International Association of Oil & Gas Producers

SPECIFICATION
IOGP S-611J

November 2023
Version 1.1

Supplementary Specification to API 600 for Steel Gate Valves

NOTE This version (S-611J) of the specification document provides the justification statements for each technical requirement, but is otherwise identical in content to S-611.

JIP33
JOINT INDUSTRY PROGRAMME

Revision history

VERSION	DATE	PURPOSE
1.1	November 2023	Issued for Public Review
1.0	May 2019	First Edition

Acknowledgements

This IOGP Specification was prepared by a Joint Industry Programme 33 Standardization of Equipment Specifications for Procurement organized by IOGP with support by the World Economic Forum (WEF).

Disclaimer

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Foreword

This specification was prepared under Joint Industry Programme 33 (JIP33) "Standardization of Equipment Specifications for Procurement" organized by the International Oil & Gas Producers Association (IOGP) with the support from the World Economic Forum (WEF). Companies from the IOGP membership participated in developing this specification to leverage and improve industry level standardization globally in the oil and gas sector. The work has developed a minimized set of supplementary requirements for procurement, with life cycle cost in mind, resulting in a common and jointly agreed specification, building on recognized industry and international standards.

Recent trends in oil and gas projects have demonstrated substantial budget and schedule overruns. The Oil and Gas Community within the World Economic Forum (WEF) has implemented a Capital Project Complexity (CPC) initiative which seeks to drive a structural reduction in upstream project costs with a focus on industry-wide, non-competitive collaboration and standardization. The CPC vision is to standardize specifications for global procurement for equipment and packages. JIP33 provides the oil and gas sector with the opportunity to move from internally to externally focused standardization initiatives and provide step change benefits in the sector's capital projects performance.

This specification has been developed in consultation with a broad user and supplier base to realize benefits from standardization and achieve significant project and schedule cost reductions.

The JIP33 work groups performed their activities in accordance with IOGP's Competition Law Guidelines (November 2020).

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Introduction

The purpose of the IOGP S-611 specification documents is to define a minimum common set of requirements for the procurement of steel gate valves in accordance with API Standard 600, 14th edition, Steel Gate Valves—Flanged and Butt-welding Ends, Bolted Bonnets, for application in the petroleum and natural gas industries.

The IOGP S-611 specification documents follow a common structure (as shown below) comprising a specification, also known as a technical requirements specification (TRS), a procurement data sheet (PDS), an information requirements specification (IRS) and a quality requirements specification (QRS). These four specification documents, together with the purchase order, define the overall technical specification for procurement.

JIP33 Specification for Procurement Documents
Supplementary Technical Requirements Specification (TRS)

This specification is to be applied in conjunction with the supporting PDS, IRS and QRS as follows.

IOGP S-611: Supplementary Specification to API 600 for Steel Gate Valves

This specification defines technical requirements for the supply of the equipment and is written as an overlay to API Standard 600, following the API Standard 600 clause structure. Clauses from API Standard 600 not amended by this specification apply as written. Modifications to API Standard 600 defined in this specification are introduced by a description that includes the type of modification (i.e. Add, Replace or Delete) and the position of the modification within the clause.

NOTE Lists, notes, tables, figures, equations, examples and warnings are not counted as paragraphs.

IOGP S-611D: Procurement Data Sheet for Steel Gate Valves (API)

The PDS defines application-specific requirements. The PDS is applied during the procurement cycle only and does not replace the equipment data sheet. The PDS may also include fields for supplier-provided information required as part of the purchaser's technical evaluation. Additional purchaser-supplied documents may also be incorporated or referenced in the PDS to define scope and technical requirements for enquiry and purchase of the equipment.

IOGP S-611L: Information Requirements for Steel Gate Valves (API)

The IRS defines information requirements for the scope of supply. The IRS includes information content, format, timing and purpose to be provided by the supplier, and may also define specific conditions that invoke the information requirements.

IOGP S-611Q: Quality Requirements for Steel Gate Valves (API)

The QRS defines quality management system requirements and the proposed extent of purchaser conformity assessment activities for the scope of supply. Purchaser conformity assessment activities are defined through the selection of one of four generic conformity assessment system (CAS) levels on the basis of evaluation of the associated service and supply chain risks. The applicable CAS level is specified by the purchaser in the PDS or in the purchase order.

The specification documents follow the editorial format of API Standard 600 and, where appropriate, the drafting principles and rules of ISO/IEC Directives Part 2.

The PDS and IRS are published as editable documents for the purchaser to specify application-specific requirements. The TRS and QRS are fixed documents.

The order of precedence of documents applicable to the supply of the equipment, with the highest authority listed first, shall be as follows:

a) regulatory requirements;

b) contract documentation (e.g. purchase order);

c) purchaser-defined requirements (e.g. PDS, IRS and QRS);

d) this specification;

e) API Standard 600.

1 Scope

Add after third paragraph

For sizes larger than DN 1050 (NPS 42), the requirements in Annex H apply.

Justification

This requirement allows for the option to purchase wedge type gate valves beyond the current size scope of API 600.

Add to section

This specification does not provide requirements for the following:

— two-piece split wedge design;

— parallel seat double-disc gate design;

— pressure seal bonnet design;

— short pattern valves;

— cryogenic service valves with a design temperature below -46 °C (-50 °F);

— high temperature valves with a design temperature above 455 °C (850 °F);

— buried valves with stem extensions;

— external body cavity relief by external piping and valves;

— soft sealing parts, i.e., thermoplastics and elastomers.

Justification

This paragraph clarifies the scope by listing the items that are not excluded but their purchase may require some additional requirements.

Add new NOTE

NOTE QSL1 is the default QSL. QSL2 to QSL4 are optional.

2 Normative References

Add to first paragraph

The following publications are referred to in this document, the PDS (IOGP S-611D) or the IRS (IOGP S-611L) in such a way that some or all of their content constitutes requirements of this specification.

Add to section

ANSI/NACE MR0175/ISO 15156 (all parts), *Petroleum and natural gas industries — Materials for use in H2S-containing environments in oil and gas production*

ANSI/NACE MR0103/ISO 17945, *Petroleum, petrochemical and natural gas industries — Metallic materials resistant to sulfide stress cracking in corrosive petroleum refining environments*

API Recommended Practice 591:2019, *Process Valve Qualification Procedure*

API Specification 5L, *Line Pipe*

API Specification 6A, *Specification for Wellhead and Christmas Tree Equipment*

API Specification 6D:2021, *Specification for Pipeline and Piping Valves*

API Specification 6FA, *Specification for Fire Test for Valves*

API Specification 17D:2021, *Specification for Subsea Wellhead and Tree Equipment*

API Standard 6DX, *Standard for Actuators and Mounting Kits for Valves*

API Standard 598:2023, *Valve Inspection and Testing*

API Standard 602, *Globe, and Check Valves for Sizes DN 100 (NPS 4) and Smaller for the Petroleum and Natural Gas Industries*

ASME B.16.34:2020, *Valves — Flanged, Threaded, and Welding End*

ASME Boiler and Pressure Vessel Code (BPVC), *Section V, Nondestructive Examination*

ASME Boiler and Pressure Vessel Code (BPVC), *Section VIII, Division 1, Rules for Construction of Pressure Vessels*

ASME PCC-1, *Guidelines for Pressure Boundary Bolted Flange Joint Assembly*

ASNT ACCP-CP-1, *ASNT Central Certification Program*

ASNT SNT-TC-1A, *Personnel Qualification and Certification in Nondestructive Testing*

ASTM A262:2021, *Standard Practices for Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels*

ASTM A578/A578M, *Standard Specification for Straight-Beam Ultrasonic Examination of Rolled Steel Plates for Special Applications*

ASTM A609/A609M, *Standard Practice for Castings, Carbon, Low-Alloy, and Martensitic Stainless Steel, Ultrasonic Examination Thereof*

ASTM F2168, *Standard Specification for Packing Material, Graphitic, Corrugated Ribbon or Textured Tape, and Die-Formed Ring*

ASTM F2191/F2191M, *Standard Specification for Packing Material, Graphitic or Carbon Braided Yarn*

AWS A4.2M, *Standard Procedures for Calibrating Magnetic Instruments to Measure the Delta Ferrite Content of Austenitic and Duplex Austenitic-Ferritic Stainless Steel Weld Metal*

EN 1591, *Flanges and their joints – Design rules for gasketed circular flange connections*

EN 14772:2021, *Flanges and their joints - Quality assurance inspection and testing of gaskets in accordance with the series of standards EN 1514 and EN 12560*

EN 60529, *Degrees of protection provided by enclosures (IP Code)*

FSA-G-604-07, *Oxidation Test Standard for Flexible Graphite Gasket Materials*

IOGP S-563, *Material Data Sheets for Piping and Valve Components*

ISO 8249, *Welding — Determination of Ferrite Number (FN) in austenitic and duplex ferritic-austenitic Cr-Ni stainless steel weld metals*

ISO 9712, *Non-destructive testing — Qualification and certification of NDT personnel*

ISO 10497, *Testing of valves — Fire type-testing requirements*

ISO 13628-4:2010, *Petroleum and natural gas industries — Design and operation of subsea production systems — Part 4: Subsea wellhead and tree equipment*

ISO 15848-1, *Industrial valves — Measurement, test and qualification procedures for fugitive emissions — Part 1: Classification system and qualification procedures for type testing of valves*

ISO 17781, *Petroleum, petrochemical and natural gas industries — Test methods for quality control of microstructure of ferritic/austenitic (duplex) stainless steels*

Replace Section 3 title with

3 Terms, Definitions, and Abbreviated terms

Add new section 3.0 to start of section

3.0 Abbreviated Terms

CRA corrosion resistant alloy

DN diamètre nominal (French for nominal diameter)

EDS element data sheet

HBW Brinell hardness with tungsten ball

MDS material data sheet

MPD maximum pressure differential

MT magnetic particle testing

NDE nondestructive examination

NPS nominal pipe size

OD outer diameter

PT liquid penetrant testing

PTFE polytetrafluoroethylene

QSL quality specification level

RT radiographic testing

SWL safe working load

UT ultrasonic testing

VT visual testing

3.4
shell

In definition, replace "Comprised of the body, bonnet, and body-bonnet" with

The sum of all pressure containing parts

Add new term 3.5

3.5
batch
component batch
Components of the same design, material, size and rating that are from a single purchase order and that are manufactured in the same location.

