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**Neporušitvene preiskave - Preiskave s penetranti - 1. del: Splošna načela  
(prevzet standard EN 571-1:1997 z metodo platnice)**

Non destructive testing - Penetrant testing - Part 1: General principles

Essais non destructifs - Examen par ressuage - Partie 1: Principes généraux

**iTeh STANDARD PREVIEW**

Zerstörungsfreie Prüfung (Eindringprüfung - Teil 1: Allgemeine Grundlagen

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Deskriptorji: neporušitvene preiskave, preiskave s tekočimi penetranti, preiskovalne metode, varnostni ukrepi, postopek, karakteristike, klasifikacija, oznake, makroskopska analiza

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ICS 19.100

Referenčna številka  
SIST EN 571-1:1998 (en)

Nadaljevanje na straneh od II do III in 1 do 17

## UVOD

Standard SIST EN 571-1, Neporušitvene preiskave - Preiskave s penetranti - 1. del: Splošna načela, prva izdaja, 1998, ima status slovenskega standarda in je z metodo platnice prevzet evropski standard EN 571-1, Non destructive testing - Penetrant testing - Part 1: General principles, 1997-01, v angleškem jeziku.

## NACIONALNI PREDGOVOR

Standard EN 571-1:1997 je pripravil tehnični odbor Evropske organizacije za standardizacijo CEN/TC 138 Neporušitvene preiskave.

Odločitev za prevzem tega standarda po metodi platnice je dne 1998-05-05 sprejel tehnični odbor USM/TC PKG Preskušanje kovinskih gradiv.

Ta slovenski standard je dne 1996-06-18 odobril direktor USM.

## ZVEZA S STANDARDOM

S prevzemom tega evropskega standarda velja poleg standardov, navedenih v izvorniku, še naslednja zveza:

SIST EN 473:1996 (sl,(en)), Kvalificiranje in certificiranje osebja za neporušitvene preiskave - Splošna načela

## OSNOVA ZA IZDAJO STANDARDA

- Prevzem standarda EN 571-1:1997.

## OPOMBI

- Povsod, kjer se v besedilu standarda uporablja izraz "evropski standard", v SIST EN 571-1:1998 to pomeni "slovenski standard".
- Uvod in nacionalni predgovor nista sestavni del standarda.

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ICS 19.100

Descriptors: non destructive tests, liquid penetrant tests, inspection methods, safety measures, procedure, characteristics, classifications, designation, macroscopic analysis

English version

## Non destructive testing - Penetrant testing - Part 1: General principles

Essais non destructifs - Examen par ressuage -  
Partie 1: Principes généraux

Zerstörungsfreie Prüfung - Eindringprüfung -  
Teil 1: Allgemeine Grundlagen

This European Standard was approved by CEN on 1995-01-14. 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 Central Secretariat or to any CEN member.

The European Standards exist 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

**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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## Foreword

This European Standard has been prepared by Technical Committee CEN/TC 138 "Non-destructive testing", 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 July 1997, and conflicting national standards shall be withdrawn at the latest by July 1997.

In the framework of its scope, Technical Committee CEN/TC 138 entrusted CEN/TC 138/WG 4 "Liquid penetrant testing" to prepare this draft European standard.

EN 571 comprises a series of European standards of penetrant testing which is made of the following:

- EN 571-1 Non-destructive testing - Penetrant testing - Part 1: General principles for the examination
- EN 571-2 Non-destructive testing - Penetrant testing - Part 2: Testing of penetrant materials
- EN 571-3 Non-destructive testing - Penetrant testing - Part 3: Reference test blocks

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: 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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## 1 Scope

This standard defines a method of penetrant testing used to detect discontinuities, e.g. cracks, laps, folds, porosity and lack of fusion, which are open to the surface of the material to be tested. It is mainly applied to metallic materials, but can also be performed on other materials, provided that they are inert to the test media and they are not excessively porous. Examples of which are castings, forgings, welds, ceramics, etc.

This standard is not intended to be used for acceptance criteria and gives no information relating to the suitability of individual test systems for specific applications nor requirements for test equipment.

The term "discontinuity" is used here in the sense that no evaluation concerning acceptability or non-acceptability is included.

Methods for determining and monitoring the essential properties of penetrant testing products to be used are specified in EN 571-2 and EN 571-3.

## 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 473      | Qualification and certification of NDT personnel - General principles  |
| prEN 571-2  | Non-destructive testing - Penetrant testing - Part 2: Testing of penetrant materials <sup>1)</sup>           |
| prEN 571-3  | Non-destructive testing - Penetrant testing - Part 3: Reference test blocks <sup>1)</sup>                    |
| prEN 956    | Non-destructive testing - Penetrant testing - Equipment  |
| prEN 1330-6 | Non-destructive testing - Terminology - Part 6: Terms used in penetrant systems <sup>1)</sup>                |
| prEN 1956   | Non-destructive testing - Penetrant testing and magnetic particle testing - Viewing conditions <sup>1)</sup> |

## 3 Definitions

For the purposes of this standard the definitions of prEN 1330-6 apply.

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<sup>1)</sup> In preparation



## 4 Safety precautions

As penetrant inspection techniques often require the use of harmful, flammable and/or volatile materials, certain precautions shall be taken.

Prolonged or repeated contact of these materials with the skin or any mucous membrane should be avoided.

Working areas shall be adequately ventilated and sited away from sources of heat, sparks and naked flames in accordance with local regulations.

The penetrant testing products and equipment shall be used with care and always in compliance with the instructions supplied by the manufacturer.

When using UV-A sources, care shall be taken to ensure that unfiltered radiation from the UV-A source does not directly reach the eyes of the operators. Whether it forms an integral part of the lamp or is a separate component, the UV-A filter shall always be maintained in good condition.

There are legislation and regulation regarding health, safety, pollution and storage, etc.

## 5 General principles

### 5.1 Personnel

The examination shall be carried out or supervised by competent personnel and, if required, qualified and certified according to EN 473 or to a system agreed upon by the contracting parties.

### 5.2 Description of the method

Prior to penetrant testing the surface to be inspected shall be cleaned and dried. Then suitable penetrants are applied to the test area and enter into discontinuities open to the surface. After the appropriate penetration time has elapsed the excess penetrant is removed from the surface and the developer applied. This absorbs the penetrant that has entered and remains in the discontinuities and may give a clearly visible enhanced indication of the discontinuity.

Should complementary non-destructive testing be required the penetrant inspection shall be performed first unless agreed upon between the contracting parties so as not to introduce contaminants in to open discontinuities. If penetrant inspection is used following another non-destructive testing technique, the surface shall be cleaned carefully to remove contaminants before application.

### 5.3 Process sequence

The sequence of operations is illustrated for the general case in Annex A.

Testing generally proceeds through the following stages:

- a) preparation and precleaning (see subclause 8.2);
- b) application of penetrant (see subclause 8.3);
- c) excess penetrant removal (see subclause 8.4);
- d) application of developer (see subclause 8.5);
- e) inspection (see subclause 8.6);
- f) recording (see subclause 8.7);
- g) postcleaning (see subclause 8.8).

#### 5.4 Equipment

The equipment for carrying out penetrant testing depends on the number, size and shape of the parts to be tested. For the requirements of equipment, see EN 956.

#### 5.5 Effectiveness

The effectiveness of the penetrant testing depends upon many factors such as:

- a) types of penetrant materials and testing equipment
- b) surface preparation and condition
- c) material under examination and expected discontinuities
- d) temperature of the test surface
- e) penetration and development time
- f) viewing conditions,  
etc.

### 6 Products, sensitivity and designation

#### 6.1 Product family

Various test systems exist in penetrant testing.

A product family is understood as a combination of the following penetrant testing materials: Penetrant, excess penetrant remover and developer. When type tested in accordance with prEN 571-2 the penetrant and excess penetrant remover shall be from one manufacturer. Only approved product families shall be used.

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## 6.2 Testing products

The testing products are given in table 1.

Table 1: Testing products

Penetrant		Excess penetrant remover		Developer	
Type	Denomination	Method	Denomination	Form	Denomination
I	Fluorescent penetrant	A	Water	a	Dry
II	Colour contrast penetrant	B	Lipophilic emulsifier 1 Oil-based emulsifier	b	Water soluble
III	Dual purpose (fluorescent colour contrast penetrant)	C	Solvent (liquid)	c	Water suspendable
				d	Solvent-based (non-aqueous wet)
		D	Hydrophilic emulsifier 1 Optional prerinse (water) 2 emulsifier (water-diluted) 3 Final rinse (water)	e	Water or solvent based for special application (e.g. peelable developer)
				E	Water and solvent

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**NOTE:** For specific cases, it is necessary to use penetrant testing product complying with particular requirements with regards to flammability, sulfur, halogen and sodium content and other contaminants, see prEN 571-2.