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## Addendum 1

*Annex A: Per API Monogram Program direction, this Annex shall be deleted and replaced with the following placeholder:*

### Annex A

**The information in this annex has been intentionally removed.**

**See API Specification Q1 (Annex A), or the API website for information pertaining to the API Monogram Program and use of the API Monogram on applicable products.**

*3.1.12.1: The definition shall be changed as indicated by the red box:*

#### **3.1.12.1**

##### **class 2 bolting**

Bolting in the riser's primary load path not exposed to subsea environment or any subsea pressure-containing bolting not intended for wellbore fluid containment.

*3.1.12.2: The definition shall be changed as indicated by the red box:*

#### **3.1.12.2**

##### **class 3 bolting**

Subsea bolting in the riser's primary load path or bolting whose failure could result in release of wellbore fluid to the environment.

*3.1.12.3: The NOTE below the definition shall be changed to the following:*

NOTE Examples include bolting on lifting eye, wear bushing, nameplate, clamps for tubing, guards, buoyancy supports, lockdown screws, keeper plate screws, hydraulic cylinders (not in the riser primary load path, whose failure would not result in the release of wellbore fluid to the environment), or not in riser running and handling equipment load path.

*3.1.47: The definition shall be changed to the following:*

#### **3.1.47**

##### **maximum supply pressure**

##### **MSP**

Highest pressure that can be supplied to the tensioners at the stroke corresponding to the rated tension.

NOTE See 7.3.1.1 for rated tension.

3.1.60: The following definition shall be added as 3.1.60, with all subsequent definitions renumbered:

### **3.1.60**

#### **riser primary load path**

The path through which riser tensioning loads pass from and including the lower flex joint to, but exclusive of, the tensioner foundation.

NOTE All components from the lower flex joint to the tensioner foundation through which riser tension loads pass are in the primary load path. Examples of components in the riser primary load path include: flex joints, riser joints, riser coupling, tension ring, riser tensioner assemblies, both direct connect and wire line type, and idler sheaves. The tensioner foundation is not included in this definition.

3.2: The CEM entry shall be deleted and replaced with the following:

OEM original equipment manufacturer

5.4.1.2.2: Under the "Impact Testing" heading, the last sentence of the first paragraph shall be changed to the following NOTE:

NOTE Impact energy requirements may be reduced by a factor of 0.833 and 0.667 for  $3/4$  size and  $1/2$  size specimens, respectively.

5.4.1.3.2: Under the "Impact Testing" heading, the third sentence shall be changed to the following NOTE:

NOTE Impact energy requirements may be reduced by a factor of 0.833 and 0.667 for  $3/4$  size and  $1/2$  size specimens, respectively.

5.5.3: The section shall be replaced by the following:

## **5.5.3 Bolting for Marine Drilling Riser Equipment**

### **5.5.3.1 Class 3 and Class 2 Bolting**

For class 3 and class 2 bolting, the following requirements shall apply.

- Manufacturers shall have a documented procedure for the qualification of bolting manufacturers, which follows the requirements of API 20E and API 20F.
- Bolting manufactured from low alloy steel or carbon steel shall not exceed 34 HRC due to concerns with hydrogen induced stress cracking.
- Bolting exposed to wellbore fluids shall meet the requirements of NACE MR0175/ISO 15156.
- Manufacturers shall have documented specifications that include the thread form and dimensions of studs, nuts, and bolts.
- When headed, bolting shall be created through the hot upset, closed die forging process.
- Bolting manufactured from proprietary materials shall conform to the manufacturer's written specification and the requirements of API 20E or API 20F with the exception that the material shall meet manufacturer's specified chemical composition and mechanical properties (per Table 2).

Riser coupling bolting shall be considered class 3 bolting regardless of location in the riser string.

Bolting above the tension ring excluding riser coupling bolts in the primary load path shall be considered class 2.

Bolting below the tension ring in the primary load path shall be considered class 3.

Primary-load-path bolting on the tension ring and primary-load-path riser tensioner attachments to it shall be class 3.

Bolting in the risers’s load path during running/handling operations for Riser Running & Handling Equipment as defined by Section 14 shall be class 2 or class 3.