Add new term 3.6

3.6
breakaway thrust or torque
The maximum thrust or torque required to operate a valve at MPD.

Add new term 3.7

3.7
corrosion allowance
The thickness to be added to the minimum required thickness given by the selected standard to account for loss of material due to corrosion.

Add new term 3.8

3.8
handwheel
A wheel that consists of a rim connected to a hub (e.g., by spokes) and used to manually operate a valve requiring multiple turns.

Add new term 3.9

3.9
lagging
A material used for insulation.

Add new term 3.10

3.10
maximum pressure differential
MPD
The maximum difference, between the upstream and downstream pressure across the obturator, at which the obturator may be operated.

Add new term 3.11

3.11
position indicator
A device that shows the position of the valve obturator.

Add new term 3.12

3.12
pressure-containing part
A part whose failure to function as intended results in a release of contained fluid into the environment and that includes, as a minimum, the body, bonnet, stem, yoke, gland flange, bolting and body/bonnet gasket that pass through the pressure boundary.

Add new term 3.13

3.13
pressure-controlling part
A part that is intended to prevent or permit the flow of fluids and that includes, as a minimum, the gate and the seat.

Add new term 3.14

3.14
tack weld
A weld that is temporary only and that is used to fix the workpieces or assemblies to be joined in their proper position for welding.

4 Pressure/Temperature Ratings

Add new section

4.5 Cavity Relief

4.5.1

When body cavity relief is specified, a hole with a diameter greater than or equal to 3 mm (0.12 in.) shall be drilled in the closure member outside the seat facing area.

Justification

Where there is a possibility that design configuration and service conditions may lead to trapped process fluid in the center cavity of the valve, it is essential to provide cavity relief. If this is not addressed, the integrity of the valve could be compromised.

4.5.2

The pressure-relief hole shall connect the valve body cavity with the high-pressure side of the valve.

Justification

This requirement ensures that the valve does not leak through the gate.

5 Design

Add new section 5.0 before section 5.1

5.0 Design Codes

5.0.1

Valves shall be in accordance with ASME B16.34 standard class gate valves.

Justification

This requirement ensures standardization of the specification used for general valve design requirements. This requirement ensures reference to ASME B16.34 specification in general rather than multiple references to selected sections.

5.0.2

When special class is specified, valves shall be in accordance with ASME B16.34 for special class.

Justification

This requirement ensures standardization of the specification used for general valve design requirements. This requirement ensures reference to ASME B16.34 specification in general rather than multiple references to selected sections.

5.3 Body Dimensions

5.3.1 Flanged Ends

5.3.1.2

Delete "or ISO 5752" from first sentence of first paragraph

Justification

This requirement ensures standardization of face-to-face dimensions to ASME B16.10, which is the industry default. Additionally, ISO 5752 does not include dimensions for DN 850 (NPS 34).

Add to section

For valve sizes DN 1000, DN 1050 (NPS 40, NPS 42) and lesser than or equal to class 300, face-to-face dimensions shall be in accordance with Table 10.

Justification

This requirement ensures standardization of face-to-face dimensions for size and rating combinations that are excluded from ASME B16.10 scope but included in API 600 scope.

Add new Table 10

Table 10—Face-to-face Dimensions

DN (NPS)	Class 150 mm (in.)	Class 300 mm (in.)
1000 (40)	As per ASME B16.10	1930 (76)
1050 (42)	787 (31)	1981 (78)
NOTE For sizes not included in this table, see Annex H.		

Justification

This table ensures standardization of face-to-face dimensions for size and rating combinations outside of ASME B16.10 scope but inside API 600 scope.

Add new section

5.3.1.3 Lateral Misalignment

5.3.1.3.1

For valve sizes lesser than or equal to DN 100 (NPS 4), the lateral misalignment of flange centerlines shall not exceed 2 mm (0.079 in.).

Justification

This requirement ensures standardization of the maximum lateral misalignment of flange centerlines, aligning with API 6D and IOGP S-562.

5.3.1.3.2

For valve sizes greater than DN 100 (NPS 4), the lateral misalignment of flange centerlines shall not exceed 3 mm (0.118 in.).

Justification

This requirement ensures standardization of the maximum lateral misalignment of flange centerlines, aligning with API 6D and IOGP S-562.

Add new section

5.3.1.4 Parallel Misalignment

5.3.1.4.1

For valve sizes lesser than or equal to DN 600 (NPS 24), the parallel misalignment between flanges shall not exceed 2.5 mm/m (0.03 in./ft).

Justification

This requirement ensures standardization of the maximum parallel misalignment between flanges, aligning with API 6D.

5.3.1.4.2

For valve sizes greater than DN 600 (NPS 24), the parallel misalignment between flanges shall not exceed 1.75 mm/m (0.02 in./ft).

Justification

This requirement ensures standardization of the maximum parallel misalignment between flanges, aligning with API 6D.

5.3.2 Butt-welding Ends

5.3.2.2

Add to section

For valve sizes not listed in ASME B16.10, end-to-end dimensions shall be specified.

Justification

This requirement defines the responsibility for face-to-face dimensions not covered by ASME B16.10 and sizes beyond API 600 scope.

5.3.2.3

Add new list section

— the sulfur content of carbon steel welding ends shall be lesser than or equal to 0.020 % by mass;

Justification

This requirement is to prevent the reduction of intergranular strength and melting point of steel, crack formation due to sulfides that can lead to fatigue failure, embrittlement of steel and reduction of weldability which are risks that a high sulfur content in steel produces.

Add new list section

— the phosphorus content of carbon steel welding ends shall be lesser than or equal to 0.025 % by mass.

Justification

This requirement ensures that steel does not deteriorate its cold working ability and weldability due to phosphorus at low temperatures making steel significantly brittle, a phenomenon known as “cold brittleness”. The higher the phosphorus content, the more severe the cold brittleness.

5.4 Bonnet

5.4.2

Add to end of first list item

or not relying on attachment by tack welding

Justification

This requirement ensures that the term "positively secured" does not include tack welding.

5.4.4

Add to section

The eyebolt pin shall not be anchored by split pins or cotter pins.

Justification

The use of split pins and cotter pins in vibrating services may lead to unanchoring of the eyebolt pin, resulting in potential leakages.

Add new section

5.4.6 Lagging

When applicable, lagging extension lengths shall be specified.

Justification

This requirement ensures that bonnet bolting is outside the lagging and that any potential leakage is visible.

NOTE Suggested dimensions for lagging requirements are provided in Annex G.

5.5 Bonnet-to-body Joint

5.5.4

Add to section

The hardness of ring-joint gaskets shall be at least 30 HBW less than the hardness of the body/bonnet sealing surfaces.

Justification

This requirement ensures that the gasket deforms to provides a suitable seal.

Add new section

5.5.12 Bolting

5.5.12.1

The bolt stress resulting from preload shall be lesser than or equal to 70 % of yield at design temperature.

Justification

This requirement provides an upper limit for variability in bold stress by torquing, which ensures the prevention of overstressing the bolt.

5.5.12.2

Bolting preload torques calculations shall be in accordance with API 6A, ASME PCC-1 or EN 1591.

Justification

This requirement ensures that bolt torques used are in accordance with the target bolt stress required.

5.5.12.3

Bolting lubricant for bolting preload torque calculations shall have the same friction factor as the one used in production.

Justification

This requirement ensures that the calculated bolting preload torque provides a suitable torque value that is aligned with the type of lubricant to be used.

5.6 Gate

5.6.3

In first sentence of second paragraph, replace "DN 650 (NPS 26)" with

DN 300 (NPS 12)

Justification

This requirement ensures the prevention of galling and jamming of wedge and body guides. The size has been reduced to start from DN 300 (NPS 12) based on industry experience.

5.7 Yoke

5.7.3

Add to section

Separate yokes shall be attached to the bonnet with studs and nuts using through holes.

Justification

This requirement ensures that a robust method is used for the attachment of the yoke.

5.8 Stem and Stem Nut

5.8.4

Add to section

Dimensional and surface finish tolerances for the stem shall be as defined by the packing manufacturer.

Justification

This requirement ensures that tolerances for valve stems are maintained for all valves including those that are not subject to the fugitive emission type testing. This requirement also ensures that packing provides optimal sealing and prevents fugitive emissions.

5.8.7

Add to section

The stem-to-gate connection of the valve shall be in accordance with the strength requirements of API 591:2019, Annex B.

Justification

This requirement ensures standardization of the practice used to qualify stem-to-gate connection strength requirements.

5.9 Packing and Packing Box

5.9.1

Add to section

The stem packing arrangement shall prevent extrusion.

Justification

This requirement ensures the prevention of valve failure and potential safety incidents.

5.9.4

Add to section

The gland flange shall protrude into the stuffing box by at least 1 mm (0.04 in.) prior to compressing the packing rings.

Justification

This requirement ensures the alignment of the gland flange. If the gland flange is not correctly aligned, it may lead to leakage, valve failure and other safety incidents.

Add to section

Threaded glands shall not be used.

Justification

This requirement ensures that the packaging is not damaged by threads, which may lead to leakage, valve failure and other safety incidents.

Add to section

The gland flange shall be constructed from a single piece of material.

Justification

This requirement ensures the prevention of any risk of loss of integrity due to a multipiece gland flange design.

5.11 Operation

5.11.1

Add to section

The handwheel or gearbox of the valve shall operate against an MPD equal to the full pressure rating at 38 °C (100 °F).

Justification

This requirement ensures that valves are operable in all process conditions related to the valves defined pressure class (e.g., Class 900).

Add new NOTE 1

NOTE 1 A bypass/equalization line or drilled gate may be required for larger valve sizes or higher temperatures that cannot operate against the MPD.

Justification

Add to section

The rim pull force required to the seat, unseat and stroke at the MPD at minimum and maximum design temperatures shall not exceed 360 N (81 lbf).

