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Composites en plastiques renforcés - Spécifications des profilés pultrudés - Partie 3: Exigences pariculières

Reinforced plastics composites - Specifications for pultruded profiles - Part 3: Specific requirements

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English version

Reinforced plastics composites - Specifications for pultruded profiles - Part 3: Specific requirements

Composites en plastiques renforcés - Spécifications des profilés pultrudés - Partie 3: Exigences pariculières

Verstärkte Kunststoffverbundwerkstoffe - Spezifikationen für pultrudierte Profile - Teil 3: Besondere Anforderungen

This European Standard was approved by CEN on 14 September 2002.

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Contents

Foreword

This document EN 13706-3:2002 has been prepared by Technical Committee CEN/TC 249 "Plastics", the secretariat of which is held by IBN.

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of an identical text or by endorsement, at the latest by April 2003, and conflicting national standards shall be withdrawn at the latest by April 2003.

Part 3 of this European Standard, EN 13706, defines the specification of pultruded profiles. The specification defines those properties, which shall be specified and the level to be obtained for each grade of profile. Two grades; E23 and E17 are defined.

EN 13706 consists of the following parts, under the general title *Reinforced plastics composites - Specifications for pultruded profiles.*

— *Part 1: Designation*

— *Part 2: Methods of tests and general requirements*

— *Part 3: Specific requirements*

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

1.1 This Part 3 of EN 13706 specifies the specification of pultruded profiles. The specification defines those properties, which shall be specified and the level to be obtained for each grade of profile.

1.2 The specification specifies grades where the short-form code, Exx, is related to the Effective Flexural Modulus of the profile measured by testing a length of the complete profile.

Two grades; E23 and E17 are defined.

NOTE Other grades can be introduced at future revisions of the standard.

1.3 The properties, that shall be achieved for each class of profile are given in Table 1. Other properties that can be reported are listed in Table 2.

1.4 Test methods to be used to determine properties related to the suitability of the profile for specific applications are referenced in clause 4.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN ISO 527-4, *Plastics - Determination of tensile properties - Part 4: Test condition for isotropic and orthotopic fibre-reinforced plastics composites (ISO 527-4:1997)*.

EN ISO 14125, *Fibre-reinforced plastic composites - Determination of flexural properties (ISO 14125:1998)*.

EN ISO 14130, *Fibre-reinforced plastic composites - Determination of apparent interlaminar shear by short-beam method (ISO 14130:1997).*

EN 13706-2:2002, *Reinforced plastic composites — Specification for pultruded profiles — Part 2: Methods of test and general requirements.*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given EN 13706-2 apply.

4 Specification

4.1 Obligatory specified properties

For each grade of pultrusion profile manufactured in accordance with this specification the manufacture shall meet all the requirements for all the properties included in Table 1.

Measurement of the property requirement 1.1 in Table 1 is undertaken on a test length of the full section of the profile but is not applicable to solid, flat sections. Measurement of the property requirements in 1.2 to 1.10 in Table 1 are undertaken using coupons cut from the profile or from a test plate prepared according to clause 6 of EN 13706-2:2002.

4.2 Other properties which may be reported

Other properties of the profile, which may be reported but are not required to be specifically controlled are given in Table 2.

4.3 Specific performance properties

Pultruded profiles under this specification may be required to meet specific performance criteria. Unless otherwise specified, the test methods given in Table F.1 to F.4 in annex F of EN 13706-2:2002 are recommended. Annex G of EN 13706-2:2002 allows flexural, shear and torsion data to be obtained for the full profile.

4.4 Other requirements

Profiles manufactured according to this specification shall comply fully with clause 4 of EN 13706-2:2002.

Table 1 — Minimum properties that are required for each grade

	Property	Unit	Test method	Minimum Properties	
				E23 Grade	E17 Grade
1.1	Full section test	GPa	Annex D, EN 13706-2:2002	23	17
1.2	Tension modulus-axial	GPa	EN ISO 527-4	23	17
1.3	Tension modulus-transverse	GPa	EN ISO 527-4	7	5
1.4	Tension strength-axial	MPa	EN ISO 527-4	240	170
1.5	Tension strength-transverse	MPa	EN ISO 527-4	50	30
1.6	Pin-bearing strength-axial	MPa	Annex E, EN 13706-2:2002	150	90
1.7	Pin-bearing strength-transverse	MPa	Annex E, EN 13706-2:2002	70	50
1.8	Flexural strength – axial	MPa	EN ISO 14125	240	170
1.9	Flexural strength – transverse	MPa	EN ISO 14125	100	70
1.10	Interlaminar shear strength-axial	MPa	EN ISO 14130	25	15

Table 2 — Material properties that may be reported

	Property	Unit	Test method
2.1	Compression strength-axial	MPa	EN ISO 14126
2.2	Compression strength-transverse	MPa	EN ISO 14126
2.3	Fibre content by weight	%	ISO 1172 (glass-fibre systems)
2.4	Density	kg/m^3	ISO 1183
2.5	Poisson's Ratio-axial		EN ISO 527-4
2.6	Poisson's Ratio-transverse		EN ISO 527-4
2.7	Thermal expansion-axial	$10^{-6}/°C$	ISO 11359-2
2.8	Thermal expansion-transverse	$10^{-6}/°C$	ISO 11359-2
2.9	In-plane shear modulus	GPa	ISO 15310

Bibliography

EN ISO 14126, *–Fibre-reinforced plastic composites - Determination of compressive properties in the in-plane direction (ISO 14126:1999).*

EN ISO 1172, *Textile-glass-reinforced plastics - Prepregs, moulding compounds and laminates - Determination of the textile-glass and mineral-filler content - Calcination methods (ISO 1172:1996).*

ISO 1183, *Plastics - Methods for determining the density and relative density of non-cellular plastics.*

ISO 11359-2, *Plastics - Thermomechanical analysis (TMA) - Part 2: Determination of coefficient of linear thermal expansion and glass transition temperature.*

ISO 15310*, Fibre-reinforced plastic composites - Determination of the in-plane shear modulus by the plate twist method.*