**Work Item Charge:** Implement TGTGC recommendation to withdraw TR SR22 from SC5 and remove references to it from relevant documents.

**Ballot Rationale:** Ballot identifies changes to 5CT required to remove references to TR SR22.

**Ballot Text:** Implement the proposed modifications to 5CT (current edition). When implemented to both 5CT and 5B, withdraw 5TRSR22.

**NOTE** Also refer to the ballot notification email for additional information.
4 Conformance

4.2 Extended Scope

Supplementary requirements that can optionally be agreed for enhanced leak resistance connections (LC) are given in K.10 (SR 22).

5 Information to be Supplied by the Purchaser

5.2 Casing

The purchaser shall also state on the purchase agreement the requirements, where applicable, concerning the following stipulations, which are at the purchaser’s option according to Table 2:

Table 2—Purchaser Supplied Agreement Optional Requirements (Casing)

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfide stress cracking test method(s) and test solution(s) –</td>
<td>7.14. 10.10, K.4211 (SR 39)</td>
</tr>
<tr>
<td>Grade C110</td>
<td></td>
</tr>
</tbody>
</table>

The following may be agreed between purchaser and manufacturer according to Table 3:

Table 3—Purchaser/Manufacturer Agreement (Casing)

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistical tensile testing</td>
<td>7.2.4, K.1410 (SR 38)</td>
</tr>
<tr>
<td>Electric-weld casing and pup joints – Grades H40, J55, K55,</td>
<td>K.1312 (SR 40)</td>
</tr>
<tr>
<td>N80 all types, L80 type 1, R95</td>
<td></td>
</tr>
<tr>
<td>Enhanced leak resistance LC connections</td>
<td>K.10 (SR 22)</td>
</tr>
</tbody>
</table>

5.3 Tubing

The following may be agreed between purchaser and manufacturer according to Table 6:

Table 6—Purchaser/Manufacturer Agreement (Tubing)

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistical tensile test</td>
<td>7.2.4, K.1410 (SR 38)</td>
</tr>
<tr>
<td>Electric-weld tubing and pup joints — Grades H40, J55, K55,</td>
<td>K.1312 (SR 40)</td>
</tr>
<tr>
<td>N80 all types, L80 type 1, R95</td>
<td></td>
</tr>
</tbody>
</table>
5.4 Coupling Stock, Coupling Material, and Accessory Material

5.4.1 When inquiring or placing orders for coupling stock, coupling material or accessory material manufactured in accordance with this standard, the purchaser shall specify the following according to Table 7:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfide stress cracking test method(s) and test solution(s) – Grade C110</td>
<td>7.14, 10.10, K.1211 (SR 39)</td>
</tr>
</tbody>
</table>

5.4.2 The purchaser shall also state on the purchase agreement the requirements, where applicable, concerning the following stipulations, which are at the purchaser’s option according to Table 8:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistical tensile testing</td>
<td>7.2.4, K.4410 (SR 38)</td>
</tr>
</tbody>
</table>

7 Material Requirements

7.2 Tensile Properties

7.2.4 Statistical Tensile Testing-Grades C90, T95, and C110

By agreement between purchaser and manufacturer, the supplementary requirements for statistical tensile testing of Grades C90, T95, and C110 in K.4410 (SR 38) shall apply.

7.14 Sulfide Stress Cracking Test-Grades C90, T95, and C110

7.14.4 Test Solution

See K.1211 (SR 39) for use of an alternative test solution in an additional informative test.


Before the SSC test, Rockwell C hardness tests (minimum of three indentations) shall be made as shown in Figure D.3028. Hardness data obtained on the DCB test specimens shall be for information only.
8 Dimensions, Masses, Tolerances, Product Ends, and Defects

8.13 Defects

8.13.1 Pipe and Accessory Made from Pipe

h) on the internal upset configuration on all upset products, any sharp corner or drastic change of section that would cause a 90° hook-type tool to hang up (see Figure D.2523), and

