AS/NZS 4645.2:2008

Australian/New Zealand Standard™

# Gas distribution networks

# Part 2: Steel pipe systems


This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee AG-008, Gas Distribution. It was approved on behalf of the Council of Standards Australia on 16 December 2008 and on behalf of the Council of Standards New Zealand on 5 December 2008.
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The following are represented on Committee AG-008:

Australian Pipeline Industry Association Ltd
Engineers Australia
Energy Networks Association
Gas Association New Zealand
Gas Technical Regulators Committee
LPG Australia
New Zealand Institute of Gas Engineers
Plastics Industry Pipe Association
Welding Technology Institute of Australia

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We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia or Standards New Zealand at the address shown on the back cover.

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# Gas distribution networks

# Part 2: Steel pipe systems

Originated as AS 1697—1981,
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# PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee AG-008, Gas Distribution, through its subcommittee AG-008-02, Installation and Maintenance of Steel Pipe Systems for Gas, to supersede AS 1697—2005, *Installation and maintenance of steel pipe systems for gas*.

The intent of this Standard is to provide for the protection of the general public, gas distribution network operating personnel and the environment, and to ensure safe and reliable operation of gas distribution networks that reticulate gas to consumers.

It covers steel piping within gas distribution networks covered by AS/NZS 4645.1, where the maximum allowable operating pressures up to or equal to 1050 kPa and the hoop stress is less than or equal to 20% SMYS of the pipe. Steel piping systems for gas outside these limits are generally covered by the AS 2885 suite of Standards and for some jurisdictions. AS/NZS 4645.1 provides for limited use up to 1965 kPa.

Users of the Standard should note that AS 4645—2005 *Gas distribution network management*, AS 4568—2005 *Preparation of a safety and operating plan for gas networks*, AS 1697—2005 *Installation and maintenance of steel pipe systems for gas* and AS 3723—1989 *Installation and maintenance of plastic pipes systems for gas* have been revised and reissued as parts of AS/NZS 4645 *Gas distribution networks*.

This series of Standards includes the following parts:

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| AS/NZS | |
| 4645 | Gas distribution networks |
| 4645.1 | Part 1: Network management |
| 4645.2 | Part 2: Steel pipe systems |
| 4645.3 | Part 3: Plastics pipe systems |

AS/NZS 4645.1 provides a risk-based framework for management of a gas distribution network and identifies the high-level safety requirements for all stages in the life-cycle of a gas distribution network.

AS/NZS 4645.2 is to be used in conjunction with AS/NZS 4645.1 and covers design, materials, construction, testing and commissioning of steel mains and services within a network to provide a means of compliance for aspects of a gas distribution network required by AS/NZS 4645.1.

This Standard achieves its purpose through five fundamental principles as follows:

(a) A gas distribution network shall be designed and constructed to have sufficient controls to withstand the threats to which it may be subjected during construction, testing and operation.

(b) Before a gas distribution network is placed into operation it shall be inspected and tested to prove its integrity.

(c) Important matters relating to safety, engineering design, materials, testing, operation and inspection shall be reviewed, documented and approved in accordance with the Safety and Operating Plan.

(d) Operations and maintenance shall provide for continued monitoring and safe operation of the gas distribution network.

(e) Where changes occur in or to a gas distribution network, which alter the design assumptions or affect the original integrity, appropriate steps shall be taken to assess the changes, to ensure continued safe operation of the network.

The Standard is not a design handbook, nor a manual on distribution practices. It does not remove the need for qualified and experienced engineering design, installation and operation or for competent engineering judgment, and does require interpretation and implementation by competent engineers.

Statements in this Standard expressed in mandatory terms are deemed to be mandatory only for claiming compliance with this Standard. Alternative means of compliance may be acceptable provided the required safety outcomes can be demonstrated with AS/NZS 4645.1.

The Australian and New Zealand Technical Regulators have advised that this Standard will only apply to the life cycle of new gas distribution networks and modifications or augmentations to existing assets within gas distribution networks. However, the sections on operations, maintenance, repair, decommissioning, gas quality and risk assessment may be suitable for application to existing assets in existing networks.

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 an ‘informative’ appendix is only for information and guidance.

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## Part 2: Steel pipe systems

## SECTION 1 SCOPE AND GENERAL

### 1.1 SCOPE

This Standard specifies materials, design, construction, installation, testing and maintenance requirements for steel piping systems and shall be used in conjunction with AS/NZS 4645.1, for the distribution of fuel gas suitable for domestic, commercial or industrial uses, where—

(a) the pressure of the gas is not greater than 1050 kPa and the operating temperature range of the materials is from −30°C to 120°C; operating pressures above 1050 kPa are covered by AS 2885; and

(b) where the hoop stress level is not greater than 20% of the Specified Minimum Yield Stress (SMYS) of the pipe used in that system.

NOTE: The relevant statutory authority may regard this standard as appropriate for other than fuel gas.

The requirements apply to the life cycle of new assets in new or existing systems, but the Sections on materials and components, welding, pressure testing and maintenance are suitable for application to existing assets in existing systems.

### 1.2 EXCLUSIONS

This Standard does not apply to the following:

(a) Piping from the outlet of the meter that measures gas to a consumer or equivalent point of supply, and any other piping covered in Australia by AS 5601 and in New Zealand by NZS 5261.

NOTE: Requirements for pipes downstream of the consumer's meter are generally provided in AS 5601 or NZS 5261, but where the operating pressure of the downstream pipe will be higher than provided for in AS 5601 or NZS 5261, the piping requirements of this Standard may be appropriate.

(b) Gas distribution networks that utilize steel pipe with a hoop stress of more than 20% of the Specified Minimum Yield Stress (SMYS).

NOTE: Where an element of the network includes steel pipe with a hoop stress greater than 20% of SMYS, AS 2885.1 provides appropriate requirements for design and construction and AS 2885.3 provides appropriate requirements for operation and maintenance relevant to that higher hoop stress.

(c) Piping associated with the handling and storage, as compared to the distribution and reticulation, of LPG (see AS/NZS 1596).

(d) The design and manufacture of proprietary items (including meters).

(e) The measurement of gas for billing purposes.

(f) Transport of gas in the liquid phase.