cap to ensure that all openings are closed.
- 19.1.15 Gasket contact surfaces on flanged valves shall be protected by means of one-piece covers secured by a minimum of four bolts. The cover material shall be 10mm thick plywood or 3mm thick steel. In addition, a corrosion preventive shall be applied to the flange faces. When plywood flange covers are used, a Polythene sheet shall be placed between the coated flange face and the cover to prevent the wood absorbing the preventative.

- 19.1.16 Flange covers are not to be used as surfaces for any marking or tagging.
- 19.1.17 Valves equipped with a single-acting spring-return actuator shall be shipped in the fail-safe position.
- 19.1.18 Shut-off valves as part of the actuator assembly (valves isolating oil filters, manometers, or pressure transmitters) shall be shipped and kept in the “open” position.
- 19.1.19 Hydraulic lines shall be depressurised. When valves are shipped in the closed position, a warning sticker shall be visible on the valve packing box/crate or container indicating “Valve Closed”.
- 19.1.20 A metal tag shall be permanently attached to each valve, which clearly identifies job number, purchase order line-item number, serial number and valve tag number.
- 19.1.21 Valve lifting sketches and handling instructions shall be included inside valve crates in order to ease lifting operations.

## **19.2 Packing requirements specific to valve type.**

### **19.2.1 Gate Valves**

- a) Gate valves that have blocking between the seat and wedge to prevent in-transit damage to the seat shall be tagged to indicate that blocking is installed. The tag shall indicate that the blocking is required to be removed before installation. The manufacturer shall be responsible for determining if valves require blocking.
- b) The Gate valve shall be shipped with the obturator in closed position.
- c) Gate Valves shall have the glands and spindles shrouded by a wrapping of petrolatum tape around the valve yoke.

### **19.2.2 Ball Valves**

- a) The ball shall be in OPEN position.

### **19.2.3 Check Valves**

- a) Check valves that have blocking between the seat and piston/disk/ball to prevent in-transit damage to the seat shall be tagged to indicate that blocking is installed. The tag shall indicate that the blocking is required to be removed before installation. The manufacturer shall be responsible for determining if valves require blocking.

### **19.2.4 Globe Valves**

- a) Globe valves that have blocking between the seat and Disc to prevent in-transit damage to the seat shall be tagged to indicate that blocking is installed. The tag shall indicate that the blocking is required to be removed before installation. The manufacturer shall be responsible for determining if valves require blocking.
- b) The Globe valve shall be shipped with the obturator in closed position.
- c) Globe Valves shall have the glands and spindles shrouded by a wrapping of petroleum tape around the valve yoke.

### **19.2.5 Plug Valve**

- a) Plug Valves shall be shipped with the plug in open position.

## **19.3 Special Tools**

SUPPLIER shall furnish special tools and appurtenance necessary for the installation, maintenance and/or operation of valves covered by this specification, if any



## 20 SHIPMENT

- 20.1 Preparation of equipment for transportation shall conform to the packing, marking, and shipping instructions or other documents identified in the Purchase Order.
- 20.2 Shipping shall be as specified in the purchase documentation.
- 20.3 Valves shall be released for shipment only after COMPANY's approval of all documentation as per the Vendor Document Requirement Schedule, attached to the requisition.
- 20.4 Packing shall be inspected by COMPANY (or their authorized representatives), before acceptance for shipment.
- 20.5 All valves shall be subject to Receipt Inspection at destination, comprising visual inspection and satisfactory review of COMPANY approved certification/ documents/ manuals/ dossiers required by the purchase order. Incomplete documentation is not acceptable.
- 20.6 Copies of the following documents shall be included with each valve delivery. These documents shall be contained in sealed a waterproof envelope and securely attached to the valve within the shipping container:
  - a) 1 copy of the Packing Lists.
  - b) Manufacturers release note (MRN).
  - c) Procedure for receipt and installation.
  - d) Agreed deviations.
  - e) A list of any rust preventative showing the brand name, type number and manufacturer's name. A copy of the manufacturer's instructions for the renewal and/or removal of any rust preventatives.
  - f) For packages containing desiccants, a list showing the brand name, type number, manufacturers name, the date the package was sealed and the recommended renewal frequency.
  - g) Any other documentation as requested in the purchase requisition.

## 21 DOCUMENTATION / MANUFACTURER DATA RECORDS

### 21.1 General

- 21.1.1 The format of documentation shall comply with Project requirements and COMPANY specific vendor drawing requirements.
- 21.1.2 Documents shall be provided shall follow the requirements listed below and Project specific purchase requisitions/ order.
- 21.1.3 VENDOR shall submit the type and quantity of drawings and documentation for CONTRACTOR'S authorization or information as listed in the individual Material Requisitions and Purchase Orders.
- 21.1.4 Mutual agreement on scheduled submittal of drawings and engineering data shall be an integral part of any formal Purchase Order.
- 21.1.5 After order placement, SUPPLIER shall submit for approval, all listed drawings / documents, strictly in accordance with the agreed schedule and program.
- 21.1.6 Comments made by CONTRACTOR on drawing submittal shall not relieve VENDOR or SUBVENDORS of any responsibility in meeting the requirements of the specifications. Such comments shall not be construed as permission to deviate from requirements of the Purchase Order unless specific and mutual agreement is reached and confirmed in writing.
- 21.1.7 Each drawing shall be provided with a block in the bottom right-hand corner incorporate the following information:

- a) Official trade name of the VENDOR.
- b) VENDOR'S drawing number.
- c) Drawing title giving the description of contents whereby the drawing can be identified.
- d) A symbol or letter indicating the latest issue or revision.
- e) PO number and item tag numbers.

21.1.8 Revisions to drawing shall be identified with symbols adjacent to the alterations, a brief description in tabular form of each revision shall be given, and if applicable, the authority and date of the revision shall be listed. The term "Latest Revision" shall not be used.

## 21.2 Documentation And Manuals

21.2.1 Vendor shall provide the minimum documentation as stated in the Purchase Order and the general minimum documents required by the VENDOR listed below:

- a) List of Vendor's Documents and Drawings
- b) Manufacturing, testing and inspection procedures (Inspection & Test Plan)
- c) Sub-Vendors and Main Suppliers List
- d) Cross Sectional Assembly Drawings (with Part List)
- e) Calculation reports
- f) Welding Procedures (WPS, PQR, Weld Map of key)
- g) NDE Procedure, PMI Procedure, Testing Procedures
- h) PWHT Procedure
- i) Type test certifications: Fire Safe Certification, Cryogenic valve Type Test Certification, AED
- j) Non-conformance records.
- k) Listing of applicable and authorized concessions, waivers and/or material substitutions
- l) Painting Specification
- m) Material test certificates for Body, Bonnet/Cover
- n) Material test certificates for Stem, Body plug.
- o) Material test certificates for Obturator, Bolt, Nuts, Gaskets, seat rings, screws, pins, cotters etc.
- p) Galvanizing and coating certificates for fasteners
- q) NDE, PMI including overlay NDE, thickness check, Ferrite check, etc., Tungsten carbide coating inspection, thickness,
- r) Visual and Dimension check
- s) Hardness testing of seat, RTJ grooves
- t) Pressure Tests (Body, Seat including)
- u) Painting inspection
- v) Marking, Name Plate, Tagging, IDENT Code, Colour Coding and Preservation
- w) Material Test Certificates along with MCS and Test Records
- x) Manufacturer Data Book as per Approved MRB Index
- y) List of Spare Parts for Erection/Installation, Commissioning and Start-up

- z) List of Spare Parts – Two Years operation
- aa) Instruction book/Maintenance manuals.

### **21.3 Final Dossier**

- 21.3.1 Final dossiers shall be submitted per instructions to Vendor for the Preparation of Vendor Data Books.
- 21.3.2 Final dossier shall contain AS-BUILT documents including design documents, manufacturing data record book and instruction for installation.
- 21.3.3 The manufacturing data records book shall contain all documentation referenced in Inspection and Test plan, all test certificates and records and code stamp certification documents.
- 21.3.4 The test reports shall be traceable to each component through the legible paint stencilled, heat numbers or equivalent.
- 21.3.5 All documents shall be identified with COMPANY'S purchase order numbers and item code numbers and shall be signed by the manufacturer's authorized signature.
- 21.3.6 An Instruction book/ Maintenance Manual provided along with final dossier shall as a minimum contain the following information:
  - a) Instructions regarding installation and maintenance of the valve
  - b) A detailed GA drawing of the valve
  - c) Section drawings including the assembly sequence of the valve.
  - d) Section drawings indicating Location and Depth of Weld Overlay (in case weld overlay is performed)
  - e) Component listing with Bill of Materials.
  - f) Spare Parts List (COMPANY's form attached to the P.O)

## **22 GUARANTEE AND WARRANTY**

- 22.1 The VENDOR shall guarantee, in accordance with the general conditions, the equipment shall meet the performance conditions specified in this specification, associated documents and Data Sheets.
- 22.2 SUPPLIER is required to provide guarantee for the trouble – free performance of the valves covered under this specification. SUPPLIER is fully responsible to ensure that the valve materials are suitable for the service, pressure/temperature specified in the data sheets/piping classes and design life. SUPPLIER is free to offer alternative materials in order to provide such a guarantee subject to COMPANY approval.
- 22.3 Notwithstanding the valve's governing code requirements, valves shall be warranted by the Manufacturer against defective material, poor workmanship, and improper design for a period of eighteen (18) months from the date of commissioning or twenty-four (24) months from the date of delivery, whichever is later. The Manufacturer shall repair or replace, without charge, any valve not meeting the terms of the warranty within this period.

## SECTION –D

### 23 APPENDIX A – REFERENCE DOCUMENTS

#### 23.1 International codes and standards

The following Codes and Standards shall form a part of this Specification. When an edition date is not indicated for a Code or Standard, the latest edition in force at the time of the contract award shall apply.

American Petroleum Institute (API)	
API 6A	Wellhead and Tree Equipment.
API 6FA	Specification for Fire Test for Valves.
API 6ACRA	Age-hardened Nickel-based Alloys for Oil and Gas Drilling and Production Equipment
API 6D	Specification for Pipeline and Piping Valves
API 594	Check Valves: Flanged, Lug, Wafer and Butt welding
API 598	Valve Inspection and Testing
API 599	Metal Plug Valves -Flanged, Threaded, and Welded Ends
API 600	Steel Gate Valves Flanged and Butt Welding Ends, Bolted Bonnets
API 602	Steel Gate, Globe and Check Valves for Sizes DN100 and Smaller for the Petroleum and Natural Gas Industries
API 603	Corrosion Resistant, Bolted Bonnet Gate Valves-Flanged and Butt-Welding Ends
API 607	Fire Test for Quarter Turn Valves and Valves with Non-metallic Seats
API 608	Metal Ball Valves-Flanged, Threaded, and Welding Ends
API 609	Butterfly Valves: Double Flanged, Lug-and Wafer-Type
API 615	Valve Selection Guide
API 622	Type Testing of Process Valve Packing for Fugitive Emissions.
API 623	Steel Globe Valves Valves—Flanged and Butt-welding Ends, Bolted Bonnets
API 624	Type Testing of Rising Stem Valves Equipped with Graphite Packing for Fugitive Emissions
API Spec Q1	Specification for Quality Management System Requirements for Manufacturing Organizations for the Petroleum and Natural Gas Industry
API-RP-14E	Recommended Practice for Design and Installation of Offshore Production Platform Piping Systems

American Society of Mechanical Engineers (ASME)	
ASME Section V	Non-destructive Examination
ASME Section VIII	Pressure Vessels
ASME Section IX	Qualification Standard for Welding and Brazing Procedures, Welders, Brazers and Welding & Brazing Operators
ASME B1.1	Unified Inch Screw Threads
ASME B1.20.1	Pipe Threads General Purpose (Inch)
ASME B16.5	Pipe flanges and Flanged Fittings
ASME B16.9	Factory Made Wrought Steel Butt Welding fittings
ASME B16.10	Face-to-Face and End-to-End dimensions of Valves
ASME B16.11	Forged fittings, Socket Welding and Threaded
ASME B16.20	Metallic Gaskets for Pipe flanges
ASME B16.21	Non-metallic Flat Gaskets for Pipe Flanges
ASME B16.25	Butt Welding Ends
ASME B16.34	Valves – Flanged, Threaded and Butt Welding Ends
ASME B16.47	Large Diameter Steel Flanges.
ASME B 18.2.1	Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws
ASME B 18.2.2	Square and Hex Nuts (Inch Series)
ASME B31.1	Power Piping
ASME B31.3	Process Piping
ASME B31.4	Pipeline Transportation Systems for Liquids and Slurries
ASME B31.8	Gas Transmission and Distribution Piping Systems
ASME B46.1	Surface Texture (Surface Roughness, Waviness, and Lay)

American Society for Testing and Materials (ASTM)	
ASNT-TC-1A	Personnel Qualification and Certification in Non-destructive Testing
ASTM A105	Standard Specification for Carbon Steel Forgings for Piping Applications.
ASTM A106	Seamless Carbon Steel Pipe for High - Temperature Service

American Society for Testing and Materials (ASTM)	
ASTM A153	Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
ASTM A182	Standard Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service.
ASTM A193/A193M	Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High Temperature Service or High pressure and other special Purpose Applications.
ASTM A194/A194M	Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.
ASTM A216	Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service
ASTM A217	Steel Castings, Martensitic Stainless and Alloy for Pressure Containing Parts Suitable for High Temperature Service
ASTM A234	Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Services
ASTM A240	Chromium and Chromium – Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels and for General Applications
ASTM A262	Standard Practices for Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels
ASTM A275	Standard Test Method for Magnetic Particle Examination of Steel Forgings.
ASTM A320/A320M	Standard Specification for Alloy Steel and Stainless Steel Bolting Materials for Low Temperature Service.
ASTM A333	Seamless and Welded Steel Pipe for Low-Temperature Service and other Applications with required Notch Toughness
ASTM A350	Standard Specification for Carbon and Low-Alloy Steel Forgings, Requiring Notch Toughness Testing for Piping Components.
ASTM A352	Standard Specification for Steel Castings, Ferritic and Martensitic, for Pressure-Containing Parts, Suitable for Low-Temperature Service
ASTM A370	Standard Test Methods and Definitions for Mechanical Testing of Steel Products
ASTM A380	Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems

American Society for Testing and Materials (ASTM)	
ASTM A388	Standard Practice for Ultrasonic Examination of Steel Forgings.
ASTM A395	Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures
ASTM A435	Standard Specification for Straight-Beam Ultrasonic Examination of Steel Plates.
ASTM A453	High Temperature Bolting with Expansion Coefficients Comparable to Austenitic Stainless Steels
ASTM A479	Standard Specification for Stainless Steel Bars and Shapes for Use in Boilers and Other Pressure Vessels
ASTM A494	Standard Specification for Castings, Nickel and Nickel Alloy
ASTM A564	Standard Specification for Hot-Rolled and Cold-Finished Age-Hardening Stainless Steel Bars and Shapes
ASTM A577	Standard Specification for Ultrasonic Angle-Beam Examination of Steel Plates.
ASTM A578	Standard Specification for Straight-Beam Ultrasonic Examination of Rolled Steel Plates for Special Applications.
ASTM A609	Standard Practice for Castings, Carbon, Low-Alloy, and Martensitic Stainless Steel, Ultrasonic Examination Thereof.
ASTM A694	Carbon and Alloy Steel Forgings for Pipe Flanges, Fittings, Valves and Parts for High Pressure Transmission Service
ASTM A705	Standard Specification for Age-Hardening Stainless Steel Forgings
ASTM A744	Casting, Iron-Chromium-Nickel, Corrosion resistant, for Severe Service
ASTM A747	Standard Specification for Steel Castings, Stainless, Precipitation Hardening
ASTM A788	Standard Specification for Steel Forgings General Requirements.
ASTM A890	Standard Specification for Castings, Iron-Chromium-Nickel-Molybdenum Corrosion Resistant, Duplex (Austenitic/Ferritic) for General Application
ASTM A923	Standard Test Methods for Detecting Detrimental Intermetallic Phase in Duplex Austenitic/Ferritic Stainless Steels
ASTM A928	Ferritic/Austenitic (Duplex) Stainless Steel Pipe Electric Fusion Welded with Addition of Filler Metal

American Society for Testing and Materials (ASTM)	
ASTM A995	Standard Specification for Castings, Austenitic-Ferritic (Duplex) Stainless Steel for Pressure Containing Parts
ASTM B148	Standard Specification for Aluminium-Bronze Sand Castings
ASTM B150	Aluminium Bronze Rod, Bar and Shapes
ASTM B381	Titanium and Titanium Alloy Forgings
ASTM B564	Standard Specification for Nickel Alloy Forgings
ASTM B637	Standard Specification for Precipitation-Hardening and Cold Worked Nickel Alloy Bars, Forgings, and Forging Stock for Moderate or High Temperature Service
ASTM E94	Standard Guide for Radiographic Examination using Industrial Radiographic Film.
ASTM E165	Standard Practice for Liquid Penetrant Testing for General Industry.
ASTM E384	Standard Test Method for Micro indentation Hardness of Materials
ASTM E562	Standard Test Method for Determining Volume Fraction by Systematic Manual Point Count.
ASTM E709	Standard Guide for Magnetic Particle Testing.
ASTM F468	Standard Specification for Nonferrous Bolts, Hex Cap Screws, Socket Head Cap Screws, and Studs for General Use.
ASTM F467	Standard Specification for Nonferrous Nuts for General Use.
ASTM G28	Standard Test Methods for Detecting Susceptibility to Intergranular Corrosion in Wrought, Nickel-Rich, Chromium-Bearing Alloys
ASTM G48	Test Methods for Pitting and Crevice Corrosion Resistance of Stainless Steels and Related Alloys by Use of Ferric Chloride Solution

British Standards (BS) / International Organization for Standardisation (ISO)	
BS 6364	Specification for Valves for Cryogenic Service
BS 6755-2	Testing of Valves Part 2: Specification for Fire Type Testing Requirements
BS EN ISO 12490	Petroleum and Natural Gas Industries - Mechanical Integrity and Sizing of Actuators and Mounting Kits for Pipeline Valves



BS EN 287-1	Qualification Test of Welders - Fusion Welding Part 1: Steels
BS EN 1092-1	Flanges and Their Joints - Circular Flanges for Pipes, Valves, Fittings and Accessories - PN Designated Steel Flanges
BS EN 10204	Metallic Products - Types of Inspection Documents
ISO 1461	Hot dip galvanised coatings on fabricated iron and steel articles - Specification and test methods.
ISO 5208	Industrial valves - Pressure testing of metallic valves
ISO 5210	Industrial Valves - Multi-Turn Valve Actuator Attachments
ISO 5211	Industrial valves - Part-turn actuator attachments.
ISO 9001	Quality management systems - Requirements.
ISO 9004	Managing for the sustained success of an organization – A quality management approach
ISO 9934-1/2/3	Non-destructive testing - Magnetic Particle Testing
ISO 9606 1	Approval Testing of Welders - Fusion Welding - Part 1: Steels.
ISO 9712	Non-destructive testing. Qualification and certification of NDT personnel.
ISO 10423	Petroleum and natural gas industries - Drilling and production equipment - Wellhead and Christmas tree equipment (API Spec 6A).
ISO 10497	Testing of valves- Fire type testing requirements.
ISO 15156 Parts 1 to 3	Petroleum and natural gas industries - Materials for use in H <sub>2</sub> S-containing environments in oil and gas production (NACE MR0175).
ISO 15607	Specification and qualification of welding procedures for metallic materials - General rules.
ISO 15609	Specification and qualification of welding procedures for metallic materials - Welding procedure specification.
ISO 15614	Specification and qualification of welding procedures for metallic materials - Welding procedure test.
ISO 15848 Parts 1 and 2	Industrial valves - Fugitive emissions - Measurement, test and qualification procedures
ISO 17781	Test Method for QC of Microstructure of Ferritic/Austenitic (Duplex) Stainless Steel

ISO 27509	Petroleum and natural gas industries – Compact flanged connections with IX seal ring
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Det Norske Veritas and Germanischer Lloyd (DNVGL)	
DNVGL-ST-F101	Submarine Pipeline Systems

Engineering Equipment and Material Users Association (EEMUA)	
EEMUA 192	Guide for the Procurement of Valves for Low Temperature (Non-Cryogenic) Service

Manufacturers Standardization Society - Standard Practice (MSS SP)	
MSS SP-6	Standard Finishes for Contact Faces of Pipe Flanges and Connecting-End Flanges of Valves and Fittings
MSS SP-25	Standard Marking System for Valves, Fittings, Flanges, and Unions
MSS SP 44	Steel Pipeline Flanges
MSS SP-45	Bypass and Drain Connection
MSS SP-54	Quality Standard for Steel Castings for Valves, Flanges and Fittings and Other Piping Components - Radiographic Examination Method
MSS SP-55	Quality Standard for Steel Castings for Valves, Flanges and Fittings and Other Piping Components - Visual Method for Evaluation of Surface Irregularities
MSS SP-61	Pressure Testing of Valves
MSS-SP-67	Butterfly Valves
MSS-SP-68	High Pressure Butterfly Valves with Offset Design
MSS-SP-72	Ball Valves with Flanged or Butt-Welding Ends for General Service
MSS-SP-80	Bronze Gate, Globe, Angle and Check Valves
MSS SP-91	Guidelines for Manual Operation of Valves
MSS-SP-92	Valve User Guide

National Association of Corrosion Engineers (NACE)	
NACE TM 0177	Laboratory Testing of Metals for Resistance to Sulphide Stress racking and Stress Corrosion Cracking in H <sub>2</sub> S environments
NACE TM 0284	Standard Test Method – Evaluation of Pipeline and Pressure Vessel Steels for Resistance to Hydrogen-Induced Cracking
NACE MR0103	Standard Material Requirements - Materials Resistant to Sulphide Stress Cracking in Corrosive Petroleum Refining Environments.
NACE MR0175	Petroleum and Natural Gas Industries - Materials for Use in H <sub>2</sub> S Containing Environments in Oil and Gas Production

### 23.2 ADNOC Specifications

Std/Spec Number	Title
AGES-GL-07-001	Material Selection Guidelines
AGES-GL-13-001	Contractor QA/QC Requirements
AGES-GL-13-002	Positive Material Identification of Equipment & Piping
AGES-SP-04-005	Emergency Shutdown and On/Off Valves Specification
AGES-GL-08-001	Process Design Criteria
AGES-PH-08-001	Isolation, Drain and Vent Philosophy
AGES-GL-08-005	P&IDs and PFDs Development Guideline
AGES-SP-07-003	Materials and Fabrication Requirements for Metallic Piping & Equipment in Severe (sour) Service
AGES-SP-07-004	Painting and Coating Specification
AGES-SP-07-005	Requirement for Cr-Mo Cr-Mo-V Steel in High Temperature, High Pressure Hydrogen Service Specification
AGES-SP-07-007	Welding & Non-Destructive Examination
AGES-SP-07-008	Prevention of Brittle Fracture
AGES-SP-07-009	Galvanising
AGES-SP-07-011	Preservation and Export packing

AGES-SP-09-001	Piping Basis of Design
AGES-SP-09-002	Piping Material Specification
AGES-SP-09-005	Gaskets & Fasteners Specification
AGES-SP-09-006	Pipe Support Specification
AGES-SP-09-008	Insulation Specification
AGES-SP-09-010	Jacketed & Steam Tracing Specification
AGES-SP-09-013	Specification For Metallic Pipe, Fittings and Flanges
AGES-SP-09-015	Clad Pipes, Fittings and Flanges Specification
AGES-SP-10-003	Onshore Pipelines Design and Construction Specification
AGES-SP-13-001	Criticality Rating Specification
AGES-SP-13-002	Procurement Inspection Requirement and Certification Requirements

In addition to above ADNOC Specifications, COMPANY specific Piping Specifications, Process Specifications, Quality Specifications, Criticality Rating Specification, Painting and Coating specification, Material & Corrosion Specifications, Civil Specifications etc. as applicable shall be applied as applicable and shall be read in conjunction to this specification.

## SECTION E

### 24 APPENDIX B – PIPELINE VALVES

The below additional requirements shall be considered for pipeline valves in addition to the requirements stated above in this specification:-

#### B.1 Introduction

B.1.1 Pipeline valves shall be supplied in compliance with the requirements given in pipeline valve data sheets. Minimum technical requirement for design, materials, testing shall be in accordance with that of piping valves in the above sections are applicable with following additional requirements.

B.1.3 This Appendix is applicable for Valves (Piggable / Non Piggable valves) in pipeline system and associated system (block / sectionalising valve stations, pumping & metering stations, etc.) designed as per ASME B 31.4 or B 31.8 or DNV OS-F101 or B31.3 as specified in valve datasheet.

B.1.4 This specification shall be applicable to all manual valves and the valve part of the actuated isolation valves (MOV, GOV, ESD, etc.). However actuated part of the Valve (i.e. valves with Pneumatic/Hydraulic/Electrical Actuators) are not covered but this specification is to be read in conjunction with the relevant specification for Actuator by others.

#### B.2 Design Considerations / Minimum Design Requirements

B.2.1 The design code of Pipeline valves NPS 2 and above and up to class 2500 shall be API 6D unless otherwise specified, Pipeline Valves in API 5000 and API 10000 class shall be to API Spec 6A/ ISO 10423 and shall also be met as specified in the valve datasheet.

B.2.2 Pipeline Valves shall be flanged ends / butt-welded ends as specified in valve datasheet.

B.2.3 For Transportation / Distribution applications and for buried pipeline valves (irrespective of services), the valves end connections shall conform to clause B 7 and Table-A.

B.2.4 Full bore valves installed in a Piggable line shall be drift tested at Vendor shop and shall have the same bore through the entire valve, including the transition piece and pup piece, and shall be capable of being pigged, sphered and scraped regularly without damage to the seats. The bore shall match the internal pipeline diameter and shall present as smooth profile as possible ensuring uninterrupted free passage.

The valve full bore diameter, transition piece and pup piece shall be measured to verify cylindricity (roundness, straightness) over the full length of the flow passage axis.

The bore of the valve in the open position shall present as smooth profile as possible to a passing pig or scraper and verified as follows:

- a) Pass a drift mandrel through the valve bore after the valve has been assembled, operated and pressure tested.
- b) The drift mandrel length being equal to face-to-face length of the valve.
- c) The drift mandrel diameter shall be equal to the minimum ID tolerance of the governing line pipe specification.
- d) The drift material shall pass completely through the valve bore".

B.2.5 Pipeline Valve shall be designed to withstand a sustained internal vacuum during drying operation of pipeline system

B.2.6 Welding ends of Butt end valves shall conform to requirements in the section 7.5.7 above. Where specified soft seated valves shall be supplied with pipe pups, material and thickness of pipe pups will be specified on the data sheet.

