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ILNAS-EN 12814-4:2018

Testing of welded joints of thermoplastics semi-finished products - Part 4: Peel test

Prüfen von Schweißverbindungen aus thermoplastischen Kunststoffen - Teil 4: Schälversuch

Essai des assemblages soudés sur produits semi-finis en thermoplastiques - Partie 4 : Essai de pelage

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National Foreword

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EUROPEAN STANDARD
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English Version

Testing of welded joints of thermoplastics semi-finished products - Part 4: Peel test

Essai des assemblages soudés sur produits semi-finis en thermoplastiques - Partie 4 : Essai de pelage

Prüfen von Schweißverbindungen aus thermoplastischen Kunststoffen - Teil 4: Schälversuch

This European Standard was approved by CEN on 10 December 2017.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Contents

Page

European foreword

This document (EN 12814-4:2018) 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of an identical text or by endorsement, at the latest by October 2018, and conflicting national standards shall be withdrawn at the latest by October 2018.

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.

This document supersedes EN 12814-4:2001.

In comparison with the previous edition, the following technical modifications have been made:

— the procedures in the Clauses "T-peel test", "Decohesion test", "Crush test" have been detailed with specifications and consequently with the reference figures.

EN 12814, *Testing of welded joints of thermoplastics semi-finished products*, is composed with the following parts:

— *Part 1: Bend test;*

— *Part 2: Tensile test;*

— *Part 3: Tensile creep test;*

— *Part 4: Peel test;*

— *Part 5: Macroscopic examination;*

— *Part 6: Low temperature tensile test;*

— *Part 7: Tensile test with waisted test specimens;*

— *Part 8: Requirements.*

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

1 Scope

This document specifies the dimensions, the method of sampling and the preparation of the test specimens, and also the conditions for performing the peel test perpendicular to the weld in order to determine the peel resistance and the failure behaviour.

A peel test can be used in conjunction with other tests (e.g. tensile creep, macroscopic examination...) to assess the performance of welded assemblies, made from thermoplastics materials.

Peel tests are applicable to overlap welded assemblies made from thermoplastics materials.

The T-peel test as defined in Clause 5 will be used only for assessing welded sheet assemblies. This test is not applicable to welded test pieces containing sheets of different nominal thickness.

The decohesion test as defined in Clause 6 will be used only for assessing electrofusion joints with nominal thickness of pipe/fitting greater than 10 mm.

For socket fusion and for electrofusion socket joints with nominal outside diameter less than or equal to 90 mm, a crush test will be used, as defined in Clause 7.

The crush test can also be used for electrofusion joints with outside diameters greater than 90 mm.

The crush test for electrofusion saddle joints will be performed in accordance with ISO 13955 [1].

NOTE A decohesion test is also defined in ISO 13954 [2].

The tests defined in this standard are not intended to be used for assessment and/or qualification of thermoplastic fittings that already have their own requirements, e.g. polyethylene fittings according to EN 1555-3 [3] and EN 12201-3 [4].

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.

ISO 5893, *Rubber and plastics test equipment — Tensile, flexural and compression types (constant rate of traverse) — Specification*

3 Terms and definitions

For the purposes of this document, the following term and definition 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
peel resistance
P_l
arithmetic mean of the force values divided by the width of the test specimen (only relevant for T-peel test)

4 Symbols and designations

For the purposes of this document, the symbols and designations given in Table 1 apply.

Table 1 — Test specimen designations

Symbols and abbreviations	Designations	Units
a_n	Nominal thickness of test piece	mm
b	Width of the test specimen	mm
c	Maximum width of the air channel (if applicable)	mm
C_c	Percentage of brittle failure	%
d_2	Maximum brittle-fracture length measure	mm
d_n	Nominal outside diameter of pipe	mm
F_w	Maximum force measured during the test	N
L_c	Clamped length of test specimen ligament	mm
L_d	Length of fracture in the fusion plane	mm
L_i	Free length of test specimen	mm
L_w [a]	Maximum width of the weld of the test specimen	mm
P_l	Peel resistance	N/mm
y	Fusion zone length of electrofusion socket	mm

[a] For welds containing an air channel, L_w shall be taken as the width of the whole weld minus the width of the channel (c).

5 T-peel test

5.1 Principle of the test

The test consists of peeling a test specimen at a constant rate of displacement until it fractures, peels or yields.

5.2 Test specimens

5.2.1 Dimensions of test specimens

The test specimen is shown in Figure 1 and the dimensions are given in Table 2.

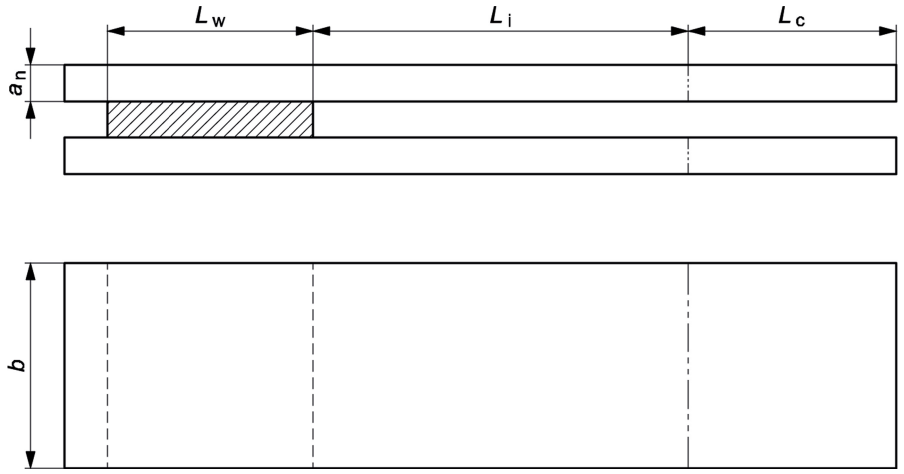

Figure 1 — T-peel test specimen

The value of L_c shall be greater than, or equal to, b.

Table 2 — Dimensions of test specimen

Dimensions in millimetres

a_n	b [a]	L_i
$a_n \leq 1{,}5$	15	≥ 15
$1{,}5 < a_n \leq 3$	15	≥ 10 x a_n
$3 < a_n \leq 5$	25	≥ 10 x a_n
$a_n > 5$	5 x a_n	≥ 10 x a_n
[a] For reinforced materials, b shall be 50 mm.		

The tolerance for b shall be ± 0,5 mm.

5.2.2 Preparation of test specimens

The time between the end of the welding operations and the start of machining operations, shall be at least 8 h.

The welded test specimens shall be cut perpendicular to the welded joint.

The test specimens shall be cut with parallel sides as shown in Figure 1.

During cutting, heating of the test specimen should be avoided.

Cutting of the test specimen shall not produce notches.

After cutting, a visual examination of the weld should be carried out and any imperfections, as defined in EN 14728 [5], recorded.

Each test specimen shall be marked so that its original position in the test piece can be identified.

5.2.3 Number of test specimens

At least 5 specimens shall be tested for each welded test piece unless otherwise specified in the relevant application standard.