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AS 2718.1-2—1984  
UDC 621.643:678.742.2:696.2

CURRENT

# Australian Standard 2718.1-2—1984

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## PLASTICS PIPES AND FITTINGS FOR GAS RETICULATION— POLYETHYLENE—OUTSIDE DIAMETER SERIES

Part 1—PIPES  
Part 2—FITTINGS

[Title allocated by Defence Cataloguing Authority:  
PIPES AND FITTINGS, PLASTICS (Polyethylene, Outside  
Diameter Series, for Gas Reticulation)  
(NATO Supply Classification: 4710 and 4730)]

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**STANDARDS ASSOCIATION OF AUSTRALIA**  
*Incorporated by Royal Charter*



This Australian standard was prepared by Committee PL/25, Plastics Pipes 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 3 August 1984.

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The following interests are represented on Committee PL/25:

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

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This standard was issued in draft form for comment as DR 83014 to DR 83015.

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AMENDMENT No 1  
to  
AS 2718.1-2—1984  
PLASTICS PIPES AND FITTINGS FOR GAS RETICULATION—POLYETHYLENE—OUTSIDE  
DIAMETER SERIES  
PART 1—PIPES  
PART 2—FITTINGS

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REVISED TEXT

*SUMMARY:* This amendment applies to the Preface, Foreword, Part 1, Clauses 1, 5, 10.2, 11.1, and Table 1; Part 2, Clauses 3 and 8.1.  
Published on 6 October 1986.

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AMDT  
No 1  
OCT.  
1986

**Page 2. Preface.**

*Add* the following paragraph:

The pressure rating has been changed from that used in the 1984 edition due to a reduction in safety factor from 4 to 3. The original factor was based on US Department of Transport regulations which have since been amended. The committee believes that sufficient length of satisfactory service has been experienced with polyethylene gas pipes in order to allow adoption of the current American design practice. Class 400 will become Class 500 (rounded down from 533 kPa) and Class 200 will become Class 250 (rounded down from 267 kPa). Existing dimensions of both pipes and fittings will be retained. Only the maximum operating pressure will alter.

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AMDT  
No 1  
OCT.  
1986

**Page 4. Foreword**

*Delete* first paragraph and *substitute*:

In the determination of the hydrostatic design stress of the material specified in this standard, an extrapolated 50-year long-term hydrostatic stress value of 8 MPa has been used to provide a factor of safety of 3.

*Delete* third paragraph and *substitute*:

For special applications, the design wall thickness of pipes shall be calculated from the following formula for use at service pressures of above 250 kPa and up to and including 500 kPa at a temperature in the range of  $-20^{\circ}\text{C}$  to  $+35^{\circ}\text{C}$ :

Last Line

*Delete* reference to 'Class 200' and 'Class 400' and *replace* with 'Class 250' and 'Class 500', respectively.

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AMDT  
No 1  
OCT.  
1986

**Page 5. Clause 1.**

*Delete* reference to '400 kPa' and '200 kPa' and *replace* with '500 kPa' and 250 'kPa', respectively.

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AMDT  
No 1  
OCT.  
1986

**Page 5. Clause 5.**

*Delete* existing clause and *substitute*:

Polyethylene gas pipe shall be classified as follows:

- (a) *Class 250*—for service pressures up to and including 250 kPa at temperatures in the range  $-20^{\circ}\text{C}$  to  $+35^{\circ}\text{C}$ .
  - (b) *Class 500*—for service pressures up to and including 500 kPa at temperatures in the range  $-20^{\circ}\text{C}$  to  $+35^{\circ}\text{C}$ .
-



AMDT **Page 6. Clause 10.2.**

No 1  
OCT.  
1986  
*Delete* reference to 'Class 200' and 'Class 400' and *replace* with 'Class 250' and 'Class 500', respectively.

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AMDT **Page 6. Table 1.**

No 1  
OCT.  
1986  
*Delete* reference to 'Class 200' and 'Class 400' and *replace* with 'Class 250' and 'Class 500', respectively.

Note 4

*Delete* reference to 'Class 200' and 'Class 400' and *replace* with 'Class 250' and 'Class 500', respectively.

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AMDT **Page 7. Clause 11.1(d).**

No 1  
OCT.  
1986  
*Delete* 'CLASS 400' and *replace* with 'CLASS 500'.

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AMDT **Page 7. Clause 11.1(f).**

No 1  
OCT.  
1986  
*Delete* the example and *substitute* :

TRADENAME NOM. OD 18 PE GAS CLASS  
500 SDR 11 840515 P1

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AMDT **Page 19. Clause 3.**

No 1  
OCT.  
1986  
*Delete* existing clause and *substitute* :

Polyethylene fusion fittings shall be classified as follows:

- (a) *Class 250*—for service with AS 2718, Part 1, Class 250 pipe up to and including 250 kPa at temperatures in the range  $-20^{\circ}\text{C}$  to  $+35^{\circ}\text{C}$ .
  - (b) *Class 500*—for service with AS 2718, Part 1, Class 500 pipe up to and including 500 kPa at temperatures in the range  $-20^{\circ}\text{C}$  to  $+35^{\circ}\text{C}$ .
- 

AMDT **Page 19. Clause 8.1(c).**

No 1  
OCT.  
1986  
*Delete* reference to 'Class 200' and 'Class 400', and *replace* with 'Class 250' and 'Class 500', respectively.

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AUSTRALIAN STANDARD

**PLASTICS PIPES AND FITTINGS  
FOR GAS RETICULATION—  
POLYETHYLENE—OUTSIDE  
DIAMETER SERIES**

**Part 1—PIPES  
Part 2—FITTINGS**

**AS 2718.1-2—1984**

First published .....1984



PUBLISHED BY THE STANDARDS ASSOCIATION OF AUSTRALIA  
STANDARDS HOUSE, 80 ARTHUR ST, NORTH SYDNEY, N.S.W.