### B.2.7 Auxiliary Connections for Pipeline valve

- a) All Pipeline valves shall be provided with vent and drain. Drain connection shall be at the lowest possible position on the valve body and vent connection at the highest possible position.
- b) For onshore pipeline valves (excluding offshore islands and offshore platforms), body vents and drains shall be provided with below features

Pipeline size	Valve	Requirement of Valve on Vent & drains	Vent & Drain size	End Connection of vent & drain valve
NPS 6 and below		No	As per clause 7.7	Refer Clause 7.7
NPS 8 to NPS 24		Single valve (Note 1)	NPS 1	Butt weld one end & NPT with Plug at open end
NPS 26 and above		Single valve (Note 1)	NPS 2	Butt weld one end & Flange with Blind at open end
Note 1 : For sour service, vent & drain shall be provided with double isolation valve (primary isolation valves shall be but welded both ends)				

- c) All the auxiliary connection and valves shall meet the design, material & service conditions of the main valves. The projection of all auxiliary connections beyond valve body shall be minimized and supported to avoid damage during valve operation/ handling.
- d) Valves 6" and above, shall be provided with sealant injection to seats (for ball valve only) and stem seals. The requirement of sealant injection shall be as described in piping valves, clause 7.7

### B.3 Ball Valves

- B.3.1 Valve body design (top entry, side entry, welded body etc.) shall be as specified in the purchase description/valve datasheet.
- B.3.2 All Butt-welded pipeline valves shall be top entry or fully welded unless specified otherwise in valve datasheet
- B.3.3 All ball valves shall be trunnion mounted type. Fire-safe design for all ball valves shall be specified in accordance with API 6FA/API 607 (same as piping valve requirement above). All ball valves shall be provided with double seat seals. (Also refer section 7.8.8 above)
- B.3.4 The seat rings shall be spring energized to ensure sealing at low differential pressures. Design of seat ring and body shall be such that entrapment of any solid present in the fluid will not obstruct free movement of the seat rings and will not reduce spring action. Seat rings shall be self-relieving type (single piston effect). Double piston effect seat design can be provided for non-expandable service like gas if specified in the datasheet. Safety relief valve for body cavity relief shall not be permitted specially for sour service.
- B.3.5 A lip seal all shall be provided in the lower bearing, stem and seat to prevent ingress of particulate materials and improve the fugitive emission rate. Design of seals shall be verified & endorsed by the vendor and seal supplier for each service applications
- B.3.6 Pressure relieving holes and pressure balancing holes (hole in ball connecting stem pocket and ball ID) in the ball are not allowed.

- B.3.7 Inline full-bore pipeline valves shall be drift tested. The drift test shall demonstrate that full-bore valves have minimum bore specified in Table 1 of API 6D. A drift mandrel shall be passed through the valve, without sticking or damage the valve with the ball in fully open position.
- B.3.8 Face to Face dimension shall be as per API 6D. Short pattern valves are not acceptable.
- B.3.8 High Pressure Hydrostatic (Body and Seat test) and High-Pressure Gas Seat test shall be carried out before external coating/painting of the valve.
1. All valves shall be hydrostatically tested at the test pressures required by API 6D. Welded ends valves shall be tested along with pup pieces. The test medium for both shell and seat tests shall be water. The minimum duration of the shell test and the seat test shall be no less than that specified in API 6D. During the seat test, the test pressure shall be raised to 75 PSI and stopped long enough to ascertain whether the seat is leaking, then the pressure shall be increased to the pressures listed in API 6D. The test fluid for hydrostatic testing shall be an emulsion of water with soluble oil. Any visually detectable leakage during the test duration at test pressure on any external surface of the shell is cause for rejection. Leakage for Valve seat shall not exceed as specified in Section 10.14. Drain and Vent lines/valves shall be subject to a hydrostatic testing with the main valve.
  2. High Pressure Gas Seat Repeated Test shall be carried out for each valve in accordance with API 6D, Annex H (Section H4.3) and as per API 6D QSL-4 requirement (Table J.3 Pressure Testing Requirements for Quality Specification Levels). A bubble tight seal is required without use of sealant. Leakage for Valve seat shall not exceed as specified in Section 10.14 for the duration of the test at test pressure
  3. Each valve shall be tested with compressed air in the final assembled condition in vendor's shop prior to shipment and after painting. Low Pressure Compressed Air/gas Seat repeated Test shall be performed in accordance with API 6D, Annex- H (Section H3.3, Type-II) and as per QSL-4 requirements (Table J.3 Pressure Testing Requirements for Quality Specification Levels). A bubble tight seal is required without use of sealant. Leakage for Valve seat shall not exceed as specified in Section 10.14 for the duration of the test at test pressure). Drain and Vent valves shall also be subject to a seat testing with the main valve
- B.4 **Gate Valves**
- B.4.1 Pipeline gate valves shall be designed, fabricated, tested and inspected in accordance with API Spec 6D and ASME B16.34 except as modified by the requirements of this Specification, for the service conditions specified on the Data Sheets. Allowable stress requirements shall comply with the provisions of ASME B31.4. End-to-end and bore dimensions shall be in accordance with API Spec 6D.
- B.4.2 Pipeline gate valves shall be designed as per requirements of API 6D and applicable standards as specified the valve datasheet.
- B.4.3 This Specification covers the following Gate Valve types:
- a) Through Conduit
  - b) Double disc
  - c) Parallel slide
- B.4.4 Unless otherwise specified, all Through Conduit Gate Valves shall be Reverse acting, Bidirectional, Self-Relieving seat, 'Through Conduit' design, with Position Indicators. The stem packing shall be dust proof design and designed for easy online replacement. The valve shall be designed to have stem sealant injection system.
- B.4.5 All piggable pipeline gate valves shall be full bore design. Inline full-bore pipeline valves shall be drift tested after the valve has been assembled, operated and pressure tested. The drift mandrel length being equal to the face-to-face length of the valve and being equal to the minimum ID tolerance of the governing line pipe specification. In addition the drift mandrel shall pass completely through the valve bore..



- B.4.6 The Valve shall be Double Block & Bleed design with automatic release of excess cavity fluid pressure into valve bore. The use of a pressure equalising hole in the disc(s) is prohibited.
- B.4.7 Full port valves specified with "Full Bore" or FB in the data sheet shall be as per API 600/602 and the valve bore size shall be in accordance with API 6D.
- B.4.8 Trim of gate valves in all services including steam/gas service valves shall be hard faced.
- B.4.9 Gate Valves shall be of a fire safe design and shall be certified to API SPEC 6FA / BS EN ISO 10497. (Also refer section 7.8.8 above)
- B.4.10 If valves are Uni-directional, they shall be clearly marked.
- B.5 Plug Valves**
  - B.5.1 Pipeline plug valves shall be designed, fabricated, tested and inspected in accordance with API Spec 6D, API 599 and ASME B16.34 except as modified by the requirements of this Specification, for the service conditions specified on the Data Sheets. Allowable stress requirements shall comply with the provisions of ASME B31.4. End-to-end and bore dimensions shall be in accordance with API Spec 6D/API 599.
  - B.5.2 The Plug Valves in sizes two inch (nominal) and larger for ASME up to class 2500 shall comply with this specification and API 6D.
  - B.5.3 Plug valves shall be pressure balanced and full-bore type.
  - B.5.4 Cylindrical plugs shall only be used with COMPANY approval.
  - B.5.5 Valves shall be provided with sealant injection connections. Design shall incorporate an internal single or double ball check valve with a vented cap giant button head grease nipple.
  - B.5.6 Valves shall be of Fire Safe Design in accordance with API 6FA. (Also refer section 7.8.8 above)
  - B.5.7 For Pipeline plug valves, Full bore design with round port pattern with minimum bore as specified in Table 1 of API 6D.
  - B.5.8 Valve design shall meet the requirements of API Specification 6D/ API 599 and shall be suitable for the service conditions indicated in the Valve Data Sheets.
- B.6 Check Valves**
  - B.6.1 Pipeline check valves shall be designed, fabricated, tested and inspected in accordance with API Spec 6D and ASME B16.34 except as modified by the requirements of this Specification, for the service conditions specified on the Data Sheets. Allowable stress requirements shall comply with the provisions of ASME B31.4 ASME B31.8 and ASME B31.3 as applicable. End-to-end and bore dimensions shall be in accordance with API Spec 6D/API 594.
  - B.6.2 Check valves shall be of the horizontal swing, full opening, and through-conduit type with contoured clapper designed for passing all types of pipeline scraper and inspection pigs on a regular basis without causing damage to either the valve components or the pig.
  - B.6.3 Valves of sizes larger than covered in API Spec 6D as concerns dimensions shall be dimensioned by the valve Supplier, and the dimensions submitted to Purchaser for approval. Certified drawings including the approved dimensions shall be submitted to Purchaser as soon as possible following approval of the dimensions.
  - B.6.4 Check valves shall have replaceable plates & springs.
  - B.6.5 Check valves shall be fully repairable in place, including replacement of seal, clapper and seat, without removal of the valve body from the pipeline. Valves shall be designed for bolted bonnet top entry.
  - B.6.6 Valves shall be of a design that by nature of its features is capable of passing a fire safe test per API Spec 607 or API Spec 6FA. (Also refer section 7.8.8 above)

- B.6.7 Valves shall be designed so that the valve body is self-supporting thus eliminating the use of support legs or other types of support devices.

#### B.7 Transportation and Distribution Pipeline Valves

The below are specific requirements for all Butt weld ends and Buried valves used in Transportation and Distribution networks. These can be also applied for applications which has zero/minimal shutdown requirements on case-to-case basis based on COMPANY approval.

##### B.7.1 Auxiliary Connection.

In addition to the requirements specified in B 2.7, the following additional requirements shall be applicable for buried pipeline valves

- a) For pipeline valves, body vents and drains shall be provided with below features

Pipeline size	Valve	Requirement of Valve on Vent & drains	Vent & Drain size	End Connection of vent & drain valve
NPS 2 to NPS 4		Single valve	NPS 1/2	Butt weld one end & NPT with Plug at open end
NPS 6 to NPS 8		Single valve (Note 1)	NPS 3/4	Butt weld one end & NPT with Plug at open end
NPS 10 to NPS 24		Single valve (Note 1)	NPS 1	Butt weld one end & NPT with Plug at open end
NPS 26 and above		Single valve (Note 1)	NPS 2	Butt weld one end & Flange with Blind at open end
Note 1 : For sour service, vent & drain shall be provided with double isolation valve (primary isolation valves shall be but welded both ends)				

- b) Double valves are required in the vent and drain lines for all buried valves, one valve close to the connection to valve body and one valve at the end of the extension line at the highest possible location. This second valve shall be fitted with a blind flange. All connection shall of welded type. Sealant injection line shall have grease fitting at the highest point and design shall incorporate an internal double ball check valve with a vented cap giant button head grease nipple.

##### B.7.2 Specific Requirements for Buried valves

- B.7.2.1 All buried valves shall be provided with stem extension and extension casing as per relevant specification. A stem extension long enough for the operator to be approximately 1200 mm above ground level shall be provided for buried valves. The extension shall be fully enclosed and externally coated for corrosion prevention.
- B. 7.2.2 The buried valves shall normally have 1m to 1.5m soil cover from top of pipe to ground level. The actual soil cover and extension length for each buried valve shall be stated on the applicable valve data sheet.
- B. 7.2.3 Enclosure for the extension stem shall be waterproof, fully sealed and have pressure relief system to prevent pressure built-up in the event of a stem seal failure.
- B. 7.2.4 Extension lines for drain, vent, sealant injection shall be adequately clamped to the valve body or stem extension to avoid damage due to vibration and reaction forces of sealant injection or escaping medium.

- B. 7.2.5 For buried valves, extension lines for drain, vent and sealant injection shall be provided terminating approximately 100 mm (4 in) below the top flange of the stem extension.
- B. 7.2.6 The wall thickness of the extension lines shall be suitable to withstand the line pressure (or sealant injection pressure for the sealant line), but not less than Schedule 80.
- B. 7.2.7 Extension lines for drains and vents shall be of the same size as the connection to the valve body
- B. 7.2.8 Extension lines shall be fully butt-welded according to ASME B31.3 except for a flanged disconnection point at the body cover flange level, in case of welded-ends top-entry valves.
- B. 7.2.9 The stem extension shall be sized for the side loads and torque needed to seal and to operate the valve against the maximum class differential pressure applied at the following.
- one or both sides of the valve, whichever case needs the higher torque.
  - both the smallest cross section of the stem extension and to the connection to the obturator.
- B.7.3 Field Tests At Site
- B.7.3.1 The Shell, Seats and Drain/Vent connections of all pipeline valves, ROVs/MOVs on station, hot tap / Tie-in valves and tight shut off valves (TSO) shall be tested by CONTRACTOR at Abu Dhabi Workshop maximum 3 months prior to site installation. Test shall be witnessed by COMPANY representative. During testing at UAE workshop CONTRACTOR shall ensure all the pressure testing, flushing, drying and packaging requirement/recommendation of valve Manufacturer are being followed.
- B.7.3.2 Hydrostatic testing shall be done for Shell, Seats and Drain/Vent connections of the valves. Compressed air testing shall be done for seats only. Testing shall be done as per API 6D. The minimum duration of the tests shall be no less than that specified in API 6D.
- B.7.3.3 Vendor to confirm that all the valves shall withstand these tests without any leakage or failure. Any subsequent repairs required as an outcome of site testing shall be carried out by Vendor/CONTRACTOR.
- B.7.4 Specific Location Wise Pipeline Ball Valve Design and End Connection.

**Table A – Applicable for Transportation & Distribution Pipelines**

Valve Location	Valve Design	Body	Valve Ends	Remarks
Pipeline Buried Valves	Fully Welded		Butt Welded	All Services
Pipeline Sectionalizing Valves (Buried)	Fully Welded		Butt Welded	All Services
First Isolation Valve for Scraper Launcher/Receiver (Near Pigging Tee)	Fully welded		Butt Welded	All Services, Above Ground
Second Isolation Valve for Scraper launcher/ receiver (Installed with Minor Barrel)	Split Body (Bolted)		Flanged	All Services, Above Ground
Station Isolation Valves (on Branch line to/from Pipeline Pigging tees)	Fully welded		Butt Welded	All Services, Above Ground
Hot Tap Valves (All Locations)	Fully Welded		Flanged	All Services, Above Ground
Isolation Valve for Filters, Metering Skid and Pressure Reducing Skid (Note-1)	Fully Welded		Butt welded	All Services, Above Ground

Tie-in Valves on Pipeline	Fully Welded	Butt welded (Note-2)	All Services, Above Ground
Valves on branch connection from pipeline	Fully Welded	Butt welded	All Services, Above Ground
Valves for Instruments and Vents/drains etc. on Scraper Launcher/Receiver Barrels	Fully Welded	Flanged	All Services, Above Ground
Valves for Instruments and Vents/drains etc. in Station Piping Area. (Note-2)	Fully Welded	Butt Welded	All Services, Above Ground
Note-1) Ball Valves for Filters and Metering Skid can be bolted body design with flanged ends for Liquid Hydrocarbon Services. Note-2) Valves ends could be one end welded and another end flanged.			

25 **APPENDIX C – SAMPLE VALVE DATASHEETS**

NOTE : The following sample valve datasheets are for reference only. Project specific data shall be incorporated during the project stage.

1	<b>SAMPLE BALL VALVE DATA SHEET (SOFT SEATED)</b>
2	<b>SAMPLE BALL VALVE DATA SHEET (METAL SEATED)</b>
3	<b>SAMPLE BUTTERFLY VALVE DATA SHEET (CONCENTRIC)</b>
4	<b>SAMPLE BUTTERFLY VALVE DATA SHEET (DOUBLE OFFSET)</b>
5	<b>SAMPLE BUTTERFLY VALVE DATA SHEET (TRIPLE OFFSET)</b>
6	<b>SAMPLE DUAL PLATE CHECK VALVE DATA SHEET</b>
7	<b>SAMPLE SWING CHECK VALVE DATA SHEET</b>
8	<b>SAMPLE NON-SLAM AXIAL VALVE DATA SHEET</b>
9	<b>SAMPLE GATE VALVE DATA SHEET</b>
10	<b>SAMPLE GLOBE VALVE DATA SHEET</b>
11	<b>SAMPLE INTEGRAL DOUBLE BLOCK AND BLEED VALVE DATA SHEET</b>
12	<b>SAMPLE PLUG VALVE DATA SHEET</b>
13	<b>SAMPLE THROUGH CONDUIT GATE VALVE DATA SHEET</b>

## INDEX COVER SHEET FOR SAMPLE VALVE DATA SHEETS


**NOTE : THE FOLLOWING SAMPLE VALVE DATASHEETS ARE FOR REFERENCE ONLY. PROJECT SPECIFIC DATA SHALL BE INCORPORATED DURING THE PROJECT STAGE.**


## INDEX

All parties consent to this document being signed electronically -PT&CS/GP/INT/2022/9418



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	<b>SAMPLE BALL VALVE DATA SHEETS</b>		
	<b>GENERAL NOTES</b>		
1	This data sheet shall be filled by the vendor as required, stamped, signed and deviations clearly marked against each part / material of valve in the space provided in the datasheet. Quotation without vendor signed data sheet will not be considered for technical review and evaluation.		
2	Detailed weight, dimension & material parts list drawings shall be provided at quotation stage for each valve size & class – typical drawings will NOT be accepted. Drawings must reflect extent of weld overlay on all CS / LTCS process wetted parts as specified in datasheet and specification.		
3	Vendor to confirm all the materials mentioned in datasheet shall comply to pressure, temperature and service requirements. Valve seat design pressure-temperature rating shall be submitted with the quotation.		
4	Fluid service & composition shall be specified in purchase specification/datasheet based on Fluid list.		
5	All Ball Valves shall be Long Pattern design. Short pattern ball valves are not acceptable.		
6	<p>a) For valves specified with Hub connectors, the hubs shall be an integral part of the body and shall be Grayloc or Techlok or equivalent type and shall be designed to full rating of the valve. The valve shall be supplied with two clamp assemblies, two seal rings, two bolting sets and two mating hubs with BW ends to match pipe dimensions (OD x wall thickness) and metallurgy specified in the valve data sheet and shall be designed to full rating of the valve.</p> <p>b) For valves specified with Compact Flange ends, valves shall be provided with integral Compact Flanges as per ISO 27509. For sizes not covered in ISO 27509., Compact Flanges shall be as per manufacturer's standard and valve vendor shall supply two companion Compact Flanges, two seal rings and bolting set along with the valves .</p>		
7	Ball valves shall be designed to seal in both directions, i.e. bidirectional, against all pressures up to the maximum service pressure rating for the class unless specified otherwise.		
8	Unless specifically requested, all trunnion mounted ball valves shall be provided with DBB feature as per API 6D.		
9	Handwheel rotation for gear operated ball valves shall be minimized ( limited to 80 turns); Vendor shall furnish data for number of hand wheel turns to full stroke. Gear operator hand wheel on valves that require more than 50 turns to full stroke, shall be fitted with a 25.4 mm male square drive for the use of a pneumatic wrench unless specifically agreed otherwise.		
10	For valve sizes NPS 10 and above, auxiliary body connection for drain and vent shall be terminated in a blank flange. The flange shall have pressure rating, material, flange facing equal to that of the valve body flanges. The flange shall be integral or welded to the valve body. If welded, flange shall be weld neck type. The bolt and gasket material shall be as specified in respective valve datasheets. For Valves up to NPS 8 the vent and drain shall be Plug type. Vent and drain connections if provided, minimum sizes shall comply with MSS SP-45. For sizes NPS 26 and above, the minimum size of connection shall be NPS 2.		
11	For Ball valves with CS / LTCS body material, in hydrocarbon, sour & lethal application, dynamic seal areas (seal housing and related contact surfaces at seat to body and stem seals including stem packing area etc.) and other contact areas ( Body seat pockets, Trunnion cavity, etc., etc.) shall be provided with 3mm weld overlay (or in solid CRA material metallurgy) with the material minimum equal to valve trim material. Vendor shall submit typical valve GADs indicating internal overlay along with technical bid. Where ALLOY 825 trim is specified, Components made from weld overlay shall use INCONEL 625 welding consumables. Refer to AGES-SP-09-015.		
12	Plugs at the body vent and drain shall be anti-blow out type and shall be with double O-ring with one fire safe seal. Bleed plugs shall be protected and secured against any involuntary or undue operation. Seal welding of plugs to valve body is not permitted. Material construction of the plug assembly shall be minimum equal to the valve trim material.		
13	All auxiliary connections such as for grease / sealant / flushing injection fittings shall be minimum equal to the respective valve trim material (in solid CRA metallurgy). Seat and stem sealant injection points shall have two non-return valves, each with a tungsten carbide ball and UNS N06625 spring, where one of the non-return valves shall be placed in a separate fitting inside the valve body. The non-return valve in the body wall shall be secured independent of the injection fitting. Sealant Injection shall be provided with a vented cap giant button head. The internal check valve size shall be NPS 1/4 minimum. The threads shall be protected from the process fluid by seal and there shall be at least one fire safe seal.		
14	For metal seated ball valves, the ball and seat sealing faces shall be coated with a hard faced with Tungsten carbide (unless specifically indicated otherwise) to achieve a minimum hardness of 1050 Vickers. The thickness of the coating must be a minimum of 400 micron (thickness of finished/machined surface). These shall be individually paired and lapped together for efficient sealing. Coating process shall be HVOF (High Velocity Oxygen Fuel process).		
15	All soft seals used shall be Anti Explosive Decompression (AED) type and shall be suitable for the long-term exposure at the design pressure, temperature conditions and service condition ( HC, Sour, CO2 service etc).		
16	Valves shall have a design life of 30 years and be suitable for continuous service in the environment specified.		
17	The minimum wall thickness of the valve body and other pressure containing parts and the valve pressure-temperature rating shall be in accordance with ASME B16.34, taking into account the corrosion allowance with minimum 3mm as specified in valve datasheets.		
18	Valve in lethal service shall be designed in compliance with ASME B 31.3 M 307.2 and Fugitive emission shall be Class AH		
19	Valve Design shall ensure that ball to seat interface and seat to body interface with full differential pressure applied shall demonstrate that the required seat to ball contact is maintained with the material remaining within the elastic limit and freedom of movement is preserved.		
20	All valves containing polymeric/elastomeric materials installed on hydrocarbon/ flammable fluid lines shall have a "fire safe and fire type-tested certified design" in accordance with ISO 10497 or API 6FA or API 607 and shall include minimum a graphite fire safe barrier in the valve bonnet and stem sealing arrangement		
21	Valve flanges shall be in accordance with Piping Material specification - AGES-SP-09-002 and AGES-SP-09-013.		
22	All material shall be qualified for the minimum design temperature.		
23	Graphite packing shall be of high purity with a non-metallic, inorganic, phosphorous based, passivating and corrosion inhibitor impregnated. Graphite seals are only acceptable as back-up seals for fire resistance properties.		
24	Where ASTM A182 F316/316L is specified it shall be Dual Certified.		
25	Austenitic stainless steel shall be supplied in solution annealed condition, Duplex and Super Duplex stainless steel shall be in solution annealed and water quenched condition, and Inconel- 625 & Incoloy 825 forging shall be in annealed condition and castings shall be in solution annealed condition. All carbon steel forgings shall be in the normalized condition. Carbon steel casting shall be the normalized or quenched and tempered condition		
26	Cast Ni-Al Bronze valve body to ASTM B148 (UNS C95800) shall be given temper anneal heat treatment before machining. Vendor shall submit PT chart along with offer.		
27	Valves with ASTM A494 CW6MC and ASTM A494 CU5MCuC material shall be designed for valve pressure temperature rating in accordance with applicable ASTM B564 UNS N06625/ASTM B564 UNS N08825 material pressure temperature rating. (ASME B16.34, Table 2-3.8).		
28	Where pressure retaining parts have been specified as forged in valve datasheets, substitution of castings is not permitted without prior COMPANY approval		
29	Fasteners (Bolts, Studs & Nuts) shall be coated with Fluorocarbon polymer system and shall comply with salt spray test as per Material selection guideline AGES-GL-07-001 for temperature up to 200 DeG c. Above 200 deg C suitable proprietary coatings with prior company approval shall be proposed.		
30	All Inconel and SS material is subjected to 100% PMI (body and trim). In case of CS/LTCS ball valve with SS or Inconel trim, PMI shall be conducted for trim material.		
31	Valves shall be fully rated in accordance with the rating tables of ASME B16.34 or other design codes as indicated in the valve data sheet.		

