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

**Part 6:
Preparation and use of precracked
specimens for tests under constant
load or constant displacement**

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

*Partie 6: Préparation et utilisation des éprouvettes préfissurées pour
essais sous charge constante ou sous déplacement constant*

ISO 7539-6:2018

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Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Principle	4
5 Specimens	5
5.1 General.....	5
5.2 Specimen design.....	7
5.3 Stress intensity factor considerations.....	17
5.4 Specimen preparation	23
5.5 Specimen identification.....	25
6 Initiation and propagation of fatigue cracks	25
7 Procedure	27
7.1 General.....	27
7.2 Environmental considerations.....	27
7.3 Environmental chamber.....	28
7.4 Environmental control and monitoring.....	29
7.5 Determination of K_{ISCC} by crack arrest.....	29
7.6 Determination of K_{ISCC} by crack initiation.....	32
7.7 Measurement of crack velocity.....	34
8 Test report	35
Annex A (informative) Use of notched specimens for stress corrosion tests	36
Annex B (informative) Determination of crack growth velocity	39
Bibliography	40

ISO 7539-6:2018

<https://standards.iteh.ai/catalog/standards/iso/81596795-66e4-438a-9c03-2e5f7eff4c8c/iso-7539-6-2018>

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 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 156, *Corrosion of metals and alloys*, in collaboration with the National Physical Laboratory (United Kingdom).

This fourth edition cancels and replaces the third edition (ISO 7539-6:2011), which has been technically revised to revise [Figure 14](#).

This corrected version of ISO 7539-6:2018 incorporates the following corrections:

— in [Figure 2](#), the symbol “^” has been corrected to “≥” in two places.

A list of all parts in the ISO 7539 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Corrosion of metals and alloys — Stress corrosion testing —

Part 6:

Preparation and use of precracked specimens for tests under constant load or constant displacement

1 Scope

This document specifies procedures for designing, preparing and using precracked specimens for investigating susceptibility to stress corrosion. It gives recommendations for the design, preparation and use of precracked specimens for investigating susceptibility to stress corrosion. Recommendations concerning notched specimens are given in [Annex A](#).

The term “metal” as used in this document includes alloys.

Because of the need to confine plasticity at the crack tip, precracked specimens are not suitable for the evaluation of thin products, such as sheet or wire, and are generally used for thicker products including plate bar and forgings. They can also be used for parts joined by welding.

Precracked specimens can be loaded with equipment for application of a constant load or can incorporate a device to produce a constant displacement at the loading points. Tests conducted under increasing displacement or increasing load are dealt with in ISO 7539-9.

A particular advantage of precracked specimens is that they allow data to be acquired, from which critical defect sizes, above which stress corrosion cracking can occur, can be estimated for components of known geometry subjected to known stresses. They also enable rates of stress corrosion crack propagation to be determined. The latter data can be taken into account when monitoring parts containing defects during service.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1
crack length

a

distance from the crack tip to either the mouth of the notch or the loading point axis, depending on the specimen geometry

3.2
specimen width

W

distance from the back face to either the face containing the notch or the loading plane, depending on the specimen geometry

3.3
specimen thickness

B

side-to-side dimension of the specimen being tested

3.4
reduced thickness at side grooves

B_n

minimum side-to-side dimension between the notches in side-grooved specimens

3.5
specimen half-height

H

50 % of the distance between both sides of the specimen measured parallel to the direction of *load* (3.6) application for compact tension, double cantilever beam and modified wedge-opening-loaded test pieces

3.6
load

P

force, which, when applied to the specimen, is considered positive if its direction is such as to cause the crack faces to move apart

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3.7
deflection at loading point axis

V_{LL}

crack opening displacement produced at the loading line during the application of *load* (3.6) to a constant displacement specimen

3.8
deflection away from the loading line

V_0

crack opening displacement produced at a location remote from the loading plane, e.g. at knife edges located at the notch mouth, during the application of *load* (3.6) to a constant displacement specimen

3.9
modulus of elasticity

E

ratio of stress to strain without deviation in proportionality of the stress and strain (Hooke's law)