Bolting for riser tensioner equipment shall meet the requirements of Section 7

**5.5.3.2 Utility Bolting**

Utility bolting shall conform to the manufacture’s written specification (per Table 2).

NOTE 1 The control of hardness levels, cathode protection, coating type and manufacturing process can be considered together in to avoid hydrogen-induced stress cracking.

NOTE 2 Section 5.8.2 discusses coating applied by plating.

NOTE 3 Section 3.1.12 defines bolting class.

**Table 2—Bolting Requirements**

<b>Bolting Type</b>	<b>Material</b>	<b>Requirement Source</b>
Class 3	Alloy steel and carbon steel	API 20E BSL-3
	Stainless steel and corrosion-resistant alloy (CRA)	API 20F BSL-3
Class 2	Alloy steel and carbon steel	API 20E BSL-2
	Stainless steel and CRA	API 20F BSL-2
Utility	Alloy steel and carbon steel	Manufacturer’s specification
	Stainless steel and CRA	Manufacturer’s specification

7.3.1.1: *The section shall be changed to the following:*

Tensioners shall be rated at the 75 % stroke position for compression-loaded tensioners and 25 % stroke position for tension-loaded tensioners since achieving 50 % (mid-stroke) setting can rarely be achieved or maintained (see Figure 1). The rated tension shall not exceed MCP at any stroke.

NOTE Achieving or maintaining 50 % (mid-stroke) setting may be compromised by one or more of the following:

- riser geometry might not position the tension ring exactly where a mid-stroke position can be obtained,
- Increased tension with increased mud weights results in additional riser stretch,
- tidal changes at the well site can result in changes to the original stroke setting.

7.5.1: *The section shall be replaced with the following:*

Pressure vessels shall be designed, fabricated, and tested in accordance with ASME *BPVC*, Section VIII, Division 1 or Division 2; ISO 11120; or other nationally or internationally recognized standards. Alloy or carbon steel vessels shall include 0.063-in. minimum corrosion allowance. This corrosion allowance shall apply regardless of the compressible medium used. Each vessel shall be equipped with a shut-off valve, drain valve, and pressure-relief device.

NOTE Pressure vessels may contain either air or an inert gas as the compressible medium.

7.5.2: *The first sentence shall be changed to the following:*

Cylinders shall be designed, fabricated, and tested to conform to the requirements of ASME *BPVC*, Section VIII, Division 1 or Division 2, or other nationally or internationally recognized standards.

7.5.9: *The following new section shall be added:*

#### **7.5.9 Riser Tensioner Bolting**

Bolting for riser tensioner cylinders that is not located subsea or in the splash zone shall conform to ASME *BPVC*, Section VIII, Division 1 or Division 2, or other nationally or internationally recognized standards.

Bolting for pressure vessels that is not located subsea or in the splash zone, shall conform to ASME *BPVC*, Section VIII, Division 1 or Division 2, or other nationally or internationally recognized standards.

Bolting for piping shall conform to ASME B31.3 or other nationally or internationally recognized standards.

All other bolting shall be in accordance with 5.5.3 with the following exceptions.

— Utility bolting shall conform to an industry standard or the OEM requirements.

14.3.2: *The following subsection shall be added, and all subsequent subsections shall be renumbered:*

#### **14.3.2 Riser Running Tool**

The riser running tool shall include a method to confirm running tool engagement and provide a positive lock signal output. The output signal shall provide positive indication that the riser running tool lock or latch is engaged prior to lifting. The tool shall also provide a visual indication of positive lock and engagement. Riser running tools that use flanged riser bolts shall be excluded from the lock signal output requirement.

The method of correct installation verification shall be documented within the OEM manuals.

NOTE These tools are typically hydraulic riser running tools.

*14.3.3.5—Ultimate Strength (Plastic) Analysis [section renumbered after insertion of new section 14.3.2 (Riser Running Tool)]:*

*The NOTE shall be replaced with the following:*

Elastic-perfectly plastic material properties shall be used for shakedown analysis. The design is acceptable if shakedown occurs after successive application of load. The application of load shall include the proof load and hydrostatic testing as well as operational loading.

