BRITISH STANDARD

BS EN
477:1999

# Unplasticized polyvinylchloride (PVC-U) profiles for the fabrication of windows and doors — Determination of the resistance to impact of main profiles by falling mass

The European Standard EN 477:1995 has the status of a British Standard

ICS 83.140.99

# National foreword

This British Standard is the English language version of EN 477:1995.

The UK participation in its preparation was entrusted by Technical Committee B/538, Doors, windows, shutters, hardware and curtain walling, to Subcommittee B/538/1, Windows, 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.

This British Standard forms part of a package of standards on unplasticized polyvinylchloride (PVC-U) profiles for the fabrication of windows and doors which will not become fully effective until all standards in the package have been published and any superseded standards have been withdrawn. The date of withdrawal for national standards will be agreed within CEN and will be notified.

**Cross-references**

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**

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 5 and a back cover.

This British Standard, having been prepared under the direction of the Sector Committee for Building and Civil Engineering, was published under the authority of the Standards Committee and comes into effect on 15 May 1999



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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN 477

May 1995

ICS 83.140; 91.060.50

Descriptors: buildings, windows, non-metallic sections, unplasticized polyvinylchloride, impact tests, shock resistance

English version

# Unplasticized polyvinychloride (PVC-U) profiles for the fabrication of windows and doors — Determination of the resistance to impact of main profiles by falling mass

Profilés de polychlorure de vinyle non plastifié (PVC-U) pour la fabrication des fenêtres et des portes — Détermination de la résistance aux chocs par masse tombante des profilés principaux

Profile aus weichmacherfreiem Polyvinylchlorid (PVC-U) zur Herstellung von Fenstern und Türen — Bestimmung der Stoßfestigkeit von Hauptprofilen mittels Fallbolzen

This European Standard was approved by CEN on 1995-05-02. 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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**CEN**

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

**Central Secretariat: rue de Stassart 36, B-1050 Brussels**



Ref. No. EN 477:1995 E

## Foreword

This European Standard was prepared by the Technical Committee CEN/TC 33, Windows, doors, shutters, building hardware and curtain walling, of which the Secretariat is held by AFNOR.

The requirements are incorporated in the product standards concerned.

This European Standard will result in one of a series of standards on test methods which supports a product standard for PVC-U profiles for the fabrication of windows and doors.

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 November 1995, and conflicting national standards shall be withdrawn at the latest by November 1995.

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

## 1 Scope

This European Standard specifies a method for the determination of the resistance to impact by a falling mass at −10 °C of unplasticized polyvinylchloride (PVC-U) main profiles for the fabrication of windows and doors for the assessment of the extrusion.

## 2 Principle

Test pieces cut from lengths of main profiles are subjected to a blow from a mass falling from a known height on the sight surface at a point mid-way between two supporting webs at a fixed temperature.

After testing the profiles are examined visually for failures.

## 3 Definitions

For the purpose of this European Standard the following definitions apply.

**3.1**

**main profile**

profile, which has a load bearing function in the construction of windows and doors

**3.2**

**sight surface**

face surface of a profile that is exposed to view, when the window or door is closed

**3.3**

**web**

membrane connecting two walls of a profile

## 4 Apparatus

*An impact testing machine*, incorporating the following basic components (see Figure 1) shall be used:

a) *main frame*, rigidly fixed in the vertical position;

b) *guide rails*, fixed to the main frame to accommodate the falling mass and allowing it to fall freely in the vertical plane;

c) *test piece support*, consisting of a rounded off support (see Figure 2) with a distance between $(200 \pm 1)$ mm. The support shall be made from steel and rigidly fixed in a solid foundation or on a table with a mass of more than 50 kg;

d) *release mechanism*, such that the falling mass can fall through a height which can be adjusted up to $(1\,500^{+10}_{0})$ mm, measured from the top surface of the test piece to be tested;

e) *falling mass*, of $(1\,000 \pm 5)$ g, which has a hemispherical striking surface of $(25 \pm 0{,}5)$ mm radius.

The striking surface shall be free from all imperfections.

## 5 Test pieces

Ten test pieces, each of length of 300 mm shall be taken from a main profile.

## 6 Conditioning

The test pieces shall be conditioned at a temperature of $(-10^{\ 0}_{-2})$ °C for at least 1 h before testing.

Each test piece shall be tested within 10 s of removal from the conditioning chamber.

## 7 Procedure

**7.1** The test shall be executed on the sight surface of the main profile (preferably on the sight surface which is designed to be exposed to the weather).

**7.2** Drop the falling mass from the given height as required in the product standard at a point mid-way between two supporting webs.

NOTE 1 Where it is impracticable for the mass to hit the profile in accordance with **7.2** due to its geometry, other impact positions for the falling mass should be agreed upon between the profile manufacturer and the testing laboratory.

NOTE 2 When due to its geometry, the profile tends to tilt sideways at the impact of the falling mass, any tilting should be prevented, by attaching additional stays to the two supports.

NOTE 3 During the test care should be taken to prevent multiple impacts of the falling mass on the test piece.

