International Association of Oil & Gas Producers

SPECIFICATION
IOGP S-730J

October 2024
Version 1.1

Supplementary Specification to API Standard 526 for Flanged Steel Pressure-relief Valves

NOTE This version (S-730J) of the specification document provides the justification statements for each technical requirement, but is otherwise identical in content to S-730.

JIP33
JOINT INDUSTRY PROGRAMME

Revision history

VERSION	DATE	PURPOSE
1.1	October 2024	Issued for Public Review
1.0	March 2021	First Edition

Acknowledgements

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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-730 specification documents is to define a minimum common set of requirements for the procurement of flanged steel pressure-relief valves in accordance with API Standard 526, Eighth Edition, August 2023, Flanged Steel Pressure-relief Valves for application in the petroleum and natural gas industries.

The IOGP S-730 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-730: Supplementary Specification to API Standard 526 for Flanged Steel Pressure-relief Valves

This specification defines technical requirements for the supply of the equipment and is written as an overlay to API 526, following the API 526 clause structure. Clauses from API 526 not amended by this specification apply as written. Modifications to API 526 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-730D: Procurement Data Sheet for Flanged Steel Pressure-relief 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-730L: Information Requirements for Flanged Steel Pressure-relief 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-730Q: Quality Requirements for Flanged Steel Pressure-relief 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 526 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 526.

1 Scope

Add to section

Ethylene oxide, chlorine, propylene oxide, hydrofluoric acid and oxygen services are excluded from the scope of this specification.

Justification

This specification is intended to cover the most commonly purchased types of pressure-relief valves. Valves for ethylene oxide, chlorine, propylene oxide, hydrofluoric acid and oxygen services do not fall within this scope and may require additional requirements to be specified. As such, they are excluded from this specification.

2 Normative References

Add to first paragraph

The following documents are referred to in this specification, the PDS (IOGP S-730D) or the IRS (IOGP S-730L) in such a way that some or all of their content constitutes requirements of these specification documents.

Add to section

API Standard 521, *Pressure-relieving and Depressuring Systems*

ASME *BPVC*, Section V:2023, *Nondestructive Examination*

ASME *BPVC*, Section VIII, Division 1:2023, *Rules for Construction of Pressure Vessels*

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

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

ASTM A609/A609M:2012, *Standard Practice for Castings, Carbon, Low-Alloy, and Martensitic Stainless Steel, Ultrasonic Examination Thereof*

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

IOGP S-715, *Supplementary Specification to NORSOK M-501 Coating and Painting for Offshore, Marine, Coastal and Subsea Environments*

IOGP S-716, *Supplementary Specification for Small Bore Tubing and Fittings*

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

Replace Section 3 title with

3 Terms, Definitions, and Acronyms

Add new section

3.1 Terms and Definitions

For the purposes of this document, the terms and definitions given in this section and API 520, Part 1 apply.

3.1.1
non-wetted part
Part of the pressure-relief valve that does not make contact with the process fluid.

3.1.2
pressure-containing part
Part exposed to and containing pressure. As a minimum, this includes the body, bonnet, cap and full nozzle.

3.1.3
pressure-controlling part
Part intended to prevent or permit the flow of fluids. This includes the semi-nozzle, disc/piston, spindle and spring.

3.1.4
process-wetted part
Part that neither contains nor controls fluid pressure but performs its function immersed in the process fluid.

3.1.5
quality specification level
QSL
Level that defines the extent of control activities, typically including verification, inspection and testing, to be undertaken by the supplier to demonstrate conformance with requirements based on determination of service risk (e.g. on the basis of pressure class, material, valve size and service) or obligations.

Add new section

3.2 Acronyms

CAS conformity assessment system

CDTP cold differential test pressure

DSS duplex stainless steel

EDS element data sheet

LTCS low temperature carbon steel (e.g. ASME SA352 grade LCC)

MDS material data sheet

MT magnetic particle testing

NDE non-destructive examination

NPS nominal pipe size

NTCS normal temperature carbon steel (e.g. ASME SA216 grade WCB)

PDS procurement data sheet

PT penetrant testing

PWHT post-weld heat treatment

QSL quality specification level

RT radiographic testing

UT ultrasonic testing

VT visual testing

7 Design

7.1 General

Add to sentence

and ASME *BPVC*, Section XIII

Justification

ASME BPVC, Section VIII and Section XIII are not yet fully synergized. Therefore, it is necessary to ensure compliance with the design and manufacturing requirements of both these sections.

Add new section

7.1.6

Minimum wall thickness shall be in accordance with ASME B16.34 or ASME *BPVC*, Section VIII.

Justification

A minimum wall thickness is needed to ensure integrity. Although ASME B16.34 is a normative requirement, it is included in the requirement for completeness. ASME BPVC, Section VIII is included as some suppliers follow UG-27. Also, the ASME BPVC, Section VIII ballot refers to a nonmandatory appendix that includes ASME BPVC, B16.34 and UG-27 for calculating wall thickness and bolted joints.

Add new section

7.1.7

The reseating pressure shall be at least 3 % greater than the specified maximum operating pressure.

Justification

This addition facilitates tighter environmental control on the relief and provides a check to ensure that the blowdown does not fall below the maximum operating pressure for the selected model.

Add new section

7.1.8

Pressure-relief valve inlet and outlet flanges shall be an integral part of the body i.e. from a single forging or casting.

Justification

This requirement prevents the supply of substandard designs which can be vulnerable to corrosion and leakage issues.

7.5 Lifting Levers

Replace first sentence of first paragraph with

Lifting levers shall be supplied only when specified.

Justification

Lifting lever design is unique and should be specified only when permitted by local regulations.

Add new NOTE

NOTE This requirement invokes ASME code case 2203-2 for compliance with ASME *BPVC*.

7.6 Special Construction Features

Add to section

Test gags (test rods) shall not be provided.

Justification

This requirement is essential for safety and ensures lifting when needed.

7.8 Threaded Auxiliary Connections

Add new section

7.8.4

Tubing and fittings shall be in accordance with IOGP S-716.

Justification

Requirements for tubing and fittings are provided in IOGP S-716.

7.9 Lifting

7.9.1

Replace "from 22.7 kg (50 lb) to 250 kg (550 lb)" with

greater than 22.7 kg (50 lb) when the valve is not fitted with lifting lugs

Justification

This replacement ensures safe lifting and handling of the valve.

8 Material

8.1 General

Add to section

Galling between sliding elements and threaded components shall be prevented.

Justification

This requirement ensures that the functionality of the valve is maintained by appropriate design, material selection and surface treatment of parts where metal-to-metal contact can result in galling.

Add to section

Material specification and grade shall be defined for all valve parts.

Justification

This requirement ensures that the materials used by the manufacturer are specified and allows for a comprehensive review of the bill of materials on the general arrangement drawing to ensure compliance with the order.

Add to section

Bellows material shall be UNS N06625 or as specified.

Justification

Alloy 625 is the standard grade for bellow for the majority of applications in oil and gas. This requirement provides the option to specify an alternative material for applications where a different material is required for compatibility with the process fluid.

Add to section

Non-metallic seals, including elastomeric O-rings, shall be fully operable at the valve design rated pressure for the specified temperature range and service conditions.

Justification

This requirement ensures that non-metallic seals are able to seal for the full pressure/temperature range of the valve.

Add to section

Elastomer O-ring material grade shall be specified.

