



SLOVENSKI STANDARD

oSIST prEN 17271:2018

01-oktober-2018

Polimerni materiali - Profili na osnovi polivinilklorida (PVC) - Določanje trdnosti profilov, laminiranih s folijami

Plastics - Poly(vinyl chloride) (PVC) based profiles - Determination of the peel strength of profiles laminated with foils

Kunststoffe - Profile auf Basis von Polyvinylchlorid (PVC) - Bestimmung der Schälfestigkeit von mit Folien kaschierten Profilen

Plastiques - Profilés à base de poly(chlorure de vinyle) (PVC) - Détermination de la résistance au pelage de profilés avec des films plaxés

Ta slovenski standard je istoveten z: prEN 17271

ICS:

83.080.20	Plastomeri	Thermoplastic materials
83.140.99	Drugi izdelki iz gume in polimernih materialov	Other rubber and plastics products

oSIST prEN 17271:2018

en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 17271

August 2018

ICS 83.080.20; 83.140.99

English Version

**Plastics - Poly(vinyl chloride) (PVC) based profiles -
Determination of the peel strength of profiles laminated
with foils**

Plastiques - Profilés à base de poly(chlorure de vinyle)
(PVC) - Détermination de la résistance au pelage de
profilés avec des feuilles plaxées

Kunststoffe - Profile auf Basis von Polyvinylchlorid
(PVC) - Bestimmung der Schälfestigkeit von mit Folien
kaschierten Profilen

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

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European foreword

This document (prEN 17271:2018) has been prepared by Technical Committee CEN/TC 249 “Plastics”, the secretariat of which is held by NBN.

This document is currently submitted to the CEN Enquiry.

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prEN 17271:2018 (E)

1 Scope

This document specifies a test method for determining the peel strength of poly(vinyl chloride) (PVC) based profiles laminated with foils.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 ISO 7500-1, *Metallic materials — Calibration and verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Calibration and verification of the force-measuring system (ISO 7500-1)*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 profile

product produced by extrusion

3.2 laminated profile

profile covered with a foil by means of adhesive

3.3 base profile

profile without covering layer

3.4 assembly

<adhesives> group of materials or parts, including adhesive, which have been placed together for bonding or which have been bonded together

[SOURCE: EN ISO 10365:1995 [1], 3.1]

3.5 peel off

separation of foil from the base profile which results in adhesion failure (3.6) or cohesion failure (3.7)

Note 1 to entry: Foil break is not considered as peel off.

3.6 adhesion failure

break of an adhesive bond in which the separation appears visually to be at the adhesive/adherend interface

Note 1 to entry: See Figure 1.

[SOURCE: EN ISO 10365:1995 [1], 3.2, modified — Note 1 to entry has been added]

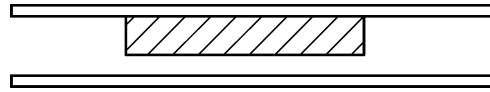


Figure 1 — Adhesion failure

3.7 cohesion failure

break of a bonded assembly in which the separation appears visually to be in the adhesive or the adherend

Note 1 to entry: See Figure 2.

[SOURCE: EN ISO 10365:1995[1], 3.3, modified — Note 1 to entry has been added]

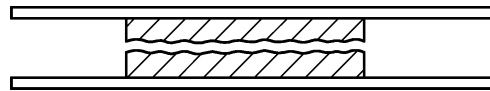


Figure 2 — Cohesion failure

3.8 peel strength

force per unit width necessary to bring an adhesive joint to the point of failure or to maintain a rate of failure by means of a stress applied in the peel mode

Note 1 to entry: The peel strength can be expressed as force per unit peel width.

