SLOVENSKI STANDARD
SIST EN 546-4:2007

01-marec-2007

Nadomeġļa:
SIST EN 546-4:1998

Aluminij in aluminijeve zlitine - Folija - 4. del: Zahtevane posebne lastnosti

Aluminium and aluminium alloys - Foil - Part 4: Special property requirements

Aluminium und Aluminiumlegierungen - Folien - Teil 4: Besondere Eigenschaftsanforderungen

Aluminium et alliages d'aluminium - Feuille mince - Partie 4 : Exigences de propriétés particulieres

Ta slovenski standard je istoveten z: EN 546-4:2006

ICS:

77.150.10 Aluminijski izdelki Aluminium products

SIST EN 546-4:2007 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 546-4

December 2006

ICS 77.150.10

Supersedes EN 546-4:1997

English Version

Aluminium and aluminium alloys - Foil - Part 4: Special property requirements

Aluminium et alliages d'aluminium - Feuille mince - Partie 4 : Exigences de propriétés particulières

Aluminium und Aluminiumlegierungen - Folien - Teil 4: Besondere Eigenschaftsanforderungen

This European Standard was approved by CEN on 25 November 2006.

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.

CEN members are the national standards bodies of Austria, Belgium, 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 United Kingdom.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 546-4:2006: E

Contents

Page

Foreword

This document (EN 546-4:2006) has been prepared by Technical Committee CEN/TC 132 “Aluminium and aluminium alloys”, the secretariat of which is held by AFNOR.

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 June 2007, and conflicting national standards shall be withdrawn at the latest by June 2007.

This document supersedes EN 546-4:1997.

Within its programme of work, Technical Committee CEN/TC 132 entrusted CEN/TC 132/WG 6 "Foil and finstock" to revise EN 546-4:1997.

The following modifications have been made:

— Clause 3: reference to EN 12258-1:1998 has been added, the definition of perforation has been deleted;

— Clause 4: Table 1: limitation of pinholes (6 μm to 20 μm) detection range for light gauge converter double roller (6 μm to 70 μm) has been deleted;

— Clause 6: addition of test by use of Cotton Wool Pad (6.3.4);

— Figure 3 second Figure has been added.

EN 546 comprises the following parts under the general title "*Aluminium and aluminium alloys - Foil*":

— *Part 1: Technical conditions for inspection and delivery*

— *Part 2: Mechanical properties*

— *Part 3: Tolerances on dimensions*

— *Part 4: Special property requirements*

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

CEN/TC 132 affirms it is its policy that in the case when a patentee refuses to grant licenses on standardised standard products under reasonable and not discriminatory conditions, then this product shall be removed from the corresponding standard.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, 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 United Kingdom.

1 Scope

This document specifies the requirements for special properties of wrought aluminium and wrought aluminium alloy foil and their tests. It applies to flat rolled products.

It does not apply to lacquered, painted, embossed or laminated products.

The technical conditions for inspection and delivery of foil are specified in EN 546-1.

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 12258-1:1998, *Aluminium and aluminium alloys — Terms and definitions — Part 1: General terms*

EN ISO 20482, *Metallic materials — Sheet and strip — Erichsen cupping test (ISO 20482:2003)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12258-1:1998 and the following apply.

3.1
pinholes (foil)
randomly distributed voids in foil of gauge 6 μm to 20 μm of normally round or oval shape with a maximum diameter < 0,2 mm

3.2
roll holes (foil)
voids with a maximum diameter > 0,2 mm which occur at regular intervals throughout the rolled coil length

4 Application of special property testing

The applicability of tests for special properties of foil products is given in Table 1.

The tests shall only be carried out when agreed between supplier and purchaser and stated on the order.

Table 1 — Applicability of special property tests to product group

Product group and gauge range	Porosity		Wettability	Stickiness	Burst strength	Erichsen cupping test
	Pinholes	Roll holes				
Light gauge converter double rolled (6 μm to 70 μm)	×	×	×	× (6 μm to 50 μm only)	NA	NA
Heavy gauge converter single rolled (35 μm to 200 μm)	NA	×	×	× (35 μm to 50 μm only)	NA	NA
Consumer foil (10 μm to 24 μm)	NA	NA	×	×	×	NA
Container foil single rolled (35 μm to 200 μm)	NA	NA	NA	NA	NA	×
[x] = test applicable NA = not applicable						

5 Porosity

5.1 Test principle

As rolled foil is examined by using a light box in an area of low illumination, porosity is seen as light points against the dark foil surface.

The light box, consists of translucent glass, lit from below by a luminous source giving an even illumination of 1 000 lux to 1 500 lux. The size of the light box is determined by the dimension of the largest foil sample to be examined.

5.2 Test method

Dim the light in the room in which the test is carried out to 20 lux to 50 lux.

Place the foil test sample on the light box with its matt surface facing the observer. Mask the area of the light box not covered by the test sample. Observe the test sample from a distance of approximately 0,5 m.

The test area shall be selected by one of the following methods:

a) **worst area selection**: a sample of 1 dm^2 is selected from the area exhibiting the highest porosity (worst field);

b) **random selection**: a sample of 1 m^2 is selected at random.

Count the number of pinholes or roll holes in the sample. Ignore pinholes less than 0,020 mm in diameter.

For the worst area selection sample, count the number of voids in 1 dm^2.For the random selection sample, count the number of voids in 1 m^2.

Report separately the number of pinholes and roll holes per unit area.

5.3 Acceptance values

The maximum acceptable number of pinholes and roll holes shall be agreed between supplier and purchaser.

5.4 Sampling and frequency of testing

One full width test sample at correct nominal gauge measuring approximately 1 m in length along the rolling direction shall be taken and tested from every three rolled coils.

6 Wettability

6.1 Test principle

The test shall apply to aluminium foil in the gauge range 6 μm to 200 μm.

The surface of the fully annealed foil is assessed according to its ability to be wetted by liquids applied under clearly defined conditions.

6.2 General test conditions

6.2.1 General

Carry out the tests at ambient temperature. Remove the outside wraps to reduce the coil build-up by a minimum of 3 mm in order to obtain a representative sample before performing the test. Usually the test is carried out on the matt side of the foil. Precautions shall be taken to prevent the liquids from accidentally coming into contact with edge of reel.

Do not repeat tests on the same area of sample.

6.2.2 Equipment used

Four techniques are recommended:

1) the droplet bottle, to be used for depositing drops of liquid on the surface to be tested (see 6.3.1);

2) a spray bottle, to apply a fine spray mist across the width of the metal surface to be tested (see 6.3.2);

3) a spray bottle, to enable a continuous stream of liquid to be applied to the surface (see 6.3.3);

4) cotton wool soaked in the appropriate liquid to be used for smearing the surface under test (see 6.3.4).

   The cotton wool shall be clean.

   This test should be used as a referee method.

Other tests can be used after agreement between supplier and customer.

6.2.3 Liquid used

The following liquids shall be used for all tests:

— distilled water; or

— distilled water mixed with industrial ethyl-alcohol to a concentration of 10 % or 20 % by volume.

6.3 Test procedures

6.3.1 Test by droplet

6.3.1.1 Test method

Use a droplet bottle to drop 40 mg to 80 mg drops of liquid onto the horizontal metal surface at a rate of one drop every 5 cm to 10 cm across the width of the web. Tilt the surface between 40°and 60°(see Figure 1). Determine the wettability index from the tail left by the movement of the droplets across the surface.

Figure 1 — Test by droplet