7.2 Pressure and temperature ratings

The nominal pressure (PN) class or the ASME rating class shall be used for the specification of the required pressure class.

Valves covered by this International Standard shall be furnished in one of the following classes:

– PN 20 (class 150);

– PN 50 (class 300);

– PN 64 (class 400);

– PN 100 (class 600);

– PN 150 (class 900);

– PN 250 (class 1500);

– PN 420 (class 2500).

If intermediate design pressures and temperatures are specified by the purchaser, the pressure-temperature rating shall be determined by linear interpolation.

The minimum design temperature shall be 0 °C unless otherwise specified by the purchaser.

7.4 External pressure and loads

The purchaser shall specify any other construction, test, functional or accidental load combinations that shall be accounted for in the design.

NOTE ISO 13623 specifies construction, functional and accidental loads and provides examples of such loads for consideration by the purchaser.

7.7 Valve operation

The purchaser should specify the method of operation and the maximum pressure differential (MPD) at which the valve is required to be opened by the lever, gearbox or actuator. If not specified, the pressure rating as determined in accordance with 7.2 for material at 38 °C (100 °F) shall be the MPD.

The manufacturer shall provide the following data to the purchaser, if requested:

– flow coefficient *C*v or *K*v;

– breakaway thrust or torque for new valve;

– maximum allowable stem thrust or torque on the valve and, if applicable, the maximum allowable input torque to the gearbox;

– number of turns for manually operated valves.

7.8 Pigging

The purchaser shall specify the requirements for piggability of the valves.

NOTE Guidance can be found in Annex D.

7.9.2 Welding ends

Welding ends shall conform to ASME B31.4-2006, Figures 434.8.6 (a) (1) and (2) or ASME B31.8-2007, Figures I-4 and I-5, unless otherwise agreed. In the case of a heavy-wall valve body, the outside profile may be tapered at 30° and then to 45° as illustrated in ASME B16.25-2003, Figure 1.

The purchaser shall specify the outside diameter, wall thickness, material grade, SMYS and any special chemistry of the mating pipe, and whether cladding has been applied.

7.9.3 Alternate valve end connections

Other end connections may be specified by the purchaser.

7.10 Bypasses, drains and vents

The use of bypass, drain and vent connections should be avoided. If required, they shall be welded, flanged or threaded as specified by the purchaser.

WARNING — Threaded connections can be susceptible to crevice corrosion.

7.11 Manual actuator-manual operator — Handwheels and wrenches

Wrenches for valves shall either be of an integral design or shall consist of a head that fits on the stem and is designed to take an extended handle. The head design shall allow permanent attachment of the extended section if specified by the purchaser.

Wrenches that are of integral design (not loose) shall not be longer than twice the face-to-face or end-to-end dimension, unless otherwise agreed.

NOTE Loose wrenches are not considered part of the valve and are not required to meet the maximum length requirements.

Handwheel diameter(s) should not exceed the face-to-face or end-to-end length of the valve or 1 000 mm, whichever is smaller, unless otherwise agreed. Except for valve sizes DN 40 (NPS

11/2) and smaller, spokes shall not extend beyond the perimeter of the handwheel, unless otherwise agreed.

If specified by the purchaser, the handwheel of the gearbox input shaft shall be provided with a torque-limiting device, such as a shear pin, to prevent damage to the drive train.

The direction of closing shall be clockwise, unless otherwise specified.

7.12 Locking devices

Valves shall be supplied with locking devices if specified by the purchaser. Locking devices for check valves shall be designed to lock the valve in the open position only.

Locking devices for other types of valves shall be designed to lock the valve in the open and/or closed position.

7.16 ROV interface

The purchaser shall specify the ROV interface requirements.

If an ROV interface is provided, the supplier shall advise the number of ROV turns required to fully stroke the valve and the force/torque requirements throughout the opening and closing strokes as follows:

a) normal operating force/torque;

b) maximum force/torque of the drive train that does not result in the stress limits exceeding those of 7.20.2;

c) minimum force/torque of the drive train bolting that can result in the stress limits exceeding those of 7.20.3.

NOTE Typical ROV interfaces are described in ISO 13628-8.

