Changes for API 6A 21st Edition

Log of Submitted Changes API 6A TG 2
Revised October 29, 2013...
Added Items 138,139,140 & 141

1. Casting and forgings – MATERIALS -
   • Provide additional guidance in Annex A proposed in meeting minutes from 2009 winter meeting (on API website) DESIGN
     o Proposal was to add language to Annex A to provide guidance or limits for service applications
   • TG Notes from July 2010 stated "Within a given PSL, castings and forgings should possess an equivalent integrity level". MATERIALS
   • Could work done on 20A be of use here? MATERIALS
   • Reference George Hill report from SC-6 Winter meeting

2. Consider SC 20 document references to standard. Consider informative annex that provides suggestions for relating SC20 quality levels to PSL levels in 6A or to the service applications of equipment. MATERIALS/ORGANIZATION/QUALITY-ORGANIZATION
   i. Are the 20 series documents up to the level of 6A
   ii. Incorporate in the body of the text as an optional requirement
   b. Determine how to link SC-20 requirements to API 6A requirements
c. Guidance – as an example “Products which meet the requirements of 20A meet the requirements of this specification”

3. Make reference to Q2 requirements in 6A to address maintenance of service tools. Consider adding Q2 reference in Annex H and expand to include maintenance. NA
   • Current Annex H only addresses design and manufacture of service tools.
   • Another alternative is to expand the Repair and Remanufacture Annex J to capture requirements specific to service tools or develop a separate maintenance document for service tools
   • Clause 1.1 states "This International Standard does not apply to field use, field testing or field repair of wellhead and christmas tree equipment."
4. Address requirements for fittings (test, vent and grease) that would better clarify what are the barriers or critical parts, materials of construction, qualification, quality, what needs to be tested during FAT and requirements for fittings in HH clad equipment (partial penetration welding/inspection, threads/fitting prep in clad material, fittings and ports in base material)/define weld overlay surfaces for test, vent and grease ports.

**DESIGN/QUALIFICATION/MATERIALS/QUALITY/ORGANIZATION**

**DESIGN**
- Determine standard functional requirements
- Method to vent pressure
- Capacity/method of securing to body
- Use of thread sealants/tape
- Pressure ratings

**QUALIFICATION**
- Method for FAT Testing
- Methods to qualify design

**MATERIALS**
- How do you transition from CRA to Alloy for HH Trim?
- Minimum material properties for strength
- Minimum material properties for corrosion resistance

**QUALITY**
- Production testing requirements
- Dimensional Inspection Requirements
- NDE
- Hardness testing
- PSLs
- Application of Monogram
- Marking requirements

**ORGANIZATION**
- Where do we put it?

- A requirements section for bleeder type fittings has long been needed
• AWHEM has developed a document to address bleeder plug dimensional information. This document could possibly help as a starting document.

5. Provide references to new API 6X design method document in lieu of the ASME BPV code for design methodology. John Fowler is currently working on this methodology.
   DESIGN/ORGANIZATION See Annex A for additional information. DESIGN

6. Address HPHT design in annex G including reference to PER15 and 17TR8
   DESIGN/MATERIAL/QUALITY/QUALIFICATION/ORGANIZATION Defer pending outcome of 17TR8
   - Clarify 350°F equipment monogramming capability for de-rated equipment.
   - Annex G - Should it be extended to some intermediate temperature ranges or add statement concerning linear interpolation.
   - Determine which equipment may need to be removed from the document and added to a “6A-HPHT” document.
   - Reference withdrawn 6AB.

7. Correct API 6AV1 references (Annex I versus 6AV1)
   ORGANIZATION
   - API Spec 6AV1 is currently called out as a normative reference in Clause 2, Annex I and Annex P (monogram)
   - Clause 3 defines the test agency with a reference to Class II validation
   - Should Annex I be removed and a reference to API 6AV1 Rev 2 replace this Annex? What are the ramifications of doing this?
   - Section 10.20 SSV / USV needs to be updated to reflect changes in API6AV1, i.e. Class III Sandy Service, elimination of Class I
   - Qualification of SSV/USV for dynamic closing capabilities against high flow conditions

8. Clarify requirements to monitor visible leakage during FAT testing and if consideration can be given to pressure drop during FAT test as justification for pressure test acceptance.
   QUALIFICATION
   - Gas testing is very volume dependant.
   - When is a bubble a leak? How do you know when you have stabilized? How accurately do you need to measure it?
   - Settling rate not to exceed 3% is used in 17D. Should we consider aligning test requirements? Terminology should match between 6A and 17D. Today anything visible is considered a leak.
   - Does low pressure test (300 psi) need -10% tolerance? Metric conversion is 290 psi.
9. Consider if alignment or option to perform additional life-cycle/endurance testing in API 17D 5.1.7.7 is appropriate for 6A equipment or specific service applications. Consider if a standard form is appropriate to document qualification status of equipment (example 17Q Annex C).
demonstrated that pressure and/or temperature testing similarly loads the component or assembly to that condition specified for endurance-cycle testing, those cycles can be accumulated toward the total number of cycles specified for endurance-cycle testing. For example, the 200/3 pressure/temperature cycles used to test a valve can cumulatively qualify as 203 cycles toward the 600 total cycles required for endurance cycling.

Table 3 — Minimum validation test requirements

<table>
<thead>
<tr>
<th>Component</th>
<th>Pressure/load cycling test</th>
<th>Temperature cycling test(^a)</th>
<th>Endurance cycling test (total cumulative cycles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal seal exposed to well bore in production</td>
<td>200</td>
<td>3</td>
<td>PMR(^e)</td>
</tr>
<tr>
<td>Metal seal not exposed to well bore in production</td>
<td>3</td>
<td>3</td>
<td>PMR(^e)</td>
</tr>
<tr>
<td>Non-metallic seal exposed to well bore in production</td>
<td>200</td>
<td>3</td>
<td>PMR(^e)</td>
</tr>
<tr>
<td>Non-metallic seal not exposed to well bore in production</td>
<td>3</td>
<td>3</td>
<td>PMR(^e)</td>
</tr>
<tr>
<td>OEC</td>
<td>200</td>
<td>NA</td>
<td>PMR(^e)</td>
</tr>
<tr>
<td>Wellhead/tree/tubing head connectors</td>
<td>3</td>
<td>NA</td>
<td>PMR(^e)</td>
</tr>
<tr>
<td>Workover/Intervention connectors</td>
<td>3</td>
<td>NA</td>
<td>100</td>
</tr>
<tr>
<td>Tubing heads</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Valves(^b)</td>
<td>200</td>
<td>3</td>
<td>600</td>
</tr>
<tr>
<td>Valve actuators</td>
<td>200</td>
<td>3</td>
<td>600</td>
</tr>
<tr>
<td>Tree cap connectors</td>
<td>3</td>
<td>NA</td>
<td>PMR(^e)</td>
</tr>
<tr>
<td>Flowline connectors</td>
<td>200</td>
<td>NA</td>
<td>PMR(^e)</td>
</tr>
<tr>
<td>Subsea chokes</td>
<td>200</td>
<td>3</td>
<td>500</td>
</tr>
<tr>
<td>Subsea choke actuators</td>
<td>200</td>
<td>3</td>
<td>1000(^e)</td>
</tr>
<tr>
<td>Subsea wellhead casing hangers</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Subsea wellhead annulus seal assemblies (including emergency seal assemblies)</td>
<td>3</td>
<td>3</td>
<td>NA</td>
</tr>
<tr>
<td>Subsea tubing hangers, HXT internal tree caps and crown plugs</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Poppets, sliding sleeves, and check valves</td>
<td>200</td>
<td>3</td>
<td>PMR(^e)</td>
</tr>
<tr>
<td>Mudline tubing heads</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Mudline wellhead, casing hangers, tubing hangers</td>
<td>3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Running tools(^d)</td>
<td>3</td>
<td>NA</td>
<td>PMR(^e)</td>
</tr>
</tbody>
</table>

NOTE: Pressure cycles, temperature cycles and endurance cycles are run as specified above in a cumulative test with one product without changing seals or components.

\(^a\) Temperature cycles shall be in accordance with ISO 13423.

\(^b\) Before and after the pressure cycle test a low-pressure, 2 MPa (300 psi) ± 10%, leak-tightness test shall be performed.

\(^c\) PMR signifies “per manufacturer rating”.

\(^d\) Subsea wellhead running tools are not included.

\(^e\) A choke-actuator cycle is defined as total choke stroke from full-open to full-close or full-close to full-open.
10. Consider addressing requirement or validation process (such as SC 20 qualification levels) to achieve necessary properties through cross section of raw material (strength, toughness). MATERIALS
   - Add 6HT to Normative References. See Clause 5.4.4.
   - Going beyond QTC can have impact on closed die forgings
   - Joel Russo may have comments

11. VR / HPVR Updates - ORGANIZATION
   - Consider allowing use of HPVR in low pressure equipment
   - Add new size (4") VR plug - Currently under testing
   - Edits to document have been completed by TG and need to be added to document

12. Requirements for O-ring/seals needs to be identified as PSL-3 for VR plugs and top connectors.
   - Update Clause 10.22.4 to add o-ring/seal requirement - ORGANIZATION

13. Consider identifying minimum requirements for materials and quality control for metal seals, similar to elastomer seals. Should apply to ring gaskets.
   - PSL, Materials, Storage & Shipping? QUALITY

14. Clarify the requirements for wear bushings by resolving conflict between Annex H and Clause 5.11. ORGANIZATION
   - Can the requirement just be removed and left to manufacturer?

15. Review BPV design parameters to insure adequate design for intended use as a barrier. DESIGN
   - Venting
   - Safety
   - Energy dissipation tool
   - Field refurbishment/retesting of tools after repair/remanufacture

16. Consider requirement for CRAs listed in API 6A 718 to meet the requirements of API 6A 718. MATERIALS/ORGANIZATION MATERIALS
   - API 6A 718 should be added to normative references
   - Will have to call out in the specification

17. Annex J, Provide a process to test and inspect equipment and return to the field. Currently this would fall under RL1 which does not provide for certificate of conformance, assembly traceability and quality records. Some repair/disassembly could
be allowed such as removing a blind flange, removing a tree top cap, removing/installing a hand wheel, removing a fitting, needle valve, gauge or cap on a grease fitting, greasing equipment.....

- How many times can hydro-test be completed on a body? Should we limit this?
- Do we need to identify situations that would warrant a hydro and not a body test?
- Do we need a design for a 15K test flange?
- Do we need a RL 0 option (test to WP and return)?

**REPAIR & REMANUFACTURE**

**QUALITY**

18. Organize document **ORGANIZATION**

- Remove ISO 10423 requirement for marking
- Remove reference to ISO 10423 in main body (each page)
- Remove Annex O (regional Annex) by adding requirements to main body
- Determine imperial / metric dimension locations
- Review interpretations for inclusion with clarification to document
  - NACE "NL" marking

19. Clarify cladding requirements **MATERIALS**

- Minimum cladding thickness requirement. Define when to use Fe 5 and Fe 10.
- Cladding requirements for other than body and bonnet
- Post-cladding heat treat requirements need to be addressed

20. Clarify welding procedure qualification requirements (6.3.2.3) **MATERIALS/ORGANIZATION**

**MATERIALS**

Following are current issues that with the guidelines in API 6A regarding hardness testing of weld procedure qualifications.

1. API 6A establishes its intent regarding hardness testing early on under PSL 1 requirements

6.3.2.3.d) Second Paragraph

*The manufacturer shall specify the hardness testing locations in order to determine maximum hardness. Testing shall be performed on the weld and base-material HAZ cross-section....*

Under PSL 3 requirements, guidelines are more prescriptive in that we are told where to perform that hardness tests. Unfortunately, they are contradictory and inadequate.

2. 6.3.4.2.3.a), 4th paragraph & Figures 4 & 5 (Hardness testing of Groove Welds)
For all thicknesses, HAZ hardness tests shall be performed in the base material within 2 mm (1/16 in) of the weld interface.

As we move further from the fusion line, hardness in the HAZ drops, so when the 2 mm was added to 6A, it allowed labs to move even farther away from the fusion line. Depending on preheat/interpass temperature, heat input and wall thickness, the high temperature portion of the HAZ is barely 1/16 (0.062 in) wide. Allowing the indent to be 2 mm away from the interface result in less of the high hardness portion of the HAZ to be sampled.

The text states that the hardness test shall be performed within 2 mm (1/16 in) of the weld interface; however the sketches of Figure 4 show the 2mm dimension line going through the center of the indent. Hardness indents centered 2 mm away from the weld interface will miss most of the hardest portion of the HAZ.

**Recommendation** – Maintain the same text, except change the dimension to 1.6 mm (1/16 in). Change the sketches of Figure 4 to show the indents within the 1.6 mm envelope, not centered on it. This is easily achievable and for most welds will capture a large portion of the high temperature HAZ.

3. **6.5.1.2.2.c) 2nd paragraph and Figure 6 (Hardness testing for Overlay Welds)**

Invokes the same figure 6 for both Rockwell and Vickers hardness testing. In Figure 6, the dimensions show the indents to be within the 2 mm (1/16 in) envelope. This is good except the 2 mm should be changed to 1.6 mm.
For Vickers testing, the dimensions shown in Figure 5 for HAZ spacing from the weld interface (.3 mm, 0.010 in) should be specified.

Recommendation – On Figure 6, change the 2 (1/16) dimension to 1.6 (1/16). Use this sketch for Rockwell hardness testing. For Vickers hardness testing create a second sketch with the only dimensional difference being the distance of the indent to the weld interface. To be consistent with Figure 5, this dimension should be 3 mm (0.10 in).

NACE MR0175/ISO 15156 states that the indents should be as close as possible to but no more than 1 mm from the fusion boundary.