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		SAMPLE BALL VALVE DATA SHEETS																																						
GENERAL NOTES																																								
33	Valve operator gearbox and/or actuator shall be fitted with their own lifting lugs. Lifting lugs shall be designed with safety factor of 4:1.																																							
34	Stem shall be anti-blow out proof design and one piece solid construction. Stem shall be forged or bar material as specified in datasheet only. Casting material shall not be used for stem. Screwed connection between Stem and closure member is not acceptable																																							
35	Stem shall be marked with permanent open/ close position indication. Position Indicator shall be visible even when operator is removed																																							
36	Flanged end valves with welded on flanges are not permitted. End flanges shall be integrally cast or forged with the valve body, retainers or end adapters.																																							
37	Wrench and hand wheel shall be made of solid material. Hollow components are prohibited. Handles / wrenches or levers shall be sufficiently robust to avoid excessive elastic or plastic distortion against the valve opening and closing forces																																							
38	For valves operated manually, the maximum force required under design and test conditions, when applied at the rim of the hand-wheel or lever, shall not exceed 360 N. For actuated valves, bonnets, stems, stem extensions etc. shall be designed and calculated to withstand the maximum torque delivered by the actuator at the maximum allowable actuator power (i.e. pressure or otherwise). Operation shall be smooth at all times.																																							
39	Ball valves shall be designed to provide automatic cavity pressure relief to prevent over pressurization of the valve body cavity (DBB type) unless specified otherwise. The valve body cavity over-pressure shall be prevented by self relieving seat rings. Trunnion mounted Valves shall be tested for cavity relief design effectiveness as per API 6D for Single piston effect valves. It must be verified that seat release occurs as per API 6D requirements when specified as supplementary test in valve datasheet i.e. Cavity relief test.																																							
40	High Pressure gas test shall be performed for the valves installed in Gas service only with sour, toxic & lethal application or when specified in datasheet. The valve shall be drained of hydrostatic test fluid and the inner parts shall be fully dried prior to the start of the high-pressure gas testing.																																							
41	Alloy 625 valve shall not be painted. Valves including hand wheel shall be painted as per requirement of AGES-SP-07-004.																																							
42	All valves shall be provided with a permanent attached stainless steel name plate (SS316). Name plate on valve and gear box shall be fixed after valve painting. One additional name plate shall be supplied loose with valve for insulated lines.																																							
43	All manual valves (whether operated with lever or a gear operator) shall be provided with provisions to locking the valve at open/close positions.																																							
44	The housing design of elastomeric O-rings shall prevent risk of extrusion by use of thermoplastic back-up rings on both sides (PEEK) for class 900 and above.																																							
45	For Valves with welded ends the following shall be complied. a) Butt-welded end valves shall be provided with extension (pup) pieces in line with AGES-SP-09-003. b) The manufacturer shall provide the pup pieces as forgings equal to the higher material grade specified, that being the valve body or the associated piping/pipeline. b) Extension (pup) pieces shall be considered an integral part of the valve. c) Valves requiring welded ends shall be supplied complete from the manufacturer to ensure welding compatibility and body or seal performance. d) Outside diameter, wall thickness, material grade and composition of the pup pieces shall be as specified in the Valve datasheet. Vendor shall provide test rings (500mm long) from pup piece material for field weld procedure qualification. e) Piggable and ID controlled valve if specified will be subjected to drift test and Drift test shall be carried out on assembled valve along with pup piece. f) Post weld heat treatment, if required, shall be performed prior to final valve assembly																																							
46	For "22Cr" duplex (austenitic-ferritic) stainless steels, the Pitting Resistance Equivalent (PREN) shall be 34 or higher For "25Cr" super duplex (austenitic-ferritic) stainless steels, the Pitting Resistance Equivalent (PREN) shall higher than 40																																							
47	Refer to table below for IGC test and acceptance level.																																							
TABLE 1																																								
<table><tr><th>STEEL GRADE</th><th>CORROSION TEST</th><th>TEST CONDITIONS</th><th>ACCEPTANCE CRITERIA</th></tr><tr><td>UNS S31600 (316) UNS S31603 (316L)</td><td>ASTM A262 Practice E</td><td>ASTM A262 Practice E</td><td>ASTM A262 Practice E</td></tr><tr><td>UNS N08904 (904L)</td><td>ASTM G48 <sup>(a)(b)</sup> Method A</td><td>Test temperature:25°C Test duration: 24 hours</td><td>No pitting at 20X minimum magnification.</td></tr><tr><td>UNS S31254</td><td>ASTM G48 <sup>(a)(b)</sup> Method A</td><td>Test temperature:50°C Test duration: 48 hours</td><td>No pitting at 20X minimum magnification</td></tr><tr><td>UNS S32205 (F60)</td><td>ASTM A923 <sup>(a)(c)</sup> Method A</td><td>As per ISO 17781</td><td>As per ISO 17781</td></tr><tr><td>UNS S32750 (F53) UNS S32760 (F55)</td><td>ASTM A923 <sup>(a)(c)</sup> Method C</td><td>As per ISO 17781</td><td>As per ISO 17781</td></tr><tr><td>UNS N08825</td><td>ASTM G28 <sup>(a)</sup> Method A</td><td>Test temperature 120°C Test duration:120 hours</td><td>No preferential attack in grain boundaries at 50 X magnification. Weight loss shall be less than 36 mpy. (0.914 mm/y) maximum.</td></tr><tr><td>UNS N06625</td><td>ASTM G28 <sup>(a)</sup> Method A</td><td>Test temperature 120°C Test duration:120 hours</td><td>No preferential attack in grain boundaries at 50 X magnification. Weight loss shall be less than 36 mpy. (0.914 mm/y) maximum.</td></tr><tr><td>UNS N10276</td><td>ASTM G28 Method B</td><td>As per ASTM G28</td><td>100 mpy (2.54 mm/y)</td></tr></table>					STEEL GRADE	CORROSION TEST	TEST CONDITIONS	ACCEPTANCE CRITERIA	UNS S31600 (316) UNS S31603 (316L)	ASTM A262 Practice E	ASTM A262 Practice E	ASTM A262 Practice E	UNS N08904 (904L)	ASTM G48 <sup>(a)(b)</sup> Method A	Test temperature:25°C Test duration: 24 hours	No pitting at 20X minimum magnification.	UNS S31254	ASTM G48 <sup>(a)(b)</sup> Method A	Test temperature:50°C Test duration: 48 hours	No pitting at 20X minimum magnification	UNS S32205 (F60)	ASTM A923 <sup>(a)(c)</sup> Method A	As per ISO 17781	As per ISO 17781	UNS S32750 (F53) UNS S32760 (F55)	ASTM A923 <sup>(a)(c)</sup> Method C	As per ISO 17781	As per ISO 17781	UNS N08825	ASTM G28 <sup>(a)</sup> Method A	Test temperature 120°C Test duration:120 hours	No preferential attack in grain boundaries at 50 X magnification. Weight loss shall be less than 36 mpy. (0.914 mm/y) maximum.	UNS N06625	ASTM G28 <sup>(a)</sup> Method A	Test temperature 120°C Test duration:120 hours	No preferential attack in grain boundaries at 50 X magnification. Weight loss shall be less than 36 mpy. (0.914 mm/y) maximum.	UNS N10276	ASTM G28 Method B	As per ASTM G28	100 mpy (2.54 mm/y)
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a) The surface of the specimens shall be picked before testing.																																								
b) Cut edges shall be prepared according to ASTM G48																																								
c) Rapid screening test (ASTM A923 Test Method A) shall not be used as an acceptance test																																								

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	<b>SAMPLE BALL VALVE DATA SHEETS</b>		
<b>GENERAL NOTES</b>			
49	Minimum NDE Inspection and testing requirements of Valves shall be as "Piping & Pipeline valve Specification -AGES-SP-09-003".		
50	For valves to API 6D and API 6A, manufacturer shall hold valid API 6D and API 6A license and all valves shall be supplied with respective API Monograms.		
51	Lifting lugs and Valve supports shall be provided for valves over 250 kg weight (including accessories).		
52	Valves for API 5000 and API 10000 class, shall comply with 60K material property requirements of API 6A, and shall comply with PSL 3 requirements of API 6A. All API 6A valves shall be Inspected and Tested as per API 6A PSL 3.		
53	Valve Ball shall be made from single piece casting or forging as solid Ball. Cast balls shall meet all material supplementary requirements (radiography, etc.). Pressure relief hole and/or Pressure balancing holes in the ball is not permitted on floating ball or on trunnion mounted valves.		
54	For Cryogenic service the following shall be applied as applicable		
	a) Valves in services with design temperature below - 50°C and continuous operating temperature below - 10°C shall be provided with an extended bonnet and cryogenic acceptance testing in accordance with the requirements of BS 6364.		
	b) However if the valves are operating for short term low temperature excursion below -50°C ( with normal operating temperature above -10°C) then non-extended bonnet is acceptable if specifically specified in datasheet and the valve seals and packing are designed for minimum design temperature. typical example of such cases are non-operable valves during depressurization) (and/or) non-insulated valve only.		
55	For valves in pipe class with minimum design temperature of -50°C or -46°C (non cryogenic pipe class) and if the valves are operating in continuous operating temperature between -10°C and - 50°C then extended bonnet valves shall be provided in line with EEMUA 192 and the same shall be specifically specified in valve datasheet.		

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		SAMPLE BALL VALVE DATA SHEET (SOFT SEATED)		Valve ID: XXX	
1	GENERAL SPECIFICATION				
2	PIPE CLASS : AC1S3C-FA		DESIGN CODE : ASME B16.34+API 6D		
3	VALVE RATING : ANSI CLASS 150		END CONNECTIONS : FLANGED TO ASME B16.5, RF		
4	DESIGN TEMPERATURE RANGE : -29 / 150 deg C		FACE TO FACE DIMENSION : ASME B16.10 /API 6D, LONG PATTERN		
5	DESIGN PRESSURE : AS PER ASME B16.34		FLANGE FACE FINISH : SMOOTH FINISH (125 - 250 µin)		
6	SIZE RANGE : NPS 2-24		BORE : FULL/REDUCED - AS PER PURCHASE DESCRIPTION		
7	OPERATOR : LEVER OPTD : NPS 8 AND BELOW; GEAR : OPTD: NPS 10 AND ABOVE; ACTUATED: WHEN SPECIFIED		VALVE CONSTRUCTION TYPE : SPLIT BODY, BOLTED BONNET, BIDIRECTIONAL		
8	NACE REQUIREMENTS : YES (REF NOTE-C)		BALL MOUNTING : FLOATING: NPS 6 AND BELOW; TRUNNION: NPS 8 AND ABOVE		
9	CORROSION ALLOWANCE in mm : 3 MM		INSULATION / THICKNESS : NO / 0 MM		
10	SEAT SEALANT INJECTION : YES FOR VALVE IN SIZE NPS 6 AND ABOVE		STEM SEALANT INJECTION : YES FOR VALVE IN SIZE NPS 6 AND ABOVE		
11	FLUID HANDLED / SERVICE : SOUR - CRUDE OIL				
12	FLUID COMPOSITION (MOL%) PROJECT SPECIFIC DATA TO BE SPECIFIED. : H2S : H2O : CO2 : BTEX : Chloride:				
13	CRYOGENIC SERVICE : NO		EXTENDED BONNET : NOT APPLICABLE		
14	MATERIAL SPECIFICATION				
15	BODY/BONNET : A105N/ASTM A216 WCB		BODY / STEM GASKETS : FIRE SAFE, FLEXIBLE GRAPHITE -VENDOR TO SPECIFY		
16	BALL : ASTM B564 UNS N08825 OR ASTM A105N / A216 WCB + 3MM Alloy 625 WELD OVERLAY		BODY / CLOSURE BOLTS : A193 GR. B7M		
17	STEM : SOLID SHOULDERED, ANTI BLOW-OUT: ASTM B637 UNS N08825		BODY / CLOSURE NUTS : A194 GR. 2HM		
18	TRUNNION : ALLOY 825 / ASTM B564 UNS N08825		BEARING : SELF LUBRICATING TYPE ALLOY 825		
19	SEAT : RPTFE/Modified RPTFE ( Vendor to specify) (REFER NOTE E)		SPRING (SEAT & ANTISTATIC) : INCONEL X718		
20	SEAT RING : FOR TRUNNION MOUNTED VALVE: SPRING ENERGIZED ALLOY 825		WELD OVERLAY : REFER TO NOTE-B		
21	SEAL MATERIAL : ELASTOMERIC- AED TYPE, FKM-ELAST-O-LION 101 OR APPROVED SUPERIOR EQUIVALENT (VENDOR TO SPECIFY), (REFER NOTE E).		BODY GASKET : SS316 SPW WITH GRAPHITE FILLER / VENDOR TO SPECIFY		
22					
23	TESTING, INSPECTION AND MISCELLANEOUS REQUIREMENTS				
24	ANTI-STATIC DEVICE : YES		TESTING CODE : API 598		
25	DRAIN / VENT CONNECTION : YES		MANDATORY PRESSURE TEST : AS PER API 598 & AGES -SP-09-003		
26	LOCKING DEVICE : YES-PROVISION ONLY		SEAT LEAKAGE RATE : CLASS A (ISO 5208)		
27	LIFTING LUGS : REQUIRED FOR VALVE WEIGHING 250 KG AND ABOVE		FUGITIVE EMISSION REQUIREMENT : CLASS "BH"		
28	SUPPORT (LEGS / SADDLE) : REQUIRED FOR VALVE WEIGHING 500 KG AND ABOVE		OTHER SUPPLEMENTARY TESTS : AS PER AGES-SP-09-003		
29	PAINTING / COATING : AGES-SP-07-004		NDT & HARDNESS REQUIREMENT : API 6D & AGES -SP-09-003		
30	FIRE SAFE REQUIREMENTS : FIRE SAFE AND FIRE TYPE-TESTED : CERTIFIED DESIGN AS PER API 6FA / API 607 / ISO 10497		INSPECTION CERTIFICATION : AS PER AGES-SP-13-002 TABLE A1.1 (REFER NOTE D)		
31	MARKING : AS PER MSS-SP-25 & AGES -SP-09-003		CRITICALITY RATING : 1 (REFER NOTE F)		
32	ADDITIONAL REQUIREMENTS : AGES-SP-09-003, AND AGES-SP-07-003				
NOTES					
A	This Valve Data sheet shall be read in conjunction with Piping & Pipeline Valve Specification - AGES-SP-09-003 & general notes provided in the data sheet document.				
B	For Valves in Sour & Lethal service, dynamic seal areas (seal housing and related contact surfaces at seat to body and stem seals including stem packing area etc) and other contact areas ( Body seat pockets, Trunnion cavity, etc) shall be provided with 3mm weld overlay with the material minimum equal to valve trim material.				
C	Valves in Sour service application shall comply with applicable upstream NACE MR 0175/ ISO 15156 or Downstream NACE MR0103/ISO 17945 and "Requirements For Materials In Severe Service -AGES-SP-07-003.				
D	3.2 Certification for all pressure retaining parts & all tests on the final assembly, 3.1 Certification for trims and other metallic parts, 2.2 certification for packings & other non pressure parts in line with AGES-SP-13-002 Table A1.1.				
E	The soft seat and elastomeric seal materials specified in the valve data sheet are COMPANY preference and indicative only. Valve vendor & Sealing manufacturer shall jointly validate and confirm the suitability of Seat & Seal materials for the Design pressure temperature limits, Size and Service condition. Where applicable vendor to propose superior alternative.				
F	Minimum Criticality rating shall be 1 for sour service and lethal service.				


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		SAMPLE BALL VALVE DATA SHEET (METAL SEATED)		Valve ID: XXX	
1	GENERAL SPECIFICATION				
2	PIPE CLASS : EC1S3C-JH		DESIGN CODE : ASME B16.34+API 6D		
3	VALVE RATING : ANSI CLASS 1500		END CONNECTIONS : FLANGED TO ASME B16.5, RTJ		
4	DESIGN TEMPERATURE RANGE : -29 / 250 deg C		FACE TO FACE DIMENSION : ASME B16.10 / API 6D, LONG PATTERN		
5	DESIGN PRESSURE : AS PER ASME B16.34		FLANGE FACE FINISH : FULL VERY SMOOTH FINISH (63 µin)		
6	SIZE RANGE : NPS AS PER PURCHASE DESCRIPTION		BORE : FULL/REDUCED - AS PER PURCHASE DESCRIPTION		
7	OPERATOR : LEVER OPTD : NPS 3 AND BELOW; GEAR OPTD: NPS 4 AND ABOVE ACTUATED: WHEN SPECIFIED		VALVE CONSTRUCTION TYPE : AS PER AGES-SP-09-003		
8	NACE REQUIREMENTS : YES (REF NOTE-C)		BALL MOUNTING : FLOATING: NPS 1 1/2 AND BELOW; TRUNNION: NPS 2 AND ABOVE		
9	CORROSION ALLOWANCE : 3 MM		INSULATION / THICKNESS : NO / 0 MM		
10	SEAT SEALANT INJECTION : NOT APPLICABLE		STEM SEALANT INJECTION : YES FOR VALVE IN SIZE NPS 6 AND ABOVE		
11	FLUID HANDLED / SERVICE : SOUR - PRODUCED GAS				
12	FLUID COMPOSITION (MOL%) PROJECT SPECIFIC DATA TO BE SPECIFIED. : H2S : H2O : CO2 : BTEX : Chloride:				
13	CRYOGENIC SERVICE : NO		EXTENDED BONNET : NOT APPLICABLE		
14	MATERIAL SPECIFICATION				
15	BODY : A105N/ASTM A216 WCB		BODY / STEM GASKETS : FIRE SAFE, FLEXIBLE GRAPHITE -VENDOR TO SPECIFY		
16	BALL : ASTM B564 UNS N08825 or ASTM A105N / A216 WCB +3 mm INCONEL 625 WELD OVERLAY WITH TUNGSTEN CARBIDE COATING		BODY / CLOSURE BOLTS : A193 GR. B7M		
17	STEM : SOLID SHOULDERED, ANTI BLOW-OUT: ASTM B637 UNS N07718		BODY / CLOSURE NUTS : A194 GR. 2HM		
18	TRUNNION : ALLOY 825 / ASTM B564 UNS N08825		BEARING : SELF LUBRICATING TYPE ALLOY 825		
19	SEAT : METAL SEATED		SPRING (SEAT & ANTISTATIC) : INCONEL X718		
20	SEAT RING : FOR TRUNNION MOUNTED VALVE: SPRING ENERGIZED ALLOY 825 WITH TUNGSTEN CARBIDE COATING, (REFER NOTE F)		WELD OVERLAY : REFR TO NOTE-B		
21	SEAL MATERIAL : ELASTOMERIC- AED TYPE, FKM-ELAST-O-LION 101 OR APPROVED SUPERIOR EQUIVALENT (VENDOR TO SPECIFY), (REFER NOTE E).		BODY GASKET : ALLOY 825		
22					
23	TESTING, INSPECTION AND MISCELLANEOUS REQUIREMENTS				
24	ANTI-STATIC DEVICE : YES		TESTING CODE : API 6D, API 598		
25	DRAIN / VENT CONNECTION : YES		MANDATORY PRESSURE TEST : AS PER API 6D, API 598 & AGES -SP-09-003 SECTION 10		
26	LOCKING DEVICE : YES-PROVISION ONLY		SEAT LEAKAGE RATE : AS PER AGES -SP-09-003, CLASS B (ISO 5208)		
27	LIFTING LUGS : REQUIRED FOR VALVE WEIGHING 250 KG AND ABOVE		FUGITIVE EMISSION REQUIREMENT : CLASS "BH"		
28	SUPPORT (LEGS / SADDLE) : REQUIRED FOR VALVE WEIGHING 500 KG AND ABOVE		OTHER SUPPLEMENTARY TESTS : HIGH PRESSURE GAS CLOSURE TEST		
29	PAINTING / COATING : AGES-SP-07-004		NDT & HARDNESS REQUIREMENT : API 6D & AGES -SP-09-003 SECTION 9		
30	FIRE SAFE REQUIREMENTS : FIRE SAFE AND FIRE TYPE-TESTED CERTIFIED DESIGN AS PER API 6FA / API 607 / ISO 10497		INSPECTION CERTIFICATION : AS PER AGES-SP-13-002 TABLE A1.1 (REFER NOTE D)		
31	MARKING : AS PER MSS-SP-25 & AGES -SP-09-003		CRITICALITY RATING : 1 (REFER NOTE G)		
32	ADDITIONAL REQUIREMENTS : AGES-SP-09-003, AND AGES-SP-07-003		HIGH PRESSURE GAS TEST : YES		
NOTES					
A	This Valve Data sheet shall be read in conjunction with Piping & Pipeline Valve Specification - AGES-SP-09-003 & general notes provided in the data sheet document.				
B	For Valves in Sour & Lethal service, dynamic seal areas (seal housing and related contact surfaces at seat to body and stem seals including stem packing area etc) and other contact areas ( Body seat pockets, Trunnion cavity, etc.) shall be provided with 3mm weld overlay with the material minimum equal to valve trim material.				
C	Valves in Sour service application shall comply with applicable upstream NACE MR 0175/ ISO 15156 or Downstream NACE MR0103/ISO 17945 and "Requirements For Materials In Severe Service -AGES-SP-07-003.				
D	3.2 Certification for all pressure retaining parts & all tests on the final assembly, 3.1 Certification for trims and other metallic parts, 2.2 certification for packings & other non pressure parts in line with AGES-SP-13-002 Table A1.1.				
E	The Elastomeric seal materials specified in the valve data sheet are COMPANY preference and indicative only. Valve vendor & Sealing manufacturer shall jointly validate and confirm the suitability of Seal materials for the Design pressure temperature limits, Size and Service condition. Where applicable vendor to propose superior alternative.				
F	For metal seated design, the gap between the body and seat ring should have an anti-debris lip or similar type design to minimize debris accumulation that could impair seat dynamics and seal performance.				
G	Minimum Criticality rating shall be 1 for sour service and lethal service.				


## SAMPLE BUTTERFLY VALVE DATA SHEETS


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	<b>SAMPLE BUTTERFLY VALVE DATA SHEETS</b>			
	<b>GENERAL NOTES</b>			
1	This data sheet shall be filled by the vendor as required, stamped, signed and deviations clearly marked against each part / material of valve in the space provided in the datasheet. Quotation without vendor signed data sheet will not be considered for technical review and evaluation.			
2	Detailed weight, dimension & material parts list drawings shall be provided at quotation stage for each valve size & class – typical drawings will NOT be accepted. Drawings must reflect extent of weld overlay on all CS / LTCS process wetted parts as specified in datasheet and specification.			
3	Vendor to confirm all the materials mentioned in datasheet shall comply to pressure, temperature and service requirements. Valve seat design pressure-temperature rating shall be submitted with the quotation.			
4	Fluid service & composition shall be specified in purchase specification/datasheet based on Fluid list.			
5	Vendor for Triple offset Butterfly valve shall indicate the CV value of the valve along with the bid			
6	Unless specified in the datasheet/purchase description, double flange short pattern butterfly valves shall be preferred. Valves shall be provided with either double flanged-short pattern or fully flanged / solid lugged end connections as indicated in the valve data sheet.			
7	Concentric disc butterfly valves shall be used only for lined butterfly valves			
8	Valve operator gearbox and/or actuator shall be fitted with their own lifting lugs. Lifting lugs shall be designed with safety factor of 4:1.			
9	Stem shall be anti-blow out proof design and one piece solid construction. Stem shall be forged or bar material as specified in datasheet. Casting material shall not be used for stem. Screwed connection between Stem and closure member is not acceptable			
10	Stem shall be marked with permanent open/ close position indication. Position Indicator shall be visible even when operator is removed.			
11	The packing bore and stem shall have surface finishes in conformance to the seal Supplier's recommendation.			
12	Valves shall be fully rated in accordance with the rating tables of ASME B16.34 or other design codes as indicated in the valve datasheet.			
13	Valve in lethal service shall be designed in compliance with B 31.3 M 307.2			
14	Valves shall be designed as per API 609 Category-B unless otherwise specifically noted in the data sheets and shall meet the rating requirements of ASME B16.34,			
15	The design of valve body, closing member, stem and operator shall be such that the closing member and operator have only one unique position after assembly.			
16	All valves shall be designed to withstand full vacuum condition in the line.			
17	Valves shall be bi-directional, designed to seal against the maximum class rated service pressure in either direction. However, if required where the design requires a preferred direction of flow, an arrow pointing downstream shall indicate the same.			
18	For flanged end valves, welded on flanges are not permitted. End flanges shall be integrally cast or forged with the valve body, retainers or end adapters.			
19	Valves in Sour service application shall comply with applicable UPSTREAM NACE MR 0175/ ISO 15156 or Downstream NACE MR0103/ISO 17945 and "Requirements For Materials In Severe Service -AGES-SP-07-003			
20	Valves in Lethal application shall meet the fugitive emissions test as per BS EN ISO 15848 Part-1 & Part -2 with leakage class 'AH'. Valves in Sour service and other Hydrocarbon service shall meet leakage class 'BH'.			
21	Triple offset valve when used in critical services as isolation valve shall a) Meet all requirements of High performance as per API 609 Category B b) Metal seated with bi-directional zero leakage (Class A as per API 598) c) Metal-to-metal torque seating d) Double flanged construction			
22	Alloy 625 valve shall not be painted. Valves including hand wheel shall be painted as per requirement of AGES-SP-09-003.			
23	Wrench and hand wheel shall be made of solid material. Hollow components are prohibited.			
24	The minimum wall thickness of the valve body and other pressure containing parts and the valve pressure-temperature rating shall be in accordance with ASME B16.34, taking into account the corrosion allowance with minimum 3mm as specified in valve datasheets.			
25	All soft seals used shall be Anti Explosive Decompression (AED) type and shall be suitable for the long-term exposure at the design pressure, temperature conditions and service condition ( Sour, Co2 service etc).			
26	For actuated valves, bonnets, stems, stem extensions etc. shall be designed and calculated to withstand the maximum torque delivered by the actuator at the maximum allowable actuator power (i.e. pressure or otherwise). Operation shall be smooth at all times.			
27	Packing shall be compatible with stem material and suitable for the specified design and service conditions in datasheet. Graphite packing shall be of high purity (98% min) and shall be impregnated with a sacrificial corrosion inhibitor to prevent corrosion of the stem.			
28	Material of all metallic thrust bearings shall be minimum equal to valve trim material. All bearing shall be of a self-lubricating design (anti-friction material is acceptable).			
29	Valves with ASTM A494 CW6MC and ASTM A494 CU5MCuC material shall be designed for valve pressure temperature rating in accordance with applicable ASTM B564 UNS N06625/ASTM B564 UNS N08825 material pressure temperature rating. (ASME B16.34, Table 2-3.8).			
30	Where ASTM A182 F316/316L is specified it shall be Dual Certified.			
31	Austenitic stainless steel shall be supplied in solution annealed condition, Duplex and Super Duplex stainless steel shall be in solution annealed and water quenched condition, and Inconel-625 & Incoloy 825 forging shall be in annealed condition and castings shall be in solution annealed condition. All carbon steel forgings shall be in the normalized condition. Carbon steel casting shall be the normalized or quenched and tempered condition			
32	Fasteners (Bolts, Studs & Nuts) shall be coated with Fluorocarbon polymer system and shall comply with salt spray test as per material selection guideline AGES-GL-07-001 for temperature up to 200 DeG c. Above 200 deg C suitable proprietary coatings with prior company approval shall be proposed.			
33	All material shall be qualified for the minimum design temperature.			
34	Valve flanges shall be in accordance with Piping Material specification - AGES-SP-09-002 and AGES-SP-09-013			
35	Vendor shall submit typical valve GADs indicating internal overlay along with technical bid. Where ALLOY 825 trim is specified, components made from weld overlay shall use INCONEL 625 welding consumables. Refer to AGES-SP-09-015.			