Justification

This requirement ensures standardization of the maximum rim pull force allowed and aligns with API 6D.

Add to section

If the force or dimensional limitations are exceeded on directly installed handwheel, the valve shall be provided with a gearbox.

Justification

This requirement ensures handwheel rim pull force does not exceed 360 N and dimension limitations are maintained.

Add new NOTE 2

NOTE 2 See Table G.2 for optional sizes at which gearboxes are to be provided.

5.11.2

Add to section

Handwheel spokes shall not extend beyond the perimeter of the handwheel.

Justification

A protruding handwheel spoke can be unintentionally touched by the operator and/or catch items of clothing. This requirement ensures the prevention of such safety incidents. Also, handwheel spokes offer no technical advantage.

Add to section

The handwheel diameter shall not exceed the end-to-end length of the valve for classes 300 and above.

Justification

This requirement ensures the prevention of handwheel clash when two valves are connected in series.

Add to section

Handwheel dimensions for class 150 valves shall not exceed twice the end-to-end dimensions or 800 mm (32 in.), whichever is smaller.

Justification

This requirement allows for piping design progression without the risk of handwheel clashes.

Add new section

5.11.7

The output torque from the gear operator or actuator shall not exceed the stem design torque.

Justification

This requirement is to prevent the stem from being stressed beyond its yield, which would lead to a valve failure.

Add new section

5.11.8 Gearboxes

5.11.8.1

Seals for gearboxes shall be of and above continuous-seal type.

Justification

This requirement ensures alignment with API 6DX for EN 60529 IP 65 protection class which requires having full protection against dust, particles similar to dust and low-pressure water jets.

5.11.8.2

The EN 60529 protection class for gearboxes shall be IP65.

Justification

This requirement ensures alignment with API 6DX for EN 60529 IP 65 protection class which requires having full protection against dust, particles similar to dust and low-pressure water jets.

5.11.8.3

Gearbox moving internal components shall be fully greased or lubricated.

Justification

This requirement ensures smooth operability of the gearbox.

5.11.8.4

External shafts shall be made of corrosion-resistant material.

Justification

This requirement ensures that corrosion of the shaft caused by environmental conditions is mitigated to prevent potential leakage or valve failure. The shaft is always exposed to the environment and is not part that is easy to replace.

5.11.8.5

Gearboxes shall allow for the handwheel to be orientated on site at any 90° increment relative to the initial position supplied.

Justification

This requirement ensures that the handwheel orientation can be modified on site.

5.11.8.6

The gearbox shall be suitable for operation for the minimum and maximum design temperatures in accordance with Annex B.

Justification

This requirement ensures that suitable lubrication is supplied for the gearbox as incorrect lubrication may lead to gearbox failure.

5.11.8.7

The dimensions of the gearbox shall not exceed the valve end-to-end dimensions for classes 300 and above.

Justification

This requirement allows for piping design progression without the risk of handwheel clashes.

5.11.8.8

Gearboxes dimensions for class 150 valves shall not exceed twice the valve end-to-end dimensions.

Justification

This requirement allows for piping design progression without the risk of handwheel clashes.

5.11.8.9

Gearbox handwheel diameters shall not exceed the dimensions specified in 5.11.2.

Justification

This requirement allows for piping design progression without the risk of handwheel clashes.

5.11.8.10

When the number of handwheel turns on a gear operator exceeds 100 from the fully open to the fully closed position, the number of handwheel turns shall be specified in the quotation.

Justification

This requirement ensures that a review of the valves can be undertaken to determine if the valve type should be changed or if alternative means of operation should be included to prevent lengthy opening/closing times of the valve. Alternative means of operation may be an actuator or a square nut for use with a hand-held power drive or hand-crank type handwheel.

5.12 Bypasses and Other Auxiliary Connections

Add to section

The bypass shall be located on the side of the valve connecting the A-B or the E-F locations in accordance with ASME B16.34:2020, Figure 1.

Justification

This requirement ensures standardization of available connection points for bypass connections and aligns with ASME B16.34.

Add to section

The bypass valve shall be of rising stem outside screw and yoke globe valve type in accordance with API 602.

Justification

This requirement ensures controlled operation when using the bypass. The use of a globe valve for bypass equalization is a recognized industry practice.

Add to section

The bypass valve stem shall have the same general orientation as the primary valve stem.

Justification

This requirement ensures standardization of the bypass valve stem orientation.

5.13 Fugitive Emission Design Requirement

5.13.1

Add to sentence

or ISO 15848-1

Justification

This requirement ensures an alternative option as API 624 uses methane for testing, which some end users view as a safety risk.

Add to section

The fugitive emission testing standard, method, tightness class and acceptance criteria shall be specified.

Justification

This requirement ensures flexibility for fugitive emissions testing whose requirements can vary depending on end user preferences.

Add new section

5.13.3 Production Testing

5.13.3.1

A sample of the manufactured valves shall be subjected to fugitive emission production testing.

Justification

This requirement ensures flexibility for fugitive emission production testing depending on end user preferences.

5.13.3.2

The size of the sample, selection method, test method and acceptance criteria shall be specified.

Justification

This requirement provides the end user with flexibility for the extent of testing.

5.13.3.3

No adjustment shall be made to stem packing and gland flange bolts after final production testing.

Justification

This requirement prevents overtightening of the packing gland, which can affect the operability of the valve.

Add new section

5.14 Lifting

5.14.1

Lifting sketches and handling instructions for safe lifting operation for valves and valve assemblies weighing at least 25 kg (55 lbs) shall be provided.

Justification

This requirement ensures that the valve is lifted safely, preventing any risk of damage to the valve or of safety incidents while personnel are performing lifting operations. The weight of 25 kg and above aligns with API 6D.

5.14.2

The weight of the valve shall be indicated on the lifting sketch.

Justification

This requirement ensures that installation personnel are provided with necessary information to allow for safe handling and installation of the valve.

5.14.3

Lifting lugs shall be provided for valves weighing more than 250 kg (550 lbs) including operator and accessories.

Justification

This requirement ensures standardization of the weight for when lifting lugs are required.

5.14.4

Lifting point positions shall be based on the stem being in the vertically up position.

Justification

This requirement ensures that valves can be handled with the stem in the vertically up position, which is a recognized industry practice.

5.14.5

Lifting points shall not be made of cast iron or ductile iron material.

Justification

This requirement ensures the prevention of fracture due to shock loading to which iron is susceptible to due to its low fracture toughness.

5.14.6

Carbon steel lifting points shall not be used on a corrosion resistant valve body (e.g., 316 SS).

Justification

This requirement ensures the prevention of connections of dissimilar materials and risk of galvanic corrosion which would result in the failure of the lifting lug.

5.14.7

Valves shall be marked to indicate the mandatory safe lifting points and lifting lug SWL.

Justification

This requirement provides installation personnel with the information to allow safe handling and installation of the valve.

6 Materials

6.1 Materials Other Than Trim Materials

6.1.1

Add after first sentence

For QSL2 and higher, materials shall be in accordance with IOGP S-563 MDSs.

Justification

This requirement ensures standardized material expectations above that of API 600 for higher criticality valves, QSL2 and higher. The additional requirements in MDSs are not deemed necessary by default for QSL1 valves based on their low criticality and resulting in potential cost increases.

Add to section

Material designation (e.g. ASTM) and material grade of all valve parts shall be provided.

Justification

This requirement ensures clarity on the materials used and allows for a comprehensive review of the bill of materials on the general arrangement drawing.

Add to section

Bolting and valve components shall not be cadmium plated.

Justification

This requirement prevents safety and environmental risks related to the use of cadmium.

Add to section

Galvanized bolting and components shall not be used.

Justification

This requirement prevents the risk of catastrophic failure due to the liquid metal embrittlement of stainless steel that zinc can cause when exposed to fire.

Add to section

Austenitic ductile iron stem nuts shall not be used in combination with austenitic stainless steel stem materials.

Justification

This requirement prevents the risk of galling of the stem which can lead to leakage and valve failure.

Add new section

6.1.2

Trim components not listed in Table 7 shall have a corrosion resistance greater than or equal to the component to which they are coupled, including low/high temperature compatibility.

Justification

This requirement ensures that materials selected for wetted components are suitable for service conditions.

Add new section

6.1.3

Valves for sour service shall be in accordance with ANSI/NACE MR0103/ISO 17945 or ANSI/NACE MR0175/ISO 15156.

Justification

This requirement ensures that the material specified is suitable for sour service.

Add new section

6.1.4

Spiral wound gaskets with PTFE filler material shall be in accordance with ASTM D4894 or ASTM D4895.

Justification

This requirement ensures standardization with recognized industry standards for PTFE filler material.

6.2 Trim

Add new section

6.2.3

If specified, CRA weld overlay shall be applied to the non-CRA trim parts of the valve in accordance with IOGP S-563 EDSs.

Justification

This requirement expands material selection choice as API 600 does not cover CRA weld overlay as a material option.

Add new section

6.3 Welding

6.3.1

Welding of pressure-containing and pressure-controlling parts shall be in accordance with ASME B31.3 for normal fluid service.

Justification

This requirement ensures standardization with recognized industry acceptable welding procedures and aligns with API 600.

6.3.2

For QSL1, heat treatment shall be performed in accordance with ASME B31.3 or the purchaser's specification.

Justification

This requirement ensures standardization with recognized industry acceptable heat treatment and aligns with API 600.

6.3.3

For QSL2 and higher, heat treatment shall be performed in accordance with IOGP S-563 MDSs or the purchaser's specification.

Justification

This requirement ensures that MDSs are used for heat treatment procedures promoting standardization.

6.3.4

Butt welds shall be full penetration welds.

Justification

This requirement prevents the use of partial penetration welds which have a higher risk of failure. This is a recognized industry practice.

Add new section

6.4 Graphite Materials

6.4.1

Die-formed rings, flexible graphite and spiral wound gaskets with graphite filler shall be in accordance with ASTM F2168 with supplementary requirements S3, S6.1, S6.2 and S10 included.

Justification

This requirement ensures standardization of graphite compliance with industry standards. This requirement prevents the use of below standard graphite which may lead to valve failure.

