



Document No.	GIS 43-352
Applicability	Group
Date	25 November 2005

Guidance on Industry Standard for EN ISO 14723 Subsea Pipeline Valves

GIS 43-352

BP GROUP
ENGINEERING TECHNICAL PRACTICES

Foreword

This is the first issue of Engineering Technical Practice (ETP) GIS 43-352.

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Introduction

- a. Guidance for subsea pipeline valves is based on EN ISO 14723 Petroleum and natural gas industries – Pipeline transportation systems – Subsea pipeline valves.
- b. Guidance statements of this GIS are modifications to ISO 14723.
- c. Modifications to ISO 14723 are identified as Add, Modify to Read, or Delete.
- d. Clause numbers in this GIS correspond to ISO 14723.
- e. Clauses of ISO 14723 that are not revised remain applicable.



1. Scope

Add

Ball, gate, and check valves located in subsea piping systems designed to a pipeline design code (such as ISO 13623, ASME B31.8, BS PD 8010, etc.).

- a. Class rated valves greater than DN 40 (NPS 1 ½) up to Class 2500.
- b. PN rated valves greater than DN 40 (NPS 1 ½).
- c. Valves greater than DN 40 (NPS 1 ½) and greater than Class 2500 rating.

For valves that are part of piping systems covered by piping design code ASME B31.3, see GIS 62-012, GIS 62-020, GIS 62-026, etc.

2. Normative references

Add

ISO 5752	Metal valves for use in flanged pipe systems – Face-to-face and centre-to-face dimensions
ISO 9001	Quality management systems
ISO 10423	Petroleum and natural gas industries Drilling and production equipment Wellhead and christmas tree equipment (API SPEC 6A)
ISO 13628	Petroleum and natural gas industries – Design and operation of subsea production systems – Part 4: Subsea wellhead and tree equipment Part 8: Remotely operated vehicle interfaces on subsea production systems
ISO 15156	Materials for use in H ₂ S containing environments
ISO 17292	Metal ball valves for petroleum, petrochemical and allied industries
ASME B16.11	Forged Fittings, Socket-Welding and threaded
ASME B31.3	Process Piping
API 6A718	Specification of Nickel Base Alloy 718 (UNS N07718) for Oil and Gas Drilling and Production Equipment
API 17D	Specification for Subsea Wellhead and Christmas Tree Equipment
API 1104	Welding of pipelines and Related Facilities
ASTM A193/A193M	Standard Specification for Alloy Steel and Stainless Steel Bolting Materials for High Temperature Service
ASTM A194/A194M	Carbon and Alloy Steel Nuts for Bolts for High Pressure and High Temperature
ASTM E562	Practice for Determining Volume Fraction by Systematic Manual Point Count
ASTM G48	Standard Test Methods for Pitting and Crevice Corrosion Resistance of Stainless Steels and Related Alloys by Use of Ferric Chloride Solution
BSI PD 5500	Unfired fusion welded pressure vessels
BSI PD 8010	Code of practice for pipelines
DS 43-353	Data Sheet for Pipeline Gate Valves (subsea)
DS 43-354	Data Sheet for Pipeline Ball Valves (subsea)
DS 43-355	Data Sheet for Pipeline Check Valves (subsea)



EN 1092-1	Flanges and their joints – Circular flanges for pipes, valves, fittings and accessories, PN designated – Part 1: Steel flanges
EN 12516, Parts 1 to 3	Valve Shell Strength
EN 12982	Industrial valves - End-to-end and centre-to-end dimensions for butt welding end valves
NAS 1638	National Aeronautical Society standard for hydraulic cleanliness
NORSOK M-630	Material data sheets for piping
NORSOK M-650	Qualification of manufacturers of special materials
GIS 43-334	Guidance on Industry Standard for Welding of CRA/Internally Clad Pipe
GIS 62-021	Guidance on Industry Standard for EEMUA 182 Integral Block and Bleed Manifolds

3. Terms and definitions

Add

Double isolation valve

A single valve having two seating surfaces, each of which provides a seal against pressure from a single source. This feature may be provided in one direction or in both directions.

In the latter case, the seats of trunnion mounted ball valves do not automatically relieve body cavity overpressure.

5. Valve types and configurations

5.1 Valve types

5.1.1 Gate valves

Modify Last Sentence to Read

Hand or ROV operated valve gates shall move “down” to close. Actuated valve gates shall move “up” to close, unless otherwise specified.

Add

Gate valves shall be of the full opening, through conduit type, suitable for the passage of pigs, unless otherwise specified.

Valves shall be of the rising stem type, unless otherwise specified.

Slab type gate valves shall be “downstream sealing” or “upstream plus downstream sealing” as specified. If not specified, supplier shall advise if design is being offered.

Expanding type gate valves shall be of the “double expanding” type where the gate makes a seal with the seats in both open and closed positions, unless otherwise specified. The arrangements incorporated to prevent jamming during opening shall be advised.

