SLOVENSKI STANDARD
SIST EN 14493:2003

01-maj-2003

Konstrukcijska lepila - Doloļevanje dinamiļne odpornosti na cepitev lepljenih spojev visoke trdnosti pod udarnimi pogoji - Metoda z udarnim klinom (ISO 11343:1993, spremenjen)

Structural adhesives - Determination of dynamic resistance to cleavage of high strength adhesive bonds under impact conditions - Wedge impact method (ISO 11343:1993 modified)

Strukturklebstoffe - Bestimmung des dynamischen Keil-Schlag-Widerstandes von hochfesten Klebungen unter Schlagbelastung - Keil-Schlag-Verfahren (ISO 11343:1993 modifiziert)

Adhésifs - Détermination de la résistance dynamique a un clivage de joints collés a haute résistance soumis aux conditions d'impact - Méthode d'impact au coin (ISO 11343:1993 modifiée)

Ta slovenski standard je istoveten z: **EN 14493:2002**

ICS:

83.180	Lepila	Adhesives

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EUROPEAN STANDARD

NORME EUROPÉENNE

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English version

Structural adhesives - Determination of dynamic resistance to cleavage of high strength adhesive bonds under impact conditions - Wedge impact method (ISO 11343:1993 modified)

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This European Standard was approved by CEN on 16 October 2002.

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 Management Centre 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, 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

Contents

Foreword

The text of the International Standard from Technical Committee ISO/TC 61 "Plastics" of the International Organization for Standardization (ISO) has been taken over as a European Standard by Technical Committee CEN/TC 193 "Adhesives", the secretariat of which is held by AENOR.

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 May 2003, and conflicting national standards shall be withdrawn at the latest by May 2003.

Endorsement notice

The text of ISO 11343:1993 has been approved by CEN as a draft European Standard with agreed common modifications as given below:

— the title has been modified ,

— Figure 1 is given as an example,

— the normative references have been updated and,

— a "Safety" clause has been introduced.

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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies a dynamic impact wedge method for the determination of the cleavage resistance under impact loading of high-strength adhesive bonds between two metallic adherends, when tested under specified conditions of preparation and testing.

The method allows a choice of sheet metal substrate corresponding to those materials frequently used in industry, e.g. for automotive applications.

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 (including amendments).

EN 923, *Adhesives – Terms and definitions.*

EN 29142, *Adhesives – Guide to the selection of standard laboratory ageing conditions for testing bonded joints (ISO 9142:1990).*

prEN 13887, *Structural adhesives – Guidelines for surface preparation of metals and plastics prior to adhesive bonding.*

EN ISO 10365, *Adhesives – Designation of main failure patterns (ISO 10365:1992).*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 923 and the following apply.

3.1
dynamic resistance to cleavage
force per unit width, necessary to bring an adhesive joint to the point of failure by means of a stress applied by a wedge moving between the two substrates of the joint, and thus separating the adherends in a peeling mode

It is expressed in kilonewtons per metre.

4 Principle

The method consits of the determination of the average cleavage resistance, expressed as force or energy, of the adhesive bond between two metallic adherends. The cleavage corresponds to the separation of the adherends by a wedge, moving at high speed, whose displacement is initiated by an impact.

5 Safety

Persons using this standard shall be familiar with normal laboratory practice.

This standard does not purport to address all the safety problems, if any, associated with its use.

It is the responsability of the user to establish safety and health practices and to ensure compliance with any European or national regulatory conditions.

6 Apparatus

6.1 Instrumented impact testing machine, capable of applying an impact energy of at least 50 J and preferably up to 300 J and an impact speed of at least 3 m/s and preferably up to 5,5 m/s. It shall be provided with a suitable grip to hold the specimen. The jaws of this grip shall firmly engage the outer part of the ends of the metallic adherends and shall have provision for positive location of these adherends by means of a hardened steel bolt passing through the grips and through an 8 mm hole predrilled in the specimens, to clamp the assembly together.

The machine shall be equipped with an instrument capable of registering and storing the force data during the impact event, as a function of time or displacement of the wedge. The response time shall be at least an order of magnitude shorter than the impact event. The machine shall be equipped with a microprocessor/computer in order to perform the necessary calculations for expression of results. Figure 1 represents a pendulum-type impact machine, using a piezoelectric transducer fixed to the specimen clamp (as an example).

NOTE 1 Falling weight and servohydraulic impact machines may be used for this test in addition to pendulum machines. Suitable machines are commercially available.

NOTE 2 Data collection is controlled by the machine type. A servohydraulic machine provides both force-time and force-displacement data, while a pendulum-type or a falling weight machine provides force-time and, by calculation, force-displacement data. Therefore, both types of data are allowed.

