AS/NZS 2280:2004
(Incorporating Amendment No. 1)

Australian/New Zealand Standard™

Ductile iron pipes and fittings

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee WS-016, Cast Iron Pressure Pipes and Fittings. It was approved on behalf of the Council of Standards Australia on 6 August 2004 and on behalf of the Council of Standards New Zealand on 6 August 2004.
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The following are represented on Committee WS-016:

Australian Chamber of Commerce and Industry
Australian Industry Group
Casting Technology New Zealand
Certification Bodies (Australia)
Civil Contractors Federation
Department of Energy Utilities and Sustainability NSW
Water Services Association of Australia

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee WS-016, Cast Iron Pressure Pipes and Fittings, to supersede AS/NZS 2280:1999.

This Standard incorporates Amendment No. 1 (March 2006). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

The objective of this Standard is to provide a standard manufacturing specification to be used by manufacturers and purchasers of ductile iron pressure pipes and fittings.

The main change to this edition has been to replace the K classification system with pressure classification.

Other relevant Standards and reference relating to installation of ductile iron pipelines include:

(a) AS 3680, *Polyethylene sleeving for ductile iron pipelines*, which specifies requirements for materials for loose polyethylene sleeving intended for the corrosion protection of ductile iron pipelines when installed underground.

(b) AS 3681, *Guidelines for the application of polyethylene sleeving to ductile iron pipelines and fitting*, which provides guidance on the application of polyethylene sleeving to ductile iron pipelines.

(c) AS/NZS 2566.1, *Buried flexible pipelines*: Part 1: *Structural design*, which specifies a practice for the structural design of buried flexible pipelines, which rely upon side support to resist vertical loads. The practice applies to pipes with outside diameters equal to or greater than 75 mm, initial ring-bending stiffness equal to or greater than 1250 N/m/m and long term ring-bending stiffness equal to or greater than 625 N/m/m.

(d) Water Services Association of Australia Information and Guidance Note, WSA TN3, *Guidelines for the pipe ring-bending stiffness and allowable deflection of ductile iron pipe*, available from www.wsaa.asn.au.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the Appendix to which they apply. A ‘normative’ Appendix is an integral part of a Standard, whereas as an ‘informative’ Appendix is only for information and guidance.

Statements expressed in mandatory terms in notes to tables and figures are deemed to be requirements of this Standard. Notes to text are for information and guidance only.

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FOREWORD

This Standard sets out manufacturing requirements and dimensions for ductile iron pipes and fittings.

In the 1999 edition of the Standard two classes of pipe, K9 and K12, were specified on the basis of wall thickness. It closely aligned with International Standards and the wall thicknesses were related to manufacturing capability.

In this edition of the Standard, the class of ductile iron pipe has been determined on the basis of the allowable operating pressure (AOP) to give a minimum wall thickness. It provides a factor of safety of 3 on allowable operating pressure, but does not include a separate corrosion allowance. Most users now consider the issue of corrosion is best addressed by the consideration of appropriate protection systems.

The Standard permits a range of pressure classifications with two standard classifications of PN 20 and PN 35 for pipe, and PN 35 for fittings.

The allowable operating pressure of a pipeline is limited to the lowest allowable operating pressure of all pipes, fittings and appurtenances within the pipeline system.

Fittings covered by this Standard are intended primarily for use with water supply pressure pipes having outside diameters nominated herein; however, the fittings may also be used with pressure pipes of alternative outside diameters by the adoption of compatible sockets or utilization of compensating elastomeric seals, provided the joint meets the performance requirements of this Standard. Ductile iron spigots should not be inserted into plastics sockets.

Other factors to be considered in selecting the wall thickness of ductile iron pipes and fittings are as follows:

(a) External loads that can be expected to be applied to pipes and fittings during and after installation. The depth of the pipeline in the ground and other pipe-laying conditions must be considered.

(b) Stresses due to expansion and contraction.

(c) Stresses incurred during handling of pipes and fittings.

A designer of a pipeline has, among other duties, the responsibility of evaluating the possible conditions to which component pipes and fittings may be exposed. The designer must consider whether pipes and fittings manufactured in accordance with this Standard are, in fact, of sufficient strength for a proposed application.

