

SUPERSEDED *by AS/NZS 2717:1996*

AS 2717.1—1984
UDC 621.791.042.4:621.791.85

Australian Standard 2717.1—1984

WELDING—ELECTRODES - GAS METAL ARC Part 1—FERRITIC STEEL ELECTRODES



STANDARDS ASSOCIATION OF AUSTRALIA
Incorporated by Royal Charter



This Australian standard was prepared by Committee WD/2, Electrodes and Filler Rods. It was approved on behalf of the Council of the Standards Association of Australia on 17 April 1984 and published on 3 August 1984.

The following interests are represented on Committee WD/2:

Australian Gas Association
Australian Institute of Petroleum Limited
Australian Welding Institute
Australian Welding Research Association
Bureau of Steel Manufacturers of Australia
Confederation of Australian Industry
Department of Defence
Department of Defence Support
Department of Industrial Relations, N.S.W.
Department of Labour and Industry, Vic.
Lloyd's Register of Shipping
Metal Trades Industry Association of Australia
Metropolitan Water, Sewerage and Drainage Board, N.S.W.
Railways of Australia Committee

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 SAA publications will be found in the Catalogue of Australian Standards; this information is supplemented each month by SAA's journal '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which subscribing members receive and which gives details of new publications, new editions and amendments, and of withdrawn standards.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 the Association, 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 83045.

AUSTRALIAN STANDARD

**WELDING—ELECTRODES—
GAS METAL ARC**
Part 1—FERRITIC STEEL ELECTRODES

AS 2717.1—1984

First published1984



PUBLISHED BY THE STANDARDS ASSOCIATION OF AUSTRALIA
STANDARDS HOUSE, 80 ARTHUR ST, NORTH SYDNEY, N.S.W.

ISBN 0 7262 3405 2

1715 1984

PREFACE

This standard was prepared by the Association's Committee on Electrodes and Filler Rods and is one of a proposed series of standards for continuous wire (welding) processes that is being developed to suit Australian conditions.

Australian standards covering electrodes and other welding consumables are as follows:

- AS 1167 Welding and Brazing—Filler Metals
Part 1—Filler Metals for Brazing and Braze Welding
- AS 1552 Classification of Covered Electrodes
- AS 1553 Covered Electrodes for Welding
Part 1—Low Carbon Steel Electrodes for Manual Metal-arc Welding of Carbon and Carbon-manganese Steels
- AS 1586 Low Alloy Steel Covered Electrodes for Manual Metal-arc Welding
- AS 1588 Filler Rods for Welding
- AS 1858 Electrodes and Fluxes for Submerged-arc Welding of Carbon and Low Alloy Steels
- AS 2203 Carbon Steel Electrodes, Cored (for Arc Welding)
- AS 2576 Welding Consumables for Build-up and Wear Resistance—Classification System.

The classification system adopted has been designed to be compatible with AS 1858 and AS 2203, and similarly has mechanical requirements complying with the Ship Classification Societies' unified rules. It also takes into consideration pertinent documents of the International Institute of Welding and the American National Standards Institute.

To assist designers, the concept of weld metal classification which was introduced in AS 1858 has been incorporated in the classification of these electrodes. This concept of weld metal classification is regarded by the committee as being of great significance.

For ease of selection, the weld metal is classified according to its tensile strength and is divided into grades related to its Charpy V-notch impact energy value. The intent here is that the designer needs only to specify on the drawing the weld metal classification which will thereby nominate the mechanical properties required for the satisfactory functioning of the welded joint. The fabricator, taking into account recommendations by the manufacturer of the consumables, can select the electrode or electrode/gas combination appropriate to the material of construction and the conditions pertaining at the time.

If procedure qualification is called for in the relevant application code, it may be necessary for the chosen electrode to be qualified by procedure testing.

©Copyright — STANDARDS ASSOCIATION OF AUSTRALIA 1984

Users of standards are reminded that copyright subsists in all SAA publications. No part of this publication may be reproduced, stored in a retrieval system in any form or transmitted by any means without prior permission in writing of the Standards Association of Australia.

