



SLOVENSKI STANDARD
oSIST prEN ISO 9934-3:2013
01-oktober-2013

**Neporušitveno preskušanje - Preskušanje z magnetnimi delci - 3. del: Naprave
(ISO/DIS 9934-3:2013)**

Non-destructive testing - Magnetic particle testing - Part 3: Equipment (ISO/DIS 9934-3:2013)

Zerstörungsfreie Prüfung - Magnetpulverprüfung - Teil 3: Geräte (ISO/DIS 9934-3:2013)

Essais non destructifs - Magnétoscopie - Partie 3: Équipement (ISO/DIS 9934-3:2013)

Ta slovenski standard je istoveten z: prEN ISO 9934-3

ICS:

19.100 Neporušitveno preskušanje Non-destructive testing

oSIST prEN ISO 9934-3:2013

en



DRAFT INTERNATIONAL STANDARD ISO/DIS 9934-3

ISO/TC 135/SC 2

Secretariat: **SABS**Voting begins on
2013-05-23Voting terminates on
2013-10-23

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Non-destructive testing — Magnetic particle testing —

Part 3: Equipment

*Essais non destructifs — Magnétoscopie —
Partie 3: Équipement*

[Revision of first edition (ISO 9934-3:2002)]

ICS 19.100

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN ISO 9934-3:2015

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.

Pour accélérer la distribution, le présent document est distribué tel qu'il est parvenu du secrétariat du comité. Le travail de rédaction et de composition de texte sera effectué au Secrétariat central de l'ISO au stade de publication.

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN ISO 9934-3:2015

<https://standards.iteh.ai/catalog/standards/sist/c96ef5a0-b7e6-483b-b180-bbc3b6ecda4e/sist-en-iso-9934-3-2015>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2013

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Safety requirements	1
4 Types of devices	1
4.1 Portable electromagnets (AC)	1
4.1.1 General	1
4.1.2 Technical data	2
4.1.3 Technical requirements	3
4.1.4 Additional requirements	3
4.2 Current generators	3
4.2.1 Technical data	4
4.2.2 Technical requirements	5
4.3 Magnetic benches	5
4.3.1 General	5
4.3.2 Technical data	5
4.3.3 Technical requirements	7
4.3.4 Additional requirements	7
4.4 Specialized testing systems	7
4.4.1 Technical data	7
4.4.2 Technical requirements	8
5 UV-A sources	8
5.1 Generals	8
5.2 Technical data	8
5.3 Technical requirements	9
6 Detection media system	9
6.1 General	9
6.2 Technical data	9
6.3 Technical requirements	9
7 Inspection booth	10
7.1 General	10
7.2 Technical data	10
7.3 Technical requirements	10
8 Demagnetization	10
8.1 General	10
8.2 Technical data	10
8.3 Technical requirements	11
9 Measurements	11
9.1 General	11
9.2 Current measurement	11
9.3 Magnetic field measurement	11
9.3.1 General	11
9.3.2 Technical data	12
9.3.3 Technical requirements	12
9.4 Visible light measurement	12
9.5 UV-A irradiance measurement	12
9.6 Verification and calibration of instruments	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 9934-3 was prepared by Technical Committee ISO/TC 135, *Non-destructive testing*, Subcommittee SC 2, and by Technical Committee CEN/TC 138, *Non-destructive testing* in collaboration.

This second edition cancels and replaces the first edition (ISO 9934-3:2002) 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 rules*
- *Part 2 : Detection media*
- *Part 3: Equipment*

Non-destructive testing — Magnetic particle testing — Part 3: Equipment

1 Scope

This European Standard describes three types of equipment for magnetic particle testing :

- portable or transportable equipment ;
- fixed installations ;
- specialized testing systems for testing components on a continuous basis, comprising a series of processing stations placed in sequence to form a process line.

Equipment for magnetizing, demagnetizing, illumination, metering and monitoring are also described.

This standard specifies the properties to be provided by the equipment supplier, minimum requirements for application and the method of measuring certain parameters. Where appropriate, measuring and calibration requirements and in-service checks are also specified.

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 10084, *Case hardening steels - Technical delivery conditions*

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

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

EN 60529 *Degrees of protection provides by enclosures (IP Code) (IEC 60529:1989)*

3 Safety requirements

The equipment design shall take into account of all European, national and local regulations which include health, safety, electrical and environmental requirements.

4 Types of devices

4.1 Portable electromagnets (AC¹⁾)

4.1.1 General

Hand-held portable electromagnets (yokes) produce a magnetic field between the two poles. (When testing according to ISO/DIS 9934-1, DC electromagnets should only be used if agreed at enquiry and order stages).

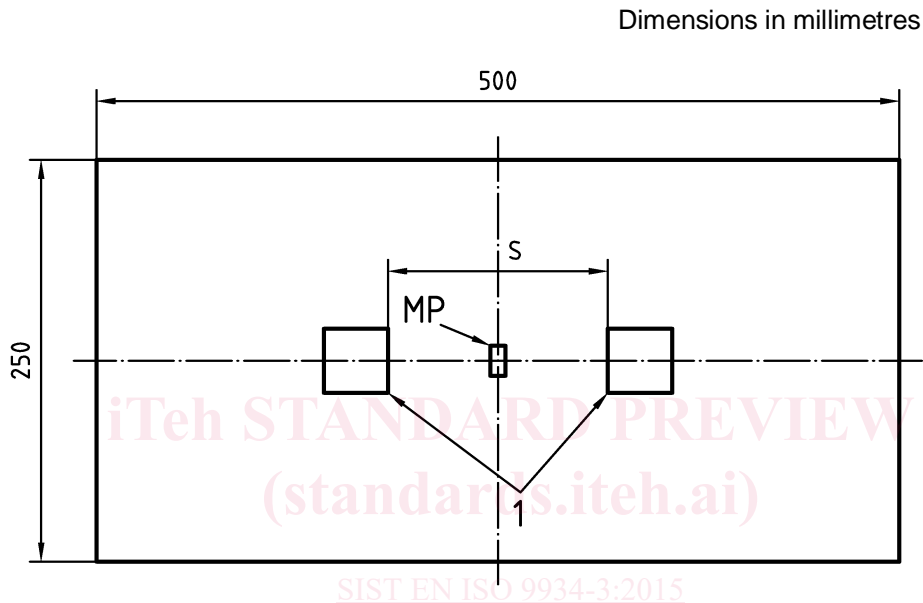
1) AC = alternative current, and DC = rectified current

ISO/DIS 9934-3

Magnetization shall be determined by measuring the tangential field strength H_t at the centre of a line joining the centres of the pole faces of the electromagnet with pole extenders where used. The electromagnet with a pole spacing s is placed on a steel plate as shown in Figure 1. The plate shall have the dimensions (500 ± 25) mm x (250 ± 13) mm x (10 ± 0.5) mm and shall be of steel conforming to C 22 (EN 10084).

Periodic functional checks may be carried out either by the method described above or by a lift test. The electromagnet shall be capable of supporting a steel plate or rectangular bar conforming to C 22 (EN 10084) and having a minimum mass of 4,5 kg, with the magnet poles set at their recommended spacing. The major dimension of the plate or bar shall be greater than the pole spacing s of the electromagnet.

NOTE To lift a steel plate with a mass of 4,5 kg requires a lifting force of 44 N.

**Key**

MP Measuring point for the tangential field strength

s Pole spacing

1 Poles

Figure 1 — Determination of the characteristics of portable electromagnets

4.1.2 Technical data

The following data shall be provided:

- recommended pole spacing (maximum and minimum pole spacing) (s_{\max} , s_{\min});
- cross sectional dimensions of the poles;
- electrical supply (voltage, current and frequency);
- current wave forms available;
- method of current control and effect on waveform (e.g. : thyristor);
- duty cycle at maximum output (ratio of current 'ON' to 'Total' time expressed as a percentage);
- maximum current 'ON' time;

- tangential field strength H_t at s_{\max} and s_{\min} (following 4.1);
- overall dimensions of the equipment;
- equipment mass, in kilograms;
- specified electrical protection degree (IP) see EN 60529.

4.1.3 Technical requirements

The following requirements shall be satisfied at an ambient temperature of 30 °C and at maximum output:

- duty cycle $\geq 10 \%$
- current 'ON' time $\geq 5 \text{ s}$
- surface temperature of handle $\leq 40 \text{ °C}$
- tangential field strength at s_{\max} (see 4.1) $\geq 2 \text{ kA/m (RMS)}$
- lifting force $\geq 44 \text{ N}$

4.1.4 Additional requirements

The electromagnet shall be supplied with a power ON/OFF switch preferably mounted on the handle.

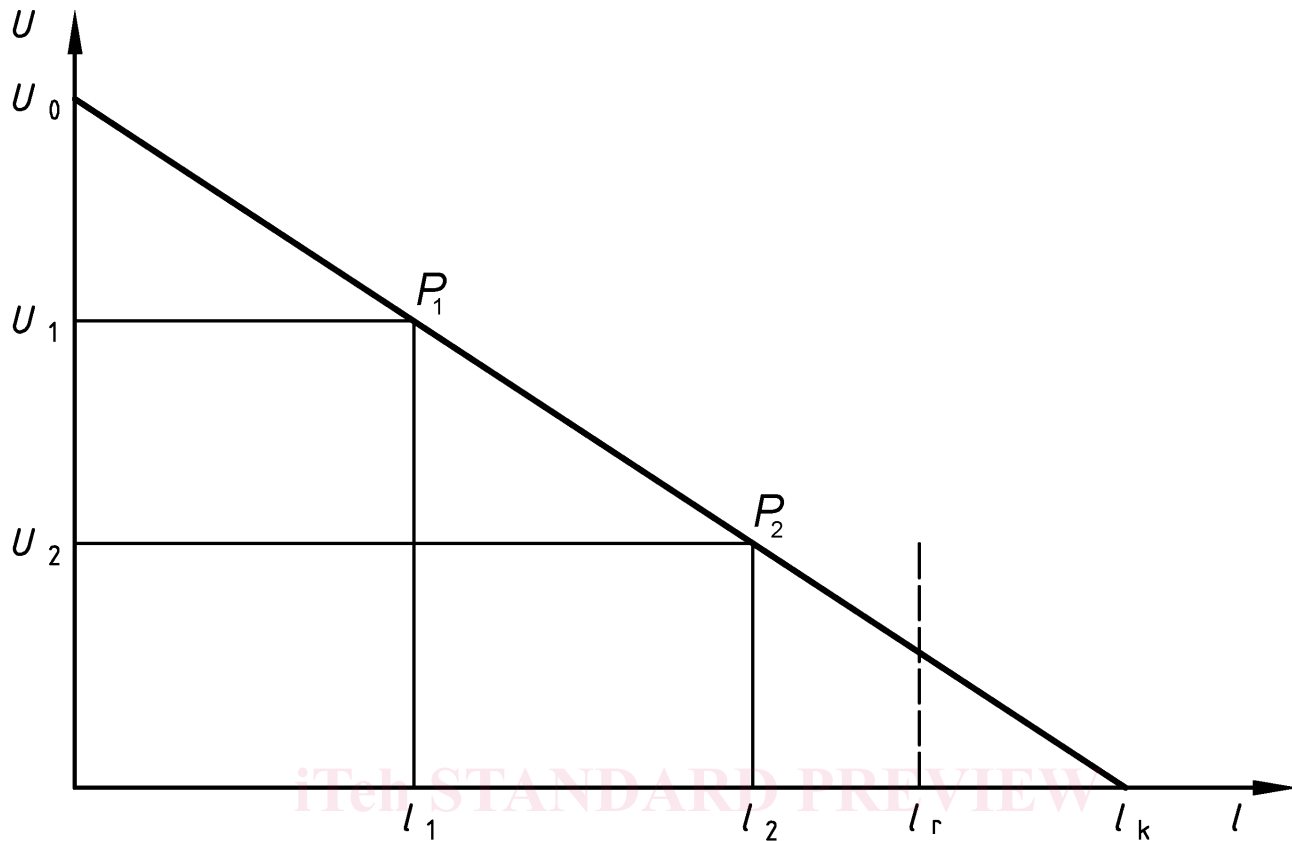
Generally electromagnets should be usable with one hand.

4.2 Current generators

Current generators are used to supply current for magnetizing equipment. A current generator is characterized by the open circuit voltage U_0 , the short circuit current I_k and the rated current I_r (RMS-values).

The rated current I_r is defined as the maximum current for which the generator is rated at the duty cycle of 10 % and for a current 'ON' time of 5 s if not otherwise specified.

The open circuit voltage U_0 and the short circuit current I_k are derived from the load-characteristic of the generator at maximum power (with any feed back controls disconnected). The load line of the generator may be derived by connecting two widely different loads, such as different lengths of cable, in turn to the generator. For the first cable, the current I_1 through the cable and voltage U_1 across the output terminals are measured and plotted, to give point P_1 on Figure 2. The process is repeated with a second load to give point P_2 . The load line is constructed by drawing a straight line between P_1 and P_2 . The open circuit voltage U_0 and short circuit current I_k are then given by the intercepts on the axes, as shown in Figure 2.

**Key**

P_1, P_2 Measuring points for determination of the load characteristics

Figure 2 — Load characteristics of the current generator

4.2.1 Technical data

The following data shall be provided:

- open circuit voltage U_0 (RMS);
- short circuit current I_k (RMS);
- rated current I_r (RMS);
- duty cycle at maximum output (if other than as specified in 4.2);
- maximum current 'ON' time (if other than specified in 4.2);
- current wave forms available;
- method of current regulation and effect on waveform;
- working range and incremental setting steps;
- method of constant current control if available;
- type of meter (digital, analog);