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PLASTICS PIPES AND FITTINGS FOR GAS RETICULATION—POLYAMIDE COMPOUNDS FOR MANUFACTURE

This Australian Standard was prepared by Committee PL/25, Plastics Pipe and Fittings for Gas. It was approved on behalf of the Council of the Standards Association of Australia on 2 April 1987 and published on 1 June 1987.

The following interests are represented on Committee PL/25:

Confederation of Australian Industry

Department of Labour, Victoria

Department of Mines, Queensland

State Energy Commission, Western Australia

The Australian Gas Association

The Plastics Institute of Australia Inc.

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This Standard was issued in draft form for comment as DR 85296.

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First published 1987

PUBLISHED BY STANDARDS AUSTRALIA
(STANDARDS ASSOCIATION OF AUSTRALIA)
1 THE CRESCENT, HOMEBUSH, NSW 2140

ISBN 0 7262 4644 1

PREFACE

This Standard was prepared by the Association's Committee on Plastics Pipes and Fittings for Gas Reticulation under the direction of the Plastics Standards Board. It was prepared as a result of a proposal by the Australian Gas Light Company.

In the preparation of this Standard cognizance was taken of AS 1685—1984, Plastics Pipes and Fittings for Gas Reticulation—Polyethylene Compound for Manufacturing. Two polyamide compounds have been specified for manufacture of gas pipes, namely PA 11 and PA 12. Plasticized grades are not included in this Standard as they are not widely used in Australia.

No specific levels of antioxidants or ultraviolet stabilizers have been set. However, performance tests on weathering, heat ageing and pressure tests at elevated temperatures check the presence of correct additives. Various ISO methods of test for physical properties have been adopted.

This Standard complements AS 2944, Plastics Pipe and Fittings for Gas Reticulation—Polyamide, Part 1—Pipes and Part 2—Fittings.

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PLASTICS PIPES AND FITTINGS FOR GAS RETICULATION—POLYAMIDE COMPOUNDS FOR MANUFACTURE

1 SCOPE. This Standard specifies requirements for polyamide 11 (PA 11) and 12 (PA 12) compounds suitable for making polyamide pipe and fittings for gas reticulation.

NOTES:
1. Advisory information on the determination of compliance of a lot with this Standard is given in Appendix A.
2. This Standard does not preclude the use of these materials for other fluid distribution applications.

2 REFERENCED DOCUMENTS. The following Standards are referred to in this Standard:

AS 1049 Polyethylene Insulation and Sheath of Telecommunication Cables.

AS 1145 Method for Determination of Tensile Properties of Plastics Materials.

AS 1193 Methods for the Determination of the Density and Relative Density of Plastics Excluding Cellular Plastics.

AS 1199 Sampling Procedures and Tables for Inspection by Attributes.

AS 1349 Bourdon Tube Pressure and Vacuum Gauges.

AS 1399 Guide to AS 1199, Sampling Procedures and Tables for Inspection by Attributes.

AS 1821-1823 Suppliers Quality Systems.

AS 1984 Vernier Callipers (Metric Series).

AS 2000 Guide to AS 1821-1823, Suppliers Quality Systems.

AS 2101 Internal Micrometers (including Stick Micrometers) (Metric Series).

AS 2102 External Micrometers (Metric Series).

AS 2490 Sampling Procedures and Charts for Inspection by Variables for Percent Defective.

AS 2700S Colour Standards for General Purposes.

AS 2944 Plastics Pipe and Fittings for Gas Reticulation—Polyamide.
Part 1—Pipes.
Part 2—Fittings.

ISO 307 Plastics—Polyamides—Determination of Viscosity Number.

ISO R960 Plastics—Determination of the Water Content in Polyamides.

AS 2782 Methods of Testing Plastics.
Part 8—Methods 823A and 823B—Methods for the Assessment of Carbon Black Dispersion in Polyethylene Using a Microscope.

3 DEFINITIONS. For the purposes of this Standard, the following definitions apply.

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

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

3.3 Hydrostatic design stress—estimated hoop stress due to internal hydrostatic pressure that can be applied continuously at a specified temperature with a high degree of certainty that failure will not occur. It is obtained by the application of a safety factor to the extrapolated 50-year long-term hydrostatic stress value.

3.4 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 polymer composition or method of manufacture.

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

3.6 Test station—a pressure test station consisting of end connections, pressure gauges, pressurizing systems and a controlled temperature environment for conducting pressure testing on pipes and fittings.

4 COMPOSITION.

4.1 Density. Polyamide gas pipe and fittings compounds shall be made from polyamide base resin which at 23 ± 2°C shall have a resin density in the range 1020 to 1050 kg/m^3 for PA 11 and in the range of 1010 to 1040 kg/m^3 for PA 12, when determined in accordance with AS 1193.

4.2 Moisture content. Polyamide gas pipe and fittings compounds, when tested in accordance with ISO R960, Method B, shall have a moisture content as agreed between purchaser and supplier.

NOTE: Dried material should have a moisture content of not more than 0.08 percent.

4.3 Viscosity. Polyamide gas pipe and fittings compounds, when tested in accordance with ISO 307, as applicable to polyamides designated PA 11 and PA 12, using m-cresol solvent, shall have a viscosity not less than 180 mL/g.

4.4 Melting point. Polyamide gas pipe and fittings compounds produced from PA 11 materials shall have a melting point in the range 178°C to 188°C and from PA 12 materials in the range 168°C to 178°C, when tested in accordance with Appendix B.

4.5 Additives.

4.5.1 *Antioxidants and ultraviolet stabilizers.* Polyamide gas pipe and fittings compound shall contain antioxidants and ultraviolet stabilizers either singly or in combination to reduce degradation during processing and service. Sufficient levels of stabilizer(s) shall be incorporated to ensure compliance with all test requirements of this Standard.