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Addendum 1

Table 3: The table shall be changed as indicated in the red boxes:

Material Class		Body, Bonnet, End and Outlet Connectors	Mandrel Hangers, Valve Bore Sealing Mechanisms, Choke Trim, and Stems
AA	General service	Carbon or low-alloy steel, or stainless steel or CRA ^d	Carbon or low-alloy steel, or stainless steel or CRA ^d
BB	General service	Carbon or low-alloy steel, or stainless steel or CRA ^d	Stainless steel or CRA ^d
CC	General service	Stainless steel or CRA ^d	Stainless steel or CRA ^d
DD	Sour service ^a	Carbon or low-alloy steel or CRA ^{b,d}	Carbon or low-alloy steel, or stainless steel or CRA ^{b,d}
EE	Sour service ^a	Carbon or low-alloy steel or CRA ^{b,d}	Stainless steel or CRA ^{b,d}
FF	Sour service ^a	Stainless steel or CRA ^{b,d}	Stainless steel or CRA ^{b,d}
HH	Sour service ^a	CRA ^{b,c,d}	CRA ^{b,c,d}
FOOTNOTES			
^a As defined by NACE MR0175/ISO 15156.			
^b In accordance with NACE MR0175/ISO 15156 and 4.3.3.2.			
^c CRA required on retained fluid-wetted surfaces only; CRA cladding of low-alloy or stainless steel is permitted (see 7.5.1.2).			
^d CRA as defined in 3.1.22; NACE MR0175/ISO 15156 definition of CRA does not apply.			

Section 6.5.1: The section shall be changed to the following:

For all heat-treating of parts, QTCs shall be performed with “production type” equipment meeting the requirements of this specification.

“Production type” heat-treating equipment shall be considered equipment that is routinely used to process production parts having an ER equal to or greater than the ER of the subject QTC.

Heat-treatment of production parts shall be performed with heat-treating equipment that satisfies one of the following:

- Equipment has been calibrated in accordance with 6.5.2 and 6.5.3 and surveyed in accordance with Annex M and 6.5.4.1 for batch type furnaces; or,
- Equipment has been calibrated and surveyed in accordance with SAE AMS 2750 Class 1, 2 or 3 for tempering and Class 1, 2, 3, 4 or 5 for normalizing and austenitizing.

Automatic controlling and recording instruments shall be used.

Thermocouples shall be placed in the furnace working zone(s) and protected from furnace atmospheres by means of suitable protective devices.

Section 6.5.4.1: The section header shall be changed to the following:

6.5.4.1 Furnace Survey Temperature Tolerance

Section 6.5.4.1.1: The section shall be changed to the following:

The following criteria shall be satisfied when performing a temperature survey in accordance with Annex M.

The temperature at any point in the working zone of a furnace used for austenitizing, normalizing, annealing, or solution annealing shall not vary by more than $\pm 14\text{ }^{\circ}\text{C}$ ($\pm 25\text{ }^{\circ}\text{F}$) from the furnace set-point temperature after the furnace working zone has been brought up to temperature. Before the furnace set-point temperature is reached, none of the temperature readings shall exceed the set-point temperature by more than the temperature tolerance.

Section 6.5.4.1.2: The section shall be changed to the following:

The following criteria shall be satisfied when performing a temperature survey in accordance with Annex M.

Furnaces that are used for tempering, aging, and/or stress-relieving shall not vary by more than $\pm 8\text{ }^{\circ}\text{C}$ ($\pm 15\text{ }^{\circ}\text{F}$) from the furnace set-point temperature after the furnace working zone has been brought up to temperature. Before the furnace set-point temperature is reached, none of the temperature readings shall exceed the set-point temperature by more than the temperature tolerance.

Section 6.5.4.2: The section shall be changed to the following:

The following criteria shall be satisfied when performing a temperature survey in accordance with Annex M.

The temperatures within each batch-type furnace shall be surveyed within 1 year prior to use of the furnace for heat-treatment.

Section 7.5.1.2.4: The section shall be changed to the following:

For PSL 1, PSL 2, PSL 3, and PSL 4, the following shall apply.

- The base metal material shall retain the minimum mechanical property requirements after post-weld heat-treatment. The manufacturer shall specify the methods to ensure these required mechanical properties and record the results as part of the PQR.
- If the overlay material is not considered as part of the manufacturer's or this specification's design requirements of Section 5.1, a tensile test and an impact test of the overlay material shall not be required.
- Other than ring grooves, if the overlay material is considered as part of the manufacturer's design requirements of Section 5.1 or where dimensions for the product are specified in this specification, mechanical testing per Section 6 of the overlay material shall be required.
- If overlay material is only part of the manufacturer's design requirements of Section 5.1, acceptance criteria for mechanical testing of the overlay material shall be as specified in Section 6, or as established by design analysis and specified by the manufacturer.