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		SAMPLE BUTTERFLY VALVE DATA SHEETS		
GENERAL NOTES				
36	All Inconel and SS material is subjected to 100% PMI (body and trim).			
37	All valves shall be provided with a permanent attached stainless steel name plate (SS316). Name plate on valve and gear box shall be fixed after valve painting. One additional name plate shall be supplied loose with valve for insulated lines.			
38	Minimum hardness difference between body and closure seating surfaces and back seating surface shall be 50 HB.			
39	Hard facing shall be Stellite 6 or equivalent unless otherwise specified.			
40	Tapped holes where necessary because the valve design does not allow through bolting shall be clearly indicated in the quotation and shall be subject to COMPANY / CONTRACTOR approval. The bolts for the tapped holes shall be part of valve supply. These tapped holes and bolts shall be identified, with the diameter and effective thread length, quantity, on the relevant Vendor drawing for each valve where required. Part list to include the design code of the bolts at tapped holes.			
41	Valves shall have a design life of 30 years and be suitable for continuous service in the environment specified.			
42	All butterfly valves shall be designed for use in throttling and the valve shall be designed to lock at any intermediate position.			
43	For "22Cr" duplex (austenitic-ferritic) stainless steels, the Pitting Resistance Equivalent (PREN) shall be 34 or higher. For "25Cr" super duplex (austenitic-ferritic) stainless steels, the Pitting Resistance Equivalent (PREN) shall higher than 40.			
44	Refer to table below for IGC test and acceptance level.			
TABLE 1				
	STEEL GRADE	CORROSION TEST	TEST CONDITIONS	ACCEPTANCE CRITERIA
	UNS S31600 (316) UNS S31603 (316L)	ASTM A262 Practice E	ASTM A262 Practice E	ASTM A262 Practice E
	UNS N08904 (904L)	ASTM G48 <sup>(a)(b)</sup> Method A	Test temperature:25°C Test duration: 24 hours	No pitting at 20X minimum magnification.
	UNS S31254	ASTM G48 <sup>(a)(b)</sup> Method A	Test temperature:50°C Test duration: 48 hours	No pitting at 20X minimum magnification
	UNS S32205 (F60)	ASTM A923 <sup>(a)(c)</sup> Method A	As per ISO 17781	As per ISO 17781
	UNS S32750 (F53) UNS S32760 (F55)	ASTM A923 <sup>(a)(c)</sup> Method C	As per ISO 17781	As per ISO 17781
	UNS N08825	ASTM G28 <sup>(a)</sup> Method A	Test temperature 120°C Test duration:120 hours	No preferential attack in grain boundaries at 50 X magnification. Weight loss shall be less than 36 mpy. (0.914 mm/y) maximum.
	UNS N06625	ASTM G28 <sup>(a)</sup> Method A	Test temperature 120°C Test duration:120 hours	No preferential attack in grain boundaries at 50 X magnification. Weight loss shall be less than 36 mpy. (0.914 mm/y) maximum.
	UNS N10276	ASTM G28 Method B	As per ASTM G28	100 mpy (2.54 mm/y)
Notes				
a) The surface of the specimens shall be picked before testing.				
b) Cut edges shall be prepared according to ASTM G48				
c) Rapid screening test (ASTM A923 Test Method A) shall not be used as an acceptance test				
45	Minimum NDE Inspection and testing requirements of Valves shall be as "Piping & Pipeline valve Specification -AGES-SP-09-003".			
46	For Cryogenic service the following shall be applied as applicable a) Valves in services with design temperature below - 50°C and continuous operating temperature below - 10°C shall be provided with an extended bonnet and cryogenic acceptance testing in accordance with the requirements of BS 6364. b) However if the valves are operating for short term low temperature excursion below -50°C ( with normal operating temperature above -10°C) then non-extended bonnet is acceptable if specifically specified in datasheet and the valve seals and packing are designed for minimum design temperature. typical example of such cases are non-operable valves during depressurization) (and/or) non-insulated valve only.			
47	For valves in pipe class with minimum design temperature of -50°C or -46°C (non cryogenic pipe class) and if the valves are operating in continuous operating temperature between -10°C and 50°C then extended bonnet valves shall be provided in line with EEMUA 192 and the same shall be specifically specified in valve datasheet.			


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		<b>SAMPLE BUTTERFLY VALVE DATA SHEETS - CONCENTRIC</b>		<b>Valve ID: XXX</b>	
1	<b>GENERAL SPECIFICATION</b>				
2	PIPE CLASS	: AP3A0F-FA	DESIGN CODE	: API 609 + B16.34	
3	VALVE RATING	: ANSI CLASS 150	END CONNECTIONS	: FLANGED TO ASME B16.5, FF	
4	DESIGN TEMPERATURE RANGE	: 0/85 Deg. C	FACE TO FACE DIMENSION	: API 609 CATEGORY A	
5	DESIGN PRESSURE	: AS PER ASME B16.34	FLANGE FACE FINISH	: SMOOTH FINISH (250-500 µin)	
6	SIZE RANGE	: NPS 2 to NPS 24 OR : AS PER PURCHASE DESCRIPTION	MATING FLANGE / PIPE BORE	: AS PER PIPE CLASS	
7	OPERATOR	: LEVER OPTD : NPS 2 AND BELOW; GEAR : OPTD: NPS 3 and ABOVE ACTUATED: WHEN SPECIFIED	VALVE CONSTRUCTION TYPE	: CONCENTRIC DISC, LUG TYPE BODY WITH THROUGH BOLTED HOLES, LINED, BOLT HOLES DRILLED TO ASME B16.5, BI-DIRECTIONAL FLOW	
8	NACE REQUIREMENTS	: NO	INSULATION / THICKNESS	: NO / 0 MM	
9	CORROSION ALLOWANCE	: 0 MM	STEM EXTENSION REQ.D / LENGTH	: NO / -	
10	FLUID HANDLED / SERVICE	: FIRE WATER / NON SOUR			
11	FLUID COMPOSITION (MOL%)	: PROJECT SPECIFIC DATA TO BE SPECIFIED			
12	THROTTLING APPLICATION	: NOT APPLICABLE			
13	<b>MATERIAL SPECIFICATION</b>				
14	BODY	: ASTM 216 GR. WCB - EDPM LINED	BOLTS	: ASTM A193 GR. B7	
15	DISC	: ASTM B148 UNSC95400	NUTS	: ASTM A194 GR. 2H	
16	STEM	: STM B865 UNS N05500 (ANTI BLOW OUT STEM)	STEM PACKING	: DIE FORGED FLEXIBLE GRAPHITE WITH TOP AND BOTTOM RINGS FLEXIBLE BRAIDED GRAPHITE	
17	SEAT	: EPDM	GLAND FLANGE	: ASTM B148 UNSC95400	
18	STEM SEAL	: NBR / EQUIVALENT (VENDOR TO SPECIFY. : NOTE C			
19					
20	<b>TESTING, INSPECTION AND MISCELLANEOUS REQUIREMENTS</b>				
21	ANTI-STATIC DEVICE	: YES	TESTING CODE	: API 598	
22	LOCKING DEVICE	: YES-PROVISION ONLY	SEAT LEAKAGE RATE	: AS PER API 598	
23	LIFTING LUGS	: REQUIRED FOR VALVE WEIGHING 250 KG AND ABOVE	OTHER SUPPLEMENTARY TESTS	: AS PER AGES-SP-09-003	
24	SUPPORT (LEGS / SADDLE)	: REQUIRED FOR VALVE WEIGHING 500 KG AND ABOVE	FUGITIVE EMISSION REQUIREMENT	: NOT APPLICABLE	
25	PAINTING / COATING	: AGES-SP-07-004	NDT & HARDNESS REQUIREMENT	: AGES -SP-09-003 SECTION 9	
26	FIRE SAFE REQUIREMENTS	: NOT APPLICABLE	INSPECTION CERTIFICATION	: REFER NOTE B	
27	MARKING	: AS PER MSS-SP-25 & AGES -SP-09-003	UL 1091 / FM APPROVED	: YES	
28	ADDITIONAL REQUIREMENTS	: AS PER AGES-SP-09-003	CRITICALITY RATING	: 2	
29					
<b>NOTES</b>					
A	This Valve Data sheet shall be read in conjunction with Piping & Pipeline Valve Specification - AGES-SP-09-003 & general notes provided in the data sheet document.				
B	3.1 Certification for all pressure retaining parts & all tests on the final assembly, 3.1 Certification for trims and other metallic parts, 2.2 certification for packings & other non pressure parts in line with AGES-SP-13-002 Table A1.1.				
C	The soft seat and elastomeric seal materials specified in the valve data sheet are COMPANY preference and indicative only. Valve vendor & Sealing manufacturer shall jointly validate and confirm the suitability of Seat & Seal materials for the Design pressure temperature limits, Size and Service condition. Where applicable vendor to propose superior alternative.				

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		<b>SAMPLE BUTTERFLY VALVE DATA SHEETS - DOUBLE OFFSET</b>		<b>Valve ID: XXX</b>	
1	<b>GENERAL SPECIFICATION</b>				
2	PIPE CLASS : AC1A3B-FA		DESIGN CODE : API 609 CATEGORY B		
3	VALVE RATING : ANSI CLASS 150		END CONNECTIONS : FLANGED TO ASME B16.5, RF		
4	DESIGN TEMPERATURE RANGE : -29 / 150 deg C		FACE TO FACE DIMENSION : API 609 CATEGORY B, TABLE 2		
5	DESIGN PRESSURE : AS PER ASME B16.34		FLANGE FACE FINISH : SMOOTH FINISH (125 - 250 µin)		
6	SIZE RANGE : NPS 2 to 24 OR AS PER PURCHASE DESCRIPTION		MATING FLANGE / PIPE BORE : AS PER PIPE CLASS		
7	OPERATOR : LEVER OPTD : NPS 6 AND BELOW; GEAR OPERATED: NPS 8 and ABOVE ACTUATED: WHEN SPECIFIED		VALVE CONSTRUCTION TYPE : HIGH PERFORMANCE BUTTERFLY VALVE, DOUBLE OFFSET, WAFER LUG, THROUGH BOLTED, RESILIENT SEATS, BI DIRECTIONAL		
8	NACE REQUIREMENTS : NO		INSULATION / THICKNESS : NO / 0 MM		
9	CORROSION ALLOWANCE : 3 MM				
10	FLUID HANDLED / SERVICE : NITROGEN & NON HYDRO CARBON VENT / NON SOUR				
11	FLUID COMPOSITION (MOL%) : PROJECT SPECIFIC DATA TO BE SPECIFIED				
12	THROTTLING APPLICATION : NOT APPLICABLE				
13	<b>MATERIAL SPECIFICATION</b>				
14	BODY : ASTM A216 GR.WCB		BOLTS : ASTM A193 GR. B7		
15	DISC : ASTM A216 GR.WCB		NUTS : ASTM A194 GR. 2H		
16	STEM : SOLID SHOULDERED, ANTI BLOW-OUT, ASTM A182 F316		SEAT : PTFE / RTFE		
17	SEAT RETAINER RING : ASTM A182 F316		STEM PACKING : DIE FORGED FLEXIBLE GRAPHITE WITH TOP AND BOTTOM RINGS FLEXIBLE BRAIDED GRAPHITE		
18	BEARING : SELF LUBRICATING TYPE				
19					
20	<b>TESTING, INSPECTION AND MISCELLANEOUS REQUIREMENTS</b>				
21	ANTI-STATIC DEVICE : YES		TESTING CODE : API 598		
22	LOCKING DEVICE : YES-PROVISION ONLY		SEAT LEAKAGE RATE : AS PER API 598		
23	LIFTING LUGS : REQUIRED FOR VALVE WEIGHING 250 KG AND ABOVE		OTHER SUPPLEMENTARY TESTS : AS PER AGES-SP-09-003		
24	SUPPORT (LEGS / SADDLE) : REQUIRED FOR VALVE WEIGHING 500 KG AND ABOVE		FUGITIVE EMISSION REQUIREMENT : NOT APPLICABLE		
25	PAINTING / COATING : AGES-SP-07-004		ANTISTATIC DEVICE TEST : YES		
26	FIRE SAFE REQUIREMENTS : FIRE SAFE AND FIRE TYPE-TESTED CERTIFIED DESIGN AS PER API 6FA / API 607 / ISO 10497		NDT & HARDNESS REQUIREMENT : AGES -SP-09-003 SECTION 9		
27	MARKING : AS PER MSS-SP-25 & AGES -SP-09-003		INSPECTION CERTIFICATION : REFER NOTE B		
28	ADDITIONAL REQUIREMENTS : AS PER AGES-SP-09-003		CRITICALITY RATING : 2		
29					
<b>NOTES</b>					
A	This Valve Data sheet shall be read in conjunction with Piping & Pipeline Valve Specification - AGES-SP-09-003 & general notes provided in the data sheet document.				
B	3.1 Certification for all pressure retaining parts & all tests on the final assembly, 3.1 Certification for trims and other metallic parts, 2.2 certification for packings & other non pressure parts in line with AGES-SP-13-002 Table A1.1.				
C	The soft seat and elastomeric seal materials specified in the valve data sheet are COMPANY preference and indicative only. Valve vendor & Sealing manufacturer shall jointly validate and confirm the suitability of Seat & Seal materials for the Design pressure temperature limits, Size and Service condition. Where applicable vendor to propose superior alternative.				


		Document No. : AGES-SP-09-003 - Appendix C		Rev - 2	Sheet No: 6 / 6
		SAMPLE BUTTERFLY VALVE DATA SHEETS - TRIPLE OFFSET		Valve ID: XXX	
1	GENERAL SPECIFICATION				
2	PIPE CLASS : AL1S1A-FA		DESIGN CODE : API 609 CATEGORY B		
3	VALVE RATING : ANSI CLASS 150		END CONNECTIONS : FLANGED TO ASME B16.47 SERIES A, RF		
4	DESIGN TEMPERATURE RANGE : -46 / 150 DEG C		FACE TO FACE DIMENSION : ISO 5752 TABLE 1 SERIES 14		
5	DESIGN PRESSURE : AS PER ASME B16.34		FLANGE FACE FINISH : SMOOTH FINISH (125 - 250 µin)		
6	SIZE RANGE : NPS 26 to NPS 48 OR AS PER PURCHASE DESCRIPTION		MATING FLANGE / PIPE BORE : AS PER PIPE CLASS		
7	OPERATOR : GEAR OPERATED OR ACTUATED WHEN SPECIFIED		VALVE CONSTRUCTION TYPE : TRIPLE OFFSET BUTTERFLY VALVE, DOUBLE FLANGED, FIRE SAFE, BI-DIRECTIONAL, ZERO LEAKAGE		
8	NACE REQUIREMENTS : YES (REF NOTE-B & C)		INSULATION / THICKNESS : NO / 0 MM		
9	CORROSION ALLOWANCE : 3 MM		DEAD END SERVICE : YES / NO		
10	FLUID HANDLED / SERVICE : SOUR - HYDROCARBON GAS		EXTENDED BONNET PER EEMUA 192 : YES / NO (REFER NOTE E)		
11	FLUID COMPOSITION (MOL%) : PROJECT SPECIFIC DATA TO BE SPECIFIED				
12	THROTTLING APPLICATION : YES / NO		VALVE CV : VENDOR TO SPECIFY		
13	MATERIAL SPECIFICATION				
14	BODY/COVER : ASTM A352 LCC		BOLTS : ASTM A320 GR. L7M		
15	DISC : ASTM A352 LCC		NUTS : ASTM A194 GR. 7M		
16	STEM : SOLID SHOULDERED, ANTI BLOW-OUT, ASTM A182 F316		SEAL RING : LAMINATED SS316 WITH GRAPHITE OR SUPERIOR		
17	SEAT RING : SS 316 WITH HARD FACING STELLITE 21		STEM PACKING : FLEXIBLE GRAPHITE / VENDOR TO SPECIFY		
18	SEAL RING RETAINER FLANGE : ASTM A182 F316		GLAND FLANGE : ASTM A182 F316		
19	BEARING : SELF LUBRICATING TYPE-SS 316				
20	TESTING, INSPECTION AND MISCELLANEOUS REQUIREMENTS				
21	ANTI-STATIC DEVICE : YES		TESTING CODE : API 598		
22	LOCKING DEVICE : YES-PROVISION ONLY		SEAT LEAKAGE RATE : ZERO LEAKAGE CLASS A PER API 598		
23	LIFTING LUGS : REQUIRED FOR VALVE WEIGHING 250 KG AND ABOVE		OTHER SUPPLEMENTARY TESTS : AS PER AGES-SP-09-003		
24	SUPPORT (LEGS / SADDLE) : REQUIRED FOR VALVE WEIGHING 500 KG AND ABOVE		FUGITIVE EMISSION REQUIREMENT : CLASS "BH"		
25	PAINTING / COATING : AGES-SP-07-004		ANTISTATIC DEVICE TEST : YES		
26	FIRE SAFE REQUIREMENTS : FIRE SAFE AND FIRE TYPE-TESTED / CERTIFIED DESIGN AS PER API 6FA / API 607 / ISO 10497		NDT & HARDNESS REQUIREMENT : API 6D & AGES -SP-09-003 SECTION 9		
27	MARKING : AS PER MSS-SP-25 & AGES -SP-09-003		INSPECTION CERTIFICATION : REFER NOTE D		
28	ADDITIONAL REQUIREMENTS : AS PER AGES-SP-09-003 & AGES-SP-07-003		CRITICALITY RATING : 1 (REFER NOTE F)		
29					
NOTES					
A	This Valve Data sheet shall be read in conjunction with Piping & Pipeline Valve Specification - AGES-SP-09-003 & general notes provided in the data sheet document.				
B	For Valves in Sour & Lethal service, dynamic seal areas (seal housing and related contact surfaces at s stem seals including stem packing area etc) shall be provided with 3mm weld overlay with the material minimum equal to valve trim material.				
C	Valves in Sour service application shall comply with applicable Upstream NACE MR 0175/ ISO 15156 or Downstream NACE MR0103/ISO 17945 and "Requirements For Materials In Severe Service -AGES-SP-07-003.				
D	3.2 Certification for all pressure retaining parts & all tests on the final assembly, 3.1 Certification for trims and other metallic parts, 2.2 certification for packings & other non pressure parts in line with AGES-SP-13-002 Table A1.1.				
E	Extended bonnet in line with EEMUA 192 required for operating and insulating valves for service where continuous operating temperature is below -10 Deg. C.				
F	Minimum Criticality rating shall be 1 for sour service and lethal service.				

## SAMPLE DUAL PLATE CHECK VALVE DATA SHEET

[illegible]

		Document No. : AGES-SP-09-003 - Appendix C	Rev - 2	Sheet No: 2 / 4
		SAMPLE DUAL PLATE CHECK VALVE DATA SHEET		
	GENERAL NOTES			
1	This data sheet shall be filled by the vendor as required, stamped, signed and deviations clearly marked against each part / material of valve in the space provided in the datasheet. Quotation without vendor signed data sheet will not be considered for technical review and evaluation.			
2	Detailed weight, dimension & material parts list drawings shall be provided at quotation stage for each valve size & class – typical drawings will NOT be accepted. Drawings must reflect extent of weld overlay on all CS / LTCS process wetted parts as specified in datasheet and specification.			
3	Vendor to confirm all the materials mentioned in datasheet shall comply to pressure, temperature and service requirements. Valve seat design pressure-temperature rating shall be submitted with the quotation.			
4	Fluid service & composition shall be specified in purchase specification/datasheet based on Fluid list.			
5	All dual plate check valves shall be of retainer less design.			
6	Valves shall have the direction of flow marked by an arrow pointing downstream. The arrow shall be an integral part of the valve body, positioned at a prominent place so as to be easily visible.			
7	Plates and springs shall be replaceable type.			
8	Designed for scrub free opening and low friction. The Valve shall be designed to have independent spring to allow higher torque to be exerted against each plate with independent closing in response. It shall have independent plate support design to reduce friction forces.			
9	Valves shall have a design life of 30 years and be suitable for continuous service in the environment specified.			
10	Hard facing shall be Stellite 6 or equivalent unless otherwise specified.			
11	Hardness differential between seating surfaces shall be 50HB minimum (including stainless steel valves) except if both seating surfaces are hard faced. Hardness differential requirements for both seating surfaces hard faced shall be as per respective design codes. (I.e, Anti galling design).			
12	Lifting lugs shall be designed with safety factor of 4:1. Lifting lugs for the dual plate check valve shall be oriented in the direction parallel to the disc stem so as verify the stem orientation during valve installation.			
13	The end connection of Dual plate check valves to API 594 shall be double flanged type complying with Table 2 & Table-3 of API 594 for Hydrocarbon service. Wafer check valves (without lug) shall not be used for Hydrocarbon service. Wafer Lug type valves, if used in Hydrocarbon service (prior approval from COMPANY) shall be of solid lug type design with studs' length covering the entire length of the valve.			
14	Valve in lethal service shall be designed in compliance with ASME B 31.3 M 307.2.			
15	Valves for API 5000 and API 10000 class, shall comply with 60K material property requirements of API 6A and shall comply with PSL 3 requirements of API 6A. All API 6A valves shall be Inspected and Tested as per API 6A PSL 3.			
16	Valves in Sour service application shall comply with applicable UPSTREAM NACE MR 0175/ ISO 15156 or Downstream NACE MR0103/ISO 17945 and "Requirements For Materials In Severe Service -AGES-SP-07-003.			
17	Cast Ni-Al Bronze valve body to ASTM B148 (UNS C95800) shall be given temper anneal heat treatment before machining. Aluminium content shall be limited to 10%.			
18	All Inconel and SS material is subjected to 100% PMI (body and trim).			
19	Alloy 625 valve shall not be painted. Valves including hand wheel shall be painted as per requirement of AGES-SP-09-003.			
20	Austenitic stainless steel shall be supplied in solution annealed condition, Duplex and Super Duplex stainless steel shall be in solution annealed and water quenched condition, and Inconel-625 & Incoloy 825 forging shall be in annealed condition and castings shall be in solution annealed condition. All carbon steel forgings shall be in the normalized condition. Carbon steel casting shall be the normalized or quenched and tempered condition			
21	All valves shall be provided with a permanent attached stainless steel name plate (SS316). Name plate shall be fixed after valve painting. One additional name plate shall be supplied loose with valve for insulated lines.			
22	Valves with ASTM A494 CW6MC and ASTM A494 CU5MCu material shall be designed for valve pressure temperature rating in accordance with applicable ASTM B564 UNS N06625/ASTM B564 UNS N08825 material pressure temperature rating. (ASME B16.34, Table 2-3.8).			
23	Where ASTM A182 F316/316L is specified it shall be Dual Certified.			
24	For "22Cr" duplex (austenitic-ferritic) stainless steels, the Pitting Resistance Equivalent (PREN) shall be 34 or higher For "25Cr" super duplex (austenitic-ferritic) stainless steels, the Pitting Resistance Equivalent (PREN) shall higher than 40			
25	Minimum NDE Inspection and testing requirements of Valves shall be as "Piping & Pipeline valve Specification -AGES-SP-09-003".			
26	All material shall be qualified for the minimum design temperature.			
27	Valve flanges shall be in accordance with Piping Material specification - AGES-SP-09-002 and AGES-SP-09-013			
28	a) For valves specified with Hub connectors, the hubs shall be an integral part of the body and shall be Grayloc or Techlok or equivalent type and shall be designed to full rating of the valve. The valve shall be supplied with two clamp assemblies, two seal rings, two bolting sets and two mating hubs with BW ends to match pipe dimensions (OD x wall thickness) and metallurgy specified in the valve data sheet and shall be designed to full rating of the valve.  b) For valves specified with Compact Flange ends, valves shall be provided with integral Compact Flanges as per ISO 27509. For sizes not covered in ISO 27509., Compact Flanges shall be as per manufacturer's standard and valve vendor shall supply two companion Compact Flanges, two seal rings and bolting set along with the valves.			


ADNOC Classification: Internal

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	SAMPLE DUAL PLATE CHECK VALVE DATA SHEET		


GENERAL NOTES				
29	Refer to table below for IGC test and acceptance level.			
TABLE 1				
	STEEL GRADE	CORROSION TEST	TEST CONDITIONS	ACCEPTANCE CRITERIA
	UNS S31600 (316) UNS S31603 (316L)	ASTM A262 Practice E	ASTM A262 Practice E	ASTM A262 Practice E
	UNS N08904 (904L)	ASTM G48 <sup>(a)(b)</sup> Method A	Test temperature:25°C Test duration: 24 hours	No pitting at 20X minimum magnification.
	UNS S31254	ASTM G48 <sup>(a)(b)</sup> Method A	Test temperature:50°C Test duration: 48 hours	No pitting at 20X minimum magnification
	UNS S32205 (F60)	ASTM A923 <sup>(a)(c)</sup> Method A	As per ISO 17781	As per ISO 17781
	UNS S32750 (F53) UNS S32760 (F55)	ASTM A923 <sup>(a)(c)</sup> Method C	As per ISO 17781	As per ISO 17781
	UNS N08825	ASTM G28 <sup>(a)</sup> Method A	Test temperature 120°C Test duration:120 hours	No preferential attack in grain boundaries at 50 X magnification. Weight loss shall be less than 36 mpy. (0.914 mm/y) maximum.
	UNS N06625	ASTM G28 <sup>(a)</sup> Method A	Test temperature 120°C Test duration:120 hours	No preferential attack in grain boundaries at 50 X magnification. Weight loss shall be less than 36 mpy. (0.914 mm/y) maximum.
	UNS N10276	ASTM G28 Method B	As per ASTM G28	100 mpy (2.54 mm/y)


Notes			
a) The surface of the specimens shall be picked before testing.			
b) Cut edges shall be prepared according to ASTM G48			
c) Rapid screening test (ASTM A923 Test Method A) shall not be used as an acceptance test			




		<b>Document No. : AGES-SP-09-003 - Appendix C</b>		<b>Rev - 2</b>	<b>Sheet No: 4 / 4</b>
		<b>SAMPLE DUAL PLATE CHECK VALVE DATA SHEET</b>		<b>Valve ID: XXX</b>	
1	<b>GENERAL SPECIFICATION</b>				
2	PIPE CLASS : AC1S3C-FA		DESIGN CODE : API 594 + ASME B16.34		
3	VALVE RATING : ANSI CLASS 150		END CONNECTIONS : FLANGED TO ASME B16.5, RF		
4	DESIGN TEMPERATURE RANGE : -29 / 150 DEG. C		FACE TO FACE DIMENSION : API 594-TYPE A (TABLE 2 & 3)		
5	DESIGN PRESSURE : AS PER ASME B16.34		FLANGE FACE FINISH : SMOOTH FINISH (125 - 250 µin)		
6	SIZE RANGE : NPS 2 to NPS 24		VALVE CONSTRUCTION : DUAL PLATE TYPE-A, DOUBLE FLANGED, RETAINERLESS DESIGN, SPRING LOADED PLATES		
7	NACE REQUIREMENTS : YES (REF NOTE-B)		CORROSION ALLOWANCE : 3 MM		
8	FLUID HANDLED / SERVICE : SOUR - PROCESS OIL AND PROCESS GAS				
9	FLUID COMPOSITION (MOL%) : PROJECT SPECIFIC DATA TO BE SPECIFIED				
10					
11	<b>MATERIAL SPECIFICATION</b>				
12	BODY : ASTM A216 WCB		DISC MATERIAL : ASTM B564 UNS N08825/A494-CU5MCUC + ST6		
13	BODY SEAT : INTEGRAL WITH STELLITE 6 HARD FACING		SPRING : INCONEL-718		
14	PINS, HINGES, AND OTHER TRIM : ALLOY 825		EYE BOLT : CS		
15					
16	<b>TESTING, INSPECTION AND MISCELLANEOUS REQUIREMENTS</b>				
17	LIFTING LUGS : REQUIRED FOR VALVE WEIGHING 250 KG AND ABOVE		TESTING CODE : API 598		
18	SUPPORT (LEGS / SADDLE) : REQUIRED FOR VALVE WEIGHING 500 KG AND ABOVE		SEAT LEAKAGE RATE : TABLE 5 API 598		
19	PAINTING / COATING : AGES-SP-07-004		OTHER SUPPLEMENTARY TESTS : AS PER AGES -SP-09-003		
20	MARKING : AS PER MSS-SP-25 & AGES -SP-09-003		NDT & HARDNESS REQUIREMENT : AGES -SP-09-003 SECTION 9		
21	ADDITIONAL REQUIREMENTS : AGES-SP-09-003, AND AGES-SP-07-003		INSPECTION CERTIFICATION : AS PER AGES-SP-13-002 TABLE A1.1(REFER NOTE C)		
22			CRITICALITY RATING : 1 (REFER NOTE D)		
<b>NOTES</b>					
A	This Valve Data sheet shall be read in conjunction with Piping & Pipeline Valve Specification - AGES-SP-09-003 & general notes provided in the data sheet document.				
B	Valves in Sour service application shall comply with applicable upstream NACE MR 0175/ ISO 15156 or Downstream NACE MR0103/ISO 17945 and "Requirements For Materials In Severe Service -AGES-SP-07-003.				
C	3.2 Certification for all pressure retaining parts & all tests on the final assembly, 3.1 Certification for trims and other metallic parts, 2.2 certification for packings & other non pressure parts in line with AGES-SP-13-002 Table A1.1				
D	Minimum criticality rating shall be 1 for sour service and lethal service.				

