

Australian Standard™

Non-destructive testing

**Part 2: Radiographic determination of
quality of ferrous castings**



This Australian Standard was prepared by Committee MT-007, Non-destructive Testing of Metals and Materials. It was approved on behalf of the Council of Standards Australia on 6 January 2006.
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Australian Aerospace Non-Destructive Testing Committee
Australian Industry Group
Australian Institute for Non-Destructive Testing
Australian Nuclear Science & Technology Organisation
Australian Pipeline Industry Association
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STANDARDS AUSTRALIA

RECONFIRMATION

OF

AS 3507.2—2006

Non-destructive testing

Part 2: Radiographic determination of quality of ferrous castings

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Technical Committee MT-007 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

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NOTES

Australian Standard™

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Part 2: Radiographic determination of quality of ferrous castings

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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 3507.2—2003, *Non-destructive testing, Part 2: Radiographic determination of quality of ferrous castings*.

After consultation with shareholders 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 revision is to change the method of assessment for quality in ferrous castings.

This Standard is one of a series of Standards covering Non-destructive testing Standards. The series comprises the following:

AS

3507 Non-destructive testing

3507.1 Part 1: Guide to radiography for ferrous castings

3507.2 Part 2: Radiographic determination of quality of ferrous castings (this Standard)

The term ‘informative’ has been used in this Standard to define the application of the appendix to which it applies. An ‘informative’ appendix is only for information and guidance.

Statements expressed in mandatory terms in notes to tables are deemed to be requirements of this Standard.

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FOREWORD

Soundness of castings depends on such factors as size, section, configuration, method of moulding and design of runner and riser systems. These factors, and other aspects such as heat treatment, affect the grain structure and location and orientation of possible discontinuities. These factors have to be considered when choosing the appropriate test method and sensitivity.

Radiographic methods described in AS 3507.1 can be used to determine the size and nature but not necessarily the depth of discontinuities in castings. Each radiographic method can yield a radiograph with a range of sensitivities depending on section thickness.

For convenience in the assessment of integrity of castings, discontinuities in castings have been graded into severity indexes, which vary according to type of discontinuity. The severity index is then converted to a quality class.

Acceptance criteria or acceptable quality classes for discontinuities are normally specified in relevant product Standards or determined by agreement between the contracting parties after due consideration of size, configuration, and service requirements of the casting.

Where alternatives exist, the exact grading should be agreed between customer and contractor, if not covered by the product or application Standard.

Non-destructive testing methods are complementary; it is emphasized that the results of one test should be considered in relation to those obtained by another method. Accordingly, differing interpretations may be advantageously reassessed by alternative methods.

STANDARDS AUSTRALIA

Australian Standard Non-destructive testing

Part 2: Radiographic determination of quality of ferrous castings

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies the method of classification of quality for radiography of steel castings.

1.2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS	
1929	Non-destructive testing—Glossary of terms
2314	Radiography of metals—Image quality indicators (II) and recommendations for their use
3507	Non-destructive testing,
3507.1	Part 1: Guide for radiography for ferrous castings
3998	Non-destructive testing—Qualification and certification of personnel
4738	Metal castings
4738.1	Part 1: Ferrous sand moulded
4749	Non-destructive testing—Terminology of and abbreviations for fusion weld imperfections as revealed by radiography.

1.3 DEFINITIONS

For the purpose of this Standard, in AS 1929, AS 4749 and those definitions given below apply.

1.3.1 Air lock

A cavity formed by the entrapment of air during pouring and solidification.

1.3.2 Blowholes

Gas porosity (see Clause 1.3.6) that is open to the surface of the casting.

1.3.3 Cold shuts

A discontinuity at the surface formed when liquid metal has flowed over previously solidified or oxidized metal, (not fused together).

1.3.4 Cracks

A stress-induced fracture of metal occurring after solidification.

1.3.5 Filamentary shrinkage

A form of shrinkage (see Clause 1.3.12) characterized by extensive branching and interconnected cavities.

1.3.6 Gas porosity

Discrete cavities (pores) formed by the entrapment of gas resulting from the reaction of metal with the mould or a core during solidification, or from the release of gas from solution in the molten metal during solidification.

1.3.7 Hot tear

A fracture, frequently discontinuous and ragged, formed by restraint of metal during solidification or cooling.

1.3.8 Inclusion

Non-metallic material entrapped in the casting during solidification.

1.3.9 Macroshrinkage

Large shrinkage (see Clause 1.3.12) cavity or cavities caused by contraction of the metal during solidification.

1.3.10 Microshrinkage

A very fine form of filamentary shrinkage.

1.3.11 Sand inclusion

Sand entrapped during solidification.

1.3.12 Shrinkage

A cavity or cavities formed during solidification as a result of inadequate feeding.

1.3.13 Slag inclusion

A piece of slag entrapped during solidification.

1.3.14 Worm hole

A tubular cavity caused by the release of gas, usually oriented near and normal to the surface of the casting.