[SOURCE: EN ISO 472:2013 [2], 2.683]

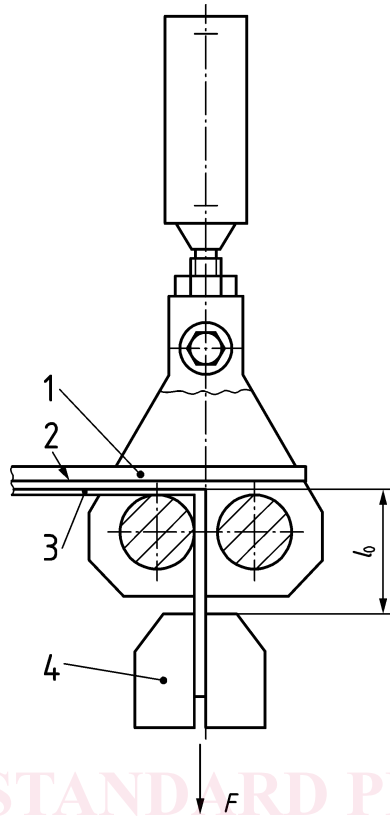
4 Principle

The peel strength of a profile laminated with a foil is determined by measuring the peel force perpendicularly to the surface of the profile, under specified conditions.

5 Apparatus and materials

5.1 Tensile testing machine, conforming to EN ISO 7500-1, class 1.

5.2 Peel strength device, capable of applying a force to the free end of a foil separated from a laminated profile, using a tensile testing machine, comprising two rolls as shown in Figure 3, or comparable device.

**Key**

- 1 profile
- 2 adhesive
- 3 foil
- 4 clamp
- F force

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Figure 3 — Clamping of (90°-) peel test specimens

The length of the free path between the laminated sample and the clamping jaws (clamping distance l_0) shall be between 25 mm and 30 mm.

5.3 Masking tape, olefin- or PVC-based self-adhesive tape or siliconised-paper having a thickness of $\leq 80 \mu\text{m}$ and a width of $\geq 50 \text{ mm}$. Other materials may be used if they do not influence the test results, the masking tape shall not attach to the laminated foil.

In case that the masking tape cannot be removed from the laminated foil, due to the glue, this shall be mentioned in the test report.

5.4 Cutting ruler (template), at least 100 mm long.

5.5 Cutter/blade, sharp enough to provide a clean cut in order to protect against fraying the edge of the foil.

6 Preparation of the test specimens

6.1 Test specimens from factory production

Cut off the laminated surface of the laminated profile or use the laminated profile in full size.

Cut the separated laminated surface or laminated profile into sections of at least 100 mm long and 50 mm wide.

Place a template that is at least 100 mm × (20 ± 1) mm lengthways on the laminated surface in the middle of these sections.

Using a blade cut through the laminated foil along both longitudinal edges of the template to obtain specimens with a width of (20 ± 1) mm.

From the rear, mill the PVC profile wall in the middle of the specimen and across its longitudinal axis to a residual thickness of 0,1 mm – 0,2 mm; be careful not to cut into the PVC too deeply so as to avoid damaging the foil on the adhesive side.

Then mill away the entire back profile wall of the specimen in the longitudinal direction along the two lines at a distance of 20 mm from one end of the specimen as far as the transverse line.

Break off the approximately 0,1 mm to 0,2 mm thick material by bending the milled strip of at least 50 mm × 20 mm in the direction of the specimen.

Prepare five test specimens according to method described above.

6.2 Other test specimens

Before lamination a piece of masking tape of at least 50 mm width is applied on the profile, e.g. each 200 mm; as indicated in Figure 4 and then the profile is laminated in the traditional way.

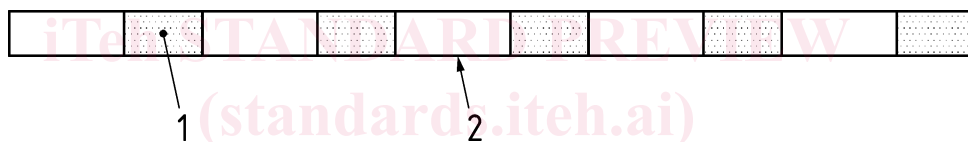


Figure 4 — Example of masking tape

Cut off the laminated surface of the laminated profile or use the laminated profile in full size.