As we move into the HPHT arena, fatigue may become somewhat more of an issue. Industry practice is moving to a Vickers hardness testing requirement to detect banding in the HAZ and requirements for closer hardness test spacing than the NACE requirement is more common.

Given the work that is currently being done to develop SC-20G standards around welding qualification, it may be worth tabling this issue until the SC-20G work is completed.

21. ALLOY 625 OVERLAY MINIMUM THICKNESS LIMIT MATERIALS/ORGANIZATION send to Round Table

- API 6A specifies two options for the percent iron in Alloy 625 overlays, but does not specify a minimum thickness limit.
- Clause 6.5.1.1.2 a states the following:
Chemical analysis shall be performed on the weld metal in accordance with the requirements of ASME, BPVC:2004, Section IX, at a location 3 mm (0.125 in) or less from the original base-metal surface. The chemical composition of the deposited weld metal at that location shall be as specified by the manufacturer or where applicable in this specification. For austenitic or 300 series stainless steels, the chemical composition shall be as given in Table 13.

For nickel-based alloy UNS N06625, the chemical composition shall meet one of the classes given in Table 15.

Table 15 — Chemical composition of the nickel-based alloy UNS N06625

<table>
<thead>
<tr>
<th>Class</th>
<th>Element</th>
<th>Composition % mass fraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fe 5</td>
<td>Iron</td>
<td>5.0 max.</td>
</tr>
<tr>
<td>Fe 10</td>
<td>Iron</td>
<td>10.0 max.</td>
</tr>
</tbody>
</table>

- A minimum thickness limit is needed to prevent manufacturers from applying a very thin layer of Alloy 625 on surfaces that may be subject to mechanical damage, erosion, or erosion/corrosion. For example, a 0.050” thick Alloy 625 overlay on the bore of a tree valve may not be thick enough to withstand the scratching and scoring that can occur during wireline operations.

- In the early days of overlaying API 6A equipment with Alloy 625 when only a 5% maximum iron limit was imposed by customers, the dilution levels resulting from the welding processes and equipment available meant that most overlays were provided with a 0.110” or 0.125” minimum thickness as it typically required two passes to achieve the required dilution.

- Now, with the option for 10% maximum iron and much new and sophisticated welding equipment, much thinner overlays can be applied that meet the API dilution levels. Not only is this true for the 10% maximum, it is also true for the 5% maximum.

- Before someone has a field failure due to too thin of an Alloy 625 overlay, API should act to specify a minimum Alloy 625 overlay thickness or several minimum Alloy 625 overlay thicknesses, depending on the application or location in the equipment.

- For reference, NORSOK M-001 specifies a minimum thickness of 3 mm for weld overlays.

22. Table 1 - Internal thread ratings. - No consideration is given for material strength or wall thickness. SEE ITEM 4 DESIGN

• Needs clarification.
• Look at how table 1 is invoked
Table 1 — Pressure ratings for internal threaded end or outlet connections

<table>
<thead>
<tr>
<th>Type of thread</th>
<th>Nominal pipe size</th>
<th>Size OD</th>
<th>Rated working pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(nominal sizes)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line, pipe: NPT</td>
<td>1/2</td>
<td>21.3</td>
<td>MPa</td>
</tr>
<tr>
<td></td>
<td>3/4 to 2</td>
<td>26.7 to 60.3</td>
<td>49.0</td>
</tr>
<tr>
<td></td>
<td>2 1/2 to 6</td>
<td>73.0 to 168.3</td>
<td>34.6</td>
</tr>
<tr>
<td>Tubing, non-upset, and external upset round thread</td>
<td>1,050 to 4 1/2</td>
<td>26.7 to 114.3</td>
<td>20.7</td>
</tr>
<tr>
<td>Casing (8 round, buttress, and extreme line)</td>
<td>4 1/2 to 10 3/4</td>
<td>114.3 to 273.1</td>
<td>34.5</td>
</tr>
<tr>
<td></td>
<td>11 3/4 to 13 3/8</td>
<td>206.5 to 339.7</td>
<td>20.7</td>
</tr>
<tr>
<td></td>
<td>16 to 20</td>
<td>406.4 to 508.0</td>
<td>13.8</td>
</tr>
</tbody>
</table>

Table 7: This can be replaced by a sentence: Minimum average impact values in the transverse direction is 15 ft-lb (20J) as follows: for PSL 3 and 4, all temperature classes. For PSL 2, -20 F and lower. For PSL 1, -50 F and lower.

Table 7 — Charpy V-notch impact requirements — 10 mm × 10 mm

<table>
<thead>
<tr>
<th>Classification</th>
<th>Test °C (°F)</th>
<th>Minimum average impact value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Transverse direction J (ft·lbf)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PSL 1</td>
</tr>
<tr>
<td>K</td>
<td>-60 (-75)</td>
<td>20 (15)</td>
</tr>
<tr>
<td>L</td>
<td>-46 (-50)</td>
<td>20 (15)</td>
</tr>
<tr>
<td>N</td>
<td>-46 (-50)</td>
<td>20 (15)</td>
</tr>
<tr>
<td>P</td>
<td>-29 (-20)</td>
<td>—</td>
</tr>
<tr>
<td>S</td>
<td>-18 (0)</td>
<td>—</td>
</tr>
<tr>
<td>T</td>
<td>-18 (0)</td>
<td>—</td>
</tr>
<tr>
<td>U</td>
<td>-18 (0)</td>
<td>—</td>
</tr>
<tr>
<td>V</td>
<td>-18 (0)</td>
<td>—</td>
</tr>
</tbody>
</table>
24. Table 62 - Stud and nut materials. Two columns are redundant. See the attached slide from John Fowler 6A seminar. Also instead of the list of flanges that cannot be used with 80 ksi studs, replace with a reference to TRs 6AF and 6AF2. This will enable the user to specify low strength studs for applications when the well pressure is less than the maximum flange rating.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Material class</th>
<th>Temperature rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO 15156: (all parts) (NACE MR0175, see Clause 2)</td>
<td>AA, BB or CC</td>
<td>P, S, T or U</td>
</tr>
<tr>
<td>Size and rated working pressure</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Bolting</td>
<td>ASTM spec grades and materials</td>
<td></td>
</tr>
<tr>
<td>0.2 % offset yield strength MPa minimum</td>
<td>725 (≥ 63.5 mm)</td>
<td>725 (≥ 63.5 mm)</td>
</tr>
<tr>
<td>0.2 % offset yield strength (ksi) minimum</td>
<td>655 (&gt; 63.5 mm)</td>
<td>655 (&gt; 63.5 mm)</td>
</tr>
<tr>
<td>Hardness as per ISO 15156 (all parts) (NACE)</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Note: For the table, it is recommended to replace references to flanges that cannot be used with 80 ksi studs with a reference to TRs 6AF and 6AF2.
25. Table 80 - minimum bore of heads. Review this table for its usefulness since larger and smaller bores are permitted. ORGANIZATION

a. Discrepancy with common casing sizes/weights
26. Table 83 - Maximum OD of hangers. This can be reduced to two columns: the flange size and the maximum hanger OD. The pressure rating has no effect on the hanger.
So there would then be only eight rows, one for each nominal flange size. **ORGANIZATION**

### Table 83 — Maximum hanger outside diameter for wellheads

<table>
<thead>
<tr>
<th>Nominal size and minimum through-bore of drill-through equipment</th>
<th>Rated working pressure</th>
<th>Maximum outside diameter of hanger</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>mm</strong></td>
<td><strong>(in)</strong></td>
<td><strong>MPa</strong></td>
</tr>
<tr>
<td>179</td>
<td>7 1/16</td>
<td>13,0; 20,7 and 34,5</td>
</tr>
<tr>
<td>179</td>
<td>7 1/16</td>
<td>69,0; 103,5 and 138,0</td>
</tr>
<tr>
<td>228</td>
<td>9</td>
<td>13,8; 20,7 and 34,5</td>
</tr>
<tr>
<td>228</td>
<td>9</td>
<td>69,0 and 103,5</td>
</tr>
<tr>
<td>279</td>
<td>11</td>
<td>13,8; 20,7 and 34,5</td>
</tr>
<tr>
<td>279</td>
<td>11</td>
<td>69,0 and 103,5</td>
</tr>
<tr>
<td>346</td>
<td>13 5/8</td>
<td>13,8 and 20,7</td>
</tr>
<tr>
<td>346</td>
<td>13 5/8</td>
<td>34,5 and 69,0</td>
</tr>
<tr>
<td>425</td>
<td>16 5/8</td>
<td>13,8 and 20,7</td>
</tr>
<tr>
<td>425</td>
<td>16 5/8</td>
<td>34,5 and 69,0</td>
</tr>
<tr>
<td>476</td>
<td>18 5/8</td>
<td>34,5 and 69,0</td>
</tr>
<tr>
<td>540</td>
<td>21 1/4</td>
<td>13,8</td>
</tr>
<tr>
<td>527</td>
<td>20 3/4</td>
<td>20,7</td>
</tr>
<tr>
<td>540</td>
<td>21 1/4</td>
<td>34,5 and 69,0</td>
</tr>
</tbody>
</table>

*Nominal size of upper end connection of wellhead body in which the hanger is used.*

27. **Figure 19 Discrepancies – Jean Brunes/Eric Wehner **

*See ITEM 4 - This is an error that needs to be fixed*

Industry data:

**Parker Autoclave High Pressure FC**

<table>
<thead>
<tr>
<th>Table Outside (inches)</th>
<th>Connection Type</th>
<th>Dimensions inches (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>1/4</td>
<td>F200C</td>
<td>33/64 (13.1)</td>
</tr>
<tr>
<td>3/8</td>
<td>F375C</td>
<td>11/16 (17.4)</td>
</tr>
<tr>
<td>9/16</td>
<td>F620C</td>
<td>1-3/64 (26.5)</td>
</tr>
<tr>
<td>9/16</td>
<td>F622AD</td>
<td>1-3/64 (26.5)</td>
</tr>
<tr>
<td>5/16</td>
<td>F312C/50</td>
<td>3/4/64 (14.7)</td>
</tr>
<tr>
<td>1</td>
<td>F1000C43</td>
<td>1-15/64 (32.9)</td>
</tr>
</tbody>
</table>

API Figure 19
• Figure is misleading – differences from b) to d)
• Dimensions do not match current industry practice
• Relief groove diameter and location discrepancies with current practice
• Venting not clearly defined / fitting option should be considered
• Vent hole intersects threads
• The minor diameter – for a 1.125-12 UN-2B thread is incorrect, the correct dimension is 1.035/1.053. The dimension was added in the 17th edition as 1.035/1.056
• Do we need a Type I connection?

28. Changes to LIF to match document (Jerry Longmire/Ed Baniak) QUALITY

a. Should it be responsibility of Monogram program to keep this form up to date with current edition document?

b. Actuator types need differentiation
i. For Non-Retained Fluid Powered Actuators there are no PSL level designations.

c. Keep a placeholder so this can be addressed at the appropriate time.

d. Should we address valves prepped for actuators monogram question?

---

### Licensing Information Form For API Spec 6A

**Wellhead and Christmas Tree Equipment**

<table>
<thead>
<tr>
<th>Products</th>
<th>Class Highest level to be manufactured (PSL)</th>
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<td>Adaptor and Spool Spools</td>
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<td>Casing and Tubing Hangers</td>
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<td>Ring Joint Ducks</td>
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</table>

Please place a check mark (\(\)) in each box that corresponds to the products you are applying to manufacture and monogram. (If using electronic PDF form, click your thesis in the developing box and the check marks will appear.)
29. **Flange Dimension Error**

Table B.53 shows the 5-1/8” 10M flange thickness as 3.12”, which is correct.
Table B.55 shows the 5-1/8” 10M flange thickness as 3.13”. **incorrect**
Table B.57 shows the 5-1/8” 10M flange thickness as 3.13”. **incorrect**

The original flange thickness was 3-1/8”.

FYI, Tables 53, 55 & 57 show the thickness as 79.4 mm.

<table>
<thead>
<tr>
<th>Dimensions in inches</th>
<th>(1) Nominal size and bore of flange</th>
<th>B</th>
<th>OD</th>
<th>tol.</th>
<th>C</th>
<th>K</th>
<th>Total thickness of flange</th>
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<th>Small diameter of hub</th>
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<th>Radius of hub</th>
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<td>(3) Maximum chamfer</td>
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</table>
30. **Table dimensional errors (Ed Baniak/Eric Wehner)** Issued with latest errata

Tables 87 and 88 are both in error. For 13.8 MPa, 20.7 MPa, and 34.5 MPa, BV and BO should be 79 mm, not 78.

- Will errata be issued for this?

31. **Reference “X” Dimension (Eric Wehner)** DESIGN

   a. Presented at 2013 Winter Meeting

32. **Choke testing (John McCaskill)** QUALIFICATION

   API 6A revisions - Chokes having an inlet connection with a higher pressure rating than the outlet connection

   Referring to paragraph 7.4.9.3.3 b) of API 6A:
The equivalent paragraph in API 16C caused a lot of heat at the WAM. Certain operators vowed they would never approve the document unless this was removed, as it leaves no way to test the choke to its full pressure rating in the field.

“7.4.9.3.3 Hydrostatic body test — Single-equipment units

b) special considerations:

For equipment with end or outlet connections having different working pressures, use the lowest working pressure rating to determine the hydrostatic body test pressure (except for cross-over connectors and chokes).

Test a cross-over connector at a test pressure based on the pressure rating for the upper connection. Apply test pressure inside and above the restricted-area pack-off of the lower connection. The lower connection shall be tested below the restricted-area pack-off to a level based on its pressure rating.