10 Inspection and Testing

10.13 Dimensional Testing

10.13.9 Internal Upset Inspection

Inspection of the internal upset configuration shall be made with a 90° hook-type tool. The contact pin shall have a circular cross-section of 4.8 mm (3/16 in.) diameter that is visually determined to be attached perpendicular to the handle. The end of the pin contacting the inside surface of the pipe shall be rounded to a height (between the radius tangent point and the vertical surface of the contact point shaft) that shall not exceed 0.30 mm (0.012 in.). The contact point radius shall not exceed the inside radius of the pipe being inspected. Sharp edges on the contact point shall be removed. See Figure D.2523. The 90° hook-type tool contact point should be maintained perpendicular to the longitudinal axis of the pipe while the contact point is passed axially throughout the inside upset transition length. Pressure on the contact point shall be no greater than the pressure created by the mass of the 90° hook-type tool.

10.15 Non-destruction Examination (NDE)

10.15.5 NDE of the Weld Seam of Welded Pipe

Additional requirements for PSL-2 and PSL-3 products are given in Annex H. When K.4312 (SR 40) is specified in the purchase agreement for all Grades except P110 and Q125, the additional requirements of K.4312 (SR 40) apply.

13 Documents

13.3 Certification Content

The certificate shall, as applicable to each item, contain at least the following information.

l) For SSC testing of Grade C110, a statement specifying if the SSC testing was performed in Solution A or when performed in the solution described in K.4211.3 (SR 39.3), the actual percent H2S;
### Annex C AND Annex E (normative)

#### Tables in SI Units AND Tables in USC Units

*********

#### Table C.48—Marking Requirements and Sequence

**AND**

#### Table E.48—Marking Requirements and Sequence

<table>
<thead>
<tr>
<th>Marking Sequence</th>
<th>Mark or Symbol</th>
<th>Stencil and/or Stamp Marking Requirements</th>
<th>Grades H40, J55, K55, N80 all types, R95, and P110</th>
<th>Grades L80 all types, C90, T95, C110, and Q125</th>
<th>All Grades</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pipe Couplings and Accessories Pipe Couplings and Accessories Coupling and Accessory Materials</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Supplementary requirements, if applicable:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>— K.2 (SR 1)</td>
<td>S1</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>— K.3 (SR 2)</td>
<td>S2</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>— K.4 (SR 9)</td>
<td>S9Q .. »</td>
<td>P</td>
<td>D or P</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>— K.8 (SR 13)</td>
<td>S13</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>— K.9 (SR 16)</td>
<td>S16 .. »</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>— K.10 (SR 22)</td>
<td>C</td>
<td>P</td>
<td>D</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>— Annex H (PSL)</td>
<td>S22</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td>L2 or L3</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
</tr>
</tbody>
</table>

*********

#### Table C.58—Enhanced Leak Resistance SR 22.1

**AND**

#### Table E.58—Enhanced Leak Resistance SR 22.1

<table>
<thead>
<tr>
<th>Label 1</th>
<th>Label 2</th>
<th>Grade*</th>
<th>Outside Diameter (D)</th>
<th>Drift Diameter</th>
<th>Coupling OD Regular (W)</th>
<th>Power Turns (N)</th>
<th>Length (L_0)</th>
<th>Approximate Start Torque</th>
<th>Recommended Thread Compound Mass (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

---

* UN80 implies L80 Type 1, N80 Type 1 and N80Q.

---

**End of pipe to apex of triangle**

---

* The recommended mass of thread compound shown in this table is for a compound containing metals, including lead (i.e., former API Bulletin 5A2) which has a specific gravity of approximately 7. Use of compounds such as described in API 5A3 or ISO 13678 requires less mass to achieve an equivalent volume of thread compound. Use of excessive thread compound may be detrimental to leak resistance.

---

* The alternative size drift (see Table C.20) is shown.

*********
Annex D
(normative)

Figures in SI (USC) Units

Key
1. Paint mark, of high visibility green color.
2. Paint stripe, approximately 25 mm (1 in.) wide and approximately 0.6 m (2 ft) long for the pin end, and not less than 100 mm (4 in.) long when a coupling is installed by the manufacturer.
3. Triangle stamp.
   a. Maximum make-up length: end of pipe to triangle apex.
   b. Total length: end of pipe to vanish point.

