

Australian Standard[®]

**PLASTICS PIPES AND FITTINGS
FOR GAS RETICULATION—
POLYETHYLENE COMPOUND
FOR MANUFACTURING**

This Australian standard was prepared by Committee PL/25, Plastics Pipe and Fittings for Gas Reticulation. It was approved on behalf of the Council of the Standards Association of Australia on 18 January 1984 and published on 11 May 1984.

The following interests are represented on Committee PL/25:

Australian Gas Association
Confederation of Australian Industry
Department of Minerals and Energy, Victoria
Department of Mines, Queensland
Federated Master Plumbers of Australia
Plastics Institute of Australia Inc.
State Energy Commission of Western Australia

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POLYETHYLENE COMPOUND
FOR MANUFACTURING**

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PREFACE

This edition of this standard was prepared by the Association's Committee on Plastics Pipe and Fittings for Gas Reticulation, to supersede AS 1685 — 1974, at the request of the Australian Gas Industry and manufacturers of polyethylene compound for the manufacture of pipes and fittings complying with AS 1667, Plastics Pipes and Fittings for Gas Reticulation—Polyethylene — Nominal Size Series*, and AS XXXX, Plastics Pipes and Fittings for Gas Reticulation—Polyethylene — ISO Outside Diameter Series†.

In this edition the specification of antioxidant and ultraviolet absorbent limits has been deleted in favour of performance tests. A chemical resistance test has also been included. This was previously in the pipe standard, but this property was considered to be more applicable to the compound.

The committee recognizes the need for test(s) of fracture toughness properties of polyethylene to assess the likelihood of propagation failure during pressure testing and slow crack growth from notches occurring in the system. However there does not appear to be any positive relationship between resistance to these two forms of failure and further work is necessary to formulate suitable test(s).

This edition retains the British Gas Corporation concept for pipe extrusion compound. This allows the use of any polyethylene compound which satisfies burst stress requirements at normal and elevated temperatures and has a nominal density at 20°C of not less than 930 kg/m³.

* Under revision.

† In course of preparation.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

for

PLASTICS PIPES AND FITTINGS FOR GAS RETICULATION—POLYETHYLENE COMPOUND FOR MANUFACTURING

1 SCOPE. This standard specifies requirements for polyethylene compound suitable for making polyethylene pipe and fittings for gas reticulation.

NOTE: Advisory information on alternative methods of determining compliance of a lot with this standard is given in Appendix A.

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 1 199, Sampling Procedures and Tables for Inspection by Attributes
- AS 1667 Plastics Pipes and Fittings for Gas Reticulation—Polyethylene—Nominal Size Series*
- AS 1821- Suppliers Quality Control Systems—Levels 1, 2 and 3
- AS 1984 Vernier Callipers (Metric Series)
- AS 2000 Guide to AS 1821-1823, Suppliers Quality Control Systems
- AS 2102 External Micrometers (Metric Series)
- AS 2193 Methods for Calibration and Grading of Force-measuring Systems of Testing Machines
- AS 2490 Sampling Procedures and Charts for Inspection by Variables for Percent Defective
- AS XXXX Plastics Pipes and Fittings for Gas Reticulation—Polyethylene—ISO Outside Diameter Series†
- BS 381C Colours for Specific Purposes
- BS 2782 Methods of Testing Plastics
Part 8: Methods 823A and 823B—
Methods for the Assessment of
Carbon Black Dispersion in Poly-
ethylene Using A Microscope

3 DEFINITIONS. For the purpose of this standard, the following definitions 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 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 Test station—a pressure test station consisting of end connections, pressure gauges, pressurizing systems and a controlled temperature environment for the purpose of conducting pressure testing on pipes and fittings.

4 COMPOSITION.

4.1 General. Polyethylene compound for pipe and fittings for gas reticulation shall consist only of a mixture of polymers and copolymers of ethylene and additives as described in Clause 4.2. The resultant nominal base resin density at 20°C shall be not less than 930 kg/m³ when determined in accordance with AS 1193. The compound shall be free of foreign material.

4.2 Additives.

4.2.1 Antioxidants. Polyethylene compound for gas pipe and fittings shall contain antioxidants either singly or in combination such that when determined in accordance with Appendix B, the induction temperature shall be not less than 230°C.

4.2.2 Pigments. Polyethylene compound for gas pipe shall contain pigments in sufficient quantity such that pipe extruded from the compound shall be similar to the Colour No 309—Canary Yellow but not lighter than Colour No 310—Primrose, nor darker than Colour No 355—Lemon of BS 381C. Compound used for the manufacture of fittings need not be yellow.

NOTE: The above colours specified in BS 381C will be available in AS 2700, Colour Standards for Paints and Related Materials (in course of preparation) under the following names and references, respectively:

Canary—AS 2700 Y11
Primrose—AS 2700 Y21
Wattle—AS 2700 Y12

* Under revision.

† In course of preparation.