



National Standards Authority of Ireland

IRISH STANDARD

I.S. EN 1013-5:2000

ICS 83.140.10

**LIGHT TRANSMITTING PROFILED PLASTIC  
SHEETING FOR SINGLE SKIN-ROOFING -  
PART 5: SPECIFIC REQUIREMENTS, TEST  
METHODS AND PERFORMANCE OF  
POLYMETHYLMETHACRYLATE (PMMA)  
SHEETS**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 1013-5**

January 2000

ICS 83.140.10

English version

**Light transmitting profiled plastic sheeting for single skin roofing  
- Part 5: Specific requirements, test methods and performance  
of polymethylmethacrylate (PMMA) sheets**

Plaques profilées éclairantes en matière plastique pour  
couverture en simple paroi - Partie 5: Exigences  
spécifiques, méthodes d'essai et performance pour plaques  
en polyméthylméthacrylate (PMMA)

Profilierte lichtdurchlässige Platten aus Kunststoff für  
einschalige Dacheindeckungen - Teil 5: Besondere  
Anforderungen, Prüfverfahren und -verhalten für Platten  
aus Polymethylmethacrylat (PMMA)

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.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



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 light transmitting profiled sheets of polymethylmethacrylate (PMMA) produced to the desired profile by extrusion and/or forming for single skin application. It is applicable in conjunction with the general requirements contained in EN 1013-1:1997.

1.2 Requirements are specified relative to:

- Sheet thickness
- Width of the sheet
- Visual characteristics
- Longitudinal reversion
- Retention of profile

- Variation of impact strength after ageing
- Thermal ageing

Test procedures 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 179:1993	Plastics - Determination of Charpy impact strength
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 8257-1:1998	Plastics - Poly(methyl methacrylate) (PMMA) moulding and extrusion materials - Part 1: Designation system and basis for specifications

## 3 Material

The materials from which standard PMMA sheets are made shall consist substantially of polymethylmethacrylate according to ISO 8257-1:1998. They comprise both unmodified materials and materials containing lubricants, processing aids, UV-absorbers, pigments and colorants. The materials for impact modified sheets shall consist of polymethylmethacrylate according to ISO 8257-1:1998 and additionally an impact modifier.

## 4 Classification

Sheets shall be classified according to EN 1013-1:1997 for each of the following:

- Light transmission
- Impact resistance
- Variation of yellowness index and light transmission after ageing procedure

## 5 Dimensions

### 5.1 General

The value for the nominal sheet thickness shall be quoted by the manufacturer.

### 5.2 Tolerances for nominal sheet thickness (Quality control test)

When tested in accordance with 11.1 the values of sheet thickness obtained from crown and valley shall be the nominal thickness quoted  $\pm 10\%$ .

On the flanks the tolerance shall be the nominal thickness quoted  $\pm 20\%$ .

### 5.3 Tolerance for cover width (Quality control test)

In addition to the requirements quoted in 5.5.4 of EN 1013-1:1997 the values of cover width shall be within an interval from 0 - + 3 mm of the width stated, when measured as described in EN 1013-1:1997.

## 6 Visual characteristics

(Quality control test)

Visual or tactile examination shall reveal no evidence of any hole, cracking, splitting or cluster of bubbles greater than 1 mm in diameter or inclusions that are likely to affect properties. The edges shall be straight and clean. Further requirements concerning the visual aspect of the sheets can 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 80 °C for 60 min, the average percentage change in dimensions shall not exceed the following:

- Longitudinal reversion       $\pm 2$  %
- Profile retention               $\pm 3$  %

Manufacturer's 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 3000 MPa and the tensile strength has to be at least 60 MPa for standard PMMA.

For impact modified materials the lower limits have to be declared by the manufacturer.

## 9 Variation of impact strength after ageing

(Type test)

When the sheet is tested according to method 1fU in ISO 179:1993 the minimum Charpy impact strength levels  $a_{cU}$  of unnotched specimens are:

**Table 1: Minimal impact strength levels**

Material	Unaged samples $a_{cU}$ kJ/m <sup>2</sup>	Aged samples $a_{cU}$ kJ/m <sup>2</sup>
Standard	$\geq 10$	$\geq 10$

For impact modified materials the impact strength levels before and after ageing have to be declared by the manufacturer.

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

The duration of ageing shall be chosen so that an exposure  $\geq 18$  GJ/m<sup>2</sup> according to class A<sub>0</sub> in EN 1013-1:1997 results.

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