SLOVENSKI STANDARD
SIST EN 4864:2021

01-februar-2021

Aeronavtika - Okoljski preskusi - Preskus z močnim dinamičnim površinskim drgnjenjem, praskanjem, razenjem in udarjanjem v notranjosti kabine

Aerospace series - Environmental testing - High dynamic abrasion, mar, scratch and punch test in cabin interior

Luft- und Raumfahrt - Umweltprüfung - Dynamische Prüfung von Abrieb- und Verschleiß, Kratz- Rill- und Schlagbeanspruchung im Flugzeuginnenraum/Kabinenbereich

Série aérospatiale - Essais d'environnement - Abrasion haute dynamique, éraflures, rayures et essai de poinçonnement en cabine intérieure

Ta slovenski standard je istoveten z: **EN 4864:2020**

ICS:

19.040	Preskušanje v zvezi z okoljem	Environmental testing
49.095	Oprema za potnike in oprema kabin	Passenger and cabin equipment

SIST EN 4864:2021 **en,fr,de**

EUROPEAN STANDARD

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English Version

Aerospace series - Environmental testing - High dynamic abrasion, mar, scratch and punch test in cabin interior

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This European Standard was approved by CEN on 4 October 2020.

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

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European foreword

This document (EN 4864:2020) has been prepared by the Aerospace and Defence Industries Association of Europe — Standardization (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of an identical text or by endorsement, at the latest by June 2021, and conflicting national standards shall be withdrawn at the latest by June 2021.

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

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1 Scope

This document provides a series of standard testing methods to determine the resistance of flat or curved surfaces against abrasion, scratch or punch under high dynamics as may occur for example by manually operating actuators or due to impacts of materials like shoes, cases, bags and other common objects of everyday's usage inside an aircraft cabin. The method is also suitable to test the resistance of a surface against all other high dynamic strains.

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 4860, *Aerospace series — Environmental testing — Test Xb: Abrasion of markings, letterings, surfaces and materials caused by rubbing of fingertips and hands* [1)]

EN 60068-1, *Environmental testing — Part 1: General and guidance*

EN ISO 2409, *Paints and varnishes — Cross-cut test*

ISO 4649, *Rubber, vulcanized or thermoplastic — Determination of abrasion resistance using a rotating cylindrical drum device* [2)]

3 Terms and definitions

No terms and definitions are listed in this document.

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

- ISO Online browsing platform: available at http://www.iso.org/obp
- IEC Electropedia: available at http://www.electropedia.org/

4 General description

The surface under test shall be once or repeatedly stressed by the rubbing, scratch, abrasion or punch movement of a test head. The test head/tip should be defined by the relevant specification in dependence of the specific test application, but should be defined in terms of material, hardness, roughness and shape as well as the movement angle to obtain reproducible test conditions. Depending on the relevant specification, an additional fabric and/or test medium could be used for testing.

The scratch movement shall start with an impact motion by lowering the tip onto the surface automatically in a reproducible fashion, and a further slide motion with one direction then the test tip shall be lifted and moved back to the initial impact point with a further one-direction slide, repeating this cyclic motion for certain times. The abrasion movement shall start with lowering the tip for the first time, followed by a reciprocating sliding motion for certain times. The punch movement shall be generated by a pneumatic cylinder with a certain force at one direction onto the sample surface.

[1)] Published as ASD-STAN Standard at the date of publication of this standard by AeroSpace and Defence industries Association of Europe — Standardization (ASD-STAN), http://www.asd-stan.org/.

[2)] Published by: ISO International Organization for Standardization http://www.iso.ch/.

5 Description of the test apparatus

5.1 General

An example of a suitable test apparatus is shown in the schematic drawing in Annex A. The apparatus moves the rubbing, scratch or punch tip under an angle of 90° ± 5° in a horizontal level over the surface. For scratch and abrasion test, the tip shall fall down on to the surface automatically with a certain momentum to simulate the first initial impact which often occurs in realistic conditions. Then the testing tip shall slide at a defined speed one direction with the length between 15 mm to 120 mm on the surface. This procedure shall be repeated cyclically by lifting the tip to the initial impact point then followed with the uni-direction movement. Another scenario is the tip shall slides on the surface after the initial impact with reciprocating motion for certain times.

The velocity v shall be generated by a pneumatic cylinder. The normal load shall be caused by adding dead weights onto the test head. The velocity of the cylinder and the normal force should be given in the relevant specification.

For punch tests the resulting force caused by the pneumatic cylinder should be defined as well by the relevant specification. For non-rigid test specimens the specification shall specify additional requirements (for example fixing).

Because of the universal approach for the high dynamic scratch, abrasion and punch test, the properties shall be defined by the relevant specification.

There are several suggested test heads for specific test methods, see 5.2 to 5.5.

5.2 Loading test by cargo and suitcase

Loading tests by cargo and suitcases are:

1) Edge of a radiator tank (commercially available);
2) Suitcase roller;
3) Socket/stand of a hard shell case;
4) Sharp edge of a flap box;
5) Edge of an aluminium case;
6) Edge and handle of a leather pilot case;
7) Metal lock and hinges;
8) Rubber feet.