6.4.2

Braided yarn shall be in accordance with ASTM F2191/F2191M with supplementary requirements S6.1 and S10 included.

Justification

This requirement ensures standardization of compliance with industry standards.

6.4.3

Active sacrificial corrosion inhibition using zinc shall not be used.

Justification

This requirement prevents valve failure due to liquid metal embrittlement of austenitic stainless steel components in case of fire in a high-temperature service.

6.4.4

The chlorine content shall be lesser than or equal to 50 ppm.

Justification

This requirement prevents the risk of pitting corrosion and stress corrosion cracking.

6.4.5

The fluorine content shall be lesser than or equal to 10 ppm.

Justification

This requirement prevents the risk of pitting corrosion and stress corrosion cracking.

6.4.6

The halogen content shall be lesser than or equal to 310 ppm.

Justification

This requirement prevents the risk of pitting corrosion and stress corrosion cracking.

6.4.7

Graphite oxidation testing shall be performed in accordance with EN 14772:2021, 6.7 or FSA-G-604-07.

Justification

This requirement ensures graphite durability when the material is exposed to a high temperature or an oxidizing environment.

6.4.8

The accumulated weight loss during graphite oxidation testing shall be less than 4 % per hour.

Justification

This requirement ensures graphite durability when material is exposed to a high temperature or an oxidizing environment.

6.4.9

The carbon content of super inhibited graphite shall be at least 98 %.

Justification

This requirement ensures an achievable and acceptable level of carbon content for super inhibited graphite. The super inhibited graphite is not able to achieve the 99 % carbon content as specified in ASTM F2191/F2191M and ASTM F2168 (see 6.4.2).

7 Testing, Inspection, and Examination

7.1 Inspection and Examination

7.1.1

Replace section with

Valves shall be inspected and examined for compliance in accordance with the specified QSL.

Justification

This requirement ensures that the supplier completes inspection, testing and examination in line with the assigned QSL.

7.1.2

Add to sentence

with amendments as detailed in Annex F

Justification

This addition ensures the compliance with the requirements of Annex F.

7.2 Pressure Tests

Add to sentence

with amendments as detailed in Annex F

Justification

This addition ensures the compliance with the requirements of Annex F.

7.3 Repairs of Defects

Add to section

For QSL2 and higher, weld repair of materials shall be in accordance with the IOGP S-563 MDSs referenced in Annex D.

Justification

This requirement ensures standardization of weld repairs as per IOGP-S-563.

Add to section

Weld repairs shall not be permitted for castings that leak during pressure testing.

Justification

This requirement prevents valve failure due to the use of poor quality castings.

Add to section

Weld repairs shall be inspected in accordance with Annex F and the standard used for the component inspection.

Justification

This requirement ensures standardization of weld repairs to the approved practices.

Add new section

7.4 Repairs of weld overlay and hard facing

For QSL2 and higher, weld repair of corrosion-resistant weld overlay and hard facing shall be in accordance with the applicable IOGP S-563 EDS referenced in Annex D.

Justification

This requirement ensures standardization of weld repairs of CRA overlay and hard facing as per IOGP S-563.

Table 8—Nominal Seating Surface, Stem and Backseat Bushing or Weld-deposit Materials and Hardness

Add row "22A" and row "22B"

Trim	Nominal Trim	Seating Surface Hardness (HB) Minimum [a]	Seating Surface Material Type [b]	Seating Surface Typical Specifications Grade			Stem/Backseat Bushing [p]		Stem Hardness (HB)	Backseat Bushing Hardness (HB)
				Cast (Integral)	Forged (Integral)	Welded [m]	Material Type [b]	Typical Specifications Type		
22A	Duplex	Note [d]	22Cr	ASTM A995 Gr. 4A	ASTM F51	AWS 5.9 ER2209, ER2553	22Cr	ASTM A276 UNS S31803	Note [d]	Note [d]
22B	Super Duplex	Note [d]	25Cr	ASTM A995 Gr. 6A	ASTM F53/F55	AWS 5.9 ER2594	25Cr	ASTM A276 UNS S32750 / S32760	Note [d]	Note [d]

Justification

This table ensures an expanded material selection choice as API 600 does not cover duplex and super duplex trim options.

Add to Footnote d

For QSL2 and higher, the hardness differential between seating surfaces shall be 50 HB minimum. The seat ring surface shall be made of the harder material.

Justification

This requirement ensures a tight shut off for backseat, preventing the risk of leakage.

Replace Footnote i with

[i] For QSL2 and higher, the hardness differential between the integral body seat and gate seat surfaces shall be 50 HB minimum. The integral body seat surface shall be made of the harder material.

Justification

This requirement ensures that the gate deforms to create a seal when in the closed position.

8 Marking

8.1 General

Add to section

The nameplate letter size shall be at least 3 mm (0.12 in.).

Justification

This requirement ensures standardization of the minimum letter size and aligns with API 6D.

Add to section

The nameplate rivet holes shall be drilled prior to valve testing.

Justification

This requirement prevents the risk of damage to the integrity of the valve by the drilling of rivet holes in the nameplate.

Add to section

The letter size height for markings on the body closure/end connector and bonnet/cover shall be at least 6 mm (0.25 in.).

Justification

This requirement ensures that markings are legible.

Add to section

Markings on the body and the bonnet shall not be masked by painting or coating.

Justification

This requirement prevents the marking from being illegible.

8.2 Specific Markings

8.2.1

Add to section

For valves that have a body cavity relief, "HP" for "high pressure" shall be permanently marked on the high-pressure side of the unidirectional valve body.

Justification

This requirement prevents the installation of the valve in the wrong direction.

9 Preparation for Shipment

9.1 Coatings

9.1.1

Add to section

Coatings shall not contain cadmium or zinc.

Justification

This requirement prevents liquid metal embrittlement with stainless steel which can lead to valve failure.

Add new section

9.1.3

External coatings for end connections shall be in accordance with API 6D:2021, Annex G.

Justification

This requirement ensures that sealing surfaces of valves ends are not covered with an external coating that would affect sealing and lead to leakages.

9.5 Packaging

Add new section 9.5.0 before section 9.5.1

9.5.0 Packing Preparation

9.5.0.1

Prior to shipment, valve internals shall be cleaned and dried.

Justification

This requirement prevents internal damage to the valve due to particles and fluids during transit and storage.

9.5.0.2

Internal surfaces of the valve shall be free from cleaning agents, loose particles and organic substances.

Justification

This requirement prevents internal damage to the valve due to particles and fluids during transit and storage.

9.5.0.3

Valves shall be packed in an enclosed vapor-proof barrier material.

Justification

This requirement ensures that no moisture can interfere with the integrity of the valves.

Annex B
(normative)

Information to be Specified by the Purchaser

In list section 2), add new list items cc) to kk)

cc) fugitive emission type testing standard, testing method and tightness class;

dd) fugitive emission production testing size of the sample, selection method, test method and acceptance criteria;

ee) QSL;

ff) lagging extension;

gg) stem protector (see Annex G);

hh) body cavity relief;

ii) minimum and maximum design temperature;

jj) wall thickness and inner diameter of the mating pipe;

kk) fire type-tested certified (see Annex G).

Justification

This requirement ensures that the supplier has received all relevant information to provide the valve.

Annex D
(informative)

Valve Material Combinations

Add to annex

For QSL2 and higher, the IOGP S-563 MDSs listed in Table D.5 shall apply.

Justification

This requirement ensures standardization of material requirements for QSL2 and higher valves.

Add to annex

When specified, for QSL1, the IOGP S-563 MDSs listed in Table D.5 shall apply.

Justification

This requirement ensures that the purchaser can invoke the standardization of material requirements for QSL1.

Add to annex

For QSL2 and higher, the IOGP S-563 EDSs listed in Table D.6 shall apply.

Justification

This requirement ensures standardization of material requirements for QSL2 and higher valves.

Add to annex

When specified, for QSL1, the IOGP S-563 EDSs listed in Table D.6 shall apply.

Justification

This requirement ensures that the purchaser can invoke the standardization of material requirements for QSL1.

Add new Table D.5

Table D.5—List of IOGP S-563 Material Data Sheets (MDSs) per Type of Material

Type of Material	Material Standard and Grades	Product Form	MDS Number	MDS Version
Non-impact tested carbon steel	ASTM A105	Forgings	IC004	01
	ASTM A216 Grade WCB, WCC	Castings	IC006	02
Impact tested carbon steel	ASTM A350 Grade LF2, LF6	Forgings	IC104	01
	ASTM A352 Grade LCC	Castings	IC106	02
Ferritic- austenitic stainless steel type 22Cr Duplex	ASTM A182 Grade F51, F60	Forgings	ID144	01
Ferritic- austenitic stainless steel type 25Cr Duplex	ASTM A182 Grade F53 (UNS S32750), Grade F55 (UNS S32760),	Forgings	ID254	02
Nickel alloys	ASTM B564 UNS N06625	Forgings	IN104S [a]	01
	ASTM B564 UNS N08825	Forgings	IN204S [a]	01
Austenitic stainless steel type 6Mo	ASTM A182 Grade F44 (UNS S31254),	Forgings	IR114	01
	ASTM A351 Grade CK3MCuN, CN3MN	Castings	IR116	01
Austenitic stainless steel type 316	ASTM A182 Grade F316	Forgings	IS104	01
	ASTM A351 Grade CF3M, CF8M	Castings	IS106	01
Austenitic stainless steel type 304	ASTM A182 Grade F304	Forgings	IS224	01
	ASTM A351 Grade CF3, CF8	Castings	IS226	01
Austenitic stainless steel, stabilized grade	ASTM A182 Grade F321, F347	Forgings	IS304	01
	ASTM A351 Grade CF8C	Castings	IS306	01
	ASTM A182 Grade F347H, F321H	Forgings	IS324	01
3.5 % nickel alloyed steel	ASTM A350 LF3	Forgings	IL104	01
	ASTM A352 LC3 (UNS J31550)	Castings	IL106	01
1¼ Cr ½ Mo alloy steel	ASTM A182 F11	Forgings	IV104	01
	ASTM A217 WC6	Castings	IV106	01
2¼ Cr 1 Mo alloy steel	ASTM A182 F22	Forgings	IV204	01
	ASTM A217 WC9	Castings	IV206	01

NOTE The suffix "S" in the MDS designation indicates a material delivered in accordance with the MDS plus the additional supplementary requirements for sour service, but excluding HIC testing and UT examination.

[a] MDSs for Ni-alloy are designated with the supplementary suffix “S” only.

Justification

This requirement ensures standardization of material requirements for QSL2 and higher valves.

Add new Table D.6

Table D.6—List of IOGP S-563 Element Data Sheets (EDSs)

Special Process Description	EDS Number	EDS Version
Hard facing by overlay welding	IH001	01
Hard facing by thermal spraying of tungsten carbide	IH002	01
Electroless nickel coating	IH004	01
Solid tungsten carbide material	IH005	02
Alloy 625 corrosion resistant overlay welding	IO001	01

Justification

This requirement ensures standardization of material requirements for QSL2 and higher valves.

Add new Annex F

Annex F
(normative)

Supplementary Requirements for Inspection and Testing

F.1 General

F.1.1

This annex specifies quality levels for gate valves.

Justification

This guidance text is the scope of this annex.

F.1.2

QSL1 is the default quality level.

Justification

This is guidance text on how to adhere to QSLs.

F.1.3

QSL2 to QSL4 are optional and may be specified.

Justification

This is guidance text on how to adhere to QSLs.

F.2 Inspection and Examination

F.2.1

NDE activities shall be conducted after final heat treatment or post-weld heat treatment.

Justification

This requirement prevents defects increasing in magnitude with heat treatment.

F.2.2

F.2.2.1

A ferrite content check shall be performed on duplex and super duplex stainless steel welds supplied in the as-welded condition (e.g., welds between duplex / super duplex pup-pieces and valve bodies).

Justification

This requirement ensures the corrosion resistance of duplex and super duplex stainless steel, preventing the use of below standard materials which may lead to valve failure.

F.2.2.2

The ferrite percentage range shall be checked using an approved ferrite content meter.

Justification

This requirement ensures the corrosion resistance of duplex and super duplex stainless steel, preventing the use of below standard materials which may lead to valve failure.

F.2.2.3

The ferrite content meter shall be calibrated in accordance with AWS A4.2M or ISO 8249.

Justification

This requirement ensures the standardization of the calibration method.

F.2.2.4

Calibration blocks shall cover ferrite within the range of 25 % to 70 %.

Justification

This requirement ensures the corrosion resistance of duplex and super duplex stainless steel, preventing the use of below standard materials which may lead to valve failure.

F.2.2.5

Ferrite checks shall be undertaken on the OD on at least three locations equally spaced around the circumference.

Justification

This requirement ensures the corrosion resistance of duplex and super duplex stainless steel, preventing the use of below standard materials which may lead to valve failure.

F.2.2.6

Coatings and surface oxide shall be removed.

Justification

This requirement ensures the corrosion resistance of duplex and super duplex stainless steel, preventing the use of below standard materials which may lead to valve failure.

F.2.2.7

The test locations shall be ground to a minimum 120 grit finish prior to testing.

Justification

This requirement ensures the accuracy of test readings. A rough surface may give a less accurate reading.

F.2.2.8

For welds in the as-welded condition, the acceptance criteria for the ferrite content shall be within the range of 30 % to 70 % in accordance with ISO 17781.

Justification

This requirement ensures the corrosion resistance of duplex and super duplex stainless steel, preventing the use of below standard materials which may lead to valve failure.

F.2.3

F.2.3.1

NDE personnel shall be qualified to ASNT SNT-TC-1A or ISO 9712 Level 2 or higher.

Justification

This requirement ensures that NDE personnel are suitably qualified to a recognized standard.

F.2.3.2

For QSL2 and higher, NDE personnel shall be certified in accordance with ASNT Central Certification Program (ACCP-CP-1) or ISO 9712.

Justification

This requirement ensures that NDE personnel have the necessary knowledge and skills to perform NDE activities and are certified by a recognized organization in accordance with a centrally administered certification scheme.

F.2.4

NDE requirements shall be in accordance with Table F.1.

Justification

This requirement ensures the use of Table F.1.

F.2.5

The extent, method and acceptance criteria of NDE and item examination code shall be in accordance with Table F.2.

Justification

This requirement ensures the use of Table F.2.

Add new Table F.1

Table F.1—NDE Requirements

Part	QSL1		QSL2 / QSL2G		QSL3 / QSL3G		QSL4	
	Cast	Forged	Cast	Forged	Cast	Forged	Cast	Forged
Body, bonnet, yoke, gland flange [e]	VT1	VT2	VT1	VT2	VT1	VT2	VT1	VT2
			MT2 [g] or PT1 [g]	MT1 [g] or PT1 [g]	MT2 [g] or PT1 [g]	MT1 [g] or PT1 [g]	MT2 or PT1	MT1 or PT1
			RT1 [a, g]	-	RT1 [a]	UT2	RT1 [a, d] and UT1	UT2
Welding ends (including pipe pup welding ends) [b]	VT1	VT2	VT1	VT2	VT1	VT2	VT1	VT2
			MT2 [g] or PT1 [g]	MT1 [g] or PT1 [g]	MT1 or PT1	MT1 or PT1	MT2 or PT1	MT1 or PT1
			RT3 [g] or UT4 [g]	UT2 [g]	RT3 or UT4	UT2	RT3 or UT4	UT2
Stem [c, e]	N/A	VT2	N/A	VT2	N/A	VT2	N/A	VT2
						MT1 or PT1		MT1 or PT1
						-		UT2
Bolting – pressure containing	N/A	VT4	N/A	VT4	N/A	VT4	N/A	VT4 and
								MT1 or PT1
Gate [c]	VT1	VT2	VT1	VT2	VT1	VT2	VT1	VT2
					MT2 [g] or PT1 [g]	MT1 [g] or PT1 [g]	MT2 or PT1	MT1 or PT1
Seat rings [c, e]	VT1	VT2	VT1	VT2	VT1	VT2	VT1	VT2
					MT2 [g] or PT1 [g]	MT1 [g] or PT1 [g]	MT2 or PT1	MT1 or PT1
Corrosion-resistant overlay	VT3 and PT1				VT3 and UT3 [f] and PT1		VT3 and UT3 and PT1	
Seals gaskets	VT4							
Pressure-containing welds	[h]		VT3		VT3			
			-		MT1 or PT1			
			RT2 or UT3		RT2 or UT3			
Fillet and attachment welds to pressure- containing parts	VT3				VT3			
					MT1 or PT1			
Hard facing	VT4				VT4 and PT1			

Table F.1 *(continued)*

Part	QSL1	QSL2 / QSL2G			QSL3 / QSL3G	QSL4		
	Cast	Forged	Cast	Forged	Cast	Forged	Cast	Forged
Sealing surfaces	VT4				VT4			
					MT3 or PT2			
Welded on lifting lugs	VT3							
	PT1 or MT1							
Integrally cast lifting lugs	RT3 or UT4							

NOTE 1 See Table F.2 for the specification of the examinations referred to in this table.

NOTE 2 Qualification and NDE requirements for pilot casting should be as per the applicable IOGP S-563 MDS.

[a] RT1 may be replaced by UT4 by agreement.

[b] See ASME B16.34:2017, 8.3.1.1 (a) (1).

[c] MT or PT shall be performed prior to coating or overlay.

[d] RT1 plus UT1 may be replaced by RT3.

[e] Requirements for examination of bar material shall be as for forgings.

[f] Applicable to machined surfaces only.

[g] 5 % or minimum one part per component batch shall be examined for QSL2.10 % or minimum one part per component batch shall be examined for QSL3. If defects outside acceptance criteria are detected, two or more parts shall be tested, and if any of these two fails, all items from the batch represented shall be examined.

[h] NDE requirements shall be in accordance with ASME B31.3 for normal fluid service.

[i] N/A means that the manufacturer is not allowed to use this material form for that specific part.

Justification

This table promotes standardization of NDE requirements for QSLs.

Add new Table F.2

Table F.2— Extent, Method, and Acceptance Criteria of Nondestructive Examination (NDE) and Item Examination Code

Examination	Extent	Method	Acceptance
RT1	Areas defined by ASME B16.34 for special class valves, at abrupt changes in sections and at the junctions of risers, gates or feeders to the casting	ASME BPVC, Section V, Article 2	ASME BPVC, Section VIII, Division 1, Appendix 7
RT2	100 %	ASME BPVC, Section V, Article 2	ASME BPVC, Section VIII, Division 1, UW-51 for linear indications and ASME BPVC, Section VIII, Division 1, Appendix 4 for rounded indications
RT3	100 %	ASME BPVC, Section V, Article 2	ASME BPVC, Section VIII, Division 1, Appendix 7
UT1	Areas not covered by RT1	ASME BPVC, Section V, Article 5	ASTM A609/A609M, Table 2, Quality Level 2
UT2	All surfaces	ASME BPVC, Section V, Article 5	Forgings: ASME BPVC, Section VIII, Div. 1, UF-55 for angle beam and ASME B16.34 for straight beam Plate: ASTM A578/A578M
UT3	Weldments: all surfaces	ASME BPVC, Section V, Article 4	ASME BPVC, Section VIII, Division 1, Appendix 12
	Overlay: all accessible machined surfaces	ASME BPVC, Section V, Article 4 straight beam method	ASTM A578A/A578M standard Level C
UT4	100 %	ASME BPVC, Section V, Article 5	ASTM A609/A609M, Table 2, Quality Level 1
MT1	All accessible surfaces	ASME BPVC, Section V, Article 7	ASME BPVC, Section VIII, Division 1, Appendix 6
MT2	All accessible surfaces	ASME BPVC, Section V, Article 7	ASME BPVC, Section VIII, Division 1, Appendix 7
MT3	All sealing surfaces	ASME BPVC, Section V, Article 7	No rounded or linear indications in pressure-contact sealing surfaces are permitted Re-examination of questionable indications as per ASME BPVC, Section VIII, Division 1 Appendix 6-3 (c) is acceptable
PT1	All accessible surfaces	ASME BPVC, Section V, Article 6	ASME BPVC, Section VIII, Division 1, Appendix 8
PT2	All accessible surfaces	ASME BPVC, Section V, Article 6	ASME BPVC, Section VIII, Division 1, Appendix 7
PT3	All sealing surfaces	ASME BPVC, Section V, Article 6	No rounded or linear indications in pressure-contact sealing surfaces are permitted Re-examination of questionable indications as per ASME BPVC, Section VIII, Division 1 Appendix 8-3 (c) is acceptable

Table F.2 *(continued)*

Examination	Extent	Method	Acceptance
VT1	100 % accessible as cast surfaces	7.1.2	7.1.2
VT2	100 % accessible as forged surfaces	Applicable MDS [b]	Applicable MDS [b]
VT3	Weldments: 100 % accessible as welded surfaces	ASME BPVC, Section V, Article 9	No undercut reduction to the thickness of the area (considering both sides) to below the minimum thickness No surface porosity and exposed slag on or within 45 mm (1.77 in.) of sealing surfaces
	Overlay: applicable EDS [b]	Applicable EDS [b]	Applicable EDS [b]
VT4	100 % accessible surfaces	Manufacturer's requirements and applicable EDS [b]	Manufacturer's requirements and applicable EDS [b]

[a] For NDE requirements for pilot casting, refer to the applicable IOGP S-563 MDS or EDS as referenced in Annex D.