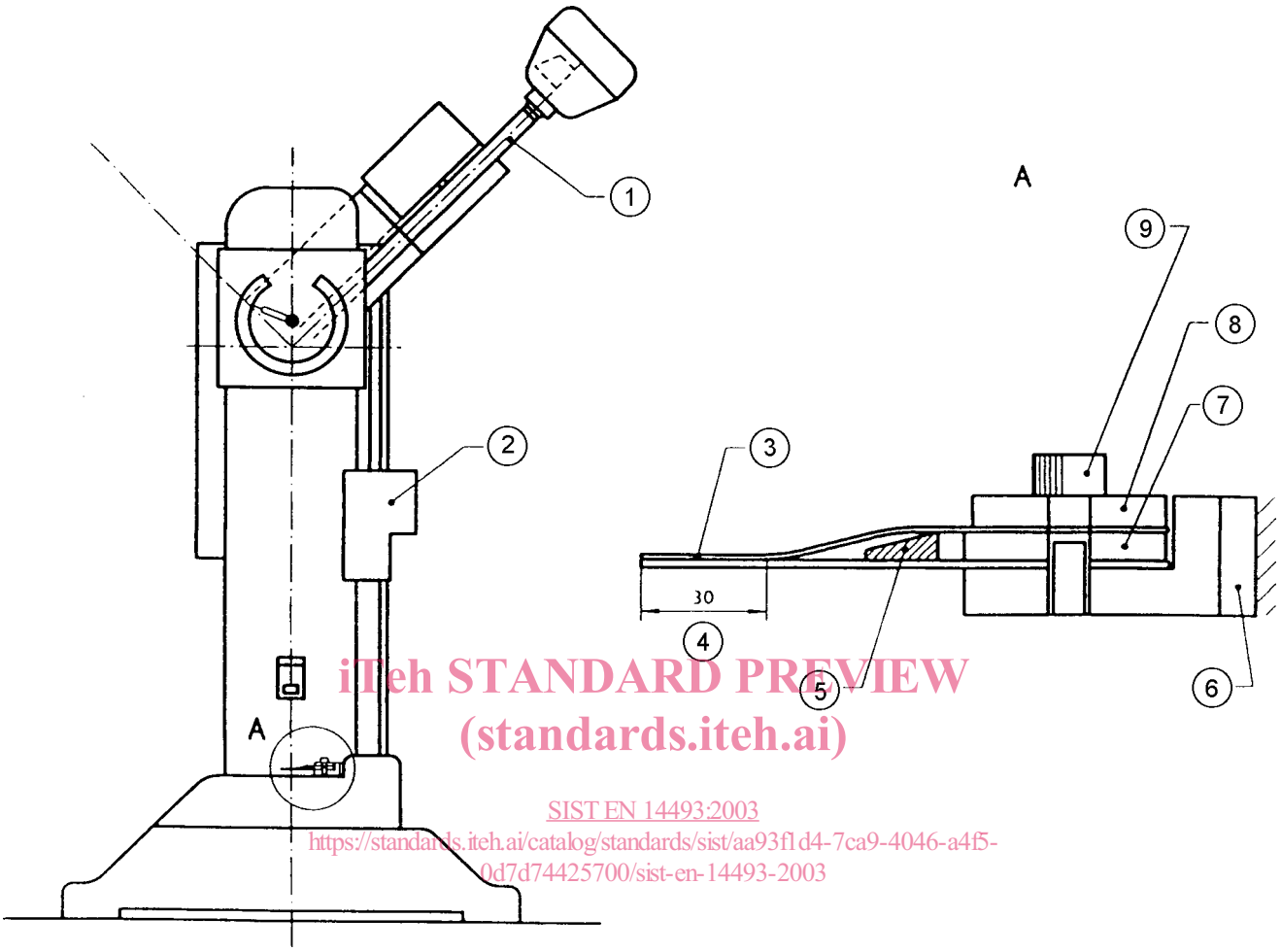
NOTE 3 The machine should be equipped with an environmental chamber to allow conditioning and testing at different temperatures if required.

6.2 Test wedge, made of hardened steel, for cleaving the specimen (see Figures 2 and 3, symmetric and asymmetric wedges).

The wedge, attached to its support frame which has a vertical degree of freedom, is pulled through the adhesive joint by the force of the impact on the frame. Because of the degree of freedom, the wedge aligns itself with the adhesive joint during the test. The included angle of the wedge, its leading edge radius and its maximum depth will determine the progression of opening of the bonded joint ahead of the wedge tip. The wedge surface condition and state of cleanliness shall be maintained and inspected before each determination, since friction unduly increases the energy consumed.

The three-dimensional diagram in Figure 4 shows the interrelation of the path of the impact head and the positions of the wedge and the test specimen.

