SLOVENSKI STANDARD
SIST EN ISO 7539-6:2011

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Nadomešča:
SIST EN ISO 7539-6:2003

Korozija kovin in zlitin - Preskušanje napetostne korozije - 6. del: Priprava in uporaba preskušancev z umetno razpoko za preskuse pri konstantni obremenitvi ali konstantni deformaciji (ISO 7539-6:2011)

Corrosion of metals and alloys - Stress corrosion testing - Part 6: Preparation and use of precracked specimens for tests under constant load or constant displacement (ISO 7539 -6:2011)

Korrosion der Metalle und Legierungen - Prüfung der Spannungsrisskorrosion - Teil 6: Vorbereitung und Anwendung von angerissenen Proben für die Prüfung unter konstanter Kraft oder konstanter Verformung (ISO 7539-6:2011)

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 7539-6:2011)

Ta slovenski standard je istoveten z: **EN ISO 7539-6:2011**

ICS:

77.060	Korozija kovin	Corrosion of metals

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English Version

Corrosion of metals and alloys - Stress corrosion testing - Part 6: Preparation and use of precracked specimens for tests under constant load or constant displacement (ISO 7539-6:2011)

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Page

Foreword

This document (EN ISO 7539-6:2011) has been prepared by Technical Committee ISO/TC 156 "Corrosion of metals and alloys" in collaboration with 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of an identical text or by endorsement, at the latest by April 2012, and conflicting national standards shall be withdrawn at the latest by April 2012.

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The text of ISO 7539-6:2011 has been approved by CEN as a EN ISO 7539-6:2011 without any modification.

INTERNATIONAL STANDARD

ISO 7539-6

Third edition
2011-10-15

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

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Contents

Page

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 7539-6 was prepared by Technical Committee ISO/TC 156, *Corrosion of metals and alloys*, in collaboration with the National Physical Laboratory (United Kingdom).

This third edition cancels and replaces the second edition (ISO 7539-6:2003), of which it constitutes a minor revision.

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: Preparation and use of uniaxially loaded tension specimens*

— *Part 5: Preparation and use of C-ring specimens*

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

— *Part 7: Method fo 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*

The following parts are under preparation:

— *Part 10: Testing of alloys using 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 6: Preparation and use of precracked specimens for tests under constant load or constant displacement

1 Scope

1.1 This part of ISO 7539 covers 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 part of ISO 7539 includes alloys.

1.2 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.

1.3 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.

1.4 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 referenced documents are indispensable for the application 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*

ISO 11782-2:1998, *Corrosion of metals and alloys — Corrosion fatigue testing — Part 2: Crack propagation testing using precracked specimens*

3 Terms and definitions

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

3.1
crack length
a
effective crack length measured 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
effective width of the specimen measured 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 specimen height measured parallel to the direction of load application for compact tension, double cantilever beam and modified wedge-opening-loaded test pieces

3.6
load
P
load which, when applied to the specimen, is considered positive if its direction is such as to cause the crack faces to move apart

3.7
deflection at loading point axis
V_{LL}
crack opening displacement produced at the loading line during the application of load 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 to a constant displacement specimen

3.9
modulus of elasticity
E
elastic modulus (i.e. stress/strain) in tension

3.10
stress intensity factor
K_I
function of applied load, crack length and specimen geometry having dimensions of stress $\times \sqrt{\text{length}}$ which uniquely define the elastic-stress field intensification at the tip of a crack subjected to opening mode displacements (mode I)

NOTE It has been found that stress intensity factors, calculated assuming that specimens respond purely elastically, correlate with the behaviour of real cracked bodies, provided that the size of the zone of plasticity at the crack tip is small compared to the crack length and the length of the uncracked ligament. In this part of ISO 7539, mode I is assumed and the subscript I is implied everywhere.

3.11
initial stress intensity factor
K_{Ii}
stress intensity applied at the commencement of the stress corrosion test

3.12
plane strain fracture toughness
K_{Ic}
critical value of K_I at which the first significant environmentally independent extension of the crack occurs under the influence of rising stress intensity under conditions of high resistance to plastic deformation

3.13
provisional value of K_{Ic}
K_Q
$K_Q = K_{Ic}$ when the validity criteria for plane strain predominance are satisfied

3.14
threshold stress intensity factor for susceptibility to stress corrosion cracking
K_{ISCC}
stress intensity factor above which stress corrosion cracking will initiate and grow for the specified test conditions under conditions of high resistance to plastic deformation, i.e. under plane strain predominant conditions

3.15
provisional value of K_{ISCC}
K_{QSCC}
$K_{QSCC} = K_{ISCC}$ when the validity criteria for plane strain predominance are satisfied

3.16
maximum stress intensity factor
K_{max} in fatigue
highest algebraic value of the stress intensity factor in a cycle, corresponding to the maximum load

3.17
0,2 % proof stress
$R_{p0,2}$
stress which must be applied to produce a plastic strain of 0,2 % during a tensile test

3.18
applied stress
σ
stress resulting from the application of load to the specimen

3.19
stress intensity factor coefficient
Y
factor derived from the stress analysis for a particular specimen geometry which relates the stress intensity factor for a given crack length to the load and specimen dimensions