Justification

Elastomeric material properties can vary significantly between different grades. It is important to clarify which grade is being specified to ensure that the physical and mechanical properties are compatible with the service and operational conditions of the valve.

Add to section

Resilient seat materials shall be as specified.

Justification

The selection of soft seal materials from the list in the PDS promotes standardization.

Add to section

Metallic gaskets shall be 316 stainless steel or a higher corrosion-resistant material matching or exceeding the corrosion resistance of the adjoining valve parts.

Justification

This requirement defines the minimum grades for metallic gaskets to ensure the integrity of the valve and to minimize the risk of leakage from premature gasket failure.

Add to section

Coating shall comply with IOGP S-715 or as specified.

Justification

Coating selection, qualification, application and testing in accordance with IOGP S-715 or an alternative standard specified by the purchaser ensures that the material is protected from corrosion in the specified environment and service.

Add to section

Stem (spindle) shall be manufactured from wrought material product forms.

Justification

This requirement prevents premature failure and ensures the functionality of the valve by using the appropriate wrought material product form (i.e. no castings) for the manufacture of the stem.

8.2 Spring-loaded Pressure-relief Valves

Replace third sentence of first paragraph with

The body and bonnet materials shall be equivalent to the following types and grades or comply with Annex I.

Justification

This requirement ensures standardization of materials for valves with high criticality and in specific services where the application demands materials "better than" the material type and grades listed in API 526. It also resolves the issue in the original requirement where the term "better than" is undefined and a potential cause for non-compliance and dispute.

In third paragraph, replace "as indicated on the purchaser's specification sheet" with

Annex I

Justification

This requirement ensures standardization of materials for valves with high criticality and in specific services when the application of the manufacturer's standard material is not sufficient to ensure integrity and preserve the functionality of the valve.

Table 2—Spring Materials

Replace Table 2 with

Body/Bonnet Material	Service	Spring Material for Pressure-relief Valve Type and Spring Service			
		Spring-loaded Conventional Process Wetted	Spring-loaded Balanced Bellows Non-wetted [e]	Pilot-operated Snap Action Process Wetted	Pilot-operated Modulating Non-wetted [e]
Carbon steel (NTCS)	Sweet	Carbon steel [h], chromium alloy steel [i]	Carbon steel [h], chromium alloy steel [i]	UNS S31600 [g], UNS S17700 [g]	UNS S31600 [g], UNS S17700 [g]
	Sour	[a, f]	Carbon steel [h], chromium alloy steel [i]	[a, f]	UNS S31600 [g], UNS S17700 [g]
LTCS	Sweet	Chromium alloy steel [i]	Chromium alloy steel [i]	UNS S31600 [g], UNS S17700 [g]	UNS S31600 [g], UNS S17700 [g]
	Sour	[a, f]	Chromium alloy steel [i]	[a, f]	UNS S31600 [g], UNS S17700 [g]
Chromium-molybdenum alloy steel	Sweet	Chromium alloy steel [i], UNS N07750 [f]	UNS S31600 [g], UNS S17700 [c, g]	N/A	N/A
	Sour	[a, f]	UNS S31600 [g], UNS S17700 [c, g]	N/A	N/A
Austenitic stainless steel	Sweet	UNS S31600 [g], UNS N07750 [f]	UNS S31600 [g], UNS S17700 [c, g]	UNS S31600 [g], UNS N07750 [f]	UNS S31600 [g], UNS S17700 [c, g]
	Sour	[a, f]	UNS S31600 [g], UNS S17700 [c, g]	[a, f]	UNS S31600 [g], UNS S17700 [c, g]
High alloy austenitic stainless steel (e.g. type 6Mo)	Sweet	UNS N07750 [b, f]	UNS S31600 [g], UNS S17700 [g]	UNS N07750 [b, f]	UNS S31600 [g], UNS S17700 [g]
	Sour	[a, b, f]	UNS S31600 [g], UNS S17700 [g]	[a, b, f]	UNS S31600 [g], UNS S17700 [g]
22Cr DSS	Sweet	UNS N07750 [f]	UNS S31600 [g], UNS S17700 [g]	UNS N07750 [f]	UNS S31600 [g], UNS S17700 [g]
	Sour	[a, f]	UNS S31600 [g], UNS S17700 [g]	[a, f]	UNS S31600 [g], UNS S17700 [g]
25 Cr DSS	Sweet	UNS N07750 [b, f]	UNS S31600 [g], UNS S17700 [g]	UNS N07750 [b, f]	UNS S31600 [g], UNS S17700 [g]
	Sour	[a, b, f]	UNS S31600 [g], UNS S17700 [g]	[a, b, f]	UNS S31600 [g], UNS S17700 [g]
Nickel-copper alloy (UNS N24135, alloy 400)	Sweet and sour	UNS N04400, UNS N05500, UNS N06625	UNS S31600 [g], UNS S17700 [g]	UNS N04400, UNS N05500, UNS N06625	UNS S31600 [g], UNS S17700 [g]
Alloy 20 (UNS N08007)	Sweet and sour	UNS N08020	UNS S31600 [g], UNS S17700 [g]	UNS N08020	UNS S31600 [g], UNS S17700 [g]
Titanium	Sweet and sour	UNS N06625 [d], UNS N10276	UNS S31600 [g], UNS S17700 [g]	UNS N06625 [d], UNS N10276	UNS S31600 [g], UNS S17700 [g]

Table 2 *(continued)*

Body/Bonnet Material	Service	Spring Material for Pressure-relief Valve Type and Spring Service			
		Spring-loaded Conventional Process Wetted	Spring-loaded Balanced Bellows Non-wetted [e]	Pilot-operated Snap Action Process Wetted	Pilot-operated Modulating Non-wetted [e]

NOTE Typical specifications for carbon steel and chromium alloy steel spring material include ASTM A231/A231M, ASTM A232/A232M, ASTM A304, ASTM A689 and ASTM A401/A401M.

[a] Spring material in sour service shall be UNS N07750 or as specified. Acceptable materials include UNS N07750, UNS N07718, UNS R30035 or UNS R30003, compliant with NACE MR0175 / ISO 15156-3 or NACE MR0103 / ISO 17945.

[b] Spring material in seawater and produced water service shall be UNS N06625 or UNS N10276.

[c] For temperatures exceeding 427 °C (800 °F), tungsten alloyed steel spring material or UNS N07750 shall be used.

[d] UNS N06625 shall not be used in seawater service at operating temperatures exceeding 30 °C (86 °F).

[e] The spring material listed for process wetted spring service may be used for non-wetted spring, but not vice-versa.

[f] The operating temperature range for UNS N07750 is -60 °C to 538 °C (-75 °F to 1000 °F).

[g] The operating temperature range for UNS S31600 and UNS S17700 is -268 °C to 427 °C (-450 °F to 800 °F).

[h] The operating temperature range for carbon steel is -29 °C to 427 °C (-20 °F to 800 °F).

[i] The operating temperature range for chromium alloy steel is -46 °C to 427 °C (-50 °F to 800 °F).

Justification

This table lists the basic API 526 body/bonnet materials included in 8.2, 8.3, Table 3 to Table 58, and the additional materials listed in Annex I. This table defines the material selection for the spring to minimize the risk of failure in specific environments.

