
Polimerni materiali - Nemehčane poli(vinil klorid) (PVC-P) membrane za vgradne bazene - 1. del: Homogene membrane z nominalno debelino, enako ali večjo od 0,75 mm

Plastics - Plasticized poly(vinyl chloride) (PVC-P) membranes for inground swimming pools - Part 1: Homogenous membranes of nominal thickness equal to or greater than 0,75 mm

Kunststoffe - Membranen aus weichmacherhaltigem Polyvinylchlorid (PVC-P) für erdverlegte Schwimmbäder - Teil 1: Homogene Membranen mit einer Nenndicke von mindestens 0,75 mm

Plastiques - Membranes en poly(chlorure de vinyle) plastifié (PVC-P) pour piscines enterrées - Partie 1: Membranes homogènes d'épaisseur nominale supérieure ou égale à 0,75 mm

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Plastics - Plasticized poly(vinyl chloride) (PVC-P) membranes
for inground swimming pools - Part 1: Homogenous membranes
of nominal thickness equal to or greater than 0,75 mm

Plastiques - Membranes en poly(chlorure de vinyle) plastifié
(PVC-P) pour piscines enterrées - Partie 1: Membranes
homogènes d'épaisseur nominale supérieure ou égale à
0,75 mm

Kunststoffe - Kunststoffbahnen aus weichmacherhaltigem
Polyvinylchlorid (PVC-P) für erdverlegte Schwimmbäder -
Teil 1: Homogene Bahnen mit einer Nenndicke von
mindestens 0,75 mm

This European Standard was approved by CEN on 19 May 2010.

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Foreword

This document (EN 15836-1:2010) has been prepared by Technical Committee CEN/TC 249 "Plastics", the secretariat of which is held by NBN.

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of an identical text or by endorsement, at the latest by December 2010, and conflicting national standards shall be withdrawn at the latest by December 2010.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

EN 15836, *Plastics — Plasticized poly(vinyl chloride) (PVC-P) membranes for inground swimming pools*, consists of the following parts:

- *Part 1: Homogenous membranes of nominal thickness equal to or greater than 0,75 mm* [this standard]
- *Part 2: Reinforced membranes of nominal thickness equal to or greater than 1,5 mm*

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

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EN 15836-1:2010 (E)**1 Scope**

This European Standard specifies the visual, dimensional, mechanical and durability characteristics of plasticized poly(vinyl chloride) (PVC-P) homogenous membranes of nominal thickness greater than or equal to 0,75 mm for use as liners for inground swimming pools. It also specifies the characteristics of the composition of the PVC-P used to produce the membranes.

It applies specifically to homogenous membranes intended for use in swimming pools where the water temperature is less than or equal to 28 °C. If the membrane manufacturer permits a temperature of water continuously maintained above 28 °C, this document also applies.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 438-2:2005, *High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (usually called Laminates) — Part 2: Determination of properties*

EN 495-5, *Flexible sheets for waterproofing — Determination of foldability at low temperature — Part 5: Plastic and rubber sheets for roof waterproofing*

EN 1107-2, *Flexible sheets for waterproofing — Determination of dimensional stability — Part 2: Plastic and rubber sheets for roof waterproofing*

EN 1848-2, *Flexible sheets for waterproofing — Determination of length, width, straightness and flatness — Part 2: Plastic and rubber sheets for roof waterproofing*

EN 1849-2, *Flexible sheets for waterproofing — Determination of thickness and mass per unit area — Part 2: Plastic and rubber sheets*

EN 1850-2, *Flexible sheets for waterproofing — Determination of visible defects — Part 2: Plastic and rubber sheets for roof waterproofing*

EN 12310-2, *Flexible sheets for waterproofing — Determination of resistance to tearing — Part 2: Plastic and rubber sheets for roof waterproofing*

EN 12316-2, *Flexible sheets for waterproofing — Determination of peel resistance of joints — Part 2: Plastic and rubber sheets for roof waterproofing*

EN 12317-2, *Flexible sheets for waterproofing — Determination of shear resistance of joints — Part 2: Plastic and rubber sheets for roof waterproofing*

EN 20105-A02, *Textiles — Tests for colour fastness — Part A02: Grey scale for assessing change in colour (ISO 105-A02:1993)*

EN ISO 62:2008, *Plastics — Determination of water absorption (ISO 62:2008)*

EN ISO 175:2000, *Plastics — Methods of test for the determination of the effects of immersion in liquid chemicals (ISO 175:1999)*

EN ISO 291, *Plastics — Standard atmospheres for conditioning and testing (ISO 291:2008)*

EN ISO 527-1, *Plastics — Determination of tensile properties — Part 1: General principles (ISO 527-1:1993 including Corr 1:1994)*

EN ISO 527-3, *Plastics — Determination of tensile properties — Part 3: Test conditions for films and sheets (ISO 527-3:1995)*

EN ISO 846:1997, *Plastics — Evaluation of the action of microorganisms (ISO 846:1997)*

EN ISO 1183-1, *Plastics — Methods for determining the density of non-cellular plastics — Part 1: Immersion method, liquid pycnometer method and titration method (ISO 1183-1:2004)*

EN ISO 4892-2:2006, *Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps (ISO 4892-2:2006)*

EN ISO 5470-1:1999, *Rubber- or plastics-coated fabrics — Determination of abrasion resistance — Part 1: Taber abrader (ISO 5470-1:1999)*

3 Terms, definitions, symbols and abbreviations

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1

homogenous membrane

sheet made of calendered or extruded, waterproof and gas-pervious, plasticized poly(vinyl chloride) (PVC-P), packaged in rolls, for use in the manufacture of swimming pool liners

3.1.2

liner

removable independent pocket, factory-made from waterproof, flexible, expandable, plasticized poly(vinyl chloride) (PVC-P) membranes

NOTE

The liner contributes to the leaktightness of a swimming pool in the same way as the parts to be sealed and the pipework.