<table>
<thead>
<tr>
<th>Key</th>
<th>Dimensions in millimeters (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Paint mark, of high visibility green color.</td>
</tr>
<tr>
<td>2</td>
<td>Paint stripe, approximately 25 mm (1 in.) wide and approximately 0.6 m (2 ft) long for the pin end, and not less than 100 mm (4 in.) long when a coupling is installed by the manufacturer.</td>
</tr>
<tr>
<td>3</td>
<td>Triangle stamp.</td>
</tr>
<tr>
<td>a</td>
<td>Maximum make-up length: end of pipe to triangle apex.</td>
</tr>
<tr>
<td>b</td>
<td>Total length: end of pipe to vanish point.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Triangle Stamp Location</th>
<th>( L_a )</th>
<th>( L_a' )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>26.20</td>
<td>82.55</td>
</tr>
<tr>
<td></td>
<td>(3.000)</td>
<td>(3.250)</td>
</tr>
<tr>
<td>5</td>
<td>85.73</td>
<td>92.11</td>
</tr>
<tr>
<td></td>
<td>(3.750)</td>
<td>(3.625)</td>
</tr>
<tr>
<td>5.1/2</td>
<td>88.90</td>
<td>95.25</td>
</tr>
<tr>
<td></td>
<td>(3.500)</td>
<td>(3.750)</td>
</tr>
<tr>
<td>6.1/2</td>
<td>98.43</td>
<td>104.78</td>
</tr>
<tr>
<td></td>
<td>(3.875)</td>
<td>(4.125)</td>
</tr>
<tr>
<td>7</td>
<td>101.60</td>
<td>107.95</td>
</tr>
<tr>
<td></td>
<td>(4.000)</td>
<td>(4.250)</td>
</tr>
<tr>
<td>7.1/2</td>
<td>104.78</td>
<td>111.13</td>
</tr>
<tr>
<td></td>
<td>(4.125)</td>
<td>(4.375)</td>
</tr>
<tr>
<td>8.1/2</td>
<td>114.30</td>
<td>120.65</td>
</tr>
<tr>
<td></td>
<td>(4.500)</td>
<td>(4.750)</td>
</tr>
<tr>
<td>9.1/2</td>
<td>120.65</td>
<td>127.00</td>
</tr>
<tr>
<td></td>
<td>(4.750)</td>
<td>(5.000)</td>
</tr>
</tbody>
</table>

Figure D.23—SR 22.1 Field-end Paint Mark and Triangle Stamp (Stamp on Mill and Field Ends)
This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept.

Copyright API. All rights reserved.

Dimensions in millimeters (inches)

---

**Figure D.24**—SR 22.2 Optional Tapered Bore along Inside Diameter Specifications

---

**Figure D.25**—Example of a 90° Hook-type Tool

---

**Figure D.26**—Axial Impact Test Apparatus

---

**Figure D.27**—45° Impact Test Apparatus

---

**Figure D.28**—Stripping Test Apparatus

---

**Figure D.29**—Seal-ring Paint Band Example

---

**Figure D.30**—Location of Hardness Impressions on DCB Specimen
Annex I
(normative)

Requirements for Thread Protector Design Validation

*********
I.6 Axial Impact Tests
*********

1.6.3 Subject the test-piece sets to the axial impact test (see Figure D.2624) at the stabilized temperatures using a steel bar of 38 mm (1.5 in.) diameter and a minimum free fall height of 0.3 m (12 in.). The thread protectors (pin and box) shall be capable of sustaining the axial impact loads in Table I.1 without damage to the machined surfaces of pipe pin or box threads.

*********
I.7 Angular Impact Test
*********

I.7.3 Apply a 45° angular impact load (see Figure D.2725) to the test-piece sets at the stabilized temperatures using a flat steel plate and a minimum free fall height of 0.3 m (12 in.). The thread protectors (pin and box) shall be capable of sustaining angular impact loads in Table I.2 without damage to the tubular's pin and box machined surfaces.

