

**API Ballot id # 5828
SC5 TGDSE**

Work Item	7047 – Non-mag Drill Collar Corrosion Testing
Type of Distribution [Ballot (vote and comment), Comment-only, Recirculation (comment resolution), Re-ballot, etc.]	Initial ballot (voting and commenting)
Impacted Document	SPEC 7-1, 1 st / 2 nd Edition
Other Impacts	None
Revision Key	<p>These changes are targeted for the second edition which is expected to publish soon. But considering its current availability and publication timing, this ballot includes the relevant information for both the 1st edition and pending 2nd.</p> <p>Content relative to the first edition shown as faded. Content relative to each edition shown as black (except for 8.3.4 that is for 2nd ed.)</p> <p>Changes tracked as:</p> <ul style="list-style-type: none"> — <u>Additions in underlined BLUE</u> — Deletions in stricken RED <p>NOTE The “*****” indicates there is un-altered content above/below.</p>

Work Item Charge: To specify an alternative test method which provides assurance of adequate resistance to intergranular corrosion while remaining practicable for manufacturers.

Ballot Rationale: Section 8.3.4 has requirements for testing for resistance to intergranular corrosion. The specified test, ASTM A262 Practice E, passes even for material which shows significant intergranular corrosion in other tests. As a result, several users have specified non-standard interpretations of a related screening test, Practice A.

A potential outcome from this item’s charge is the ability to differentiate proprietary grades by corrosion resistance as well as strength.

NOTE See the ballot email notification for additional information regarding this ballot.

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Rotary Drill Stem Elements

API SPECIFICATION 7-1
FIRST / [SECOND](#) EDITION

(Ballot) Draft—For Committee Review

8 Drill Collars

8.3 Non-magnetic Drill Collars

8.3.5 Corrosion Resistance Requirements (for Austenitic Steel Collars of 12 % Chromium or More)

8.3.4 ~~Intergranular~~ corrosion resistance requirements (for austenitic stainless steel drill collars)

8.3.5.3 / 8.3.4.3 Pitting corrosion resistance

8.3.5.3.1 / 8.3.4.3.1 General

Austenitic stainless steels are subject to pitting corrosion in certain environmental conditions. The resistance to pitting corrosion may be specified at the option of the customer to requirements CR1 to CR4, as applicable. If none is specified, CR1 shall apply.

NOTE Test temperature is specified as a minimum; a higher test temperature may always be used at manufacturer's option for tighter quality control.

8.3.5.3.2 / 8.3.4.3.2 Requirements for CR1

CR1 is intended for drilling fluids that are oil-based or low salinity.

Every sample within the forging lot shall be tested according to ASTM A262 Practice A with none showing ditch structure.

Material conforming to CR2, CR3, or CR4 is also considered to conform to CR1 by this standard.

8.3.5.3.3 / 8.3.4.3.3 Requirements for CR2

CR2 is intended for drilling fluids with salinity comparable to sea water.

Resistance to corrosion shall be demonstrated by testing a sample from the forging lot of each non-magnetic drill collar.

A test sample shall be taken from a point 25.4 mm (1.0 in.) or deeper below the outside surface. The sample shall be tested in accordance with ASTM G48 Practice A at 0 °C minimum for 24 hours with mass loss less than 1 mg/cm².

Material conforming to CR3 or CR4 is also considered to conform to CR2 by this standard.

8.3.5.3.4 / 8.3.4.3.4 Requirements for CR3

CR3 is intended for high salinity drilling fluids.

Resistance to corrosion shall be demonstrated by testing a sample from the forging lot of each non-magnetic drill collar.

A test sample shall be taken from a point 25.4 mm (1.0 in.) or deeper below the outside surface. The sample shall be tested in accordance with ASTM G48 Practice A at 22 °C minimum for 24 hours with mass loss less than 1 mg/cm².

Material conforming to CR4 is also considered to conform to CR3 by this standard.

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8.3.5.3.5 / 8.3.4.3.5 Requirements for CR4

CR4 is intended for high salinity fluids with risk of exposure to acid gases.

Resistance to corrosion shall be demonstrated by testing a sample from the forging lot of each non-magnetic drill collar.

A test sample shall be taken from a point 25.4 mm (1.0 in.) or deeper below the outside surface. The sample shall be tested in accordance with ASTM G48 Practice A at 50 °C minimum for 24 hours with mass loss less than 1 mg/cm².

8.3.6 / 8.3.5 Marking

Non-magnetic drill collars conforming to this standard shall be die-stamped with the following information:

- a) the manufacturer's name or identifying mark;
- b) outside diameter;
- c) bore;
- d) non-magnetic identification (non-magnetic drill collar NMDC);
- e) connection designation;
- f) "API 7-1";
- g) CR (CR1 to CR4).

NOTE The drill collar number consists of two parts separated by a hyphen; the first part is the connection number in the NC style; the second part, consisting of 2 (or 3) digits, indicates the drill collar outside diameter in units and tenths of inches; drill collars with 209.6 mm, 241.3 mm, and 279.4 mm outside diameters are shown with 6-5/8, 7-5/8, and 8-5/8 REG connections, since there are no NC connections in the recommended range of bending-strength ratios.

The example below illustrates these marking requirements. Location of the markings and the application of additional markings shall be specified by the manufacturer.

EXAMPLE A 209.6 mm (8-1/4 in.) collar, with 71.4 mm (2-13/16 in.) bore, manufactured by AB Company, is stamped:

AB Co. (or mark) 209.6 71.4 NMDC 6-5/8 REG API 7-1 CR1

OR

AB Co. (or mark) 8.25 2.81 NMDC 6-5/8 REG API 7-1 CR1