Cut the separated laminated surface or laminated profile into sections of at least 150 mm long.

Place a template that is at least 100 mm × (20 ± 1) mm lengthways on the laminated surface in the middle of these sections.

Using a blade cut through the laminated foil along both longitudinal edges of the template to obtain specimens with a width of (20 ± 1) mm.

Prepare five test specimens according to method described above.

7 Conditioning

Condition the test specimens at (23 ± 5) °C for at least two hours before testing.

The test specimens shall not be tested within 72 h after lamination. During this time period the temperature shall be at least 18 °C.

8 Test procedure

Fix the peel device (5.2) into one of the grips of the tensile testing machine (5.1) and place the test specimen in such a way that the free end of the foil is between the rolls. Clamp the free end in the second grip of the test machine (see Figure 3) ensuring that the foil is not folded or bent, nor stretched (tension-free mounting). The test can be performed pulling upward or downwards.

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The adhesion of the foil is determined by a peel test perpendicular to the surface of the profile (see Figure 1) with a pull-off speed of 10 ± 1 mm/min at (23 ± 2) °C.

Set the test path to 55 mm (crosshead distance) and cut off the first 5 mm. This is not applicable in case of foil break within the first 5 mm where an initial peak occurs.

After positioning the foil between the clamps the value of the force (N) shall be reset to "0" (tension-free mounting of the foil).

After passing a pre-force of 3 N the test path shall start (= 0 mm).

The test is stopped when the overall peel off distance or stretching of 50 mm is reached or when the foil breaks.

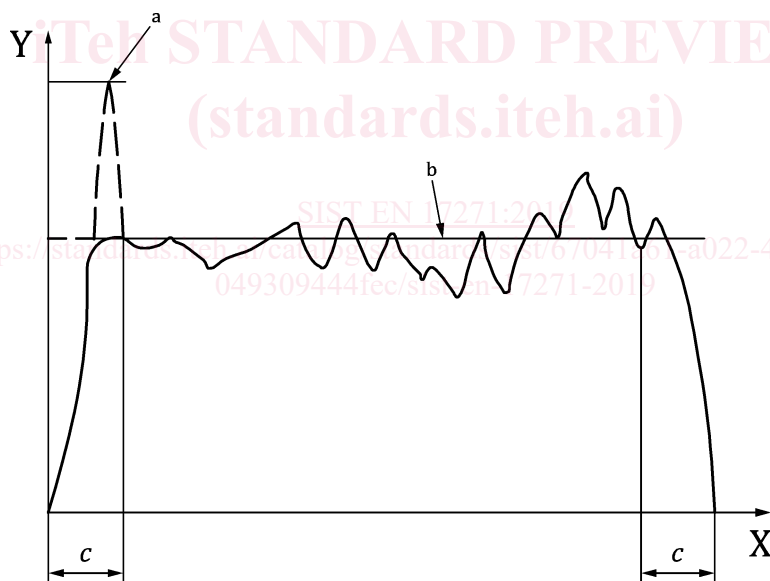
9 Evaluation and expression of results

9.1 Record the peel strength for each test specimen as follows and record the type of failure [adhesion failure (3.6) or cohesion failure (3.7)] when foil break occurs.

As a result of the test, one of the following graphs can be seen.

a) Peel off

In case of peel off a graph as shown in Figure 5 is usually obtained.



Key

- X peel length of bond, in millimetres
- Y peel force, in Newton
- a initial peak value of peel force
- b average peel force value after initial peak (if any)
- c first and last peak are ignored if applicable

Figure 5 — Determination of average peel force in case of peel off

In case an initial peak (a) or a peak at the end (c) occur, cut off the first and the last peak. The average value of the peel force of the remaining part of the graph can be determined by means of appropriate software (by means of an integrator) or by means of a graphical method.