8.3 Pilot-operated Pressure-relief Valves

Replace second sentence of first paragraph with

The body material shall be equivalent to the following grades or comply with Annex I:

Justification

This requirement ensures standardization of materials for valves with high criticality and in specific services when the application demands materials "better than" the material type and grades listed in API 526. It also resolves the issue in the original requirement where the term "better than" is undefined and is a potential cause for non-compliance and dispute.

Replace second paragraph with

Except for the spring material, materials for internals and the pilot valve of pilot-operated pressure-relief valves shall be the manufacturer's standards (for the temperature and service) or comply with Annex I.

Justification

This replacement ensures standardization of materials for valves with high criticality and for specific services where the application of the manufacturer's standard material is not sufficient to ensure the integrity and preservation of the functionality of the valve.

Add to section

Materials for the pilot spring and main valve dome spring shall be selected from Table 2 based on the selected body material.

Justification

This requirement defines the material selection for the spring to minimize the risk of failure in specific environments with reference to Table 2. Table 2 includes both API 526 standard materials and additional materials.

Add new section

8.5 Welding

8.5.1

Pressure-containing parts that leak during pressure testing shall not be weld repaired.

Justification

A leak during pressure testing is deemed a fundamental flaw and therefore repair is not acceptable. This requirement supports ASME BPVC, Section XIII:2023, 3.6.1 h) which does not permit parts subjected to pressure testing to exhibit signs of leakage.

8.5.2

Weld repairs shall be inspected to the same quality standards as the original inspection requirements.

Justification

This requirement ensures that the weld repair meets the same quality requirements as the original material and that integrity is maintained after the repair.

8.5.3

Additional weld repairs shall not be permitted on areas that have undergone major weld repair as defined in IOGP S-563.

Justification

This requirement ensures that the integrity of the casting is maintained and prevents degradation of the material resulting from multiple repair and post-weld heat treatment (PWHT) cycles.

8.5.4

When specified, welds, including repair welds, shall be post-weld heat treated.

Justification

This requirement prevents failure of the material in services that require PWHT, such as for carbon steel in caustic service.

9 Inspection and Shop Tests

Replace section 9.1 title with

9.1 General Requirements for Inspection and Testing

Add to section

Valve inspections shall comply with Annex J for the specified quality specification level (QSL).

Justification

This requirement ensures that valve inspections are conducted in accordance with Annex J for the specified QSL.

Add to section

Water used as a test fluid shall contain a corrosion inhibitor.

Justification

The addition of a corrosion inhibitor to the test medium minimizes corrosion both during testing and following testing if any residual water remains in the valve.

Add to section

The chloride content of test water in contact with austenitic and duplex stainless steel wetted components of valves shall not exceed 50 mg/kg (50 parts per million by mass).

Justification

Specifying a limit for chloride content reduces the likelihood of corrosion (e.g. stress corrosion cracking).

Add to section

The chloride content of test water shall be tested at least every 12 months.

Justification

Water added to replenish the test fluid reservoir could increase its chloride content. Annual testing ensures that the chloride content of the test water is maintained over time, therefore minimizing the corrosion associated with elevated chloride levels.

Add to section

The pH of the test water shall be between 6 and 8.5.

Justification

This requirement prevents corrosion of materials and material degradation.

Add to section

On completion of factory acceptance testing, valves shall be drained of test fluids.

Justification

This requirement minimizes the corrosion of materials in contact with the test water.

9.3 Seat Leakage Test

Add to section

When the specified maximum operating pressure is greater than 90 % of the set pressure, seat leakage testing of spring-loaded valves shall be performed at a pressure equal to 95 % of the set pressure.

Justification

Performing the seat leakage test at 95 % of the set pressure, rather than 90 % as recommended by API 527, ensures tighter control of seat leakage.

Add new section

9.4 Pressure Testing

9.4.1

Pressure-containing parts shall be pressure tested in accordance with ASME *BPVC*, Section XIII.

Justification

ASME BPVC, Section XIII is the primary standard covering overpressure protection rules. This requirement ensures that the full nozzle is tested as a pressure-containing part since it is not specifically defined as a pressure-containing part in ASME BPVC, Section XIII.

9.4.2

Pneumatic testing of the primary pressure zone shall not be permitted.

Justification

ASME BPVC, Section XIII advises that pneumatic testing can be hazardous and requires special precautions to be in place. The majority of suppliers do not pneumatically test the primary pressure zone.

9.4.3

The hydrostatic test duration shall be in accordance with ASME B16.34.

Justification

ASME BPVC does not stipulate the duration of the testing and hence the reference to ASME B16.34 provides a minimum duration which guarantees adequate time for any leakage to be noticed.
The largest size covered by API 526 is 8 T 10. The pressure test duration specified in ASME B16.34 is more conservative than ISO EN 4126-1 for sizes up to 8 T 10.

9.4.4

A backpressure test shall be performed at the specified total backpressure or 200 kPa (30 psig), whichever is greater.

Justification

Performing the backpressure test at the specified total backpressure or 200 kPA (30 psig) ensures that the test is representative of the backpressures that will be seen in service.

9.4.5

The holding time for backpressure testing shall be at least 3 minutes.

Justification

ASME BPVC, Section XIII does not specify the holding time for this test. The specified holding time is based on operator experience.

10 Identification and Preparation for Shipment

10.1 Identification

In first sentence, replace "permanently attached" with

riveted or screwed

Justification

The information on the nameplate is critical for the entire lifecycle of the valve. Riveting or screwing of the nameplate to the valve body reduces the likelihood of the fixing deteriorating over time and the nameplate detaching.

Add to section

The data on the nameplate shall be in the specified units.

Justification

The use of the selected units on the nameplate prevents the need for the operator to perform unnecessary conversions and reduces the likelihood of errors resulting from the use of incorrect units.

10.2 Preparation for Shipment

Add new list section e)

e) Flanged pressure-relief valves shall be secured in the upright position for storage and transportation.

Justification

Storage and transportation of flanged pressure-relief valves in the upright position reduces the likelihood of damage to the disc and nozzle.

Add new list section f)

f) Unpainted surfaces shall be protected from atmospheric corrosion during shipping and storage.

Justification

Protecting unpainted surfaces from atmospheric corrosion during transportation and storage is essential to ensure integrity and performance.

Add new Annex I

Annex I
(normative)

Material Selection Tables

I.1

When Annex I is specified, material specifications and grades for valve parts shall comply with Table I.1 for spring-loaded valves and Table I.2 for pilot-operated valves.

Justification

This annex provides standardization of materials for selected valve body material types as an alternative to standard API 526 materials.

I.2

Materials for parts not covered in Table I.1 and Table I.2 shall be compatible with the specified body material.

Justification

This requirement defines the material selection for parts not listed in Table I.1 and Table I.2.

I.3

When a material in the material tables has a corresponding MDS in IOGP S-563, the requirement of the MDS shall apply to pressure-containing parts and bolting.

Justification

This requirement ensures standardization of material requirements for high criticality valves when this annex is applied and more stringent requirements need to be applied to material standard specifications.

Add new NOTE

NOTE IOGP S-563 MDSs supplement ASTM material specifications. When ASME *BPVC,* Section II states that the ASME material specification is identical to an ASTM specification, the MDS supplementary requirements to the ASTM specification also apply to the ASME material specification.

Justification

This note clarifies how to apply the supplementary requirement in IOGP S-563 MDS, which are based on ASTM material standard specifications, to ASME materials specifications.

I.4

When a weld overlay material (e.g. hardfacing overlay on disc and nozzle) has a corresponding element data sheet (EDS) in IOGP S-563, the requirements of the EDS shall apply.

Justification

This requirement ensures standardization of material requirements for hardfacing, when this is applied to specific parts like disc and nozzle.

Add new Table I.1

Table I.1—Spring-loaded Valves, Acceptable Material Specifications, and Grades for Valve Parts

Body Material Type		Temperature Range	Service	Body, Bonnet, and Cap	Nozzle [a]	Disc [a]	Other Process-Wetted Parts [b]	Body/Bonnet Bolting and Body/Cap Bolting
NTCS		-29 °C (-20 °F) to 427 °C (800 °F)	Sweet	SA-105, SA-216 WCB, SA-216 WCC, SA-350 LF2 Class 1, SA-352 LCC [c]	SA-182 F316/F316L [e], SA-351 CF3M or CF8M, SA-479 316/316L [e]	SA-182 F316/F316L [e], SA-351 CF3M or CF8M, SA-479 316/316L [e]	SA-105 [d], SA-182 F316/F316L [e], SA-351 CF3M or CF8M, SA-479 316/316L [e]	SA-193 B7, SA-320 L7, SA-194 2H, SA-194 7
		-29 °C (-20 °F) to 230 °C (450 °F)	Sour	SA-105, SA-216 WCB, SA-216WCC, SA 350-LF2 Class 1, SA-352 LCC	SA182 F316/F316L [e], SA351 CF3M or CF8M, SA479 316/316L [e]	SA-182 F316/F316L [e], SA-351 CF3M or CF8M, SA-479 316/316L [e]	SA-105 [d], SA-182 F316/F316L [e], SA-351 CF3M or CF8M, SA-479 316/316L [e]	SA-193 B7M, SA-320 L7M, SA-194 2HM, SA-194 7M
LTCS		-46 °C (-50 °F) to 427 °C (800 °F)	Sweet	SA-350 LF2 Class 1, SA-352 LCC [c]	SA-182 F316/F316L [e], SA-351 CF3M [f] or CF8M [f], SA-479 316/316L [e]	SA-182 F316/F316L [e], SA-351 CF3M [f] or CF8M [f], SA-479 316/316L [e]	SA-182 F316/F316L [e], SA-351 CF3M [f] or CF8M [f], SA-479 316/316L [e]	SA-320 L7, SA-194 7
		-46 °C (-50 °F) to 230 °C (450 °F)	Sour	SA 350-LF2 Class 1, SA-352 LCC	SA182 F316/F316L [e], SA351 CF3M [f] or CF8M [f], SA-479 316/316L [e]	SA-182 F316/F316L [e], SA-351 CF3M [f] or CF8M [f], SA-479 316/316L [e]	SA-182 F316/F316L [e], SA-351 CF3M [f] or CF8M [f], SA-479 316/316L [e]	SA-320 L7M, SA-194 7M
Chromium-molybdenum alloy steel	P11	-29 °C (-50 °F) to 538 °C (1000 °F)	Sweet	SA-182 F11 [k], SA-217 WC6 [k]	SA-182 F316/F316L [e], SA-351 CF3M [j] or CF8M, SA-479 316/316L [e]	SA-182 F316/F316L [e], SA-351 CF3M [j] or CF8M, SA-479 316/316L [e]	SA-182 F11 [k], SA-182 F316/F316L [e], SA-351 CF3M [j] or CF8M, SA-479 316/316L [e]	SA-193 B16, SA-194 7
		-29 °C (-50 °F) to 538 °C (1000 °F)	Sour [m]	SA-182 F11 [k], SA-217 WC6 [k]	SA-182 F316/F316L [e], SA-351 CF3M [j] or CF8M, SA-479 316/316L [e]	SA-182 F316/F316L [e], SA-351 CF3M [j] or CF8M, SA-479 316/316L [e]	SA-182 F11 [k], SA-182 F316/F316L [e], SA-351 CF3M [j] or CF8M, SA-479 316/316L [e]	SA-193 B7M, SA-194 7M, SA-194 2HM

Table I.1 *(continued)*

Body Material Type		Temperature Range	Service	Body, Bonnet, and Cap	Nozzle [a]	Disc [a]	Other Process-Wetted Parts [b]	Body/Bonnet Bolting and Body/Cap Bolting
Chromium-molybdenum alloy steel *(continued)*	P22	-29 °C (-50 °F) to 538 °C (1000 °F)	Sweet	SA-182 F22 [k], SA-217 WC9 [k]	SA-182 F316/F316L [e], SA-351 CF3M [j] or CF8M, SA-479 316/316L [e]	SA-182 F316/F316L [e], SA-351 CF3M [j] or CF8M, SA-479 316/316L [e]	SA-182 F22 [k], SA-182 F316/F316L [e], SA-351 CF3M [j] or CF8M, SA-479 316/316L [e]	SA-193 B16, SA-194 7
		-29 °C (-50 °F) to 538 °C (1000 °F)	Sour [m]	SA-182 F22 [k], SA-217 WC9 [k]	SA-182 F316/F316L [e], SA-351 CF3M [j] or CF8M, SA-479 316/316L [e]	SA-182 F316/F316L [e], SA-351 CF3M [j] or CF8M, SA-479 316/316L [e]	SA-182 F22 [k], SA-182 F316/F316L [e], SA-351 CF3M [j] or CF8M, SA-479 316/316L [e]	SA-193 B7M, SA-194 7M, SA-194 2HM
	P9	-29 °C (-50 °F) to 538 °C (1000 °F)	Sweet	SA-182 F9 [k], SA-217 C12 [k]	SA-182 F316/F316L [e], SA-351 CF3M [j] or CF8M, SA-479 316/316L [e]	SA-182 F316/F316L [e], SA-351 CF3M [j] or CF8M, SA-479 316/316L [e]	SA-182 F9 [k], SA-182 F316/F316L [e], SA-351 CF3M [j] or CF8M, SA-479 316/316L [e]	SA-193 B16, SA-194 7
		-29 °C (-50 °F) to 538 °C (1000 °F)	Sour [m]	SA-182 F9 [k], SA-217 C12 [k]	SA-182 F316/F316L [e], SA-351 CF3M [j] or CF8M, SA-479 316/316L [e]	SA-182 F316/F316L [e], SA-351 CF3M [j] or CF8M, SA-479 316/316L [e]	SA-182 F9 [k], SA-182 F316/F316L [e], SA-351 CF3M [j] or CF8M, SA-479 316/316L [e]	SA-193 B7M, SA-194 7M, SA-194 2HM
Austenitic stainless steel	Type 316	-196 °C (-320 °F) to 427 °C (800 °F)	Sweet	SA-182 F316/F316L [e], SA-351 CF3M [f] or CF8M [f], SA-479 316/316L [e, g]	SA-182 F316/F316L [e], SA-351 CF3M [f] or CF8M [f], SA-479 316/316L [e]	SA-182 F316/F316L [e], SA-351 CF3M [f] or CF8M [f], SA-479 316/316L [e]	SA-182 F316/F316L [e], SA-351 CF3M [f] or CF8M [f], SA-479 316/316L [e]	SA-193 B8M [h], SA-194 8M, SA-194 8MA, SA-320 B8M [h], SA-320 B8MA [h], SB-637 UNS N07718, SB-446 UNS N06625 Grade 1
		-196 °C (-320 °F) to 427 °C (800 °F)	Sour	SA-182 F316/F316L [e], SA-351 CF3M [f] or CF8M [f], SA-479 316/316L [e, g]	SA-182 F316/F316L [e], SA-351 CF3M [f] or CF8M [f], SA-479 316/316L [e]	SA-182 F316/F316L [e], SA-351 CF3M [f] or CF8M [f], SA-479 316/316L [e]	SA-182 F316/F316L [e], SA-351 CF3M [f] or CF8M [f], SA-479 316/316L [e]	SA-194 8MA, SA-320 B8MA [h], SB-637 UNS N07718, SB-446 UNS N06625 Grade 1

