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Affected Publication: ANSI/API Specification 17D/ISO 13628-4, *Design and Operation of Subsea Production Systems—Subsea Wellhead and Tree Equipment*, Second Edition, May 2011

ADDENDUM

Insert the attached Annex O after Annex N.

Annex O (informative)

Regional Annex

Page 19, **Section 5.1.3.5**, *replace*:

5.1.3.5 Closure bolting and critical bolting

Closure bolting (pressure-containing) and critical bolting (high-load bearing) require a preload to a high percent of material yield strength as noted below.

Closure bolting of all 6BX and 17SS flanges shall be made up using a method that has been shown to result in a stress range between 67 % and 73 % of the bolt's material yield stress.

This stress range should result in a preload in excess of the separation force at test pressure while avoiding excessive stress beyond 83 % of the bolt material's yield strength.

Closure bolting manufactured from carbon or alloy steel, when used in submerged service, shall be limited to 321 HBN (Rockwell "C" 35) maximum due to concerns with hydrogen embrittlement when connected to cathodic protection. Closure bolting for material classes AA-HH that is covered by insulation shall be treated as exposed bolting in accordance with ISO 15156 (all parts).

The maximum allowable tensile stress for closure bolting shall be determined considering initial bolt-up, rated working pressure and hydrostatic test pressure conditions. Bolting stresses, based on the root area of the thread shall not exceed the limits given in ISO 10423.

with

5.1.3.5 Closure bolting

Closure bolting (pressure-containing) and critical bolting (high-load bearing) require a preload to a high percentage of material yield strength as noted below.

Closure bolting of all 6BX, 17SS, and 17SV flanges used within the scope of this part of ISO 13628 shall require a nominal bolt preload of 67 % of the bolt's minimum specified material yield strength (SY). In order to achieve this state, bolting should be made up in accordance with Annex G

NOTE This stress is intended to result in a bolting preload in excess of the separation force at test pressure while avoiding excessive stress beyond 83 % of the bolt material's yield strength.

Minimum make-up stresses for closure bolting used in Other End Connections shall be as determined by the design. Minimum make-up stresses for closure bolting used in Other End Connections should result in a bolting preload in excess of the separation force at test pressure as determined by the design. Maximum make-up stresses at worst case conditions for closure bolting used in Other End Connections should avoid excessive stresses beyond 83% of the bolt material's yield strength.

Closure bolting manufactured from carbon or alloy steel, when used in submerged service, shall be limited to 321 HBW (Rockwell "C" 34) maximum due to concerns with hydrogen embrittlement when connected to cathodic protection. For all material classes, closure bolting that is covered by insulation shall be treated as exposed bolting in accordance with NACE MR0175 (all parts)

The maximum allowable tensile stress for closure bolting shall be determined considering initial make-up, operating and pressure loads at rated working pressure, and hydrostatic test pressure conditions.

Page 136 to 137, **Section 8.5.5.1**, *replace*:

8.5.5.1 Factory acceptance testing

All wellhead housings shall be hydrostatically tested prior to shipment from the manufacturer's facility. The hydrostatic test is performed to verify the pressure integrity of the housing pressure boundary. All wellhead housings shall be tested to the requirements of ISO 10423, PSL 3 or PSL 3G.

The hydrostatic body test pressure shall be determined from the housing rated working pressure (see Table 31). The hydrostatic body test pressure shall not be less than the values given in Table 31.

Wellhead housings shall show no visible leakage or visible bubbles in the water bath during each pressure holding period. Any permanent deformation of the housing, after hydrostatic testing is complete, shall not adversely affect the function of the casing hangers, packoffs, gaskets, connectors or other subsea equipment. Housing should show no deformation, within tolerances, after hydrostatic testing is complete.

with

8.5.5.1 Validation testing

Validation testing of the wellhead housing is not defined or required per 5.1.7 Table 3. A wellhead housing or representative test part may be used as part of validation testing for casing hangers to fulfill requirements specified by 8.6.3.1. An overall wellhead system stack-up validation test to ensure form, fit and function may be performed after FAT. Any pressure testing performed during a full system stack-up shall be hydrostatic and at ambient temperature to address safety concerns.

