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PPA ED.

Australian Standard®

Polybutylene pipe systems

Part 2: Polybutylene (PB) pipe for hot and cold water applications

AS/NZS 2642.2:1994
Polybutylene (PB) pipe for hot and cold water applications
(In Professional Package 61A)
11pp *DD*

Specifies materials, dimensions and performance requirements for polybutylene pipe for hot and cold water applications, including domestic, industrial and agricultural purposes. Applies to pipes of up to 125 mm nominal outside diameter with a wall thickness no greater than 15 mm but does not apply to a wall thickness of less than 1.6 mm.

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STANDARDS AUSTRALIA

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The following interests are represented on Committee PL/3:

Confederation of Australian Industry

Engineering and Water Supply Department, S.A.

Hunter District Water Board

Melbourne and Metropolitan Board of Works

Plastics Institute of Australia

Water Board, Sydney

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PREFACE

This Standard was prepared by the Standards Australia Committee on Polybutylene Pipe Systems, acting under the authority of the Plastics Standards Board to supersede the 1984 edition. It is one of a series relating to polybutylene pipe systems; other Standards in the series are AS 2642.1, *Polybutylene (PB) pipe extrusion compounds*, and AS 2642.3, *Mechanical jointing fittings for use with polybutylene (PB) pipes for hot and cold water applications.*

Polybutylene pipe can be used with either plastics fittings or metallic fittings, provided that they are in accordance with AS 2642.3. Requirements set out therein cover compatibility with pipe, toxicity, resistance to leakage and pull-out, as well as thermal and pressure cycling tests.

CONTENTS

FOREWORD

The hydrostatic design stresses of the pipes specified in this Standard have been determined by the application of a safety factor of 1.8 to the extrapolated 100 000-hour long-term hydrostatic stress value, which is based on a minimum stress regression line.

The wall thicknesses for the pipes specified in this Standard are based on the Lame formula[1], which takes into account the hydrostatic design stress of the material and the working pressure and diameter of the pipes.

The equations used to calculate wall thickness are as follows:

$$T_{min} = \frac{D_{m\,max}}{2}\left[1 - \sqrt{\left(\frac{S/P - 1}{S/P + 1}\right)}\right]$$

$$T_{max} = 1.10T_{min} + 0.1$$

where

T_{min} = minimum wall thickness, in millimetres

$D_{m\,max}$ = maximum mean outside diameter, in millimetres

S = hydrostatic design stress of 7.6 MPa at 20°C.

P = working pressure at 20°C, in megapascals

T_{max} = maximum wall thickness, in millimetres.

[1] Popov, E.P. *Mechanics of Materials*, Prentice Hall, Englewood-Cliffs New Jersey, 2nd Ed. 1976.

STANDARDS AUSTRALIA

Australian Standard
Polybutylene pipe systems

Part 2: Polybutylene (PB) pipe for hot and cold water applications

1 SCOPE. This Standard specifies materials, dimensional and performance requirements for polybutylene pipe for hot and cold water applications including domestic, industrial and agricultural purposes.

In the interests of serviceability of the pipe, and irrespective of the calculated minimum wall thickness, this Standard does not apply to a wall thickness of less than 1.6 mm. The Standard applies to pipes of up to 125 mm nominal outside diameter with a wall thickness no greater than 15 mm.

NOTES:

1. Polybutylene undergoes a crystalline transition after it has cooled from the molten state. As a consequence pipe manufactured to this Standard will not have achieved its full strength until 10 d after the date of manufacture, i.e. the date stamped on the pipe. Precautions should be taken to ensure that pipe is not released from the manufacturer's control prematurely and installed before gaining full strength.
2. Polybutylene pipe manufactured in accordance with this Standard is considered suitable for use in situations exposed to sunlight, direct or indirect, only if it is stabilized against ultraviolet degradation. One effective method of stabilization is by the addition of between 2 percent and 3 percent carbon black.
3. Polybutylene pipe manufactured in accordance with this Standard is intended to be used with fittings complying with AS 2642.3. Joining polybutylene pipe by means of solvent cement is not satisfactory.
4. Advisory information on alternative methods of determining compliance of a 'lot' with this Standard is given in Appendix A.
5. Type tests specified in Clauses 8.1, 8.2, 8.3, 9.2, 9.3, and 9.4 are type tests performed to assess compliance of finished product with this Standard, however it may also be convenient for product manufacturers to use these tests for quality control purposes during manufacture.

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

AS
1199 Sampling procedures and tables for inspection by attributes
1349 Bourdon tube pressure and vacuum gauges
1399 Guide to AS 1199, Sampling procedures and tables for inspection by attributes
1821–23 Suppliers Quality Systems
1984 Vernier callipers
2000 Guide to AS 1821–23—Suppliers quality systems
2101 Internal micrometers (including stick micrometers)
2102 External micrometers
2490 Sampling procedures and charts for inspection by variables for percent defective
2642 Polybutylene pipe systems
2642.1 Part 1: Polybutylene (PB) pipe extrusion compounds
2642.3 Part 3: Mechanical jointing fittings for use with polybutylene (PB) pipe for hot and cold water applications
3900 Quality systems—Guide to selection and use
3901 Quality system for design, development, production, installation and servicing
3902 Quality system for production and installation
3903 Quality system for final inspection and test
3904 Quality systems—Guide to quality management and quality system elements

ASTM
D 1708 Standard test method for tensile properties of plastics by use of microtensile specimens

BS
6920 Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water

3 DEFINITIONS. For the purpose of this Standard, the definitions below 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 temperature and time.

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 100 000-hour long-term hydrostatic stress value.

3.4 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 anticipated working conditions.

3.5 Test pressure—the pressure applied internally to pipes or fittings when being tested for strength and watertightness.

3.6 Reference curve—the curve obtained by connecting the points 7.2 MPa at 0.1 h, 6.8 MPa at 170 h and 4.1 MPa at 100 000 h, for a failure stress-time graph plotted on log/log graph paper.

3.7 Pipe material temperature—the average temperature estimated as applying through the full wall thickness.