Ductile iron pressure pipes and fittings with spigot and socket ends are manufactured for use with flexible joints in which the seal is made by means of a suitably retained rubber gasket. It is not possible to include complete details of such joints and joint surfaces without restricting future developments in their design.

Where pipeline designers are combining non-metallic pipes with fittings manufactured to this Standard, the following should be considered when assessing required minimum depth of pipe entry into fitting sockets:

(i) Thermal expansion and contraction.

(ii) Joint deflection.

(iii) Viscoelasticity of pipeline material.

(iv) Off-square pipe cuts and chamfer lengths.

Guidelines for the use of non-metallic pipes with ductile iron fittings specified within this Standard are given in the Water Services of Australia Information and Guidance Note WSA TN2, Guidelines for the use of non-metallic pipes with ductile iron elastomeric joint fittings, available from www.wsaa.asn.au.

Ductile iron pipelines can be subject to corrosion in some soils. The need for protection can be assessed by various methods, including the AWWA C105/A21.5 *ANSI Standard for Polyethylene Encasement for Ductile-iron Pipe Systems* and the Orstad Chart. The most accurate and commonly used method in Australia is the LPR technique or Linear Polarisation Resistance. Advice on assessment can be obtained from manufacturers of ductile iron pipeline systems.

Protection against corrosive soils is most commonly afforded by loose polyethylene sleeving, manufactured to AS 3680 applied in accordance with AS 3681 (see Preface). This system of protection has been in use in Australia for over 40 years and has been shown to be a most cost effective means of corrosion protection. Training in the use of loose polyethylene sleeving is recommended by ductile iron pipe manufacturers and has been accredited by the Vocational Education and Training Accreditation Board (VETAB).

Thermal-bonded polymeric coatings, liquid applied epoxy, metallized coatings and petrolatum impregnated wrapping tapes are corrosion protection systems that may be specified by the purchaser. Thermal-bonded polymeric coatings and petrolatum-impregnated wrapping tapes are commonly used for ductile iron fittings installed in plastics pipelines. Liquid-applied epoxy and metallized coatings may be used in conjunction with loose polyethylene sleeving to enhance corrosion protection. Availability should be checked with manufacturers.

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

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S E C T I O N 1 S C O P E A N D G E N E R A L

1.1 SCOPE

This Standard specifies requirements for ductile iron pressure pipes centrifugally cast in moulds, and ductile iron fittings of nominal sizes up to and including DN 750.

The specified pipes and fittings are intended primarily for conveying water under pressure, but they may be used for conveying sewage or other liquids.

This Standard specifies classifications of pipe on the basis of the allowable operating pressure (AOP); however, Flange Class pipe has been specified for manufacture of flanged pipe with screw-on flanges.

NOTE: Ductile iron is also known as spheroidal graphite iron, SG iron or nodular graphite iron.

1.2 MEANS FOR DEMONSTRATING COMPLIANCE

Compliance with this Standard shall be demonstrated in accordance with Appendix A.

NOTE: Information to be supplied by the purchaser, or by the manufacturer, is contained in the purchasing guidelines set out in Appendix B.

1.3 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

1111 ISO metric hexagon commercial bolts and screws
1111.1 Part 1: Bolts

1290 Linear measuring instruments used in construction
1290.4 Part 4: Retractable steel pocket rules
1290.5 Part 5: Coated and etched steel measuring tapes

1349 Bourdon tube pressure and vacuum gauges

1391 Methods for tensile testing of metals

1646 Elastomeric seals for waterworks purposes
1646.1 Part 1: General requirements
1646.2 Part 2: Material requirements for pipe joint seals used in water and wastewater applications—Specifies by prescription formulation
1646.3 Part 3: Material requirements for pipe joints seals used in water and wastewater applications with the exception of natural rubber and polyisoprene compounds

1722 Pipe threads of Whitworth form
1722.1 Part 1: Sealing pipe threads (Metric series)

1816 Metallic materials—Brinell hardness set
1816.1 Part 1: Test method (ISO 6506–1:1999, MOD)

1831 Ductile cast iron