7.18 Lifting points and supports

Valves of size DN 200 (NPS 8) and larger shall be provided with lifting points, unless otherwise agreed. The manufacturer shall verify the suitability of the lifting points and recommend the lifting procedure. Each lifting point shall have a safe working load at least equal to the valve mass and shall be so marked.

If the valve manufacturer is responsible for the supply of the valve and operator assembly, the valve manufacturer shall verify the suitability of the lifting points for the complete assembly.

If the purchaser is responsible for the supply of the operator assembly, the purchaser shall provide adequate information to enable the manufacturer to verify the suitability of the lifting points for the complete assembly.

NOTE Regulatory requirements can specify special design, manufacturing and certification of lifting points.

Valves of size DN 200 (NPS 8) and larger shall be provided with support ribs or legs, unless otherwise agreed.

7.19 Valve operator interface

The actuator power source shall be specified by the purchaser.

Actuators and gearboxes shall be mounted on the valves by the valve manufacturer at the factory, unless otherwise agreed.

The output of the actuator shall not exceed the stress limits of the valve drive train permitted by 7.20.2, unless otherwise agreed.

WARNING — Permanent deformation or failure of drive-train components can occur if they are exposed to thrust or torque exceeding these stress limits.

NOTE Typical quarter-turn valve-to-actuator interfaces are given in ISO 5211.

The manufacturer shall state the maximum permissible input torque or thrust for the valve operator.

If specified by the purchaser, valves shall be provided with a pressure cap.

The purchaser shall specify whether it is required that a gearbox or an actuator be capable of being removed from the valve subsea.

7.22 Stem/shaft protector

If specified by the purchaser, the design shall have provisions for fitting a stem/shaft protector or cap. If the protector or cap can contain pressure, the protector or cap and method of attachment shall be capable of withstanding the valve design pressure and external hydrostatic pressure and shall be hydrostatically tested in accordance with this International Standard. The protector or cap shall have provisions for venting prior to removal and during fitting.

7.24 Corrosion/erosion

If specified by the purchaser, the manufacturer shall take precautions in the valve design and material selection to ensure that corrosion or erosion does not affect the correct functioning of the valve over its design life. Such precautions may include corrosion-resistant overlay in sealing areas, gasket contact areas or all process-wetted surfaces. Commissioning and hydrostatic test conditions shall also be considered and may require corrosion protection.

If a specific corrosion/erosion allowance is specified, the manufacturer shall also ensure that design thickness calculations include a loss of thickness equal to the corrosion/erosion allowance specified.

7.25 Hyperbaric performance

The manufacturer shall demonstrate by calculation or other means that the valve and/or operator are suitable for the required water depth.

If hyperbaric testing is specified by the purchaser to demonstrate suitability, hyperbaric testing shall be performed in accordance with Clause B.5.

8.1 Material specification

Specifications for pressure-containing and pressure-controlling metallic parts shall be issued by the manufacturer and shall address the following, as a minimum:

– chemical analysis;

– carbon equivalent, if applicable;

– heat treatment;

– mechanical properties including Charpy impact values and hardness, if applicable;

– NDE;

– testing;

– certification.

Metallic pressure-containing and pressure-controlling parts shall be made of materials consistent with the pressure-temperature rating as determined in accordance with 7.2. Use of other materials shall be by agreement.

All austenitic and duplex stainless steels shall be solution-treated and water-quenched.

Free-machining re-sulfurized or similar steels shall not be used for any purpose.

The chemical composition, mechanical properties, microstructure, heat treatment and testing of complex alloys (e.g. duplex stainless steels) including welds, require special consideration and shall be by agreement.

8.2 Service compatibility

All process-wetted parts, metallic and non-metallic, and lubricants shall be suitable for the commissioning fluids and service specified by the purchaser. Metallic materials shall be selected so as to avoid corrosion and galling that can impair function and/or pressure-containing capability.

8.7.1 Sulfide stress cracking

Materials for pressure-containing and pressure-controlling parts and bolting shall meet the requirements of ISO 15156 (all parts) if sour service is specified by the purchaser.
The purchaser should as a minimum provide the partial pressure of H2S, percent chlorides, pH and temperature.

