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Australian Standard 396—1979

STEEL WATER BORE CASING

1396—1990 **Steel water bore casing** A4 7pp CC

Specifies material and dimensional requirements for seamless or electric resistance welded tubes intended for use as water-bore casing. It covers six sizes specified by outside diameter, from 101.6 mm and 323.8 mm providing for bevelled and welded joints in all sizes and for threaded and coupled joints in sizes up to 219.1 mm outside diameter. American National Standard Pipe Threads are used, and the Standard includes details of an obsolete thread formerly known as 44 in nominal pipe size. Minimum joint strengths of threaded and coupled casing are also given.

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STANDARDS ASSOCIATION OF AUSTRALIA
Incorporated by Royal Charter

THE FOLLOWING INDUSTRIAL, PROFESSIONAL, SCIENTIFIC AND GOVERNMENTAL organizations and departments were officially represented on the committee entrusted with the preparation of this standard:

National Water Well Association

Tubemakers of Australia Limited

Warman (International) Limited

Water Resources Commission, N.S.W.

This standard, prepared by Committee CE/7 Water Bore Casing, was approved on behalf of the Council of the Standards Association of Australia on 11 June 1979, and was published on 1 September 1979.

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AUSTRALIAN STANDARD

STEEL WATER BORE CASING

AS 1396—1979

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PREFACE

This standard was prepared by the Association's Committee on Water Bore Casing. It sets down the physical and chemical requirements for the materials used in the manufacture of tubes and couplings for water bore casing, together with dimensions of the tubes and couplings. Six tube sizes, specified by outside diameter, are covered in a range from 101.6 mm to 323.8 mm, the joints in the four smaller sizes (to 219.1 mm) being either threaded and coupled or bevelled and welded. Joints in the two larger sizes (273 mm and 323.8 mm) are bevelled and welded. Provision is made for the use of tube thicknesses not specified in the standard, since it is felt that the specified thicknesses, although selected to fit the end use, may not be the most readily available. The Association proposes to review the need for optional thicknesses in the future.

Joint details follow American practice and, except for 127 mm outside diameter, employ threads in accordance with the gauging practice and tolerances of the American national standard for pipe threads (ANSI B2.1). This thread would be interchangeable with line pipe in accordance with Specification 5L of the American Petroleum Institute, with a pitch of 3.175 mm (8 t.p.i.) and a taper of 1 in 16 on diameter, and the taper applies to both tube end and coupling.

To provide the desired progression of sizes and clearances on 127 mm OD pipe, use has been made of an obsolete American pipe thread formerly known as 4½ in nominal pipe size. Thread dimensions of this non-standard pipe thread are covered in Appendix C.

The Association accepted the historical nature of the hydrostatic test for the tubing. Provision was made for the possible use of casing tube for pressure purposes, by allowing the purchaser to call up the test; nevertheless it was deemed appropriate to consider casing tube primarily as a mechanical barrier to the material in the sides of the bore.

Tubes and couplings manufactured in Australia are produced by the electric resistance welding process, but seamless tube and couplings complying with the requirements of this standard may be used if so desired.

In the preparation of this standard, information was obtained from various sources, including British and American standards, and the assistance from these sources is acknowledged.

This standard may require reference to the following standards:

AS 1391	Methods for the Tensile Testing of Metals
AS 1450	Circular and Non-circular Carbon Steel Tubes for Mechanical and General Engineering Purposes
BS 879	Water Well Casing
BS 3894	Method for Converting Elongation Values for Steel Part 1—Carbon and Low Alloy Steels
ANSI B2.1	Pipe Threads (Except Dryseal)
ASTM A53	Welded and Seamless Steel Pipe
ASTM A589	Seamless and Welded Carbon Steel Water-well Pipe
API Std 5B	Threading, Gaging and Thread Inspection of Casing, Tubing and Line Pipe Threads

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
for
STEEL WATER BORE CASING

1 SCOPE. This standard applies to electric resistance welded steel tubing for water bore casing, having threaded and coupled joints in sizes ranging from 101.6 mm OD to 219.1 mm OD, and bevelled and welded joints in sizes ranging from 101.6 mm OD to 323.8 mm OD. It also applies to couplings intended for use with the tubing.

Casing tubes (specified by OD and thickness) are listed in Tables 3 and 4.

NOTE: For purchasing guidelines, see Appendix A.

2 DEFINITIONS. For the purpose of this standard, the definitions given in AS 1391 and the following apply:

2.1 Tube—where used without qualification, means one length of casing.

2.2 Size—outside diameter (OD) of the casing along the barrel.

3 MATERIAL.

3.1 General. Tubes and couplings shall be made from steel meeting the requirements for chemical analysis given in Clause 3.3.

3.2 Manufacturing Process. Tubes and couplings shall be produced by either the electric resistance welded process or the seamless process.

NOTE: Seamless tubes and couplings are not manufactured in Australia, but their use is permitted provided that their chemical analysis and physical properties comply with the requirements of this standard.

3.3 Chemical Analysis. The steel used for the tubes and couplings shall conform to the chemical analysis given in Table 1.

TABLE 1
CHEMICAL ANALYSIS

Analysis	Chemical composition max percent			
	C	$C+\frac{Mn}{6}$	P	S
Ladle	0.25	0.42	0.050	0.050
Product	0.29	—	0.060	0.060

3.4 Physical Properties. When tested in accordance with Clause 4.2, tube, including tube for coupling manufacture, shall show the minimum tensile properties given in Table 2.

When tested in accordance with Clause 4.3, the material shall show no sign of failure.

TABLE 2
TENSILE PROPERTIES

Product	Yield stress MPa	Tensile strength MPa	Elongation on gauge length of $5.65\sqrt{S_o}$* percent
Tube	350	450	20
Coupling	350	450	20

*See Clause 4.2.

4 TESTS FOR PHYSICAL PROPERTIES.

4.1 Test Specimens. For tubes presented for testing for compliance with Clause 3.4, the test specimens shall not be subjected to any form of heat treatment other than that involved in the process of manufacture of the tubes from which they have been cut.

For tubes of size 168.3 mm and smaller, test specimens shall be taken from one tube selected from each batch of 200 tubes, and for tube sizes larger than 168.3 mm, from one tube from each batch of 100 tubes.

NOTE: For batch sizes smaller than those specified above, tests, if required, are a matter for arrangement between purchaser and manufacturer.

4.2 Tensile Test. A longitudinal test piece in accordance with AS 1391 shall be cut from the test specimen and shall not be flattened between gauge marks. For a test specimen containing a longitudinal weld, the test piece shall be taken from a location approximately 90 degrees from the weld.

The tensile test piece shall be tested as specified in AS 1391. The rate of loading when approaching yield stress shall be such that the straining rate shall not exceed straining rate A of AS 1391.

When reporting the elongation of a tensile test piece, the proportion of change in length between the gauge marks shall be expressed in terms of a gauge length of $5.65\sqrt{S_o}$, where S_o is the area of cross-section of the test piece.

NOTE: For converting elongation values on other gauge lengths, see BS 3894: Part 1.

4.3 Cold Flattening Test. A transverse flattening test piece shall be taken circumferentially from one end of a test specimen taken from a sample tube prior to threading. The length of the test piece shall be not less than 40 mm. All burrs shall be removed before testing.

The flattening test piece shall be flattened at room temperature between two parallel plane surfaces with the weld at 90 degrees to the direction of flattening, until the distance between the surfaces is 0.75 times the specified outside diameter of the tube.