NOTE Shakedown analysis is an alternative to linear elastic analysis that can be used to justify high local primary and secondary stresses.

*14.4.1.1 / 14.4.1.2: The following sections shall be added after 14.4.1:*

**14.4.1.1 Prototype Strength Testing**

Prototype testing shall be performed to validate the strength analyses specified in 14.3.3. The component rated load shall be applied to verify any assumptions made in the analysis of the component.

NOTE The prototype testing has two primary objectives: to verify any assumptions made about preloading, separation behavior, friction coefficients, structural material response, and boundary conditions and to substantiate the analytical stress predictions.

Strain measurements shall be determined as near as physically possible to at least five of the highly stressed locations and five locations away from stress concentrations as predicted by the methods in 14.3.3. The measurements shall correlate to the design methodology used to within manufacturer's acceptance criteria.

**14.4.1.2 Riser Running Tool Positive Lock Indication**

Prototype testing shall confirm the following results are produced.

- a) The positive lock indication delivers a positive output signal when the tool is properly engaged in and locked to the riser joint or a fixture that replicates the riser coupling interface geometry.
- b) The positive lock indication does not deliver a positive output signal (false positive) if the device is not properly engaged and is not locked to the riser joint or a fixture that replicates the riser coupling interface geometry.

*14.4.2.3: The section shall be replaced with the following:*

A functional test shall be performed to ensure proper operation of the components. The functional test shall be performed after the completion of the production load test and after the completion of the pressure test, including inspection in accordance with Section 6.

Riser running tool positive lock indication functional testing shall confirm that the method used gives a positive output signal when the tool is properly engaged in a riser joint.

16.5: The section shall be replaced with the following:

## **16.5 Testing**

### **16.5.1 Test Types**

#### **16.5.1.1 General**

Three types of full-scale design qualification tests shall be performed:

- a tensile load test to establish the rated load of the coupling design,
- a makeup test to demonstrate the ability of the coupling to be correctly made up in the field and the repeatability of proper makeup, and
- an internal pressure test to check pressure integrity and seal effectiveness.

These tests shall be performed on a full-scale coupling specimen(s) to qualify the design of each coupling model.

To assure validity of the test results, the testing machine shall be qualified and calibrated and so documented.

The test coupling for all verification and qualification tests shall be built to standard dimensions and manufacturing tolerances and have standard finishes, coatings, and materials. These tests and those described in 16.5.2 shall be for design evaluation only; they are not intended for in-service readiness testing.

**NOTE** Optional performance tests listed in Annex J may also be included. A cyclic load or fatigue test may be performed to verify fatigue calculations and to check that no areas of stress concentration were overlooked in the design analysis. Cyclic testing to failure yields a data point to aid in predicting fatigue life. Other optional performance testing may be included to substantiate serviceability.

#### **16.5.1.2 Scaling**

Scaling may be used to validate the members of a product family in accordance with the requirements and limitations described in 16.5.1.3.

If scaling is used to validate the same product family, testing shall qualify only products of the same family having one nominal rated load (refer to 16.2.3) lower than tested size.

#### **16.5.1.3 Product Family**

A product family shall meet the following design requirements:

- a) Configuration: The design principles of physical configuration, material properties, and functional operation are the same.
- b) Design stress levels: The design stress levels in relation to material mechanical properties are based on the same criteria.
- c) Analyzed stress levels: The analyzed stress levels and SAF/SLR in the scaled product shall not exceed the analyzed stress levels and SAF/SLR in the product that is validated per 16.5 when applying the same design methodology.

*C.2: The first sentence shall be replaced by the following:*

For all components except coupling bolts and auxiliary, choke, and kill rigid piping, linearized stresses shall be less than or equal to the allowable stresses as defined below.

*Annex F: In the Manufacturing Data Book table, in the “Test Report(s), Pressure Testing, and Final Acceptance Testing” section, the following changes shall be made:*

- “Dimensions (as defined by OEM/CEM)”

shall be changed to

“Dimensions (as defined by OEM)”

- “All remaining documentation required as defined in API 16F are kept at OEM/CEM facility for required retention period”

shall be changed to

“All remaining documentation required as defined in API 16F are kept at OEM facility for required retention period”