

AS 2084—1987

Australian Standard[®]

**NON-DESTRUCTIVE TESTING—
EDDY CURRENT TESTING OF
METAL TUBES**

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 17 February 1987 and published on 4 May 1987.

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
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which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.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 85281.

AS 2084—1987

Australian Standard[®]

**NON-DESTRUCTIVE TESTING—
EDDY CURRENT TESTING OF
METAL TUBES**

First published	1977
Second edition	1987

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

ISBN 0 7262 4591 7

PREFACE

This edition of this standard was prepared under the direction of the Association's Committee for Non-destructive Testing of Metals and Materials by its subcommittee on surface methods as a result of a request from industry. It was considered that the existing standard endeavoured to cover too broad a field, viz., non-ferrous tube, ferrous tube, welded tube and bar, and was insufficiently specific with regard to geometry and manufacturing details of the reference standards, calibration procedures, and to frequency limitations. In view of differing and specific requirements for the above products, it was felt by the subcommittee that the standard should cover a related group of products, and this standard covers metal tubes only. If a requirement for eddy current testing of rod and bar arises in the future, a further standard will be prepared.

© 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 REFERENCED DOCUMENTS	4
1.3 DEFINITIONS	4
1.4 PRINCIPLE OF TEST	4
1.5 SAFETY	4
SECTION 2. EQUIPMENT	
2.1 GENERAL	5
2.2 TEST COILS	5
2.3 DRIVING MECHANISM	5
2.4 CALIBRATION STANDARDS	5
2.5 EQUIPMENT TEST SENSITIVITY	5
2.6 END EFFECT SUPPRESSION	6
SECTION 3. METHODS OF TEST	
3.1 GENERAL	7
3.2 COPPER AND COPPER ALLOY TUBE	7
3.3 FERROUS TUBE	7
3.4 STAINLESS STEEL TUBE	7
SECTION 4. EVALUATION OF TEST DATA	
4.1 GENERAL	10
4.2 TEST EVALUATION	10
SECTION 5. PRESENTATION OF TEST DATA	
5.1 GENERAL	11
5.2 RECORD OF TEST	11
5.3 TEST REPORT	11
APPENDIX A. INFORMATION TO BE SUPPLIED WITH THE ENQUIRY AND ORDER	12

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

for

NON-DESTRUCTIVE TESTING—EDDY CURRENT TESTING OF METAL TUBES

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard sets out methods employing external search coils for eddy current testing of ferrous and non-ferrous tubular products for discontinuities or damage.

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

AS 1470 Code of General Principles for Safe Working in Industry

AS 1929 Non-destructive Testing—Glossary of Terms.

1.3 DEFINITIONS. For the purpose of this standard the definitions in AS 1929 apply.

1.4 PRINCIPLE OF TEST. The test consists in locating discontinuities by the use of eddy currents induced in the product under test by an applied electromagnetic field. It is intended for use with either an encircling coil or an external probe coil technique.

The test is performed by passing the product lengthwise through or near to an exciter coil energized with alternating current having one or more frequencies which induce eddy currents in the product. The electrical impedance of this coil or

search coil is modified by the proximity of the product to the coil. The extent of this modification is determined by the distance between the coil and the product under test, by product dimensions, electrical conductivity and magnetic permeability.

Damage or discontinuities in the product arising from physical, metallurgical, mechanical or dimensional changes will alter the apparent impedance of the coil.

Changes in coil response characteristics (caused by local differences in the induced eddy current field in the product during its passage either through a test coil or past a probe) will produce electrical signals which are amplified and modified either to activate a signalling device (e.g. bells or lamp), or to initiate a mechanical marker which will indicate the position of discontinuities on the product by paint spots, or to initiate a sorting or other device.

Signals can be produced by discontinuities located on the exterior or interior surfaces of a tube, or within the walls of a tube by the selection of appropriate equipment test conditions.

1.5 SAFETY. In carrying out tests in accordance with this standard, the safe working procedures laid down in AS 1470 shall apply.