5.1.2 Ball valves

Add

Valves shall be end entry, top entry, or welded body, as specified.

Valves shall be trunnion mounted type.

Valves shall be full opening, through conduit type, suitable for the passage of pigs, unless otherwise specified.



Gear operators shall be provided on hand operated Class 600, 900, and 1500 rated valves $\geq$ DN 150 (NPS 6) and on Class 2500 and higher rated valves $>$ DN 50 (NPS 2). Valves $\leq$ DN 50 (NPS 2) shall be lever/or ROV operated, as appropriate.

5.1.3 Check valves

Add

Axial flow nozzle check valves may also be used.

Single plate wafer style valves shall not be used.

5.2 Valve configuration

5.2.1 Full-opening valves

Modify First Sentence to Read

Full opening valves shall have an unobstructed opening not smaller than the bore of the end connections.

5.2.2 Reduced-opening valves

Modify to Read

Reduced opening valves with a circular bore through the obturator shall be supplied with a minimum bore as follows unless otherwise agreed.

- For valves less than or equal to DN 300: One line size below nominal size of valve with bore according to Table 1.
- For valves DN 300 to DN 600: Two line sizes below nominal size of valve with bore according to Table 1.
- For valves $>$ DN 600: by agreement.

Example: A DN 400 reduced opening ball valve shall have a minimum bore of 287 mm.

Add

5.2.3 Directionality

Valves shall be bi-directional seating

6 Design

6.1 Design codes and calculations

Add

An appropriate assumption shall be made about pipe loads based on the strength of the connected pipe.

Design pressure, design differential pressure, and max./min. design temperatures shall be as specified.

In addition, valve bodies having nominal sizes less than or equal to DN 300 (NPS 12) and a rating less than or equal to Class 2500 or PN420 shall meet the minimum wall thickness requirements of ASME B16.34 or EN 12516 Part 1 as appropriate for the specified rating, nominal size, and material.

The basis for design shall be clearly stated in the proposal and any deviations from these requirements shall be clearly identified.



For high pressure valves that are outside the scope of the reference standard, relevant clauses of the reference standard shall apply and valves shall be rated and designed in accordance with one of the following alternatives:

- a. ASME B16.34 standard ratings up to and including Class 4500.
- b. An ASME B16.34 intermediate rating up to Class 4500.
- c. ISO 10423 (API Spec 6A) 10 000 or 15 000 rating (PSL3 minimum) except that for austenitic, superaustenitic, duplex, and superduplex stainless steels the allowable stress limit S_m shall be the lower of $2/3 S_y$ at design temperature or $1/3 S_u$ at design temperature. Allowable stress limits shall also meet any requirements specified by the pipeline design standard.

The allowable stress limits of ISO 10423(API 6A) are not conservative in the case of materials that do not exhibit a yield point and can result in "cold creep" if working or test stresses are high. The allowable stress values listed in ASME B31.3 are generally lower than those listed in ASME VIII.

Valves so designed shall meet clauses 9 and 10 and meet other relevant requirements, unless otherwise agreed. The API 6A monogram shall not be applied unless requirements of that standard are also met. Valves may be designed to an intermediate API rating by agreement with the purchaser if there is advantage in so doing. Such proposals shall be clearly identified in the bid as an alternative to the standard valve. Such valves shall have their pressure limitations clearly marked on the nameplate and valve body and the API monogram shall not be applied.

ISO 10423 (API 6A) makes no provision for intermediate ratings that can often provide a useful weight/cost saving.

The design shall be such that valve function is unaffected by long periods of inactivity or by build up of rust, sand, wax, or other debris.

6.2 Pressure and temperature ratings

Modify Fourth Paragraph to Read

Weld end, compact connector, or flanged valves greater than Class 900 rating and greater than DN 250 (NPS 10) size may be designed to an intermediate ASME rating by agreement with the purchaser if there is advantage in so doing. Such proposals shall be clearly identified in the bid as an alternative to the standard valve. Such valves shall have their pressure limitations clearly marked on the nameplate and valve body.

Flanged valves are not normally designed to an intermediate rating because of the danger of their being transferred to a different application requiring a fully rated valve. This is an unlikely occurrence in a subsea system but acceptability of intermediate rated valves should always be confirmed by the purchaser.

Add

Operating temperature limitations imposed by the sealing/seating materials, etc. shall be clearly identified in the proposal and marked on the valve nameplate.

Weld end valves meeting the applicable requirements of ASME B16.34 in addition to the requirements of clause 6.1 may be designated as Special Class Valves. In this case the pressure/temperature ratings of ASME B16.34 for Special Class for the applicable material specification and the applicable Class Rating apply. The required non-destructive examination shall be conducted in accordance with clause 9 of this GIS.

For steel PN rated valves, the pressure/temperature ratings applicable to the valve pressure containing shell (body, bonnet, etc.) shall be in accordance with those specified for PN rated flanges in the tables of EN 1092-1.

