



**SLOVENSKI STANDARD**  
**oSIST prEN ISO 9934-2:2013**  
**01-oktober-2013**

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**Neporušitveno preskušanje - Preskušanje z magnetnimi delci - 2. del: Sredstva za preiskave (ISO/DIS 9934-2:2013)**

Non-destructive testing - Magnetic particle testing - Part 2: Detection media (ISO/DIS 9934-2:2013)

Zerstörungsfreie Prüfung - Magnetpulverprüfung - Teil 2: Prüfmittel (ISO/DIS 9934-2:2013)

Essais non destructifs - Magnétoscopie - Partie 2: Produits magnétoscopiques (ISO/DIS 9934-2:2013)

**Ta slovenski standard je istoveten z: prEN ISO 9934-2**

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**ICS:**

19.100      Neporušitveno preskušanje      Non-destructive testing

**oSIST prEN ISO 9934-2:2013**

**en**





## DRAFT INTERNATIONAL STANDARD ISO/DIS 9934-2

ISO/TC 135/SC 2

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## Non-destructive testing — Magnetic particle testing —

Part 2:  
Detection media*Essais non destructifs — Magnétoscopie —**Partie 2: Produits magnétoscopiques*

[Revision of first edition (ISO 9934-2:2002)]

ICS 19.100

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## ISO/CEN PARALLEL PROCESSING

This draft has been developed within the European Committee for Standardization (CEN), and processed under the **CEN-lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five-month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

**To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.**

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## Contents

Page

Foreword .....	v
1 Scope .....	1
2 Normative references .....	1
3 Terms and definitions .....	1
4 Safety precautions .....	2
5 Classification .....	2
5.1 General .....	2
5.2 Magnetic inks .....	2
5.3 Powders .....	2
6 Testing and test certificate .....	2
6.1 Type testing and batch testing .....	2
6.2 In service testing .....	2
7 Requirements and test methods .....	2
7.1 Performance .....	2
7.1.1 Type testing and batch testing .....	2
7.1.2 In service testing .....	3
7.1.3 Contrast aid paints .....	3
7.2 Colour .....	3
7.3 Particle size .....	3
7.3.1 Method .....	3
7.3.2 Definition of the particle size .....	3
7.4 Temperature resistance .....	3
7.5 Fluorescent coefficient and fluorescent stability .....	3
7.5.1 Type testing .....	4
7.5.2 Batch testing .....	5
7.6 Fluorescence of carrier liquid .....	6
7.7 Flash point .....	6
7.8 Corrosion induced by detection media .....	6
7.8.1 Corrosion testing on steel .....	6
7.8.2 Corrosion testing of copper .....	6
7.9 Viscosity of the carrier liquid .....	6
7.10 Mechanical stability .....	6
7.10.1 Long term test (endurance test) .....	6
7.10.2 Short term test .....	7
7.11 Foaming .....	7
7.12 pH .....	7
7.13 Storage stability .....	7
7.14 Solids content .....	7
7.15 Sulphur and halogen content .....	7
8 Testing requirements .....	8
9 Test report .....	8
10 Packaging and labelling .....	8
Annex A (normative) Procedure for type, batch and in service testing .....	1
A.1 Preparation of the detection media .....	1
A.2 Cleaning of the reference blocks .....	1
A.3 Application of the detection media .....	1
A.4 Inspection and interpretation .....	1

## ISO/DIS 9934-2

A.4.1	Inspection.....	1
A.4.2	Interpretation.....	1
A.5	Contrast aid paint.....	2
Annex B	(normative) Reference blocks.....	3
B.1	Reference block type 1.....	3
B.1.1	Description.....	3
B.1.2	Manufacturing.....	3
B.1.3	Verification.....	3
B.2	Reference block type 2.....	4
B.2.1	Description.....	4
B.2.2	Manufacturing.....	5
B.2.3	Verification.....	7
Annex C	(normative) Corrosion testing of steel.....	8
C.1	Principle.....	8
C.2	Apparatus.....	8
C.2.1	Petri-dish made of glass, of 100 mm outside diameter.....	8
C.2.2	Pipette with ml scale.....	8
C.2.3	Round filter paper, ø 90 mm, with a 40 mm diameter circle inscribed on it with indelible ink.....	8
C.2.4	Stainless steel spatula.....	8
C.2.5	Mesh 5 sieve in accordance with ISO 2591-1.....	8
C.2.6	Balance accurate to 0,1 g.....	8
C.3	Reagents and materials.....	8
C.3.1	Acetone;.....	8
C.3.2	Xylene;.....	8
C.3.3	Steel granules grade 2C40 (according to EN 10083-1), generally 2,5 × 2,5 mm;.....	8
C.3.4	Lamellar graphite general purpose cast iron granules;.....	8
C.3.5	Hard water.....	8
C.3.6	Different stock solutions shall be prepared:.....	8
C.3.7	From these stock solutions prepare three diluted solutions as follows:.....	9
C.4	Test procedure.....	9
C.4.1	Preparation of the solutions (100 ml).....	9
C.4.2	Preparation of the granules and filters.....	9
C.4.3	Corrosion testing.....	9
C.5	Interpretation of the results.....	10
C.6	Expression of results.....	10
C.7	Uncertainties.....	10
Bibliography	.....	12

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 9934-2 was prepared by Technical Committee ISO/TC 135, *Non-destructive testing*, Subcommittee SC , and by Technical Committee CEN/TC 138, *Non-destructive testing* in collaboration.

This second edition cancels and replaces the first edition (ISO 9934-2:2002), which has been technically revised.

ISO 9934 consists of the following parts, under the general title *Non-destructive testing — Magnetic particle testing*:

— *Part 1: General principle*

— *Part 2: Detection media*

— *Part 3: Equipment*

# Non-destructive testing — Magnetic particle testing — Part 2: Detection media

## 1 Scope

This European Standard specifies the significant properties of magnetic particle testing products (including magnetic ink, powder, carrier liquid, contrast aid paints) and the methods for checking their properties.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1330-1, *Non destructive testing - Terminology - Part 1: List of general terms*

EN 1330-2, *Non destructive testing - Terminology - Part 2: Terms common to the non-destructive testing methods*

EN 10083-1, *Quenched and tempered steels - Part 1: Technical delivery conditions for special steels*

EN 10204, *Metallic products - Types of inspection documents*

EN 12157, *Rotodynamic pumps - Coolant pumps units for machine tools - Nominal flow rate, dimensions*

ISO 2160, *Petroleum products - Corrosiveness to copper - Copper strip test*

ISO 3059, *Non-destructive testing - Penetrant testing and magnetic particle testing - Viewing conditions*

ISO 3104, *Petroleum products - Transparent and opaque liquids - Determination of kinematic viscosity and calculation of dynamic viscosity*

ISO/DIS 9934-1, *Non-destructive testing - Magnetic particle testing - Part 1: General principle*

ISO/DIS 9934-3, *Non-destructive testing - Magnetic particle testing - Part 3: Equipment*

ISO/DIS 12707, *Non-destructive testing - Terminology - Terms used in magnetic particle testing*

ISO 2591-1, *Test sieving - Part 1: Methods using test sieves of woven wire cloth and perforated metal plate*

ISO 4316, *Surface active agents - Determination of pH of aqueous solutions - Potentiometric method*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1330-1, EN 1330-2 and ISO/DIS 12707 and the following apply.

### 3.1

#### batch

quantity of material produced during one manufacturing operation having uniform properties throughout and with a unique identifying number or mark



## ISO/DIS 9934-2

### 4 Safety precautions

The materials used in magnetic particle inspection and those used in their testing include chemicals that can be harmful, flammable and/or volatile. All necessary precautions should be observed. All relevant regulations, including national and local regulations pertaining to health and safety, anti-pollution requirements etc., shall be observed.

### 5 Classification

#### 5.1 General

The magnetic particle materials covered by this specification shall be classified as follows.

#### 5.2 Magnetic inks

Magnetic inks shall consist of finely divided coloured or fluorescent magnetic particles in a suitable carrier liquid. They shall form a uniform suspension when agitated.

Magnetic inks may be produced from products supplied as concentrates, including paste and powders, or ready for use.

#### 5.3 Powders

Powders for the dry technique shall consist of finely divided coloured and/or fluorescent magnetic particles.

### 6 Testing and test certificate

#### 6.1 Type testing and batch testing

Type testing and batch testing of magnetic particle materials shall be carried out in accordance with the requirements of ISO/DIS 9934-1, ISO/DIS 9934-2, and ISO/DIS 9934-3.

Type testing is carried out in order to demonstrate suitability of a product for the intended use. Batch testing is carried out in order to demonstrate conformity of the characteristics of a batch to the product type specified.

The supplier shall provide a test certificate showing compliance with this standard having used the methods detailed. This certificate shall include results obtained and tolerances allowed.

If any changes are made to the detection media, then a new type test shall be performed.

#### 6.2 In service testing

In service testing is carried out to demonstrate the continued performance of the detection media.

### 7 Requirements and test methods

#### 7.1 Performance

##### 7.1.1 Type testing and batch testing

Type testing and batch testing shall be carried out according to Annex A using the reference blocks types 1 or 2 as described in Annex B.

### 7.1.2 In service testing

In service testing shall be carried out according to Annex A using one of the reference blocks types 1 or 2 as described in Annex B or a test block which exhibit similar discontinuities to those normally found in components typically processed in the equipment.

### 7.1.3 Contrast aid paints

Type testing and batch testing shall be carried out according to 7.1.1 after having applied the paint in accordance with the manufacturer instructions and using a type test approved, compatible magnetic ink.

## 7.2 Colour

The colour of magnetic particles detection media under working conditions shall be stated by the supplier.

The colour of the batch test sample shall not differ from the colour of the type test sample when visually compared.

## 7.3 Particle size

### 7.3.1 Method

The method for determination of particle size is dependent on the range of the particle size distribution.

NOTE For magnetic inks the particle-size-distribution can be determined by the Coulter Method or an equivalent method (see Bibliography).

### 7.3.2 Definition of the particle size

The range of particle size shall be as follows:

- lower diameter  $d_l$ : no more than 10 % of the particles shall be smaller than  $d_l$ ;
- average diameter  $d_a$ : 50% of the particles shall be larger and 50 % smaller than  $d_a$ ;
- upper diameter  $d_u$ : no more than 10 % of the particles shall be larger than  $d_u$ .

$d_l$ ,  $d_a$  and  $d_u$  shall be reported.

NOTE 1 Percentage values by volume.

NOTE 2 For powders  $d_l$  is generally  $\geq 40 \mu\text{m}$ .

## 7.4 Temperature resistance

There shall be no degradation of the product after 5 minutes heating at the maximum temperature specified by the supplier. This shall be verified by repeating the performance test as specified in 7.1.1.

## 7.5 Fluorescent coefficient and fluorescent stability

To carry out these tests it is necessary to use dry powder. For magnetic inks the magnetic particle solid content shall be used.

## ISO/DIS 9934-2

## 7.5.1 Type testing

## 7.5.1.1 Method

The fluorescent coefficient  $\beta$  in cd/W is defined as follows:

$$\beta = L/E_e \quad (1)$$

where

$L$  luminance in cd/m<sup>2</sup> of a plane powder surface;

$E_e$  level of UV-irradiance in W/m<sup>2</sup> at the surface of the powder.

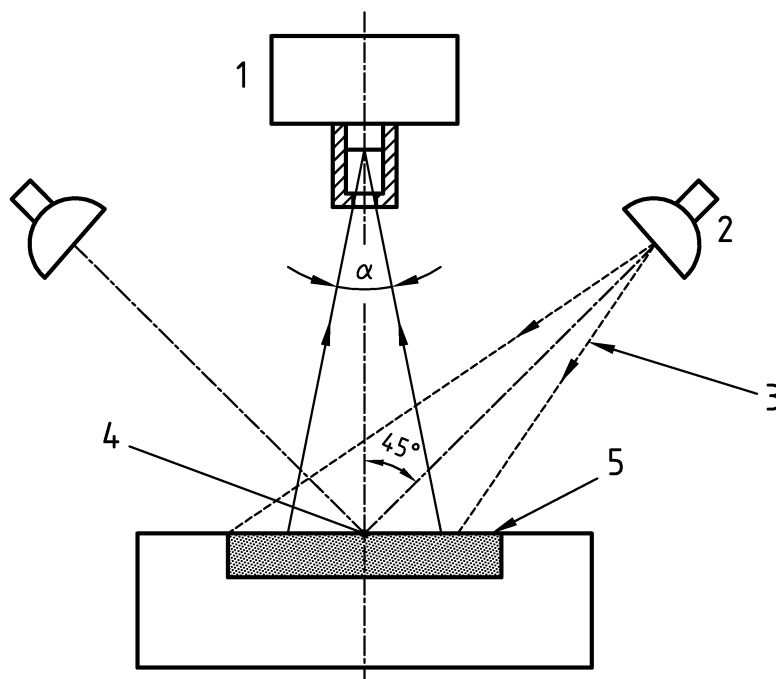
The arrangement of the apparatus used is shown in Figure 1.

The powder surface shall be evenly irradiated with UV(A) at an angle of  $(45 \pm 5)^\circ$ . Luminance shall be measured with a suitable meter with an accuracy of  $\pm 10\%$ . It shall measure the luminance from the powder surface and be unaffected by areas outside of the target area. The level of irradiance shall be measured with a meter conforming to ISO 3059 with its UV sensor replacing the powder surface.

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### Key

- 1 Measurement of luminance
- 2 Lamp
- 3 UV radiation
- 4 Measurement point of the irradiance
- 5 Powder surface

**Figure 1 - Determination of the fluorescent coefficient  $\beta$  for magnetic particles**

NOTE A recommended arrangement is using a luminance meter with a 200 cd/m<sup>2</sup> range and a viewing angle ( $\alpha$ ) of 20° placed 80 mm above the plane powder surface, diameter 40 mm. UV (A) lamps are placed so as to give an even irradiance at the powder surface, with  $E_e$  between 10 W/m<sup>2</sup> and 15 W/m<sup>2</sup>.

### 7.5.1.2 Requirements

The fluorescent coefficient ( $\beta$ ) shall be greater than 1,5 cd/W.

### 7.5.1.3 Fluorescence stability

The sample shall first be tested according to the method described in 7.5.1.1.

The sample shall then be exposed and re-tested as described in 7.5.1.1 after 30 minutes of exposure to UV-A irradiance of 20 W/m<sup>2</sup> (minimum). The fluorescent coefficient shall not decrease more than 5 %.

### 7.5.2 Batch testing

Batch testing shall be carried out according to 7.5.1.1. The fluorescent coefficient shall be within 10 % of the type test value.