For chokes having an inlet connection with a higher pressure rating than the outlet connection, test the body hydrostatically, from the inlet connection to the body-to-bean seal point of the replaceable seat or flow bean, to the appropriate pressure for the inlet connection. Test the remainder of the body, downstream from the seal point, to the appropriate pressure for the outlet connection. Temporary seat seals may be used to facilitate testing.”

Looking not only for guidance from the committee, but also recommending that we keep the documents in line by removing it from API 6A as well.

33. Allow use of Equotip in API 6A (Michael Cornelissen) QUALITY
   a. Other portable hardness measurement devices?
   b. Limit to screening?

34. Redefine PSL 1 QUALITY
   a. Limit Trims (no HH for PSL 1)
   b. Raise raw material requirements to PSL 2
   c. Limit pressure (no 15K, 10K?)
   d. Revise Annex A to limit application (ie. no tree valves)
35. Eliminate 316L cladding option for ring grooves (Eric Wehner) **MATERIALS**
   a. Remove all references to 316L cladding for ring grooves

36. Revise hydrostatic testing requirements and acceptance criteria **QUALITY**
   a. Visible/ detectable wording in acceptance criteria
   b. Only check after last test for visible leakage
   c. Provide acceptance criteria for valve operation/torque

37. Consider Normative Annex F (Make request for extended implementation period to CSOEM) Look at all the revisions of Annex F to ensure there aren’t products that would be invalidated. **QUALIFICATION**
   a. Possibly limit it to certain products
   b. Can this be invoked by product from the main document
   c. Operational model consideration
   d. Do we need 3rd party witness requirement? Could be difficult. Onerous.

38. Include Hip Material Requirements powder metallurgy (per NACE) **MATERIALS**
   a. Duplex
   b. 625M
   c. Process controls, NDT
   d. HIP Cladding outside the scope of 6A

39. Add note to identify all products that have complete design information within 6A **ORGANIZATION/DESIGN**
   a. Put notes in section 10 with associated equipment

API Spec 6A:

- Tees and Crosses;
- Ring Joint Gaskets;
- Top Connectors;
- Flanged Connectors (except Type 6B);
Threaded Connectors;
Adapter and Spacer Spools;
Bullplugs; and
Valve Removal Plugs.

40. 5B thread counter bores / API 6A differences DESIGN
   a. Investigate to see if 6A counter bore can be removed
   b. Address the gauging of threads with different counter bore dimensions
      i. Plug gages
      ii. Crest diameter

41. NPT versus Line-pipe DESIGN

42. Requirements around pressure containing elements that are not currently covered QUALITY
   a. Bonnet gasket
   b. Custom wellhead gaskets
   c. Packing retainer nuts

43. Requirements around pressure controlling elements that are not currently covered QUALITY
   a. Stem Drive Bushing/Nut
   b. Packoff bushings
   c. Hanger lock mechanisms

44. Marking of partial pressure of H2S, Cl, pH, Temperature, Elemental Sulfur MATERIALS
   a. Sub-Trim classes?
   b. Address use of NL (No Limit Defined)

45. Weld cladding requirements for components other than bodies MATERIALS

46. Create Annex with topical list for various products ORGANIZATION

47. Review list of RFI’s to see if there are other items that need to be added EVERYBODY
Ask Ed for list of all and circulate

48. Third level of qualification which meets top Tier Customer Critical Application needs, i.e. PR3 QUALIFICATION

49. Does PR1 have any value or should it be discontinued QUALIFICATION

50. Annex J needs to be updated to cover documentation sent to operator at RL2 level of repairs

   Traceability of components back to the assembly level for SSVs should be addressed for PSL2

   Align requirements between PSL2 and RL2 with consideration of 14H REPAIR AND REMANUFACTURE QUALITY

51. Submitted by David Comeaux

   Actuator retained fluid. The wording in section 10.16.3.2 leads you to believe that the only way to design an actuator for 6A retained fluid is if you create a piston housing which can contain full rated working pressure of the valve. This is problematic with pneumatics and does not have value. I believe the intent is as they are always used is to rate the actuator at working level of actuator not valve and provide provisions for dealing with over pressurization. This needs to be cleared up a bit in Section 10. Integral actuators are really the concern here. Design in such a way to handle an over-pressure situation (eg. Regulator, rupture disc). DESIGN

52. Submitted by David Comeaux - FAT and Annex F validation steps for chokes

   FAT and Annex F validation steps which reflect choke valves which make a control valve seal class claim for its trim, i.e. ANSI / FCE 70-2 class IV, V. API 6A current or past editions do not address leakage performance issues related to today’s commonly utilized choke valve styles, i.e. plug and cage and external sleeve trims. Control valves must meet leakage criteria, for Choke valves the most specified leakage criteria is either Class IV (hydro test .01% /min) ; or Class V (hydro test 10ml /min). Yet there are currently no performance expectations for chokes other than “pressure containing” criteria, avoiding “pressure controlling” criteria. I’m proposing that the TG consider building in validation approaches both at a FAT, and at an Annex F performance level for this functionality. (ANNEX F revision to accommodate choke performance) Might need to divide the chokes into different groups based on the type of seat seal which would be used QUALIFICATION

53. Remove the column for PSL 3G from Table 35 to align with 17D changes requested for gas testing on subsea wellheads (see Annex A for Attachment) Not Interested. Remove from list.
54. Use of Stainless in DD Valves - Eric Wehner - See Annex A for Full Text

Suggested revision in 21st edition: Clause 4.2.3.1

Replace:

“Provided the mechanical properties requirements can be met, stainless steels and/or CRA materials may be used for material classes AA and BB in place of carbon and low-alloy steels. Similarly, for all material classes, corrosion-resistant alloys may be used in place of stainless steels.”

With:

“Provided the mechanical properties requirements can be met, stainless steels and/or CRA materials may be used in place of carbon and low-alloy steels and corrosion-resistant alloys may be used in place of stainless steels. For material classes DD, EE and FF, any restrictions on the use of stainless steels and CRAs in NACE MR0175/ISO 15156 shall be considered. This could affect the maximum partial pressure of H2S, which is a required component of the material class designation.” MATERIALS

55. Submitted by David Comeaux - Definition of remanufacture should it also include other pressure containing components such as stem and bonnet not just disallow the replacement of bodies?

Annex J If you swap a body do you lose traceability/serialization. Take the requirement out of the definition see Item 58 REPAIR AND REMANUFACTURE QUALITY

56. Change Table F.3:

Remove 4-1/8” from the table and combine the 20-3/4” and 21-1/4” together

See Annex A for further explanation Scaling should be by nominal connector size. Cover 3” sizes as well. ORGANIZATION

57. Change Table F.24:

Provide clarification on what is intended by the endurance testing?

-Replace term “Endurance cycling” with “Dynamic Cycling”

Column in table does not match the text in the document

Remove entire table but ensure that all items are addressed in the text. Add a clause at the beginning of the annex to state that testing requirements not specified in this Annex are per manufacturers requirements. See F.2.1.2 QUALIFICATION

-Replace the 3 cycles required for wellhead housings/spools/cross-over connectors with "PMR" as there is no dynamic cycling for these in normal situations.

58. Change remanufacture definition Clause 3.1.93

remanufacture

activity involving disassembly, reassembly and testing of wellhead and christmas tree equipment, with or without the replacement of parts other than bodies, where machining, welding, heat treating or other manufacturing operations are employed. Remanufacture does not may include the replacement of bodies. Group not in favor of this change.

Go into body of the document and add requirements. Do not change the definition. Replacement of a body is a new assembly. Body is the "soul". REPAIR AND REMANUFACTURE QUALITY
59. Page 4, Figure 1, view on right: mandrel labeled “27” should be “26.” (errata change)

60. Page 29, 4.7, 1st sentence: delete “of designs” after “design validation.” (errata change)

61. Page 211, 10.16.3.2, last sentence: delete “be” from “(be pneumatically or hydraulically powered).”

62. Clarify definition of "field" when used in the context of "field repair". Where is it? After delivery.

63. Remove "Reference X" dimension and add tolerance (ASME B16.5). 2K,3K,5K

64. No quality control requirements for slip hangers

65. PR-2 requirements in Clause 10 are loose. Should the requirements be tightened/expanded?

66. Jean B. - Material Class Table - Multiple material classes for equipment that do not have internal components. Proposal to drop multiple material class designations when not needed.

67. Jean B. - Table 15 – I know this has been argued before, but an overlay with Fe10 does not meet the requirements for UNS N06625. This alloy has a 5% max Fe content. In my opinion, this just confuses the issue. When is the use of FE10 appropriate. This is acceptable for NACE. Should we drop the table? Should we add verbiage to say FE10 is the minimum requirement?

68. ANNEX O AND ERRATA 3 & 4 ADD TO DOCUMENT

69. DIMENSIONAL INSPECTION CLARIFY REQUIREMENT FOR "ALL PARTS SHALL BE INSPECTED FOR PSL3" ALL PARTS? ALL DIMENSIONS? CRITICAL DIMENSIONS FOR PSL 1-4.

70. Better group the products in the scope. 1.2b) “connectors” vs 1.2e) “loose connectors”. Two types of connectors with no clear definition of them other than your listing. Describe per section 10.

a. Align the applicable API Product Listing on the licensing form (Monogram) to this list. For monogram products, consider providing a representative figure [sketch] of each product.

b. Products in Section 10 need to be aligned to those in the scope.

71. Need to have a list of all products where PSL does not apply. Should be in the scope. Organize this information. It is already there.

72. Discussion of PSL (A.4.1) needs to be in the front of the document, not buried in an Annex. You also need to better discuss the differences of PSL and PR up front.

73. Section 10.23 is misplaced. It does not belong in Section 10. In fact, what is it? Is it a product (as suggested by Section 10). Other pressure boundary penetrations. Test connections?

74. Section 11 is not needed. This can be handled by a clear scope statement directing the user to the annex.
OECs - This area needs serious overhaul. First, OECs should never be monogrammable. The main driver of monogramming equipment is to show standardization of the equipment as meeting specific requirements. There are no specified requirements for OECs and therefore should never be monogrammed. They are a required piece of equipment, but not in the monogram program. OECs are not tested like the other products. And all a manufacturer has to do is make a tiny dimensional change that pushes the products out of range, and it can be reclassified as an OEC and no testing needs to be done. This happens regularly. General consensus was opposed to taking monogramming requirement away from OEC's but A normative Annex F might make a difference here.

75. Section 10.20 – SSVs and USVs should be treated separately from actuators (just as they are 10.5 Valves and 10.16 Actuators. Should align 10.20 to the classifications of the new 6AV1 and then delete Annex I altogether (making 6AV1 normative). This is on the list. Do cleanup throughout document. ORGANIZATION

76. There is regular confusion as to how flanges are part of other components; and thus are the flange requirements needed to make those components. Spool (pipe section with 2 same-sized flanges) or Adaptor (pipe with two different-sized flanges): flanges require no testing yet adaptors and spacers do….but flanges can be monogrammed just like adaptors and spacers. If I am licensee, do I need to have a license for flanges in order to make a spool? Right now they do not. We do not address monogramming of products that are assemblies or fabrications of monogrammed components. QUALITY

77. Flanges, as a product line should be removed from the monogram program. They should be taken out of Section 10 and put into their own annex. QUALITY

78. Consider using API 20E in classifying bolting for 6A, including the identification of BSLs. Then make that document normative. QUALITY

79. 10.22 Define valve-removal preparation (plugs are defined, not preparations). Add to definitions in clause 3. ORGANIZATION

80. Need to reinstate the Nickel value in Table 9. Since you maintain Nickel tolerance ranges in Table 11, this discrepancy causes a lot of confusion and questions. The reason why Nickel is not in Table 9 is lost on 75% of users. Need to look at this with respect to industry standards. Concern over H2S compatibility needs to be addressed if we do this. MATERIALS

81. 10.3 Studs and Nuts should be removed from Section 10 and either put in quality control or given its own Annex. Everything in section 10 should be in alignment with the scope of products. QUALITY
82. Each product in Section 10 should be laid out the same way, with the same subheading. If a subheading does not apply, then state that “This is not a requirement for XYZ product”. But that way, you introduce consistency in the way the product requirements are called out. ORGANIZATION

83. Annex C should be normative. If the equations in that section are used for establishing lengths (1st line) used in the tables, and the tables are normative…then why not make the use of those equations normative? DESIGN

84. Annex F should be normative. QUALIFICATION

85. Annex M…either make this normative or change all of the “shall” statements to “should”. The very first line (M.1) is incongruous with being an “Informative” annex. We cannot have shall statements in informative Annexes. We can rewrite the beginning of the Annex to say "When this Annex is invoked..." Can we take Annex M out and make it an RP, we can use "shall" wording. MATERIALS

86. Need to reorganization Section 7. When you start using 7.a.b.c.d (4 decimal points) as section heads, it is too difficult to use. For example… 7.4.2.3.15.a.1) is a part of the document. See Annex F as well. ORGANIZATION

87. Can FEA be used as objective evidence for valve validation testing to Annex F (it read that way now) and if so, how is that reconciled with the monogram program requirements for design testing “proof by testing” This may be a typo (verification vs validation). Clause F.2.1.4.

