

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

Review of Australian Standards. *To keep abreast of progress in industry, Australian Standards are subject to periodic review and are kept up to date by the issue of amendments or new editions as necessary. It is important therefore that Standards users ensure that they are in possession of the latest edition, and any amendments thereto.*

Full details of all Australian Standards and related publications will be found in the Standards Australia Catalogue of Publications; this information is supplemented each month by the magazine 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.

Suggestions for improvements to Australian Standards, addressed to the head office of Standards Australia, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian Standard should be made without delay in order that the matter may be investigated and appropriate action taken.

This Standard was issued in draft form for comment as DR 83243.

Australian Standard®

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

First published (as AS B274)	1971
AS 1710 first published	1975
Second edition	1986

PUBLISHED BY STANDARDS AUSTRALIA
(STANDARDS ASSOCIATION OF AUSTRALIA)
1 THE CRESCENT, HOMEBUSH, NSW 2140

ISBN 0 7262 4019 2

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 characterized by a limiting discontinuity content in plate edge zones only.

© Copyright — STANDARDS AUSTRALIA

Users of Standards are reminded that copyright subsists in all Standards Australia publications and software. Except where the Copyright Act allows and except where provided for below no publications or software produced by Standards Australia may be reproduced, stored in a retrieval system in any form or transmitted by any means without prior permission in writing from Standards Australia. Permission may be conditional on an appropriate royalty payment. Requests for permission and information on commercial software royalties should be directed to the head office of Standards Australia.

Standards Australia will permit up to 10 percent of the technical content pages of a Standard to be copied for use exclusively in-house by purchasers of the Standard without payment of a royalty or advice to Standards Australia.

Standards Australia will also permit the inclusion of its copyright material in computer software programs for no royalty payment provided such programs are used exclusively in-house by the creators of the programs.

Care should be taken to ensure that material used is from the current edition of the Standard and that it is updated whenever the Standard is amended or revised. The number and date of the Standard should therefore be clearly identified.

The use of material in print form or in computer software programs to be used commercially, with or without payment, or in commercial contracts is subject to the payment of a royalty. This policy may be varied by Standards Australia at any time.

CONTENTS

	<i>Page</i>
SECTION 1. SCOPE AND GENERAL	
1.1 Scope	4
1.2 Application	4
1.3 Referenced Documents	4
1.4 Definitions	4
SECTION 2. EQUIPMENT	
2.1 General	5
2.2 Probes	5
2.3 Presentation	5
2.4 Gain Control	5
2.5 Couplant	5
2.6 Equipment Checks	5
SECTION 3. PROCEDURE	
3.1 Surface Condition	6
3.2 Sensitivity	6
3.3 Scanning Methods	6
3.4 Evaluation—Sensitivity Levels	6
SECTION 4. SIZING OF DISCONTINUITIES	
4.1 Laminations	8
4.2 Inclusion Clusters	8
SECTION 5. QUALITY GRADING	
5.1 Limits of Discontinuities	9
5.2 Designation of Quality Grades	9
SECTION 6. RECORD OF RESULTS AND TEST REPORT	
6.1 Record of Results	10
6.2 Test Report	10
APPENDICES	
A Information to be Supplied with the Enquiry and Order	11
B Sizing Methods	12

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

for

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

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.