



NSAI
Standards

Irish Standard
I.S. EN ISO 7539-10:2014

Corrosion of metals and alloys - Stress corrosion testing - Part 10: Reverse U-bend method (ISO 7539-10:2013)

I.S. EN ISO 7539-10:2014

Incorporating amendments/corrigenda/National Annexes issued since publication:

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English Version

Corrosion of metals and alloys - Stress corrosion testing - Part 10: Reverse U-bend method (ISO 7539-10:2013)

Corrosion des métaux et alliages - Essais de corrosion sous
contrainte - Partie 10: Méthode d'essai par cintrage en U
inversé (ISO 7539-10:2013)

Korrosion der Metalle und Legierungen - Prüfung der
Spannungsrissskorrosion - Teil 10: Vorbereitung und
Anwendung von reversierten Bügelproben (ISO 7539-
10:2013)

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EN ISO 7539-10:2014 (E)

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Foreword

The text of ISO 7539-10:2013 has been prepared by Technical Committee ISO/TC 156 “Corrosion of metals and alloys” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 7539-10:2014 by Technical Committee CEN/TC 262 “Metallic and other inorganic coatings” the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2015, and conflicting national standards shall be withdrawn at the latest by June 2015.

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Endorsement notice

The text of ISO 7539-10:2013 has been approved by CEN as EN ISO 7539-10:2014 without any modification.

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**INTERNATIONAL
STANDARD**

**ISO
7539-10**

First edition
2013-03-01

**Corrosion of metals and alloys —
Stress corrosion testing —**

**Part 10:
Reverse U-bend method**

*Corrosion des métaux et alliages — Essais de corrosion sous
contrainte —*

Partie 10: Méthode par pliage en U inverse



Reference number
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ISO 7539-10:2013(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives

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The committee responsible for this document is ISO/TC 156, *Corrosion of metals and alloys*.

ISO 7539 consists of the following parts, under the general title *Corrosion of metals and alloys — Stress corrosion testing*:

- Part 1: *General guidance on testing procedures*
- Part 2: *Preparation and use of bent-beam specimens*
- Part 3: *Preparation and use of U-bend specimens*
- Part 4: *Method for the preparation and use of uniaxially loaded tension specimens*
- Part 5: *Preparation and use of C-ring specimens*
- Part 6: *Preparation and use of pre-cracked specimens for tests under constant load or constant displacement*
- Part 7: *Method for slow strain rate testing*
- Part 8: *Preparation and use of specimens to evaluate weldments*
- Part 9: *Preparation and use of pre-cracked specimens for tests under rising load or rising displacement*
- Part 10: *Reverse U-bend test method*
- Part 11: *Guidelines for testing the resistance of metals and alloys to hydrogen embrittlement and hydrogen-assisted cracking*

Corrosion of metals and alloys — Stress corrosion testing —

Part 10: Reverse U-bend method

WARNING — — This International Standard may involve hazardous materials, operations, and equipment. It is the responsibility of whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

1 Scope

This part of ISO 7539 covers procedures for designing, preparing and using reversed U-bend (RUB) test specimens for investigating the susceptibility of the metal to stress corrosion cracking. The term “metal” as used in this standard includes alloys.

2 Normative reference

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 7539-1, *Corrosion of metals and alloys — Stress corrosion testing — Part 1: General guidance on testing procedures*

ISO 8407, *Corrosion of metals and alloys — Removal of corrosion products from corrosion test specimens*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 7539-1 apply.

4 Principle

The RUB test is a particularly severe test for assessing susceptibility to stress corrosion cracking. The test is intended primarily for application to metals with high corrosion resistance, such as Ni-based alloys, with the advantage compared to methods such as the conventional U-bend test of having significantly less stress relaxation. It is used primarily as a screening test for tubing, piping, plate, bar and other products including welded materials. It may also be used as an acceptance test for performance in service subject to agreement between the parties.

The principle of the test is to introduce very severe stresses in a high corrosion resistance metal, with minimum relaxation, in order to enhance the likelihood of inducing stress corrosion cracking.

The test consists of exposing to the corroding medium a piece of metal of semicircular section bent back on itself (i.e. reversed bent) into a U-shape and held in a manner which ensures that there are initial tensile stresses in excess of the yield strength over a large proportion of the inner surface. The test is accelerated by the presence of complex bi-axial stresses that may or may not exist in service. In the act of forming specimens, varying amounts of cold work may be introduced and this deformation may influence the stress corrosion cracking tendency as compared to that of the material in the original condition.

The test is normally performed in the laboratory by exposing the specimens to simulated service conditions.

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