[illegible]

	<b>Document No. : AGES-SP-09-003 - Appendix C</b>	<b>Rev - 2</b>	<b>Sheet No: 2 / 4</b>
	<b>SAMPLE SWING CHECK VALVE DATASHEET</b>	<b>Valve ID: XXX</b>	
<b>GENERAL NOTES</b>			
1	This data sheet shall be filled by the vendor as required, stamped, signed and deviations clearly marked against each part / material of valve in the space provided in the datasheet. Quotation without vendor signed data sheet will not be considered for technical review and evaluation.		
2	Detailed weight, dimension & material parts list drawings shall be provided at quotation stage for each valve size & class – typical drawings will NOT be accepted. Drawings must reflect extent of weld overlay on all CS / LTCS process wetted parts as specified in datasheet and specification.		
3	Vendor to confirm all the materials mentioned in datasheet shall comply to pressure, temperature and service requirements. Valve seat design pressure-temperature rating shall be submitted with the quotation.		
4	Fluid service & composition shall be specified in purchase specification/datasheet based on Fluid list.		
5	Valves shall have the direction of flow marked by an arrow pointing downstream. The arrow shall be an integral part of the valve body, positioned at a prominent place so as to be easily visible.		
6	Vendor shall submit flow characteristic and Cv for Check Valves along with quotation.		
7	Vendor shall state the minimum flow velocity necessary to keep the swing check valve in a fully open condition.		
8	Piston Lift Check Valves shall be spring loaded and shall be suitable for vertical and horizontal Installation.		
9	Lifting lugs shall be designed with safety factor of 4:1.		
10	Hardness differential between seating surfaces shall be 50HB minimum (including stainless steel valves) except if both seating surfaces are hard faced. Hardness differential requirements for both seating surfaces hard faced shall be as per respective design codes (ie, Anti galling design).		
11	All valves shall be designed to withstand full vacuum condition in the line.		
12	Valves shall have a design life of 30 years and be suitable for continuous service in the environment specified.		
13	For Swing check valve, Seat rings shall be replaceable type. These seat rings shall not be rolled-in or threaded on to the body and shall be positively secured against loosening.		
14	For swing check valve, body seat ring shall be inclined or the hinge shall have an offset. The angle of the seat with the vertical axis of the valve shall be minimum 5 degrees, to prevent chatter.		
15	Hard facing shall be Stellite 6 or equivalent unless otherwise specified.		
16	Closing and opening the disc shall not result in any slamming action. Swing type check valves shall be suitable for horizontal and vertical upward flows.		
17	If a hinge pin retaining disc is installed , the thread of the pin shall protected against exposure to the medium and a locking ring is required for the hinge pin.		
18	If a shaft retaining plug is installed, the thread of the plug shall be protected against exposure to the medium by a seal. Graphite seals shall have a stainless steel 316L back up ring as a minimum.		
19	Valves for API 5000 and API 10000 class, shall comply with 60K material property requirements of API 6A, Table 6 and shall comply with PSL 3 requirements of API 6A. All API 6A valves shall be Inspected and Tested as per API 6A PSL 3.		
20	The minimum wall thickness of the valve body and other pressure containing parts and the valve pressure-temperature rating shall be in accordance with ASME B16.34, taking into account the corrosion allowance with minimum 3mm as specified in valve datasheets.		
21	Valve in lethal service shall be designed in compliance with B 31.3 M 307.2.		
22	All Inconel and SS material is subjected to 100% PMI (body and trim).		
23	Cast Ni-Al Bronze valve body to ASTM B148 (UNS C95800) shall be given temper anneal heat treatment before machining. Aluminium content shall be limited to 10%.		
24	Valves with ASTM A494 CW6MC and ASTM A494 CU5MCuC material shall be designed for valve pressure temperature rating in accordance with applicable ASTM B564 UNS N06625/ASTM B564 UNS N08825 material pressure temperature rating. (ASME B16.34, Table 2-3.8).		
25	Austenitic stainless steel shall be supplied in solution annealed condition, Duplex and Super Duplex stainless steel shall be in solution annealed and water quenched condition, and Inconel-625 & Incoloy 825 forging shall be in annealed condition and castings shall be in solution annealed condition. All carbon steel forgings shall be in the normalized condition. Carbon steel casting shall be the normalized or quenched and tempered condition.		
26	All valves shall be provided with a permanent attached stainless steel name plate (SS316). Name plate shall be fixed after valve painting. One additional name plate shall be supplied loose with valve for insulated lines.		
27	Alloy 625 valve shall not be painted. Valves including hand wheel shall be painted as per requirement of AGES-SP-09-003.		
28	Fasteners (Bolts, Studs & Nuts) shall be coated with Fluorocarbon polymer system and shall comply with salt spray test as per Material selection guideline AGES-GL-07-001 for temperature up to 200 DeG c. Above 200 deg C suitable proprietary coatings with prior company approval shall be proposed.		
29	For "22Cr" duplex (austenitic-ferritic) stainless steels, the Pitting Resistance Equivalent (PREN) shall be 34 or higher For "25Cr" super duplex (austenitic-ferritic) stainless steels, the Pitting Resistance Equivalent (PREN) shall higher than 40		
30	Where ASTM A182 F316/316L is specified it shall be Dual Certified.		

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		SAMPLE SWING CHECK VALVE DATASHEET	Valve ID: XXX	
GENERAL NOTES				
31	Refer to table below for IGC test and acceptance level.			
TABLE 1				
	STEEL GRADE	CORROSION TEST	TEST CONDITIONS	ACCEPTANCE CRITERIA
	UNS S31600 (316) UNS S31603 (316L)	ASTM A262 Practice E	ASTM A262 Practice E	ASTM A262 Practice E
	UNS N08904 (904L)	ASTM G48 <sup>(a)(b)</sup> Method A	Test temperature:25°C Test duration: 24 hours	No pitting at 20X minimum magnification.
	UNS S31254	ASTM G48 <sup>(a)(b)</sup> Method A	Test temperature:50°C Test duration: 48 hours	No pitting at 20X minimum magnification
	UNS S32205 (F60)	ASTM A923 <sup>(a)(c)</sup> Method A	As per ISO 17781	As per ISO 17781
	UNS S32750 (F53) UNS S32760 (F55)	ASTM A923 <sup>(a)(c)</sup> Method C	As per ISO 17781	As per ISO 17781
	UNS N08825	ASTM G28 <sup>(a)</sup> Method A	Test temperature 120°C Test duration:120 hours	No preferential attack in grain boundaries at 50 X magnification. Weight loss shall be less than 36 mpy. (0.914 mm/y) maximum.
	UNS N06625	ASTM G28 <sup>(a)</sup> Method A	Test temperature 120°C Test duration:120 hours	No preferential attack in grain boundaries at 50 X magnification. Weight loss shall be less than 36 mpy. (0.914 mm/y) maximum.
	UNS N10276	ASTM G28 Method B	As per ASTM G28	100 mpy (2.54 mm/y)
<b>Notes</b> a) The surface of the specimens shall be picked before testing. b) Cut edges shall be prepared according to ASTM G48 c) Rapid screening test (ASTM A923 Test Method A) shall not be used as an acceptance test				
32	Minimum NDE Inspection and testing requirements of Valves shall be as per "Piping & Pipeline valve Specification -AGES-SP-09-003".			
33	All material shall be qualified for the minimum design temperature.			
34	Valve flanges shall be in accordance with Piping Material specification - AGES-SP-09-002 and AGES-SP-09-013			
35	a) For valves specified with Hub connectors, the hubs shall be an integral part of the body and shall be Grayloc or Techlok or equivalent type and shall be designed to full rating of the valve. The valve shall be supplied with two clamp assemblies, two seal rings, two bolting sets and two mating hubs with BW ends to match pipe dimensions (OD x wall thickness) and metallurgy specified in the valve data sheet and shall be designed to full rating of the valve.  b) For valves specified with Compact Flange ends, valves shall be provided with integral Compact Flanges as per ISO 27509. For sizes not covered in ISO 27509., Compact Flanges shall be as per manufacturer's standard and valve vendor shall supply two companion Compact Flanges, two seal rings and bolting set along with the valves.			

		Document No. : AGES-SP-09-003 - Appendix C		Rev - 2	Sheet No: 4 / 4
		SAMPLE SWING CHECK VALVE DATASHEET		Valve ID: XXX	
1	GENERAL SPECIFICATION				
2	PIPE CLASS : EC1S3C-JH		DESIGN CODE : API 6D		
3	VALVE RATING : ANSI CLASS 1500		END CONNECTIONS : FLANGED TO ASME B16.5, RTJ		
4	DESIGN TEMPERATURE RANGE : -29 / 250 DEG. C		FACE TO FACE DIMENSION : ASME B16.10		
5	DESIGN PRESSURE : AS PER ASME B16.34		FLANGE FACE FINISH : FULL VERY SMOOTH FINISH (63 µin)		
6	SIZE RANGE : NPS 2 to NPS 24		VALVE CONSTRUCTION : SWING CHECK, BOLTED COVER		
7	NACE REQUIREMENTS : YES (REFER NOTE-B)		CORROSION ALLOWANCE : 3 MM		
8	FLUID HANDLED / SERVICE : SOUR - PRODUCED GAS				
9	FLUID COMPOSITION (MOL%) : PROJECT SPECIFIC DATA TO BE SPECIFIED.				
10					
11	MATERIAL SPECIFICATION				
12	BODY/COVER : ASTM A216 WCB		COVER GASKET : ALLOY 825		
15	DISC : ASTM B564 UNS N08825/A494-CU5MCUC + ST6		BODY / CLOSURE BOLTS : ASTM A193 GR. B7M		
16	BODY SEAT : INTEGRAL WITH STELLITE 6 HARD FACING		BODY / CLOSURE NUTS : ASTM A194 GR. 2HM		
17	HINGE AND PIN : ALLOY 825		SPRING : INCONEL-718		
20					
21	TESTING, INSPECTION AND MISCELLANEOUS REQUIREMENTS				
22	DRAIN / VENT CONNECTION : NO		TESTING CODE : API 598		
23	LIFTING LUGS : REQUIRED FOR VALVE WEIGHING 250 KG AND ABOVE		SEAT LEAKAGE RATE : AS PER AGES -SP-09-003		
25	SUPPORT (LEGS / SADDLE) : REQUIRED FOR VALVE WEIGHING 500 KG AND ABOVE		OTHER SUPPLEMENTARY TESTS : AS PER AGES -SP-09-003		
26	PAINTING / COATING : AGES-SP-07-004		NDT & HARDNESS REQUIREMENT : AGES -SP-09-003 SECTION 9		
27	MARKING : AS PER MSS-SP-25 & AGES -SP-09-003		INSPECTION CERTIFICATION : AS PER AGES-SP-13-002 TABLE A1.1 (REFER NOTE C)		
29	ADDITIONAL REQUIREMENTS : AGES-SP-09-003, AND AGES-SP-07-003		CRITICALITY : 1 (REFER NOTE D)		
NOTES					
A	This Valve Data sheet shall be read in conjunction with Piping & Pipeline Valve Specification - AGES-SP-09-003 & general notes provided in the data sheet document.				
B	Valves in Sour service application shall comply with applicable UPSTREAM NACE MR 0175/ ISO 15156 or Downstream NACE MR0103/ISO 17945 and "Requirements For Materials In Severe Service -AGES-SP-07-003.				
C	3.2 Certification for all pressure retaining parts & all tests on the final assembly, 3.1 Certification for trims and other metallic parts, 2.2 certification for packings & other non pressure parts in line with AGES-SP-13-002 Table A1.1.				
D	Minimum Criticality rating shall be 1 for sour service and lethal service.				

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	<b>Document No. : AGES-SP-09-003 - Appendix C</b>	<b>Rev -2</b>	<b>Sheet No: 2 / 4</b>
<b>SAMPLE NON SLAM AXIAL VALVE DATASHEET</b>		<b>Valve ID: XXX</b>	
<b>GENERAL NOTES</b>			
1	This data sheet shall be filled by the vendor as required, stamped, signed and deviations clearly marked against each part / material of valve in the space provided in the datasheet. Quotation without vendor signed data sheet will not be considered for technical review and evaluation.		
2	Detailed weight, dimension & material parts list drawings shall be provided at quotation stage for each valve size & class – typical drawings will NOT be accepted. Drawings must reflect extent of weld overlay on all CS / LTCS process wetted parts as specified in datasheet and specification.		
3	Vendor to confirm all the materials mentioned in datasheet shall comply to pressure, temperature and service requirements. Valve seat design pressure-temperature rating shall be submitted with the quotation.		
4	Fluid service & composition shall be specified in purchase specification/datasheet based on Fluid list.		
5	Lifting lugs shall be designed with safety factor of 4:1.		
6	Valves shall have the direction of flow marked by an arrow pointing downstream. The arrow shall be an integral part of the valve body, positioned at a prominent place so as to be easily visible.		
7	Vendor shall submit flow characteristic and Cv for Check Valves along with quotation.		
8	Axial Flow Non-Slam Check Valve shall have following feature: - Short stroke length to reduce closure time and eliminate water hammer - Seat shall be self-aligning and provide tight shut off - Shall be designed for minimum pressure drop loss and designed for excellent dynamic performance - Shall be metal seated until and unless specified otherwise. - Hard facing shall be Stellite 6 or equivalent unless otherwise specified.		
9	All valves shall be designed to withstand full vacuum condition in the line.		
10	Hardness differential between seating surfaces shall be 50HB minimum (including stainless steel valves) except if both seating surfaces are hard faced. Hardness differential requirements for both seating surfaces hard faced shall be as per respective design codes (ie, Anti galling design).		
11	The minimum wall thickness of the valve body and other pressure containing parts and the valve pressure-temperature rating shall be in accordance with ASME B16.34, taking into account the corrosion allowance with minimum 3mm as specified in valve datasheets.		
12	Valves for API 5000 and API 10000 class, shall comply with 60K material property requirements of API 6A, Table 6 and shall comply with PSL 3 requirements of API 6A. All API 6A valves shall be Inspected and Tested as per API 6A PSL 3.		
13	Valves in Sour service application shall comply with applicable UPSTREAM NACE MR 0175/ ISO 15156 or Downstream NACE MR0103/ISO 17945 and "Requirements For Materials In Severe Service -AGES-SP-07-003.		
14	Valves with ASTM A494 CW6MC and ASTM A494 CU5MCu material shall be designed for valve pressure temperature rating in accordance with applicable ASTM B564 UNS N06625/ASTM B564 UNS N08825 material pressure temperature rating. (ASME B16.34, Table 2-3.8).		
15	Fasteners (Bolts, Studs & Nuts) shall be coated with Fluorocarbon polymer system and shall comply with salt spray test as per Material selection guideline AGES-GL-07-001 for temperature up to 200 DeG c. Above 200 deg C suitable proprietary coatings with prior company approval shall be proposed.		
16	Cast Ni-Al Bronze valve body to ASTM B148 (UNS C95800) shall be given temper anneal heat treatment before machining. Aluminium content shall be limited to 10%.		
17	All Inconel and SS material is subjected to 100% PMI (body and trim).		
18	Alloy 625 valve shall not be painted. Valves including hand wheel shall be painted as per requirement of AGES-SP-09-003.		
19	Austenitic stainless steel shall be supplied in solution annealed condition, Duplex and Super Duplex stainless steel shall be in solution annealed and water quenched condition, and Inconel-625 & Incoloy 825 forging shall be in annealed condition and castings shall be in solution annealed condition. All carbon steel forgings shall be in the normalized condition. Carbon steel casting shall be the normalized or quenched and tempered condition		
20	Where ASTM A182 F316/316L is specified it shall be Dual Certified.		
21	All valves shall be provided with a permanent attached stainless steel name plate (SS316). Name plate shall be fixed after valve painting. One additional name plate shall be supplied loose with valve for insulated lines.		
22	For "22Cr" duplex (austenitic-ferritic) stainless steels, the Pitting Resistance Equivalent (PREN) shall be 34 or higher For "25Cr" super duplex (austenitic-ferritic) stainless steels, the Pitting Resistance Equivalent (PREN) shall higher than 40		
23	Minimum NDE Inspection and testing requirements of Valves shall be as "Piping & Pipeline valve Specification -AGES-SP-09-003".		
24	All material shall be qualified for the minimum design temperature.		



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## SAMPLE NON SLAM AXIAL VALVE DATASHEET

Valve ID: XXX

## GENERAL NOTES

25 Refer to table below for IGC test and acceptance level.

TABLE 1

STEEL GRADE	CORROSION TEST	TEST CONDITIONS	ACCEPTANCE CRITERIA
UNS S31600 (316) UNS S31603 (316L)	ASTM A262 Practice E	ASTM A262 Practice E	ASTM A262 Practice E
UNS N08904 (904L)	ASTM G48 <sup>(a)(b)</sup> Method A	Test temperature:25°C Test duration: 24 hours	No pitting at 20X minimum magnification.
UNS S31254	ASTM G48 <sup>(a)(b)</sup> Method A	Test temperature:50°C Test duration: 48 hours	No pitting at 20X minimum magnification
UNS S32205 (F60)	ASTM A923 <sup>(a)(c)</sup> Method A	As per ISO 17781	As per ISO 17781
UNS S32750 (F53) UNS S32760 (F55)	ASTM A923 <sup>(a)(c)</sup> Method C	As per ISO 17781	As per ISO 17781
UNS N08825	ASTM G28 <sup>(a)</sup> Method A	Test temperature 120°C Test duration:120 hours	No preferential attack in grain boundaries at 50 X magnification. Weight loss shall be less than 36 mpy. (0.914 mm/y) maximum.
UNS N06625	ASTM G28 <sup>(a)</sup> Method A	Test temperature 120°C Test duration:120 hours	No preferential attack in grain boundaries at 50 X magnification. Weight loss shall be less than 36 mpy. (0.914 mm/y) maximum.
UNS N10276	ASTM G28 Method B	As per ASTM G28	100 mpy (2.54 mm/y)

## Notes


- a) The surface of the specimens shall be picked before testing.
- b) Cut edges shall be prepared according to ASTM G48
- c) Rapid screening test (ASTM A923 Test Method A) shall not be used as an acceptance test

26	Valve flanges shall be in accordance with Piping Material specification - AGES-SP-09-002 and AGES-SP-09-013
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27

- a) For valves specified with Hub connectors, the hubs shall be an integral part of the body and shall be Grayloc or Techlok or equivalent type and shall be designed to full rating of the valve. The valve shall be supplied with two clamp assemblies, two seal rings, two bolting sets and two mating hubs with BW ends to match pipe dimensions (OD x wall thickness) and metallurgy specified in the valve data sheet and shall be designed to full rating of the valve.
- b) For valves specified with Compact Flange ends, valves shall be provided with integral Compact Flanges as per ISO 27509. For sizes not covered in ISO 27509., Compact Flanges shall be as per manufacturer's standard and valve vendor shall supply two companion Compact Flanges, two seal rings and bolting set along with the valves.




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		SAMPLE NON SLAM AXIAL VALVE DATASHEET		Valve ID: XXX	
1	GENERAL SPECIFICATION				
2	PIPE CLASS : AC1S3C-FA		DESIGN CODE : API 6D		
3	VALVE RATING : ANSI CLASS 150		END CONNECTIONS : FLANGED TO ASME B16.5, RF		
4	DESIGN TEMPERATURE RANGE : -29 / 150 DEG. C		FACE TO FACE DIMENSION : API 6D		
5	DESIGN PRESSURE : AS PER ASME B16.34		FLANGE FACE FINISH : SMOOTH FINISH (125 - 250 µin)		
6	SIZE RANGE : NPS 2 to NPS 24		VALVE CONSTRUCTION : AXIAL FLOW NOZZLE CHECK; NON-SLAM CLOSURE, ONE PIECE CONSTRUCTION		
7	NACE REQUIREMENTS : YES (REF NOTE-B)		CORROSION ALLOWANCE : 3 MM		
8	FLUID HANDLED / SERVICE : SOUR - PROCESS OIL AND PROCESS GAS		FLOW RATE : AS PER PROCESS DATA		
9	FLUID DENSITY : AS PER PROCESS DATA		CLOSING TIME : VENDOR TO SPECIFY		
10	PRESSURE DROP : VENDOR TO SPECIFY				
11	MATERIAL SPECIFICATION				
12	BODY/COVER : ASTM A216 WCB		BODY GASKET : SS316 SPW WITH GRAPHITE FILLER		
13	DISC : ASTM B564 UNS N08825/A494-CU5MCUC + ST6		BUSHING : ALLOY 825		
14	BODY SEAT : INTEGRAL WITH STELLITE 6 HARD FACING		BODY / CLOSURE NUTS : N/A		
15	HINGE AND PIN : ALLOY 825		SPRING : INCONEL 718		
16	ORIFICE PLUG, DISC GUIDE : ALLOY 825		SPRING RETAINER, BALL CHECK & TRIM SEAL RING : ALLOY 825		
17	TESTING, INSPECTION AND MISCELLANEOUS REQUIREMENTS				
18	DRAIN / VENT CONNECTION : YES/NO		TESTING CODE : API 598		
19	LIFTING LUGS : REQUIRED FOR VALVE WEIGHING 250 KG AND ABOVE		SEAT LEAKAGE RATE : TIGHT SHUT OFF AS PER API 598		
20	SUPPORT (LEGS / SADDLE) : REQUIRED FOR VALVE WEIGHING 500 KG AND ABOVE		OTHER SUPPLEMENTARY TESTS : AS PER AGES -SP-09-003		
21	PAINTING / COATING : AGES-SP-07-004		NDT & HARDNESS REQUIREMENT : API 6D & AGES -SP-09-003 SECTION 9		
22	MARKING : AS PER MSS-SP-25 & AGES -SP-09-003		INSPECTION CERTIFICATION : AS PER AGES-SP-13-002 TABLE A1.1(REFER NOTE C)		
23	ADDITIONAL REQUIREMENTS : AGES-SP-09-003, AND AGES-SP-07-003		CRITICALITY : 1 (REFER NOTE F)		
NOTES					
A	This Valve Data sheet shall be read in conjunction with Piping & Pipeline Valve Specification - AGES-SP-09-003 & general notes provided in the data sheet document.				
B	Valves in Sour service application shall comply with applicable upstream NACE MR 0175/ ISO 15156 or Downstream NACE MR0103/ISO 17945 and "Requirements For Materials In Severe Service -AGES-SP-07-003.				
C	3.2 Certification for all pressure retaining parts & all tests on the final assembly, 3.1 Certification for trims and other metallic parts, 2.2 certification for packings & other non pressure parts in line with AGES-SP-13-002 Table A1.1.				
D	Manufacturer to select and advise the spring stiffness required for optimum dynamic response.				
E	Manufacturer shall design valve having proven trouble free operational experience in identical flow and service conditions.				
F	Minimum Criticality rating shall be 1 for sour service and lethal service.				