Section 7.5.3: The section shall be changed to the following:

For PSL 1, PSL 2, PSL 3, and PSL 4, repairs of weld overlays, including associated base metal build-up using the overlay material, shall be acceptable only provided that:

- the original applicable requirements (see 7.5.1) are adhered to;
- when the manufacture determines that the overlay material and/or base metal build-up is part of the design requirements of Section 5.1 and proves through design analysis the functionality of the finished part, provided that the finished part is in conformance with the dimensions of this specification;
- weld overlay repairs and associated base metal build-up for use in hydrogen-sulfide service conform to the requirements of ISO 15156 (all parts) (NACE MR0175).

Section 10.1: The section shall be changed to the following:

Equipment manufactured to this specification shall meet the quality control and record requirements of Section 10.

Equipment shall be manufactured under the manufacturer's quality management system which shall conform to an internationally recognized standard such as API Q1 or ISO 9001.

The manufacturer shall ensure control over the manufacturing processes that are outsourced.

The manufacturer shall maintain:

- a) Documented procedure for the controls used for outsourced processes;
- b) Records that provide evidence of conformity of outsourced processes to the requirements of this specification, and
- c) When applicable, records of validation for outsourced welding, heat treatment, nondestructive testing, coating and plating.

Section 10.2.2.3: The section shall be changed to the following:

Calibration intervals shall be established based on repeatability and degree of usage. Calibration intervals may be lengthened and shall be shortened based on recorded calibration history.

Calibration intervals shall be a maximum of 3 months until recorded calibration history can be established by the manufacturer. Extension of intervals shall be limited to 3-month increases, with a maximum calibration interval to not exceed 1 year.

The calibration interval shall start either on the date of calibration or on the date of first use after calibration.

If the manufacturer chooses to start the calibration interval on the date of first use after calibration, the following shall apply:

- the date of first use shall be recorded, and
- the time between the calibration date and date of first use shall not exceed 3 months.

Section 10.4.2.12.4: The section shall be changed to the following:

For PSL 2 and PSL 3 castings, and for PSL 3 and PSL 4 wrought material, radiographic examination shall be performed in accordance with methods specified in ASME BPVC, Section V, Article 2 (or equivalent) using 2T Essential Hole for plaque type IQI or Equivalent Essential wire for wire type IQI. Both X-ray and gamma-ray sources shall be acceptable within the inherent thickness range limitation of each.

NOTE 1 Real time imaging and recording/enhancement methods may be used provided the designated hole image quality indicator or essential wire is displayed as required by ASME BPVC, Section V, Article 2.

NOTE 2 Radiographic examination does not apply to PSL 1.

Table 22: The table shall be changed as indicated in the red boxes:

Weld Type	Stages ^{a,b}	Reference			
		PSL 1	PSL 2	PSL 3	PSL 4
Pressure-containing	Preparation - Visual	—	—	10.4.2.6	10.4.2.6
	Completion - Visual	—	10.4.2.14	10.4.2.14	10.4.2.14
	Completion - Surface NDE	—	10.4.2.15	10.4.2.15	10.4.2.15
	Completion - Volumetric NDE	—	10.4.2.16	10.4.2.16	10.4.2.16
	Completion - Hardness test	—	—	10.4.2.17	10.4.2.17
Nonpressure-containing (including repairs)	Preparation - Visual	—	—	10.4.2.6	10.4.2.6
	Completion - Visual	—	10.4.2.14	10.4.2.14	10.4.2.14
	Completion - Hardness Test	—	—	10.4.2.17	10.4.2.17
Pressure-containing repairs	Preparation - Surface NDE	—	10.4.2.15	10.4.2.15	10.4.2.15
	Completion - Visual	—	10.4.2.14	10.4.2.14	10.4.2.14
	Completion - Surface NDE	—	10.4.2.15	10.4.2.15	10.4.2.15
	Completion - Volumetric NDE	—	10.4.2.16	10.4.2.16	10.4.2.16
	Completion - Hardness Test	—	—	10.4.2.17	10.4.2.17
Partial weld metal overlay	Preparation - Surface NDE	—	—	10.4.2.10	10.4.2.10
	Completion - Surface NDE	—	10.4.2.15	10.4.2.15	10.4.2.15
	Completion - Volumetric NDE	—	—	10.4.2.18	10.4.2.18
Full weld metal overlay	Preparation - Visual	10.4.2.6	10.4.2.6	-	-
	Preparation - Surface NDE	—	—	10.4.2.10	10.4.2.10
	Completion - Visual	10.4.2.14	10.4.2.14	10.4.2.14	10.4.2.14
	Completion - Surface NDE	—	10.4.2.15	10.4.2.15	10.4.2.15
	Completion - Volumetric NDE	—	—	10.4.2.18	10.4.2.18

FOOTNOTES
^a "Preparation" refers to surface preparation, joint preparation, fit-up and preheat.
^b "Completion" refers to after all welding, post-weld heat treat and machining, except for volumetric NDE which shall be done prior to machining that would limit effective interpretation of results.

