AS 4441(Int)—1996
(Expires 5 December 2000)

Interim
Australian Standard®

Oriented PVC (OPVC) pipes for pressure applications

This Interim Australian Standard was prepared by Joint Technical Committee PL/21, Unplasticized PVC Pipe. It was approved on behalf of the Council of Standards Australia on 6 November 1996 and on behalf of the Council of Standards New Zealand on 6 November 1996. It was published on 5 December 1996.

The following interests are represented on Committee PL/21:

Australian Association of Certification Bodies
CSIRO—Division of Building, Construction and Engineering
Department of Land and Water Conservation, N.S.W.
Department of Natural Resources, Qld
Melbourne Retail Water Companies
New Zealand Local Government Association
New Zealand Society of Master Plumbers and Gasfitters
Plastics and Chemicals Industry Association
Plastics Institute of New Zealand
South Australian Water Corporation
Sydney Water Corporation
Water Corporation Western Australia

This Standard was issued in draft form for comment as DR 94198.

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PUBLISHED BY:

STANDARDS AUSTRALIA
1 The Crescent,
Homebush NSW 2140 Australia

ISBN 0 7337 0864 1

PREFACE

This Interim Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee PL/21, Unplasticized PVC Pipe.

The objective of this document is to provide a standard specification for manufacturers and purchasers of PVC (OPVC) pipes for pressure applications.

This Interim Standard was prepared from a document used within the industry as an operating specification for the manufacture and testing of oriented PVC pressure pipes.

Standards Australia/Standards New Zealand invite comment on this Interim Standard from persons and organizations concerned with this subject.

The date of expiry for comment is 2 years after publication, at which time this Interim Standard will either be confirmed, withdrawn or revised in the light of public comment, with the view to the preparation of a Joint Standard.

During the life of this document, the Committee will monitor all comment or field data as it is received.

Attention is drawn to the fact that this document is an Interim Australian Standard, and should be regarded as a developmental Standard and liable to future alteration.

The term ‘informative’ has been used in this Standard to define the application of the appendix to which it applies. An ‘informative’ appendix is only for information and guidance.

The AS 1462 series Standards at time of publication of this Standard are in the process of a joint AS/NZS review and will be published as the AS/NZS 1462 Series.

As these are published the AS 1462 documents referred in this Standard will be replaced by the equivalent AS/NZS 1462 document.

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First published as AS/NZS 4441(Int):1996.

Incorporating:
Amdt 1—1999

FOREWORD

Molecular orientation of plastics enhances the ultimate tensile strength of the material, enabling higher operating stresses to be utilized.

The level of strength enhancement achievable is limited by practical factors and the limits of the intended application. For pressure pipes for general water supply work, stability against vacuum is required, which is independent of tensile strength. While some enhancement of stiffness (elastic modulus) can be achieved by orientation, this requirement imposes a lower limit on the wall thickness, and thus an upper limit on the useable tensile strength.

In this Standard, pipes are designed on the basis of a working hydrostatic hoop stress of 23.6 MPa. This is approximately double the design stress level for pipes under AS/NZS 1477. The lowest useful dimension ratio at this stress level is Class 9, (PN 9).

Higher stress enhancement could be useful for higher classes of pipe. However, no practical experience has been gained at higher levels of orientation, and this Standard is therefore restricted to pipes of 23.6 MPa stress rating.

The design basis used is identical to that for AS/NZS 1477, viz. the Barlow equation relating stress and pressure, i.e.

$$T_{\text{min.}} = \frac{PD_{\text{m min.}}}{2S + P} \text{ with a minimum of 1.4 mm}$$

where

$T_{\text{min.}}$ = minimum wall thickness, in millimetres

$D_{\text{m min.}}$ = minimum mean outside diameter, in millimetres

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

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

Diameter tolerances are the same as for standard PVC pipes. Wall thickness tolerances are based on a relationship derived from experience with the orientation manufacturing process, i.e.

$$T_{\text{max.}} = 1.14T_{\text{min.}} + 0.4$$

$T_{\text{min.}}$ is rounded (4/5) to the nearest 0.1 mm. $T_{\text{max.}}$ is computed on the rounded value of $T_{\text{min.}}$ and then likewise rounded.

The long-term (extrapolated 50 years) burst stress has been set to provide a safety factor of 2 times the hydrostatic design stress.

STANDARDS AUSTRALIA

Interim Australian Standard

Oriented PVC (OPVC) pipes for pressure applications

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE This Standard specifies requirements for oriented PVC (OPVC) pipe for pressure applications for use below ground, above ground where not exposed to direct sunlight, and for operational temperatures below 50°C.

OPVC pipes in accordance with this Standard are intended for elastomeric ring jointing by integral sockets or by separate couplings. Solvent cement joints are not a specified jointing method for OPVC pipes.

OPVC pipe manufactured to this Standard should be used and installed only in accordance with AS 2032 and AS 2566.

1.2 REFERENCED DOCUMENTS The following documents are referred to in this Standard:

AS	
1199	Sampling procedures and tables for inspection by attributes
1399	Guide to AS 1199—Sampling procedures and tables for inspection by attributes
1462	Methods of test for unplasticized PVC (UPVC) pipes and fittings
1462.3	Part 3: Method for determining the impact characteristics of UPVC pipes
1462.4	Part 4: Method for determining reversion of UPVC pipes
1462.6	Part 6: Methods for hydrostatic pressure testing of UPVC pressure pipes
1462.8	Part 8: Method of test for liquid infiltration
1462.17	Part 17: Method for testing pressure pipe joints with elastomeric seals
2032	Code of practice for installation of UPVC pipe systems
2566	Plastics pipelaying design
3500	National Plumbing and Drainage Code
3500.0	Part 0: Glossary of terms
3855	Suitability of plumbing and water distribution systems products for contact with potable water
AS	
4020	Products for use in contact with water intended for human consumption with regard to their effect on the quality of water.
AS	
ISO 9000	Quality management and quality assurance standards
ISO 9000.1	Part 1: Guidelines for selection and use
ISO 9004	Quality management and quality system elements
ISO 9004.1	Part 1: Guidelines