



**SLOVENSKI STANDARD**  
**SIST CR 14376:2002**

**01-september-2002**

---

**Lepila - Lepila za papir in karton za embalažo in higienske izdelke za enkratno uporabo - Opis in ocena procesa lepljenja**

Adhesives - Adhesives for paper and board, packaging and disposable sanitary products  
- Description and assessment of the setting process

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

Ta slovenski standard je istoveten z: <sup>SIST CR 14376:2002</sup>**CR 14376:2002**  
<https://standards.iteh.ai/catalog/standards/sist/2e1d9155-49fc-4c50-abfb-d45339e65e91/sist-cr-14376-2002>

---

**ICS:**

83.180            Lepila    Adhesives

**SIST CR 14376:2002**    **en**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST CR 14376:2002](#)

<https://standards.iteh.ai/catalog/standards/sist/2e1d9159-49fc-4c50-abfb-d45339e65e91/sist-cr-14376-2002>

CEN REPORT  
RAPPORT CEN  
CEN BERICHT

**CR 14376**

January 2002

---

ICS

English version

**Adhesives - Adhesives for paper and board, packaging and  
disposable sanitary products - Description and assessment of  
the setting process**

This CEN Report was approved by CEN on 30 November 2001. It has been drawn up by the Technical Committee CEN/TC 193.

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.

**ITEH STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST CR 14376:2002](https://standards.iteh.ai/catalog/standards/sist/2e1d9159-49fc-4c50-abfb-d45339e65e91/sist-cr-14376-2002)

<https://standards.iteh.ai/catalog/standards/sist/2e1d9159-49fc-4c50-abfb-d45339e65e91/sist-cr-14376-2002>



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

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

## Contents

Foreword.....	3
1 Scope .....	5
2 Normative references .....	5
3 Terms and definitions.....	5
4 Safety .....	5
5 Description of terms of the setting process .....	6
5.1 General.....	6
5.2 Setting .....	6
5.3 Setting time.....	6
5.4 Maximum open time .....	6
5.5 Bond Setting time .....	7
5.6 Hot Tack - Wet Tack.....	7
Annex A (informative) Examples of equipment available on the market.....	8
A.1 Principle of WERLE Tack tester .....	8
A.2 Principle of OLINGER adhesion bond tester .....	8
A.3 Principle of FIPAGO adhesive tester .....	9
A.4 Principle of the WACKER AZG-TESTING apparatus .....	10
A.5 Principle of the ASSTI (Adhesive Setting Speed Test Instrument).....	11

[SIST CR 14376:2002](https://standards.iteh.ai/catalog/standards/sist/2e1d9159-49fc-4c50-abfb-d45339e65e91/sist-cr-14376-2002)

<https://standards.iteh.ai/catalog/standards/sist/2e1d9159-49fc-4c50-abfb-d45339e65e91/sist-cr-14376-2002>

## Foreword

This document (CR 14376:2002) has been prepared by Technical Committee CEN/TC 193 "Adhesives", the secretariat of which is held by AENOR.

This Report includes an informative Annex A.

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST CR 14376:2002](https://standards.iteh.ai/catalog/standards/sist/2e1d9159-49fc-4c50-abfb-d45339e65e91/sist-cr-14376-2002)

<https://standards.iteh.ai/catalog/standards/sist/2e1d9159-49fc-4c50-abfb-d45339e65e91/sist-cr-14376-2002>

**CR 14376:2002 (E)****Introduction**

The setting of an adhesive is a complex process, during which the adhesive develops its cohesive strength.

It takes place in several phases which are affected by numerous factors e.g. environmental conditions, substrates, coating weight, etc. Terms commonly used, related to the setting process are e.g. open time (correctly termed maximum open time), wet tack, hot tack, green tack, closed time, setting time.

**iTeh STANDARD PREVIEW  
(standards.iteh.ai)**

[SIST CR 14376:2002](https://standards.iteh.ai/catalog/standards/sist/2e1d9159-49fc-4c50-abfb-d45339e65e91/sist-cr-14376-2002)

<https://standards.iteh.ai/catalog/standards/sist/2e1d9159-49fc-4c50-abfb-d45339e65e91/sist-cr-14376-2002>

## 1 Scope

This Report defines the terms of the setting process in detail, and describes the various aspects of the testing procedures used to assess the setting process.

## 2 Normative references

This CEN Report 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 CEN Report 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 1066, *Adhesives - Sampling*

ISO 291, *Plastics - Standard atmospheres for conditioning and testing*

## 3 Terms and definitions

For the purpose of this CEN Report the terms and definitions in accordance with EN 923 and the following apply.

### 3.1

#### setting

process by which an adhesive develops its cohesive strength and thus the physical and chemical properties of its bond

NOTE The development can be effected by physical changes (gelation, hydration, cooling, evaporation of volatile constituents) and/or chemical reactions (polymerization, crosslinking, oxidation, curing).  
[EN 923:1998]

### 3.2

#### setting time

period of time necessary for an adhesive to set under the specified conditions  
[EN 923:1998]

### 3.3

#### maximum open time

maximum time interval after which an adhesive coat being applied loses its bonding ability  
[EN 923:1998]

## 4 Safety

Persons using this Report shall be familiar with normal laboratory practice. This document does not purport to address all the safety problems, if any, associated with its use it is the responsibility of the user to establish safety and health practices and to ensure compliance with any European and national conditions.

**CR 14376:2002 (E)****5 Description of terms of the setting process****5.1 General**

The following terms are used to describe the setting process and to test the setting properties of adhesives for paper and board, packaging and disposable sanitary products.

The description includes some recommendations for testing setting properties.

**5.2 Setting**

The increase in strength of an adhesive bond with time can be measured.

An adhesive is usually applied to an adherend in liquid or molten form and has a relatively low cohesive strength at the time of application. The adhesive will undergo physical change e.g. loss of water, solvent or thermal energy or gellation or crystallisation and/or chemical changes e.g. polymerisation, crosslinking, oxidation reflected in an increase in viscosity and cohesive strength.

This increase in viscosity and cohesive strength is called "setting".

In the case of adhesive coatings e.g. heat seal or remoistenable adhesives, the coating should first be reactivated by adding thermal energy and/or water. In the case of cold seal or contact adhesives pressure could also be necessary.

Bond strength appears to develop continuously with the majority of adhesives, but in distinct phases with others.

NOTE The direct measurement of cohesive strength of adhesives used for paper and packaging is difficult. Therefore, in practice, the strength of a bond is measured and the increase in the bond strength with time is taken to be a measure of the increase of the cohesive strength.

[SIST CR 14376:2002](https://standards.iteh.ai/catalog/standards/sist/2e1d9159-49fc-4c50-abfb-d45339e65e91/sist-cr-14376-2002)

<https://standards.iteh.ai/catalog/standards/sist/2e1d9159-49fc-4c50-abfb-d45339e65e91/sist-cr-14376-2002>

**5.3 Setting time**

When the cohesive strength of an adhesive no longer increases with time, the adhesive has set and the time taken for this to occur is called "setting time".

However, in bonds the speed of setting is influenced by the adherends, the assembling and by the environmental conditions.

Therefore the setting time observed in practice by various procedures (e.g. time to reach fibre tear, substrate failure or a defined minimum bond strength), is not necessarily the same as the time required for an adhesive to set fully i.e. to reach its maximum cohesive strength.

Thus setting time data should always be treated with caution because absolute values cannot be determined. Setting times will always be specific to equipment, substrates and conditions.

**5.4 Maximum open time**

When an adhesive is applied to a substrate, (with the exception of pressure sensitive adhesives and cold-seal adhesives) after a certain period of time it loses the ability to form a satisfactory bond when a second surface is brought into contact with it. This time is called the maximum open time.

A satisfactory bond is one that fulfils the requirements of its intended purpose.

This maximum open time can be determined by measuring the strength of bonds made at regular intervals after the adhesive has been applied to one adherend.

The maximum open time is taken as the time after which the resulting bond strength falls below an agreed percentage (usually 50%) of the maximum value.

Maximum open time will always be specific to equipment, substrate and conditions.



## 5.5 Bond Setting time

After a bond has been formed within the maximum open time of the adhesive, the strength of the bond can be measured at time intervals after bond formation. This allows the development of the bond strength to be determined. The time necessary for a given bond strength to be reached is referred to as the "bond setting time".

The setting time will always be specific to equipment, substrate and conditions.

## 5.6 Hot Tack - Wet Tack

The adhesive is named as "high hot tack" when a bond with a hot melt adhesive immediately shows high strength. When the bond strength is relatively low, the hot melt adhesive shows low hot tack.

Similarly, if a water borne adhesive is capable of forming a bond with relatively high strength immediately after its application to the substrate it is named as "high wet tack".

Hot tack and wet tack will always be specific to equipment, substrate and conditions.

NOTE Hot tack and wet tack of an adhesive increase during the maximum open time, e.g. if the bond is formed at the beginning of the maximum open time, the resulting hot tack/wet tack will be lower than if the bond is formed at the end of the maximum open time.

# iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST CR 14376:2002](https://standards.iteh.ai/catalog/standards/sist/2e1d9159-49fc-4c50-abfb-d45339e65e91/sist-cr-14376-2002)

<https://standards.iteh.ai/catalog/standards/sist/2e1d9159-49fc-4c50-abfb-d45339e65e91/sist-cr-14376-2002>