



**SLOVENSKI STANDARD**  
**SIST EN ISO 12737:2011**

**01-november-2011**

**Nadomešča:**  
**SIST EN ISO 12737:2005**

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**Kovinski materiali - Ugotavljanje lomne žilavosti pri ravninskem deformacijskem stanju (ISO 12737:2010)**

Metallic materials - Determination of plane-strain fracture toughness (ISO 12737:2010)

Metallische Werkstoffe - Bestimmung der Bruchzähigkeit (ebener Dehnungszustand) (ISO 12737:2010)

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**Ta slovenski standard je istoveten z: EN ISO 12737:2010**

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**ICS:**

77.040.10 Mehansko preskušanje kovin Mechanical testing of metals

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NORME EUROPÉENNE  
EUROPÄISCHE NORM

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English Version

**Metallic materials - Determination of plane-strain fracture  
toughness (ISO 12737:2010)**

Matériaux métalliques - Détermination du facteur d'intensité  
de contrainte critique (ISO 12737:2010)

Metallische Werkstoffe - Bestimmung der Bruchzähigkeit  
(ebener Dehnungszustand) (ISO 12737:2010)

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## Foreword

This document (EN ISO 12737:2010) has been prepared by Technical Committee ISO/TC 164 "Mechanical testing of metals" in collaboration with Technical Committee ECISS/TC 101 "Test methods for steel (other than chemical analysis)" the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by June 2011, and conflicting national standards shall be withdrawn at the latest by June 2011.

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INTERNATIONAL  
STANDARD

ISO  
12737

Third edition  
2010-12-15

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**Metallic materials — Determination  
of plane-strain fracture toughness**

*Matériaux métalliques — Détermination du facteur d'intensité  
de contrainte critique*

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## ISO 12737:2010(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.

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.

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.

ISO 12737 was prepared by Technical Committee ISO/TC 164, *Mechanical testing of metals*, Subcommittee SC 4, *Toughness testing — Fracture (F), Pendulum (P), Tear (T)*.

This third edition cancels and replaces the second edition (ISO 12737:2005), of which it constitutes a minor revision.

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# Metallic materials — Determination of plane-strain fracture toughness

## 1 Scope

This International Standard specifies the ISO method for determining the plane-strain fracture toughness of homogeneous metallic materials using a specimen that is notched and precracked by fatigue, and subjected to slowly increasing crack displacement force.

## 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 7500-1, *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Verification and calibration of the force-measuring system*

ISO 9513, *Metallic materials — Calibration of extensometers used in uniaxial testing*

ASTM E399-09, *Standard Test Method for Linear-Elastic Plane-Strain Fracture Toughness  $K_{Ic}$  of Metallic Materials*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 3.1

#### plane-strain stress intensity factor

$K_I$

magnitude of the elastic stress field at the tip of a crack subjected to opening mode displacement (mode I)

NOTE It is a function of applied force and test specimen size, geometry, and crack length, and has the dimensions of force times length<sup>-3/2</sup>.

### 3.2

#### plane-strain fracture toughness

$K_{Ic}$

measure, by the operational procedure of this method, of a material's resistance to crack extension when the state of stress near the crack tip is predominantly plane strain and plastic deformation is limited

NOTE It is the critical value of  $K_I$  at which significant crack extension occurs on increasing load with high constraint to plastic deformation.