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Metallic materials - Small punch test method

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English Version

Metallic materials - Small punch test method

Matériaux métalliques - Méthode d'essai de micro-emboutissage

Metallische Werkstoffe - Small-Punch-Test

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European foreword

This document (EN 10371:2021) has been prepared by Technical Committee CEN/TC 459/SC 1 “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of an identical text or by endorsement, at the latest by October 2021, and conflicting national standards shall be withdrawn at the latest by October 2021.

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Introduction

This document describes small punch testing of metallic materials.

While it is recognized that the small punch test technique is not equivalent to uniaxial testing and cannot currently replace uniaxial and fracture mechanics tests with larger specimens, it allows estimation of the values normally obtained using classical standard size uniaxial or fracture mechanics specimens.

The small punch technique is especially useful when only small amounts of material are available as in the case of experimental material batches, or for assessing aging of components where the extraction of classical specimen types would require expensive repairs. Other areas of interest for small punch testing are the characterization of irradiated materials, where small specimens minimize laboratory staff exposure to radiation or the investigation of different zones in welds.

1 Scope

This document specifies the small punch method of testing metallic materials and the estimation of tensile, creep and fracture mechanical material properties from cryogenic up to high temperatures.

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.

EN 60584-1, *Thermocouples - Part 1: EMF specifications and tolerances (IEC 60584 1)*

EN ISO 148-1, *Metallic materials - Charpy pendulum impact test - Part 1: Test method (ISO 148-1)*

EN ISO 204, *Metallic materials - Uniaxial creep testing in tension - Method of test (ISO 204)*

EN ISO 286-2, *Geometrical product specifications (GPS) - ISO code system for tolerances on linear sizes - Part 2: Tables of standard tolerance classes and limit deviations for holes and shafts (ISO 286-2)*

EN ISO 6892-1, *Metallic materials - Tensile testing - Part 1: Method of test at room temperature (ISO 6892-1)*

EN ISO 6892-2, *Metallic materials - Tensile testing - Part 2: Method of test at elevated temperature (ISO 6892-2)*

EN ISO 7500-1, *Metallic materials - Calibration and verification of static uniaxial testing machines - Part 1: Tension/compression testing machines - Calibration and verification of the force-measuring system (ISO 7500-1)*

EN ISO 7500-2, *Metallic materials - Verification of static uniaxial testing machines - Part 2: Tension creep testing machines - Verification of the applied force (ISO 7500-2)*

EN ISO 9513, *Metallic materials - Calibration of extensometer systems used in uniaxial testing (ISO 9513)*

ISO 2768-1, *General tolerances - Part 1: Tolerances for linear and angular dimensions without individual tolerance indications*