

# Light transmitting profiled plastic sheeting for single skin roofing —

## Part 1: General requirements and test methods

The European Standard EN 1013-1:1997 has the status of a  
British Standard

ICS 83.140.10

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# National foreword

This British Standard is the English language version of EN 1013-1:1997.

The UK participation in its preparation was entrusted by Technical Committee B/542, Roofing and cladding products for discontinuous laying, to Subcommittee B/542/8, Light transmitting plastics sheeting for roofing and cladding, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

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The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

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## Summary of pages

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English version

## Light transmitting profiled plastic sheeting for single skin roofing — Part 1: General requirements and test methods

Plaques profilées éclairantes en matière plastique  
pour couverture en simple paroi —  
Partie 1: Exigences générales et méthodes d'essai

Lichtdurchlässige profilierte Platten aus Kunststoff  
für einschalige Dacheindeckungen —  
Teil 1: Allgemeine Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 2 November 1997.

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**CEN**

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 May 1998, and conflicting national standards shall be withdrawn at the latest by May 1998.

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.

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## Introduction

This standard describes the general requirements and test methods for translucent roofing sheets.

The physical properties of translucent profiled plastic sheets differ from bituminous, metal and fibre reinforced cement sheets, as defined in EN 534, prEN 506, prEN 508-1, prEN 508-2, prEN 508-3 or EN 494. They do not necessarily have the same span capabilities and alternative fixing specifications are generally required.

Until codes of practice are established, determination of span capabilities and/or method of fixing is based on specific test results.

Reference should be made to national codes and/or manufacturer's literature for requirements concerning design, storage and installation, including all safety aspects, according to material.

## 1 Scope

This European Standard specifies the general requirements for profiled plastic translucent sheets for single skin roofing irrespective of the material used to produce the sheets. The specific requirements according to the material itself are given in specific parts of this standard, e.g. prEN 1013-2 and EN 1013-3. The standard specifies test methods and each (excepting that for dimensional tolerances) is defined either as a type test or a quality control test. The test method for dimensional tolerances has been included to provide a common approach for the purchaser and the manufacturer in cases of dispute over measurements.

This standard is applicable to all types of translucent roofing sheets used in any kind of buildings.

NOTE Material complying with this standard is also applicable for single skin vertical cladding.

## 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 494, *Fibre-cement profiled sheets and fittings for roofing — Product specification and test methods*

prEN 506, *Roofing product from metal sheet — Self supporting products of copper and zinc-copper-titanium sheet*

prEN 508-1, *Roofing product from metal sheet — Self supporting products of steel, aluminium or stainless steel sheet — Part 1: Steel*

prEN 508-2, *Roofing product from metal sheet — Self supporting products of steel, aluminium or stainless steel sheet — Part 2: Aluminium*

prEN 508-3, *Roofing product from metal sheet — Self supporting products of steel, aluminium or stainless steel sheet — Part 3: Stainless steel*

EN 534, *Corrugated bitumen sheets*

prEN 1013-2, *Light transmitting profiled plastic sheets for single skin roofing — Part 2: Specific requirements and test methods for sheets of glass fibre reinforced polyester (GRP)*

EN 1013-3, *Light transmitting profiled plastic sheets for single skin roofing — Part 3: Specific requirements and test methods for sheets of polyvinyl chloride (PVC)*

ISO 4892, *Plastics — Methods of exposure to laboratory light sources*

EN ISO 6603-1:1996, *Plastics — Determination of multi-axial impact behaviour of rigid plastics — Part 1: Falling dart method* (ISO 6603-1:1985)

## 3 Definitions

For the purposes of this standard the following definitions apply:

### 3.1

#### diffusing sheets

sheets which give transmission of light and a dull (blurred) image of an object placed 1 m behind the sheet

### 3.2

#### non-diffusing sheets

sheets which give transmission of light and a sharp image of an object placed 1 m behind the sheet

### 3.3

#### type test

tests which are concerned with the introduction of a new product and/or a fundamental change in formulation and/or method of manufacture and/or change in product design or whenever significant change of property can logically be expected

### 3.4

#### quality control test

tests which are performed on samples drawn either from continuous production or from a consignment, to establish whether a batch of products conforms to this specification

### 3.5

#### yellowness

deviation in chroma from whiteness or water-whiteness in the dominant wavelength range, from 570 nm to 580 nm