Table I.1 *(continued)*

Body Material Type		Temperature Range	Service	Body, Bonnet, and Cap	Nozzle [a]	Disc [a]	Other Process-Wetted Parts [b]	Body/Bonnet Bolting and Body/Cap Bolting
High alloy austenitic stainless steel	Type 6Mo	-196 °C (-320 °F) to 370 °C (700 °F)	Sweet and sour	SA-351 CK3MCuN [n], SA-351 CN3MN, SA-182 F44, SB-462 UNS N08367, SB-691 UNS N08367 [g]	SA-351 CK3MCuN [n], SA-351 CN3MN, SA-182 F44, SB-462 UNS N08367, SB-691 UNS N08367	SA-351 CK3MCuN [n], SA-351 CN3MN, SA-182 F44, SB-462 UNS N08367, SB-691 UNS N08367	SA-351 CK3MCuN [n], SA-351 CN3MN, SA-182 F44, SB-462 UNS N08367, SB-691 UNS N08367	SA-182 F44, SB-462 UNS N08367, SB-691 UNS N08367, SA-194 8MA, SA-320 B8MA [h], SB-637 UNS N07718, SB-446 UNS N06625 Grade 1
DSS [i]	Type 22Cr	-46 °C (-50 °F) to 260 °C (500 °F)	Sweet and sour	SA-182 F51, SA-995 4A, SA-479 UNS S31803 [g]	SA-182 F51, SA-995 4A, SA-479 UNS S31803	SA-182 F51, SA-995 4A, SA-479 UNS S31803	SA-182 F51, SA-995 4A, SA-479 UNS S31803, SB-564 UNS N06625	SB-446 UNS N06625 Grade 1
	Type 25Cr	-46 °C (-50 °F) to 316 °C (600 °F)	Sweet and sour	SA-182 F53 or F55, SA-995 6A, SA-479 UNS S32760 [g]	SA-182 F53 or F55, SA-995 6A, SA-479 UNS S32760	SA-182 F53 or F55, SA-995 6A, SA-479 UNS S32760	SA-182 F53 or F55, SA-995 6A, SA-479 UNS S32760, SB-564 UNS N06625	SB-446 UNS N06625 Grade 1
Nickel-copper alloy		-29 °C (-20 °F) to 482 °C (900 °F)	Sweet and sour	SA-494 M35-1 [n], SB-564 UNS N04400, SB-164 UNS N04400 [g], SB-127 UNS N04400	SA-494 M35-1 [n], SB-564 UNS N04400, SB-164 UNS N04400	SB-564 UNS N04400, SB-164 UNS N04400, SB-865 UNS N05500	SA-494 M35-1 [n], SB-564 UNS N04400, SB-164 UNS N04400, SB-865 UNS N05500	SB-164 UNS N04400, SF-468 UNS N05500, SF-467 UNS N05500
Alloy 20 (UNS N08007)		-29 °C (-20 °F) to 149 °C (300 °F)	Sweet and sour	SA-351 CN7M, SB-462 UNS N08020, SB-473 UNS N08020 [g], SB-463 UNS N08020	SA-351 CN7M, SB-462 UNS N08020, SB-473 UNS N08020	SA-351 CN7M, SB-462 UNS N08020, SB-473 UNS N08020	SA-351 CN7M, SB-462 UNS N08020, SB-473 UNS N08020	SB-473 UNS N08020
Titanium		-46 °C (-50 °F) to 260 °C (500 °F)	Sweet and sour	SB-381 F-2 (UNS R50400), SB-367 C-2 (UNS R52550), SB-348 2 (UNS R50400) [g]	SB-381 F-2 (UNS R50400), SB-367 C-2 (UNS R52550), SB-348 2 (UNS R50400)	SB-381 F-2 (UNS R50400), SB-367 C-2 (UNS R52550), SB-348 2 (UNS R50400)	SB-381 F-2 (UNS R50400), SB-367 C-2 (UNS R52550), SB-348 2 (UNS R50400)	SB-381 F-2 (UNS R50400), SB-348 2 (UNS R50400), SB-637 UNS N07718, SB-446 UNS N06625 Grade 1

Table I.1 *(continued)*

Body Material Type	Temperature Range	Service	Body, Bonnet, and Cap	Nozzle [a]	Disc [a]	Other Process-Wetted Parts [b]	Body/Bonnet Bolting and Body/Cap Bolting

NOTE 1 Materials for parts not listed in this table are defined in I.2.

NOTE 2 IOGP S-563 MDS requirements apply to materials in accordance with I.3.

[a] When hardfacing is specified on the disc and nozzle, hardfacing shall comply with I.4.

[b] Spring material shall comply with Table 2. Bellow material shall comply with 8.1.

[c] SA-352 LCC is limited to a maximum of 343 °C (650 °F) in accordance with ASME *BPVC,* Code Case 1750-31.

[d] Acceptable for base and bonnet threaded plugs.

[e] Dual-certified grade.

[f] SA-351 CF3M and CF8M shall be impact tested in accordance with ASME *BPVC,* Section VIII, Division 1:2023, UHA-51 for design temperature colder than -29 °C (-20 °F).

[g] Body, bonnet up to 102 mm (4 in.) can be manufactured from bars. Bars shall comply with the IOGP S-563 MDS. When the bar diameter exceeds 205 mm (8 in.), two transverse (tangential) tension test specimens shall be tested per bar lot. The two transverse tensile specimens shall be located 90° apart around the perimeter of the bar.

[h] Acceptance class for bolting shall be in accordance with the IOGP S-563 MDS.

[i] In addition to the requirements in the IOGP S-563 MDS, the lateral expansion of each impact test sample shall be greater than or equal to 0.38 mm (0.015 in.).

[j] SA-351 CF3M is limited to a maximum of 454 °C (850 °F).

[k] Except for bolting, in addition to the requirements in the IOGP S-563 MDS, the material shall be impact tested in accordance with ASME *BPVC,* Section VIII, Division1:2023, UCS-66.

[m] At temperatures exceeding 230 °C (450 °F) sulfidation can occur. Refer to API 939-C.

[n] SA-494 M35-1 and SA-351 CK3MCuN casting in accordance with ASME *BPVC,* Code Case 1750-31.

Justification

This table provides material selection requirements to standardize material selection for the denoted material for spring-loaded pressure-relief valves.

Add new Table I.2

Table I.2—Pilot-operated Valves, Acceptable Material Specifications, and Grades for Valve Parts

Body Material Type	Temperature Range	Service	Main Valve Body, Bonnet, and Cap	Pilot Valve Body and Pressure Parts	Nozzle [a]	Disc [a]	Other Process Wetted parts [b]	Body/Bonnet Bolting and Body/Cap Bolting (Main Valve)	Body/Bonnet Bolting (Pilot Valve)
NTCS	-29 °C (-20 °F) to 260 °C (500 °F)	Sweet	SA-105, SA-216 WCB, SA-216 WCC, SA-350 LF2 Class 1, SA-352 LCC, SA-516 Grade 60, 65 or 70 [i]	SA-182 F316/F316L [d], SA-351 CF3M or CF8M, SA-479 316/316L [d], SA-240 316/316L [d]	SA-182 F316/F316L [d], SA-351 CF3M or CF8M, SA-479 316/316L [d]	SA-182 F316/F316L [d], SA-351 CF3M or CF8M, SA-479 316/316L [d]	SA-105 [c], SA-182 F316/F316L [d], SA-351 CF3M or CF8M, SA-479 316/316L [d], SA-240 316/316L [d]	SA-193 B7, SA-320 L7, SA-194 2H, SA-194 7	SA-193 B8M [g], SA-194 8M
	-29 °C (-20 °F) to 230 °C (450 °F)	Sour	SA-105, SA-216 WCB, SA-216 WCC, SA-350 LF2 Class 1, SA-352 LCC, SA-516 Grade 60, 65 or 70 [i]	SA-182 F316/F316L [d], SA-351 CF3M or CF8M, SA-479 316/316L [d, f], SA-240 316/316L [d]	SA-182 F316/F316L [d], SA-351 CF3M or CF8M, SA-479 316/316L [d]	SA-182 F316/F316L [d], SA-351 CF3M or CF8M, SA-479 316/316L [d]	SA-105 [c], SA-182 F316/F316L [d], SA-351 CF3M or CF8M, SA-479 316/316L [d], SA-240 316/316L [d]	SA-193 B7M, SA-320 L7M, SA-194 2HM, SA-194 7M	SA-194 8MA, SA-320 B8MA [g]
LTCS	-46 °C (-50 °F) to 260 °C (500 °F)	Sweet	SA-350 LF2 Class 1, SA-352 LCC, SA-516 Grade 60, 65 or 70 [i, j]	SA-182 F316/F316L [d], SA-351 CF3M [e] or CF8M [e], SA-479 316/316L [d, f], SA-240 316/316L [d]	SA-182 F316/F316L [d], SA-351 CF3M [e] or CF8M [e], SA-479 316/316L [d]	SA-182 F316/F316L [d], SA-351 CF3M [e] or CF8M [e], SA-479 316/316L [d]	SA-182 F316/F316L [d], SA-351 CF3M [e] or CF8M [e], SA-479 316/316L [d], SA-240 316/316L [d]	SA-320 L7, SA-194 7	SA-193 B8M [g], SA-194 8M
	-46 °C (-50 °F) to 230 °C (450 °F)	Sour	SA-350 LF2 Class 1, SA-352 LCC, SA-516 Grade 60, 65 or 70 [i, j]	SA-182 F316/F316L [d], SA-351 CF3M [e] or CF8M [e], SA-479 316/316L [d, f], SA-240 316/316L [d]	SA-182 F316/F316L [d], SA-351 CF3M [e] or CF8M [e], SA-479 316/316L [d]	SA-182 F316/F316L [d], SA-351 CF3M [e] or CF8M [e], SA-479 316/316L [d]	SA-182 F316/F316L [d], SA-351 CF3M [e] or CF8M [e], SA-479 316/316L [d], SA-240 316/316L [d]	SA-320 L7M, SA-194 7M	SA-194 8MA, SA-320 B8MA [g]

Table I.2 *(continued)*

Body Material Type		Temperature Range	Service	Main Valve Body, Bonnet, and Cap	Pilot Valve Body and Pressure Parts	Nozzle [a]	Disc [a]	Other Process Wetted parts [b]	Body/Bonnet Bolting and Body/Cap Bolting (Main Valve)	Body/Bonnet Bolting (Pilot Valve)
Austenitic stainless steel	Type 316	-196 °C (-320 °F) to 260 °C (500 °F)	Sweet	SA-182 F316/F316L [d], SA-351 CF3M [e] or CF8M [e], SA-479 316/316L [d, f], SA-240 316/316L [d, i]	SA-182 F316/F316L [d], SA-351 CF3M [e] or CF8M [e], SA-479 316/316L [d, f], SA-240 316/316L [d]	SA-182 F316/F316L [d], SA-351 CF3M [e] or CF8M [e], SA-479 316/316L [d]	SA-182 F316/F316L [d], SA-351 CF3M [e] or CF8M [e], SA-479 316/316L [d]	SA-182 F316/F316L [d], SA-351 CF3M [e] or CF8M [e], SA-479 316/316L [d], SA-240 316/316L [d]	SA-193 B8M [h], SA-194 8M, SA-320 B8M [h], SB-637 UNS N07718, SB-446 UNS N06625 Grade 1	SA-193 B8M [g], SA-194 8M, SA-320 B8M [g], SB-637 UNS N07718, SB-446 UNS N06625 Grade 1
		-196 °C (-320 °F) to 260 °C (500 °F)	Sour	SA-182 F316/F316L [d], SA-351 CF3M [e] or CF8M [e], SA-479 316/316L [d, f], SA-240 316/316L [d, i]	SA-182 F316/F316L [d], SA-351 CF3M [e] or CF8M [e], SA-479 316/316L [d, f], SA-240 316/316L [d]	SA-182 F316/F316L [d], SA-351 CF3M [e] or CF8M [e], SA-479 316/316L [d]	SA-182 F316/F316L [d], SA-351 CF3M [e] or CF8M [e], SA-479 316/316L [d]	SA-182 F316/F316L [d], SA-351 CF3M [e] or CF8M [e], SA-479 316/316L [d], SA-240 316/316L [d]	SA-194 8MA, SA-320 B8MA [h], SB-637 UNS N07718, SB-446 UNS N06625 Grade 1	SA-194 8MA, SA-320 B8MA [g], SB-637 UNS N07718, SB-446 UNS N06625 Grade 1
DSS [h]	Type 22Cr	-46 °C (-50 °F) to 260 °C (500 °F)	Sweet and sour	SA-182 F51, SA-995 4A, SA-479 UNS S31803 [f], SA-240 UNS S31803 [i]	SA-182 F51, SA-995 4A, SA-479 UNS S31803 [f], SA-240 UNS S31803	SA-182 F51, SA-995 4A, SA-479 UNS S31803	SA-182 F51, SA-995 4A, SA-479 UNS S31803	SA-182 F51, SA-995 4A, SA-479 UNS S31803, SA-240 UNS S31803, SB-564 UNS N06625	SB-446 UNS N06625 Grade 1	SB-446 UNS N06625 Grade 1
	Type 25Cr	-46 °C (-50 °F) to 316 °C (600 °F)	Sweet and sour	SA-182 F53 or F55, SA-995 6A, SA-479 UNS S32760 [f], SA-240 UNS S32750 [i] or S32760 [i]	SA-182 F53 or F55, SA-995 6A, SA-479 UNS S32760 [f], SA-240 UNS S32750 or S32760	SA-182 F53 or F55, SA-995 6A, SA-479 UNS S32760	SA-182 F53 or F55, SA-995 6A, SA-479 UNS S32760	SA-182 F53 or F55, SA-995 6A, SA-479 UNS S32760, SA-240 UNS S32750 or S32760, SB-564 UNS N06625	SB-446 UNS N06625 Grade 1	SB-446 UNS N06625 Grade 1

Table I.2 *(continued)*

Body Material Type	Temperature Range	Service	Main Valve Body, Bonnet, and Cap	Pilot Valve Body and Pressure Parts	Nozzle [a]	Disc [a]	Other Process Wetted parts [b]	Body/Bonnet Bolting and Body/Cap Bolting (Main Valve)	Body/Bonnet Bolting (Pilot Valve)

NOTE 1 Material for parts not listed in this table is defined in I.2.

NOTE 2 IOGP S-563 MDS requirements apply to materials in accordance with I.3.

[a] When hardfacing is specified on the disc and nozzle, hardfacing shall comply with I.4.

[b] Spring material shall comply with Table 2. Bellow material shall comply with 8.1.

[c] Acceptable for base and bonnet threaded plug.

[d] Dual-certified grade.

[e] SA-351 CF3M and CF8M shall be impact tested in accordance with ASME *BPVC,* Section VIII, Division 1:2023, UHA-51 for design temperatures colder than -29 °C (-20 °F).

[f] Body, bonnet up to 102 mm (4 in.) can be manufactured from bars. Bars shall comply with the IOGP S-563 MDS. When the bar diameter exceeds 205 mm (8 in.), two transverse (tangential) tensile test specimens shall be tested per bar lot. The two transverse tensile specimens shall be located 90° apart around the perimeter of the bar.

[g] Acceptance class for bolting shall be in accordance with the IOGP S-563 MDS.

[h] In addition to the requirements in the IOGP S-563 MDS, the lateral expansion of each impact test sample shall be greater than or equal to 0.38 mm (0.015 in.).

[i] Acceptable for the main valve cap only.

[j] SA-516 impact tested in accordance with IOGP S-563 MDS IC105.

Justification

This material selection table standardizes the material selection for the denoted materials for pilot-operated pressure-relief valves.

Add new Annex J

Annex J
(normative)

Supplementary Requirements for Inspection

J.1 General

J.1.1

This annex specifies QSLs for non-destructive examination (NDE) of pressure-relief valves.

Justification

This guidance text defines the scope of this annex.

J.1.2

QSL1 is the default quality level and corresponds to the level of NDE required by API 526 with no supplementary requirements.

Justification

This guidance text defines the NDE requirements for QSL1.

J.2 NDE Requirements

J.2.1

NDE shall comply with Table J.1 and Table J.2 for the specified QSL and the applicable material product form.

Justification

This requirement ensures compliance with Table J.1 which defines the NDE type required for different valve parts and material product forms (cast vs wrought) based on the QSL selected by the purchaser in the PDS, and Table J.2 which specifies the extent, method and acceptance criteria for NDE.

J.2.2

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

Justification

This requirement ensures that any flaw that develops into a defect during heat treatment or PWHT is detected before final assembly and testing.

J.2.3

NDE personnel shall be qualified to ASNT SNT-TC-1A Level II or Level III, or ISO 9712 Level 2 or Level 3.

Justification

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

J.2.4

Certification shall be performed by an independent third-party certification body or authorized qualifying body in accordance with the ASNT Central Certification Program (ACCP) 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. This prevents level III inspectors within a company qualifying others within the same company which has historically seen levels of competency drop leading to defects not being detected or reported. This requirement also ensures consistency with IOGP S-563.

Add new Table J.1

Table J.1—NDE Requirements

<table>
<tr><th rowspan="2">Valve part</th><th colspan="2">QSL1</th><th colspan="2">QSL2</th><th colspan="2">QSL3</th><th colspan="2">QSL4</th></tr>
<tr><th>Cast</th><th>Wrought [a]</th><th>Cast</th><th>Wrought [a]</th><th>Cast</th><th>Wrought [a]</th><th>Cast</th><th>Wrought [a]</th></tr>
<tr><td rowspan="3">Body [b], bonnet [b], cap and integral lifting lugs</td><td rowspan="3">VT1</td><td rowspan="3">VT2</td><td>VT1</td><td>VT2</td><td>VT1</td><td>VT2</td><td>VT1</td><td>VT2</td></tr>
<tr><td>MT2 [c] or PT2 [c]</td><td rowspan="2">MT1 [c] or PT1 [c]</td><td>MT2 [c] or PT2 [c]</td><td>MT1 [c] or PT1 [c]</td><td>MT2 [c] or PT2 [c]</td><td>MT1 [c] or PT1 [c]</td></tr>
<tr><td>RT1 [d, e]</td><td>RT1 [d]</td><td>UT2</td><td>RT3 [d, f]</td><td>UT2</td></tr>
<tr><td rowspan="2">Nozzle and disc</td><td rowspan="2">VT1</td><td rowspan="2">VT2</td><td rowspan="2">VT1</td><td rowspan="2">VT2</td><td>VT1</td><td>VT2</td><td>VT1</td><td>VT2</td></tr>
<tr><td>MT2 or PT2</td><td>MT1 or PT1</td><td>MT2 or PT1</td><td>MT1 or PT1</td></tr>
<tr><td rowspan="3">Stem/spindle</td><td rowspan="3">N/A</td><td rowspan="3">VT2</td><td rowspan="3">N/A</td><td rowspan="3">VT2</td><td rowspan="3">N/A</td><td>VT2</td><td rowspan="3">N/A</td><td>VT2</td></tr>
<tr><td rowspan="2">MT1 or PT1</td><td>MT1 or PT1</td></tr>
<tr><td>UT2</td></tr>
<tr><td rowspan="2">Pressure-boundary bolting</td><td rowspan="2">N/A</td><td rowspan="2">VT4</td><td rowspan="2">N/A</td><td rowspan="2">VT4</td><td rowspan="2">N/A</td><td rowspan="2">VT4</td><td rowspan="2">N/A</td><td>VT4</td></tr>
<tr><td>MT1 or PT1</td></tr>
<tr><td>Spring</td><td>N/A</td><td>VT4</td><td>N/A</td><td>VT4</td><td>N/A</td><td>VT4</td><td>N/A</td><td>VT4</td></tr>
<tr><td rowspan="2">Other internal wetted parts (e.g. bellow)</td><td rowspan="2">VT1</td><td rowspan="2">VT2</td><td rowspan="2">VT1</td><td rowspan="2">VT2</td><td>VT1</td><td>VT2</td><td>VT1</td><td>VT2</td></tr>
<tr><td>MT2 or PT2</td><td>MT1 or PT1</td><td>MT2 or PT2</td><td>MT1 or PT1</td></tr>
<tr><td>Seals and gaskets</td><td colspan="8">VT4</td></tr>
<tr><td rowspan="3">Pressure-containing welds</td><td colspan="2" rowspan="3">VT3</td><td colspan="6">VT3</td></tr>
<tr><td colspan="6">MT1 [c] or PT1 [c]</td></tr>
<tr><td colspan="6">RT2 [g]</td></tr>
<tr><td>Fillet and attachment welds to pressure-containing parts</td><td colspan="2">VT3</td><td colspan="6">VT3
MT1 [c] or PT1 [c]</td></tr>
<tr><td rowspan="2">Hard facing</td><td colspan="2" rowspan="2">VT4</td><td colspan="6">VT4</td></tr>
<tr><td colspan="6">PT1</td></tr>
<tr><td rowspan="2">Sealing surfaces</td><td colspan="2" rowspan="2">VT4</td><td colspan="6">VT4</td></tr>
<tr><td colspan="6">MT3 or PT3</td></tr>
</table>

Key

N/A: not applicable.

