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Australian Standard 1835—1983

Metals file

TUBES FOR PRESSURE PURPOSES—SEAMLESS STEEL

STANDARDS ASSOCIATION OF AUSTRALIA
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AS 1835—1983

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PREFACE

This edition of this standard was prepared by the Association's Committee on Boilers and Unfired Pressure Vessels to supersede AS 1835—1976 and is intended to cover seamless steel tubes for use in the boiler and pressure vessel field.

The committee recognized that there had been only limited production of these tubes in Australia, but after investigation decided that the standard would be retained for, as well as its use as the basis of manufacture of tubes, the standard establishes the criteria, particularly non-destructive testing requirements, for tubes for use in the Australian boiler and pressure vessel industry.

Changes from the previous edition include the deletion of one grade (TS 2), the deletion of the size tables and the presentation of Lower Confidence Limit (LCL) line data.

This standard is based on ISO 2604, Steel Products for Pressure Purposes—Quality Requirements—Part II: Wrought Seamless Tubes, but includes only those steel grades that are used in Australia. However, in this edition, some values for material properties have been revised to align with those in the latest British standards for the equivalent tubes, in which the previously adopted ISO values have been reviewed to take advantage of the most recent research.

Stress rupture properties for the steels covered, though not part of this standard, are given in Appendix C and approximate steel grade and test category equivalents are given in Appendix F.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
for
TUBES FOR PRESSURE PURPOSES—SEAMLESS STEEL

1 SCOPE. This standard specifies requirements for seamless carbon, carbon-manganese and low alloy steel tubes manufactured from steel by one of the processes listed in Clause 7. It is primarily intended for use with AS 1200, and consequently includes low temperature, room temperature and elevated temperature properties.

NOTES:

1. Guidelines to purchasers on requirements that must be specified by the purchaser and those that must be agreed to at the time of enquiry and/or order are listed in Appendix A.
2. For the purpose of this standard, the terms 'pipe' and 'tube' are synonymous.

2 REFERENCED DOCUMENTS. The following documents are referred to in this standard:

AS 1050	Methods for the Analysis of Iron and Steel
AS 1200	SAA Boiler Code
AS 1213	Iron and Steel—Methods of Sampling
AS 1391	Methods for Tensile Testing of Metals
AS 1544	Methods for Impact Tests on Metals Part 2—Charpy V-notch
AS 1733	Methods for the Determination of Grain Size in Metals
AS 2069	Method for Verifying the Minimum Elevated Temperature Lower Yield or Proof Stress Properties of Carbon and Low Alloy Steel Products
AS 2291	Methods for Tensile Testing of Metals at Elevated Temperatures
AS K1	Methods for the Sampling and Analysis of Iron and Steel
ISO/R 85	Bend Test for Steel
ISO/R 165	Flanging Test on Steel Tubes
ISO/R 166	Drift Expanding Test on Steel Tubes
ISO/R 202	Flattening Test on Steel Tubes
ISO 2566	Steel—Conversion of Elongation Values Part 1: Carbon and Low Alloy Steels

3 DESIGNATION. Tubes manufactured to this standard shall be designated by the number of this standard (i.e. AS 1835) and the steel grade (see Table 1) followed by the process of manufacture (see Clause 7) and test category (see Clause 9).

Examples (for TS 1 tubes):

AS 1835—TS 1—HFS-II (for hot-finished tubes, test category II)
AS 1835—TS 1—CFS-IV (for cold-finished (including cold drawn) tubes, test category IV).

4 DEFINITIONS. For the purpose of this standard, the following definitions apply:

4.1 Outside diameter and thickness—the nominal outside diameter and nominal thickness unless otherwise qualified in the text.

4.2 Shall and should—'shall' is to be understood as mandatory and 'should' as advisory.

5 STEELMAKING PROCESS. The steel shall be made by the open hearth process, the electric process, or the basic oxygen process, unless one or more of these processes is specially required.

For the purpose of this standard, the basic oxygen process means the process of making steel in a basic converter blown with commercially pure oxygen.

6 CHEMICAL COMPOSITION.

6.1 General. The method of sampling for chemical analysis shall be in accordance with AS 1213. Chemical composition shall be determined by any procedures which are not less accurate than AS 1050 or AS K1.

6.2 Cast analysis. A chemical analysis of the steel from each ladle shall be made to determine the proportions of the specified elements. Where it is impractical to obtain samples from liquid steel, analysis on test samples taken in accordance with Clause 3.5 of AS 1213 may be reported as cast analysis.

The reported cast analysis of the steel shall conform to the limits given in Table 1.

6.3 Product analysis. The purchaser shall state (see Appendix A, item (e)) whether a product analysis is to be made on the tube. The product analysis shall not deviate from the limits for cast analysis beyond the values given in Table 2.

7 METHOD OF MANUFACTURE. The tubes shall be manufactured by a seamless process and may be hot finished or cold finished. The terms 'hot finished' and 'cold finished' apply to the condition of the tube before it is heat-treated in accordance with Clause 8.

8 HEAT TREATMENT. Unless otherwise specified (see Notes), tubes shall be supplied in the hot-finished condition or in one of the heat-treated conditions shown for the particular steel grade in Table 1, at the option of the manufacturer.

NOTES:

1. Where specified (see Appendix A, item (c)) and by agreement between the purchaser and the manufacturer, the tubes may be supplied in a condition other than one of the heat-treated conditions in Table 1, in which case they are to be suitable for subsequent manipulation and the purchaser is to be informed of the heat treatment necessary to give the specified properties.
2. Where heat treatments to be carried out after delivery of the tubes are different from, or additional to any of the heat treatments shown in Table 1 (and may have an adverse effect on mechanical properties), the purchaser may if so specified (see Appendix A, item (c)), require additional mechanical tests on additional samples which have been given heat treatments different from or additional to those in Table 1. In that case, the heat treatment of the samples and the mechanical properties to be obtained on them are subject to agreement between the purchaser and the manufacturer.

9 TEST CATEGORIES. For the purpose of this standard, tubes shall be categorized in accordance with the types of tests required. The tests required for each category are shown in Table 3.

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