AS/NZS 4645.1:2008

Australian/New Zealand Standard™

Gas distribution networks

Part 1: Network management

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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Part 1: Network management

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee AG-008, Gas Distribution, and AS/NZS 4645.1 is to supersede AS 4645 *Gas distribution network management* and AS 4568 *Preparation of a safety and operating plan for gas networks* that were published in 2005. AS/NZS 4645.2 replaces AS 1697 and AS/NZS 4645.3 replaces AS 3723. The Committee primarily addressed the safety aspects of managing a fuel gas distribution network. It maintained a close liaison throughout with the Standards Australia Committee ME-038, Petroleum Pipelines.

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.

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 this Standard AS/NZS 4645 *Gas distribution networks*.

This series of Standards includes the following parts:

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

These Standards provide a performance based approach for gas distribution network management. Adopting a performance rather than prescriptive approach recognises that one particular standard or way of doing things may not be the best fit for all situations in all networks. A performance based approach allows innovation and development in the way networks are managed, operated and maintained. A performance based standard aims to specify safety outcomes whilst allowing some flexibility on how these outcomes are delivered.

The purpose of this set of Standards is to—

(a) provide performance-based requirements for gas distribution network safety, defining important principles during the life cycle of gas distribution networks;

(b) provide prescriptive, deemed to comply, means of compliance in support of some of those requirements; and

(c) allow for alternative means of compliance that may be also acceptable provided the required safety outcomes can be demonstrated.

AS/NZS 4645.1 covers the design, construction, commissioning, operation, maintenance and decommissioning of gas distribution networks and provides a performance-based framework for their management. This Standard identifies the high-level safety requirements for all stages in the life-cycle of a gas distribution network.

AS/NZS 4645.2 and AS/NZS 4645.3 each provide a means of compliance for elements of design, materials, construction, testing, commissioning and decommissioning of steel and plastics mains and services within a network. Other means of compliance can be achieved through the processes described in AS/NZS 4645.1.

AS/NZS 4645.1 can be used as a stand-alone document whereas AS/NZS 4645.2 and AS/NZS 4645.3 are to be used in conjunction with AS/NZS 4645.1.

The Standard takes a risk management approach in accordance with AS/NZS 4360, *Risk Management*. Risks associated with the network shall be at acceptable levels with respect to any loss of supply of gas and any threats from escaping gas, throughout the life of the network. Guidance on the preparation of Safety and Operating Plans (safety cases), which was previously covered under AS 4568, is provided in Clause 2.4. Safety and operating plans are used to ensure that all risks associated with the design operation and maintenance of a gas distribution network are identified and appropriately managed.

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

(i) A gas distribution network shall be designed and constructed to have sufficient controls to withstand the threats to which it may be subjected during its life cycle.

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

(iii) Important matters relating to safety, engineering design, materials, testing and inspection shall be reviewed, documented, recorded and approved in accordance with the SAOP.

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

(v) 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.

(vi) Where means of compliance alternative to that provided in this Standard is to be adopted, a review shall be undertaken to determine the acceptability of the alternative. Subject to the criticality of the alternative means of compliance, this review may be undertaken by either an internal, or external, independent party.

Where the Standard does not provide detailed requirements appropriate to a specific item, the fundamental principles set out above and the principles and guidelines set out in the Standard is the basis on which an engineering assessment is to be made.

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.

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.

Details for design and maintenance of gas control plant and equipment associated with the distribution network are specified by reference to—

(A) AS 4041—*Pressure piping* for design of above ground steel pipework and facilities; and

(B) AS 3873—*Pressure equipment—Operation and maintenance* for maintenance of above ground facilities.

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SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

Except as provided in Appendix A, this Standard specifies requirements for safe management of a gas distribution network operating at less than or equal to 1050 kPa, throughout the life cycle of all elements of that network.

The requirements apply to the life cycle of new assets in new or existing networks, whereas the Sections on operations, maintenance, repair, decommissioning, gas quality and risk assessment may be suitable for application to existing assets in existing networks.

Gas distribution networks within the scope of this Standard comprise all facilities between the outlets of all city gates, supply points or equivalent, or for an LP Gas network, the point of entry to the gas distribution network, and the outlet of the consumer's meter assemblies, as detailed in Figure 1.1.

Additional requirements for steel gas distribution networks at MAOP greater than 1050 kPa under this Standard are identified in Appendix A. Appendix A is applicable in New Zealand and where explicitly adopted by legislation in Australia.

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.