



Standard Practice for Evaluating and Qualifying Oil Field and Refinery Corrosion Inhibitors Using Rotating Cage¹

This standard is issued under the fixed designation G184; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers a generally accepted procedure to use the rotating cage (RC) for evaluating corrosion inhibitors for oil field and refinery applications.

1.2 The values stated in SI units are to be regarded as standard. The values given in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

G1 Practice for Preparing, Cleaning, and Evaluating Corrosion Test Specimens

G15 Terminology Relating to Corrosion and Corrosion Testing (Withdrawn 2010)³

G16 Guide for Applying Statistics to Analysis of Corrosion Data

G31 Guide for Laboratory Immersion Corrosion Testing of Metals

G46 Guide for Examination and Evaluation of Pitting Corrosion

G111 Guide for Corrosion Tests in High Temperature or High Pressure Environment, or Both

G170 Guide for Evaluating and Qualifying Oilfield and Refinery Corrosion Inhibitors in the Laboratory

D1141 Practice for the Preparation of Substitute Ocean Water

¹ This practice is under the jurisdiction of ASTM Committee **G01** on Corrosion of Metals and is the direct responsibility of Subcommittee **G01.05** on Laboratory Corrosion Tests.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ The last approved version of this historical standard is referenced on www.astm.org.

D4410 Terminology for Fluvial Sediment

3. Terminology

3.1 The terminology used throughout shall be in accordance with Terminologies **G15** and **D4410** and Guide **G170**.

4. Summary of Practice

4.1 This practice provides a method of evaluating corrosion inhibitor efficiency in a RC apparatus. The method uses a well-defined rotating specimen setup and mass loss measurements to determine corrosion rates in a laboratory apparatus. Measurements are made at a number of rotation rates to evaluate the inhibitor performance under increasingly severe hydrodynamic conditions.

5. Significance and Use

5.1 Selection of corrosion inhibitor for oil field and refinery applications involves qualification of corrosion inhibitors in the laboratory (see Guide **G170**). Field conditions should be simulated in the laboratory in a fast and cost-effective manner (**1**).⁴

5.2 Oil field corrosion inhibitors should provide protection over a range of flow conditions from stagnant to that found during typical production conditions. Not all inhibitors are equally effective over this range of conditions so it is important for a proper evaluation of inhibitors to test the inhibitors using a range of flow conditions.

5.3 The RC test system is relatively inexpensive and uses simple flat specimens that allow replicates to be run with each setup. (**2-13**).

5.4 In this practice, a general procedure is presented to obtain reproducible results using RC to simulate the effects of different types of coupon materials, inhibitor concentrations, oil, gas and brine compositions, temperature, pressure, and flow. Oil field fluids may often contain sand; however, this practice does not cover erosive effects that occur when sand is present.

⁴ The boldface numbers in parentheses refer to the list of references at the end of this standard.