

Aerospace series - Analysis of non-metallic materials (cured) for the determination of the extent of cure by Differential Scanning Calorimetry (DSC)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 6064:2017 sisaldab Euroopa standardi EN 6064:2017 ingliskeelset teksti.	This Estonian standard EVS-EN 6064:2017 consists of the English text of the European standard EN 6064:2017.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 20.12.2017.	Date of Availability of the European standard is 20.12.2017.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 49.025.01

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:
Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

English Version

**Aerospace series - Analysis of non-metallic materials
(cured) for the determination of the extent of cure by
Differential Scanning Calorimetry (DSC)**

Série aérospatiale - Analyse Enthalpique Différentielle
(AED) des matériaux non métalliques (polymérisés)
pour la détermination du degré de polymérisation

Luft- und Raumfahrt - Analyse von nichtmetallischen
Werkstoffen (gehärtet) zur Bestimmung des
Vernetzungsgrades durch dynamische
Differenzkalorimetrie (DSC)

This European Standard was approved by CEN on 26 July 2017.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

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

Contents	Page
European foreword	3
1 Scope.....	4
2 Normative references.....	4
3 Symbols and definitions	4
4 Principle of the method	4
5 Designation of the method.....	5
6 Apparatus.....	5
7 Test specimens.....	6
8 Procedure	7
9 Presentation of the results	8
10 Test report.....	8
Annex A (informative) Equipment.....	11
A.1 Mettler TA 3000/TA 2100 - DSC 20/DSC 30	11
A.2 DuPont 9900	11
A.3 Perkin Elmer DSC 2/DSC 4/DSC 7	11

European foreword

This document (EN 6064:2017) 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 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 June 2018 and conflicting national standards shall be withdrawn at the latest by June 2018.

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.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This test method defines the procedure for the estimation of the extent of cure of certain non-metallic materials (e.g. preimpregnated and neat resin systems, adhesives) for aerospace use. The extent of cure is estimated by Differential Scanning Calorimetry (DSC) measurements of uncured (reference) and cured materials. Additional evidence on the extent of cure may be gained by combining results from this method with those obtained by other techniques.

This standard does not give any directions necessary to meet the health and safety requirements. It is the responsibility of the user of this standard to adopt 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 2331, *Aerospace series — Textile glass fibre preimpregnates — Test method for the determination of the resin and fibre content and mass of fibre per unit area*

EN 2559, *Aerospace series — Carbon fibre preimpregnates — Determination of the resin and fibre content and the mass of fibre per unit area*

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

3 Symbols and definitions

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

The determination of these parameters shall be agreed upon between manufacturer and purchaser in case of non-ideal curves or different instrument types.

3.1

curing reaction (see Figure 1)

θ is the heating rate, in degrees Celsius or Kelvin by minutes;

ΔH is the reaction enthalpy, in Joules by grams;

ΔH_{100} is the reaction enthalpy corrected to 100 % resin content, in Joules by grams;

A-curve is the reference reaction curve for uncured material;

B-curve is the reaction curve for an already (semi-) cured sample.

3.2

calibration (see 6.6)

T_m is the melting temperature, in degrees Celsius or Kelvin

ΔH_m is the enthalpy of fusion, in Joules by grams

4 Principle of the method

Differential Scanning Calorimetry (DSC) measures the temperatures and the heat flow associated with transitions in materials as a function of time and temperature.