

Corrosion of metals and alloys — Stress corrosion testing —

Part 1: General guidance on testing procedures

The European Standard EN ISO 7539-1:1995 has the status of a
British Standard

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- Aluminium Federation
- British Gas plc.
- British Steel Industry
- Department of Trade and Industry (National Physical Laboratory)
- Department of Transport (Transport and Road Research Laboratory)
- Electricity Supply Industry in England and Wales
- Institution of Corrosion Science and Technology
- Institution of Structural Engineers
- Ministry of Defence
- Society of Chemical Industry
- United Kingdom Atomic Energy Authority

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National foreword

This Part of BS EN ISO 7539 has been prepared under the direction of the Engineering Sector Board. It is identical with ISO 7539-1:1987 *Corrosion of metals and alloys — Stress corrosion testing — Part 1 General guidance on testing procedures*, published by the International Organization for Standardization (ISO).

BS EN ISO 7539 comprises the following parts:

- *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 pre-cracked specimens;*
- *Part 7: Slow strain rate testing.*

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN ISO title page, pages 2 to 16, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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English version

Corrosion of metals and alloys — Stress corrosion testing — Part 1: General guidance on testing procedures

(ISO 7539-1:1987)

Corrosion de métaux et alliages — Essais de
corrosion sous contrainte —
Partie 1: Guide général des méthodes d'essai
(ISO 7539-1:1987)

Korrosion der Metalle und Legierungen —
prüfung der Spannungsrißkorrosion —
Teil 1: Allgemeine Richtlinien für
Prüfverfahren
(ISO 7539-1:1987)

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Foreword

This European Standard has been taken over by the Technical Committee CEN/TC 262 Protection of metallic materials against corrosion, from the work of ISO/TC 156 Corrosion of metals and alloys, of the International Organization for Standardization (ISO).

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 November 1995, and conflicting national standards shall be withdrawn at the latest by November 1995.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

0 Introduction

This part of ISO 7539 gives general guidance on the selection, use and interpretation of the significance of various test procedures that have been developed for the assessment of the resistance of metals and alloys to stress corrosion. These test procedures are described in a series of additional parts as follows:

- *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 pre-cracked specimens.*
- *Part 7: Slow strain rate testing.*

1 Scope and field of application

This part of ISO 7539 describes the general considerations which apply when designing and conducting tests to assess susceptibility of metals to stress corrosion.

NOTE Particular methods of test are not treated in detail in this document. These are described in the additional parts of ISO 7539.

2 Definitions

2.1

stress corrosion

synergistic attack on a metal caused by the simultaneous action of a corrosive environment and nominally static tensile stress which usually results in the formation of cracks. This process frequently results in a significant reduction of the load-bearing properties of metallic structures

NOTE See *stress corrosion cracking* (3.1).

2.2

threshold stress (for stress corrosion)

the stress above which stress corrosion cracks initiate and grow, for the specified test conditions

2.3

threshold stress intensity factor (for stress corrosion)

the stress intensity factor above which stress corrosion cracks will initiate, under conditions of high constraint to plastic deformation, i.e. under plane strain predominant conditions

2.4

test environment

either a service environment, or an environment produced in the laboratory, to which the test specimen is exposed and which is maintained constant or varied in an agreed manner. In the case of stress corrosion the environment is often quite specific (see clause 6)

2.5

start of test

the time when the stress is applied or when the specimen is exposed to the test environment, whichever occurs later

2.6

crack initiation time

the period from the start of a test to the time when a crack is detectable by the means employed

2.7

time to failure

the period elapsing between the start of a test and the occurrence of failure, the criterion of failure being the first appearance of cracking or the total separation of the test piece, or some agreed intermediate condition