API AST SUBCOMMITTEE
SUBGROUP FABRICATION
Agenda Item: 620-330

Revision No. 0
Date: November 26, 2012
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TITLE: REWORD REFERENCES to A516, A516 Grades 65 & 70 Mod 1, and A516 Grades 65 & 70 Mod 2

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TO: Sub-Committee Letter Ballot

SOURCE: An email sent from Jack Blanchard to Doug Miller on October 14, 2010 and an inquiry dated February of 2002 that resulted in Agenda Item 620-313, which was passed to publication at the Spring 2012 meeting. It was determined that similar modifications to references to A516 Grades 65 & 70 Mods 1 & 2 be investigated.

SUBJECT: To revise references to A516 Grades 65 & 70 Mod 1 & remove references to A516 Grades 65 & 70 Mod 2.

SECTIONS REFERENCED: 4.2.3.3 f)

RATIONALE: To remove the “Mod” terminology and place the C and Mn requirements directly into the footnotes of the respective tables. Also, remove all references to Mod 2, as it does not show up in Table R-4, which is the main place where some advantage to Mod 2’s existence should appear. The primary note in Table R-4 describes the advantage that all normalized plates allow. It states: “When normalized, materials in this table may be used at temperatures 20 deg. F below those shown…”

EXISTING PARAGRAPHS:

4.2.3.2 f) A516, with the following API modifications as required: Mod 1 requires the carbon content to be restricted to a maximum of 0.20% by ladle analysis; a maximum manganese content of 1.50% shall be permitted. Mod 2 requires the minimum manganese content be lowered to 0.70% and the maximum increased to 1.40% by ladle analysis. The carbon content shall be limited to a maximum of 0.20% by ladle analysis. The steel shall be normalized. The silicon content may be increased to a maximum of 0.50% by ladle analysis.

DISCUSSION:

REVISIONS: Proposed changes are in red. Explanation notes are in blue.

4.2.3.2 f) A516, with the following API modifications as required: Mod 1 requires the carbon content to be restricted to a maximum of 0.20% by ladle analysis; a maximum manganese content of 1.50% shall be permitted. Mod 2 requires the minimum manganese content be lowered to 0.70% and the maximum increased to 1.40% by ladle analysis. The carbon content shall be limited to a maximum of 0.20% by ladle analysis. The steel shall be normalized. The silicon content may be increased to a maximum of 0.50% by ladle analysis.
0.20% by ladle analysis. The steel shall be normalized. The silicon content may be increased to a maximum of 0.50% by ladle analysis.

(Note – A516 element modifications are now detailed in the various table notes as listed below)

Table 4-3 Minimum Charpy V-notch Requirements for Plate Specifications

<table>
<thead>
<tr>
<th>Group</th>
<th>Specification #</th>
<th>Grade</th>
<th>Range in Tk.</th>
<th>Impact Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ave.</td>
<td>Individual</td>
</tr>
<tr>
<td>111</td>
<td>A516</td>
<td>65 and 70</td>
<td>3/16 – 2</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>A516 Mod 1b</td>
<td>65 and 70</td>
<td>3/16 – 2</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>A516 Mod 2b</td>
<td>65 and 70</td>
<td>3/16 – 2</td>
<td>15</td>
</tr>
</tbody>
</table>

Notes:

a. See 4.2.3 for complete description of this material.

b. See 4.2.3 for complete description of this material.

c. See 4.2.3 for complete description of this material.

d. See 4.2.3 for complete description of this material.

e. The steel shall be fully killed and made with fine-grain practice.
f. The carbon content to be restricted to a maximum of 0.20% by ladle analysis. A maximum manganese content of 1.50% shall be permitted.

(Note – Remove references to Mod lines from Table 4-3 since they are not referenced in Table 4-1 and thus do not have any affect in the base document. Remove note b as this is not relevant anymore and re-letter the remaining notes.)

Table R-2

<table>
<thead>
<tr>
<th>Specification Number</th>
<th>Grade</th>
<th>Range in Thickness (in)</th>
<th>Plate Impact Value</th>
<th>Welded Impact Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM A516</td>
<td>65 and 70</td>
<td>3/16 – 2</td>
<td>25      20</td>
<td>20      15</td>
</tr>
<tr>
<td>ASTM A516 Mod 1d</td>
<td>65 and 70</td>
<td>3/16 – 2</td>
<td>25      20</td>
<td>20      15</td>
</tr>
<tr>
<td>ASTM A516 Mod 2d</td>
<td>65 and 70</td>
<td>3/16 – 2</td>
<td>25      20</td>
<td>20      15</td>
</tr>
</tbody>
</table>

Notes:

a. See 4.2.3 for complete description of this material.

b. See 4.2.3 for complete description of this material.

c. See 4.2.3 for complete description of this material.

d. See 4.2.3 for complete description of this material.

e. The steel shall be fully killed and made with fine-grain practice.
f. The carbon content to be restricted to a maximum of 0.20% by ladle analysis. A maximum manganese content of 1.50% shall be permitted.

(Note - Remove all references to A516 Grades 65 & 70 Mod 2 as it does not appear in Table R-4, which is the main place where it should have an impact. The 20 deg. F credit for normalizing even without Mod 2 chemistry would still exist. ASTM’s A516 Grade 65 has a maximum manganese content of 1.44% when carbon is limited to a maximum of 0.20% (see note “B” in Table 1 Chemical Requirements found in ASTN Designation: A516/A516M – 6). Dropping the 1.50% maximum requirement of Mod 1 eliminates the mill’s requirement to show that the material is not conforming to it’s standard.)
### Table R-4 Minimum Permissible Design Metal Temperature for Atmospheric Temperature Material Plates Used without Impact Testing

<table>
<thead>
<tr>
<th>Group</th>
<th>Specification #</th>
<th>Grade</th>
<th>Minimum Design Metal Temp., deg. F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Plate Thickness including CA, in.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3/16 to 3/8</td>
</tr>
<tr>
<td>111</td>
<td>A516</td>
<td>65 &amp; 70</td>
<td>-30</td>
</tr>
<tr>
<td></td>
<td>A516</td>
<td>65 &amp; 70 Mod 1</td>
<td>-40</td>
</tr>
</tbody>
</table>

**Notes:**
When normalized, materials in this table may be used at temperatures 20 deg. F below those shown.  

*a* See 4.2.3 for a complete description of this material. The carbon content to be restricted to a maximum of 0.20% by ladle analysis. A maximum manganese of 1.50% shall be permitted.

(Notes - See notes for Table R-2.)

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### Table R-5 Minimum Charpy V-notch Impact Requirements for Atmospheric Temperature Material Plate Specimens (Transverse)

<table>
<thead>
<tr>
<th>Group</th>
<th>Specification #</th>
<th>Grade</th>
<th>Range in Tk. (in.)</th>
<th>Impact Value (foot-lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>111</td>
<td>A516</td>
<td>65 and 70</td>
<td>3/16 – 2</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>A516</td>
<td>65 and 70 Mod 1</td>
<td>3/16 – 2</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>A516</td>
<td>65 and 70 Mod 2</td>
<td>3/16 – 2</td>
<td>15</td>
</tr>
</tbody>
</table>

**Notes:**
*a* The stated values apply …  

*b* See 4.2.3 for a complete description of this material. The carbon content to be restricted to a maximum of 0.20% by ladle analysis. A maximum manganese of 1.50% shall be permitted.

(Notes – see above.)

**IMPACT:** Minimal. Eliminates the need to request materials (Mod 1) that do not conform to the existing ASTM Specification.

**BALLOTING RESULTS:** Not balloted