Section 10.4.2.16.2: The section shall be changed to the following:

Radiographic examinations shall be performed in accordance with the procedures specified in ASME BPVC Section V, Article 2 (or equivalent) using 2T Essential Hole for plaque type IQI or Equivalent Essential wire for wire type IQI.

Both X-ray and gamma-ray sources are acceptable within the inherent thickness range limitation of each. Real time imaging and recording/enhancement methods may be used provided the designated hole image quality indicator or essential wire is displayed as required by ASME BPVC, Section V, Article 2.

Section 10.4.2.17: The section shall be changed to the following:

The hardness weld NDE requirements of 10.4.2.17 shall apply to PSL 3 and PSL 4.

NOTE The hardness weld NDE requirements do not apply to PSL 1 and PSL 2.

Except for overlays, 100 % of all accessible welds (including repairs) shall be hardness tested.

Hardness testing shall be performed in accordance with ISO 6506 (all parts) or ISO 6508 (all parts), or ASTM E10 or ASTM E18.

When the WPS requires PWHT, hardness testing shall be performed after all heat treatment on the weld metal and the base metal within 13 mm (0.5 in.) from the weld to conform to 10.4.2.4. When the WPS does not require PWHT, the weld metal at a minimum shall be hardness tested to conform to 10.4.2.4.

Hardness values shall meet the base material requirements of 10.4.2.4.

The hardness recorded in the PQR shall be the basis for acceptance if the weld is not accessible for hardness testing.

Section 10.4.2.18.1: The section shall be changed to the following:

The weld overlay volumetric inspection requirements of 10.4.2.18 shall apply to PSL 3 and PSL 4 except for ring grooves that conform to this specification.

Section 10.4.2.18.2: The section shall be changed to the following:

10.4.2.18.2 Design Requirements

For PSL 3 and PSL 4 overlay welds other than ring grooves conforming to this specification, the manufacturer shall document if the overlay material is necessary to meet the design requirements of Section 5.1, and:

- If the overlay material is necessary to meet the design requirements of Section 5.1, volumetric examination shall be in accordance with 10.4.2.18.3.
- If the overlay material is not necessary to meet the design requirements of Section 5.1, a measurement of overlay thickness and testing of bond integrity shall be performed according to the manufacturer's written specifications.

NOTE 1 These requirements do not apply to PSL 1 and PSL 2.

NOTE 2 See Table 22.

Section 10.4.2.18.3: The section shall be changed to the following:

Weld overlay shall be examined using ultrasonic examination performed in accordance with ASME *BPVC*, Section V, Subsection A, Article 4 technique 1 except that the immersion method may be used.

The acceptance criteria shall be as follows:

- no single indication exceeding reference DAC;
- no multiple indications exceeding 50 % of reference DAC.

NOTE "Multiple indications" is defined as two or more indications (each exceeding 50 % of the reference DAC) within 13 mm (1/2 in.) of each other in any direction.

Section 11.2.1: The section shall be changed to the following:

All hydrostatic testing of 11.2 shall conform to the requirements of this section.

- Test fluid shall be water or water with additives.
- If a body includes an integral API flange connector, it shall be acceptable to use a test fixture with nonmetallic seals for the API flange connection. Nonmetallic seals, placed in the flow bore, shall be within half of flange thickness from the bore entrance

- Test fixtures shall not apply additional stress to the body under test.
- All hold periods shall not start until the test article and the pressure measuring/recording equipment has been isolated from the pressure source and the external surfaces of the shell members have been thoroughly dried.
- All pressure testing shall be conducted prior to the addition of body-filler grease. Lubrication applied during assembly is acceptable.
- Testing shall be performed prior to painting; however, if the body and other pressure-containing parts are constructed of wrought material, tests may be completed after painting.
- If possible, all fittings and other pressure boundary penetrations should be installed during testing, with the secondary sealing device removed or compromised if the design has that capability. If any fitting or pressure boundary penetration was not installed during the last pressure-holding period, a conditional test of 11.2.5 shall be performed.

NOTE This does not apply to dual barrier applications or buried check valves.

Section 11.2.2: The section shall be changed to the following:

The acceptable criteria specified below shall be applied to shell tests, seat tests, and conditional hydrostatic body tests. For PSL 1, PSL 2, PSL 3, and PSL 4, the acceptance criteria shall be as follows.

