SLOVENSKI STANDARD
SIST EN 546-4:1998

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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

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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

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CEN

European Committee for Standardization
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Foreword

This European Standard 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of an identical text or by endorsement, at the latest by January 1998, and conflicting national standards shall be withdrawn at the latest by January 1998.

This standard is part of a set of four standards. The other standards deal with :

EN 546-1	Auminium and aluminium alloys - Foil - Part 1 : Technical conditions for inspection and delivery
EN 546-2	Auminium and aluminium alloys - Foil - Part 2 : Mechanical properties
EN 546-3	Auminium and aluminium alloys - Foil - Part 3 : Tolerances on dimensions

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

1 Scope

This part of EN 546 specifies the requirements for special properties of wrought aluminium and aluminium alloy foil and their tests. It applies to flat rolled products. It does not apply to lacquered, painted, embossed or laminated products. The chemical composition of these alloys is specified in EN 573-3.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

EN 546-1		Aluminium and aluminium alloy - Foil - Part 1 : Technical conditions for inspection and delivery
EN 573-3		Aluminium and aluminium alloys - Chemical composition and form of wrought products - Part 3 : Chemical composition
ISO 8490	1986	Metallic materials - Sheet and strip - Modified Erichsen cupping test

3 Definitions

For the purposes of this part of this standard the definitions of EN 546-1 and the following definitions shall apply :

3.1 pinholes

Randomly distributed voids in foil of gauge 6 μm to 20 μm of normally round or oval shape with a maximum dimension up to and including 0,20 mm.

3.2 perforations

Voids with a maximum dimension of more than 0,20 mm which occur arbitrarily throughout the rolled coil length.

3.3 roll holes

Voids with a maximum dimension of more than 0,20 mm which recur 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)	x (6 µm to 20 µm only)	x	x	x (6 µm to 50 µm only)	NA	NA
Heavy gauge converter single rolled (35 µm to 200 µm)	NA	x	x	x (35 µm to 50 µm only)	NA	NA
Consumer foil (10 µm to 24 µm)	NA	NA	x	x	x	NA
Container foil single rolled (35 µm to 200 µm)	NA	NA	NA	NA	NA	x
x = test applicable NA = not applicable						

5 Porosity

5.1 Principle of test

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 procedure

Dim the light in the room in which the test is carried out to between 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) **Random selection** : A sample of 1 m^2 is selected at random ;

b) **Worst area selection** : A sample of 1 dm^2 is selected from the area exhibiting the highest porosity (worst field).

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

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

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

5.3 Acceptance values

The maximum acceptable number of pinholes, perforations 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 Principle of test

The test shall apply to aluminium foil in the gauge range from 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

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. Perform the test on the matt side of the foil, where relevant.

The following liquids shall be used :

- distilled water or ;

- distilled water mixed with an industrial alcohol to a concentration of 20 % by volume.

Do not repeat tests on the same area of sample.

6.3 Test methods

6.3.1 Test by droplet

6.3.1.1 Test procedure

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.

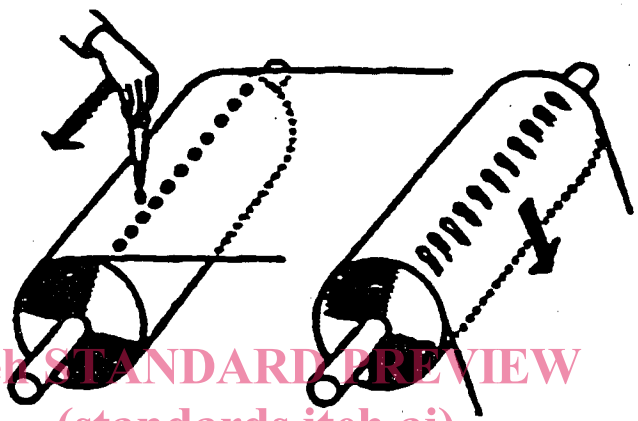

Figure 1

6.3.1.2 Acceptance criteria

If the test is performed with distilled water, the wettability index is shown by the shape of the trace given on the surface taken from the worst area of the foil. The wettability indices are defined from A to E in figure 2. Wettability indices included between A to C are acceptable.

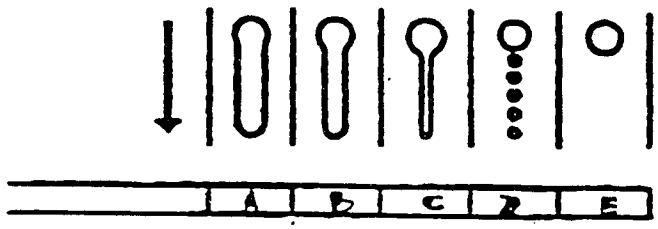

Figure 2