



SLOVENSKI STANDARD
kSIST FprEN 6038:2014

01-maj-2014

Aeronavtika - Z vlakni ojačeni polimerni materiali - Preskusna metoda - Ugotavljanje tlačne odpornosti po udarcu

Aerospace series - Fibre reinforced plastics - Test method - Determination of the compression strength after impact

Luft- und Raumfahrt - Faserverstärkte Kunststoffe - Prüfverfahren - Bestimmung der Restdruckfestigkeit nach Schlagbeanspruchung

Série aérospatiale - Matières plastiques renforcées de fibres - Méthode d'essai - Détermination de la résistance en compression après impact

Ta slovenski standard je istoveten z: FprEN 6038

ICS:

49.025.40	Guma in polimerni materiali	Rubber and plastics
83.120	Ojačani polimeri	Reinforced plastics

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EUROPEAN STANDARD
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FINAL DRAFT
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ICS

English Version

Aerospace series - Fibre reinforced plastics - Test method - Determination of the compression strength after impact

Série aérospatiale - Matières plastiques renforcées de
fibres - Méthode d'essai - Détermination de la résistance en
compression après impact

Luft- und Raumfahrt - Faserverstärkte Kunststoffe -
Prüfverfahren - Bestimmung der Restdruckfestigkeit nach
Schlagbeanspruchung

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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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword.....	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	4
4 Principle of the method.....	4
5 Designation of the method	5
6 Apparatus	5
7 Test specimen	5
8 Procedure	6
9 Presentation of the results	7
10 Test report	8

Foreword

This document (FprEN 6038:2014) 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 Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, prior to its presentation to CEN.

This document is currently submitted to the Formal Vote.

FprEN 6038:2014 (E)

1 Scope

This European Standard defines a method to be used to measure the low speed impact resistance characteristics of fibre reinforced plastics.

It is applicable to composite laminates with unidirectional plies or woven fabric reinforcement.

This standard does not give any direction necessary to meet health and safety requirements. It is the responsibility of the user of this standard to consult and establish appropriate health and safety precautions.

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.

EN 2374, *Aerospace series — Glass fibre reinforced mouldings and sandwich composites — Production of test panels*

EN 2565, *Aerospace series — Preparation of carbon fibre reinforced resin panels for test purposes* ¹⁾

EN 2743, *Aerospace series — Fibre reinforced plastics — Standard procedures for conditioning prior to testing unaged materials*

EN 2760, *Aerospace series — Steel FE-PL78 — $1\,760 \leq R_m \leq 2\,000$ MPa — Bar — $D_e \leq 75$ mm* ¹⁾

3 Terms and definitions

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

3.1
compression strength after impact
maximum compression load experienced by the impacted specimen divided by the initial gross cross sectional area

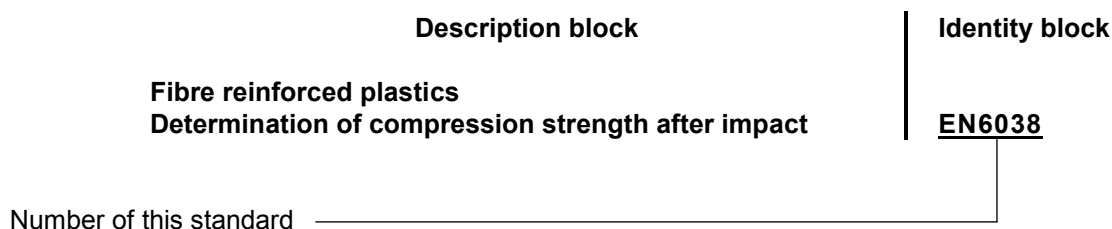
4 Principle of the method

Subject the laminate specimen to impacts of varying energy, then measure the indentation depth and the compression strength after impact.

1) Published as ASD-STAN Prestandard at the date of publication of this standard. <http://www.asd-stan.org/>

5 Designation of the method

The designation of the method used shall be drawn up according to the following example:



6 Apparatus

- 6.1** Impact machine: drop weight impact tester, capable of capturing the drop weight after the first impact so that a restrike shall not occur (see Figure 3).
- 6.2** Impactor with the following characteristics (see Figure 1).
- 6.3** Flat-faced micrometer with 6 mm diameter anvils, calibrated to within 0,01 mm.
- 6.4** Depth gauge with hemispheric adapter, diameter 3 mm and calibrated to within 0,01 mm accuracy.
- 6.5** Test machine accurate to within 1 % in the relevant load range.
- 6.6** Compression tools (drawings in Figure 4 for information).
- 6.7** Vernier slide callipers calibrated to within 0,1 mm.

7 Test specimen

7.1 Specimen description

For the description, dimensions, tolerances see Figure 5.

7.2 Specimen preparation

The specimens are cut out from laminates. The coefficient of variation in the thickness measurements shall be smaller than 2 % per laminate. The laminates shall be produced according to EN 2565 for carbon, or according to EN 2374 for glass.

The laminate should be inspected for example by C-Scan to establish that the laminate is worth testing. If the NDT reveals unacceptable defects, limits defined by the specification invoking the test, the laminate should not be tested.

The process parameters shall be in line with the specification invoking the test.

FprEN 6038:2014 (E)**7.3 Number of specimens**

Eight specimens shall be tested, one for each energy specified as defined in 8.3.

Three specimens shall be tested at the BVID as defined in 8.5.

8 Procedure**8.1 Conditioning**

The storage and testing of the dry specimens shall be carried out at $(23 \pm 2) ^\circ\text{C}$, $(50 \pm 5) \%$ relative humidity in accordance with EN 2743.

8.2 Determination of dimensions

Measure and record the thickness and width at three points of the specimen. Use the micrometer for the thickness and the vernier slide callipers for the width.

8.3 Impact tests

As shown in Figure 3, secure the specimen to a flat mounting plate using four snap fasteners. This leaves a clear window of $[75 (\pm 0,1) \times 125 (\pm 0,2)]$ mm.

Set the drop height according to the selected impact energy (see formula in 9.1).

Subject the specimens to impact with energy: 9, 12, 16, 20 and 25 joules (impactor 1 kg to 3 kg), 30 and 40 joules (impactor 4 kg to 6 kg).

The specimens must only receive one impact. Therefore bouncing must be prevented using a suitable device.

8.4 Indentation inspection

Inspect each specimen and assess, on the impact face and the opposite face:

- the visibility of the indentation,
- any breaks in the fibres.

Just prior to perform the compression test, set the specimen between two appropriate tabs. Using a depth gauge, measure the indentation depth on the impacted face to within 0,05 mm with the following procedure:

- measure the depth gauge value in the deepest part of the indented area,
- then measure the depth gauge value on 4 points as shown in Figure 2 and subtract from the value in the indented area,
- the indented depth is the average of these 4 values.