[b] Refer to the applicable IOGP S-563 MDS or EDS as referenced in Annex D. Where no MDS or EDS is referenced in Annex D, the applicable material standard applies without additional requirements.

Justification

This table defines the required extent, method and acceptance of NDE activities.

F.2.6

Visual examination after assembly shall include dimensional inspection of the following:

— end-to-end dimensions;

— flange dimensions including bolt hole orientation, bolt hole diameters and flange facings;

— gate seat position and stem projection in accordance with 5.6.6.

Justification

This requirement promotes standardization of minimum requirements for visual inspections after assembly.

F.3 Pressure Testing

F.3.1

F.3.1.1

The requirements of Table F.3 shall replace those of API 598:2023, Table 1.

Justification

This requirement ensures the use of Table F.3 which is based upon QSLs for a more flexible approach to the required pressure testing based on criticality.

F.3.1.2

When the test pressure is limited by pup pieces, testing procedures and manufacturing sequences shall be revised accordingly.

Justification

This requirement ensures adequate testing procedures and manufacturing sequences for reduced test pressure.

Table F.3—Pressure Testing Requirements for Quality Specification Levels (QSLs)

Sequence	Test description	Size	ASME Class	QSLs					
				QSL1	QSL2	QSL2G [a]	QSL3	QSL3G [a]	QSL4
1	High pressure backseat (water) [b]	All	All	Required	Required	Required	Required	Required	Required
2	Shell (water)	All	All	Required	Required	Required	Required	Required	Required
3	Functional and torque test	All	All	None	Required	Required	Required	Required	Required
4	High pressure closure (water)	All	All	Required	Required	None	Required	None	Required
5	High pressure gas closure test	All	All	None	None	Required	None	Required	Required
6	Low pressure closure (air or inert gas)	All	All	Required	Required	Required	Required	Required	Required
7	High pressure gas backseat test [b]	All	All	None	None	None	None	None	Required
8	High pressure gas shell test	All	All	None	None	Required	None	Required	Required
9	Production fugitive emission testing per section 5.13.3	All	All	Test as per 5.13.3	Test as per 5.13.3	Test as per 5.13.3	Test as per 5.13.3	Test as per 5.13.3	Test as per 5.13.3

[a] QSL2G and QSL3G are designations used for gas service.

[b] Gland packing bolts shall be retightened to the manufacturer's recommended values after the back seat test (refer to 5.9 and 9.4).

Justification

This table is based upon QSLs for a more flexible approach to the required pressure testing based on criticality.

F.3.1.3

Testing shall be carried out in accordance with Table F.3.

Justification

This requirement minimizes the risk of a safety incident due to a valve failing a gas test before it has been hydrotested. Fugitive emission testing is performed last as other pressure tests may affect the Fugitive emission testing results.

F.3.2

For QSL2 and higher, the requirements of Table F.4 shall replace those of API 598:2023, Table 4.

Justification

This requirement provides increased assurance for QSL2 and higher valves by increasing the durations for pressure testing.

Table F.4—Duration of Required Test Pressure for Quality Specification Level 2 (QSL2) and Higher

Valve Size		Minimum Test Duration [a] min				
DN	NPS	Hydrostatic Shell Test	Gas Shell	Backseat	Hydrostatic Closure	Gas Closure
≤ 100	≤ 4	2	5	2	2	5
150 to 250	6 to 10	5	15	5	5	15
300 to 450	12 to 18	15	15	5	5	15
≥ 500	≥ 20	30	30	5	10	30

[a] The test duration is the period of inspection after the valve is fully prepared and is under full pressure. Test durations start only after the test pressure has stabilized.

Justification

This table provides increased assurance for QSL2 and higher valves by increasing the durations for pressure testing.

F.3.3

Valves with a gear operator shall be seat tested after assembly of the operating mechanism.

Justification

This requirement ensures that the valve is tested in its fully constructed condition preventing the risk of a valve tested without its operating mechanism, which may lead to incorrect test results.

F.3.4 Torque Measurements and Functional Testing

F.3.4.1 General

F.3.4.1.1

For functional testing, valve seats shall be free of sealant.

Justification

This requirement ensures that the test is truly representative of the installed condition of the valve. This also aligns with API 598.

F.3.4.1.2

Lubricant required for assembly shall not exceed the viscosity range of SAE 10W motor oil.

Justification

This requirement promotes standardization of the viscosity range of the lubricant used which can affect leak testing.

F.3.4.2 Functional and Torque Testing

F.3.4.2.1

Functional testing of the valve shall be performed during the backseat, low-pressure and high-pressure closure tests required by API 598.

Justification

This requirement ensures that functional testing is completed alongside the pressure tests of API 598 rather than separately, which would be increase cost testing.

F.3.4.2.2

Manually operated valves (i.e., handwheel or gearbox) shall be tested with the final operator fitted on.

Justification

This requirement ensures that the test is truly representative of the installed and in-use condition of the valve.

F.3.4.2.3

The torque shall be measured directly on the input shaft of the gear or on the stem for direct-mounted handwheels.

Justification

This requirement ensures that torque values are taken from points where the maximum torque can be applied to give accurate results on the test report. If incorrect torques are recorded, the valve may be at risk of failure from over torquing.

F.3.4.2.4

Gearbox output torques shall be calculated using the gearbox mechanical advantage ratio.

Justification

This requirement promotes standardization of the correct calculation method for output torques.

F.3.4.2.5

Torque measurements shall be carried out at the break-to-open, break-to-close and end-to-close positions.

Justification

This requirement ensures that the measurements are recorded at the three points in the valve cycle where the highest torques are encountered. If this is not done at these points, incorrect torque values may be measured, leading to valve failure by overtorquing.

F.3.4.2.6

The rim pull force required to seat and unseat the valve shall be calculated.

Justification

This requirement promotes standardization of the maximum allowed rim pull force and aligns with 5.11.1.

F.3.4.2.7

Acceptance for functional and torque testing of the valve shall include the requirements in F.3.4.2.7 a) through F.3.4.2.7 c).

a) The valve shall demonstrate smooth operability.

b) The calculated rim pull shall not exceed the value listed in 5.11.1.

c) The measured torque results shall not exceed the manufacturer's documented valve torques.

Justification

This requirement ensures ease of use when installed and standardization of the rim pull force aligning with API 6D, and prevents the risk of overstressing.

F.3.4.3

Valves shall be drained of test fluid and dried after hydrotesting.

Justification

This requirement ensures that valves are dry and not susceptible to corrosion from remaining test fluids, which could cause leakages.

NOTE The QSL defines the extent of inspection and testing to be undertaken by the manufacturer. The QSL is selected on the basis of service risk, with the QSL number increasing with the extent of inspection and testing required.

Add new Annex G

Annex G
(informative)

Specified Customization—Supplementary Options to Specified Design and Manufacturing Requirements

G.1 General

G.1.1

The supplementary requirements in this annex apply only when specified in the purchase order or purchasing documentation.

Justification

This requirement ensures that each requirement in this annex is defined as optional and not normative.

G.1.2

When gland bolting is secured to the bonnet using eyebolts, one side of the eyebolt pin shall be welded to the yoke anchor lug.

Justification

This requirement ensures mechanical retention of eye bolt to the yoke anchor lug, preventing the potential risk and leakage if eye bolt retention is not maintained.

G.1.3

The eyebolt pin to yoke anchor lug weld shall cover 30 % of the circumference of the pin.

Justification

This requirement ensures mechanical retention of the eye bolt to the yoke anchor lug, preventing the potential risk and leakage if eye bolt retention is not maintained.

G.1.4

When requested, the manufacturer shall provide the following data:

— flow coefficient Cv or Kv;

— breakaway thrust or torque for new valves and the breakaway travel or angle;

— valve run thrust or torque;

— 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;

— valve top work details for interlock design.

Justification

This requirement provides additional information required in certain applications.

G.1.5

When specified, handwheels shall not be constructed of hollow tubular materials.

Justification

This requirement ensures that handwheels do not fail due to excessive corrosion when used in extremely corrosive environments.

G.1.6

When specified, valves shall be fire type-tested in accordance with ISO 10497 or API 6FA.

Justification

This requirement ensures that the valve is suitable for fire safe conditions when required, preventing the risk of unexpected leakage due to fire.

G.1.7

When specified, austenitic stainless steel gaskets (spiral wound or ring joint) shall be in the solution-annealed condition.

Justification

This requirement ensures the integrity of the gasket and its ability to seal in severely corrosive applications, preventing potential leakages.

G.1.8

When specified, weld procedure qualification for ferritic-austenitic (duplex and super duplex) stainless steel shall include microstructural examination including ferrite measurement, impact testing and corrosion testing in accordance with ISO 17781.

