



SLOVENSKI STANDARD

SIST ENV 1967:1998

01-februar-1998

Konstruksijska lepila - Ocena učinkovitosti površinske obdelave aluminija s preskusom mokrega luščenja in metodo plavajočega valja

Structural adhesives - Evaluation of the effectiveness of surface treatment techniques for aluminium using a wet peel test in association with the floating roller method

Strukturklebstoffe - Beurteilung der Wirksamkeit von Oberflächenbehandlungstechniken für Aluminium unter Anwendung der Naßschälprüfung in Verbindung mit dem Floating-Roller-Verfahren

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Adhésifs structuraux - Evaluation de l'efficacité des techniques de traitement de surface pour l'aluminium par essai de pelage humide associé à la méthode des galets mobiles

Ta slovenski standard je istoveten z: **ENV 1967:1995**

ICS:

| | | |
|-----------|---------------------------------|--------------------------------|
| 25.220.20 | Površinska obdelava | Surface treatment |
| 77.120.10 | Aluminij in aluminijeve zlitine | Aluminium and aluminium alloys |
| 83.180 | Lepila | Adhesives |

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EUROPEAN PRESTANDARD

ENV 1967

PRÉNORME EUROPÉENNE

EUROPÄISCHE VORNORM

June 1995

ICS 25.220.20; 77.120.10; 83.180

Descriptors: adhesives, surface treatment, aluminium, quality, effectiveness, peel tests

English version

**Structural adhesives - Evaluation of the
effectiveness of surface treatment techniques for
aluminium using a wet peel test in association
with the floating roller method**

Adhésifs structuraux - Evaluation de
l'efficacité des techniques de traitement de
surface pour l'aluminium par essai de pelage
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Strukturklebstoffe - Beurteilung der
Wirksamkeit von Oberflächenbehandlungstechniken
für Aluminium unter Anwendung der
Naßschälprüfung in Verbindung mit dem
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REPUBLICA SLOVENIJA
MINISTRSTVO ZA ZNANOST IN TEHNOLOGIJO
Urad RS za standardizacijo in meroslovje
LJUBLJANA

SIST..... ENV 1967

PREVZET PO METODI RAZGLASITVE

-02- 1998

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Ref. No. ENV 1967:1995 E

Foreword

This European Prestandard has been prepared by the Technical Committee CEN/TC 193 "Adhesives", of which the secretariat is held by AFNOR.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to announce this European Prestandard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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0 Introduction

This test has been developed to assess pretreatments for aluminium and is intended for laboratory evaluations. The object was to find/develop a rapid test possessing high sensitivity which could differentiate between pickling pretreatments, complete CAA/PAA and incomplete CAA/PAA processes. The application of water containing a wetting agent changes the mode of failure from the cohesive form, usually found in dry joints, into quasi-adhesive failure. This latter being associated with a corresponding reduction in the resistance to peeling if the surfaces were not pretreated according to the complete CAA or PAA process. The failure mechanisms in the boundary layer zone initiated by this test are mainly explained by the diffusion of water. The wetting agent essentially improves the surface wetting.

This test is considered to be unsuitable for long term durability prediction. It is expected that if this severe test is applied to less stable joints it will cause mainly adhesive failure. As a consequence of this the test loses its ability to differentiate effectively in such circumstances. However, the applicability to other materials and surface pretreatment methods has not been investigated in detail.

In order to define the precision of this test, interlaboratory data will have to be obtained.

1 Scope

The object of this method is the evaluation of the quality of a surface pretreatment used in the preparation of aluminium or its alloys.

This European Standard specifies a floating roller method for the determination of the peel resistance of high strength adhesive bonds between one rigid metallic adherend and one flexible metallic adherend when tested under specified conditions of preparation and testing.

NOTE : The use of the floating roller produces more constant numerical data than other peel methods, but it should not be expected that the flexible metallic adherend will conform to the surface of the roller.

