



# **Non-destructive testing — Magnetic particle testing**

## **Part 3: Equipment**



AS ISO 9934.3:2020

This Australian Standard® was prepared by MT-007, Non-Destructive Testing Of Metals And Materials. It was approved on behalf of the Council of Standards Australia on 24 February 2020.

This Standard was published on 6 March 2020.

The following are represented on Committee MT-007:

- Australasian Thermographers Association
- Australian Institute for Non-Destructive Testing
- Australian Nuclear Science and Technology Organisation
- Austrroads
- Engineers Australia
- Institute of Electrical Inspectors
- National Aerospace Non-Destructive Testing Board of Australia
- Weld Australia

This Standard was issued in draft form for comment as DR AS ISO 9934.3:2019.

### **Keeping Standards up-to-date**

Ensure you have the latest versions of our publications and keep up-to-date about Amendments, Rulings, Withdrawals, and new projects by visiting:

[www.standards.org.au](http://www.standards.org.au)

ISBN 978 1 76072 759 8



# Non-destructive testing — Magnetic particle testing

## Part 3: Equipment

Originated as part of AS B260.4A—1968.  
Revised and redesignated as AS 1171—1976.  
Previous edition 1998.  
Revised and redesignated as AS ISO 9934.3:2020.

### **COPYRIGHT**

© ISO 2020 — All rights reserved  
© Standards Australia Limited 2020

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968 (Cth).

## Preface

This Standard was prepared by the Australian members of Joint Standards Australia/Standards New Zealand Committee MT-007, Non-Destructive Testing of Metals and Materials, to supersede AS 1171—1998, *Non-destructive testing — Magnetic particle testing of ferromagnetic products, components and structures*.

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard rather than an Australian/New Zealand Standard.

The objective of this Standard is to describe the following three types of equipment for magnetic particle testing:

- (a) Portable or transportable equipment.
- (b) Fixed installations.
- (c) 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 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.

This Standard is identical with, and has been reproduced from, ISO 9934-3:2015, *Non-destructive testing — Magnetic particle testing — Part 3: Equipment*.

As this document has been reproduced from an International Standard, the following applies:

- (i) In the source text “this part of ISO 9934” should read “this Australian Standard”.
- (ii) A full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

# Contents

Preface .....	ii
Foreword .....	v
<b>1 Scope .....</b>	<b>1</b>
<b>2 Normative references .....</b>	<b>1</b>
<b>3 Safety requirements .....</b>	<b>1</b>
<b>4 Types of devices .....</b>	<b>1</b>
4.1 Portable electromagnets (AC <sup>1</sup> ) .....	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 General .....	3
4.2.2 Technical data .....	4
4.2.3 Technical requirements .....	5
4.3 Magnetic benches .....	5
4.3.1 General .....	5
4.3.2 Technical data .....	5
4.3.3 Technical requirements .....	6
4.3.4 Additional requirements .....	6
4.4 Specialized testing systems .....	6
4.4.1 Technical data .....	7
4.4.2 Technical requirements .....	7
<b>5 UV-A sources .....</b>	<b>8</b>
5.1 General .....	8
5.2 Technical data .....	8
5.3 Technical requirements .....	8
<b>6 Detection media system .....</b>	<b>8</b>
6.1 General .....	8
6.2 Technical data .....	8
6.3 Technical requirements .....	9
<b>7 Inspection booth .....</b>	<b>9</b>
7.1 General .....	9
7.2 Technical data .....	9
7.3 Technical requirements .....	9
<b>8 Demagnetization .....</b>	<b>10</b>
8.1 General .....	10
8.2 Technical data .....	10
8.3 Technical requirements .....	10
<b>9 Measurements .....</b>	<b>10</b>
9.1 General .....	10
9.2 Current measurement .....	10
9.3 Magnetic field measurement .....	11
9.3.1 General .....	11
9.3.2 Technical data .....	11
9.3.3 Technical requirements .....	11
9.4 Viewing conditions .....	11
9.5 Verification and calibration of instruments .....	11

---

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

**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.

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](http://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](http://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*

## NOTES

# Australian Standard<sup>®</sup>

## 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<sup>1)</sup>)

###### 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<sup>1)</sup> electromagnets should only be used if agreed at enquiry and order stages.

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

---

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