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Aerospace series - Metallic materials - Test methods - Part 001: Tensile testing at ambient temperature

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 03/26

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ICS 49.025.05; 49.025.15 Supersedes EN 2002-001:2005

English Version

Aerospace series - Metallic materials - Test methods - Part 001: Tensile testing at ambient temperature

Série aérospatiale - Matériaux métalliques - Méthodes d'essais - Partie 001: Essais de traction à température ambiante

Luft- und Raumfahrt - Metallische Werkstoffe - Prüfverfahren - Teil 001: Zugversuch bei Umgebungstemperatur.

This European Standard was approved by CEN on 10 November 2025.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 2002-001:2026) has been prepared by ASD-STAN.

After enquiries and votes carried out in accordance with the rules of this Association, this document has received the approval of the National Associations and the Official Services of the member countries of ASD-STAN, prior to its presentation to CEN.

This document shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2026, and conflicting national standards shall be withdrawn at the latest by July 2026.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 2002-001:2005.

EN 2002-001:2026 includes the following significant technical changes with respect to EN 2002-001:2005:

— overall editorial improvements;

— subclause 6.3.6.2: “0,003 to 0,007 (0,3 % to 0,7 %) per min., a strain rate of 0,005 (0,5 %) per min is preferred” changed to “The test shall be performed at a strain rate as required in Table 2 and Table 3”.

The strain-rate, mentioned in 6.3.6.2, of 0,003/min to 0,007/min is too low for aluminium and aluminium alloys. ASTM B557 work with a rate of stress application of maximum 11,5 MPa/s. For aluminium with an E-Modulus of about 72 000 MPa this results to a strain-rate of 0,01/min. All testing machines work with a stressing rate in this range of 11,5 MPa/s. So consequently, beginning with leaving the Hooke's line (linear relationship between stress and strain) up to achieving the yield strength $R_{p0,2}$ significant higher strain rates of 0,04/min to 0,05/min at simultaneously significant decreasing stressing rates are determined.

EN ISO 6892-1 allows for materials with an E-Modulus less than 150 000 MPa a stress rate up to 20 MPa/s. The preferred strain rate is 0,015/min for all materials.

— subclause 6.3.6.3: if the test is to be continued to fracture, the strain rate of the parallel length may be increased beyond the proof stress but shall not exceed a value of 0,1 (10 %) per min. Changed to: “If the test is to be continued to fracture, the strain rate of the parallel length may be increased beyond the proof stress but shall not exceed a value required in Table 2 and Table 3”.

The strain-rate, mentioned in 6.3.6.3, of 0,1 (10 %)/min is significantly too low for aluminium and aluminium alloys. All other relevant specifications (ASTM B557 or EN ISO 6892-1) allow a strain rate up to 0,5 (50 %)/min. That means conversely, one tensile test would take five times longer by application of EN 2002-001. The throughput of one test-machine would decrease to 1/5;

— subclauses 6.3.6.2 and 6.3.6.3: Table 2 shows the required test speeds implemented for aluminium and aluminium alloys. Table 3 contains the unchanged requirements for all other metallic materials.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this document: Austria, Belgium, Bulgaria, Croatia, Cyprus,

Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Introduction

This document is part of the series of EN metallic material standards for aerospace applications. The general organization of this series is described in EN 4258.

1 Scope

This document is applicable to material testing and specifies the requirements for the tensile testing of metallic materials at ambient temperature for aerospace applications.

This document is applicable when referred to in the EN technical specification or material standard unless otherwise specified on the drawing, order or inspection schedule.

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 4259, *Aerospace series — Metallic materials — Definition of general terms*

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

ASTM E1012,[1] *Standard practice for verification of test frame and specimen alignment under tensile and compressive axial force application*

[1] Published by American Society for Testing and Materials (ASTM International), available at: https://www.astm.org/.