3.1.3

inground swimming pool

permanent installation containing treated water for water activities totally or partially realized under the ground level with a water depth $\geq 0,85$ m or a water volume ≥ 8 m³

3.2 Symbols

E_n thickness of the membrane declared by the manufacturer, in millimetres

l_n width declared by the manufacturer, in metres or millimetres

L_n length of the roll declared by the manufacturer, in metres

ρ_n mass density declared by the manufacturer, in grams per cubic centimetre

3.3 Abbreviations

CaCO₃ calcium carbonate

PVC-P plasticized poly(vinyl chloride)

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4 Sampling and conditioning

4.1 Sampling

The test pieces shall be taken only from rolls of unused membranes.

4.2 Conditioning of test pieces

Unless otherwise specified by the applicable test method, the test pieces used for the determination of the characteristics shall be conditioned before testing for at least 4 h in standard atmosphere 23/50 [(23 ± 2) °C, (50 ± 10) % HR] according to EN ISO 291:2008.

5 PVC-P compound

5.1 Characteristics of the compound

When tested in accordance with the test methods as specified in Table 1 using the parameters indicated, the PVC-P compound shall have characteristics conforming to the requirements given in Table 1.

Table 1 — Characteristics of the compound

Characteristic	Requirement	Test parameters		Test method
Density	$(\rho_n \pm 0,02) \text{ g/cm}^3$ ρ_n : density as declared by the manufacturer	Test temperature	23 °C	EN ISO 1183-1
Water absorption	$\leq 1 \text{ % mass}$	Duration of immersion Test temperature	168 h (23 ± 2) °C	EN ISO 62:2008, Method 1
CaCO ₃ content	$\leq 3 \text{ % mass}$			Annex A

5.2 Heavy metals and other dangerous substances

The PVC-P membranes should conform to all national and international regulations in force.

The PVC-P membranes shall consist of materials that are not substances classified as carcinogen category 1 or carcinogen category 2, mutagen category 1 or mutagen category 2, toxic to reproduction category 1 or toxic to reproduction category 2 (see Directive 76/769/EEC [1]).

The total concentration of lead (Pb), cadmium (Cd), mercury (Hg), hexavalent chromium [Cr(VI)] and arsenic (As) shall not exceed 100 mg/kg.

NOTE This requirement is based on the concentration levels of heavy metals present in packaging as defined in Directive 94/62/EC, Article 11 [2].

For the determination of the total concentration of Pb, Cd, Hg, Cr(VI) and As, the method given in Annex A shall be used.

5.3 Environmental aspects

The PVC-P compounds are recyclable materials that can be treated in a material recovery process intended to save resources while minimising harmful emissions into air, water and soil as well as their impacts on human health.

NOTE A scheme for the characterisation of plastics waste is given in EN 15347 [3] and data for the characterisation of PVC recyclates are given in EN 15346 [4].

6 Visual characteristics

6.1 Appearance

Visible defects in the membrane shall be determined using the method specified in EN 1850-2.

A visual inspection shall be made on a minimum area of the PVC-P membrane that is 2 m long and as wide as the membrane itself. The inspection shall be performed on samples of both sides of the membrane taken at random from a roll laid down, without tension, on a flat, opaque surface.

The membrane shall have no defects visible to the naked eye, such as bubbles, blisters, coloured streaks, pinholes, mottles, folds or ripples. However air inclusion and mottles cannot be completely avoided in PVC-P sheet.

The appearance shall be uniform, as even as that of the reference test piece, irrespective of the area examined. The surface condition (smooth or embossed) and the colour reflection shall be in conformance with those of the reference test piece.

Non-printed membranes shall have an even surface finish.

In the case of a printed membrane, the imprint shall be even with no smudging. No ink shall be transferred to the non-printed side.

An embossed membrane shall have a regular appearance with an even pattern.

The pigments shall be homogeneously and evenly distributed throughout the material. Slight differences in colour, related to composition and manufacture shall generally be permissible.

The rolls of membranes shall be suitably and sufficiently tight.

The result of the visual examination shall be expressed as "appearance conform" or "appearance non-conform". In the latter case, the defects noted shall be listed.

6.2 Colour (plain coloured membranes)

The colour of the unused (new) membrane, as delivered, shall be the same as that of the reference sample as agreed between the supplier and the customer.

The contrast or visual differences between the unused membrane and the reference sample shall be assessed in accordance with EN 20105-A02.

NOTE The trichromatic coordinates L^* , a^* and b^* determined according to ISO 7724-1 [5], ISO 7724-2 [6] and ISO 7724-3 [7] can be used to assess the colour of the membrane, as well as any differences in colour between the membrane and the reference sample. However, permissible limits cannot be defined in this document.

6.3 Abrasion resistance (printed and/or coated membranes)

6.3.1 Test method

In the case of printed and/or coated PVC-P membranes, the abrasion resistance on the pattern shall be assessed by means of the method specified in EN ISO 5470-1, with the following test conditions: