INTERNATIONAL STANDARD

ISO 9311-1

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Adhesives for thermoplastic piping systems —

Part 1: Determination of film properties

Adhésifs pour réseaux de tuyauteries en matières thermoplastiques —

Partie 1: Détermination des propriétés des films

Reference number
ISO 9311-1:2005(E)

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 9311-1 was prepared by the European Committee for Standardization (CEN) in collaboration with Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 5, *General properties of pipes, fittings and valves of plastic materials and their accessories — Test methods and basic specifications*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Throughout the text of this document, read “...this European Standard...” to mean “...this International Standard...”.

ISO 9311 consists of the following parts, under the general title *Adhesives for thermoplastic piping systems*:

— *Part 1: Determination of film properties*

— *Part 2: Determination of shear strength*

— *Part 3: Test method for the determination of resistance to internal pressure*

Contents

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 193 "Adhesives" the secretariat of which is held by AENOR, in collaboration with Technical Committee ISO/TC 138 "Plastics pipes, fittings and valves for the transport of fluids".

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of an identical text or by endorsement, at the latest by February 2006, and conflicting national standards shall be withdrawn at the latest by February 2006.

This European Standard is one of a series of standards as listed below:

ISO 9311-1: Adhesives for thermoplastics piping systems - Part 1: Determination of film properties

ISO 9311-2: Adhesives for thermoplastic piping systems - Part 2: Determination of shear strength

ISO 9311-3: Adhesives for thermoplastic piping systems - Part 3: Test method for the determination of resistance to internal pressure

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, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom

1 Scope

This part of ISO 9311 specifies three test procedures suitable for the determination of the spreadability and film properties of solvent containing adhesives for thermoplastic piping systems. These methods do not produce directly comparable results.

One method is applicable to non-thixotropic adhesives and the other two methods are applicable to thixotropic adhesives.

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 923:1998, *Adhesives — Terms and definitions*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 923:1998 apply.

4 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 responsibility of the user to establish health and safety practices and to ensure compliance with any European and national regulatory conditions.

5 Principle

The adhesive under test is applied to a test plate using a specially designed applicator, at a predetermined speed and over a given length, and its spreadability is assessed by a system of scoring in comparison with a reference pattern.

The adhesive film is examined for continuity and lumps or foreign matter.

6 Apparatus

6.1 Adhesive applicator 1

(as shown in Figure 1)

This applicator has two different edges: one is used for non-thixotropic adhesives and the other for thixotropic adhesives.

Dimensions in millimetres

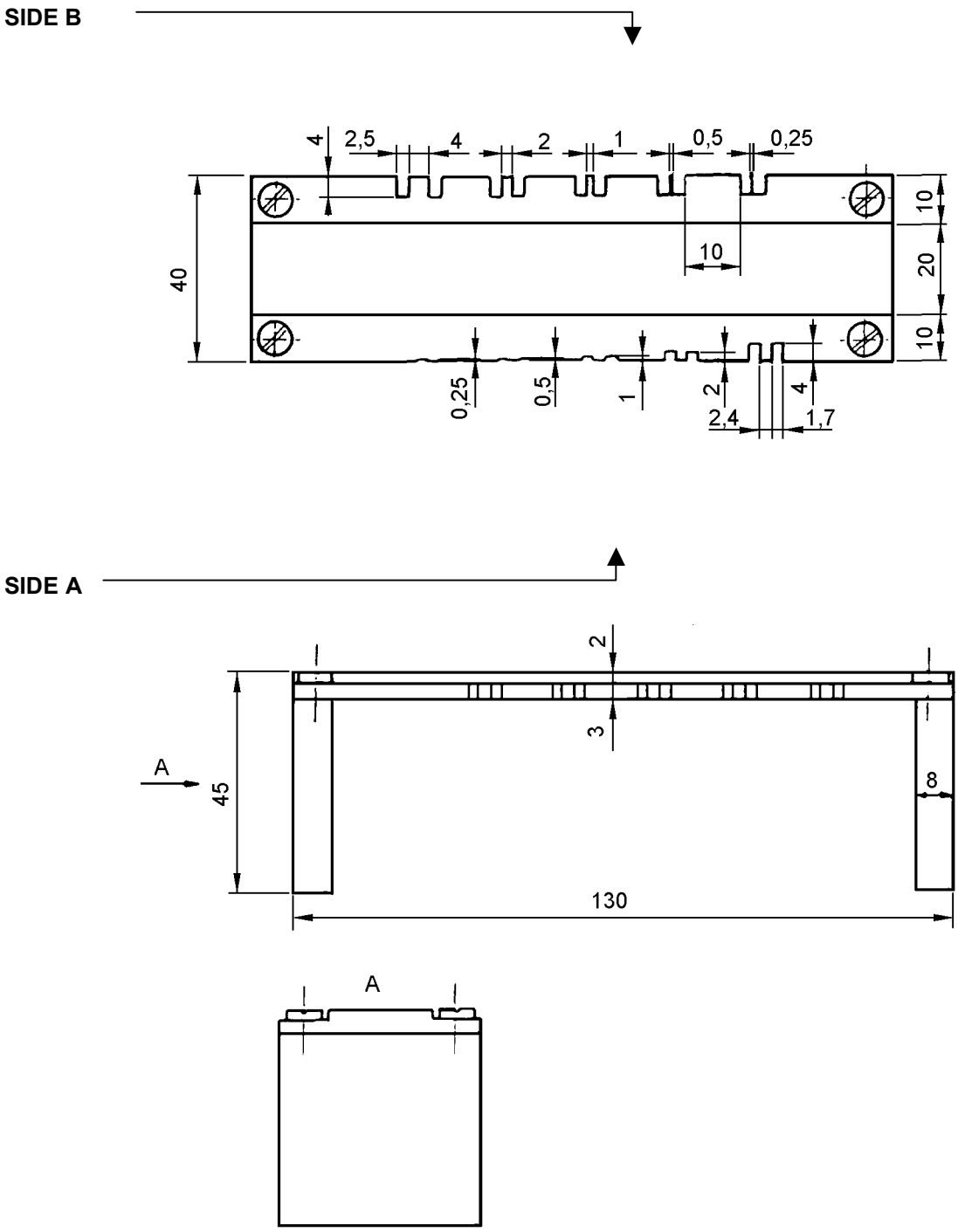


Figure 1 —Adhesive applicator 1

6.2 Adhesive applicator 2

(as shown in Figure 2, or a similar apparatus capable of applying a film of width 100 mm and thickness (2 ± 0,1) mm.)

This applicator is only used for thixotropic adhesives.

Dimensions in millimetres

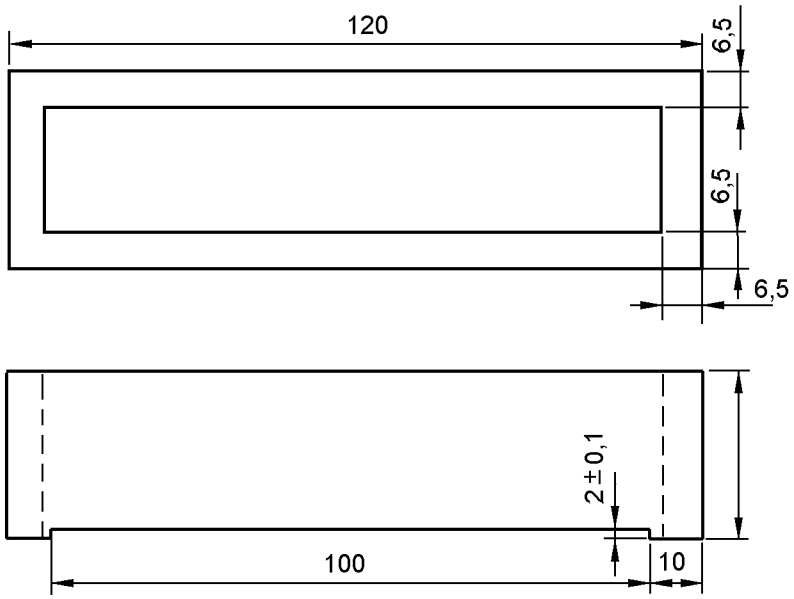


Figure 2 — Adhesive applicator 2

6.3 Glass plate

The recommended dimensions of the glass plate are:

Width: 150 mm or greater.

Length: 250 mm or greater

6.4 Plastic plate

(relevant to the intended use of the adhesive, that is, a PVC-U plate for a PVC-U adhesive.)

The recommended dimensions of the plastic plate are:

Width: 150 mm or greater.

Length: 250 mm or greater.

The plastic plate shall be smooth and untreated.

7 Procedure

7.1 General

Condition the adhesive, the applicator and the test plate at (23 ± 2) ºC and (50 ± 5) % relative humidity for at least 6 h. The test plate and adhesive applicator shall be clean and free of grease.

For each procedure apply a coating to each of three test plates.

7.2 Method A, non-thixotropic adhesives

After conditioning, open the container and immediately apply the adhesive onto the glass plate and spread using adhesive applicator 1 (side A), at a speed of approximately 20 mm/s and over a minimum length of 200 mm.

Depending upon the depth of slots in the applicator and upon the spreadability of the adhesive examined, complete or partial films of specified nominal thickness will be obtained.

7.3 Method B, thixotropic adhesives

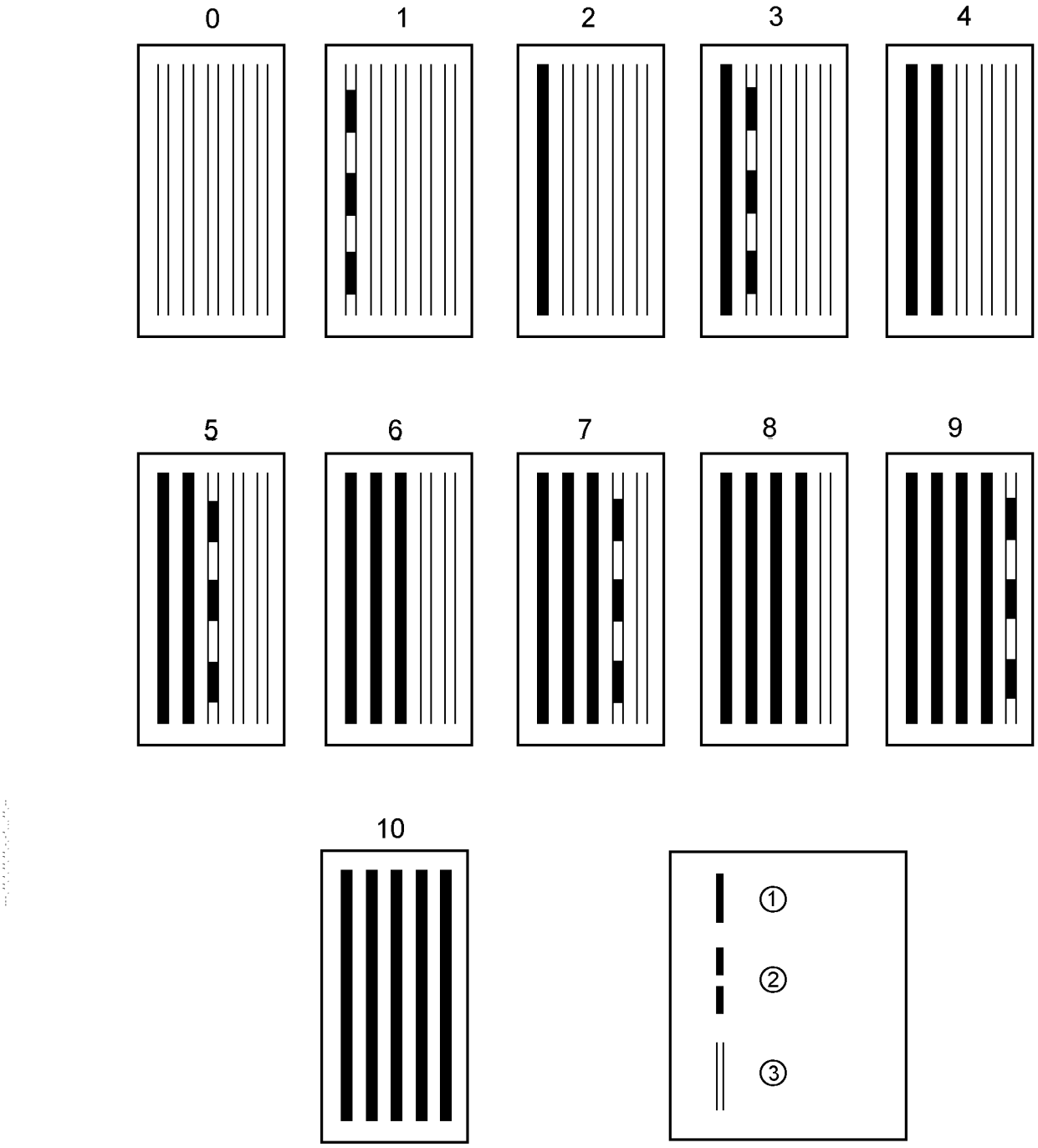
After conditioning, open the container and immediately apply the adhesive onto the glass plate and spread using adhesive applicator 1 (side B), at a speed of approximately 20 mm/s and over a minimum length of 200 mm.

