AS/NZS 2280:2020

Australian/New Zealand Standard™

Ductile iron pipes and fittings

AS/NZS 2280:2020

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Australian Building Codes Board
Australian Chamber of Commerce and Industry
Australian Industry Group
Australian Water Association
Casting Technology New Zealand
Plastics Industry Pipe Association of Australia
Plastics New Zealand
SAI Global (Certification Interests Australia)
Water New Zealand
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Originated as AS 2280—1979.
Previous edition AS/NZS 2280:2014.
Ninth edition AS/NZS 2280:2020.

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 2280:2014.

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 major changes to this revision include:

(a) Inclusion of a calculation method to determine minimum wall thickness values for fittings with alternative pressure classifications.

(b) Inclusion of prescriptive wall thickness values for PN 16 and PN 20 fittings.

(c) Modification to fittings design verification test procedures.

(d) Amendment to tensile properties of ductile iron for fittings.

(e) Removal of liquid applied coatings and cement mortar lining options for fittings.

(f) Modification to lifting lug and thrust pad requirements.

Relevant Standards relating to the installation of ductile iron pipes and fittings are listed in the Bibliography.

The terms “normative” and “informative” are used in Standards to define the application of the appendices to which they apply. A “normative” appendix is an integral part of a Standard, whereas an “informative” appendix is only for information and guidance.

Notes to text are for information and guidance only.

Contents

Introduction

This Standard sets out manufacturing requirements and dimensions for ductile iron pipes and fittings up to DN 750.

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 AOP, but does not include a separate corrosion allowance. Most users now consider the issue of corrosion to be best addressed by the specification of appropriate protection systems.

This Standard permits a range of pressure classifications with standard classifications of PN 20 and PN 35 for pipe and PN 16, PN 20 and PN 35 for fittings.

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

Requirements for DN 900 to DN 2600 ductile pipes and fittings are given in ISO 2531, *Ductile iron pipes, fittings, accessories and their joints for water applications*.

Fittings covered by this Standard are intended primarily for use with water supply pressure pipes having outside diameters nominated herein.

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.

(b) The depth of the pipeline in the ground and other pipe-laying conditions.

(c) Stresses due to expansion and contraction.

(d) 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 has to consider whether pipes and fittings manufactured in accordance with this Standard are 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 plastics pipes with fittings manufactured to this Standard, the following needs to 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 plastic pipes with ductile iron fittings specified in this Standard are given in the Water Services of Australia Information and Guidance Note WSAA TN2, *Guidelines for the use ductile iron elastomeric joint fittings with plastic pipes*, available from https://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 approved 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 provided by loose polyethylene sleeving, manufactured to AS 3680, *Polyethylene sleeving for ductile iron piping*, applied in accordance with AS 3681, *Application of polyethylene sleeving for ductile iron piping*. 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.

Australian/New Zealand Standard

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Section 1 Scope and general

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.

NOTE 1 Ductile iron is also known as spheroidal graphite iron, SG iron or nodular graphite iron.

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

Fittings covered by this Standard are intended primarily for use with water supply pressure pipes.

NOTE 2 Fittings are also used in non-metallic pipeline systems.

NOTE 3 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 plastic pipe sockets.

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

1.2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document:

NOTE Documents referenced for informative purposes and relevant Standards relating to the installation of ductile iron pipes and fittings are listed in the Bibliography.

AS 1111.1, *ISO metric hexagon commercial bolts and screws—Product grade C, Part 1: Bolts*

AS 1349, *Bourdon tube pressure and vacuum gauges*

AS 1353.2, *Flat synthetic-webbing slings, Part 2: Care and use*

AS 1391, *Metallic materials—Tensile testing at ambient temperature*

AS 1580.408.4, *Paints and related materials—Methods of test, Method 408.1: Adhesion (crosscut)*

AS 1646, *Elastomeric seals for waterworks purposes*

AS 1816.1, *Metallic materials—Brinell hardness test, Method 1: Test method (ISO 6506-1:2005, MOD)*

AS 1831, *Ductile cast iron*

AS 2317.1, *Lifting points, Part 1: Collared eyebolts and collared eyenuts—Grade 4*

AS 2345, *Dezincification resistance of copper alloys*

AS 2758.1, *Aggregates and rock for engineering purposes, Part 1: Concrete aggregates*

AS 3972, *General purpose and blended cements*

AS ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

AS/NZS 3500.0, *Plumbing and drainage, Part 0: Glossary of terms*