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PROPYLENE COPOLYMER PRESSURE PIPE

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The following interests are represented on Committee PL/38:

Department of Public Works, N.S.W.

Engineering and Water Supply Department, S.A.

Federated Master Plumbers of Australia

Melbourne and Metropolitan Board of Works

Metropolitan Water Authority, W.A.

Rural Water Commission, Vic.

The Plastics Institute of Australia Inc.

Water Board, Sydney

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AUSTRALIAN STANDARD

PROPYLENE COPOLYMER PRESSURE PIPE

AS 2950—1988

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PREFACE

This Standard was prepared by the Association's Committee on Polypropylene Pipe Systems, under the authority of the Plastics Standards Board.

In the preparation of this Standard, the committee took cognizance of overseas experience, including BS 4991, *Specification for propylene copolymer pressure pipe*, ISO 1873/1, *Plastics—Polypropylene and (PP) propylene copolymer thermoplastics—* Part 1: *Designation*, and ISO 3212, *Polypropylene pipes—Burst test requirements.*

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FOREWORD

The hydrostatic design stress of 5 MPa specified in this Standard has been determined by the application of a safety factor of 1.8 to the extrapolated 50-year long-term hydrostatic stress value. This has been taken from ISO 3213.

Minimum wall thickness for pipes specified has been calculated using the Barlow formula which takes into account the hydrostatic design stress of the material, working pressure and diameter of pipes.

The Barlow formula used for calculating the maximum wall thickness is as follows:

$$T_{min} = \frac{PD_{m\ max}}{2S + P}$$

$$T_{max} = 1.10T_{min} + 0.1$$

where

T_{min} = minimum wall thickness of pipe, in millimetres

P = maximum allowable working pressure at 20°C, in megapascals

$D_{m\ max}$ = maximum mean outside diameter, in millimetres

S = hydrostatic design stress at 20°C, in megapascals

T_{max} = maximum wall thickness of pipe, in millimetres.

In the interests of serviceability, and irrespective of the calculated minimum wall thickness, this Standard does not provide for a wall thickness of less than 1.6 mm.

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
PROPYLENE COPOLYMER PRESSURE PIPE

1 SCOPE. This Standard specifies requirements for black or grey propylene copolymer pressure pipe for the conveyance of water in water supply, agricultural, industrial, and other applications. Pipes manufactured in accordance with this Standard are not intended for the transport of gaseous fuels (see AS 1667 and AS 2718). Propylene copolymer pipe of colour other than black, may not be suitable for storage or use where exposed to direct sunlight.

The Standard specifies requirements for dimensions, freedom from defects, impact characteristics, reversion, short term and long term hydrostatic pressure resistance and effect on water.

Test requirements included in this Standard are only applicable to pipe at the time of manufacture or after a conditioning period or test period as detailed in the particular test method. Tests performed at times other than those specified may provide different results due to either change in the properties of the propylene copolymer or the service history of the pipe specimens.

NOTES:

1. Advisory information on alternative methods of determining compliance of a lot with this Standard is given in Appendix A.
2. Pipes manufactured in accordance with this Standard may be suitable for the conveyance of fluids other than water. Advice should be sought from the manufacturer.
3. Exposure to direct sunlight may reduce the service life of propylene copolymer pipe. Advice should be sought from the pipe manufacturer where this may be important.
4. Tests specified in Clauses 7.1, 7.2, 7.3, 8.1, 8.2 and 8.3 are type tests performed to assess compliance of finished product with this Standard, however it may also be convenient for product manufacturers to use those tests for quality control purposes during manufacture.

2 REFERENCED DOCUMENTS. The documents below are referred to in this Standard:

AS
1199 Sampling procedures and tables for inspection by attributes
1349 Bourdon tube pressure and vacuum gauges
1399 Guide to AS 1199, Sampling procedures and tables for inspection by attributes
1667 Plastics pipes and fittings for gas reticulation—Polyethylene—Nominal size series
1821-1823 Suppliers quality systems
1984 Vernier callipers (metric series)
2000 Guide to AS 1821-1823, Suppliers quality control systems
2033 Installation of polyethylene pipe systems
2102 External micrometers (metric series)
2490 Sampling procedures and charts for inspection by variables for percent defective
2718 Plastics pipes and fittings for gas reticulation—Polyethylene—Outside diameter series
2949 Propylene copolymer compounds for the manufacture of pressure pipe and fittings
3900 Quality systems—Guide to selection and use
3901 Quality systems for design/development, production, installation and servicing
3902 Quality systems for production and installation
3903 Quality systems for final inspection and test
3904 Quality systems—Guide to quality management and quality system elements

ISO
3213 Polypropylene pipes—Reduction of permissible stress as a function of time and temperature

3 DEFINITIONS. For the purpose of this Standard, the definitions below apply:

3.1 Hoop stress—the stress in a pipe or fitting under pressure acting tangentially to the perimeter of a transverse section.

3.2 Long-term hydrostatic stress—the continuously applied hoop stress which is estimated will cause failure at a specified time and temperature.

3.3 Hydrostatic design stress—the hoop stress due to internal hydrostatic pressure that can be applied continuously at a specified temperature. It is obtained by the application of a safety factor to the extrapolated 50-year long-term hydrostatic stress value.

3.4 Working pressure—the maximum pressure that can be sustained by the type and class of pipe or fitting for its estimated useful life under the expected working conditions.

3.5 Pipe material temperature—the average temperature estimated as applying through the full wall thickness.

3.6 Type test—a test intended to prove the suitability and performance of a new composition, a new compounding or processing technique, or a new design or size of pipe, joint or fitting. Type tests are generally carried out when a change is made in compound composition or method of manufacture.

3.7 Quality control test—a test carried out during or after manufacture to prove the quality of a production run of pipe or fittings.

4 NOTATION. The following notation applies in this Standard:

D_e = nominal outside diameter, in millimetres.
D_m = mean outside diameter, in millimetres.
D_i = mean inside diameter, in millimetres.
D_o = outside diameter including ovality, in millimetres
T = wall thickness, in millimetres.