9.1 Qualifications

Welding, including weld overlays and repair welding, of pressure-containing and pressure-controlling parts shall be performed in accordance with procedures qualified to ISO 15607, ISO 15609, ISO 15614-1 or ASME BPVC, Section IX and 9.2 and 9.3 of this International Standard. Welders and welding operators shall be qualified in accordance with ISO 9606 (all parts), ASME BPVC, Section IX or EN 287 (all parts).

NOTE 1 The purchaser, pipeline design standards, material specifications and/or local requirements can specify additional requirements.

10.1 NDE requirements

Any purchaser-specified NDE requirements shall be selected from the list in accordance with Annex A. Final NDE activities shall be conducted after heat treatment, unless otherwise agreed.

10.4 NDE

The extent, method and acceptance criteria for NDE of parts shall be in accordance with Annex A, which specifies two levels of NDE requirements (QL1 and QL2) to assist the purchaser with the selection of a set of requirements appropriate for the intended valve duty.

NOTE The extent of NDE for QL2 is more stringent than for QL1.

The purchaser shall specify the NDE level at the time of the order placement, considering the following factors:

– service fluid;

– size/pressure/temperature;

– location;

– material of construction;

– criticality and function.

All NDE of fabrication welds shall be carried out in the final heat-treated condition and shall be performed in accordance with written procedures.

10.5 NDE of repairs

After defect removal, the excavated area shall be examined by magnetic-particle testing, MT, or penetrant testing, PT, methods in accordance with Annex A. Repair welds on pressure-containing parts shall be examined using the same NDE method that is used to detect the defect with a minimum of MT or PT.

Acceptance criteria shall be as specified in Annex A for the appropriate product form. The final NDE activities shall be conducted after post-weld heat treatment, unless otherwise agreed.

The NDE requirements specified by the purchaser in 10.1 shall also apply to repair welding.

11.1 General

Each valve shall be tested prior to shipment. The purchaser shall specify which particular supplementary tests in Annex B shall be performed.

Valves for gas service shall be subject to a gas shell test in accordance with B.4.2, unless otherwise agreed.

11.2 Hydrostatic shell test

Valve ends shall be closed off and the obturator placed in the partially open position during the test. If specified by the purchaser, the method of closing the ends shall permit the transmission of the full-pressure force acting on the end blanks to the valve body. If present, external relief valves shall be removed and their connections plugged.

The test pressure shall be 1,5 or more times the pressure rating determined in accordance with 7.2 for material at 38 °C (100 °F). The duration shall not be less than that specified in Table 9.

Table 9 — Minimum duration of hydrostatic shell tests

Valve size		Test duration
DN	NPS	h
15 to 40	1/2 to 11/2	1
50 to 100	2 to 4	2
150 to 250	6 to 10	4
> 300	> 12	6

No visible leakage is permitted during the hydrostatic shell test. There shall be no variation in pressure that cannot be accounted for by temperature fluctuations.

If the pressure rating of the pipe pups is insufficient for the hydrostatic-shell test pressure, then the pups shall be welded to the valve following the valve-shell test and the valve and pup(s) tested at a pressure specified by the purchaser.

11.4.4.3 Additional seat testing

If the purchaser specifies that the functionality for the valve be that of double-block-and-bleed (DBB) valves, the test described in Clause B.8 shall be performed.

If the purchaser specifies that the functionality for the valve be that of double-isolation-and-bleed (DIB-1), both seats bi-directional, the test described in Clause B.9 shall be performed. If the purchaser specifies that the functionality for the valve be that of DIB-2, one seat unidirectional and one seat bi-directional, the test described in Clause B.10 shall be performed.

11.5 Cavity-relief test

If a body-cavity relief test is specified by the purchaser, each valve shall be tested in accordance with Annex B.

12 Coating

Coating requirements shall be by agreement.

Non-corrosion-resistant valves shall be blast-cleaned, primed and/or painted externally prior to shipment in accordance with a procedure approved by the purchaser.

Corrosion-resistant valves shall be blast-cleaned with sand or other non-ferrous medium prior to shipment and shall not be coated, unless otherwise agreed.

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Annex B
(normative)

Supplementary Test Requirements

B.1 General

This annex specifies requirements for supplementary testing that shall be performed by the manufacturer if specified by the purchaser. The frequency of testing shall also be specified by the purchaser, if not defined in this annex.