*********
I.9 Stripping Test (Pin-end Protector Only)
*********

I.9.3 A stripping test shall be conducted in accordance with IADC/SPE 11396 on the pin protector (see Figure D.2826) at the required stabilized temperatures and with an axial load equal to or greater than Fax calculated using Equation (I.1) (SI units) or Equation (I.2) (USC units):

*********
Annex K
(normative)

Supplementary Requirements

*********

K.8 SR 13—Seal-ring Couplings

*********

K.8.3 SR 13.3—Marking

All couplings that meet the requirements of K.8 (SR 13) shall be marked “S13” and have a blue band painted around the coupling, see Figure D.2927. If the coupling size does not permit separation of markings as shown in Figure D.2927, stencil marking may cross over the paint bands. When this occurs, the stencil shall be on top of the band and be of a contrasting color.

*********

K.10 SR 22—Enhanced Leak Resistance, LC

K.10.1 General

By agreement between purchaser and manufacturer, the Supplementary Requirements for enhanced leak resistance LC shall apply. It should be noted that the product is fully interchangeable with standard API LC connections. However, the design criteria concerning leak resistance shall not apply for such mixed product.

NOTE 1 Other provisions for the implementation of SR 22 are found in API 5B, API 5B1, and API 5C1.

Liquid metal embrittlement may result if thread compound containing lead is used with tin-plated couplings at elevated temperatures for some materials. Use of thread compounds containing lead in applications involving temperatures in excess of 135 °C (275 °F) is cautioned.

NOTE 2 The application of API connections or pipe at elevated temperature or in sour service conditions is beyond the scope of this standard.

K.10.2 SR 22—Enhanced Leak Resistance

K.10.2.1 SR 22.1 Casings and couplings shall be furnished with enhanced leak resistance connections (LC) in accordance with the requirements specified in API 5B SR 22 for dimensions, inspection, and coupling thread coatings.

K.10.2.2 SR 22.2.a—Die Stamp-marking the End of the Pipe

An equilateral triangle die stamp 6.35 mm (¼ in.) high shall be placed at a distance of L9 from each end of each pipe using Method 3, 4, or 5 of 11.2.1. See Figure D.23 for SR 22.1.

K.10.2.3 SR 22.2.b—Paint-marking the End of the Pipe

High-visibility green paint marks shall be applied on the field end of each pipe. See Figure D.23 for SR 22.1.

K.10.2.4 SR 22.2.c—Die Stamp-marking the Couplings

All couplings shall be marked “S22” using Method 3 or 5 of 11.2.1.

K.10.2.5 SR 22.2.d—Color-banding the Couplings

Couplings shall be color-banded with the color(s) indicative of the steel grade from which the couplings are manufactured, and shall also be painted with a high-visibility green band around the outside surface near one end of the coupling.
K.10.2.6 SR 22.3 – Optional Tapered Bore Requirement for Casing with Special Drift Requirements

For casing ordered with a drift mandrel of diameter larger than standard (see 8.10), the manufacturer may drift or bore along the inside diameter of the ends of the pipe. This option requires either of the following treatments for both ends of the pipe:

a) to be drifted with a special end drift with a minimum diameter in accordance with the “special end drift diameter” column of Option 1 in Figure D.24 for SR 22.2. The drift shall be inserted a distance equal to or greater than $L_9$. Pipe ends that are too small to accept the special end drift shall be bored along the inside diameter in accordance with b) below.

b) to be finished with a tapered bore along the inside diameter with a taper between $2^\circ$ and $15^\circ$, the maximum diameter of the machined surface at the end of the pipe ("chamfer diameter $d_0$"), and the angle of the tapered bore shall be in accordance with Option 2 in Figure D.24 for SR 22.2. The tapered bore machined surface need not run continuously around the inside circumference. The bore shall run smoothly to the pipe inside diameter. If bored, the inside diameter of each pin end shall meet the requirements of Option 2 "$d_0$".

K.10.2.7 SR 22.4.1 – Application of Thread Compound

API 5A3 or ISO 13678 thread compound shall be applied in one of the three following locations:

- to the pin end only;
- to the coupling thread only; or
- to the pin in a band approximately 25 mm (1 in.) wide at the large end of the thread and to the entire coupling thread.

In all cases, the full thread form outline shall be clearly discernible after applying thread compound evenly over the surface.

It should be recognised by the user that compliance with API or ISO 13678 does not ensure adequate thread compound system performance in field service. The user has the responsibility of evaluating the results obtained from the procedures and test protocols and determining if the thread compound system in question meets the anticipated requirements of that particular field service application.

