Cross-linked polyethylene (PE-X) pipes for pressure applications

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- Certification Interests (Australia)
- CSIRO Manufacturing and Infrastructure Technology
- Energy Networks Association
- Engineers Australia
- Master Plumbers, Gasfitters and Drainlayers New Zealand
- New Zealand Water and Waste Association
- Plastics Industry Pipe Association of Australia
- Plastics New Zealand
- Water Services Association of Australia

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Australian Standard®

Cross-linked polyethylene (PE-X) pipes for pressure applications

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee PL-006, Polyolefin Pipe Systems, to supersede, in part, AS 2492—1994, *Cross-linked polyethylene (PE-X) pipe for hot and cold water applications*, which is withdrawn.

This Standard incorporates Amendment No. 1 (November 2018). 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.

A1 Amendment No. 1 to this Standard was prepared by the Australian members of Joint Standards Australia/Standards New Zealand Committee PL-006, Polyolefin Pipe Systems. As a consequence of Amendment No. 1, which was published as an Australian only Amendment, the designation of this Standard has been changed from AS/NZS 2492:2007 to AS 2492:2007.

The objective of this Standard is to provide a standard specification for manufacturers and purchasers of cross-linked polyethylene pipes to be used in pressure applications.

The objective of this revision is to revise the Australian Standard and issue it as a joint Australian/New Zealand Standard. This revision extends the product applications to general pressure, including fuel gas, and includes sizes up to DN 1000.

This Standard is based on the latest ISO documents for gas and water applications and, where appropriate, the principles of AS/NZS 4130 *Polyethylene (PE) pipes for pressure applications* and AS/NZS 4131, *Polyethylene (PE) compounds for pressure pipes and fittings* have been followed. One exception is the inclusion of the optional addition of pigment or carbon black masterbatch during extrusion. Appendix A incorporates increased BRT frequency related to use of the option.

The overall service (design) coefficient of 1.25, taken from ISO 12162, *Thermoplastics materials for pipes and fittings for pressure applications—Classification and designation—Overall service (design) coefficient*, has been applied to establish the hydrostatic design stress.

The requirements for resistance to slow crack growth and rapid crack propagation are intended to facilitate the use of PE-X pipes for fuel gas at pressures up to 16 bar and for general pressure applications without special granular bedding.

The means for demonstrating compliance with this Standard (Appendix A) have been included for minimum sampling and testing frequency plans to include batch release tests, process verification tests and type tests requirements, to simplify and improve product quality verification.

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 this Standard, whereas 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 contain information and guidance. They are not an integral part of the Standard.

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FOREWORD

This Standard describes pipes in terms of dimensional requirements, PE-X material, and PN rating.

Appendix B tabulates operating parameters for PE-X pipes when used for the conveyance of hot and cold water within buildings. These parameters are taken from ISO 15875-2, *Plastics piping systems for hot and cold water installations—Crosslinked polyethylene (PE-X),* Part 2: *Pipes,* along with the pressure test requirements for PE-X 80. Other test requirements are taken from ISO 14531-1, *Plastics pipes and fittings—Crosslinked polyethylene (PE-X) pipe systems for the conveyance of gaseous fuels—Metric series – Specifications*, Part 1: *Pipes*.

In this Standard, there is a partial pressure limitation for liquefied petroleum gas (LPG). The aim of this limitation is to prevent the formation of aliphatic hydrocarbon liquids under normal service conditions and subsequent deleterious effects on the long-term performance of the pipe. At a partial pressure of 300 kPa absolute, the dewpoint for a typical propane LPG is below 0°C. The designer of a cross-linked polyethylene reticulation system should be aware that if service temperatures lower than this are likely to occur or if LPG containing significant quantities of butane gases are to be reticulated, the partial pressure limitation must be revised to avoid condensation of hydrocarbon liquids.

STANDARDS AUSTRALIA

Australian Standard
Cross-linked polyethylene (PE-X) pipes for pressure applications

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies requirements for cross-linked polyethylene pipes for the conveyance of fluids under pressure. Such fluids include, but are not restricted to, water, wastewater, slurries, compressed air, and fuel gas. Fuel gas includes natural gas, liquefied petroleum gas (LPG) in the vapour phase and LPG/air mixtures. The partial pressure of the LPG is not to exceed 300 kPa absolute.

Pipes intended for the transmission of fuel gas are hereinafter referred to as 'gas pipes' and are not be operated at pressures above 1600 kPa gauge.

1.2 MEANS FOR DEMONSTRATING COMPLIANCE

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

1.3 APPLICATION

This Standard does not apply to gas pipes for use with petroleum liquids, including liquid LPG and liquid pentane, or with manufactured or mixed gas distribution systems, which may contain more than 1% aromatics by volume, unless resistance to aromatic constituents has been demonstrated, as required in Clause 2.3.

Pipes that do not contain carbon black in compliance with this Standard are not intended for extended exposure in direct sunlight.

PE-X pipe is suitable for use at temperatures up to 100°C as described in Appendix B; however, continuous long-term operation should be between –50°C and +70°C.

The test requirements specified in this Standard may be achieved by alternative test methods if such methods can be shown to provide equal or greater accuracy than those specified herein. In all cases of dispute, the methods specified in this Standard shall be considered the reference test methods.

1.4 REFERENCED DOCUMENTS

The documents referred to in this Standard are listed in Appendix C:

1.5 DEFINITIONS

For the purpose of this Standard, the definitions given in AS/NZS 3500.0 and those below apply.