- a) The equipment shall show no visible leakage while subjected to test pressure, except as specified otherwise in 11.2.2.c) or 11.2.2.d).
- b) For the hold period, the following shall apply:
 - At the start of the hold period, monitored pressure shall not be greater than 5 % above the specified test pressure.
 - During the hold period, the pressure shall not vary from the pressure at the start of the hold period by more than 5% or 3.45 MPa (500 psi), whichever is less.
 - Monitored pressure shall not be less than the specified test pressure.
- c) Leakage past the thread during the hydrostatic shell test of a threaded wellhead member when joined with a threaded test fixture is permissible above the working pressure of the thread. Threaded connections that leak at above working pressure shall have an additional hold period performed at working pressure with no visible leakage. This hold period shall be of the same duration as the secondary pressure-holding period.
- d) For metal seating check valves, the maximum allowable through-bore leakage in hydrostatic seat testing shall be in accordance with ISO 5208 Rate E.

Section 11.3.1: The section shall be changed to the following:

All gas testing shall conform to the requirements of this section.

- The test medium shall be air, nitrogen, or other gas mixture that will remain in the gas phase at test pressure.
- Gas testing shall be performed at ambient temperature and with the tested equipment completely submerged in a water bath, with exception per NOTE 1.

NOTE 1 Actuator components (e.g. electric motors) and manual valve drivetrain components (e.g. thrust bearings) may be excluded from submersion completely if all retained fluid pressure-containing parts, seals, and other potential leak points or the outlet of vent ports are submerged to ensure that leakage is observable.

- Hold periods shall not start until the test article and the pressure measuring/recording equipment has been isolated from the pressure source and the pressure source bled to zero.
- All pressure testing shall be conducted prior to the addition of body-filler grease. Lubrication applied during assembly shall be acceptable. Testing shall be performed prior to painting, with exception per NOTE 2.

NOTE 2 If the body and other pressure-containing parts are constructed of wrought material, testing may be performed after painting.

- If possible, all fittings and other pressure boundary penetrations should be installed during testing, with the secondary sealing device removed or compromised if the design has that capability. If any fitting or pressure boundary penetration was not installed during the last pressure-holding period, a conditional gas body test of 11.3.6 shall be performed.

NOTE 3 This does not apply to dual barrier applications or buried check valves.

- Nonmetallic seals shall not be used in body gas testing on API flange connectors of equipment with API flange connectors.

Tables D.1, D.2, and D.3: Footnote b) shall be changed to the following:

- b Break sharp corner.

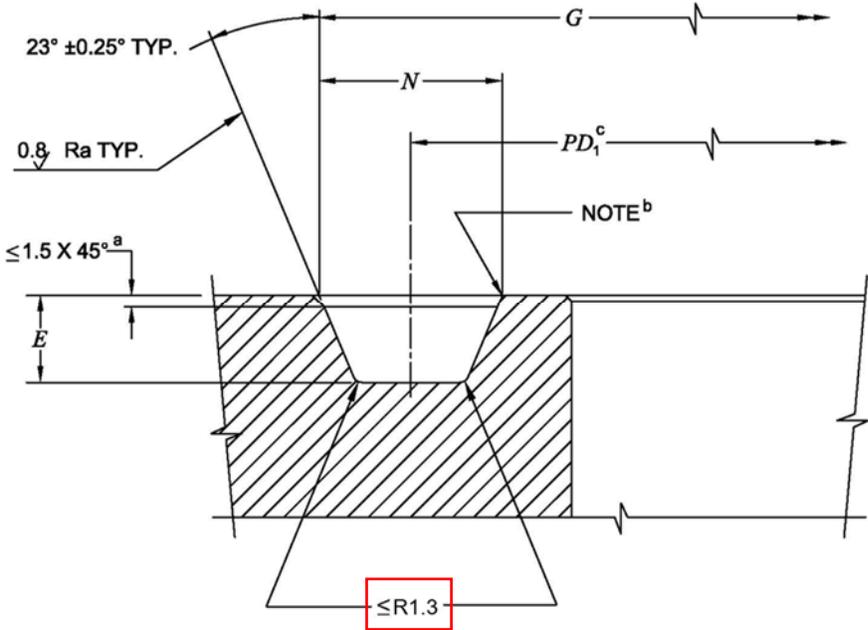
Tables D.4, D.5, and D.6: Footnote a) shall be changed to the following:

- a Break sharp corner.

Table D.7: Footnote e) shall be changed to the following:

- e Break sharp corner.

Table D.11: The table shall be shall as indicated in the red box:



Tables E.1, E.2, and E.3: Footnote b) shall be changed to the following:

b Break sharp corner.

Tables E.4, E.5, and E.6: Footnote a) shall be changed to the following:

a Break sharp corner.

Table E.7: Footnote e) shall be changed to the following:

e Break sharp corner.

Table E.11: The table shall be shall as indicated in the red box:

