INTERNATIONAL STANDARD

ISO 9934-3

Second edition
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Non-destructive testing — Magnetic particle testing —

Part 3: Equipment

Essais non destructifs — Magnétoscopie —

Partie 3: Équipement

Reference number
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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

ISO 9934-3 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 138, *Non-destructive testing*, in collaboration with ISO/TC 135, *Non-destructive testing*, Subcommittee SC 2, *Surface methods*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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 principles*

— *Part 2: Detection media*

— *Part 3: Equipment*

Non-destructive testing — Magnetic particle testing —

Part 3: Equipment

1 Scope

This part of ISO 9934 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, measurement, and monitoring are also described.

This part of ISO 9934 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.

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

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

EN 10250-2, *Open steel die forgings for general engineering purposes — Non-alloy quality and special steels*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

3 Safety requirements

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

4 Types of devices

4.1 Portable electromagnets (AC[1])

4.1.1 General

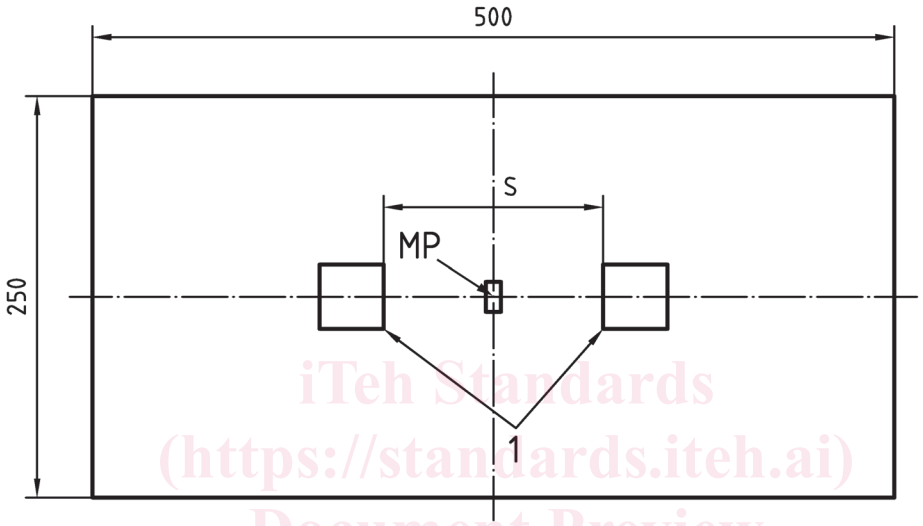
Hand-held portable electromagnets (yokes) produce a magnetic field between the two poles. When testing according to ISO 9934-1, DC[1] electromagnets should only be used if agreed at enquiry and order stages.

1) AC = alternating current, and DC = rectified current.

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 × (250 ± 13) mm × (10 ± 0,5) mm and shall be of steel conforming to C22 (1.0402) of EN 10250-2. Periodic functional checks can 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 C22 (1.0402) of EN 10250-2 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.

Dimensions in millimetres



Key

1 poles
s pole spacing
MP measuring point for the tangential field strength

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;