Depending upon the depth of slots in the applicator and upon the spreadability of the adhesive examined, complete or partial films of specified nominal thickness will be obtained.

7.4 Method C, thixotropic adhesives

After conditioning, open the container and immediately apply the adhesive onto the plastic plate and spread using adhesive applicator 2, at a speed of approximately 20 mm/s and over a minimum length of 200 mm. Ensure that the position of the applicator is approximately 100 mm from the end of the plastic plate. An adhesive film of 2 mm nominal thickness shall be obtained.

Directly after forming the film hold the plastic plate in a vertical position. After 3 min return the plastic plate to a horizontal position. The adhesive will flow down the test plate by an amount which depends on the thixotropic character of the adhesive.



Key

1) Complete film

2) Partial film

3) No film

Figure 3 — Reference patterns and corresponding scores

8 Expression of results

8.1 Method A, non-thixotropic adhesives

Compare the results obtained with the reference patterns shown in Figure 3. Allocate to each test plate the score corresponding to the pattern, which it most closely resembles. Record the result for each of the three test plates.

8.2 Method B, thixotropic adhesives

Compare the results obtained with the reference patterns shown in Figure 3. Allocate to each test plate the score corresponding to the pattern, which it most closely resembles. Record the result for each of the three test plates.

8.3 Method C, thixotropic adhesives

Examine the amount of flow at three points (50 mm, 100 mm and 150 mm respectively) along the lower edge of the adhesive film. Calculate the mean of these three measurements in millimetres. Calculate the spreadability by means of the equation:

$$S = 100 - M$$

where:

S is the spreadability of the adhesive, in millimetres;

M is the mean of the measurements of the amount of flow of the adhesive film at the three points, in millimetres

Record the result for each of the three test plates.

8.4 Film properties

Examine the adhesive film produced by test method A, B or C for continuity and for lumps of foreign matter. Record the observations.

9 Test report

The test report shall include:

a) reference to this European Standard;

b) type and identification (batch number, date of manufacture or other code) of the adhesive tested;

c) test method used and, for test method C, which test plate was used;

d) score obtained for each test plate and the mean score from three tests;

e) description of the film, including the presence of any lumps or foreign matter;

f) any modification of the test method described in this part of EN ISO 9311 and any circumstances which may have affected the results;

g) date of the test.

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