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## PREFACE

This standard was prepared by the Association's Committee on Plastics Pipe and Fittings for Gas Reticulation as a result of a proposal by the Australian Gas Light Company for a standard corresponding to ISO 161/1, Thermoplastics Pipes for the Transport of Fluids—Nominal Outside Diameters and Nominal Pressures, Part 1—Metric Series.

The dimensions and SDR values used in this standard are based on those in ISO TC 138 DIS 4437, Buried Polyethylene (PE) Pipes for Supply of Gaseous Fuels—Metric Series—Specification. However pipes with a SDR of 17.6 are limited to a maximum service pressure of 200 kPa compared with 400 kPa in the ISO draft standard.

This standard specifies requirements for dimensions, freedom from defects, pressure resistance at 80°C, squeeze-off properties and reversion. The performance requirements are technically identical with AS 1667, Plastics Pipes and Fittings for Gas Reticulation—Polyethylene—Nominal Size Series.

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 established relationship between resistance to these two forms of failure, and further work is necessary to formulate suitable test(s) which may include an ESCR test. Consideration will also be given to the work currently being carried out within the technical committees of ISO TC 138, Plastics Pipes, Fittings and Valves for the Transport of Fluids.

✓ **SEE AMENDMENT 1**

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## STANDARDS ASSOCIATION OF AUSTRALIA

## Australian Standard

for

PLASTICS PIPES AND FITTINGS FOR GAS RETICULATION—POLYETHYLENE—  
OUTSIDE DIAMETER SERIES

## PART 1—PIPES

## FOREWORD

~~SEE AMENDMENT 1~~  
~~In the determination of the hydrostatic design stress of the material specified herein, an extrapolated 50-year long-term hydrostatic stress value of 8 MPa has been used to provide a factor of safety of 4.~~

The wall thicknesses for the pipes specified have been calculated from formulas which take into account the hydrostatic design stress of the material and the working pressure and diameter of the pipes.

~~SEE AMENDMENT 1~~  
~~For special applications, the design wall thickness of pipes shall be calculated from the following formula for use at service pressures of above 200 kPa and up to and including 400 kPa at temperatures in the range -20°C to +35°C:~~

$$T_{\min} = \frac{D_e}{SDR}$$

where

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

$D_e$  = the nominal outside diameter of pipe

$SDR$  = the standard dimension ratio (see Clause 3.5)

For Class <sup>250</sup> pipe, the  $SDR$  value shall be 17.6, and for Class <sup>500</sup> pipe, 11.0.

NOTE: Where saddle fusion techniques may be used in the special application, a provision for additional wall thickness may be necessary.

## SPECIFICATION

**1 SCOPE.** This standard specifies requirements for polyethylene pipes for use in gas mains and services for direct burial and reliner applications. Such pipe is intended for use in the distribution of natural gas, liquefied petroleum gas (LPG) in the vapour phase and LPG/air mixtures at pressures up to 400 kPa, provided that the partial pressure of the LPG component does not exceed 200 kPa.

<sup>250</sup> ~~SEE AMENDMENT 1~~  
This standard does not apply to pipe 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 percent aromatics by volume.

### NOTES:

1. AS XXXX is applicable to pipes manufactured in accordance with this standard.
2. 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 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 1685	Plastics Pipes and Fittings for Gas Reticulation—Polyethylene Compound for Manufacturing
AS 1821-1823	Suppliers Quality Control Systems—Levels 1 to 3
AS 1984	Vernier Callipers (Metric Series)
AS 2000	Guide to AS 1821-1823, Suppliers Quality Control Systems
AS 2033	Installation of Polyethylene Pipe Systems
AS 2102	External Micrometers (Metric Series)
AS 2490	Sampling Procedures and Charts for Inspection by Variables for Percent Defective
AS XXXX	Installation of Plastics Gas Pipe Systems*

**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 LP gas (LPG)**—liquefied petroleum gas which is composed predominantly of any of the following hydrocarbons or mixtures of all or any of them: propane, propylene, butane and butylene.

**3.5 Standard dimension ratio (SDR)**—the pipe nominal outside diameter ( $D_e$ ) divided by the minimum wall thickness ( $T_{min}$ ).

**3.6 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.

**3.7 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.

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

**3.9 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 NOTATION.** The following notation shall apply in this standard:

$D_e$  = the nominal outside diameter, in millimetres.

$D_m$  = the mean outside diameter, in millimetres.

$D_o$  = the outside diameter including ovality, in millimetres.

$T$  = the wall thickness, in millimetres.

**5 CLASSIFICATION.** <sup>SEE AMENDMENT 1</sup> Polyethylene gas pipe shall be classified as follows:

(a) ~~Class 200~~—for service pressures up to and including 200 kPa at temperatures in the range  $-20^{\circ}\text{C}$  to  $+35^{\circ}\text{C}$ .

(b) ~~Class 400~~—for service pressures up to and including 400 kPa at temperatures in the range  $-20^{\circ}\text{C}$  to  $+35^{\circ}\text{C}$ .

**6 COMPOSITION.** Polyethylene gas pipe shall be manufactured from polyethylene extrusion compound complying with AS 1685.

The compound shall be free from foreign material. The addition of rework material shall not be permitted.

**7 DIAMETER AND WALL THICKNESS.** When pipe is measured in accordance with Appendix B, it shall conform to the dimensions given in Table 1.

**8 LENGTH.** Straight pipe shall be supplied in nominated lengths with a tolerance of  $+0.05, -0$  m. In coils, the length shall be not less than that designated by the manufacturer, and the inside diameter of the coil shall comply with Table 2.

\*In course of preparation.