CONTENTS

	<i>Page</i>
SECTION 1. SCOPE AND GENERAL	
1.1 Scope	4
1.2 Referenced Documents	4
1.3 Definitions	4
1.4 Classification	4
SECTION 2. PROPERTIES AND REQUIREMENTS	
2.1 Shielding Gas	6
2.2 Electrodes	6
2.3 Chemical Composition	6
2.4 Physical Requirements	6
2.5 Manufacture	7
2.6 Sizes	7
2.7 Finish, Temper, Cast, Helix and Uniformity	9
2.8 Coiling and Packaging of Electrodes	10
2.9 Marking	12
2.10 Storage	13
APPENDICES	
A Methods of Test	14
B Guide to Gas Metal Arc Electrodes for Ferritic Steels	19
ANNEX. LIST OF REFERENCED DOCUMENTS	24

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
for
WELDING—ELECTRODES—GAS METAL ARC
PART 1—FERRITIC STEEL ELECTRODES

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard specifies requirements for the following solid electrodes for gas metal arc welding:

- (a) Carbon steel electrodes.
- (b) Low or intermediate alloy ferritic steel electrodes. Additional information concerning electrodes is given in Appendix B.

1.2 REFERENCED DOCUMENTS. A list with titles of the documents referred to in this standard is given in the Annex.

1.3 DEFINITIONS. For the purpose of this standard, the definitions in AS Z5, Part 1, and the following apply:

1.3.1 Basket—a type of package consisting of a continuous length of electrode wound on a rigid open wire framework forming a cylinder, flanged at both ends.

1.3.2 Coil—a type of package consisting of a continuous length of electrode in coil form, with or without internal support.

1.3.3 Drum—a type of package consisting of a continuous length of electrode wound or coiled within an enclosed cylindrical container.

1.3.4 Lot or batch number—a number from which the manufacturer is able to identify the electrode composition and the date of manufacture.

1.3.5 Reel—a type of package consisting of a continuous length of electrode wound on a cylinder, flanged at both ends, with a flange diameter exceeding 450 mm.

1.3.6 Rim—a type of package consisting of a continuous length of electrode wound on a flanged liner of the type shown in Fig. 2.4.

1.3.7 Shall and should—the word 'shall' is to be understood as mandatory and the word 'should' as non-mandatory, advisory or recommended.

1.3.8 Spool—a type of package consisting of a continuous length of electrode wound on a cylinder, flanged at both ends, with a maximum diameter of 450 mm at the flanged ends.

1.4 CLASSIFICATION.

1.4.1 Basis of classification. Electrodes shall be classified on the basis of their chemical composition. Provision is made in the designation for specification

of the type of external shielding gas and the mechanical properties of the deposited weld metal.

1.4.2 Description of the classification system. The classification system shall consist of three groups of elements separated by hyphens, each group comprising letters or letters and figures. The letters used in the system are given below in their group subdivisions and the figures used are given in Table 2.2. (See Clause 1.4.3 for examples of the use of the system.)

(a) *First group*—chemical composition of electrode:
ES = electrode, solid, followed by an alphanumeric code taken from Table 2.2 indicating chemical composition.

(b) *Second group*—type of external shielding:
G = gas shielding, followed by a letter as follows:
C = shielding with carbon dioxide
M = shielding with mixed gases
I = shielding with inert gas.

The gas used in the qualification tests shall be specified by trade name or by composition (percentage of constituents).

(c) *Third group*—mechanical properties of the weld metal:

W = weld metal. This is followed by a three-digit number indicating the weld metal properties. This number is extracted from Tables 2.3 and 2.4.

(i) *The first two digits*—being approximately 0.1 of the specified minimum tensile strength of the weld metal, in megapascals, as listed in Table 2.3.

(ii) *The third digit*—for carbon steel electrodes, indicates the impact energy grade number as listed in Table 2.4. For low alloy ferritic steel electrodes, the third digit is 9 and the minimum impact value shall be as stated in Table 2.4.

H = the gas metal arc welding process is hydrogen controlled, i.e. contains not more than 15 mL of diffusible hydrogen per 100 g of deposited weld metal. (See Appendix B.)

1.4.3 Use of classification system.

1.4.3.1 Order of expression. Where an electrode, shielding gas and the resultant weld metal classification are to be quoted in combination they should be set out in the order illustrated in Fig. 1.1 and separated by hyphens. In Fig. 1.1, the letter 'X' indicates a variable.