5.3 High dynamic shoe sole test

Requirements for high dynamic shoe sole test are:

1) SBR-Recipe with approximately 30 % mineral filler;
2) Shore-hardness (95 ± 3) Shore A;
3) Spec. weight (1,23 ± 0,20) g/cm^3;
4) Tensile strength ≥ 10 N/mm^2;
5) Elongation ≥ 250 %;

6) Abrasion ≤ 250 mm³ according to ISO 4649;

7) Thickness 4 mm;

8) Dimension: Diameter 52 mm;

9) Installation orientation: longitudinally to testing direction;

10) Pointed tip, angle of 55°;

11) Other shoe sole materials and shore hardness possible.

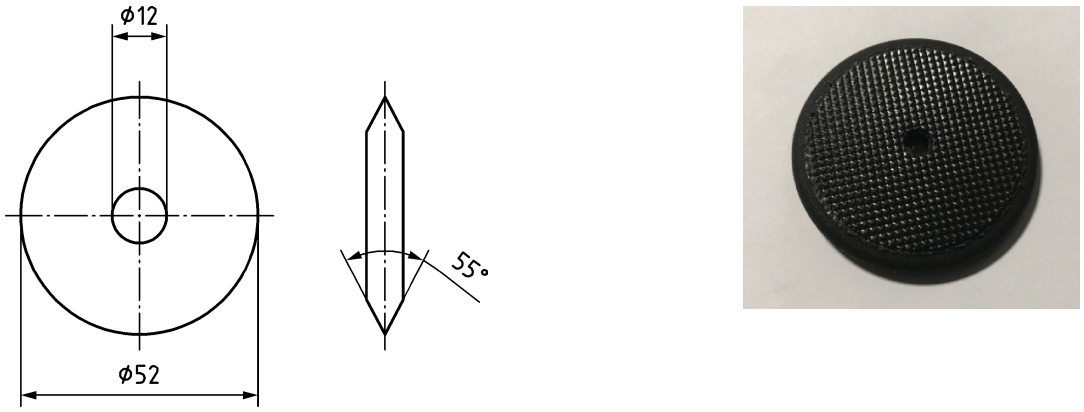

Figure 1 — Shoe sole wheel for high dynamic test

5.4 High dynamic shoe heel test

Requirements for high dynamic shoe heel test are:

1) Foamed out of Ethylenvinylacetat (commercially available);

2) Punched out for stamp (d = 10 mm or 20 mm) to simulate stiletto heels;

3) Shore A hardness from 45 to 90 depending on application.

Figure 2 — Shoe heel material

5.5 Cross cut test (according to EN ISO 2409)

A multi-blade test head should have six cutting edges with 1 mm, 2 mm or 3 mm distance, see Figure 3. The thickness of the 6 (six) blades should be 5 mm if the distance between the blades is 1 mm. The thickness should be 10 mm if the distance between the blades is 2 mm or more. If the cutting edge is worn down to 0,1 mm, it has to be reshaped. The velocity of the movement should be realized by a pneumatic cylinder (Annex A).

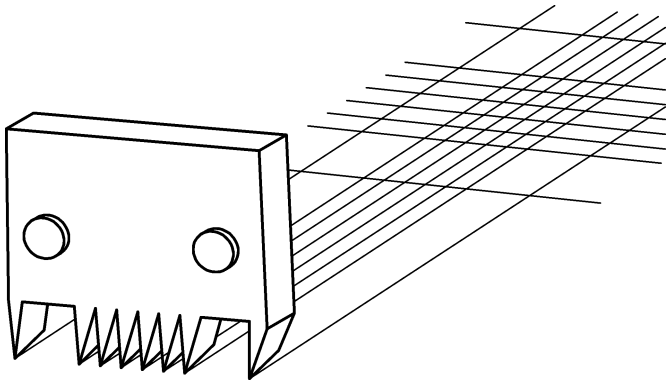

Figure 3 — Cross cut test

If necessary other dimensions for the test piston more suited to the test specimen should be chosen. They shall then be prescribed by the relevant specification.

6 Severity

The load is given by the force with which the test piston acts on the specimen and by the number of cycles. It shall be chosen from the following values. The chosen values shall be prescribed in the relevant specification.

Force: 1 N ± 0,2 N; 5 N ± 1 N; 10 N ± 2 N; 15 N ± 3 N; 20 N ± 4 N; 25 N ± 5 N; 30 N ± 6 N.

Number of cycles: 10^0, 10^1; 10^2; 10^3; 10^4, 10^5.

7 Preconditioning

The surface under test shall be in the condition of delivery after normal production. The relevant specification may prescribe preconditioning (for example aging, dusting and cleaning).

8 Initial measurements

The specimen shall be submitted to a visual check and if prescribed by the relevant specification to dimensional and functional checks.

9 Testing

9.1 General

The test shall be carried out under standard conditions. If not specified in the relevant specification, the test is carried out at standard atmospheric conditions according to EN 60068-1.

The test specimens are stressed in the test apparatus (see 5.1) with the prescribed severity.