SLOVENSKI STANDARD
oSIST prEN ISO 3785:2022

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Kovinski materiali - Označevanje osi preskusnih vzorcev glede na teksturo snovi vzorca (ISO/DIS 3785:2022)

Metallic materials - Designation of test specimen axes in relation to product texture (ISO/DIS 3785:2022)

Metallische Werkstoffe - Kennzeichnung von Probenachsen in Bezug zur Halbzeuggefügetextur (ISO/DIS 3785:2022)

Matériaux métalliques Désignation des axes des éprouvettes en relation avec la texture du produit (ISO/DIS 3785:2022)

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Metallic materials — Designation of test specimen axes in relation to product texture

Matériaux métalliques — Désignation des axes des éprouvettes en relation avec la texture du produit

ICS: 77.040.10

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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 3785 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 first edition (ISO 3785:2006), which has been technically revised.

Introduction

The measured mechanical properties of a metallic product, especially those characterizing ductility and toughness, such as elongation, reduction of area, fracture toughness and impact resistance, are dependent on the test specimen location within the product and orientation with respect to the product's principal directions of metal working, grain flow or otherwise-produced texture. This International Standard specifies a method for designating specimen orientation in relation to product texture.

Metallic materials — Designation of test specimen axes in relation to product texture

1 Scope

This International Standard specifies a method for designating test specimen axes in relation to product texture by means of an X-Y-Z orthogonal coordinate system.

The system applies equally to unnotched and notched (or precracked) test specimens.

The method is intended only for metallic materials with uniform texture that can be unambiguously determined.

Test specimen orientation is decided before specimen machining, identified in accordance with the designation system specified in this International Standard, and recorded.

2 Normative references

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.

ISO 15653, *Metallic materials — Method of test for the determination of quasistatic fracture toughness of welds*

ISO/ASTM 52921:2016, *Standard terminology for additive manufacturing. Coordinate systems and test methodologies*

3 Designation system

3.1 General

The method for relating specimen axes to the characteristic directions of the product makes use of an X-Y-Z orthogonal coordinate system for wrought metals:

— the letter X always denotes the direction of principal deformation (maximum grain flow in the product);

— the letter Y denotes the direction of least deformation;

— the letter Z denotes the direction normal to the X-Y plane.

3.2 Exception — not aligned

When the specimen direction does not coincide with the product's characteristic grain-flow directions, two letters are used as described for unnotched specimens in 3.2.2 and 3.2.4, and for notched specimens in 4.3.

3.3 Exception — no grain flow

When there is no grain-flow direction as in a casting, specimen location and orientation shall be defined on a part drawing and the test result shall carry no orientation designation.

4 Designation of unnotched specimens

4.1 General

The designations of unnotched specimens variously aligned with respect to the product's characteristic grain-flow directions are depicted in Figure 1. Only specimens fully aligned with, or lying midway between, the product's characteristic grain-flow directions are shown.

4.2 Sheet, plate, bar (flat rolled products)

4.2.1 Aligned, grain flow different in all three orthogonal directions

For products of non-circular cross-section and grain flow differing in the three orthogonal directions, specimens aligned with the product's characteristic grain-flow directions are designated as either X-, Y- or Z-direction specimens as depicted in Figure 1 a).

4.2.2 Not aligned, grain flow different in all three orthogonal directions

For products of non-circular cross-section and grain flow differing in the three orthogonal directions, specimens lying midway between the product's characteristic grain-flow directions are designated as XY-, XZ- or YZ-direction specimens as depicted in Figure 1 f). When the specimen lies neither in alignment with the product's characteristic grain-flow directions nor midway between them, but rather at some other angle to them, then that angle shall be stated between the two designation letters, the first letter denoting the direction toward which the specimen axis is inclined, and the second letter the direction from which the specimen axis is inclined. This designation scheme is restricted to direction vectors that lie within any of the three planes described by the orthogonal X, Y and Z directions. When the direction vector lies outside those planes, specimen location and orientation hall be defined on a drawing of the product or part and the test result shall carry no orientation designation.

4.2.3 Aligned, equal cross-sectional grain flow

For products of non-circular cross-section with equal Y- and Z-direction grain flow, specimens oriented normal to the X-direction (principal direction of) grain flow may be designated as either Y- or Z-direction specimens, as depicted in Figure 1 a).

4.2.4 Not aligned, equal cross-sectional grain flow

For products of non-circular cross-section with equal Y- and Z-direction grain flow, specimens lying midway between the product's characteristic grain-flow directions are designated as XY-, XZ-, or YZ-direction specimens, as depicted in Figure 1 f). When the specimen lies neither in alignment with the product's characteristic grain-flow directions nor midway between them, but rather at some other angle to them, then that angle shall be stated between the two letters, the first letter denoting the direction toward which the specimen axis is inclined, and the second letter the direction from which the specimen axis is inclined. This designation scheme is restricted to direction vectors the lie within any of the three planes described by the orthogonal X, Y and Z directions. When the direction vector lies outside those planes, specimen location and orientation shall be defined on a drawing of the product or part and the test result shall carry no orientation designation.

4.3 Cylinders and thick-walled tubes

Specimen depictions in Figures 1 b) and 1 c) pertain to solid cylinders; those in Figure 1 d) apply to hollow cylinders (thick-walled tubes).

4.4 Thin-walled tubes, helical grain flow

Specimen depictions in Figure 1 e) pertain to products with helical grain flow, typically thin-walled tubing.