Justification

This requirement ensures further qualification of correct material properties for duplex and super duplex materials when the purchaser deems it required based on its proposed application. Below standard duplex and super duplex material properties may cause valve failure.

G.1.9

When specified, the nameplate shall contain metric and US customary units.

Justification

This requirement prevents the risk of a wrong conversion by the user from one unit system to the other.

G.1.10 Chainwheels

G.1.10.1

When specified, chainwheels shall be of direct mounted adjustable sprocket rim type with chain guides.

Justification

This requirement ensures that clamp-on type chainwheels are not used as they can detach and may cause injury to the operator.

G.1.10.2

When specified, chainwheels shall not be clamp-on type.

Justification

This requirement ensures "clamp on" type chainwheels are not used as they can detach and may cause injury to the operator.

G.1.10.3

When specified, chainwheels shall be securely attached and provided with safety cables.

Justification

This requirement ensures "clamp on" type chainwheels are not used as they can detach and may cause injury to the operator.

G.1.10.4

When specified, chainwheels for valves greater than or equal to DN 150 (NPS 6) without the gearbox shall incorporate a hammer-blow device.

Justification

This requirement ensures that clamp-on type chainwheels are not used as they can detach and may cause injury to the operator.

G.1.11

When specified, lifting points shall be in accordance with API 17D:2021, Annex K and ISO 13628-4:2010, Annex K.

Justification

This requirement ensures standardization of the calculation method for lifting points if the purchaser requires this option.

G.1.12

When specified, valves shall be marked in accordance with Table G.1.

Justification

This requirement ensures that marking preferences extending beyond API 600 are included when the purchaser deems it necessary.

G.1.13

When specified, a sample of austenitic stainless-steel gaskets (spiral wound or ring joint) shall pass an intergranular corrosion test in accordance with ASTM A262:2021, Practice E

Justification

This requirement ensures the integrity of the gasket and its ability to seal in severely corrosive applications, preventing potential leakages.

Table G.1—Valve Marking

Item Number	Marking	Location
1a	Manufacturer's name	On body and/or nameplate
1b	Trademark or mark (optional)	On body and/or nameplate
2a	Pressure class (except when row 2b applies)	On both body and nameplate
2b	Intermediate pressure rating (upon agreement)	Agreed upon rated class on body and nameplate
3	Pressure-temperature rating — Maximum operating pressure at maximum operating temperature — Maximum operating pressure at minimum operating temperature	On nameplate
4	Face-to-face/end-to-end dimensions, if not as per ASME B16.10	On nameplate
5a	Body/end connector/bonnet/cover material designation a c material grade	On both body/ end connector/bonnet/cover and nameplate
5b	Body/end connector/bonnet/cover melt identification (e.g., case or heat number)	On body/end connector/bonnet/cover only
6a	Body/bonnet material designation c material grade	On body/bonnet
6b	Body/bonnet melt identification (e.g., heat number)	On body/bonnet
7	Trim identification b: material grade symbols indicating material of stem and sealing faces of closure members if different from that of body	On nameplate
8	Nominal valve size	On both body and nameplate
9	Ring joint groove number	On valve flange OD
10	SMYS (units) of valve ends, where applicable	On body weld ends
11	QSL level: QSL1, QSL2, QSL2G, QSL3, QSL3G or QSL4	On nameplate
12	Unique serial number	On both body and nameplate
13	Date of manufacture (month and year)	On nameplate
14	API 600	On nameplate
15	ASME B16.34	On nameplate
16	Product specification license number (if applicable)	On nameplate
17	Schedule on weld end valves	On weld ends or nameplate
18	Valve data sheet identification code	On nameplate

NOTE 1 When the body is manufactured from more than one type of material, both body and end connector materials shall be identified.

NOTE 2 MSS SP-25 gives guidance on marking.

NOTE 3 Where the grade and class does not uniquely identify the material specification, the material specification, grade and class shall be marked (e.g. A516-70).

Justification

This table ensures that marking preferences extending beyond API 600 are included when purchaser deems it necessary.

G.1.14 Minimum Documentation and Retention

G.1.14.1

When specified, the following documents shall be retained by the manufacturer for a minimum of ten years from the start of the contract guarantee period:

a) design calculations;

b) cross section drawings with parts and materials list, with the minimum and maximum design temperatures shown on the valve drawings;

c) manufacturing, testing and inspection procedures;

d) welding procedures and qualification records;

e) nondestructive testing procedures and qualifications;

f) material qualification records in accordance with IOGP S-563;

g) manufacturing, testing and inspection equipment calibration records;

h) nonconformance records;

i) list of applicable and authorized concessions, waivers and/or material substitutions;

j) list of applicable manuals (e.g., assembly or maintenance manuals);

k) material test reports and inspection certificates, traceable by heat number to the foundry or mill, including for sour service materials a statement confirming compliance with ANSI/NACE MR0175/ISO 15156 or ANSI/NACE MR0103/ISO 17945;

l) weld maps of major repairs;

m) heat treatment records, including heat treatment charts;

n) relevant fabrication drawings and sketches to facilitate the understanding of welding, heat treatment and NDE records;

o) visual inspection records;

p) chloride content;

q) pressure test results.

Justification

This requirement ensures that the listed documents can be requested from the manufacturer for a set period of ten years. In the event that the purchaser no longer has access to the original documents sent at the time of purchase, this requirement ensures that the documents can still be accessed.

G.1.14.2

When specified, NDE reports, including sketches if necessary, that show the locations of examination traceable by heat or serial number shall be retained by the manufacturer for at least five years from the start of the contract guarantee period.

Justification

This requirement ensures that the listed documents can be requested from the manufacturer for a set period of five years. In the event that the purchaser no longer has access to the original documents sent at the time of purchase, this requirement ensures that the documents can still be accessed.

G.1.14.3

When specified, radiographs shall be retained by the manufacturer for a minimum of one year from the start of the contract guarantee period.

Justification
This requirement ensures that the listed documents can be requested from the manufacturer for a set period of one year. In the event that the purchaser no longer has access to the original documents sent at the time of purchase, this requirement ensures that the documents can still be accessed.

G.1.15

When specified, chloride content of test water in contact with austenitic and duplex stainless steel components of the valve shall not exceed 30 ppm.

Justification

This requirement ensures the integrity of stainless steel components in case of any left over water post hydrotesting, which leads to higher concentration of chloride which may cause potential damage. This aligns with API 6D.

G.1.16

When specified, stainless steel bellows shall be hydrostatically tested with demineralized water that has a chloride content lesser than or equal to 2 ppm.

Justification

This requirement ensures the integrity of bellows in case of any left-over water post hydrotesting, which leads to higher concentration of chloride and may cause damage.

G.1.17

When specified, the minimum duration for the tests specified in API 598 shall be 60 s after the test pressure has stabilized.

Justification

This requirement ensures increased reliability of leak testing when the purchaser deems it necessary.

G.1.18

When specified, carbon steel yokes shall not be used for service temperatures below -20 °C (-4 °F) or above 400 °C (752 °F).

Justification

This requirement prevents the risk of a failed yoke due to the use of regular CS which can still potentially see process temperatures for which is not suitable.

G.1.19

When specified, the material of the gearbox or actuator mounting bracket shall remain ductile at -40 °C (-40 °F).

Justification

This requirement prevents the failure of the gearbox or mounting bracket in extreme weather conditions.

G.1.20

When specified, gearboxes shall be designed with rolling element thrust bearings.

Justification

This requirement prevents the use of non-rolling bearings, which may cause failure of the gearbox.

G.1.21

When specified, gearboxes shall be filled with grease or heavy-duty gear oil to ensure that moving parts are submerged and sufficiently lubricated.

Justification

This requirement ensures long term lubrication, preventing gearbox failure due to the lack of lubrication.

G.1.22

Gearboxes shall be equipped with one or more easily accessible injection fittings and weatherproof vent connection, permitting easy packing in-situ and lubrication of rotating shafts penetrating the gearbox.

Justification

This requirement ensures long term lubrication application, preventing gearbox failure due to the lack of lubrication.

G.1.23

Valves with bore sizes greater than or equal to those specified in Table G.2 shall have gearboxes fitted.

Justification

This provides standardization of the changing point from handwheel to gearbox based on where generally the rim pull max force of 360N occurs.

Add new Table G.2

Table G.2—Minimum Bore Sizes at which a Gearbox is Required

Class	Valve Size at which a Gearbox is Required
150	≥ DN 300 (NPS 12)
300	≥ DN 250 (NPS 10)
600	≥ DN 150(NPS 6)
900	≥ DN 100 (NPS 4)
1500 and 2500	≥ DN 80 (NPS 3)

Justification

This table provides references on minimum bore sizes at which gearbox is required.

G.2 Pup Pieces

G.2.1

When specified, butt-welded end valves shall be provided with extension pup pieces in accordance with Table G.3.

Justification

This requirement promotes standardization of the lengths of pup pieces.

Table G.3—Pup Lengths

Valve Size	Pup Length
DN 50 to DN 200 (NPS 2 to NPS 8)	200 mm (8 in.)
DN 250 to DN 500 (NPS 10 to NPS 20)	Minimum 1*D* or maximum 500 mm (20 in.)
DN 550 (NPS 22) and above	800 mm (32 in.)
NOTE *D* refers to outside pipe diameter	

Justification

This table promotes standardization of pup lengths.

G.2.2

When a pup piece is specified, the pup piece material grade shall be greater than or equal to the material grade of the valve body or the associated piping/pipeline.

Justification

This requirement ensures that the material grade specified is suitable for the same service conditions for which the valve is designed. This removes the risk of the pup piece not being fit for purpose for the conditions in which it is installed, resulting in a safety incident.

G.2.3

When specified, an additional piece (e.g., test ring) in the same material as the extension pup pieces shall be provided.

Justification

This requirement ensures a level of confidence for site welding as the test piece used for the welding qualification gives a true representative of the extension pup pieces.

G.2.4

When extension pup pieces are specified, final assembly and leak testing of the valve shall be performed after welding and heat treatment.