88. Define ball valve. We have requirements but no definition. Look at plug valve definition. ORGANIZATION

89. Define difference between a "test coupon" and a "qualified test coupon". It is hard to find in the current document. Take TC's out? MATERIALS

90. Add other commonly used valve sizes. Make provision for valves not having standard end to end dimensions. Add new sizes 7"-10, 7"-15, 6"-15 standardize the length on the flanged end valves that we add. Look at 6D. Allow for OEC end valves, non-standard sizes etc to be monogrammed. Look at tees and crosses as well with respect to standardized dimensions. DESIGN

91. Consider adding reference centerline requirements back in or delete all triple and quad valve requirements (Jean Brunjes). 16 bolt flange interchangeability issue. This should be brought up at the roundtable meeting. DESIGN

92. Add note to clarify that Table 6 may apply to higher strength materials as long as they meet the ductility requirements of the table (Nigel McKie). DESIGN
93. Clarify requirements for ring groove clad and clad of API flange bores to allow design analysis to prove integrity of the component. Optional configuration would address part of the issue MATERIALS

94. Modify clause 2. Nothing in here about the effective date for documents that don't have a defined implementation period. Providing capability for sub-committee to extend the effective date for normative references. (Mike Briggs) QUALITY

95. Clause: 8.1.2
   Issue: Stamping requiring subsequent stress relief should be removed.
   Contributor: Appelt
   Disposition: Accepted
   Comments: We need to work this item. Include table describing areas of low stress wellhead; acceptable areas; state to specify on drawing; low stress stamping is difficult to read; add 'to be revised with current practices or stamping standards.'
   Group Assigned: Design

96. Clause: 10.5.3.8
   Issue: Operating mechanisms
   Hand wheel shall permit opening and closing of the valve at the maximum working pressure differential without aid of tools or bars. Otherwise the valve shall be equipped with a torque reducing mechanism (i.e. gear operator, ball screw, etc.).
   Contributor: Appelt
   Disposition: Accepted
   Comments: Define maximum rim pool (OSHA requirements); if it is more than this, it is too much for one person to do; need a bigger hand wheel; really impact design; should it be able to work under full differential pressure? Generally are equalized; otherwise, just a recommendation; can we say if it is above a certain value? How much torque does it need for full differential pressure? Need a bell curve distribution; need to test the valves to know the torque values; PR2 testing makes you test it (open valve twice under pressure on both sides); sticky topic; frac trees - where does that fall under? Seeing more companies open up more differential; no one put together a spec for OPs on manifolds; for manifolds, refer back to 6A; it is not just restricted to wellheads and Christmas trees; have the option to put other specs, but chose to go this way with this spec; Make this statement a should instead of shall? Maximum anticipated maximum working pressure differential; safety issue? Design issue? Should be considered, but should not be mandatory (too many variations to consider it mandatory); change the word to 'a mechanism', why does it have to be a round hand wheel? Referring specifically to operating gears/ mechanisms; Leave to sub-committee for further review
   Group Assigned: Design

97. Clause: 10.14.3.4
   Issue: Restricted-area pack-off
   Each cross-over spool, multi-stage cross-over spool, cross-over adapter and cross-over tubing-head adapter shall have at least one restricted-area pack-off for each increase in pressure rating.
   Contributor: Appelt
   Disposition: Accepted
   Comments: Change was made because we decided to permit different pressure ranges; the way it is worded, it doesn't say increase in standard rating, just says pressure rating, so that is okay; the intent was for each recognized increase; can recognize any pressure jumps; secondary/ restricted packoffs, 1 or 2 seals, can still test from above or below;
2000 - 5000 lb. jump, it would possibly have a failure, so introduced a plug/ pressure relief plug onto port so if there was excessive pressure, it would pop the fitting on the flange; people don't monitor ports between two sets of seals; don't know when one set fails; show picture or diagram of expectations? Could get something; was in 17th or prior editions; put this out for review? Further review

Group Assigned: Design

98. Clause: Annex L
   Issue: VR Prep/Plug
   Remove all references to ‘low pressure VR Prep/Plug’ (i.e. Clauses L.3.1, L.3.2, L.6.1; Tables L.1, L.2, L.7, L.8; Figures L.1, L.2, L.3, L.4, L.5, L.12, L.13).
   Contributor: Appelt
   Disposition: Tabled; see what comments come in
   Comments: Go to all high pressure; remove all low pressure references; it is a safety issue; consider allow the use of low pressure equipment is how it is read; intermediate step: leave the option, and it could be user specified; what is the problem? The spool was probably marked, but as said earlier, it might have been painted/ etc. and might have been the problem; could have been an old plug; this would address that, the main concern is where we have the charpy V that can engage each other but not safely; if it is safety issue, we maybe should address it/ see if it is really happening in the field; it is possible some people are not making these/ engaging them correctly; unsure about mixing threads (lp & tubing); that is the problem
   Group Assigned: None

99. Clause: Volumetric NDE
   Issue: Volumetric NDE should be applied by WP and not PSL for pressure containing components. Another alternative would be to require minimum PSL for certain WP (i.e. 15K+, PSL 3+; 2K-10K, All PSL levels; etc.).
   Contributor: Appelt
   Disposition: Accepted
   Comments: Two parts to proposal: volumetric NDE requires PSL 3 or higher; volumetric NDE should be based on function of component; we can buy PSL 2 that doesn't require it or PSL 3 that everything stays the same and is required; proposal is to consider hardness testing, pressure containing 10K or higher should require V NDE, alternative is to follow Annex A, PSL 3 is required for certain pressures; we have talked about removing PSL 1, where you couldn't use it higher than 10K working pressure, so along the same lines; leaves it open to PSL 2 being rated to just as hi; I think we should leave it to the customer, let them specify it; to me, argument is what is required on PSL 3 that isn't needed on PSL 2; if you don't see the need, what is the need for it in higher? It is a purchasing option; should be left up to the customer; drives them to PSL 3; WP may not have any relationship to the service conditions; WP isn't descriptive of what the application is going to be; I think the place to do that would be in the Annex and not in the main text because it would over complicate the main text; for every piece of equipment where there is a quality rating, would have to put table for pressure rating; Annex A Figure 14 provides an example; gives you the pressure ratings, not by sections, but that is a different question, I wouldn't change what we have, just add to it; can't get to PSL 1 if you follow Figure 14; but the chart is informative; Annex A is a recommended practice, if we want to give guidance, take most of Annex A out and have it as a guide for what kind of equipment to put on their wells; don't think we should give users guidance of what to put on their well in Annex A; pretty hidden within; reference to it is within 1.4 'Annex A provides guidelines
(not requirements) for accepting PSL'; not sure that is the right place for it or the best wording for it; within the PSL scheme, should we limit the PSL rating for different pressures? Or is this guidance for the user? I would like to see it; it simplifies the use of the document or production planning/ inventory control, commercial considerations; this would still be driven by technical requirements and risk assessment; if we don't remove PSL 1, than this should be considered; manufacturers would love that because it reduces number; could also increase the cost; regards to safety and quality and interchangeability; alternative is limiting where PSL 1 is used; revisit Annex A; roll this into Addendum 1/ PSL levels to make sure that coincides because it might change the table

Group Assigned: Materials/ Design

100. Clause: 7.4.5

Issue: The last sentence from 7.4.5 is inaccurate and misleading. It reads: “The requirements shown for valve-bore sealing mechanisms are the same as for bodies and bonnets, except that material properties shall conform to the requirements of 5.1 and 5.2 and volumetric NDE is not required.” This sentence should be deleted. If you compare Table 17 with Table 23 it is obvious at a glance that there are more differences than volumetric NDE. This sentence adds nothing to the spec except confusion. Clause 7.4.5 should stand on its own in defining the quality requirements for VBSM & choke trim.

Contributor: Wehner

Disposition: Accepted; look into additional discussions

Comments: It is not useful or necessary that you say this table is just like the other, but has these exceptions; they may not be correct the next time someone changes it; why do we need them? The table should stand alone. This came from an RFI, I don't think it violates anything to say that it came from an RFI that came from an audit because it did not do impact testing/ didn't meet requirements, but if this statement led the auditor to apply a non-existent requirement; if the API auditors are getting confused, put the exact requirements into the table; Take the sentence out in stem and valve sections to say that the requirements are in table so and so, but except... ; hardness have specific tables vs. saying hardness testing for valves PSL 1, PSL 2, etc. It would be nice to say there are only these 3 options; a lot of times these tables refer back to bonnet bodies, but it is actually for hangers - it is confusing; it would simplify it a lot, it would go straight to hardness (this means revise Section 7); maybe this chart needs to have the paragraph reference added

Group Assigned: Quality

101. Clause: 7.4.3.1

Issue: The same is true for stems, clause 7.4.3.1, 2nd & 3rd sentences: “The requirements shown for stems are the same as for bodies and bonnets, except that material properties shall conform to the requirements of 5.1 and 5.2. Impact testing requirements and acceptance criteria for stems shall be the same as for bodies, bonnets, and end and outlet connections.” Impact test requirements are not the same for stems as for BBEOC, because impact testing is not required for PSL 1 stems. (5.9: “If reference to 5.9 is given in this International Standard, the manufacturer shall specify the methods necessary to qualify and test materials.”) These three sentences in 7.4.3.1 and 7.4.5 have caused problems and prompted RFIs for years. Quality requirements for stems should be clearly defined in 7.4.3. We can reference specific requirements in 7.4.2 to avoid repetition, but we should eliminate these “same as, except...” comparison statements.

Contributor: Wehner

Disposition: Accepted
Comments:  
Group Assigned: Quality  

102. Clause: 5.6.3.3  
Issue: heat treatment furnaces: if the austenetising furnace is continuous and the tempering furnace is batch, how would you consider the final result. My personal point of view would be “batch” since the mechanicals are mainly driven by the batch furnace?  
Contributor: Dabas  
Disposition: Accepted  
Comments: Depending on which process you use, there are different requirements; both types of furnaces are discussed in 5.8; the TC has to go through the same process; the difference is if it is continuous or batch treated; we need another which is a hybrid process; words need to be worked in; I don't think they conflict, I think C is more stringent; each batch furnace will have to have a TC in it; needs to be further reviewed  

Group Assigned: Materials  

103. Clause: 7.4.2.3.15  
Issue: UT control: API6A only refers to FBH. do you believe it would be possible to refer to other methods like DGS which is equivalent in terms of final result?  
Contributor: Dabas  
Disposition: Accepted  
Comments:  

104. Clause: Table 18  
Issue: Suggest adding section to Table 18 for non-pressure containing repair welds. Paragraph 7.4.2.2.13 is required for all welds but is not included in Table 18 for non-pressure containing repairs.  
Contributor: Briggs  
Disposition: Accepted  
Comments: If you look at acceptance criteria, 'no indication...' the last then says 'no slag indication'... so we said you can't have any in one, but says you can in the third; I think what happened was that there was an extra sentence in ASME Section 8 that talks about the 'reference level' but that is regardless of reference level; take the 'no indications' out and replace with ASME Section 8 text: 'Imperfections which product a response greater than 20%... standards given in (a) and (b).' They refer to Section 5 for the method; pasted acceptance criteria directly out of Section 8. There is a conflict; don't change slag inclusions that are acceptable or cracks, but the statement 'no indications exceeding reference level' It is 20% of the reference level; if you detect it, you have to investigate; the technician can interpret based upon the response based upon it being linear or if there is slag as long as they don't exceed length; regardless of reference level, you are not allowed to accept anything that looks like a crack;  

Group Assigned: Quality  

105. Clause: 7.4.2.1.7  
Issue: Suggest rewording of 7.4.2.1.7 to “Other testing requirements” "If examination is required (see Table 18).” Table 18 only references 7.4.2.1.7 for PSL3 and PSL4 and 7.4.2.1.7 is included under requirements for PSL1.  
Contributor: Briggs  
Disposition: Accepted  
Comments: 7.4.2.1.7: 'If the overlay...' If someone takes the opinion that there is no design criteria, then you don't have to do anything. No where can I find it in API and
general interpretation is that I should have the same design strength as based mode; there is no definition as to where it is required. Need a better definition/clarification; look at AF1 and AF2 for design methodology/analysis with flange definitions and models they used; for 6A using 'design criteria' or 'design manufacturers', needs to be clearer; weld overlay and weld cladding need to be clarified regarding what each means; 6.5.1.1.3; 6.5.1.4.b.; shows intent here; certain instances with inlay or overlay or whatever you want to call it, must use it as your design criteria; later discussion: even if you allow it to be part of your design criteria, need to spell out it is for compression only in some instances; not defining it well; if it meets your design criteria. Need to make sure weld metal meets your design criteria; define what the design criteria is (whatever you allow pressure or tension); if it is a bore, it will have stresses; sometimes it can only be designed for compression and not tension; if you've changes the stiffness/geometry of the part, it may be conservative, but also may not be accurate; stiffness of the design may not be the same if you take it out; this is getting back to taking the inlaying 316 ring groove out of the spec;

Group Assigned: Quality

106. Clause: 7.4.2.1.7

Issue: “If the overlay is considered part of the manufacturer’s design criteria or of the design criteria of this International Standard, volumetric examinations shall be in accordance with the following:” Recommend adding definitions for “API design criteria” and “manufacturer design criteria”. The paragraph as written could result in no volumetric inspection being performed as there are no definitions provided for the circumstances when it is required. Alternately, if it is intended that 100% volumetric examination always be performed this sentence could be removed in it’s entirety.

Contributor: Briggs

Disposition: Accepted

Comments: See above.

Group Assigned: Quality

107. Clause: 7.4.2.1.6

Issue: Suggest clarification. Table 18 only addresses requirements for bodies, bonnets and end and outlet connections in the heading. Tables 22, 23, and 37 direct you to 7.4.2.1.6 for general weld requirements. 7.4.2.1.6 says “if examination is required (see Table 18----. Verbiage could be added to 7.4.2.1.6 that it applies to where specified for other parts not included in Table 18.

Contributor: Briggs

Disposition: Accepted

Comments: This is one of the things we saw which is that we need to address other components, but don't want to make all changes; need to do something here. Valve bore sealing mechanisms and stems (Items 15, 16 and 17 connected)

Group Assigned: Quality

108. Clause: 7.4.2.3.8

Issue: Suggest clarification. Table 18 only addresses requirements for bodies, bonnets and end and outlet connections in the heading. Table 23 for valve bore sealing mechanisms and choke trim directs you to 7.4.2.3.8. Paragraph 7.4.2.3.8 requires surface NDE prior to weld overlay and says see Table 18. Verbiage could be added to 7.4.2.3.8 that it applies to where specified for other parts not included in Table 18.

