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Australian Standard®

NON-DESTRUCTIVE TESTING—ULTRASONIC TESTING OF CARBON AND LOW ALLOY STEEL PLATE—TEST METHODS AND QUALITY CLASSIFICATION

This Australian standard was prepared by Committee MT/7, Non-destructive Testing of Metals and Materials. It was approved on behalf of the Council of the Standards Association of Australia on 31 October 1985 and published on 6 January 1986.

The following interests are represented on Committee MT/7:

Australian Atomic Energy Commission
Australian Institute for Non-destructive Testing
Australian Pipeline Industry Association
Australian Welding Institute
Bureau of Steel Manufacturers of Australia
Commonwealth Aircraft Corporation Limited
Confederation of Australian Industry
Department of Defence
Department of Industrial Relations, N.S.W.
Electricity Supply Association of Australia
Institute of Australian Foundrymen
Metal Trades Industry Association of Australia
Ministry of Employment and Training, Victoria
National Association of Australian State Road Authorities
National Association of Testing Authorities, Australia
Pipeline Authority
Railways of Australia Committee
Society of Automotive Engineers—Australasia

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PREFACE

This edition of this standard was prepared under the direction of the Association's Committee on Non-destructive Testing of Metals and Materials, by its subcommittee on NDT acoustical methods. It applies to the testing and quality grading of steel plate supplied by the manufacturer. Such testing will usually be carried out as part of the manufacturer's production process and is an assurance of the general internal quality of the plate.

During the preparation of this standard, the Committee considered testing methods written into overseas standards, and practices which have evolved in the field of non-destructive testing in Australia, as well as the following standards:

AS 2207 Methods for the Ultrasonic Testing of Fusion Welded Joints in Steels

BS 5996 Methods of Testing and Quality Grading of Ferritic Steel Plate by Ultrasonic Methods

Quality grading classification has been increased to include three levels characterized by a limiting discontinuity content in the body of the plate including the plate edges, and one level charactertized by a limiting discontinuity content in plate edge zones only.

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for

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SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard sets out methods for the ultrasonic manual testing of carbon and low alloy wrought steel plate of uniform thickness, in the range 5 mm to 180 mm inclusive, using A-scan presentation. It also classifies plate quality.

NOTE: Supplementary information required to augment the standard is set out in Appendix A.

1.2 APPLICATION. This standard applies to the testing of steel plate for general internal quality, using methods which specify scanning to a designated scanning system. The procedures described in this standard enable the test operator to detect 'laminar' and 'inclusion cluster' type discontinuities. Section 5, Quality Grading, allows the specification of three quality levels for the body of the plate and one quality level for the edge zone.

1.3 REFERENCED DOCUMENTS. The following standards are referred to in this standard:

AS 1929 Non-destructive Testing — Glossary of Terms

AS 2083 Calibration Blocks and their Method of Use in Ultrasonic Testing.

1.4 DEFINITIONS. For the purpose of this standard, the definitions given in AS 1929 and the following apply:

1.4.1 Discontinuity indication—the appearance of an echo on the flaw detector screen (using 'A' scan presentation) between the surface position and the back echo position or a reduction of the original back echo.

NOTE: Care needs to be taken when observing a reduction of the original back echo without the simultaneous appearance of a discontinuity echo, since a loss of coupling efficiency may also cause this effect.

1.4.2 Significant discontinuity—at the sensitivity levels specified in Clause 3.4, any lamination or inclusion cluster type discontinuity (see Clauses 1.4.3 and 1.4.4) with an estimated area equal to or greater than that specified in Column 1 of Tables 3.1 and 3.2 for the applicable quality level.

1.4.3 Lamination—at the sensitivity levels specified in Clause 3.4, any discontinuity causing total reflection of acoustic energy for a probe movement of 5 mm in a direction transverse to the major dimension of the discontinuity.

NOTE: Care needs to be exercised in assessing a lamination when it is located exactly in the centre of the plate thickness, because the back echoes are replaced by multiples of the discontinuity echo.

1.4.4 Inclusion cluster—at the sensitivity levels specified in Clause 3.4, a discontinuity is termed an inclusion cluster if individual discontinuity echoes are at least 50 percent of the reduced back echo, or cause at least a 50 percent reduction in the back echo obtained from a discontinuity free area of the plate.

NOTE: Discontinuities separated by less than 12 mm are considered continuous.