K.10.2.8 SR 22.4.2 – Coupling Make-up

Required make-up is based on power turns and position, not torque. Torque is not a basis for acceptance or rejection, but is an indicator of process control. Make-up shall be rejected when the coupling does not achieve the position criteria with minimum power-turns.

K.10.2.9 SR 22.4.3 – Coupling Make-up Speed

Power make-up speed shall not exceed 10 r/min.

K.10.2.10 SR 22.4.4 – Coupling Make-up Acceptance Criteria

Options are allowed for connection make-up. Make-up shall be rejected when the coupling does not make the position criteria with minimum power-turns. Any connection in which the face of the coupling advances beyond the apex of the triangle shall be rejected. The coupling make-up shall be verified by one of the following methods:

b) by power turns: the number of power turns shall equal or exceed the minimum number of power turns specified in Table C.58 (SR 22.1) or Table E.58 (SR 22.1). Counting power turns should start at a reference start torque specified in Table C.58 (SR 22.1) or Table E.58 (SR 22.1). Ensure proper alignment in make-up equipment and identity, and minimise abnormal sources of torque oscillation;

c) by position: make up the face of the coupling within the triangle mark. Verify that the number of power turns equals or exceeds the number of power turns specified in Table C.58 (SR 22.1) or Table E.58 (SR 22.1) during operations.

K.10.2.11 SR 22.4.5 – Coupling Break-out and Make-up

If a connection is broken out, subsequent make-up shall be in accordance with K.10.2.10 (SR 22.4.4).
K.1110 SR 38—Statistical Tensile Testing—Grades C90, T95, and C110

K.1110.1 SR 38.1—General

NOTE K.1110 (SR 38) is intended to be used when the specified yield strength range is less than 103 MPa (15 ksi).

K.1110.2 SR 38.2—Frequency of Testing

K.1110.3 SR 38.3—Yield Strength Determination

K.1110.4 SR 38.4—Additional Testing to Qualify a Lot

The manufacturer may elect to tensile test additional pipes [i.e. in excess of the minimum of 20 pipes per lot specified in K.1110.2 (SR 38.2)]. The additional pipes shall be selected at random. The data from the original tests and the additional tests shall be used to determine acceptance as specified in K.1110.3 (SR 38.3).

The manufacturer may elect to test as many additional pipes as necessary to attempt to improve the mean yield strength or to lower the standard deviation to meet the acceptance criteria in K.1110.3 (SR 38.3).

K.1110.5 SR 38.5—Retests to Qualify a Pipe

If the original tensile specimen from a pipe fails to conform to the specified requirements, the manufacturer shall either reject the pipe or make additional tensile tests (as specified in 10.4) on both ends of the pipe in question. The results of both of the retests shall meet the requirements of Table C.5 or Table E.5. In addition, the average of the initial test data and the two retests shall meet the requirements of Table C.5 or Table E.5 or the pipe shall be rejected. The average yield strength for the pipe (i.e. based on the original test and the two retests) shall replace the original test data and be used to determine the mean and standard deviation for the qualification of the lot as specified in K.1110.3 (SR 38.3).

K.1211 SR 39—Alternative NACE TM0177-2016 Method D Sulfide Stress Cracking (SSC) Tests—Grade C110

K.1211.1 SR 39.1—Test Requirements

For each lot, as defined in 10.2, manufacturers shall carry out an NACE TM0177-2016 Method D test with the test solution specified in K.1211.3 (SR 39.3). The test results shall not be used to determine conformance of the product to this standard.

K.1211.2 SR 39.2—Test Sample Selection and Location

K.1211.3 SR 39.3—Alternative Test Solution

K.1211.4 SR 39.4—Test Conditions

K.1211.5 SR 39.5—Invalidation of Tests

K.1211.6 SR 39.6—Additional Testing Provisions

K.1312 SR 40—Electric-welded Casing, Tubing, and Pup Joints, Grades H40, J55, K55, N80 (All Types), L80 Type 1, and R95

K.1312.1 SR 40.1—Height and Trim of Electric-weld Flash

K.1312.2 SR 40.2—Non-destructive Examination of Weld Seam