### 3.6

#### yellowness index

magnitude in yellowness relative to CIE Source C

## 4 Symbols and abbreviations

|                   |                                                                                                                 |
|-------------------|-----------------------------------------------------------------------------------------------------------------|
| $C_c$             | Change in light transmission                                                                                    |
| $DYI$             | Change in the yellowness index                                                                                  |
| $E$               | Energy applied during ageing procedure                                                                          |
| $H_{50}$          | Velocity which has a probability of 50 % to cause failure, expressed in metres per second, during the hail test |
| $L_a$             | Light transmission of an aged test piece                                                                        |
| $L_{an}$          | Light transmission of the $n$ th aged test piece                                                                |
| $L_c$             | Light transmission of an unaged test piece                                                                      |
| $L_{cn}$          | Light transmission of the $n$ th unaged test piece                                                              |
| $L_s$             | Light transmission of a test piece                                                                              |
| $L_{sn}$          | Light transmission of the $n$ th test piece                                                                     |
| $LT$              | Nominal value of the light transmission of the sheet expressed in %                                             |
| $M_a$             | Light transmission of the aged sample                                                                           |
| $M_c$             | Average of $R_4$ and $R_6$                                                                                      |
| $MFE$             | Energy which has a probability of 50 % to cause failure, expressed in J, during the impact test                 |
| $M_s$             | Average of $R_1$ and $R_3$                                                                                      |
| $M_t$             | Average of $R'_4$ and $R'_6$                                                                                    |
| $M_u$             | Light transmission of the unaged sample                                                                         |
| $M_v$             | Light transmission of the sample                                                                                |
| $R_1$ and $R_3$   | Reading of galvanometer without any test piece                                                                  |
| $R_2$             | Reading of galvanometer with the test piece                                                                     |
| $R_4$ and $R_6$   | Reading of galvanometer without any test piece, before ageing procedure                                         |
| $R_5$             | Reading of galvanometer with the test piece, before ageing procedure                                            |
| $R'_4$ and $R'_6$ | Reading of galvanometer without any test piece, after ageing procedure                                          |
| $R'_5$            | Reading of galvanometer with the test piece, after ageing procedure                                             |
| $S_f$             | Average of shooting energy when test result was a failure                                                       |
| $S_p$             | Average of shooting energy when test result was a pass                                                          |
| $YI$              | Value of the yellowness index of aged test piece                                                                |
| $YI_0$            | Value of the yellowness index of unaged test piece                                                              |

## 5 Requirements

### 5.1 Visual aspect

The visual characteristics are defined in material-related other parts of this standard. The sheets are classified in two categories in accordance with their visual aspect:

- diffusing sheets;
- non-diffusing sheets.

### 5.2 Light transmission

According to their light transmission, sheets are classified in five categories:

|         |                         |
|---------|-------------------------|
| $L_0$ : | $85 \% \leq LT$         |
| $L_1$ : | $75 \% \leq LT < 85 \%$ |
| $L_2$ : | $65 \% \leq LT < 75 \%$ |
| $L_3$ : | $50 \% \leq LT < 65 \%$ |
| $L_4$ : | $LT < 50 \%$            |

For the sheets of class  $L_0$ ,  $L_1$ ,  $L_2$  and  $L_3$ , the average of the measurements of five specimens, in accordance with 6.1, shall be within the interval of its category.

For the sheets of class  $L_4$ , the average of the measurements on five specimens in accordance with 6.1 shall be within  $\pm 5 \%$  of the manufacturer declared light transmission.

### 5.3 Impact resistance

#### 5.3.1 General

According to their impact resistance, sheets are classified in five classes:

|         |                                        |
|---------|----------------------------------------|
| $I_1$ : | $50 \text{ J} \leq MFE$                |
| $I_2$ : | $30 \text{ J} \leq MFE < 50 \text{ J}$ |
| $I_3$ : | $15 \text{ J} \leq MFE < 30 \text{ J}$ |
| $I_4$ : | $5 \text{ J} \leq MFE < 15 \text{ J}$  |
| $I_5$ : | $0,5 \text{ J} \leq MFE < 5 \text{ J}$ |

The average, in accordance with 6.2.7, shall be within the interval of its category.

#### 5.3.2 Hail resistance

For zones where heavy hail storms occur, special hail-resistant sheets are recommended. Those sheets shall pass the test as described in 6.3 (optional type test).

The value  $H_{50}$  shall be equal to or greater than 5 m/s. The manufacturer may declare its personal value of  $H_{50}$ , provided it is greater than 5 m/s.

### 5.4 Variation of yellowness index and light transmission after ageing procedure

The ageing test shall be conducted in accordance with 7. Light transmission shall be maintained at a minimum level of 85 % of the original requirement. For mechanical characteristics refer to appropriate standards. The yellowness index of non-coloured