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PLASTICS PIPES AND FITTINGS FOR GAS RETICULATION—UNPLASTICIZED PVC (UPVC)

Part 1—PIPES
Part 2—FITTINGS

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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, 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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PREFACE

This edition of this standard was prepared by the Association's Committee on Plastics Pipe and Fittings for Gas Reticulation to supersede AS 1464—1974. It sets out dimensional and performance requirements for UPVC pipes and fittings for use in gas reticulation systems. It also takes into consideration specific requirements of the gas industry in respect to terminology and gas pressure classification.

In this standard, pipes and fittings are designated by a nominal size as shown in Table 2.1. Designated sizes are not exact dimensions.

The standard classifies pipe as Type 1—Unmodified UPVC Class 100, and Type 2—Modified (improved impact) UPVC Class 100, for use underground with pressures up to 100 kPa and temperatures up to 40°C. New developments have taken place since the publication of the 1974 edition and an additional type has now been included, viz Type 3—Modified (high ductility) UPVC Class 100 and 450. Class 100 is for use with pressures up to 100 kPa and Class 450 for pressures up to 450 kPa, with temperatures up to 40°C.

It has been recognized that in the low pressure application, long-term hoop stress could no longer be used as the basis of design. Hoop stresses developed in the pipe wall due to internal pressure are quite low, and the predominant design consideration relates to the higher safety factors required by the industry because of the hazardous nature of the material conveyed.

The committee recognizes the need for test(s) of fracture toughness properties of UPVC 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).

A minimum wall thickness of 1.6 mm has been specified in this standard, but the dimensions are otherwise based on those established in AS 1477 for UPVC pipes and fittings for pressure applications.

Because permeability of UPVC to methane is negligible, no requirement for the determination of methane permeability has been included in the standard.

Polyethylene pipes and fittings for gas reticulation are specified in AS 1667, Plastics Pipes and Fittings for Gas Reticulation—Polyethylene—Nominal Size Series*, and AS ...., Plastics Pipes and Fittings for Gas Reticulation—Polyethylene—ISO Outside Diameter Series†.

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* Under revision.
† In course of preparation.

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PLASTICS PIPES AND FITTINGS FOR GAS RETICULATION—UNPLASTICIZED PVC (UPVC)

PART 1—PIPES

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard specifies requirements for UPVC pipes for use in gas mains and services for direct burial and refiner applications. Such pipe is intended for use with natural gas, liquefied petroleum gas (LP gas), and air and LP gas mixtures at pressures up to 450 kPa.

This standard does not apply to pipe for use with petroleum liquids, including liquid LP gas and pentane, manufactured or mixed gas distribution systems, systems which may contain more than 1 percent ammonia, or systems in which the gas contains more than 50 percent saturation vapour pressure of aromatics.

Pipes manufactured in accordance with this standard are intended to be jointed using solvent cements complying with AS XXXX.

NOTES:

1. AS YYYY is applicable to pipes manufactured in accordance with this standard.
2. Fittings for use with pipes specified in this standard are dealt with in AS 1464, Part 2.
3. Advisory information on alternative methods of determining compliance of a lot with this standard is given in Appendix A.

1.2 REFERENCED DOCUMENTS. The following standards are referred to in this standard:

AS 1145 Method for Determination of Tensile Properties of Plastics Materials

AS 1199 Sampling Procedures and Tables for Inspection by Attributes

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

AS 1462 Methods of Test for Unplasticized PVC (UPVC) Pipes and Fittings

- AS 1462.1 Method for Determining the Dimensions of UPVC Pipes and Fittings
- AS 1462.2 Method for Determining the Flattening Properties of UPVC Pipes
- AS 1462.3 Method for Determining the Impact Characteristics of UPVC Pipes
- AS 1462.4 Method for Determining Reversion of UPVC Pipes
- AS 1462.5 Method for Determining the Softening Point of UPVC Pipes and Fittings
- AS 1462.6 Method for Hydrostatic Pressure Testing of UPVC Pressure Pipes
- AS 1462.12 Method for Determining the Effect of Immersion in Anhydrous Acetone on UPVC Pipes

AS 1821-23 Suppliers Quality Control Systems—Levels 1, 2 and 3

AS 2000 Guide to AS 1821-23, Suppliers Quality Control Systems

AS 2032 Installation of UPVC Pipe Systems

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 Solvent Cements and Priming Fluids for use with Unplasticized PVC Pipe and Fittings*

AS YYYY Installation of Plastics Gas Pipe Systems*

BS 381C Colours for Specific Purposes.

1.3 DEFINITIONS. For purposes of this standard, the following definitions apply:

1.3.1 LP gas—liquefied petroleum gas which is composed predominantly of any of the following hydrocarbons or mixtures of all or any of them: propane, propylene, butanes and butylenes.

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

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

1.3.4 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.

1.3.5 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.

* In course of preparation.