Contributor: Briggs

Disposition: Accepted

Comments: See above.
109. Clause: J.7.4.1.4

Issue: Suggest clarification. Paragraph J.7.4.1.4 refers you to Table 18 for weld repairs to any part and Table 18 is only addresses requirements for bodies, bonnets and end and outlet connections in the heading. Paragraph J.7.4.1.4 should be revised to refer to Section 7 for welding requirements.

Contributor: Briggs

Disposition: Accepted

Comments: For parts other than pressure containing parts; needs wordsmithing; See Section 7 for welding quality

110. Clause: multiple

Issue: Suggest adding definition for “repair weld” as repair to base metal or weld metal defects. Any other weld would fall into category of pressure containing, non-pressure containing or weld metal overlay.

Contributor: Briggs

Disposition: Accepted

Comments: "Word 'repair' causes a lot of confusion; use term 'repair' for repair and manufacturing, where it doesn't involve any welding; get into welding/ quality control requirements, start using repair' thru my research, everything directed at repair drives you towards material defects, or repair of fabrication weld; any of the other welds are either non-pressure containing welds; we need to define a repair weld; 'talking about repairs to materials or to a weld'; if I decide to weld up a bore in this part, I'm actually doing a design change;

Differentiating between a repair weld and what we redefined as repair or manufacture of a valve; in that context, they do not mean the same thing;
We have no definition for anything besides repair and manufacture;
Recommendation? In text; a repair weld should be defined as repair to material or a weld; It is a weld repair, but in the material section, talking about what you can do to weld repair a piece of raw material is different; those have limits on them; terms get jumbled together

111. Clause: Table 3

Issue: Suggest clarification. Definition for full clad says it can be an austenitic stainless steel. Table 3 permits CRA weld clad for HH service but does not address use of austenitic stainless steel. Suggest adding clarification of where full austenitic cladding is permitted.

Contributor: Briggs

Disposition: Already addressed/ accepted

Comments: Agreed to remove austenitic stainless steel from document

112. Clause: 10.9.3.8

Issue: Add the following sentence before the last sentence. “As an alternative to a visible orifice-area-indicating mechanism, an adjustable choke may be fitted with a mechanism that indicates the Cv (as defined by ISA-75.01.01 / IEC 60534-2-1) of the choke at any adjusted choke setting throughout its operating range.”

While we all use the term “Cv”, the ISA and IEC now use “C” described per below. Not sure which symbol we should propose.
Contributor: Briggs  
Disposition: Modify  
Comments: Asking for Cv instead of C, but don't think that will be approved; 16C currently says you define the size in terms of area of orifice, not diameter, which as far as I'm concerned, no one has done it. Already talked about this, so don't go back there; Cv has been an acceptable additional indicator but is certainly not a primary indicator; primary is opening; Cv is based on water, but is universal sizing constant; most people don't know what it means, so to say we use Cv only and nothing else is not a good plan; to add Cv to our basic measurement as an additional indicator is fine; not thinking it is a good plan 'as an alternative'; is an 'addition' and not 'alternative'; primary requirement is on the 64ths markings?  
Group Assigned: Design  

113. Clause: 10.9.3  
Issue: Most production choke trims are Tungsten Carbide, a brittle material. If the TC breaks it can allow the stem to move further into the bore than designed to. Would suggest some wording like “in the event of collapse of the controlling element of the choke trim pressure containment must be assured under all circumstances”  
Contributor: Briggs  
Disposition: Rejected  
Comments: It is inside the choke; needle and seat chokes, solid TC on the stem and liner on the seat, if either one breaks, the stem can do untold things; it is true regardless of material, you can be in a world of hurt; not sure if someone is saying if all TC goes away, that is silly; the way it is worded, if it breaks, it still has to work; want to be sure that your stem doesn't blow out in case TC tip gets broken off; if needle breaks and it flies out; the stem still doesn't fall out. Typically have a valve upstream of choke that can be closed.  
Group Assigned:  

114. Clause: 7.4.9.5.9  
Issue: In testing area, the back seat test is optional. If tested, API required the area between backseat and stem seal to be vented. GV uses the grease fitting port to monitor leakage per API requirement. The port is also to allow field people to check sealing of the back seat before they disassemble bonnet top area to replace the stem seal. Cameron position has been saying back seat (grease fitting) port is a must regardless FAT/SUT back seat seal test is required or not. So all valves have grease fitting port. For SUBSEA customers, some do not want grease port because possible leak path. Obviously, valves cannot do back seat test. The question is can the valve be monogrammed.  
Contributor: Briggs  
Disposition: Accepted  
Comments: Backseat testing; last edition, lots of discussion around this particular topic; asking to mandate the port; Cameron? For backseat testing, have to have a way to monitor testing of gas leaking; how do we test backseat if customer says I don't want grease fitting; when do you replace? Without a back seat, can we monogram? 17D question; USV is under 6A; there are applications where the user says I am not going to depend on that backseat as a barrier so don't want it tested or need a port; if that is where you put your port, then its between them and the manufacture; if the spec requires it to have a backseat while valve is under pressure; one of my proposal is to do away with that part about repacking the stubbing valve; it is not safe or done; but that valve is very popular, the model M; USV need to be in 17D; we have to have a 6A valve for USV subsea;
customer also wants 17D; valve and actuator; rule says that you can replace one and then after replace the other, right? There is a way to test it without having a port, but I don't agree

**Group Assigned:** Design

**Issue:** The scope of this document is to give guidance to suppliers developing actuators and to clarify and be more specific with respect to technical requirements.

Please note this is for the actuator only. Bonnet, stems, stem packing assembly and other parts that may see well pressure or fluids have to be selected and qualified according to relevant section in API 6A

**Contributor:** Fredheim

**Disposition:** Tabled; possibility for another document; on agenda for next SC6 meeting

**Comments:** In Washington, we discussed possible addition to PR3 to Annex F: the following items were submitted; first one is regarding actuators; we do see existing testing doesn't fulfill our requirements; we want to standardize; it does state on how the actuators should work, for any actuator; outside the normal envelope of temperatures; we are trying to pull together how we do an actuator on PR3 level; talk about standard API temperatures; low T is based on application that you use, and the high T is 150 degrees for actuators; are you talking about increasing T for actuator? Mainly for PR3 requirements; endurance test based on what we've done the past 3-4 years that takes pressure from both sides; also on metal to metal seals and when does it fail and how does it fail and look at the lifespan; 200 cycles seem to be reasonable to see lifetime for 20 years; 10 cycles a year; 50+ means a minimum of 50 cycles; development, you'll see hot and cold; you will not take it all the way probably; are you talking 200 thermal cycles? Yes; this is additional to what we do today; why need that many thermal cycles? See development and how it performs for it is very different from when it is cold; our conditions can be very cold and the T swings over the year and see how it can be done as an endurance test; why testing a change from existing paragraph F.2.4 or 5? We already have validation testing defined. This is additional testing; Asking for a third; API recognizes that they allow the testing to be together or separate; look at PR3 which is extended PR2, this is the proposal; we have equipment for 25 years + and we see it fails due to the actuator; you want 200 hot and 200 cold? Yes; What is a cycle? Same as in PR2; open and closed; open and closed is all done at the same T; one cycle hot, one cycle cold, and do it 200 times; would take quite some time; if the actuator fails, to us, it is critical; maybe it is too much, the point is this is what we think we need for qualification; looking at electric and hydraulic actuators; SEI requirements in Norway which is reliability data and so stringent that it is hard to get thru, but are able to see how reliable they are and must have data to see what it is going to take to operate; the 20 years is without replacing any seals (that is the intention); this is not research, but verification; this is emergency equipment; wouldn't necessarily be exactly this, but just is our current proposal; this can be modified; group interested in pursuing PR3? Is this for Annex F or in another Annex? Think it is going to be hard to have it on one product and not everything else; Annex F is the standard test that industry got together that agreed upon; you are able to see which model is better based upon that test; it is a big step, number of actuators that are actually PR2 qualified are small; you are also asking for valve and actuator, not just actuator; we proposed for seals, valves, not just one product; Does API have another metric for different kind of testing? For example, 6A one for sandy service, introduce another level and understand result? In real life, need to bring those together; fundamental difference in Annex F and 6A, 6A is design validation in
terms of functional operation satisfies the basic design requirements, reliability is another issue, you have to have statistics, numbers, I don't know how we get from testing 1 article to get to reliability; I see the demand from time to time but it isn't there yet because data isn't there yet; our failure rate has dramatically dropped; valves being in operation for 10 years and put back for another 10 years with no problems; we have been doing this for 25 years; classify it like fire test specs, special option and should be developed as if it is a stand-alone standard? Don't always have to work to it as a top level, it is a new set of requirements, we'd have to be careful, looking at it as a different document isn't a bad idea; document is too big already.

Group Assigned:

Issue: API 6A Annex F – PR 3 level Annular and Tubing Seal Assembly
Contributor: Fredheim
Disposition: Tabled; possibility for another document; on agenda for next SC6 meeting
Comments: See above

Group Assigned:

117. Clause: Annex F
Issue: API 6A Annex F – Metallic and Non-Metallic Seals
Contributor: Fredheim
Disposition: Tabled; possibility for another document; on agenda for next SC6 meeting
Comments: Since metal to metal seals are not defined, this section was to say qualification; what type of qualification you can do to metal to metal seals; today, there is no direct requirement to test a metal seal to F1.11. Raised this to put it on the agenda; wanted to start work on this; may need a short paragraph on what you do with metal seals; PR-2 is F1.11 which takes into account temperature and pressure cycles; adding seal requirements; no reason to mandate that for all seals; we just say primary; if you say primary must be metal to metal if only seal and can't be elastomeric is how I'm reading this; primary may not be a primary seal to the environment; this says 'or' to the well barrier which isn't quite right. First seal that the fluid gets to is primary, second seal is secondary; so far, we only use the PR for validation test requirements; room for upgrades on requirements for seals? A lot of people are putting metals seals in; take this and potentially put it in as a separate document

Group Assigned:

118. Clause: Studs & Nuts
Issue: Fasteners
1) Comment
i) Fasteners are not covered. It is important to have include covers as bolted flanged connections are used in the equipment covered by API 6X. It is a general requirement that the nut shall be stronger than the stud for fasteners. API 6A allows low strength nuts like 2HM be used with high strength bolting like L7. This is a structural safety risk as the 2HM nuts are weaker than the L7 studs and stripping of threads in the 2HM nuts occurs before failure of L7 studs.
2) Suggested change
i) Include design criteria and corresponding material requirements to fasteners.
Contributor: Fredheim
Disposition: Tabled
Comments: As a suggested change, that is not specific enough. I'd like to see something come in with exact words; if it says 'for fastener sizes about X diameter, 2 HM nuts shall
not be used with grade B7/L7, etc.' If that is a sentence that can be stated that addresses the issue, that's fine. Does it matter where you mix them? It is a mix and match thing and depends on size; apparently, 2 HM is assumed to have B7 stud and you can't do that; you get to a point where the nut may be the weaker of the two; doesn't the table in 6A tell you? It doesn't say what combinations you can use; Look at Section 10.3.3.4; Table 62; John; there was previous discuss on that. 10.3.3.5, there is a specific combination of A194 and grade 2 HM, and I don't think there was anything arbitrary about that; as a manufacturer, I'll supply whatever is required; but I think API supplied the info; I'm pretty sure they didn't do any testing; and the proposal says that there was testing; The nut failed before the stud; doesn't mean the nut didn't have adequate strength; The chart reflects what API came down with; Table 62 specifies what it allows; Design basis doesn't necessarily mean anything; actual vs. what you calculate are two different things; If we could get a specific suggested change, then we can look into it; if they have done testing to show that a specific combination/size isn't safe, then give us specific verbiage to put into the standard; David Z. will circulate the document

119. Clause: 6X
Issue: Yield criterion
Comment
i) For pressure only, the pressure capacity (limit load) for von Mises yield criterion will be 2/SQRT(3)=1.15 higher than for Tresca yield criterion. This has been used as an argument for not derating the material strength up to 121 °C (250 °F). For bending and tension only, the limit load capacity will be identical for von Mises and Tresca yield criterion. However, the effects of external loads are not considered in API 6A, see 4.2.3.1 in API 6A.
ii) API 6A also includes other design methods and stress levels given in 4.3.3.1 where it is stated:
“In the event that the stress levels calculated by the methods in 4.3.3.2 to 4.3.3.6 exceed the allowable stresses, other methods identified by the manufacturer, such as ASME BPVC:2004, with 2005 and 2006 addenda, Section VIII, Division 3, shall be used to justify these stresses.” ASME VIII Div.3:2004
Suggested change
i) Include a statement if API 6X opens up for use of manufacturer methods including use of ASME VIII Div. 3:2004 can be used. It is recommended not to open for this option in order to ensure consistent safety level, especially when 6X introduces extreme conditions in addition to working (normal) conditions.
Contributor: Fredheim
Disposition: Rejected; move to John Fowler
Comments: Look at yield criteria; says that we don’t look at change in yield strength at T below 250; wanted to open up to allow the ASME methods to be used; also for externally applied loads; there are other documents that take care of that; are y'all okay with all 6X (design document) material to accept and give to John Fowler's team to identify?