## Valve ID:XXX

GENERAL NOTES	2
GATE VALVE	3
GATE VALVE - PRESSURE SEAL	4

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<b>SAMPLE GATE VALVE DATA SHEET</b>		<b>Valve ID:XXX</b>	
<b>GENERAL NOTES</b>			
1	This data sheet shall be completely filled by the vendor as required, stamped, signed and deviations clearly marked against each part / material of valve in the space provided in the datasheet. Quotation without vendor signed data sheet will not be considered for technical review and evaluation.		
2	Detailed weight, dimension & material parts list drawings shall be provided at quotation stage for each valve size & class – typical drawings will NOT be accepted. Drawings must reflect extent of weld overlay on all CS / LTCS process wetted parts as specified in datasheet and specification.		
3	Vendor to confirm all the materials mentioned in datasheet shall comply to pressure, temperature and service requirements. Valve seat design pressure-temperature rating shall be submitted with the quotation.		
4	Fluid service & composition shall be specified in purchase specification/datasheet based on Fluid list.		
5	Gate valves shall be suitable for operation with differential pressure corresponding to rated pressure as per class rating of the data sheet.		
6	Hand wheel shall be made of solid material. Hollow components are prohibited.		
7	Solid wedge for gate valves NPS 1 ½ and larger shall be flexible type unless otherwise specified. A disc and stem connection shall be designed in such a way that the disc and the stem cannot be separated when the valve is oriented in any position or any loading the connection may see during valve operation.		
8	All gate valve shall be provided with back seats features.		
9	Valves shall be designed to seal in both directions i.e. bi-directional against full pressure requirements for the relevant ASME 16.34 pressure class.		
10	Gate valves NPS 1.5 and below shall have solid wedge. NPS 2 and above shall have Flexible Wedge / Parallel wedge as specified.		
11	Hardness differential between seating surfaces shall be 50HB minimum (including stainless steel valves) except if both seating surfaces are hard faced. Hardness differential requirements for both seating surfaces hard faced shall be as per respective design codes (i.e. Anti galling design).		
12	All Inconel , SS or other CRA material is subjected to 100% PMI (body and trim).		
13	Valve operator gearbox and/or actuator shall be fitted with their own lifting lugs. Lifting lugs shall be designed with safety factor of 4:1.		
14	Stem shall be anti-blow out proof design and one piece solid construction. Stem shall be forged or bar material as specified in datasheet. Casting material shall not be used for stem. Screwed connection between Stem and closure member is not acceptable.		
15	Vendor to confirm suitability of seal or packing material for the service and design conditions specified in datasheet.		
16	The packing bore and stem shall have surface finishes in conformance to the seal Supplier's recommendation		
17	Austenitic stainless steel shall be supplied in solution annealed condition, Duplex and Super Duplex stainless steel shall be in solution annealed and water quenched condition, and Inconel-625 & Incoloy 825 forging shall be in annealed condition and castings shall be in solution annealed condition. All carbon steel forgings shall be in the normalized condition. Carbon steel casting shall be the normalized or quenched and tempered condition		
18	Gates, in wedge gate valves shall be forged or cast. Welded fabrication is not acceptable.		
19	All valves shall be provided with a permanent attached stainless steel name plate (SS316). Name plate shall be fixed after valve painting. One additional name plate shall be supplied loose with valve for insulated lines.		
20	All valves NPS 2 and larger shall be supplied with renewable seats. Threaded seat ring if used shall be seal welded.		
21	Gate Valves shall be Outside Screw and Yoke (OS&Y), bolted bonnet, gland, rising stem, non-rising operator and provided with back seats. Valve wedge and back seat shall be hard faced. Seat and Seat rings shall be renewable and hard faced. Hard facing shall be with Stellite 6 or equivalent unless otherwise specified.		
22	The stem packing shall comprise of the diagonal braided carbon yarn, top and bottom anti-extrusion rings and preformed compressed intermediate rings of flexible graphite. Graphite packing shall be of high purity (98% min.) with corrosion inhibitor to prevent corrosion of the stem.		
23	Bonnet gaskets for the valves shall be suitable for the service conditions specified in the data sheets.		
24	Valves shall have a design life of 30 years and be suitable for continuous service in the environment specified.		
25	In seawater service (including firewater), Graphite seals shall not be used for primary sealing but may be used as part of the fire-tested design.		
26	Valves for API 5000 and API 10000 class, shall comply with 60K material property requirements of API 6A, Table 6 and shall comply with PSL 3 requirements of API 6A. All API 6A valves shall be Inspected and Tested as per API 6A PSL 3.		
27	Cast Ni-Al Bronze valve body to ASTM B148 (UNS C95800) shall be given temper anneal heat treatment before machining. Aluminium content shall be limited to 10%.		
28	All manual valves (whether operated with handwheel or a gear operator) shall be provided with provisions to locking the valve at open/close positions.		
29	The minimum wall thickness of the valve body and other pressure containing parts and the valve pressure-temperature rating shall be in accordance with ASME B16.34, taking into account the corrosion allowance with minimum 3mm as specified in valve datasheets.		
30	Vendor to mention the offered seal & packing materials against valve data sheet and submit along with the offer.		
31	Valves in Sour service application shall comply with applicable UPSTREAM NACE MR 0175/ ISO 15156 or Downstream NACE MR0103/ISO 17945 and "Requirements For Materials In Severe Service -AGES-SP-07-003.		
32	Valve in lethal service shall be designed in compliance with ASME B 31.3 M 307.2and Fugitive emission Class AH		
33	Valves in Lethal application shall meet the fugitive emissions test as per BS EN ISO 15848 Part-1 & Part -2 with leakage class 'AH'. Valves in Sour service and other Hydrocarbon service shall meet leakage class 'BH'.		
34	Valves with ASTM A494 CW6MC and ASTM A494 CU5MCu material shall be designed for valve pressure temperature rating in accordance with applicable ASTM B564 UNS N06625/ASTM B564 UNS N08825 material pressure temperature rating. (ASME B16.34, Table 2-3.8).		
35	Where ASTM A182 F316/316L is specified it shall be Dual Certified.		
36	Fasteners (Bolts, Studs & Nuts) shall be coated with Fluorocarbon polymer system and shall comply with salt spray test as per Material selection guideline AGES-GL-07-001 for temperature up to 200 DeG c. Above 200 deg C suitable proprietary coatings with prior company approval shall be proposed.		
37	Alloy 625 valve shall not be painted. Valves including hand wheel shall be painted as per requirement of AGES-SP-09-003.		
38	For "22Cr" duplex (austenitic-ferritic) stainless steels, the Pitting Resistance Equivalent (PREN) shall be 34 or higher For "25Cr" super duplex (austenitic-ferritic) stainless steels, the Pitting Resistance Equivalent (PREN) shall higher than 40		
39	Vendor shall submit typical valve GADs indicating internal overlay along with technical bid. Where ALLOY 825 trim is specified, components made from weld overlay shall use INCONEL 625 welding consumables. Refer to AGES-SP-09-015.		

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41	Minimum NDE Inspection and testing requirements of Valves shall be as "Piping & Pipeline valve Specification -AGES-SP-09-003".																																							
42	All soft seals used shall be Anti Explosive Decompression (AED) type and shall be suitable for the long-term exposure at the design pressure, temperature conditions and service condition ( HC, Sour, CO2 service etc)																																							
43	All material shall be qualified for the minimum design temperature.																																							
44	All valves containing polymeric / elastomeric materials on hydrocarbon / flammable fluid lines shall have a "fire safe and fire type-tested certified design" in accordance with ISO 10497 or API 6FA or API 607 and shall include minimum a graphite fire safe barrier in the valve bonnet and stem sealing arrangement.																																							
45	Valve flanges shall be in accordance with Piping Material specification - AGES-SP-09-002 and AGES-SP-09-013																																							
46	<p>a) For valves specified with Hub connectors, the hubs shall be an integral part of the body and shall be Grayloc or Techlok or equivalent type and shall be designed to full rating of the valve. The valve shall be supplied with two clamp assemblies, two seal rings, two bolting sets and two mating hubs with BW ends to match pipe dimensions (OD x wall thickness) and metallurgy specified in the valve data sheet and shall be designed to full rating of the valve.</p> <p>b) For valves specified with Compact Flange ends, valves shall be provided with integral Compact Flanges as per ISO 27509. For sizes not covered in ISO 27509., Compact Flanges shall be as per manufacturer's standard and valve vendor shall supply two companion Compact Flanges, two seal rings and bolting set along with the valves.</p>																																							
47	<p>For Cryogenic service the following shall be applied as applicable</p> <p>a) Valves in services with design temperature below - 50°C and continuous operating temperature below - 10°C shall be provided with an extended bonnet and cryogenic acceptance testing in accordance with the requirements of BS 6364.</p> <p>b) However if the valves are operating for short term low temperature excursion below -50°C ( with normal operating temperature above -10°C) then non-extended bonnet is acceptable if specifically specified in datasheet and the valve seals and packing are designed for minimum design temperature. typical example of such cases are non-operable valves during depressurization) (and/or) non-insulated valve only.</p>																																							
48	For valves in pipe class with minimum design temperature of -50°C or -46°C (non cryogenic pipe class) and if the valves are operating in continuous operating temperature between -10°C and -50°C then extended bonnet valves shall be provided in line with EEMUA 192 and the same shall be specifically specified in valve datasheet.																																							


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		SAMPLE GATE VALVE DATA SHEET		Valve ID:XXX	
1	GENERAL SPECIFICATION				
2	PIPE CLASS : AL1S1A-FA		DESIGN CODE : API 600+ASME B16.34		
3	VALVE RATING : ANSI CLASS 150		END CONNECTIONS : FLANGED TO ASME B16.5, RF		
4	DESIGN TEMPERATURE RANGE : -46 / 150 deg C		FACE TO FACE DIMENSION : ASME B16.10		
5	DESIGN PRESSURE : AS PER ASME B16.34		FLANGE FACE FINISH : SMOOTH FINISH (125 - 250 µin)		
6	SIZE RANGE : NPS 2 to NPS 24		BORE TYPE : STANDARD BORE		
7	OPERATOR HAND WHEEL OPTD : NPS 12 AND BELOW; GEAR OPTD: NPS 14 and ABOVE; ACTUATED: WHEN SPECIFIED		VALVE CONSTRUCTION : OS &Y, BOLTED BONNET, RISING STEM, NON RISING WHEEL, BI-DIRECTIONAL		
8	INSULATION / THICKNESS : NO / 0 MM		WEDGE DESIGN : FLEXIBLE WEDGE		
9	CORROSION ALLOWANCE : 3 MM		NACE REQUIREMENTS : YES (REF NOTE-C)		
10	FLUID HANDLED / SERVICE : SOUR - HYDROCARBON				
11	FLUID COMPOSITION (MOL%) : PROJECT SPECIFIC DATA TO BE SPECIFIED				
12	CRYOGENIC SERVICE : NO		EXTENDED BONNET : NO		
13	MATERIAL SPECIFICATION				
14	BODY/BONNET : ASTM A352 LCC		BONNET GASKET : SS316 SPW WITH GRAPHITE FILLER / VENDOR TO SPECIFY		
15	WEDGE MATERIAL : ASTM A350 LF2 GR 1/ ASTM A352 LCC		BODY / CLOSURE BOLTS : A193 GR. B7M OR AS PER PIPE CLASS		
16	SEAT : SS316 + STELLITE 6 (HF)		BODY / CLOSURE NUTS : A194 GR. 2HM OR AS PER PIPE CLASS		
17	BODY SEAT : SS316 + STELLITE 6 (HF)		GLAND : SS316		
18	BACK SEAT : SS316 + ST6 (HF)		GLAND PACKING : FELXIBLE GRAPHITE		
19	STEM : ANTI BLOW-OUT: ASTM A182 F316		LANTERN RING : NO		
20					
21	TESTING, INSPECTION AND MISCELLANEOUS REQUIREMENTS				
22	BY PASS REQUIREMENT : NO		TESTING CODE : API 6D, API 598 OR OTHER TESTING CODE AS AGREED WITH COMPANY		
23	DRAIN / VENT CONNECTION : NO		SEAT LEAKAGE RATE : AS PER AGES-SP-09-003		
24	LOCKING DEVICE : YES-PROVISION ONLY		OTHER SUPPLEMENTARY TESTS : AS PER AGES-SP-09-003		
25	LIFTING LUGS : REQUIRED FOR VALVE WEIGHING 250 KG AND ABOVE		FUGITIVE EMISSION REQUIREMENT : CLASS "BH"		
26	SUPPORT (LEGS / SADDLE) : REQUIRED FOR VALVE WEIGHING 500 KG AND ABOVE		NDT & HARDNESS REQUIREMENT : AGES -SP-09-003 SECTION 9		
27	PAINTING / COATING : AGES-SP-07-004		INSPECTION CERTIFICATION : AS PER AGES-SP-13-002 TABLE A1.1 (REFER NOTE D)		
28	MARKING : AS PER MSS-SP-25 & AGES -SP-09-003		CRITICALITY RATING : 1 (REFER NOTE E)		
29	ADDITIONAL REQUIREMENT : AGES-SP-09-003, AND AGES-SP-07-003				
NOTES					
A	This Valve Data sheet shall be read in conjunction with Piping & Pipeline Valve Specification - AGES-SP-09-003 & general notes provided in the data sheet document.				
B	For Valves in Sour & Lethal service, dynamic seal areas (seal housing and stem seals including stem packing area etc) shall be provided with 3mm weld overlay with the material minimum equal to valve trim material.				
C	Valves in Sour service application shall comply with applicable UPSTREAM NACE MR 0175/ ISO 15156 or Downstream NACE MR0103/ISO 17945 and "Requirements For Materials In Severe Service -AGES-SP-07-003.				
D	3.2 Certification for all pressure retaining parts & all tests on the final assembly, 3.1 Certification for trims and other metallic parts, 2.2 certification for packings & other non pressure parts in line with AGES-SP-13-002 Table A1.1.				
E	Minimum criticality rating shall be 1 for sour service and lethal service.				


## SAMPLE GLOBE VALVE DATA SHEETS

Valve ID:XXX

## INDEX

[illegible]

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	SAMPLE GLOBE VALVE DATA SHEET	Valve ID:XXX	
<b>GENERAL NOTES</b>			
1	This data sheet shall be completely filled by the vendor as required, stamped, signed and deviations clearly marked against each part / material of valve in the space provided in the datasheet. Quotation without vendor signed data sheet will not be considered for technical review and evaluation.		
2	Detailed weight, dimension & material parts list drawings shall be provided at quotation stage for each valve size & class – typical drawings will NOT be accepted. Drawings must reflect extent of weld overlay on all CS / LTCS process wetted parts as specified in datasheet and specification.		
3	Vendor to confirm all the materials mentioned in datasheet shall comply to pressure, temperature and service requirements. Valve seat design pressure-temperature rating shall be submitted with the quotation.		
4	Fluid service & composition shall be specified in purchase specification/datasheet based on Fluid list.		
5	Valve operator gearbox and/or actuator shall be fitted with their own lifting lugs. Lifting lugs shall be designed with safety factor of 4:1.		
6	Globe valves in steam service shall be Y type pattern to reduce pressure drop and erosion damage.		
7	Valve plug/piston shall be non-integral with the stem however the disc-to-stem design shall be such that the disc cannot become detached from the stem as a result of vibration emanating from either flow through the valve or attached piping movement.		
8	Globe Valves shall be Outside Screw and Yoke (OS&Y), bolted bonnet, gland, rising stem, non-rising operator, Straight pattern/angle/Y-pattern and provided with back seats. Valve plug disc/ball/disc and back seat shall be hard faced with Stellite 6 or equivalent unless otherwise specified. All globe valves shall be provided with back seats features.		
9	All globe valves shall be suitable for throttling duties. Valves shall have the direction of flow marked by an arrow pointing downstream. The arrow shall be an integral part of the valve body, positioned at a prominent place so as to be easily visible.		
10	Valves shall have a design life of 30 years and be suitable for continuous service in the environment specified.		
11	Stem shall be anti-blow out proof design and one piece solid construction. Stem shall be forged or bar material as specified in datasheet. Casting material shall not be used for stem. Screwed connection between Stem and closure member is not acceptable.		
12	Vendor to confirm suitability of seal or packing material for the service and design conditions specified in datasheet.		
13	The packing bore and stem shall have surface finishes in conformance to the seal Supplier's recommendation.		
14	All manual valves (whether operated with lever or a gear operator) shall be provided with provisions to locking the valve at different open/close positions including intermediate throttling positions for long periods without having lash down the hand wheel.		
15	Hardness differential between seating surfaces shall be 50HB minimum (including stainless steel valves) except if both seating surfaces are hard faced. Hardness differential requirements for both seating surfaces hard faced shall be as per respective design codes (ie, Anti galling design).		
16	Valves NPS 2 and larger shall be supplied with renewable seats.		
17	Vendor to mention the offered seal & packing materials against valve index table and submit along with the offer.		
18	The globe valves shall be suitable for operation with differential pressure corresponding to rated pressure as per class rating of the data sheet.		
19	Vendor shall submit flow characteristic and Cv for Globe Valves along with quotation.		
20	The stem packing shall comprise of the diagonal braided carbon yarn, top and bottom anti-extrusion rings and preformed compressed intermediate rings of flexible graphite. Graphite packing shall be of high purity (98% min.) with corrosion inhibitor to prevent corrosion of the stem.		
21	All soft seals used shall be Anti Explosive Decompression (AED) type and shall be suitable for the long-term exposure at the design pressure, temperature conditions and service condition ( HC, Sour, CO2 service etc)		
22	Valve in lethal service shall be designed in compliance with B 31.3 M 307.2		
23	Valves in Lethal application shall meet the fugitive emissions test as per BS EN ISO 15848 Part-1 & Part -2 with leakage class 'AH'. Valves in Sour service and other Hydrocarbon service shall meet leakage class 'BH' ( Refer to Valve specification AGES-SP-09-03).		
24	Valves in sour application shall comply with applicable upstream NACE MR 0175/ ISO 15156 or down stream NACE MR0103/ISO 17945 and "Requirements For Materials In Severe Service -AGES-SP-07-003.		
25	Valves for API 5000 and API 10000 class, shall comply with 60K material property requirements of API 6A, Table 6 and shall comply with PSL 3 requirements of API 6A. All API 6A valves shall be Inspected and Tested as per API 6A PSL 3.		
26	Valves with ASTM A494 CW6MC and ASTM A494 CU5MCuC material shall be designed for valve pressure temperature rating in accordance with applicable ASTM B564 UNS N06625/ASTM B564 UNS N08825 material pressure temperature rating. (ASME B16.34, Table 2-3.8).		
27	Where ASTM A182 F316/316L is specified it shall be Dual Certified.		
28	Austenitic stainless steel shall be supplied in solution annealed condition, Duplex and Super Duplex stainless steel shall be in solution annealed and water quenched condition, and Inconel-625 & Incoloy 825 forging shall be in annealed condition and castings shall be in solution annealed condition. All carbon steel forgings shall be in the normalized condition. Carbon steel casting shall be the normalized or quenched and tempered condition		
29	All Inconel and SS material is subjected to 100% PMI (body and trim).		
30	Cast Ni-Al Bronze valve body to ASTM B148 (UNS C95800) shall be given temper anneal heat treatment before machining. Aluminium content shall be limited to 10%.		
31	Fasteners (Bolts, Studs & Nuts) shall be coated with Fluorocarbon polymer system and shall comply with salt spray test as per Material selection guideline AGES-GL-07-001 for temperature up to 200 DeG c. Above 200 deg C suitable proprietary coatings with prior company approval shall be proposed.		
32	All valves shall be provided with a permanent attached stainless steel name plate (SS316). Name plate shall be fixed after valve painting. One additional name plate shall be supplied loose with valve for insulated lines.		
33	Alloy 625 valve shall not be painted. Valves including hand wheel shall be painted as per requirement of AGES-SP-09-003.		
34	For Valves in Pipeline application, requirements of AGES-SP-09-003 Appendix B shall be adopted while developing Pipeline Valve Data sheets.		
35	For "22Cr" duplex (austenitic-ferritic) stainless steels, the Pitting Resistance Equivalent (PREN) shall be 34 or higher For "25Cr" super duplex (austenitic-ferritic) stainless steels, the Pitting Resistance Equivalent (PREN) shall higher than 40		
36	The minimum wall thickness of the valve body and other pressure containing parts and the valve pressure-temperature rating shall be in accordance with ASME B16.34, taking into account the corrosion allowance with minimum 3mm as specified in valve datasheets.		

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		SAMPLE GLOBE VALVE DATA SHEET		Valve ID:XXX	
GENERAL NOTES					
37	Refer to table below for IGC test and acceptance level.				
TABLE 1					
	STEEL GRADE	CORROSION TEST	TEST CONDITIONS	ACCEPTANCE CRITERIA	
	UNS S31600 (316) UNS S31603 (316L)	ASTM A262 Practice E	ASTM A262 Practice E	ASTM A262 Practice E	
	UNS N08904 (904L)	ASTM G48 <sup>(a)(b)</sup> Method A	Test temperature:25°C Test duration: 24 hours	No pitting at 20X minimum magnification.	
	UNS S31254	ASTM G48 <sup>(a)(b)</sup> Method A	Test temperature:50°C Test duration: 48 hours	No pitting at 20X minimum magnification	
	UNS S32205 (F60)	ASTM A923 <sup>(a)(c)</sup> Method A	As per ISO 17781	As per ISO 17781	
	UNS S32750 (F53) UNS S32760 (F55)	ASTM A923 <sup>(a)(c)</sup> Method C	As per ISO 17781	As per ISO 17781	
	UNS N08825	ASTM G28 <sup>(a)</sup> Method A	Test temperature 120°C Test duration:120 hours	No preferential attack in grain boundaries at 50 X magnification. Weight loss shall be less than 36 mpy. (0.914 mm/y) maximum.	
	UNS N06625	ASTM G28 <sup>(a)</sup> Method A	Test temperature 120°C Test duration:120 hours	No preferential attack in grain boundaries at 50 X magnification. Weight loss shall be less than 36 mpy. (0.914 mm/y) maximum.	
	UNS N10276	ASTM G28 Method B	As per ASTM G28	100 mpy (2.54 mm/y)	
Notes					
a) The surface of the specimens shall be picked before testing.					
b) Cut edges shall be prepared according to ASTM G48					
c) Rapid screening test (ASTM A923 Test Method A) shall not be used as an acceptance test					
38	Minimum NDE Inspection and testing requirements of Valves shall be as "Piping & Pipeline valve Specification -AGES-SP-09-003".				
39	All soft seals used shall be Anti Explosive Decompression (AED) type and shall be suitable for the long-term exposure at the design pressure, temperature conditions and service condition ( HC, Sour, CO2 service etc)				
40	All material shall be qualified for the minimum design temperature.				
41	All valves containing polymeric / elastomeric materials on hydrocarbon / flammable fluid lines shall have a "fire safe and fire type-tested certified design" in accordance with ISO 10497 or API 6FA or API 607 and shall include minimum a graphite fire safe barrier in the valve bonnet and stem sealing arrangement.				
42	Valve flanges shall be in accordance with Piping Material specification - AGES-SP-09-002 and AGES-SP-09-013				
43	a) For valves specified with Hub connectors, the hubs shall be an integral part of the body and shall be Grayloc or Techlok or equivalent type and shall be designed to full rating of the valve. The valve shall be supplied with two clamp assemblies, two seal rings, two bolting sets and two mating hubs with BW ends to match pipe dimensions (OD x wall thickness) and metallurgy specified in the valve data sheet and shall be designed to full rating of the valve.  b) For valves specified with Compact Flange ends, valves shall be provided with integral Compact Flanges as per ISO 27509. For sizes not covered in ISO 27509., Compact Flanges shall be as per manufacturer's standard and valve vendor shall supply two companion Compact Flanges, two seal rings and bolting set along with the valves.				
44	For Cryogenic service the following shall be applied as applicable a) Valves in services with design temperature below - 50°C and continuous operating temperature below - 10°C shall be provided with an extended bonnet and cryogenic acceptance testing in accordance with the requirements of BS 6364. b) However if the valves are operating for short term low temperature excursion below -50°C ( with normal operating temperature above -10°C) then non-extended bonnet is acceptable if specifically specified in datasheet and the valve seals and packing are designed for minimum design temperature. typical example of such cases are non-operable valves during depressurization) (and/or) non-insulated valve only.				
45	For valves in pipe class with minimum design temperature of -50°C or -46°C ( non cryogenic pipe class) and if the valves are operating in continuous operating temperature between -10°C and -50°C then extended bonnet valves shall be provided in line with EEMUA 192 and the same shall be specifically specified in valve datasheet.				




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		SAMPLE GLOBE VALVE DATA SHEET		Valve ID:XXX	
1	GENERAL SPECIFICATION				
2	PIPE CLASS : CC1S4C-FA		DESIGN CODE : API 623+ASME B16.34		
3	VALVE RATING : ANSI CLASS 600		END CONNECTIONS : FLANGED TO ASME B16.5, RF		
4	DESIGN TEMPERATURE RANGE : -29 / 150 deg C		FACE TO FACE DIMENSION : ASME B16.10		
5	DESIGN PRESSURE : AS PER ASME B16.34		FLANGE FACE FINISH : SMOOTH FINISH (125 - 250 µin)		
6	SIZE RANGE : NPS 2 to NPS 12		BORE TYPE : AS PER AGES-SP-09-003		
7	OPERATOR : HANDWHEEL OPTD : NPS 4 AND BELOW; : GEAR OPTD: NPS 6 AND ABOVE; : ACTUATED: WHEN SPECIFIED		VALVE CONSTRUCTION : BOLTED BONNET & GLAND, OS & Y, RISING STEM, NON-RISING OPERATOR		
8	NACE REQUIREMENTS : YES (REF NOTE-C)		VALVE PATTERN : STRAIGHT		
9	CORROSION ALLOWANCE : 4.5 MM		INSULATION / THICKNESS : NO / 0 MM		
10	FLUID HANDLED / SERVICE : SOUR - HYDROCARBON GAS				
11	FLUID COMPOSITION (MOL%) : PROJECT SPECIFIC DATA TO BE SPECIFIED				
12	CRYOGENIC SERVICE : NO		EXTENDED BONNET : NOT APPLICABLE		
13	VALVE CV : VENDOR TO SPECIFY				
14	MATERIAL SPECIFICATION				
15	BODY/BONNET : A105N/ASTM A216 WCB		BONNET GASKET : ALLOY 825 SPW WITH GRAPHITE FILLER / VENDOR TO SPECIFY		
16	DISC /DISC SEAT : ASTM A494-CU5MCUC +STELLITE 6 (HF)		BODY / CLOSURE BOLTS : ASTM A193 GR. B7M		
17	BODY SEAT : B564-UNS N08825/A494-CU5MCUC + : STELLITE 6 (HF), RENEWABLE		BODY / CLOSURE NUTS : ASTM A194 GR. 2HM		
18	BACK SEAT : ALLOY 825 + STELLITE 6 (HF)		GLAND : ALLOY 825		
19	STEM : ANTI BLOW-OUT INCONEL X718		GLAND PACKING : FELXIBLE GRAPHITE		
20			LANTERN RING : NO		
21					
22	TESTING, INSPECTION AND MISCELLANEOUS REQUIREMENTS				
23	DRAIN / VENT CONNECTION : NO		TESTING CODE : API 598		
24	LOCKING DEVICE : YES-PROVISION ONLY		SEAT LEAKAGE RATE : AGES -SP-09-003 SECTION 10.14		
25	LIFTING LUGS : REQUIRED FOR VALVE WEIGHING 250 KG : AND ABOVE		OTHER SUPPLEMENTARY TESTS : AS PER AGES-SP-09-003		
26	SUPPORT (LEGS / SADDLE) : REQUIRED FOR VALVE WEIGHING 500 KG : AND ABOVE		FUGITIVE EMISSION REQUIREMENT : CLASS "BH"		
27	PAINTING / COATING : AGES-SP-07-004		NDT & HARDNESS REQUIREMENT : API 6D & AGES -SP-09-003 SECTION 9		
28	MARKING : AS PER MSS-SP-25 & AGES -SP-09-003		INSPECTION CERTIFICATION : AS PER AGES-SP-13-002 TABLE A1.1 (REFER NOTE D)		
29	ADDITIONAL REQUIREMENTS : AGES-SP-09-003, AND AGES-SP-07-003		CRITICALITY RATING : 1 (REFER NOTE E)		
NOTES					
A	This Valve Data sheet shall be read in conjunction with Piping & Pipeline Valve Specification - AGES-SP-09-003 & general notes provided in the data sheet document.				
B	For Valves in Sour service, dynamic seal areas (seal housing and stem seals including stem packing area etc) shall be provided with 3mm weld overlay with the material minimum equal to valve trim material.				
C	Valves in Sour service application shall comply with applicable UPSTREAM NACE MR 0175/ ISO 15156 or Downstream NACE MR0103/ISO 17945 and "Requirements For Materials In Severe Service -AGES-SP-07-003.				
D	3.2 Certification for all pressure retaining parts & all tests on the final assembly, 3.1 Certification for trims and other metallic parts, 2.2 certification for packings & other non pressure parts in line with AGES-SP-13-002 Table A1.1				
E	Minimum criticality rating shall be 1 for sour service and lethal service.				