B.2 Hydrostatic testing

By agreement, hydrostatic testing may be performed at pressures higher than specified in 11.2 and 11.4 and/or for longer periods than specified in Tables 9 or 10.

B.3 Low-pressure gas seat testing

The seat test specified in 11.6 shall be repeated at a test pressure between 0,05 MPa (0,5 bar; 7.3 psi) and 0,10 MPa (1,0 bar; 14.5 psi) using air or nitrogen as the test medium.

The acceptable leakage rate for low-pressure gas seat testing shall be

– ISO 5208:2008, rate A (no visible leakage), for soft-seated valves and lubricated plug valves;

– ISO 5208:2008, rate C, for metal-seated block valves;

– ISO 5208:2008, rate D, for metal-seated check valves.

B.4 High-pressure gas testing

B.4.1 General

High-pressure gas testing shall be performed after hydrostatic shell testing.

WARNING — High-pressure gas testing involves potential hazards. Appropriate safety precautions shall be taken.

B.4.2 Shell testing

Valves designated by the purchaser shall have a high-pressure-gas shell test performed using inert gas as the test medium. The minimum test pressure shall be 1,1 times the pressure rating determined in accordance with 7.2 for the materials at 38 °C (100 °F). The test duration shall be in accordance with Table B.1.

Table B.1 — Minimum duration of gas shell tests

Valve size		Test duration
DN	NPS	h
15 to 40	1/2 to 11/2	2
50 to 450	2 to 18	4
≥ 500	≥ 20	6

Acceptance criteria shall be no visible leakage unless the test is performed using nitrogen with a helium tracer measured using a mass spectrometer; a maximum of 0,27 ml/min is allowed from any leak path.

B.4.3 High-pressure-gas seat test

The seat test specified in 11.4 shall be performed using an inert gas as the test medium. The test pressure and duration shall be as specified in 11.4.2.

Acceptance criteria shall be as follows:

– ISO 5208:2008, rate A (no visible leakage), for soft-seated valves and lubricated plug valves;

– two times that allowed by ISO 5208:2008, rate D, for metal-seated valves, unless otherwise agreed.

B.5 Hyperbaric qualification testing

If specified, the valve shall be subjected to a hyperbaric test at a minimum pressure equivalent to 1,1 times the design water depth, in accordance with written procedures. The agreed test method should simulate the operational requirements of the valve and should include both static and functional tests as appropriate.

The use of test fixtures is also allowed, by agreement, when circumstances dictate.

EXAMPLE When large assemblies make full testing impractical or when specific seal arrangements are involved.

B.6 Cathodic protection continuity test

If the valve is being installed in a cathodically protected system, all external items of the valve, actuator and other connected equipment shall be checked for electrical continuity before coating.
Continuity shall be measured using a DC power source not exceeding 12 V. The measured resistance shall not exceed 10 Ω.

B.7 Seal type test

If valve stems, shafts or body joints are sealed with a multiple-seal arrangement, a minimum of one sample of each seal design having a unique size, type and rating shall be tested in such a manner that the effectiveness of each individual seal is demonstrated.

The test fluid shall be water or inert gas, as specified.

Test pressures and durations shall be in accordance with 11.2 and/or Clause B.2, as applicable, unless otherwise agreed.

If this requires the provision of temporary test ports, these shall be plugged and sealed as required by 7.10.

B.8 Double-block-and-bleed (DBB) valves

With the valve half-open, the valve and its cavity shall be completely filled with test fluid. The valve shall then be closed and the valve-body vent valve opened to allow excess test fluid to overflow from the valve cavity test connection. The test pressure shall be applied simultaneously from both valve ends.

Seat tightness shall be monitored via overflow through the valve cavity connection.

B.9 Double-isolation-and-bleed (DIB-1) valves (both seats bi-directional)

Each seat shall be tested in both directions.

Cavity-relief valves shall be removed if fitted. The valve and cavity shall be filled with test fluid, with the valve half-open, until the test fluid overflows through the cavity relief connection.

To test for seat leakage in the direction of the cavity, the valve shall be closed. The test pressure shall be applied successively to each valve end to test each seat separately from the upstream side. Leakage shall be monitored via the valve cavity pressure relief connection.