2 Normative references

This European Prestandard 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 Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

| | | |
|-----------------------|------|---|
| EN 1464 ¹⁾ | 199X | Adhesives - Determination of peel resistance of high strength adhesive bonds - Floating roller method |
|-----------------------|------|---|

¹⁾ In course of publication.

| | | |
|------------------------|------|---|
| EN 29142 | 1993 | Adhesives - Guide to the selection of standard laboratory ageing conditions for testing bonded joints |
| ISO 291 | 1977 | Plastics - Standard atmospheres for conditioning and testing |
| ISO 4588 ²⁾ | 1989 | Adhesives - Preparation of metal surfaces for adhesive bonding |
| ISO 10365 | 1992 | Adhesives - Designation of main failure patterns |

3 Definitions

For the purposes of this European Prestandard, the following definitions apply :

3.1 peel resistance

The average force per unit test specimen width, measured along the bond line, required to separate progressively the two metallic members of a bonded test specimen under specified conditions of test. It is expressed in kilo Newtons per metre of width.

3.2 wet-peel resistance

Peel resistance after application of water containing a wetting agent.

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4 Apparatus

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4.1 Tensile testing machine, capable of maintaining a pre-determined constant crosshead rate to be reported in the test report (preferred rate 100 mm/min). It shall be provided with a suitable self-aligning grip to hold the test specimen. The jaws of this grip shall firmly engage the outer 25 mm of the end of the flexible adherend. The grip and attachments shall be so constructed that they will move into alignment with the test specimen as soon as the force is applied, so that the flexible member of the test specimen will coincide with the direction of the applied pull through the centre line of the grip assembly. The machine shall be autographic, giving a chart that can be read in terms of millimetres of crosshead movement as one co-ordinate and applied force as the other co-ordinate.

All equipment shall be calibrated regularly. It is recommended that equipment should be essentially free of inertial forces during use.

The machine shall permit the measurement and recording of the applied force with an accuracy of $\pm 2\%$.

²⁾ Under revision.

4.2 Peel test fixture, for supporting the test specimen conforming to EN 1464 (see figure 1). The fixture shall be attached to one of the cross-arms of the testing machine (4.1). The 25 mm diameter rollers on the test fixture shall roll freely. The angle determined by the rollers and the use of dual roller bearings are critical and the rollers shall therefore be carefully maintained.

Dimensions in millimeters

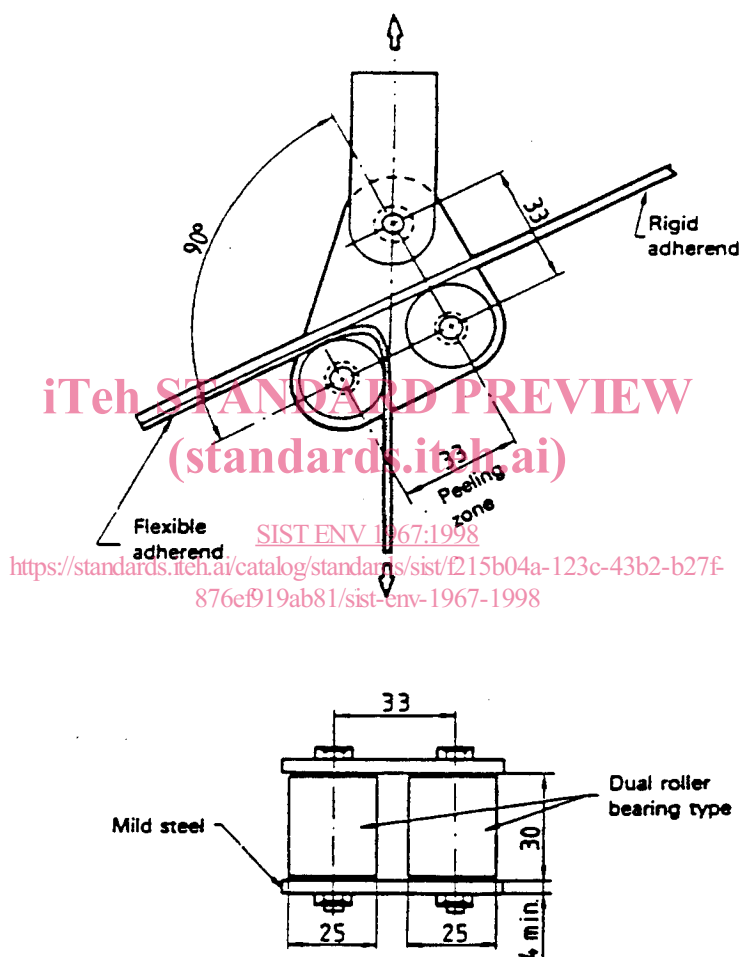


Figure 1 : Peel test fixture for supporting test specimen

5 Test specimens

5.1 Test specimens of the dimensions shown in figure 2 may be prepared individually or cut from bonded panels. Laminated test panels, or individual test specimens, shall consist of two adherends properly prepared and bonded together according to EN 1464.

Dimensions in millimeters

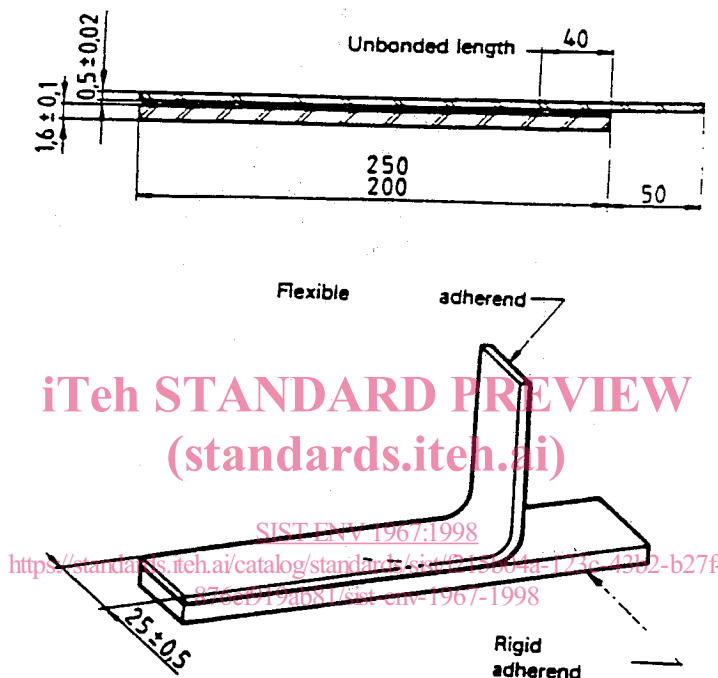


Figure 2 : Test specimen

5.2 Surface treatment shall be such as to obtain optimum strength in the bonded assembly. The preparation of the surface shall be in accordance with either the adhesive manufacturer's instructions or ISO 4588 and shall be stated in the test report.

The adhesive shall be applied in accordance with the manufacturer's recommendations to obtain an optimum bond with a minimum of variations.

NOTE : Direct comparison of different adhesives can be made only when test specimen construction, adherend materials and dimensions, and test conditions are identical.

5.3 The thickness of the flexible adherend shall be $0,5 \text{ mm} \pm 0,2 \text{ mm}$ and that of the rigid adherend shall be $1,6 \text{ mm} \pm 0,1 \text{ mm}$.

5.4 Test specimens shall be cut from the bonded panels (see figure 2) by a means that is not deleterious to the bond.

The width shall be 25 mm.

NOTE : The method of cutting the test specimens is dependent upon the adherend and adhesive compositions and the tolerance specified in figure 2. Milling and band-sawing are two methods commonly used for this purpose.

5.5 The unbonded end of the flexible adherend shall be bent perpendicular to the rigid adherend for clamping in the grip of the testing machine.

5.6 The number of specimens to be tested shall be as specified in the material specification or, if not so specified, shall be not less than five.

6 Conditioning and testing atmosphere

The test specimens shall be conditioned and tested in one of the standard laboratory atmospheres specified in ISO 291.

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7 Procedure

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7.1 Insert the test specimen into the peel test fixture (4.2) as shown in figure 1, with the unbonded end of the flexible adherend gripped in the jaw of the testing machine (4.1). Peel the specimen at a constant crosshead separation rate of (100 ± 5) mm/min, unless otherwise specified. If the rigid adherend bends or is distorted during the test, it is recommended that the specimen be redesigned with a rigid adherend stiff enough to ensure even peeling.

Stop the crosshead after peeling about 75 mm of the bonded length. Then apply several drops of water containing a wetting agent (t.b.d., for example 0,5 - 1,0 % of a detergent) to the crack opening. After the application of this liquid the peeling process shall be immediately commenced. The test shall be continued until the complete sample is peeled.

7.2 An autographic recording of force versus crosshead movement (force versus distance peeled) shall be made.

7.3 Disregard the results if failure occurs outside the peeling zone as defined in figure 1.