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<b>SAMPLE INTEGRAL DOUBLE BLOCK AND BLEED VALVE DATA SHEET</b>		<b>Valve ID:XXX</b>	
<b>GENERAL NOTES</b>			
1	This data sheet shall be filled by the vendor as required, stamped, signed and deviations clearly marked against each part / material of valve in the space provided in the datasheet. Quotation without vendor signed data sheet will not be considered for technical review and evaluation.		
2	Detailed weight, dimension & material parts list drawings shall be provided at quotation stage for each valve size & class – typical drawings will NOT be accepted. Drawings must reflect extent of weld overlay on all CS / LTCS process wetted parts as specified in datasheet and specification.		
3	Vendor to confirm all the materials mentioned in datasheet shall comply to pressure, temperature and service requirements. Valve seat design pressure-temperature rating shall be submitted with the quotation.		
4	Fluid service & composition shall be specified in purchase specification/datasheet based on Fluid list.		
5	The Process IDBB valves Greater than NPS 2 is supplied for process isolation purpose in place of separate block valve and bleed valves due to space constraints, etc, and based on approval of COMPANY. Such IDBB shall have the Inlet & Outlet connection shall be Flanged and Bleed connection shall be Flanged with Blind. The Bore of such valves shall be Full or Reduced as specified in Valve Datasheet.		
6	All valves shall be designed to withstand full vacuum condition in the line.		
7	Lifting lugs and Valve supports shall be provided for valves over 250 kg & 500 kg weight respectively (including accessories).		
8	Valve operator gearbox and/or actuator shall be fitted with their own lifting lugs. Lifting lugs shall be designed with safety factor of 4:1.		
9	Double Block and Bleed valves shall be designed to seal in both directions, i.e. bidirectional, against all pressures upto the maximum service pressure rating for the class unless specified otherwise.		
10	The design, size, bore and material of construction shall be as specified in the Individual Valve Datasheets.		
11	Handles / wrenches for primary and secondary isolation valve shall be in line with the pipe centre-line when valves are open. Unless specifically requested, handles / wrench position for primary isolation and secondary isolation valve shall be on the same side and direction. Wrench and hand wheel shall be made of solid material. Hollow components are prohibited. Handles / wrenches or levers shall be sufficiently robust to avoid excessive elastic or plastic distortion against the valve opening and closing forces		
12	Vendor to confirm all the materials mentioned in datasheet shall comply to pressure, temperature and service requirements. Valve seat design pressure-temperature rating shall be submitted with the quotation.		
13	For valves in Class 150 to Class 2500, the minimum wall thickness of the valve body and other pressure containing parts and the valve pressure-temperature rating shall be in accordance with ASME B16.34, taking into account the corrosion allowance with minimum 3mm as specified in valve datasheets.		
14	API 5,000 and API 10,000 rated valves shall be designed and fully rated in accordance with API 6A. Valve body wall thickness shall be calculated taking into account the corrosion allowance specified in valve datasheets.		
15	Ball shall be trunnion mounted design for NPS 2, IDBB valves in ASME Class 300 and above. All other IDBB valves shall be with floating ball design. In API 10,000 all IDBB Valves shall be trunnion mounted design.		
16	All soft seals used shall be Anti Explosive Decompression (AED) type and shall be suitable for the long-term exposure at the design pressure, temperature conditions and service condition (HC, Sour, CO2 service etc).		
17	Valves for API 5000 and API 10000 class, shall comply with 60K material property requirements of API 6A, Table 6 and shall comply with PSL 3 requirements of API 6A. All API 6A valves shall be Inspected and Tested as per API 6A PSL 3.		
18	The needle type bleed valve shall be provided with the following design features: a) OS&Y needle type globe valve. b) packed gland bolted bonnet. c) metal to metal seat. d) adjustable gland flange. e) stuffing box with self-centering and non-rotating tip.		
19	Bleed shall be flanged with blind flange. Padded blinds are not acceptable. Threaded joint shall not be used to achieve 2" bleed flange connection, unless specifically requested, bleed flange shall be located at opposite side of the valve stem.		
20	When specifically stated in the purchase description, valve may have size reduction at the valve body itself (i.e inlet and outlet sizes of the valve are different size). In such cases, valve bore requirement shall be based on the smallest flange size, but shall not be smaller than 14mm. Minimum bore for Instrument to piping IDBB valve shall be 14 mm unless specified otherwise.		
21	Valves with ASTM A494 CW6MC and ASTM A494 CU5MCu material shall be designed for valve pressure temperature applicable rating in accordance with ASTM B564 UNS N06625 and ASTM B564 UNSN08825 material pressure temperature rating. (ASME B16.34, Table 2-3.8).		
22	Valves shall be designed to provide automatic cavity pressure relief to prevent over pressurization of the valve body cavity. The valve body cavity over-pressure shall be prevented by self relieving seat rings.		
23	For IDBB valve, sizes NPS 10 and above, auxiliary body connection for drain and vent shall be terminated in a blank flange. The flange shall have pressure rating, material, flange facing equal to that of the valve body flanges. The flange shall be integral or welded to the valve body. If welded, flange shall be weld neck type. The bolt and gasket material shall be as specified in respective valve datasheets. Vent and drain connections if provided, minimum sizes shall comply with MSS SP-45. For sizes NPS 26 and above, the minimum size of connection shall be NPS 2.		
24	Plugs at the body vent and drain shall be anti-blow out type and shall be with double Oring with one fire safe seal. Bleed plugs shall be protected and secured against any involuntary or undue operation. Seal welding of plugs to valve body is not permitted. Material construction of the plug assembly shall be minimum equal to the valve trim material		
25	All auxiliary connections such as for grease / sealant / flushing injection fittings shall be minimum equal to the respective valve trim material (in solid CRA metallurgy). Seat and stem sealant injection points shall have two non-return valves, each with a tungsten carbide ball and UNS N06625 spring, where one of the non-return valves shall be placed in a separate fitting inside the valve body. The non-return valve in the body wall shall be secured independent of the injection fitting. The internal check valve size shall be NPS 1/4 minimum. The threads shall be protected from the process fluid by seal and there shall be at least one fire safe seal.		
26	The valves shall be anti-static. The design shall ensure electrical continuity between the stem, ball and the body.		
27	For IDBB valve in sour and lethal service, internal threading in the IDBB valve body is not permitted.		
28	Valves shall have a design life of 30 years and be suitable for continuous service in the environment specified.		
29	Seal material for chemical injection line shall be Kalrez or approved superior equivalent. Sufficient mixing length shall be provided for the first isolation valve down stream of the chemical injection point, otherwise selection of the seal materials shall be reviewed case by case for these location.		
30	Graphite packing shall be of high purity with a non-metallic, inorganic, phosphorous based, passivating and corrosion inhibitor impregnated.		
31	For valves with CS / LTCS body material, in hydrocarbon, sour & lethal application, dynamic seal areas (seal housing and related contact surfaces at seat to body and stem seals including stem packing area etc) and other contact areas ( Body seat pockets, Trunnion cavity, etc., etc) shall be provided with 3mm weld overlay (or in solid CRA material metallurgy) with the material minimum equal to valve trim material. Vendor shall submit typical valve GADs indicating internal overlay along with technical bid. Valves with lip seals at static sealing locations, relates contact area shall also be weld overlayed with valve trim material.		

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		<b>SAMPLE INTEGRAL DOUBLE BLOCK AND BLEED VALVE DATA SHEET</b>	<b>Valve ID:XXX</b>	
	<b>GENERAL NOTES</b>			
31	Related contact area of the lip seals at the static and dynamic seal area (including when used as body gasket) shall be weld overlayed with the material miniumum equal to valve trim.			
32	Material of all metallic thrust bearings shall be minimum equal to valve trim material. All bearings shall be of a self-lubricating design (anti-friction material is acceptable).			
33	All material shall be qualified for the design minimum temperature.			
34	Stem sealing arrangement consisting of only a single O-ring or lip seal shall not be permitted on Class 600 and above. It shall not be assumed that graphite "fire seals" provide an effective additional seal.			
35	All manual valves (whether operated with lever or a gear operator) shall be provided with provisions to locking the valve at open/close positions.			
36	For valves to API 6D and API 6A, manufacturer shall hold valid API 6D and API 6A license.			
37	Unless specifically requested, all trunnion mounted ball valves shall be provided with DBB feature as per API 6D.			
38	Valves in Lethal application shall meet the fugitive emissions test as per BS EN ISO 15848 Part-1 & Part -2 with leakage class 'AH'. Valves in Sour service and other Hydrocarbon service shall meet leakage class 'BH'. This shall be applicable for primary and secondary block valve (ball type) and bleed valve (needle type).			
39	Trunnion mounted Valves shall be tested for cavity relief design effectiveness as per API 6D for Single piston effect valves (DBB Type). It must be verified that seat release occurs as per API 6D requirements when specified as supplementary test in valve datasheet.			
40	Valves with ASTM A494 CW6MC and ASTM A494 CU5MCuC material shall be designed for valve pressure temperature rating in accordance with applicable ASTM B564 UNS N06625/ASTM B564 UNS N08825 material pressure temperature rating. (ASME B16.34, Table 2-3.8).			
41	Where ASTM A182 F316/316L is specified it shall be Dual Certified.			
42	Austenitic stainless steel shall be supplied in solution annealed condition, Duplex and Super Duplex stainless steel shall be in solution annealed and water quenched condition, and Inconel-625 & Incoloy 825 forging shall be in annealed condition and castings shall be in solution annealed condition. All carbon steel forgings shall be in the normalized condition. Carbon steel casting shall be the normalized or quenched and tempered condition			
43	For Ni-Al-Brz and Titanium valves, valve body and the valve seat pressure-temperature rating shall be submitted by the vendor along with the quotation. For Ni-Al-Brz valves, Flanges at valve ends shall be compatible with WN flanges as per EEMUA PUB 145.			
44	Cast Ni-Al Bronze valve body to ASTM B148 (UNS C95800) shall be given temper anneal heat treatment before machining.			
45	Where pressure retaining parts have been specified as forged in valve datasheets, substitution of castings is not permitted without prior COMPANY approval			
46	Fasteners (Bolts, Studs & Nuts) shall be coated with Fluorocarbon polymer system and shall comply with salt spray test as per Material selection guideline AGES-GL-07-001 for temperature up to 200 DeG c. Above 200 deg C suitable proprietary coatings with prior company approval shall be proposed.			
47	All valves containing polymeric/elastomeric materials/installed on hydrocarbon/ flammable fluid lines shall have a "fire safe and fire type-tested certified design" in accordance with ISO 10497 or API 6FA or API 607 and shall include minimum a graphite fire safe barrier in the valve bonnet and stem sealing arrangement			
48	For metal seated ball valves, the ball and seat sealing faces shall be coated with a hard faced with Tungsten carbide (unless specifically indicated otherwise) to achieve a minimum hardness of 1050 Vickers. The thickness of the coating must be a minimum of 400 micron (thickness of finished/machined surface). These shall be individually paired and lapped together for efficient sealing. Coating process shall be HVOF (High Velocity Oxygen Fuel process).			
49	Stem shall be anti-blow out proof design and one piece solid construction. Stem shall be forged or bar material as specified in datasheet. Casting material shall not be used for stem. Screwed connection between Stem and closure member is not acceptable.			
50	Stem shall be marked with permanent open/ close position indication. Position Indicator shall be visible even when operator is removed.			
51	Valve Ball shall be made from single piece casting or forging as solid Ball. Cast balls shall meet all material supplementary requirements (radiography, etc.). Pressure relief hole and/or Pressure balancing holes in the ball is not permitted on floating ball or on trunnion mounted valves.			
52	Flanged end valves with welded on flanges are not permitted. End flanges shall be integrally cast or forged with the valve body, retainers or end adapters.			
53	For valves operated manually, the maximum force required under design and test conditions, when applied at the rim of the hand-wheel or lever, shall not exceed 360 N			
54	Valve flanges shall be in accordance with Piping Material specification - AGES-SP-09-002 and AGES-SP-09-013.			
55	All Inconel and SS material is subjected to 100% PMI (body and trim). In case of CS/LTCS ball valve with SS or Inconel trim, PMI shall be conducted for trim material			
56	All valves shall be provided with a permanent attached stainless steel name plate (SS316). One additional name plate shall be supplied loose with valve for insulated lines.			
57	High Pressure gas test shall be performed for the valves installed in Gas service only with sour, toxic & lethal application.			
58	Alloy 625 valve shall not be painted. Valves including hand wheel shall be painted as per requirement of Painting Specification AGES-SP-07-004.			
59	For Valves in Pipeline application, requirements of AGES-SP-09-003 Appendix B shall be adopted while developing Pipeline Valve Data sheets.			
60	For "22Cr" duplex (austenitic-ferritic) stainless steels, the Pitting Resistance Equivalent (PREN) shall be 34 or higher. For "25Cr" super duplex (austenitic-ferritic) stainless steels, the Pitting Resistance Equivalent (PREN) shall higher than 40.			
61	For Cryogenic service the following shall be applied as applicable a) Valves in services with design temperature below - 50°C and continuous operating temperature below - 10°C shall be provided with an extended bonnet and cryogenic acceptance testing in accordance with the requirements of BS 6364. b) However if the valves are operating for short term low temperature excursion below -50°C ( with normal operating temperature above -10°C) then non-extended bonnet is acceptable if specifically specified in datasheet and the valve seals and packing are designed for minimum design temperature. typical example of such cases are non-operable valves during depressurization) (and/or) non-insulated valve only.			
62	For valves in pipe class with minimum design temperature of -50°C or -46°C (non cryogenic pipe class) and if the valves are operating in continuous operating temperature between -10°C and -50°C then extended bonnet valves shall be provided in line with EEMUA 192 and the same shall be specifically specified in valve datasheet.			



		Document No. : AGES-SP-09-003 - Appendix C		Rev - 2	Sheet No: 5 / 5
		SAMPLE INTEGRAL DOUBLE BLOCK AND BLEED VALVE DATA SHEET		Valve ID:XXX	
1	GENERAL SPECIFICATION				
2	PIPE CLASS	: AC1S4A-FA	DESIGN CODE	: ASME B16.34+API 6D+MANF STD	
3	VALVE RATING	: ANSI CLASS 150	END CONNECTIONS	: INLET & OUTLET FLANGED TO ASME B16.5, RF BLEED FLANGED WITH BLIND TO ASME B16.5, RF	
4	DESIGN TEMPERATURE RANGE	: -29 / 150 deg C	FACE TO FACE DIMENSION	: MANF STD	
5	DESIGN PRESSURE	: AS PER ASME B16.34	FLANGE FACE FINISH	: SMOOTH FINISH (125 - 250 µin)	
6	SIZE ( INLET x OUTLET x BLEED)	: NPS 2 x NPS 2 x NPS 1/2	BORE	: MINIMUM 14 MM	
7	OPERATOR	: LEVER	VALVE CONSTRUCTION TYPE	: SPLIT BODY, BOLTED BONNET, BIDIRECTIONAL, BLOCK-BALL VALVE, BLEED NEEDLE VALVE, BLEED END WITH BLIND FLG.	
8	NACE REQUIREMENTS	: YES (REFER NOTE C)	BALL MOUNTING	: FLOATING	
9	CORROSION ALLOWANCE	: 4.5 MM	INSULATION / THICKNESS	: NO / 0 MM	
10	SEAT SEALANT INJECTION	: NO	STEM SEALANT INJECTION	: NO	
11	FLUID HANDLED / SERVICE : SOUR - PROCESS CRUDE OIL				
12	FLUID COMPOSITION (MOL%) : PROJECT SPECIFIC DATA TO BE SPECIFIED				
13	BLEED VALVE DESIGN : NEEDLE VALVE, BODY-OS&Y, STEM-ANTI BLOW OUT, FIRE SAFE				
14	MATERIAL SPECIFICATION				
15	BODY	: A105N/ASTM A216 WCB	STEM PACKING	: FIRE SAFE, FLEXIBLE GRAPHITE -VENDOR TO SPECIFY	
16	BALL	: ASTM A182 F316	BODY / CLOSURE BOLTS	: A193 GR. B7M	
17	STEM	: SOLID SHOULDERED, ANTI BLOW-OUT: ASTM A182 F316	BODY / CLOSURE NUTS	: A194 GR. 2HM	
18	TRUNNION	: ASTM A182 F316	BEARING	: SELF LUBRICATING TYPE-SS316	
19	SEAT	: RPTFE/Modified RPTFE ( VENDOR TO SPECIFY) (REFER NOTE E)	SPRING (SEAT & ANTISTATIC)	: INCONEL X718	
20	SEAT RING	: FOR TRUNNION MOUNTED VALVE: SPRING ENERGIZED-SS316	WELD OVERLAY	: REFER TO NOTE-B	
21	SEAL MATERIAL	: ELASTOMERIC- AED TYPE, FKM-ELAST-O- LION 101 OR APPROVED SUPERIOR EQUIVALENT (VENDOR TO SPECIFY)	BLEED VALVE	: BODY-A105, TRIM-SS316+STELLITE 6 HF (HF FOR SEAT & DISC/PLUG), STEM PACKING-GRAPHITE/PTFE	
22	BLEED BLIND FLANGE / GASKET	: A105 / SPIRAL WOUND-SS316 WITH FLEXIBLE GRAPHITE FILLER	BODY GASKET	: SS 316 SPW WITH GRAPHITE FILLER / VENDOR TO SPECIFY	
23	TESTING, INSPECTION AND MISCELLANEOUS REQUIREMENTS				
24	ANTI-STATIC DEVICE	: YES	TESTING CODE	: API 6D	
25	DRAIN / VENT CONNECTION	: NO	MANDATORY PRESSURE TEST	: AS PER API 6D & AGES -SP-09-003 SECTION 10	
26	LOCKING DEVICE	: YES-PROVISION ONLY	SEAT LEAKAGE RATE	: CLASS A (ISO 5208)	
27	LIFTING LUGS	: NO	FUGITIVE EMISSION REQUIREMENT	: CLASS "BH"	
28	SUPPORT (LEGS / SADDLE)	: NO	OTHER SUPPLEMENTARY TESTS	: AS PER AGES -SP-09-003	
29	PAINTING / COATING	: AGES-SP-07-004	NDT & HARDNESS REQUIREMENT	: API 6D & AGES -SP-09-003 SECTION 9	
30	FIRE SAFE REQUIREMENTS	: FIRE SAFE AND FIRE TYPE-TESTED CERTIFIED DESIGN AS PER API 6FA / API 607 / ISO 10497	INSPECTION CERTIFICATION	: AS PER AGES-SP-13-002 TABLE A1.1 (NOTE D)	
31	MARKING	: AS PER MSS-SP-25 & AGES -SP-09-003	CRITICALITY RATING	: 1 (REFER NOTE F)	
32	MANDATORY ADDITIONAL REQUIREMENTS	: AGES-SP-09-003, AND AGES-SP-07-003			
NOTES					
A	This Valve Data sheet shall be read in conjunction with Piping & Pipeline Valve Specification - AGES-SP-09-003 & general notes provided in the data sheet document.				
B	For Valves in Sour & Lethal service, dynamic seal areas (seal housing and related contact surfaces at seat to body and stem seals including stem packing area etc) and other contact areas (Body seat pockets, Trunnion cavity, etc) shall be provided with 3mm weld overlay with the material minimum equal to valve trim material.				
C	Valves in Sour service application shall comply with applicable UPSTREAM NACE MR 0175/ ISO 15156 or Downstream NACE MR0103/ISO 17945 and "Requirements For Materials In Severe Service -AGES-SP-07-003.				
D	3.2 Certification for all pressure retaining parts & all tests on the final assembly, 3.1 Certification for trims and other metallic parts, 2.2 certification for packings & other non pressure parts in line with AGES-SP-13-002 Table A1.1.				
E	The soft seat and elastomeric seal materials specified in the valve data sheet are COMPANY preference and indicative only. Valve vendor & Sealing manufacturer shall jointly validate and confirm the suitability of Seat & Seal materials for the Design pressure temperature limits, Size and Service condition. Where applicable vendor to propose superior alternative.				
F	Minimum Criticality rating shall be 1 for sour service and lethal service.				


## SAMPLE PLUG VALVE DATA SHEET


Valve ID: XXX

[illegible]

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	SAMPLE PLUG VALVE DATA SHEET		Valve ID: XXX
<b>GENERAL NOTES</b>			
1	This data sheet shall be filled by the vendor as required, stamped, signed and deviations clearly marked against each part / material of valve in the space provided in the datasheet. Quotation without vendor signed data sheet will not be considered for technical review and evaluation.		
2	Detailed weight, dimension & material parts list drawings shall be provided at quotation stage for each valve size & class – typical drawings will NOT be accepted. Drawings must reflect extent of weld overlay on all CS / LTCS process wetted parts as specified in datasheet and specification.		
3	Vendor to confirm all the materials mentioned in datasheet shall comply to pressure, temperature and service requirements. Valve seat design pressure-temperature rating shall be submitted with the quotation.		
4	Fluid service & composition shall be specified in purchase specification/datasheet based on Fluid list.		
5	Unless specifically specified in data sheet, plug valves shall be Lubricated Plug Valves ( Metal seated).		
6	Valve operator gearbox and/or actuator shall be fitted with their own lifting lugs. Lifting lugs shall be designed with safety factor of 4:1.		
7	Lifting lugs and Valve supports shall be provided for valves over 250 kg and 500 kg weight respectively (including accessories).		
8	For Lubricated Plug Valves (Metal Seated) that are supplied with a lubricant screw or a combination of sealant fitting and lubricant screw, steel check valve with minimum of two independent check elements are required. For valves supplied with a sealant fitting, steel check valves with one check element can be used provided the lubricant fitting has a separate checking element.		
9	The material of check valve, including the check elements and the housing shall be at least as corrosion resistant as the metal of the valve trim. Valves shall be provided with secondary sealant injection connections.		
10	For valve sizes NPS 10 and above, auxiliary body connection for drain and vent shall be terminated in a blank flange. The flange shall have pressure rating, material, flange facing equal to that of the valve body flanges. The flange shall be integral or welded to the valve body. If welded, flange shall be weld neck type. The bolt and gasket material shall be as specified in respective valve datasheets. Vent and drain connections if provided, minimum sizes shall comply with MSS SP-45. For sizes NPS 26 and above, the minimum size of connection shall be NPS 2.		
11	Plugs at the body vent and drain shall be anti-blow out type and shall be with double O-ring with one fire safe seal. Bleed plugs shall be protected and secured against any involuntary or undue operation. Seal welding of plugs to valve body is not permitted. Material construction of the plug assembly shall be minimum equal to the valve trim material		
12	Only the taper with rectangular ports is acceptable. However valves NPS 1/2 and NPS 3/4 may have round ports full bore.		
13	The valves shall be anti-static. The design shall ensure electrical continuity between the stem, ball and the body.		
14	Lubricant / sealant shall protect internals of the valve against corrosion and wear as well as reducing the valve torque. Vendor / Supplier shall furnish the minimum and maximum torque values to operate (open/close) and maintain the valve sealing integrity.		
15	For valves specified for piggable services, vendor shall ensure bore of valve is to be the same as the ID of the pipeline for suitability of pigging requirement. Inline piggable full-bore pipeline valves shall be drift tested.		
16	Plug valve application shall be limited to 175 Deg.C.		
17	Soft seats to achieve a seal between plug and body are not permitted.		
18	All soft seals used shall be Anti Explosive Decompression (AED) type and shall be suitable for the long-term exposure at the design pressure, temperature conditions and service condition ( HC, Sour, CO2 service etc)		
19	All material shall be qualified for the minimum design temperature.		
20	Graphite packing shall be of high purity with a non-metallic, inorganic, phosphorous based, passivating and corrosion inhibitor impregnated.		
21	Lubricated plug valves shall be furnished with hydrocarbon resistant lubricating sealant that has a temperature range from -29 Deg C through 107 Deg C. This sealant shall have both proper plasticity for tight sealing and lubricity for ease of operation. Vendor to specify the maximum operating temperature of the supplied plug valve including the operating temperature range of the lubricating sealant.		
22	Vendor shall advise the frequency of lubrication based on the valve service and type of lubricant for maintaining the valve. Vendor shall supply the necessary tools/gun for lubrication and lubricant kits with storage conditions and their expiry date if any.		
23	Valve body-to-cover seals or non-metallic diaphragms or gaskets shall be suitable for the service conditions and the valve's pressure temperatures.		
24	For valves in Class 150 to Class 2500, the minimum wall thickness of the valve body and other pressure containing parts and the valve pressure-temperature rating shall be in accordance with ASME B16.34, taking into account the corrosion allowance with minimum 3mm as specified in valve datasheets. API 5,000 and API 10,000 rated valves shall be designed and fully rated in accordance with API 6A. Valve body wall thickness shall be calculated taking into account the corrosion allowance specified in valve datasheets.		
25	All valves shall be designed to withstand full vacuum condition in the line.		
26	Valves shall have a design life of 30 years and be suitable for continuous service in the environment specified.		
27	Unless otherwise specified the valve pattern and operation for the lubricated and non-lubricated plug valves shall be in accordance with API 599		
28	Valves for API 5000 and API 10000 class, shall comply with 60K material property requirements of API 6A, Table 6 and shall comply with PSL 3 requirements of API 6A. All API 6A valves shall be Inspected and Tested as per API 6A PSL 3.		
29	Stem retention: when stem/plug is separate pieces, stem shall be of blowout-proof type. Shouldered stem design is required. Stem retention shall not depend on the packing gland. Refer to ASME B16.34, section 6.5.1.		
30	Additional supplementary test F22 (Antistatic design test) shall be performed by the MANUFACTURER for TSO plug valves in accordance with BS EN 12266-2. TSO valves shall comply with leakage Rate A only in accordance with ISO 5208.		
31	Valves shall be designed to provide automatic cavity pressure relief to prevent over pressurization of the valve body cavity. The valve body cavity over-pressure shall be prevented by self relieving seat rings.		
32	For valves specified with Hub connectors, the hubs shall be an integral part of the body and shall be Grayloc or Techlok or equivalent type and shall be designed to full rating of the valve. The valve shall be supplied with two clamp assemblies, two seal rings, two bolting sets and two mating hubs with BW ends to match pipe dimensions (OD x wall thickness) and metallurgy specified in the valve data sheet and shall be designed to full rating of the valve.		
33	For valves specified with Compact Flange ends, valves shall be provided with integral Compact Flanges as per ISO 27509. For sizes not covered in ISO 27509., Compact Flanges shall be as per manufacturer's standard and valve vendor shall supply two companion Compact Flanges, two seal rings and bolting set along with the valves .		
34	Valve flanges shall be in accordance with Piping Material specification - AGES-SP-09-002 and AGES-SP-09-013.		
35	Valves in Lethal application shall meet the fugitive emissions test as per BS EN ISO 15848 Part-1 & Part -2 with leakage class 'AH'. Valves in Sour service and other Hydrocarbon service shall meet leakage class 'BH'.		