NOTE Activation of annulus seal assemblies within the wellhead housing (and installed casing hanger) to create a seal may compromise the seal assembly for future use.

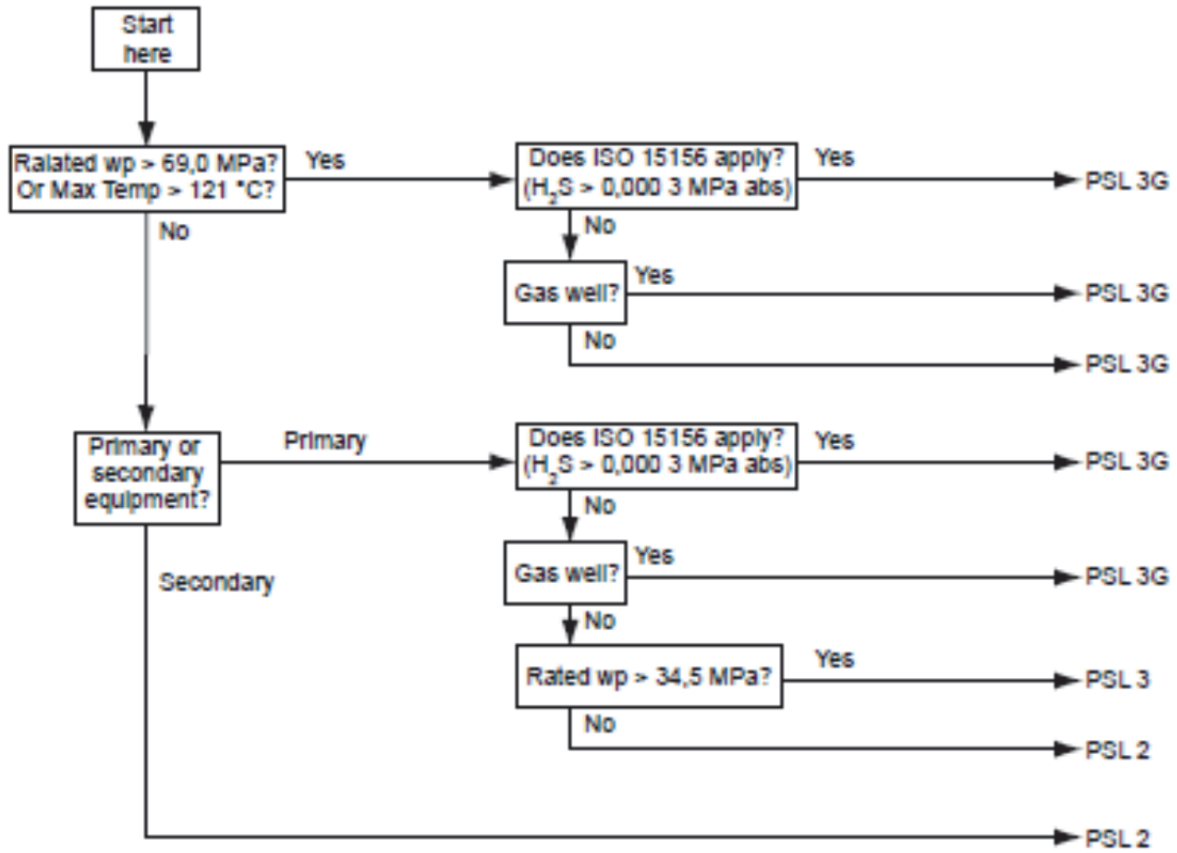
Page 137, insert new **Section 8.5.5.2**, *as follows*:

8.5.5.2 Factory acceptance testing

All wellhead housings shall be hydrostatically tested prior to shipment from the manufacturer's facility. The hydrostatic test is performed to verify the pressure integrity of the housing pressure boundary. All wellhead housings shall be tested to the requirements of ISO 10423 [API 6A], PSL 3. The gas testing requirements (PSL 3G) shall not apply.

The hydrostatic body test pressure shall be determined from the housing rated working pressure (see Table 31). The hydrostatic body test pressure shall not be less than the values given in Table 31.

Page 228, Figure M.1, replace:



with