120. Clause: Materials
Issue: Use prolongations or sacrificial forgings as ASME VIII Div.2:2004 to ensure that samples for production testing realistically reflect the properties in the actual components. For products forged by the closed die method, the test specimen shall be obtained from a sacrificial product. For products forged by open die or by the ring rolling
method, the test specimens shall be obtained from a sacrificial forging or an integral prolongation. When using prolongation, qualification of the prolongation testing sampling with respect to critical section in the actual product shall be performed.

Contributor: Fredheim
Disposition: Tabled
Comments: If it is large cross sections prolongations make sense; if it is anything complicated, go with a prolongation, or closed eye, you cut up the part. Saying to forget about the QTC? Kill the little guy and low end market and may not be proving anything; On larger forging, prolongation cost a bundle

Group Assigned

121. Clause: Table 7

Issue: The Charpy V-notch impact energy requirement for API 6X (and 6A) should be increased and should comply with the requirements in with ASME VIII Div.2:2004 (or ASME VIII Div.2:2010 which use von Mises yield criterion). The Charpy V-notch impact energy requirement should depend on yield strength and thickness. For welds, different requirements for as-welded and post weld heat treated welds should be given.

Contributor: Fredheim
Disposition: Rejected
Comments: Raise the impact requirements? DNV, NORSOK are all higher than 6A; they use a wider range of materials; I don't know where the additional requirements are coming from; ABS wanted lateral expansion, etc. But a lot of the offshore codes are starting to call for higher impact; I don't understand why; If there is no technical justification to make it harder, then why should we do it? I'd keep it the same. Low T impacts are much more difficult that are used out in West Texas; Grade 4130, etc. are more commonly used in colder applications or even higher alloys. There are technical requirements there and up to those companies to disclose their technical justifications; I'd like to know why; Lots of different tech requirements from one to the next; ASTM for base material doesn't make much sense; we are trying to default to requirements for welding testing; problem is I can't correlate charpy impact requirements or test results from negative 20 to 30, there are no results; I can't give a definitive answer; but I can't correlate that; adds complexity to qualifications; problem of base material testing vs. welding testing; No impact requirement; Piper Alpha; finally API adopted; this is my 15 ft. lb., 30 ft. lb.; let's standardize it on API; went through all these years; recently pulled out old DNV spec; API got one; we need a different one for API and north sea; 3 different material specs, 3 different part numbers; back to the question, why? Answer is application; a lot of different in equipment in west Texas and offshore components; Q00073 is an example from FMC from welding standpoint to match welding to base material; easier to have material to be qualified to something similar to the welding; the weaker part is usually the material; break down table to material types and type of environment it is going to see; sensitive areas, etc. not an easy thing to do, but if you can standardize the environment that it is going into; we settled on strength required for the FMC Q spec; this avoids having every supplier qualified for every use; material are more stringent than welding; What problem are we solving other than saying we meet all of the codes in the world? We went to 6X code because we couldn't meet charpy, so if we can, we are wasting our money. This isn't centered around surface 6 A fits well, but for subsea, not enough when it is a welded product; it won't be easy; Table 7 in API is basic chart that's been around forever; some values are low, but it appears to work. We vary test T to vary service. If we alter values, does it get us better materials or better numbers? Personally, I don't worry about table 7
because those requirements are low; you will meet those; I'm not saying change, but I
don't even look at it; Looks like the problem is with the welding ones; Jump base material
can't meet welding so we write M specs; If we wanted to change that chart, where would
we get these values? ABS says 39 ft. lbs., and then would come back saying 6A allows
them, that's your out. 6A is a lot easier to meet; doesn't mean we can keep it; But, this
also covers a lot of material, different environments, different applications; can't change
certain properties, so you're going to have to select certain materials; two choices: one is
we don't force specialized material and make big guy pay for it; other is to have an
increasing array of quality requirements or material requirements, so you don't have to do
a new one each time a customer comes around, something standard, but it will cost you
more money. If we increase the charpy impact requirements at level 3 or 4, impact? It is
hard to get this hardness for some materials; 410 ss works perfectly in many applications
but won't give you impacts; That's why we moved away from more rigorous
requirements.

Group Assigned: NONE

122. Clause: 6X
Issue: API 6X should clarify its position regarding treatment of non-standard materials to
avoid confusion and misinterpretations.
Contributor: DKF
Disposition: Rejected; Refer to Fowler
Comments:
Group Assigned: NONE

123. Clause: 7.3.3.2
Issue: Comment
i) ISO 15156-2/MR0175-2 states the following in clause 7.3.3.2: “The HRC method may be
used for welding procedure qualification if the design stress does not exceeds two thirds
of SMYS and the welding procedure specification includes post-weld heat treatment”.
Suggest change
i) API 6X should state its position regarding: What is meant by 2/3 of SMYS with respect to
hardness testing method? Is 2/3 of SMYS the same as 2/3 of primary membrane stress
with
stress intensity (Tresca) or von Mises yield criterion? Is the 2/3 of SMYS local inner fibre
stress?
Is 2/3 of SMYS applicable for Extreme condition? Consider to apply HV also to welding
procedure qualification for H2S environment.
Contributor: DKF
Disposition: Tabled
Comments: Allow the use of rockwell C as long as we keep stress below 2/3; Got lots of
push back on that one; lot of the operators want to see HV10 as a mandatory test; F6NM
is exception, so we need to have it in there, but a lot of internal specs have moved to
match operator requirements, so the discussion is whether or not they have jumped over
to make you use HV10 all of the time; look at 6.3.4.2.3.b.; does do Vickers method for
groove, but not for overlay; Already an agenda item from the last meeting; We are being
held to this; so if you go by the old NACE, it says as close as possible, etc. But if someone
takes it as close as possible and one at 1 mm so they can pass; the overlay doesn't have
this, still Rockwell; I didn't go back to see if it was in there; Joel: I think it means whatever
you got on the tensile test, 2/3 of that; actually, it does say Rockwell OR Vickers. I think it
is still being fought in the NACE committee.
124. **Clause: 4.2.3.1** 6X

**Issue:** External loads

1) **Comment:**
   i) 6A states the following in 4.2.3.1: The effects of external load (i.e. bending moments, tensions, etc.) on the assembly of components are not explicitly addressed by this International Standard. 6X is silent on external loads.

2) **Suggested change:**
   i) Introduce load conditions like: Pressure/temperature (60 % yield??), Pressure testing (only) - 90 % yield, Working (with external loads) - 67 % yield and Extreme (with external loads) – 80 % yield. At present pressure testing will be governing for pressure design within 6A for most materials and temperature, a separate allowable stress for pressure design may not be necessary. However, many codes perform pressure design as a separate task and test pressure is not governing the design. For high temperature and material derating, when pressure testing governing the design, may give challenges in order to maintain a consistent safety margin with temperature derating.

**Contributor:** Fredheim

**Disposition:** Rejected; refer to Fowler

**Comments:** Suggesting we introduce load conditions into the document and then have appropriate stress levels for those conditions; I was thinking, we have other docs that do that, correct? External physical loads are covered in 6AF load curves if it is an API load flange; if you do an OEC design, then you'd have to address those as well. I thought there was something to that affect in the standard; most other products don't have much in regards to external mechanical loads or it shouldn't. If so, they are application specific. External loads are applied at rated working pressure and not external; can't assume it is always working pressure; Places in 17D that some of this stuff needs to be provided by the customer; you never know what is going to get thrown at you; have seen jobs where customer says this is the external loads; this is something that we see on a day to day basis, but not sure where it needs to be directed. From 6A to 6X for all design requirements; Just being called 6A or 6X, getting away from 'RP' etc.

**Group Assigned:** None

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125. **Clause: Mechanical Testing**

**Issue:** Mechanical test sampling

1) **Comment:**
   i) API 6A performs mechanical tests (tensile testing, Charpy V-notch impact testing, hardness testing) from qualification test coupons (QTCs) during production. This method may not give test results which are representative for the properties in the actual components. Experience has shown reduction in yield strength, tensile strength and Charpy V-notch impact energy in the order of 10 to 25 %. It is also been observed brittle fracture during pressure testing of valve bodes using QTCs. This gives concerns to the actual safety margin in this equipment as 67 % of yield imply a safety margin (factor) of 1.5. API 6X design methodology assumes ductile metallic materials, see Section 1, last sentence 2nd paragraph.

2) **Suggest change**
   i) Use prolongations or sacrificial forgings as ASME VIII Div.2:2004 to ensure that samples for production testing realistically reflect the properties in the actual components. For products forged by the closed die method, the test specimen shall be obtained from a
sacrificial product. For products forged by open die or by the ring rolling method, the test specimens shall be obtained from a sacrificial forging or an integral prolongation. When using prolongation, qualification of the prolongation testing sampling with respect to critical section in the actual product shall be performed.

Contributor: Fredheim
Disposition: Rejected
Comments: Advocating a rating change of the equipment below 250; very similar to one above
Group Assigned: None

126. Clause: 4.2.2.2
Issue: Thermal derating of material strength below 250F
1) Comment
   i) API 6A originally was written based on the assumption that wellheads would rarely see temperatures over 250 °F (120 °C), and no provision was made for material strength temperature derating at temperatures up to 250 °F (120 °C). API 6A use the stress intensity (Tresca yield criterion). For a cylinder subjected to pressure only, the pressure capacity (limit load) for von Mises yield criterion is 2/SQRT(3)=1.15 higher than for Tresca yield criterion. This 15 % conservatism has been used as an argument for not derating the material strength up to 121 °C (250 °F) in API 6A. The ASME Code requires strength derating for temperature above 104 °C (219 °F). Metals will typically have a drop in yield
Contributor: Fredheim
Disposition: Rejected
Comments: None
Group Assigned: None

127. Clause: 5.4.2?
Issue: Ductile failure mode, i.e. preventing brittle (unstable) fracture
1) Comment
   i) It is observed that the allowable stresses are increased, however, specific material requirements to ensure ductile material behavior is missing.
2) Suggest change
   i) Include requirements to obtain ductile failure modes for the applicable environments like follows:
   I) In non-aggressive environment (e.g. air): Specify Charpy V-notch impact energy, % elongation, % reduction in area and maximum yield over tensile strength ratio.
   II) Exposed to seawater and cathodic protection to ensure sufficient resistance to hydrogen stress cracking: Specify hardness limitations and maximum actual yield. Duplex steel in addition to comply with DNV RP-F112.
   III) Exposed to well fluid to ensure resistance to hydrogen stress cracking (H2S service): NACE compliance considerations should be given, i.e. maximum hardness, limitations on local tensile stress for elastic analysis, limitations on tensile strains for limit load/elastic plastic analysis and qualification testing in sour service if required (e.g. threaded connections, welds tested to reflect actual weld without grinding to remove local stress concentrations at root or undercuts).
Contributor: Fredheim
Disposition: Rejected
Comments: Suggests taking into account all environments; sounds like a materials issue; don't know where they are referring to put this in 6A; we can't address every possible aspect of design analysis/ material failures; what we have right now is minimal to 6X has;
if we put in sections that say you can look at this in certain circumstances, but in audit mode, 90& saying not applicable? It isn't right; Doesn't consider all other environments; 6A is a standard, doesn't say what to do; Goes back to the customer knowing his situation and telling the manufacturer what they need; 6A is a basic spec - Remember that.

128. Clause: 6X
Issue: Fatigue
Include a separate section on Fatigue. Present version of API 6X includes cyclic loading from the environment, see Extreme loading. Furthermore, API TR8 refers to API 6X for subsea equipment, hence fatigue should be considered. Please consider the draft proposal in section 4.3. NDT acceptance criteria in 6A shall be reviewed if fatigue is introduced, e.g. ASME VIII Div.3 requirements should be applied.
Suggest change, i.e. addition section in API 6X

4.3 Fatigue
Fatigue assessment shall include all cyclic loading, including but not limited to: internal pressure, external pressure, thermal loads, axial loads and bending. Results from finite element analysis shall be used to determine areas of high stress concentrations (e.g. areas with high cyclic stress ranges) to be used in the fatigue evaluation. The fatigue analysis should be based on the S-N approach using the linear damage hypothesis (Miner’s rule). When appropriate, the fatigue analysis may alternatively be based on fracture mechanics. NDT extent and acceptance criteria shall be consistent with the applied fatigue method for the fatigue sensitive areas. Guidance on the S-N approach is given by DNV-RP-C203 and BS 7608 for components in air, in seawater with cathodic protection and in seawater with free corrosion. Guidance on the fracture mechanics approach can be found in BS 7910 or API 579-1/ASME FFS-1. The S-N curve and the fatigue crack growth parameters used for fatigue design should be qualified for the intended service conditions, e.g. cyclic loaded components exposed to H2S.

NOTE: In the design process fatigue methods do not consider any fracture criterion. However, in cases where cracks are found and not removed, i.e. for fitness for service assessment, failure criteria due to cracks are used.
With respect to the S-N approach the following apply:
a) The calculated fatigue life shall be at least 3 times the service life for all components considered acceptable for inspection during its service life.
b) For components that cannot be inspected, the calculated fatigue life shall be at least 10 times the service life.
c) The maximum inspection interval shall maximum be at least 1/10 the calculated fatigue life.

With respect to the fracture mechanics design approach, the following apply:
a) The calculated fatigue life shall be at least 1.5 times the service life for all components considered acceptable for inspection during its service life.
b) For components that cannot be inspected, the calculated fatigue life shall be at least 5 times the service life.
c) The maximum inspection interval should be at least 1/5 (one-fifth) of the time required for a reliably detectable crack to grow to failure.

The fatigue performance should be presented as load range vs. number of cycles to failure (closed form equations), e.g. bending moment range vs. number of cycles to failure (ΔM-N), pressure range vs. number of cycles to failure (Δp-N) or axial force range vs. number of cycles to failure (ΔT-N).
129. Clause: 7.4.9.3.4 Hydrostatic body test —Christmas trees

Issue: Order of tests
Considering the wording of 10.16.6.2 it would seem that the a) seat test, b) operational test and c) back seat test could be conducted and any order as well. We might consider if the sequence of the tests should be defined in the future

Contributor: Lewis
Disposition: Accepted
Comments: Came up as an RFI a few weeks ago; should we have a specific order of the tests? There are some pretty clear definitions in there, but there is some middle ground that says you can do what you want; I don't see a need for mandating a specific order of tests, besides clear up RFIs. Necessary? Maybe add a note that says the order isn't specified? Ultimately, do shell test for containment; testing scenario is specific to that particular actuator; I think it does alter the results for different actuators; need further review; Define different types of actuators and then look into the requirements

Group Assigned: Qualification

130. Clause: 4.3.1

Issue: Hammer Unions
4.3.1.4 Hammer Union End and Outlet Connections
Design of end and outlet hammer union connections used on equipment specified in this International Standard shall conform to the material and dimensional requirements of API 7HU2 for all size and figure combinations defined in API 7HU2.

4.3.1.5 Hammer Union Nuts and Segments
Hammer union nuts and segments meeting the requirements of API 7HU2 are acceptable for installation on equipment specified in this International Standard with hammer union end and outlet connections meeting the requirements of API 7HU2.

Contributor: Harder
Disposition: Tabled until spec is released
Comments: Intention is for it to be compatible to 6A; hammer is similar to clamps in other standards; 7HU2 hasn't been accepted, so this might be premature, but can consider adding this as well; there is a working draft with dimensions to this 7HU2! Only 6A flange I can think of is a union adapter; Choke valves, pressure transmitter; I'm not sure it applied to 6A; The flange, gasket and welding procedures; anything else is covered under 7; All he is saying to add a note to see this standard (once accepted); You can still have your clamp and sell as OECs; Can also 'hammer unions that are in conformance to 7HU2 are compatible with 6A' but have to wait till it is finished; 4.3.1.5: Similar to clamps; it would not be suitable because part of end connection, and this gives you an out to that; nut and segments themselves would all be to higher strength which would not meet NACE; segments are not going to be wetted; In 4.3.1.3, put in there or else you couldn't use for sour equipment; If you refer to another standard for the connection, it is an all or nothing deal; For all design in that standard; I just want to make this explicitly clear; It would be a type of end connector; OEC; Address here or no? If we do that for tree cap, what is the difference? Have one on top connector, too; If you monogram, you take responsibility; I don't think you can monogram with that welded on there; what are we going to do to it? Reference in 16c?? Upon release? Not sure this fits with 6A equipment.
131. **Clause:** 10.16.6.2 a) Functional testing  
**Issue:** Clause: a) test for hydraulic and pneumatic actuator seal:  
The actuator seals shall be pressure-tested in two steps by applying pressures of 20 % and 100 % of the maximum working pressure to the actuator.  
Question 1: Does the standard stipulate that the steps be first performed at 20% follow by 100% of the maximum working pressure?  
**Contributor:** Baniak  
**Disposition:** Accepted; link with one above  
**Comments:** Specify an order for testing? Sequence question; one that Ed sent in as a result of inquiry; Should we clarify the document or does it matter? Link this comment with one above  
**Group Assigned:** None

132. **Clause:** 7.31; 7.3.2  
**Issue:** EN 473 has been withdrawn and replaced by ISO 9712, which is already referenced.  
**Contributor:** Brunjes  
**Disposition:** Accepted  
**Comments:** Text portion says that must qualify with 'EITHER' EN 473 and 92; would have to replace 273 with 9712 quote  
**Group Assigned:** None

133. **Clause:** 6.3.2.3 d) 6.3.4.2.3  6.3.4.2.3 b) 6.5.1.2.2 c) 6.5.1.1.2 c)  
**Issue:** ASTM E92 has been withdrawn and replaced by ASTM E384  
**Contributor:** Brunjes  
**Disposition:** Accepted  
**Comments:**  
**Group Assigned:** None

134. **Clause:** B.1.2  
**Issue:** ISO 31-0 has been withdrawn and replaced by ISO 800000-1  
**Contributor:** Brunjes  
**Disposition:** Rejected  
**Comments:**  
**Group Assigned:** None

135. **Clause:** 7.4.2.1.3  
**Issue:** We currently reference ISO 2859-1 “sampling by attributes” and previously referenced ANSI/ASQ Z1.4 to cover the same subject. However, we do not cover “sampling by variables”. We reference the standard for sampling of hardness testing but one can argue that hardness testing should be by variable. I have to go back and check, but I think the 16th edition included ANSI/ASQ Z1.9 for “Sampling by variables”. Would like to see something like ISO 3951 to cover “sampling by variables” for hardness testing  
**Contributor:** Brunjes  
**Disposition:** Tabled; Jerry Longmire to explain  
**Comments:** Anything 10000 psi and over, you have to hardness; anything that is NACE, you have to hardness test; only thing you can apply is non-NACE equipment; only place you could apply a variable on non-NACE equipment; you can’t do it for PSL 3; Still leaves a fair amount of stuff to test; We just say to do it per 2859-1; this only says attributes; saying that you should do it by a different standard, by variables and not attributes; Each attribute you have to treat individually; not sure what he means  
**Group Assigned:** None
136. **Clause: Table 15**
   **Issue:** An overlay with Fe10 does not meet the requirements for UNS N06625. This alloy has a 5 percent max Fe content. In my opinion, this just confuses the issue
   **Contributor:** Brunjes
   **Disposition:** Rejected
   **Comments:**
   **Group Assigned:** None

137. **Clause: 10.1.2.4.6**
   **Issue:** Clarify limitations on segmented flanges in sour service
   **Contributor:** Zollo
   **Disposition:** Accepted; more work needed/ clarification
   **Comments:** Why are they limited? Why can't they be used in sour service? Because they leak when the wind blows; Interested in dropping segmented flanges? No, will get a lot of opposition from lower end; Send to sub-committee; suggest dropping; Ask John Fowler to give you his memory bc he probably can recall some of the design work.
   **Group Assigned:** Design
   **Items reviewed at 10/29/2013 meeting**

138. **Clause: Page 265 Detail Y**
   **Issue:** I have been asked to get clarification on the Max hub diameter(J1) for API 6A flanges. In the past, I have always defined J1 as the intersection of the back surface of the flange and the conical surface of the hub. This week it was presented to me in API Specification 6A/ISO 10423 page 265 that Detail Y shows two perpendicular lines at the intersection. This suggests to some that J1 may be a theoretical cylindrical surface, and the conical surface is derived from running a tangent from the radius to the minor hub.
   I tried to get input from other engineers to see if I could get a definitive answer. This query produced a third, less likely alternative, but in fairness, I have to present it. This interpretation is similar to the second option, except that it starts the connection from J1 to J2 only after the radius R is completes its 90 degrees.
   I have included a drawing of the flange, with all three options represented. The model was created using option 2, and option 1 and option 3 are shown in phantom lines. Will you help me put this disagreement to bed, and provide us with APIs interpretation of J1? Is it one of these options, or could there even be a forth option to consider?

![Flange Diagram](image_url)
Contributor: Ed Baniak
Disposition: Accepted
Comments: Zollo...Please see markup attached.

Option 1 is the correct option but with the radius as per detail Y as shown in my markup. All other options would be more conservative. It may not be a bad idea to add a reference dimension to the detail for clarification. I have copied Jean Brunjes on this as he is leading the design team.

Comments: Wehner...
Our name on the drawing implies that the question came from NOV, but if so I don’t know from whom. I am not sure if I agree with David, although I may be confused as to which option is which, so I made my own drawing, attached.
I would agree that “option 1” is standard drafting practice: where a tapered diameter intersects with another surface and a fillet radius is added, the diameter dimensioned at that point would be the circular intersection that would exist if the fillet radius were zero. BUT from detail Y and the drawings used in previous editions, I think the intended requirement is clearly “option 2.” That is, the tapered length starts at a fillet radius that would connect at 90° to a straight OD of the diameter called out. I think this is correct and technically justified, because J2 and J3 are minimum values only, meaning no taper is required. The flange neck can be straight and often is machined as a straight diameter of J1. So if the allowed taper is employed, it should start from the same radius. If option 1 is used for the tapered neck, the flange strength is lowered at the highest stressed area. I am surprised how much difference it makes – about 0.170” diametrically for a 3-1/16” 10K that I drew. The 14th edition doesn’t have detail Y, but the extension lines for diameter J1 line up with a straight intersection as in option 2.

Comments: Brunjes

There is no definitive location specified for the radius, such as the center of it being located on a diameter equal to J1 plus 2R. This throws out option 3 of the “mysterious” NOV drawing DRW0001.

The radius is a transition between the back face of the flange and: a) a diameter of J1 if the flange is machined with a cylindrical diameter = J1; or b) the conical surface defined by a point at the J2 and J3 dimensions and J1 diameter at the backface of the flange. Thus, the center of the radius can “move” diametrically, whether it is tangent to the J1 cylinder or the conical surface.

If you look at the attachment to this email, it shows a 14th edition flange drawing. I’ve added the red lines on the backface, conical surface and extension line for J1. You see the backface and conical surface intersect the backface at J1 diameter. The Detail B from the 16th edition (and later Detail Y) are screwed up.
Thus I agree with Eric’s explanation: “where a tapered diameter intersects with another surface and a fillet radius is added, the diameter dimensioned at that point would be the circular intersection that would exist if the fillet radius were zero.”

I disagree with Eric’s note: “...So if the allowed taper is employed, it should start from the same radius.” Rephrasing your sentence, I think you are saying if the taper is employed, the center of the radius is in the same position. That’s where I disagree. As I said in the first sentence of this email, there is no specified location for the center of the radius. It is tangent to the backface and a surface that varies.

In summary, I agree with option 1 of DRW0001 when the conical surface is machined, where the red dashed radius is properly located. I agree with option 2 of DRW0001 when J1 is machined as a cylindrical surface, where the radius is located as shown by the “R .380”. (Except the radius isn’t “anchored”.)

The detail Y (from 20th edition) needs updating.

6AF2 says models were used at the nominal dimensions of 6A, and the raised face thickness = ring groove depth of E from the ring groove tables. It is interesting to note the mesh models don’t show a radius whatsoever.

Group Assigned: Design

139. Clause: Table 30
Issue: Table 30 for drift mandrels sizes for the following sizes in Inches conversation to MM tolerance in D1 are too large and make the D1 dimension out of tolerance.

The +0.68mm (+0.027”) is where there is an issue. When you add the +0.68 to the D1 dimension it is larger than the size in MM and you can’t drift the valve. Should D1 the D1 mm values be lowered or the tolerance of 0.68mm be smaller by 0.006 mm to make sure the D1 dimension with tolerance is not larger than the nominal bore size.

By the way, how much tolerance does 6A have on the nominal bore dimension. API 6D has -.060.

3-1/8”
4-1/16”
5-1/8”
7-1/16” -152mm, 168mm,179mm
9”

Contributor: Rick Faircloth
Disposition: Accepted
Comments: There will be an errata to the 20th edition but this needs to be fixed long term
Group Assigned: Quality
140. Clause: 9.2
Issue: Prior to shipment, parts and equipment shall have exposed metallic surfaces protected with a rust preventative that does not become fluid and run at a temperature of less than 50 °C (122 °F).

The next revision of API 6D will using more generic wording.

Delete this current wording: Parts and equipment that have bare metallic machined surfaces shall be protected with a rust preventative that can provide protection at temperatures up to 50 °C (122 °F).

Replace with this wording: Corrosion protection for bare metallic machined surfaces such as flange faces, weld bevel ends, exposed stems and internal surfaces of the valve shall be provided with corrosion protection using the manufacturer’s documented requirements.

Contributor: Rick Faircloth
Disposition: Accepted
Comments: May need some rewording. How long does the coating need to last? Will it run off with high temperature in a desert environment? Do we need to protect CRA materials? What if it is raining? Requirement should be auditable.
Group Assigned: Materials

141. Clause:
Issue: The 6A spec has different bore diameters for flanges and valve. I suggest the 5” 10K valve to be same as the flange. (5.12 +0.4/-0.00)

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Pressure (psi)</th>
<th>Flange Bore</th>
<th>Valve Bore</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>API (Tables</td>
<td>API (Tables</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B.53 &amp; B.54)</td>
<td>B.70 &amp; B.71)</td>
</tr>
<tr>
<td>5-1/8</td>
<td>5.12</td>
<td>5.16 Max</td>
<td>5.12 +.03/-0.00</td>
</tr>
<tr>
<td></td>
<td>15000</td>
<td>5.12 5.16</td>
<td>5.12 +.04/-0.00</td>
</tr>
</tbody>
</table>

Contributor: Loc Hoang
Disposition: Accepted
Comments: Also look at 7” 2K,3K and 5K flanges. Add 9”-10K to table B.70. Add to the table below (B.71) (15K) 7” and 9”. Look at B.72 (20K) for 4”,5” and 7”. Look at table B.51 max bore of 3”,4”,5”,7”.
Table 71 — Flanged plug and gate valves for 15 000 psi rated working pressure (USC units)

Dimensions in inches

<table>
<thead>
<tr>
<th>Nominal size</th>
<th>Full-bore valves</th>
<th>Face-to-face valve length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bore</td>
<td>± 0,06</td>
</tr>
<tr>
<td></td>
<td>0,03 =</td>
<td></td>
</tr>
<tr>
<td>1 13/16</td>
<td>1,81</td>
<td>18,00</td>
</tr>
<tr>
<td>2 1/16</td>
<td>2,06</td>
<td>19,00</td>
</tr>
<tr>
<td>2 9/16</td>
<td>2,56</td>
<td>21,00</td>
</tr>
<tr>
<td>3 1/16</td>
<td>3,06</td>
<td>23,56</td>
</tr>
<tr>
<td>4 1/16</td>
<td>4,06</td>
<td>29,00</td>
</tr>
<tr>
<td>5 1/8</td>
<td>5,12a</td>
<td>35,00</td>
</tr>
</tbody>
</table>

a Tolerance on 5 1/8 bore is 0,04.

Group Assigned: Design

Suggested committees

- Design
- Materials, Welding and Cladding
- Organization
- Qualification
- Quality
- Repair and Remanufacture
Annex A

Item 5: API 6X changes Change title of 4.3.3.2 to API 6X method.

Remove dated reference to ASME BPVC in clause 4.3.3.1
Recommended changes to API 6A to accommodate a new Standard 6X

4.3.3.1 General

In the third paragraph, replace “4.3.3.2 to 4.3.3.6” with “4.3.3.2 to 4.3.3.4”.

4.3.3.2 ASME Method

Replace this entire subclause with the following:

“The design methodology of API Standard 6X may be used for design calculations for pressure-containing equipment.”

4.3.3.5 Design Qualification by Proof Test

This describes an antiquated method intended for low pressure, thin wall equipment, from the ASME Code, Section VIII, Division 1, part UG-101. It is based on a maximum total stress at operating conditions equal to one-half the yield strength, which is much too conservative. This should be removed from API Spec 6A.

4.3.3.6 Non-Standard materials design requirements

Remove this section. With Standard 6X, no special rules apply to non-standard materials.

5.4.1 a)

Second paragraph, replace first sentence with: “Non-standard material for components shown in Table 5 shall have a specified minimum yield strength at least equal to that of the lowest-strength standard material permitted for that application.”

Table 5

Remove “4.3.3 and” from footnote b.

Item 53.

Case for eliminating PSL 3G from Subsea Wellhead FAT Requirement

Please consider the following request regarding elimination of the PSL 3G rating for the Wellhead Housing that was added in the 2nd Edition of API 17D section 8.5.5.1.
Pressure testing the wellhead housing body to rated working pressure with gas after the hydro test is an unnecessary safety risk that provides no additional quality or functional verification value. The material of the wellhead housing is inspected for internal flaws with volumetric NDE and inspected for surface flaws with wet magnetic particle NDE after all machining steps per PSL 3. The housing is then hydrostatically pressure tested to 1.5 times the working pressure to proof load and leak test the housing per PSL 3. The test fixture for gas testing would have seals which accomplish the testing but these are different from those used in field and therefore do not add any assembly test value. Testing seals and wellhead ring gasket (AX, VX, VX2, or other) used during FAT are discarded and replaced. As such, the only thing that performing a gas media pressure test to working pressure could possibly prove is that the bulk material of the housing does not have a material flaw that would allow gas to leak through. This seems unlikely given the inspection requirements already prescribed by PSL 3. Prescribing a gas pressure test for FAT of the wellhead housing also introduces an extreme safety risk due to the frequency (FAT is for each production unit) and the size of the compressed volume of gas required for an 18.5" bore, the general length of the wellhead (60" to 70" long). In addition, many wellheads are left as stock unfinished items, waiting for a customer's casing size/weight callouts (along with casing thread, weld prep and transition joint materials—given just prior to delivery) making the stock unfinished item and/or thread callout difficult to accommodate gas testing at rated working pressure.

The current flowchart in Annex M suggests that operators may request PSL 3G rating on all wellhead units. However, the design application of the wellhead housing is significantly different from other PSL 3G equipment. Valves and chokes are in direct contact with the production fluid by design, while the wellhead housing is one to two barriers away from production fluid by design. We do recognize the customer's concern over encountering gas during drilling, and as a result validate the annulus seal assembly to gas cyclic loads during qualification testing. Wellhead ring gaskets and casing threads are subject to varying degrees of gas tightness integrity, and therefore cannot be controlled by the wellhead manufacturer, as these are specific requirements called out by the customer at the time of purchase.

Therefore, we request that 17D section 8.5.5.1 be revised to remove the PSL 3G rating from wellhead factory acceptance testing. We also request that Figure M.1 be re-written to remove any potential confusion between wellhead and completion equipment when considering PSL 3 or PSL 3G.

**ITEM 54**

I feel I should weigh in, because I chaired the WG that came up with the changes to 4.2.3 that were made to accommodate the revisions to NACE MR0175. There were several very contentious issues and “upgrade” substitutions was one of them. That WG ended up not
addressing the issue in Addendum 1 to the 19th edition. It was addressed with a change in the 20th edition; this question shows we possibly could have done it more clearly.

It is vital to clear this up. It is very common for 6A valves to be sold (monogrammed) with a material class of DD-NL and with 718, 725, or XM-19 stems, with 410 or F6NM SST valve bore sealing mechanism components, and with 316L or 625 overlay in ring grooves and other body or bonnet seal areas.

**Background:**

Spec 6A 16th, 17th and 19th editions included the general statement, “Provided the mechanical properties can be met, stainless steels may be used in place of carbon and low-alloy steels and corrosion-resistant alloys may be used in place of stainless steels.” This was changed in the 20th edition to a limited provision, “Provided the mechanical properties requirements can be met, stainless steels and/or CRA materials may be used for material classes AA and BB in place of carbon and low-alloy steels. Similarly, for all material classes, corrosion-resistant alloys may be used in place of stainless steels.”

The intended effect of the change in 20th was to remove the blanket allowance to use stainless steels or CRAs where Table 3 specifies carbon/low alloy steels, in DD & EE. The reasons were:

- There is no maximum partial pressure of H2S (“No Limit”) in MR0175 for carbon/low alloy steels.
- There are limits on the use of stainless steels for some components.
- There are even limits on some CRAs at elevated temperatures.
- For example, if an alloy steel stem in a valve rated “DD-NL” were replaced with a 410 SST stem, the material class would have to change to “DD-1.5,” which is a downgraded rating.
- **However, the NACE limit of 1.5 psia H2S for 410 SST applies only to stems; it does not apply to seats.** So the material class designation would not change for a DD-NL valve if assembled with a 410 stem, which is the specific case in question.
- For new equipment, the H2S rating can be marked according to the materials used, and that was the prevailing argument with Addendum 1 to 19th edition. But the ousted annex on repair and remanufacture was not reinstated in 19th edition until Addendum 3. With Annex J back in the 20th edition, there was concern that a blanket statement allowing SST in place of carbon/alloy steel could result in repaired valves not meeting the H2S rating of the original material class marked.

I don’t think anybody intended that the change in 20th edition was to prohibit using SST or CRA parts in new DD equipment. The decision was made to be silent on the question and thus leave it to the manufacturer to determine if a specific use of SST or CRA parts in DD would affect the H2S rating and would meet customer specs.

There is nothing stating specifically that SST/CRA cannot be used in place of carbon/alloy steel. The column heading in Table 3, “Minimum material requirements,” was discussed and left unchanged in 20th edition. We thought that left the door open for the manufacturer to make the decision and apply the appropriate material class and H2S rating. I don’t recall any discussion about the definitions of carbon steel and low-alloy steel entering into it.
Suggested interpretation response:

It should be noted that for all stated requirements of Specification 6A, the definitions of Spec 6A Clause 3 take precedence over definitions in a normative reference. In regard to material requirements of 4.2.3 and Table 3, the applicable definitions are 3.1.14 carbon steel, 3.1.31 corrosion-resistant alloy, 3.1.67 low-alloy steel, and 3.1.110 stainless steel. For the purposes of Spec 6A, AISI 410 (UNS S41000) is a martensitic stainless steel.

The relevant question is not whether 410 stainless steel meets the definition of low-alloy steel; the question is whether the use of stainless steel for valve bore sealing mechanism components in Material Class DD valves exceeds the “Minimum material requirement” of carbon or low-alloy steel in Table 3. The word “minimum” in the heading for the right-hand columns in Table 3, “Minimum material requirements,” refers to the three types of materials listed. The intended order, with 1 as the minimum material selection and 3 as the maximum, is as follows:

1. Carbon or low-alloy steel
2. Stainless steel
3. Corrosion-resistant alloy (CRA)

The use of stainless steel for valve-bore sealing mechanisms in material class DD exceeds and thus satisfies the minimum requirement of carbon or low-alloy steel. The statement in 4.2.3 that “stainless steels and/or CRA materials may be used for material classes AA and BB in place of carbon and low-alloy steels” indicates that there are no restrictions on the use of stainless steel in AA and BB; it does not prohibit the same usage in DD. However, for sour service there are restrictions on the use of some stainless steels and CRAs in NACE MR0175/ISO 15156 that must be considered. This could affect the maximum partial pressure of H₂S, which is a required part of the material class designation.

Suggested revision in 21st edition:

Replace:
“Provided the mechanical properties requirements can be met, stainless steels and/or CRA materials may be used for material classes AA and BB in place of carbon and low-alloy steels. Similarly, for all material classes, corrosion-resistant alloys may be used in place of stainless steels.”

With:
“Provided the mechanical properties requirements can be met, stainless steels and/or CRA materials may be used in place of carbon and low-alloy steels and corrosion-resistant alloys may be used in place of stainless steels. For material classes DD, EE and FF, any restrictions on the use of stainless steels and CRAs in NACE MR0175/ISO 15156 shall be considered. This could affect the maximum partial pressure of H₂S, which is a required component of the material class designation.”
ITEM 56

I agree that Table F.3 has at least one error: 4-1/16 & 4-1/8 should not be listed separately. There is no difference between the two for validation and scaling purposes. But I think the correct change is to delete 4-1/8 from Table F.3. There are no flanges with the nominal size of 4-1/8” in 10.1, no threaded end connector size of 4-1/8” for valves in 10.5.3.4, and no 4-1/8” size for hubs in API Spec 16A. Therefore 4-1/8” is not a nominal size for end connectors.

In regard to David’s last comment regarding the valve tables, nominal valve size and nominal connector size are not always the same thing. For valves, 6A allows several different bore sizes with some nominal connector sizes. However, for design validation purposes, F.1.14.3.2 b) states, “The valve nominal size shall be determined by the nominal size of the end connections, as defined in F.1.14.3.2 e).” And F.1.14.3.2 e) is actually just Table F.3. I believe the intent of F.1.14.3.2 b) is that for scaling purposes, the 2000, 3000 and 5000 psi nominal valve sizes of 4-1/16 in., 4-1/16 X 4-1/8 in., and 4-1/16 X 4-1/4 in. are all defined as 4-1/16 in. for validation, since that is the nominal end connector size of all three.

4-1/8”, 4-1/4”, 6”, 6-1/8”, 6-3/8”, 6-5/8”, and 7-1/8” are not nominal connector sizes; they are optional bore sizes. Tables 67-72 list (in the first column) combinations of nominal connection size and maximum bore size, and those tables call that “nominal size” for valves.

My Objective Evidence:

1. The only permissible end connectors for 6A valves are:
   a) 6B/6BX flanges listed in Tables 49, 50, 51, 53, 54, and 60,
   b) threaded end sizes listed in 10.5.3.4,
   c) 16A hubs listed in 16A Table 6,
   d) OECs, which per 10.18.3 b) must have a nominal size listed for (a) or (b). These references do not list any of the following as a nominal connector size: 4-1/8”, 4-1/4”, 6”, 6-1/8”, 6-3/8”, 6-5/8”, and 7-1/8”. Therefore, the only nominal connector sizes are those listed in Table F.3, except for 4-1/8”, the odd man out.

2. Clause 8.1.6, Size Marking, states, “The size marking shall include the nominal size and, if applicable, the restricted or over-size bore.” I believe that for valve size 4-1/16 X 4-1/8 in., 4-1/16” is the nominal connector size and 4-1/8” the oversize bore, and for valve size 7-1/16 X 6-3/8 in., 7-1/16” is the nominal connector size and 6-3/8” the restricted bore.

I can accept that reverting to the 19th edition version of Table F.3 (4-1/16 or 4-1/8) as shown in David’s message should eliminate any confusion on the point. But that would prompt the question that David raised. So we either make a new table for Annex F listing all valve nominal sizes, including all connector/bore combinations, or just delete 4-1/8” from Table F.3. Obviously, I prefer the latter approach.
Table F.3 lists sizes 20-3/4” and 21-1/4” separately. I think 20-3/4” and 21-1/4” should be lumped together for scaling purposes. Reasons:

1. At one time, the 21-1/4” 2000 and 20-3/4” 3000 flanges were both called 20” nominal, even though the 20” 2000 and the 20” 3000 both had 20-1/4” bores. The current 21-1/4” 2000 and 20-3/4” 3000 flanges are identical to the older 20” flanges except for bore size and hub diameter.

2. For 2000, 5000, and 10,000 psi, there is a 21-1/4” flange, and for 3000 psi there is a 20-3/4” flange, never both for one pressure rating.

3. Table 80 includes the same nominal casing size (20”) as the largest for use beneath either a 21-1/4” or 20-3/4” housing.

4. Table F.4 can be used to size hangers and pack-offs by pipe size instead of wellhead connector size, and it lists only 20” nominal pipe size.

There may not be any equipment that is affected at present, but if somebody had an OEC design or casing hanger system sized by connection size, it’s certainly possible that they would want to qualify a 20-3/4” 3000 along with a 21-1/4” 5000 and/or 21-1/4” 2000. As it stands, some sticklers would say that testing a 20-3/4” 3000 OEC would not qualify a 26-3/4” 2000 or 3000 of the same design, because that is two sizes up, not one size. But there is no such thing as a 21-1/4” 3000 OEC: Clause 10.18.3 b) says, “OECs shall be designed with the same nominal sizes and pressure ratings shown in 10.1, or if appropriate, the sizes shown in 10.2,” and there is no 21-1/4” 3000 flange size in 10.1.