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	SAMPLE PLUG VALVE DATA SHEET		Valve ID: XXX	
<b>GENERAL NOTES</b>				
36	Where pressure retaining parts have been specified as forged in valve datasheets, substitution of castings is not permitted without prior COMPANY approval			
37	Valves with ASTM A494 CW6MC and ASTM A494 CU5MCu material shall be designed for valve pressure temperature rating in accordance with applicable ASTM B564 UNS N06625/ASTM B564 UNS N08825 material pressure temperature rating. (ASME B16.34, Table 2-3.8).			
38	Austenitic stainless steel shall be supplied in solution annealed condition, Duplex and Super Duplex stainless steel shall be in solution annealed and water quenched condition, and Inconel-625 & Incoloy 825 forging shall be in annealed condition and castings shall be in solution annealed condition. All carbon steel forgings shall be in the normalized condition. Carbon steel casting shall be the normalized or quenched and tempered condition			
39	Where ASTM A182 F316/316L is specified it shall be Dual Certified.			
40	Fasteners (Bolts, Studs & Nuts) shall be coated with Fluorocarbon polymer system and shall comply with salt spray test as per Material selection guideline AGES-GL-07-001 for temperature up to 200 DeG c. Above 200 deg C suitable proprietary coatings with prior company approval shall be proposed.			
41	All valves containing polymeric/elastomeric materials/installed on hydrocarbon/ flammable fluid lines shall have a "fire safe and fire type-tested certified design" in accordance with ISO 10497 or API 6FA or API 607 and shall include minimum a graphite fire safe barrier in the valve bonnet and stem sealing arrangement			
42	Stem shall be anti-blow out proof design and one piece solid construction. Stem shall be forged or bar material as specified in datasheet. Casting material shall not be used for stem. Screwed connection between Stem and closure member is not acceptable			
43	All valves shall be provided with plug position indicator and stops of rugged construction at the fully open and fully closed positions.			
44	Flanged end valves with welded on flanges are not permitted. End flanges shall be integrally cast or forged with the valve body, retainers or end adapters.			
45	Wrench and hand wheel shall be made of solid material. Hollow components are prohibited. Handles / wrenches or levers shall be sufficiently robust to avoid excessive elastic or plastic distortion against the valve opening and closing forces			
46	For valves operated manually, the maximum force required under design and test conditions, when applied at the rim of the hand-wheel or lever, shall not exceed 360 N			
47	All Inconel and SS material is subjected to 100% PMI (body and trim).			
48	Alloy 625 valve shall not be painted. Valves including hand wheel shall be painted as per requirement of AGES-SP-09-003.			
49	All valves shall be provided with a permanent attached stainless steel name plate (SS316). Name plate on valve and gear box shall be fixed after valve painting. One additional name plate shall be supplied loose with valve for insulated lines.			
50	All manual valves (whether operated with lever or a gear operator) shall be provided with provisions to locking the valve at open/close positions. Valves shall be provided with a suitable stop for the plug assembly to enable locking in both open and close positions Open: In line of flow Close: Perpendicular to the flow			
51	For Valves in Pipeline application, requirements of AGES-SP-09-003 Appendix B shall be adopted while developing Pipeline Valve Data sheets.			
52	For "22Cr" duplex (austenitic-ferritic) stainless steels, the Pitting Resistance Equivalent (PREN) shall be 34 or higher For "25Cr" super duplex (austenitic-ferritic) stainless steels, the Pitting Resistance Equivalent (PREN) shall higher than 40			
53	Refer to table below for IGC test and acceptance level.			
TABLE 1				
	STEEL GRADE	CORROSION TEST	TEST CONDITIONS	ACCEPTANCE CRITERIA
	UNS S31600 (316) UNS S31603 (316L)	ASTM A262 Practice E	ASTM A262 Practice E	ASTM A262 Practice E
	UNS N08904 (904L)	ASTM G48 <sup>(a)(b)</sup> Method A	Test temperature:25°C Test duration: 24 hours	No pitting at 20X minimum magnification.
	UNS S31254	ASTM G48 <sup>(a)(b)</sup> Method A	Test temperature:50°C Test duration: 48 hours	No pitting at 20X minimum magnification
	UNS S32205 (F60)	ASTM A923 <sup>(a)(c)</sup> Method A	As per ISO 17781	As per ISO 17781
	UNS S32750 (F53) UNS S32760 (F55)	ASTM A923 <sup>(a)(c)</sup> Method C	As per ISO 17781	As per ISO 17781
	UNS N08825	ASTM G28 <sup>(a)</sup> Method A	Test temperature 120°C Test duration:120 hours	No preferential attack in grain boundaries at 50 X magnification. Weight loss shall be less than 36 mpy. (0.914 mm/y) maximum.
	UNS N06625	ASTM G28 <sup>(a)</sup> Method A	Test temperature 120°C Test duration:120 hours	No preferential attack in grain boundaries at 50 X magnification. Weight loss shall be less than 36 mpy. (0.914 mm/y) maximum.
	UNS N10276	ASTM G28 Method B	As per ASTM G28	100 mpy (2.54 mm/y)
<b>Notes</b> a) The surface of the specimens shall be picked before testing. b) Cut edges shall be prepared according to ASTM G48 c) Rapid screening test (ASTM A923 Test Method A) shall not be used as an acceptance test				
54	Minimum NDE Inspection and testing requirements of Valves shall be as "Piping & Pipeline valve Specification -AGES-SP-09-003"			

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		SAMPLE PLUG VALVE DATA SHEETS		Valve ID: XXX	
1	GENERAL SPECIFICATION				
2	PIPE CLASS : BC1A3H-FH		DESIGN CODE : API 599 + ASME B16.34		
3	VALVE RATING : ANSI CLASS 300		END CONNECTIONS : FLANGED TO ASME B16.5, RF		
4	DESIGN TEMPERATURE RANGE : -29 / 175 DEG. C		FACE TO FACE DIMENSION : ASME B16.10		
5	DESIGN PRESSURE : AS PER ASME B16.34		FLANGE FACE FINISH : SMOOTH FINISH (125 - 250 µin)		
6	SIZE RANGE : NPS 2 to NPS 12		PATTERN : REGULAR		
7	OPERATOR : LEVER OPTD : NPS 8 AND BELOW; GEAR : OPTD: NPS 10 AND ABOVE; ACTUATED: WHEN SPECIFIED		VALVE CONSTRUCTION TYPE : LUBRICATED PLUG VALVE, PRESSURE BALANCED, SLEEVE PTFE LINED, ANTISTATIC,BOLTED BONNET, BIDIRECTIONAL		
8	NACE REQUIREMENTS : NO		INSULATION / THICKNESS : NO / 0 MM		
9	CORROSION ALLOWANCE in mm : 3 MM		STEM SEALANT INJECTION : YES FOR VALVES IN SIZE NPS 6 AND ABOVE		
10	LUBRICANT INJECTION : YES		LOCATION : ABOVEGROUND, HORIZONTAL / VERTICAL		
11	FLUID HANDLED / SERVICE : NON SOUR - LIQUID SULPHUR				
12	FLUID COMPOSITION (MOL%) PROJECT SPECIFIC DATA TO : H2S :		H2O : CO2 : BTEX : Chloride:		
13					
14	MATERIAL SPECIFICATION				
15	BODY : ASTM A105N/ASTM A216 WCB		BODY GASKET PACKING : FIRE SAFE, FLEXIBLE GRAPHITE -VENDOR TO SPECIFY		
16	PLUG (TAPERED) : ALLOY 20 WITH STELLITE 6 OR TUNGSTEN : CARBIDE HARD FACING ANTI FRICTION TREATMENT		BODY / CLOSURE BOLTS : A193 GR. B7		
17	STEM : SOLID SHOULDERED, ANTI BLOW-OUT: ALLOY 20		BODY / CLOSURE NUTS : A194 GR. 2H		
18	SEAT : METAL SEATED		GLAND PACKING : DIE FORMED FLEXIBLE GRAPHITE WITH TOP AND BOTTOM RINGS FLEXIBLE BRAIDED GRAPHITE		
19	SEAL : ELASTOMERIC- AED TYPE		BODY GASKET : ALLOY 20 SPW WITH GRAPHITE FILLER / VENDOR TO SPECIFY		
20	LUBRICANT : HYDROCARBON RESISTANT (VENDOR TO SPECIFY)		LUBRICANT OPERATING TEMP. RANGE : VENDOR TO SPECIFY		
21					
22					
23	TESTING, INSPECTION AND MISCELLANEOUS REQUIREMENTS				
24	ANTI-STATIC DEVICE : YES		TESTING CODE : API 6D		
25	DRAIN / VENT CONNECTION : YES		MANDATORY PRESSURE TEST : AS PER API 6D, API 598 & AGES -SP-09-003 SECTION 10		
26	LOCKING DEVICE : YES-PROVISION ONLY		SEAT LEAKAGE RATE : AS PER AGES -SP-09-003		
27	LIFTING LUGS : REQUIRED FOR VALVE WEIGHING 250 KG AND ABOVE		FUGITIVE EMISSION REQUIREMENT : CLASS "BH"		
28	SUPPORT (LEGS / SADDLE) : REQUIRED FOR VALVE WEIGHING 500 KG AND ABOVE		OTHER SUPPLEMENTARY TESTS : AS PER AGES-SP-09-003		
29	PAINTING / COATING : AGES-SP-07-004		NDT & HARDNESS REQUIREMENT : API 6D & AGES -SP-09-003 SECTION 9 ANTISTATIC DESIGN TEST AS PER BS EN 12266-2		
30	FIRE SAFE REQUIREMENTS : FIRE SAFE AND FIRE TYPE-TESTED : CERTIFIED DESIGN AS PER API 6FA / API 607 / ISO 10497		INSPECTION CERTIFICATION : AS PER AGES-SP-13-002 TABLE A1.1 (REFER NOTE C)		
31	MARKING : AS PER MSS-SP-25 & AGES -SP-09-003		CRITICALITY RATING : 2		
32	ADDITIONAL REQUIREMENTS : AGES-SP-09-003, AND AGES-SP-07-003				
NOTES					
A	This Valve Data sheet shall be read in conjunction with Piping & Pipeline Valve Specification - AGES-SP-09-003 & general notes provided in the data sheet document.				
B	The Elastomeric seal materials specified in the valve data sheet are COMPANY preference and indicative only. Valve vendor & Sealing manufacturer shall jointly validate and confirm the suitability of Seal materials for the Design pressure temperature limits, Size and Service condition. Where applicable vendor to propose superior alternate				
C	3.1 Certification for all pressure retaining parts & all tests on the final assembly, 3.1 Certification for trims and other metallic parts, 2.2 certification for packings & other non pressure parts in line with AGES-SP-13-002 Table A1.1				

## SAMPLE THROUGH CONDUIT GATE VALVE DATA SHEET


Valve ID: XXX


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THROUGH CONDUIT GATE VALVE 4

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		SAMPLE THROUGH CONDUIT GATE VALVE DATA SHEET	Valve ID: XXX	
	GENERAL NOTES			
1	This data sheet shall be filled by the vendor as required, stamped, signed and deviations clearly marked against each part / material of valve in the space provided in the datasheet. Quotation without vendor signed data sheet will not be considered for technical review and evaluation.			
2	Detailed weight, dimension & material parts list drawings shall be provided at quotation stage for each valve size & class – typical drawings will NOT be accepted. Drawings must reflect extent of weld overlay on all CS / LTCS process wetted parts as specified in datasheet and specification.			
3	Vendor to confirm all the materials mentioned in datasheet shall comply to pressure, temperature and service requirements. Valve seat design pressure-temperature rating shall be submitted with the quotation.			
4	Fluid service & composition shall be specified in purchase specification/datasheet based on Fluid list.			
5	Valve operator gearbox and/or actuator shall be fitted with their own lifting lugs. Lifting lugs shall be designed with safety factor of 4:1.			
6	Stem shall be anti-blow out proof design and one piece solid construction. Stem shall be forged (or bar material as specified in datasheet) material only. Casting material shall not be used for stem. Screwed connection between Stem and closure member is not acceptable			
7	Vendor to confirm suitability of seal or packing material for the service and design conditions specified in datasheet.			
8	The packing bore and stem shall have surface finishes in conformance to the seal Supplier's recommendation			
9	The stem packing shall comprise of the diagonal braided carbon yarn, top and bottom anti-extrusion rings and preformed compressed intermediate rings of flexible graphite. Graphite packing shall be of high purity (98% min.) with corrosion inhibitor to prevent corrosion of the stem. The stem packing shall be dust proof design and designed for easy online replacement. The valve shall be designed to have stem sealant injection system			
10	Valves shall have a design life of 30 years and be suitable for continuous service in the environment specified.			
11	All valves NPS 2 and larger shall be supplied with renewable seats. Threaded seat ring if used shall be seal welded.			
12	All manual valves (whether operated with handwheel or a gear operator) shall be provided with provisions to locking the valve at open/close positions.			
13	Hardness differential between seating surfaces shall be 50HB minimum (including stainless steel valves) except if both seating surfaces are hard faced. Hardness differential requirements for both seating surfaces hard faced shall be as per respective design codes. (I.e, Anti galling design).			
14	Valves NPS 2 and larger shall be supplied with renewable seats.			
15	Vendor to mention the offered seal & packing materials against valve index table and submit along with the offer.			
16	Gate valves shall be suitable for operation with differential pressure corresponding to rated pressure as per class rating of the data sheet.			
17	Hand wheel shall be made of solid material. Hollow components are prohibited.			
18	Unless otherwise specified, all Through Conduit Gate Valves shall be Reverse acting type, Bidirectional, Self-Relieving seat (DBB design), with Position Indicators. Standard acting valves instead of Reverse acting is not acceptable.			
19	All piggable pipeline gate valves shall be full bore design. Inline full-bore pipeline valves shall be drift tested			
20	The Valve shall be Double Block & Bleed design with automatic release of excess cavity fluid pressure into valve bore. The use of a pressure equalising hole in the disc(s) is prohibited.			
21	Unless noted otherwise in the valve data sheets, valves shall be provided with renewable seats.			
22	Bonnet gaskets for the valves shall be suitable for the service conditions specified in the data sheets.			
23	Trim of gate valves in all services including steam/gas service valves shall be hard faced.			
24	All soft seals used shall be Anti Explosive Decompression (AED) type and shall be suitable for the long-term exposure at the design pressure, temperature conditions and service condition ( HC, Sour, CO2 service etc)			
25	The minimum wall thickness of the valve body and other pressure containing parts and the valve pressure-temperature rating shall be in accordance with ASME B16.34, taking into account the corrosion allowance with minimum of 3mm as specified in valve datasheets.			
26	Pipeline gate valves shall be designed, fabricated, tested and inspected in accordance with API Spec 6D and ASME B16.34 except as modified by the requirements of this Specification, for the service conditions specified on the Data Sheets. Allowable stress requirements shall comply with the provisions of ASME B31.4. End-to-end and bore dimensions shall be in accordance with API Spec 6D.			
27	Pipeline gate valves shall be designed as per requirements of API 6D and applicable standards as specified the valve datasheet.			
28	Full port valves specified with "Full Bore" or FB in the data sheet shall be as per API 600/602 and the valve bore size shall be in accordance with API 6D.			
29	All valves containing polymeric/elastomeric materials/installed on hydrocarbon/ flammable fluid lines shall have a "fire safe and fire type-tested certified design" in accordance with ISO 10497 or API 6FA or API 607 and shall include minimum a graphite fire safe barrier in the valve bonnet and stem sealing arrangement			
30	Valves in Lethal application shall meet the fugitive emissions test as per BS EN ISO 15848 Part-1 & Part -2 with leakage class 'AH'. Valves in Sour service and other Hydrocarbon service shall meet leakage class 'BH'			
31	Valves in Sour service application shall comply with applicable upstream NACE MR 0175/ ISO 15156 or Downstream NACE MR0103/ISO 17945 and "Requirements For Materials In Severe Service -AGES-SP-07-003.			
32	Valves with ASTM A494 CW6MC and ASTM A494 CU5MCuC material shall be designed for valve pressure temperature rating in accordance with applicable ASTM B564 UNS N06625/ASTM B564 UNS N08825 material pressure temperature rating. (ASME B16.34, Table 2-3.8).			
33	Austenitic stainless steel shall be supplied in solution annealed condition, Duplex and Super Duplex stainless steel shall be in solution annealed and water quenched condition, and Inconel- 625 & Incoloy 825 forging shall be in annealed condition and castings shall be in solution annealed condition. All carbon steel forgings shall be in the normalized condition. Carbon steel casting shall be the normalized or quenched and tempered condition			
34	Where ASTM A182 F316/316L is specified it shall be Dual Certified.			
35	All Inconel , SS or other CRA material is subjected to 100% PMI (body and trim).			
36	Cast Ni-Al Bronze valve body to ASTM B148 (UNS C95800) shall be given temper anneal heat treatment before machining. Aluminium content shall be limited to 10%.			
37	All valves shall be provided with a permanent attached stainless steel name plate (SS316). Name plate shall be fixed after valve painting. One additional name plate shall be supplied loose with valve for insulated lines.			
38	Fasteners (Bolts, Studs & Nuts) shall be coated with Fluorocarbon polymer system and shall comply with salt spray test as per Material selection guideline AGES-GL-07-001 for temperature up to 200 DeG c. Above 200 deg C suitable proprietary coatings with prior company approval shall be proposed.			
39	For "22Cr" duplex (austenitic-ferritic) stainless steels, the Pitting Resistance Equivalent (PREN) shall be 34 or higher For "25Cr" super duplex (austenitic-ferritic) stainless steels, the Pitting Resistance Equivalent (PREN) shall higher than 40			
40	All material shall be qualified for the minimum design temperature.			
41	Valve flanges shall be in accordance with Piping Material specification - AGES-SP-09-002 and AGES-SP-09-013			
42	Minimum NDE Inspection and testing requirements of Valves shall be as "Piping & Pipeline valve Specification -AGES-SP-09-003"			

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		SAMPLE THROUGH CONDUIT GATE VALVE DATA SHEET		Valve ID: XXX	
GENERAL NOTES					
43	Refer to table below for IGC test and acceptance level.				
TABLE 1					
	STEEL GRADE	CORROSION TEST	TEST CONDITIONS	ACCEPTANCE CRITERIA	
	UNS S31600 (316) UNS S31603 (316L)	ASTM A262 Practice E	ASTM A262 Practice E	ASTM A262 Practice E	
	UNS N08904 (904L)	ASTM G48 <sup>(a)(b)</sup> Method A	Test temperature:25°C Test duration: 24 hours	No pitting at 20X minimum magnification.	
	UNS S31254	ASTM G48 <sup>(a)(b)</sup> Method A	Test temperature:50°C Test duration: 48 hours	No pitting at 20X minimum magnification	
	UNS S32205 (F60)	ASTM A923 <sup>(a)(c)</sup> Method A	As per ISO 17781	As per ISO 17781	
	UNS S32750 (F53) UNS S32760 (F55)	ASTM A923 <sup>(a)(c)</sup> Method C	As per ISO 17781	As per ISO 17781	
	UNS N08825	ASTM G28 <sup>(a)</sup> Method A	Test temperature 120°C Test duration:120 hours	No preferential attack in grain boundaries at 50 X magnification. Weight loss shall be less than 36 mpy. (0.914 mm/y) maximum.	
	UNS N06625	ASTM G28 <sup>(a)</sup> Method A	Test temperature 120°C Test duration:120 hours	No preferential attack in grain boundaries at 50 X magnification. Weight loss shall be less than 36 mpy. (0.914 mm/y) maximum.	
	UNS N10276	ASTM G28 Method B	As per ASTM G28	100 mpy (2.54 mm/y)	
Notes					
a) The surface of the specimens shall be picked before testing.					
b) Cut edges shall be prepared according to ASTM G48					
c) Rapid screening test (ASTM A923 Test Method A) shall not be used as an acceptance test					
44	a) For valves specified with Hub connectors, the hubs shall be an integral part of the body and shall be Grayloc or Techlok or equivalent type and shall be designed to full rating of the valve. The valve shall be supplied with two clamp assemblies, two seal rings, two bolting sets and two mating hubs with BW ends to match pipe dimensions (OD x wall thickness) and metallurgy specified in the valve data sheet and shall be designed to full rating of the valve.				
b) For valves specified with Compact Flange ends, valves shall be provided with integral Compact Flanges as per ISO 27509. For sizes not covered in ISO 27509., Compact Flanges shall be as per manufacturer's standard and valve vendor shall supply two companion Compact Flanges, two seal rings and bolting set along with the valves .					
For Cryogenic service the following shall be applied as applicable					
45	a) Valves in services with design temperature below - 50°C and continuous operating temperature below - 10°C shall be provided with an extended bonnet and cryogenic acceptance testing in accordance with the requirements of BS 6364.				
b) However if the valves are operating for short term low temperature excursion below -50°C ( with normal operating temperature above -10°C) then non-extended bonnet is acceptable if specifically specified in datasheet and the valve seals and packing are designed for minimum design temperature. typical example of such cases are non-operable valves during depressurization) (and/or) non-insulated valve only.					
46	For valves in pipe class with minimum design temperature of -50°C or -46°C (non cryogenic pipe class) and if the valves are operating in continuous operating temperature between -10°C and -50°C then extended bonnet valves shall be provided in line with EEMUA 192 and the same shall be specifically specified in valve datasheet.				

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		<b>SAMPLE THROUGH CONDUIT GATE VALVE DATA SHEET</b>		<b>Valve ID: XXX</b>			
<b>GENERAL SPECIFICATION</b>							
2	PIPE CLASS : FC1S3C-FA			DESIGN CODE : API 6D + ASME B16.34			
3	VALVE RATING : ANSI CLASS 2500			END CONNECTIONS : FLANGED TO ASME B16.5, RF			
4	DESIGN TEMPERATURE RANGE : -29 / 150 DEG. C			FACE TO FACE DIMENSION : API 6D			
5	DESIGN PRESSURE : AS PER ASME B16.34			FLANGE FACE FINISH : SMOOTH FINISH (125 - 250 µin)			
6	SIZE RANGE : NPS 2 to NPS 12			BORE TYPE : FULL			
7	OPERATOR : HANDWHEEL OPTD : NPS 3 AND BELOW; : GEAR OPTD: NPS 4 AND ABOVE; : ACTUATED: WHEN SPECIFIED			VALVE CONSTRUCTION : REVERSE ACTING,BIDIRECTIONAL, SELF-RELIEVING SEAT, IOS & Y TYPE, RISING STEM, SLAB GATE & DOUBLE BLOCK & BLEED DESIGN.			
8	CORROSION ALLOWANCE : 3MM			THROUGH CONDUIT GATE VALVE DESIGN : AS PER AGES-SP-09-003			
9	INSULATION / THICKNESS : NO / 0 MM			NACE REQUIREMENTS : YES (REF NOTE-C)			
10	FLUID HANDLED / SERVICE : SOUR - PROCESS OIL / PROCESS GAS						
11	FLUID COMPOSITION (MOL%) : PROJECT SPECIFIC DATA TO BE SPECIFIED						
12	CRYOGENIC SERVICE : NO			EXTENDED BONNET : NOT APPLICABLE			
<b>MATERIAL SPECIFICATION</b>							
14	BODY/BONNET : ASTM A216 WCC			BONNET GASKET : SPIRAL WOUND ALLOY 825, GRAPHITE FILLED			
15	STEM : ASTM B637 UNS N07718			BODY / CLOSURE BOLTS : A193 GR. B7M			
16	SEAT : ASTM B564 UNS N08825 + STELLITE 6			BODY / CLOSURE NUTS : A194 GR. 2HM			
17	SLAB : ASTM B564 UNS N08825 / A494-CU5MCUC + ST 6			GLAND FLANGE & RING : ASTM B564 UNS N08825 / ASTM A494 CU5MCuC			
18	BACK SEAT : RENEWABLE, ASTM B564 UNS N08825 + STELLITE 6			PACKING : FIRE SAFE, FLEXIBLE GRAPHITE -VENDOR TO SPECIFY			
19	BODY SEAT RING : ASTM B564 UNS N08825 + STELLITE 6			LANTERN RING : NO			
<b>TESTING, INSPECTION AND MISCELLANEOUS REQUIREMENTS</b>							
22	BY PASS REQUIREMENT : AS PER AGES-SP-09-003			TESTING CODE : API 6D OR OTHER TESTING CODE AS AGREED WITH COMPANY			
23	DRAIN / VENT CONNECTION : YES/NO			SEAT LEAKAGE RATE : AS PER AGES-SP-09-003			
24	LOCKING DEVICE : YES-PROVISION ONLY			OTHER SUPPLEMENTARY TESTS : AS PER AGES-SP-09-003, DRIFT TEST			
25	LIFTING LUGS : REQUIRED FOR VALVE WEIGHING 250 KG AND ABOVE			FUGITIVE EMISSION REQUIREMENT : CLASS "BH"			
26	SUPPORT (LEGS / SADDLE) : REQUIRED FOR VALVE WEIGHING 250 KG AND ABOVE			NDT & HARDNESS REQUIREMENT : API 6D & AGES -SP-09-003 SECTION 9			
27	PAINTING / COATING : AGES-SP-07-004			INSPECTION CERTIFICATION : AS PER AGES-SP-13-002 TABLE A1.1 (REFER NOTE D)			
28	MARKING : AS PER MSS-SP-25 & AGES -SP-09-003			SPECIAL REQUIREMENT : AGES-SP-09-003 AND AGES-SP-07-003			
29	FIRE SAFE REQUIREMENTS : API SPEC 6FA / BS EN ISO 10497			CRITICALITY RATING : 1 (REFER NOTE E)			
<b>NOTES</b>							
A	This Valve Data sheet shall be read in conjunction with Piping & Pipeline Valve Specification - AGES-SP-09-003 & general notes provided in the data sheet document.						
B	Valves in Sour & Lethal service, dynamic seal areas (seal housing and stem seals including stem packing area etc) shall be provided with 3mm weld overlay with the material minimum equal to valve trim material.						
C	Valves in Sour service application shall comply with NACE MR 0175/ ISO 15156 and "Requirements For Materials In Severe Service -AGES-SP-07-003.						
D	3.2 Certification for all pressure retaining parts & all tests on the final assembly, 3.1 Certification for trims and other metallic parts, 2.2 certification for packings & other non pressure parts in line with AGES-SP-13-002 Table A1.1						
E	Minimum Criticality rating shall be 1 for sour service and lethal service.						