SLOVENSKI STANDARD
oSIST prEN 3874:2026

01-april-2026

Aeronavtika - Preskusne metode za kovinske materiale - Preskusi utrujenosti z nizkim številom ciklov s konstantno amplitudo in nadzorom sile

Aerospace series - Test methods for metallic materials - Constant-amplitude force-controlled low-cycle fatigue testing

Luft- und Raumfahrt - Prüfverfahren für metallische Werkstoffe - Kraftgesteuerter Kurzzeit-Ermüdungsversuch (LCF) mit konstanter Amplitude

Ta slovenski standard je istoveten z: **prEN 3874**

ICS:

49.025.05	Železove zlitine na splošno	Ferrous alloys in general
49.025.15	Neželezove zlitine na splošno	Non-ferrous alloys in general

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EUROPEAN STANDARD

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ICS 49.025.05; 49.025.15

English Version

Aerospace series - Test methods for metallic materials - Constant-amplitude force-controlled low-cycle fatigue testing

Luft- und Raumfahrt - Prüfverfahren für metallische Werkstoffe - Kraftgesteuerter Kurzzeit-Ermüdungsversuch (LCF) mit konstanter Amplitude

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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European foreword

This document (prEN 3874:2026) 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 is currently submitted to the CEN Enquiry.

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 applies to constant-amplitude force-controlled low-cycle fatigue (LCF) testing of metallic materials governed by EN Aerospace standards. The document defines the mechanical properties that need to be determined, the equipment, test pieces, methodology of test and presentation of results.

The document applies to uniaxially loaded tests carried out on plain or notched test pieces under ambient and elevated temperatures. The document does not cover the testing of more complex test pieces, full scale components or structures, although the methodology could well be adopted to provide for such tests.

The purpose of this document is to ensure the comparability and reproducibility of the test results. The document does not cover the evaluation or interpretation of the results.

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 ISO 7500-1:2018, *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 7500-1:2018)*

ASTM E1012:2019,[1] *Standard Practice for Verification of Testing Frame and Specimen Alignment Under Tensile and Compressive Axial Force Application*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp/

— IEC Electropedia: available at https://www.electropedia.org/

3.1
force
F
instantaneous load applied to the test section, in kN

Note 1 to entry: Tensile forces are considered to be positive and compressive forces negative.

3.2
force-control
tests in which the force acting on a known test section is controlled

3.3
maximum force
F_{max}
highest algebraic value of force applied, in kN

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

3.4
minimum force
F_{min}
lowest algebraic value of force applied, in kN

3.5
force range
ΔF
algebraic difference between the maximum and minimum forces, in kN

Note 1 to entry: $\Delta F = F_{max} - F_{min}$

3.6
force amplitude
F_a
half the algebraic difference between the maximum and minimum forces, in kN

Note 1 to entry: $F_a = (F_{max} - F_{min})/2$

3.7
mean force
F_m
half the algebraic sum of the maximum and minimum forces, in kN

Note 1 to entry: $F_m = (F_{max} + F_{min})/2$

3.8
force ratio
R
algebraic ratio of the minimum force to the maximum force

Note 1 to entry: $R = F_{min}/F_{max}$

Note 2 to entry: See Figure 2 for examples of different force ratios.

3.9
stress
σ
force divided by the nominal cross-sectional area, in MPa

Note 1 to entry: It is the independent variable in a stress-controlled fatigue test.

Note 2 to entry: The nominal cross-sectional area (engineering stress) is that calculated from measurements taken at ambient temperature and no account is taken for the change in section as a result of expansion at elevated temperatures.

3.10
stress ratio
R_s
ratio of minimum stress to maximum stress during a fatigue cycle

Note 1 to entry: $R_s = \sigma_{min}/\sigma_{max}$