Thereafter, each seat shall be tested as a downstream seat. Both ends of the valve shall be drained and the valve cavity filled with test fluid. Pressure shall then be applied whilst monitoring leakage through each seat at both ends of the valve. Some valve designs can require the balancing of the upstream and valve cavity pressure during the downstream seat test.

B.10 Double-isolation-and-bleed (DIB-2) valves (one seat uni-directional and one seat bi-directional)

The bi-directional seat shall be tested in both directions.

Cavity-relief valves shall be removed if fitted. The valve and cavity shall be filled with test fluid, with the valve half-open, until the test fluid overflows through the cavity relief connection.

To test for seat leakage in the direction of the cavity, the valve shall be closed. The test pressure shall be applied successively to each valve end to test each seat separately from the upstream side. Leakage shall be monitored via the valve cavity pressure relief connection.

To test the bi-directional seat from the cavity, test pressure shall be applied simultaneously to the valve cavity and upstream end. Leakage shall be monitored at the downstream end of the valve.

B.11 Torque/thrust functional testing

The maximum torque or thrust required to operate ball, gate or plug valves shall be measured at the pressure specified by the purchaser for the following valve operations:

a) open to closed with the bore pressurized and the cavity at atmospheric pressure;

b) closed to open with both sides of the obturator pressurized and the cavity at atmospheric pressure;

c) closed to open with one side of the obturator pressurized and the cavity at atmospheric pressure;

d) as in c) but with the other side of the obturator pressurized.

Torque or thrust values shall be measured with seats free of sealant, except where the sealant is the primary means of sealing. If necessary for assembly, a lubricant with a viscosity not exceeding that of SAE 10W motor oil or equivalent may be used.

Thrust and torque testing shall be performed following hydrostatic shell testing and, if specified, prior to any low-pressure gas seat testing.

The measured torque or thrust results shall be documented and shall not exceed the manufacturer's documented breakaway torque/thrust.

B.12 Drive train strength test

B.12.1 General

The test torque shall be the greater of

– twice the manufacturer's predicted breakaway torque/thrust, or

– twice the measured breakaway torque/thrust.

The test torque shall be applied with the obturator blocked for a minimum time of 1 min.

NOTE For gate valves, the thrust can be tensile or compressive, whichever is the most stringent condition.

B.12.2 Acceptance criteria

The test shall not cause any permanent visible deformation of the drive train.

For ball and plug valves, the total torsional deflection of the extended drive train when delivering the design torque shall not exceed the overlap contact angle between the seat and obturator.

B.13 Cavity-relief testing

B.13.1 Frequency

Each valve shall be tested.

Cavity-relief testing is not required if protection of the cavity against over-pressure is ensured, for both the open and the closed position, by a hole in the obturator or around the seat seal.

B.13.2 Trunnion-mounted ball valves and through-conduit gate valves with internal-relieving seats

The procedure for cavity-relief testing of trunnion-mounted ball valves and through-conduit gate valves with internal-relieving seats shall be as follows.

a) Fill the valve in the half-open position with water.

b) Close the valve and allow water to overflow from the test connection at each end of the valve.

c) Apply pressure to the valve cavity until one seat relieves the cavity pressure into the valve end; record this relief pressure.

d) For valve types with second-seat relief, continue to increase the pressure to the cavity until the second seat relieves; record the relief pressure of the second seat.

Failure to relieve at a pressure less than 1,33 times the valve pressure rating shall be cause for rejection.

B.13.3 Floating-ball valves

The procedure for cavity-relief testing of floating-ball valves shall be as follows.

a) With the valve half-open, pressurize the valve to 1,33 times the valve pressure rating specified in 7.2 for the material at 38 °C (100 °F).

b) Close the valve and vent each end to atmospheric pressure.

c) Open the valve to the half-open position and monitor for the release of test medium trapped in the cavity.

Evidence of trapped pressurizing medium in the cavity shall be cause for rejection.

B.14 Additional testing

The purchaser shall specify any additional testing requirements not covered by this International Standard.

