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LIGHT TRANSMITTING PROFILED PLASTIC SHEETING FOR SINGLE SKIN ROOFING - PART 4: SPECIFIC REQUIREMENTS, TEST METHODS AND PERFORMANCE OF POLYCARBONATE (PC) SHEETS

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Light transmitting profiled plastic sheeting for single skin roofing - Part 4: Specific requirements, test methods and performance of polycarbonate (PC) sheets

Plaques profilées éclairantes en matière plastique pour couverture en simple paroi - Partie 4: Exigences spécifiques, méthodes d'essai et performance pour plaques en polycarbonate (PC)

Profilierte lichtdurchlässige Platten aus Kunststoff für einschalige Dacheindeckungen - Teil 4: Besondere Anforderungen, Prüfverfahren und -verhalten für Platten aus Polycarbonat (PC)

This European Standard was approved by CEN on 7 November 1999.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 128 " Roof covering products for discontinuous laying and products for wall cladding", 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of an identical text or by endorsement, at the latest by July 2000, and conflicting national standards shall be withdrawn at the latest by July 2000.

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, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

This standard is one of a series dealing with profiled plastics sheeting for single skin roofing.

EN 1013-1:1997	Light transmitting profiled plastic sheeting for single skin roofing - Part 1: General requirements and test methods
EN 1013-2:1998	Light transmitting profiled plastic sheeting for single skin roofing - Part 2: Specific requirements and test methods for sheets of glass fibre reinforced polyester resin (GRP)
EN 1013-3:1997	Light transmitting profiled plastic sheeting for single skin roofing - Part 3: Specific requirements and test methods for sheets of polyvinyl chloride (PVC)
EN 1013-4:1999	Light transmitting profiled plastic sheeting for single skin roofing - Part 4: Specific requirements, test methods and performance of polycarbonate (PC) sheets
EN 1013-5:1999	Light transmitting profiled plastic sheeting for single skin roofing - Part 5: Specific requirements, test methods and performance of polymethylmethacrylate (PMMA) sheets

1 Scope

1.1 This part of EN 1013 specifies requirements for materials, methods of testing and performance of polycarbonate (PC) light transmitting profiled sheets produced to the desired profile by extrusion and/or forming for single skin applications. It is applicable in conjunction with the general requirements contained in EN 1013-1:1997.

1.2 Requirements are specified relative to:

- Sheet thickness
- Visual characteristics
- Longitudinal reversion
- Retention of profile
- Multi-axial impact resistance
- Thermal ageing

Test methods are indicated as appropriate.

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.

EN 1013-1:1997	Light transmitting profiled plastic sheeting for single skin roofing - Part 1: General requirements and test methods
ISO 527-1:1993	Plastics - Determination of tensile properties - Part 1: General principles
ISO 527-2:1993	Plastics - Determination of tensile properties - Part 2: Test conditions for moulding and extrusion plastics
ISO 6603-1:1985	Plastics - Determination of multiaxial impact behaviour of rigid plastics - Part 1: Falling dart method
ISO 7391-1:1996	Plastics - Polycarbonate (PC) moulding and extrusion materials - Part 1: Designation system and basis for specifications

3 Materials

The sheets shall consist substantially of polycarbonate according to ISO 7391-1 : 1996. They can comprise both unmodified materials and materials containing lubricants, processing aids, UV absorbers, pigmented colorants, surface hard-coatings and flame retardants.

4 Classification

In addition to the requirements described in clauses 5 to 10, sheets shall be characterized according to EN 1013-1:1997 dealing with general requirements for each of the following:

- Light transmission;
- Ageing procedure;
- Impact resistance.

5 Dimensions

5.1 General

The dimensions of the sheet shall be quoted by the manufacturer and shall include those identified in Annex A of EN 1013-1:1997 together with a value for the nominal sheet thickness.

5.2 Tolerance for nominal sheet thickness (Quality control test)

When tested in accordance with 11.1 the values of sheet thickness obtained from crown, valley and flanks shall be the nominal thickness quoted ± 20 % respectively.

6 Visual characteristics
(Quality control test)

Both sides of the sheet shall be of regular appearance. Visual or tactile examination shall reveal no evidence of any hole, cracking, splitting or cluster of bubbles greater than 1mm in diameter, or inclusions that are likely to affect properties. The edges of the sheet shall be straight and clean.

Further requirements concerning the visual aspects of the sheets are to be agreed upon between the manufacturer and the customer.

7 Longitudinal reversion and profile retention

(Type test)

When the sheet is tested by the method described in 11.2 at a temperature of 100°C for 60 min, the average percentage change in dimensions shall not exceed the following:

- Longitudinal reversion : ± 2%
- Profile retention : ± 3%

Manufacturers´ literature shall give guidance where conditions of use may lead to these figures being exceeded.

8 *E*-modulus and tensile strength

(Type test)

When the sheet is tested according to ISO 527-1:1993 and ISO 527-2:1993, the *E*-modulus has to be at least 2200 MPa and the tensile strength has to be at least 50 MPa.

9 Multi-axial impact resistance variation

(Type test)

When the sheet is tested by the method ISO 6603-1:1985 the minimum impact resistance levels are:

Table 1: Minimum impact resistance levels

Thickness mm.	Unaged samples E_{kin} J	Aged samples E_{kin} J
0,8	≥ 14	≥ 9
1,0	≥ 24	≥ 19

Ageing shall be carried out in accordance with 7.1 of EN 1013-1:1997 using a Xenon arc lamp.

The duration of the ageing shall be chosen as such that an exposure ≥ 18 GJ/m² according to class A_0 in EN 1013-1:1997 results.

10 Thermal ageing

(Type test)

When the sheet is exposed to dry heat for 3 000 h at 100 °C by the method described in 11.4, property levels, with respect to unexposed sheet, shall be maintained at:

- Light transmission ≥ 90 % of its original value
- Change in yellowness index ≤ 10 points

11 Test methods

11.1 Sheet thickness

The sheet thickness shall be determined by using a micrometer screw with hemispherical tips of 5 mm in diameter and with an accuracy of ± 0,01 mm.

Sheet thickness is to be checked by nine measurements taken at random in the crowns, valleys and flanks across the total sheet width at a distance of 20 mm from the one end. First and last measurements are to be within 25 mm of the sheet edges.

11.2 Longitudinal reversion and profile retention

11.2.1 Principle

During a given period of time, the test pieces are submitted to a determined temperature. Next, the percentage changes in length and in the pitch of corrugations are determined.