## 8 Expression of results

The number of test pieces tested and the number of test pieces broken shall be reported for each type of main profile.

## 9 Test report

The test report shall include the following information:

a) reference to this European Standard;

b) the testing laboratory;

c) full identification of the profile;

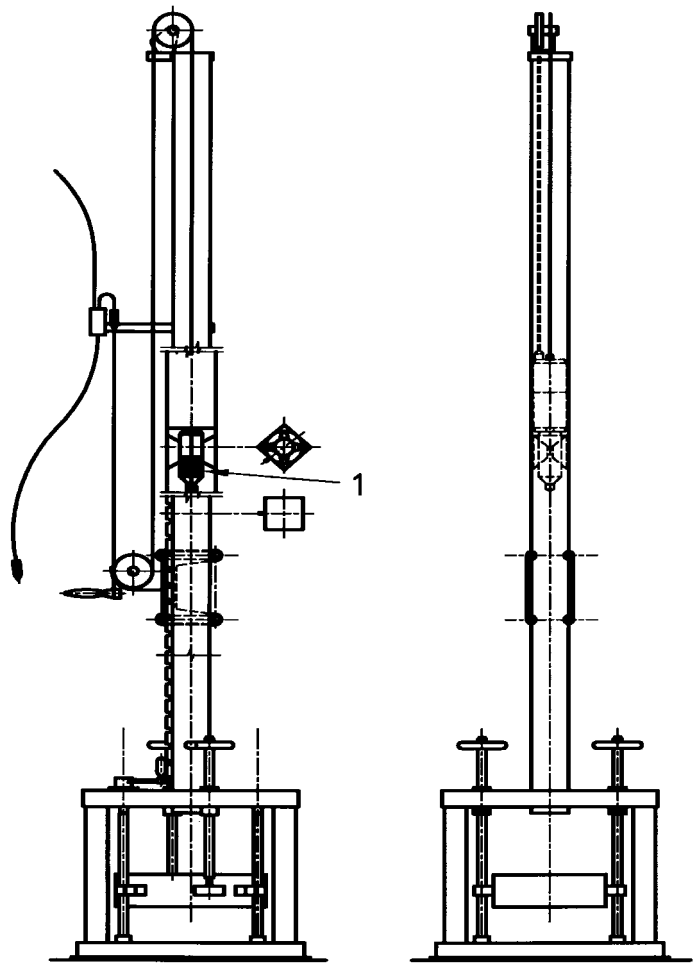
d) date of testing;

e) the height of the falling mass;

f) the number of test pieces tested;

g) the number of test pieces broken;

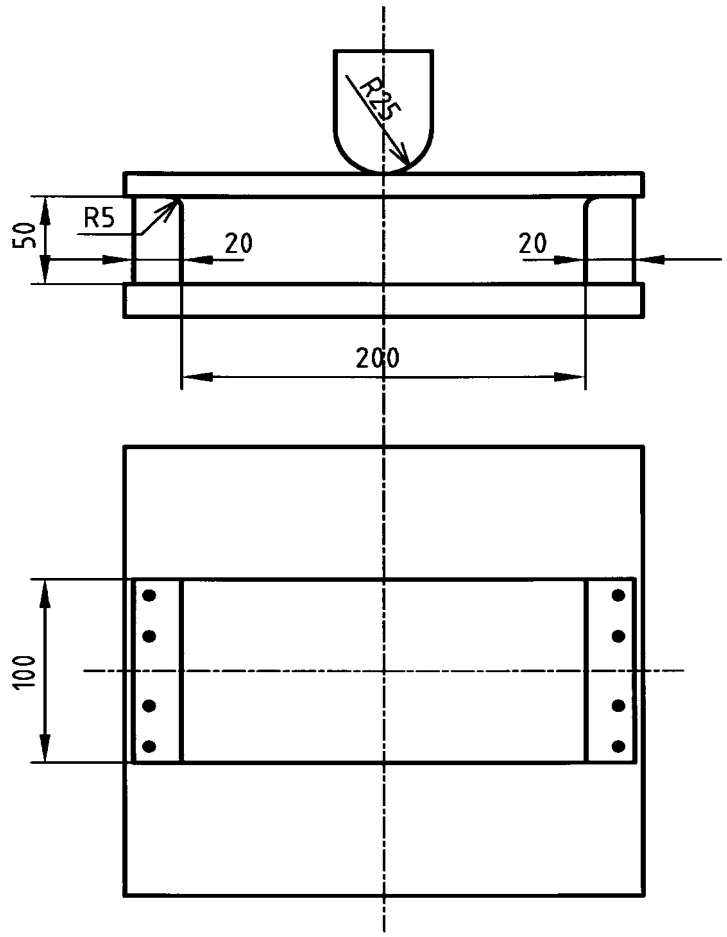
h) all operating details not specified in this European Standard, as well as incidents likely to have influenced the results.




KEY

1 Falling mass

**Figure 1 — Example of impact resistance testing apparatus**




Dimensions in millimetres

**Figure 2 — Example of a supporting device**

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