Justification

This requirement mitigates the risk of damage to valves seals that could result in the failure of leak testing.

G.2.5

When extension pup pieces are specified, the ratio of the minimum yield strength of the extension pup piece material to the valve body material or extension pup piece to the pipe shall not exceed 1.5:1.

Justification

This requirement prevents abrupt changes in thicknesses during welding, which may lead to high stress intensification.

G.2.6

Where the specified minimum yield strength of the adjoining pipe material exceeds the specified minimum yield strength of the valve material by more than 1.5:1, the extension pup piece shall be of an intermediate strength so that the maximum yield strength ratio of 1.5:1 across the valve to extension pup piece weld and extension pup piece to pipe weld is satisfied (e.g., the extension pup piece between an A350 LF2 valve and an API 5L X60 pipeline may be of A694 F52/API 5L X52 material).

Justification

This requirement prevents abrupt changes in thicknesses during welding, which may lead to high stress intensification.

G.2.7

When extension pup pieces are specified, the extension pup piece material shall be in accordance with the applicable IOGP S-563 MDS.

Justification

This requirement promotes standardization of material requirements for extension pup pieces in accordance with IOGP S-563.

G.2.8

The end preparation and alignment of the extension pup pieces shall be in accordance with ASME B31.3.

Justification

This requirement ensures the prevention of mismatched end preparations resulting in the inability to install the valve correctly.

G.2.9

Prior to the installation and leak testing of the valve internals, the extension pup pieces shall be welded and, if applicable, post-weld heat treated.

Justification

This requirement ensures the prevention of damage to valve internals.

G.2.10

Heat-treatment delivery conditions shall be marked on the extension pup piece using a low-stress die stamp.

Justification

This requirement mitigates the risk of the incorrect installation of the valve due to the lack of information on the heat treatment condition of the pup piece.

G.3 Stem Protector

G.3.1

When specified, valves shall be equipped with a fully enclosed weatherproof stem protector.

Justification

This requirement ensures that the valve operates effectively when installed in locations with severe weather.

G.3.2

With the valve in the fully open position, the stem protector design shall provide 25 mm (1 in.) minimum clearance between the top of the stem and the inside top of the stem protector.

Justification

This requirement ensures the prevention of damage or dislocation of the stem protector.

G.3.3

If the stem protector obscures the position of the stem, the design shall be provided with a position indicator.

Justification

This requirement ensures the prevention of the valves position not being known, which may cause a safety incident if operated under the incorrect process isolation conditions.

G.3.4

When specified, the stem protector shall have a stem nut grease injector.

Justification

This requirement ensures the lubrication and protection via grease application to the stem, preventing the risk of the valve becoming inoperable due to jamming.

G.4 Lagging Extensions

G.4.1

When specified, valves shall include a lagging bonnet extension as specified in Table G.4.

Justification

This requirement ensures that insulation can be accommodated when specified.

G.4.2

Lagging extension lengths shall be measured from the top of the end flange rim or body diameter, whichever is the larger, to the upper bonnet flange.

Justification

This requirement promotes standardization of how lagging extension lengths are to be measured.

Table G.4—Lagging Extension Lengths Clearance Required for Insulation

DN (NPS) Minimum	DN (NPS) Maximum	Lagging Extension Length mm (in.)
15 (½)	50 (2)	80 (3.0)
80 (3)	400 (16)	110 (4.5)
450 (18)	1200 (48)	120 (5.0)

Justification

This table promotes standardization of lagging extension lengths.

G.4.3

The lagging extended bonnet shall be provided with an insulation collar plate.

Justification

This requirement ensures that there is a physical barrier on the bonnet for insulation, improving the ability to install insulation correctly.

G.4.4

When an adjustable collar plate is specified, the bolting shall be on the upper side.

Justification

This requirement ensures easy adjustment of the collar plate to allow for ease of insulation installation.

Add new Annex H

Annex H
(normative)

Valves Outside of API 600 Size Limit

H.1

This annex applies to valves whose sizes are larger than those listed in Table 1 of API 600 and that meet the requirements of API 600, ASME B16.34 and this specification.

Justification

This details the scope of the annex.

H.2

Design and calculations shall be in accordance with ASME B31.3 requirements for unlisted components.

Justification

This requirement promotes standardization of calculations and design for valves outside API 600 scope.

H.3

Wall thickness shall not be less than the thickness required for ASME B16.34 standard class plus any corrosion allowance specified.

Justification

This requirement promotes standardization of wall thicknesses for valves outside API 600 to the recognized industry standard of ASME B16.34. This prevents the risk of valves having thinner wall thickness than required for the pressure class, resulting in a potential safety risk.

H.4

When a corrosion allowance is specified, a CRA weld overlay shall be applied to wetted surfaces in contact with valve seats, gaskets and packing materials.

Justification

This requirement ensures longevity and continued operability of the valve, preventing the risk of reduced lifetime of the valve.

H.5

The CRA weld overlay shall extend beyond the contact area by a distance not less than the specified corrosion allowance on both sides.

Justification

This requirement ensures longevity and continued operability of the valve, preventing the risk of reduced life time of the valve.

H.6

For sizes above DN 1050 (NPS 42), minimum wear travel and maximum stem projection shall be within the limits defined for DN 1050 (NPS 42) in Table 4.

Justification

This requirement promotes standardization of minimum wear travel and maximum stem projection for valve sizes beyond API 600.

H.7

Valves shall be subjected to design validation testing in accordance with API 6D.

Justification

This requirement prevents the risk that API 600 design validation is used, which may lead to valve failure as the exempt experience for API 600 does not apply to valves in these sizes.

Add new Annex I

Annex I
(informative)

Quality Specification Level (QSL) Decision Tree Guidance

I.1

Figure I.1 provide guidance on selecting the appropriate QSL.

Justification

Figure I.1 helps the purchaser with choosing the right QSL.

I.2

QSL designation shall be defined by the purchaser.

Justification

This requirement ensures that purchaser's independent parameters for determining QSLs are defined.

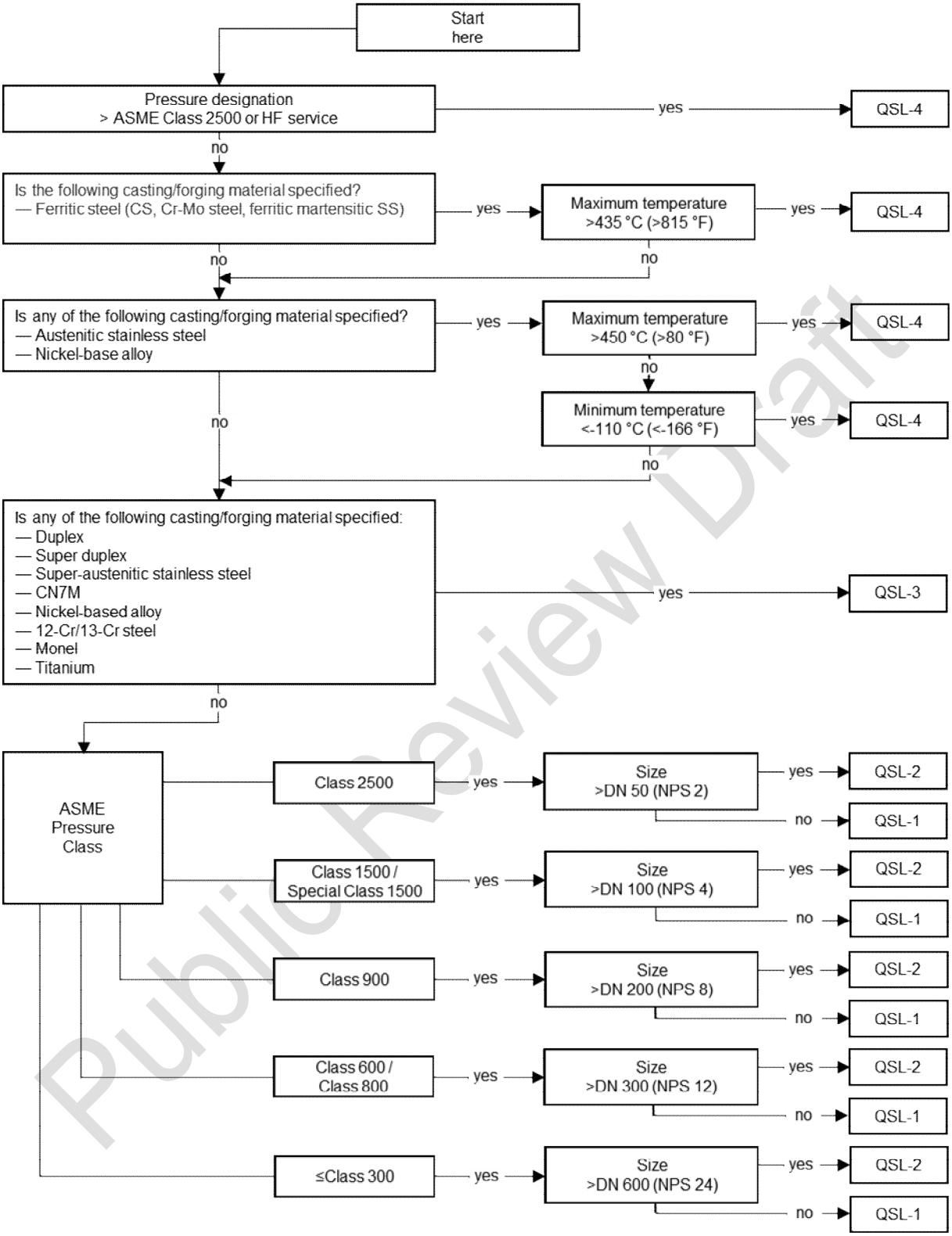

Figure I.1—Guidance Decision Tree for Quality Specification Level (QSL) Selection

Justification

This requirement ensures that if the purchaser does not have their own internal structure for selecting the QSL, they can use a supplied established framework. This prevents the risk of an incorrect definition of QSLs by the purchaser.

Bibliography

Add to start of Bibliography

The following documents are informatively cited in the text of this document, API 600, the PDS (IOGP S-611D) or the IRS (IOGP S-611L).

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