VT1, VT2, VT3, VT4, PT1, PT2, PT3, MT1, MT2, RT1, RT2, RT3, UT1, UT2, UT3, UT4: NDE codes. Refer to Table J.2.

NOTE 1 The NDE codes used in this table are defined in Table J.2 which specifies the extent, method and acceptance criteria of examination for each NDE code.

NOTE 2 When valve materials are selected in accordance with Annex I, NDE requirements for pilot casting are specified in IOGP S-563 MDS.

[a] Requirements for NDE of wrought material apply to bar, rod, wire, forgings, and plate material product forms.

[b] When this specification permits the manufacture of body and bonnet parts from bar, bar with a hot-worked diameter exceeding 205 mm (8 in.) shall be examined by UT before machining in accordance with ASME *BPVC,* Section VIII, Division 1:2023, UG-14 (b) (4) (-c).

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

[d] RT1 and RT3 may be replaced by UT4 by agreement.

[e] RT1 inspection frequency for QSL2 shall be 5 %, minimum one part per component batch to be examined. If defects outside the acceptance criteria are detected, two additional parts shall be tested, and if any of these two parts fail the test, all items from the batch shall be examined.

[f] RT1 plus UT1 may be replaced for RT3.

[g] If RT2 is not possible due to geometrical constraints, UT3 shall be performed.

Justification

The requirements of this table promote standardization of NDE requirements for QSLs.

Add new Table J.2

Table J.2—Extent, Method, and Acceptance Criteria for the NDE Codes in Table J.1

NDE Code	Extent	Method	Acceptance Criteria
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:2023, Article 2	ASME *BPVC,* Section VIII, Division 1:2023, Appendix 7
RT2	100 %	ASME *BPVC*, Section V:2023, Article 2	ASME *BPVC*, Section VIII, Division 1:2023, UW-51 for linear indications and ASME *BPVC*, Section VIII, Division 1:2023, Appendix 4 for rounded indications
RT3	100 %	ASME *BPVC*, Section V:2023, Article 2	ASME *BPVC*, Section VIII, Division 1:2023, Appendix 7
UT1	Areas not covered by RT1	ASME *BPVC*, Section V:2023, Article 5	ASTM A609/A609M:2012, Table 2, Quality Level 2
UT2	All surfaces	ASME *BPVC*, Section V:2023, Article 5	Forgings and bars: ASME *BPVC*, Section VIII, Division 1:2023, UF-55 for angle beam and ASME B16.34 for straight beam Plate: ASTM A578/A578M
UT3	All surfaces	ASME *BPVC*, Section V:2023, Article 4	ASME *BPVC*, Section VIII, Division 1:2023, Appendix 12
UT4	100 %	ASME *BPVC*, Section V:2023, Article 5	ASTM A609/A609M:2012, Table 2, Quality Level 1
MT1	All accessible surfaces	ASME *BPVC*, Section V:2023, Article 7	ASME *BPVC*, Section VIII, Division 1:2023, Appendix 6
MT2	All accessible surfaces	ASME *BPVC*, Section V:2023, Article 7	ASME *BPVC*, Section VIII, Division 1:2023, Appendix 7
MT3	All sealing surfaces	ASME *BPVC*, Section V:2023, Article 7	No rounded or linear indications in pressure-contact sealing surfaces. Re-examination of indications as per ASME *BPVC*, Section VIII, Division 1:2023, Appendix 6-3 (c) is acceptable.
PT1	All accessible surfaces	ASME *BPVC*, Section V:2023, Article 6	ASME BPVC, Section VIII, Division 1:2023, Appendix 8
PT2	All accessible surfaces	ASME BPVC, Section V:2023, Article 6	ASME BPVC, Section VIII, Division 1:2023, Appendix 7
PT3	All sealing surfaces	ASME *BPVC*, Section V:2023, Article 6	No rounded or linear indications in pressure-contact sealing surfaces. Re-examination of indications as per ASME *BPVC*, Section VIII, Division 1:2023, Appendix 8-3 (c) is acceptable.
VT1	100 % accessible as cast surfaces	MSS SP-55	MSS SP-55
VT2	100 % accessible as forged surfaces	Applicable IOGP S-563 MDS [a]	Applicable IOGP S-563 MDS [a]
VT3	100 % accessible as welded surfaces	Applicable IOGP S-563 EDS [a]	Applicable IOGP S-563 EDS [a]
VT4 [b]	100 % accessible surfaces	In accordance with manufacturer requirements and applicable IOGP S-563 EDS [a]	In accordance with manufacturer requirements and applicable IOGP S-563 EDS [a]

[a] Refer to the applicable IOGP S-563 MDS or EDS as specified in Annex I. If the material is not specified in accordance with Annex I or no IOGP S-563 MDS or EDS is available, the applicable material standard shall apply without additional requirements.

[b] Gaskets shall be free from sharp edges, burrs, organic substances or foreign particulate matter.

Justification

The requirements in this table promote standardization of NDE requirements for QSLs, by defining the required extent, method and acceptance criteria for NDE activities.

J.2.5

Visual examination after assembly shall include dimensional inspection of the following items in accordance with 7.4:

— centre-to-face dimensions;

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

Justification

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

Bibliography

Add to start of Bibliography

The following documents are informatively cited in the text of this specification, API 526, the PDS (IOGP S-730D) or the IRS (IOGP S-730L).

Add to Bibliography

[4] API Recommended Practice 939-C, *Guidelines for Avoiding Sulfidation (Sulfidic) Corrosion Failures in Oil Refineries*

[5] API Specification Q1, *Specification for Quality Management System Requirements for Manufacturing Organizations for the Petroleum and Natural Gas Industry*

[6] API Specification Q2, *Specification for Quality Management System Requirements for Service Supply Organizations for the Petroleum and Natural Gas Industries*

[7] ASME *BPVC*, Section XIII:2023, *Rules for Overpressure Protection*

[8] ASTM A231/231M, *Standard Specification for Chromium-Vanadium Alloy Steel Spring Wire*

[9] ASTM A232/232M, *Standard Specification for Chromium-Vanadium Alloy Steel Valve Spring Quality* Wire

[10] ASTM A304, *Standard Specification for Carbon and Alloy Steel Bars Subject to End-Quench Hardenability Requirements*

[11] ASTM A401/A401M, *Standard Specification for Steel Wire, Chromium-Silicon Alloy*

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[13] EN 10204, *Metallic products — Types of inspection documents*

[14] EN ISO 4126-1 *, *Safety devices for protection against excessive pressure – Part 1: Safety valves*

[15] ISO 4624, *Paints and varnishes — Pull-off test for adhesion*

[16] ISO 9001:2015, *Quality management systems — Requirements*

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[19] ISO 12944-2, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 2: Classification of environments*

[20] ISO 12944-8, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 8: Development of specifications for new work and maintenance*

[21] ISO 19277, *Petroleum, petrochemical and natural gas industries — Qualification testing and acceptance criteria for protective coating systems under insulation*

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[24] ISO/IEC 17000:2020, *Conformity assessment — Vocabulary and general principles*

[25] ISO/IEC 17020:2012, *Conformity assessment — Requirements for the operation of various types of bodies performing inspection*

[26] ISO/IEC 17050-1:2004, *Conformity assessment — Supplier's declaration of conformity — Part 1: General requirements*

* Cited in IOGP S-730J only.

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