Dimensions in millimetres

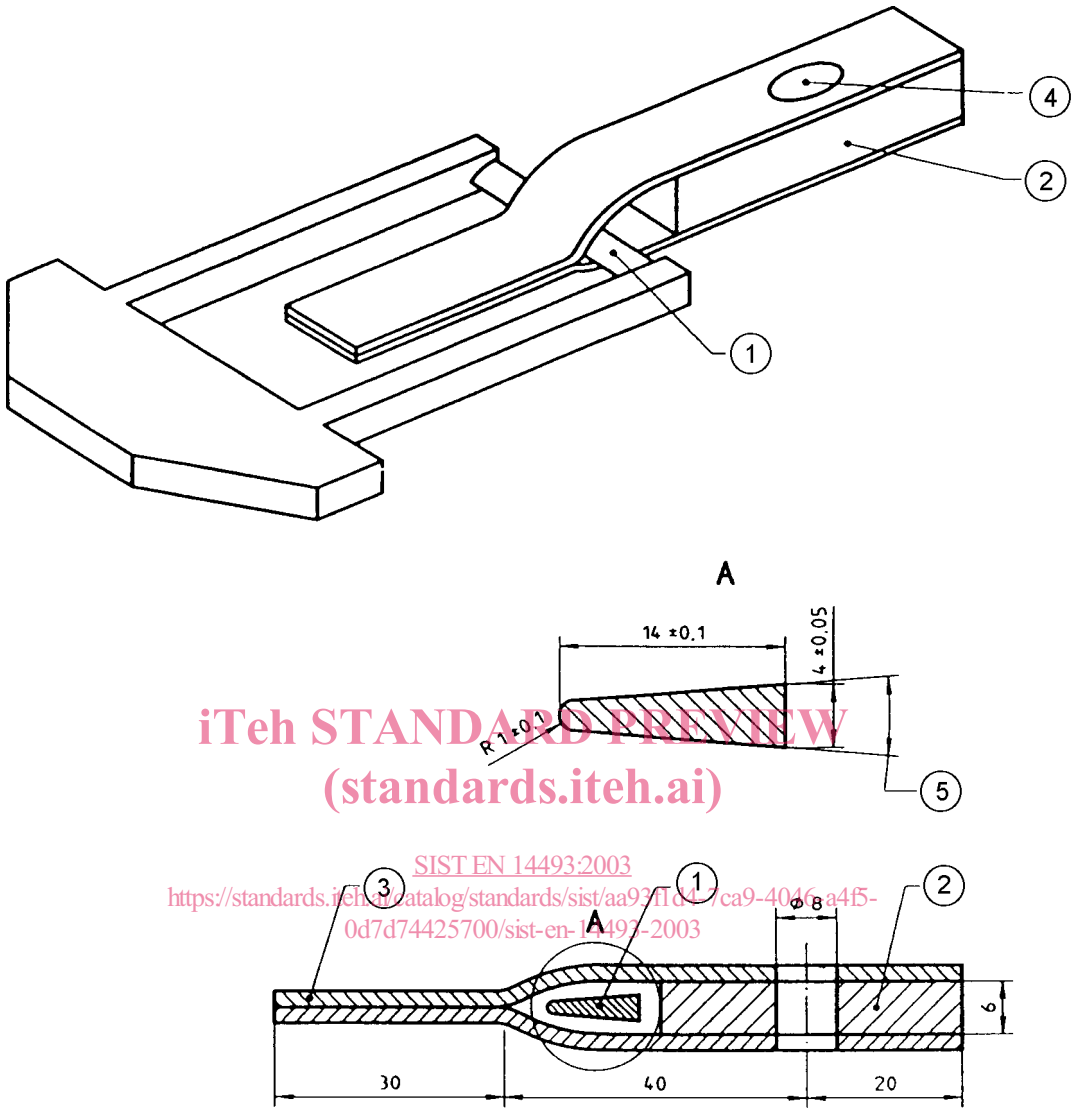


Key

1 Pendulum
2 Sliding unit for setting initial pendulum height
3 Specimen
4 Adhesive region
5 Wedge
6 Transducer
7 Spacer
8 Clamping plate
9 Specimen-retaining bolt

Figure 1 — Pendulum-type impact machine (as an example)

Dimensions in millimetres



Key

1 Wedge
2 Spacer
3 Specimen
4 Bolt hole
5 Angle = 8° 46' 18"

Figure 2 — Symmetric wedge

6.3 **Device** for measuring thickness, with an accuracy of ± 0,01 mm

6.4 **Wedge support frame**, consisting of two parallel steel bars with the wedge fixed between them (at one of their ends) and a steel crosshead, for receiving the impact, positioned parallel to the wedge and connected perpendicular to the two bars at their other ends. The bar cross-section shall be 6,0 mm to 6,5 mm wide x 4,5 mm to 5,0 mm high. Total mass of the assembly shall be 820 g ± 5 g.

7 Specimens

7.1 Specimens of the dimensions as shown in Figures 2 and 3 shall be prepared individually, and shall consist of two adherends properly prepared and bonded together.