AS/NZS 2280:2012

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 September 2012 and on behalf of the Council of Standards New Zealand on 5 October 2012.
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The following are represented on Committee WS-016:

Australian Chamber of Commerce and Industry
Australian Industry Group
Certification Interests Australia
Plastics Industry Pipe Association of Australia
Plastics New Zealand
Water Industry Operations Group of New Zealand
Water New Zealand
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 2280:2004.

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.

This edition provides for coating systems other than those described in the previous edition and also includes a requirement for compliance with AS/NZS 4020 in relation to use in recycled water systems.

Other relevant Standards and references relating to installation of ductile iron pipelines include the following:

(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.

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 ANSI Standard, AWWA C105/A21.5, *Polyethylene Encasement for Ductile-iron Pipe Systems and the Orstad Chart*. The most accurate and commonly used method in Australia is the Linear Polarization Resistance (LPR) technique. 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 Australian Skills Quality Authority.

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 bolts and screws—Product grade C	
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	Metallic materials—Tensile testing at ambient temperature	
1646	Elastomeric seals for waterworks purposes	
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 6506-1:2005, MOD)
1831	Ductile cast iron	
1984	Vernier callipers (metric series)	
2101	Internal micrometers (including stick micrometers) (metric series)	
2102	Micrometer callipers for external measurement	
2345	Dezincification resistance of copper alloys	