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Annex C
(informative)

Supplementary documentation requirements

C.1 Supplementary documentation

The purchaser may select supplementary documentation from the list below:

a) NDE records;

b) WPS;

c) PQR;

d) WPQ;

e) for sour service valves, certificate of compliance to ISO 15156 (all parts);

f) hardness test report on pressure-containing parts;

g) hardness test report on pressure-controlling parts;

h) heat-treatment certification records, e.g. charts;

i) design calculations for pressure-containing parts and/or the drive train;

j) design calculations for pressure-controlling parts;

k) NDE personnel-qualification records;

l) NDE procedures;

m) calibration records (it is the responsibility of the purchaser to identify requirements for equipment when ordering);

n) material inspection certificates in accordance with ISO 10474 or EN 10204 (the purchaser shall specify the type of certification, and for which parts, when ordering);

o) design verification by certification body/agency;

p) type approval by certification body/agency;

q) cross-sectional drawings with a list of parts and materials;

r) flow coefficient, *C*v or *K*v;

s) current quality management system certificate.

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Annex D
(Informative)

D.1 General

This annex provides guidelines to assist the purchaser with valve-type selection and specification of specific requirements when ordering valves.

D.2 Field testing

Pressures during the testing of installed valves should not exceed the pressure rating of the valve by more than 50 % when testing with the valve partially open or by more than 10 % of the pressure rating when testing against a closed valve.

D.3 Pigging

The purchaser should examine the valve design for piggability when ordering valves for use in pipelines requiring pigging.

NOTE 1 Venturi or reduced-bore valves are not suitable for most pigging operations, including intelligent pigging, but can allow the passage of foam pigs.

NOTE 2 A valves in which the drive member or the obturator obstructs the bore in the otherwise fully open position, e.g. a dual-plate check valve, is not piggable.

NOTE 3 Certain full-opening valves with pockets can allow a bypass of fluid around a short pig or sphere.

D.4 Valve operator compatibility

The design of the complete valve and actuator/operator unit should be the responsibility of the valve manufacturer.

This is to ensure

a) compatibility of the mechanical interface between the valve and the actuator/operator;

b) matching of the actuator/operator output to the valve force/torque, including any factor of safety required or specified by the purchaser;

c) functional testing of the combined valve and actuator/operator assembly.

D.5 Valve data sheet

The valve data sheet in Table D.1 can be used to assist with the specification of valves when ordering.

D.6 Information provided

Table D.2 provides a list of information that it is necessary for the purchaser and/or manufacturer to provide.

Table D.1 — Valve data sheet

Specification requirements
Materials of construction _____
Location and function _____
Nominal size _____
Maximum water depth _____
Maximum operating pressure _____
Maximum field test pressure (see Clause D.2) _____
Pressure class _____
Design temperature _____
Maximum service temperature _____
Minimum service temperature _____
Liquid or gas service _____
Flow medium composition _____
Special flow requirements: blow down, solids, pigs, etc._____
Corrosive conditions _____
Valve
Type: Plug _____ Gate _____ Ball _____ Check _____
Design configuration _____
Full-round opening required? _____ Minimum bore _____
End connections
Upstream pipe: OD _____ ID _____ Material _____
Pipe pup length _____
Flanged end? Yes _____ No _____
Plain raised face or ring joint _____
If ring joint, flat or raised face? _____
Size and pressure class, as per ASME B16.5_____ or MSS SP-44_____ or ASME B16.47, Series A _____
Ring gasket or other gasket type and size _____
Note: Gaskets are not furnished as a part of the valve.

Welding end? Yes _____ No _____

Attach specifications for welding end configuration.

Special flanges and mechanical joints?_____

Table D.1 (continued)

Downstream pipe: OD _____ ID _____ Material _____

Pipe pup length _____

Flanged end? Yes _____ No _____

Plain raised face or ring joint? _____

If ring joint, flat or raised face? _____

Size and pressure class, as per ASME B16.5_____ or MSS SP-44_____ or ASME B16.47, Series A _____

Ring gasket or other gasket type and size _____

Note: Gaskets are not furnished as a part of the valve.

Welding end? Yes _____ No _____

Attach specifications for welding end configuration.

Special flanges and mechanical joints?_____

Length: Any special requirements for end-to-end or face-to-face dimension? _____

Valve operation

Is valve actuated? If so, state manual or ROV-operated _____

If actuated, provide valve closing times _____

Is gearbox with handwheel required? If so, give details_____

For a handwheel on a horizontal shaft, the distance from the centreline of the valve opening to the handwheel: _____ mm

Or, for a handwheel on a vertical shaft, the distance from the centreline of the valve opening to the centre of the rim of the handwheel _____ mm

Wrench required?_____

Locking device required? _____ Type_____

ROV interface required? Type _____ Class _____ Horizontal _____ Vertical _____

Valve support

Are support ribs or legs required? _____

Other requirements

Supplementary requirements (see Annexes B and C)_____

NDE requirements: QL1 _____ QL2 _____

ISO 15156? Yes _____ No _____

If yes, specify concentration of H2S _____, % pH _____, % chlorides _____ and temperature _____

Drain connections: Any requirements? _____

Bypass connections: Any requirements? _____

Supplementary documentation required (see Annex C) _____

Third-party witness of processes/test_____

Painting requirements _____

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Table D.2 — Summary of information provided by manufacturer and/or purchaser

Subclause	Information provided	Provider [a]
6.2.2	Reduced bore sizes other than those shown in tables	P
6.2.2	Obturator size for non-circular openings	A
6.2.2	Obturator openings in reduced bore valves above DN 600 (NPS 24)	A
7.2	Intermediate design pressure and temperatures	P
7.1	Pressure vessel design	A
7.2	Minimum design temperature	P
7.7	Advise MPD	P
7.3	Cavity relief	A
7.4	External loads	P
7.6	Face-to-face or end-to-end dimension	A
7.6	Tolerances other than those listed	A
7.7	Valve operation data, torque/thrust, *Cv*, *Kv* or number-of-turns data	M-P
7.8	Requirements for piggability	P
7.9.1	Alternate standard for flanges	A
7.9.2	Weld bevels	A
7.9.2	Mating pipe data	P
7.9.3	Other end connection	P
7.1	Alternative vent/drain connections	P
7.1	Thread profiles	A
7.1	Connection sizes	A
7.11	Wrench head design	P
7.11	Handwheel diameter(s)	A
7.11	Number of turns	M
7.12	Locking devices	P
7.16	ROV interface	P
7.17	Sealant injection	P
7.18	Lifting points	A
7.18	Lifting procedure	M
7.19	Actuator power source	P
7.19	Fitting of gearboxes and actuators other than at valve manufacturers' works	A
7.19	Maximum torque	M
7.19	Thrust/torque	A
7.19	Pressure cap	P
7.19	Requirement for removal of gearbox from subsea	P
7.20.1	Greater operation factor	M

Table D.2 (continued)

Subclause	Information provided	Provider [a]
7.22	Protector/pressure cap	P
7.24	Corrosion/erosion allowance	P
7.24	Corrosion-protection measures	M
7.25	Hyperbaric test	P
8.1	Material specification	A
8.1	Corrosion test	P
8.2	Commissioning fluids	P
8.4	Composition limits	A
8.4	Chemical composition of welding end	A
8.4	Chemical composition of other materials	A
8.5	Charpy tests for other materials	A
8.6	Bolting for hydrogen embrittlement	A
8.7.1	Sour service	P
9.1	Ferrite austenite ratios of welded duplex steels	
9.1	Additional welding requirements to meet pipeline requirements	P
9.3	Use of other hardness test methods	A
9.4	Through-wall weld repairs	A
9.4	Weld repairs to correct defects in plates and forgings	A
9.4	Specification for defect removal and repair	M
10.1	NDE requirements	P
10.4	NDE level	P
10.5	NDE before final heat treatment	A
10.5	NDE requirements for weld repair	P
11.1	Supplementary tests in Annex B	P
11.1	Gas shell test	A
11.1	Test sequence	A
11.1	Use of antifreeze in test water	A
11.2	Method of closing ends	A
11.2	Pipe pup test pressure	P
11.4.1	Lubricant removed for testing	A
11.4.3	Other leakage rates	A
11.4.4.3	Valve seat functionality	P
11.5	Cavity relief test	P
12	Coating requirements	A
Annex A	NDE requirements	P

Table D.2 (continued)

Subclause	Information provided	Provider [a]
Annex B	Supplementary test requirements	P
Annex C	Supplementary documentation requirements	P
Annex D	Purchasing guidelines	P

a M indicates information supplied by manufacturer.
M-P indicates information supplied by manufacturer when required by purchaser.
P indicates information supplied by purchaser.
A indicates information established by agreement.