AS 4321:2025

Australian STANDARD®

STANDARDS Australia

Fusion-bonded medium-density polyethylene coating and lining for pipes and fittings



AS 4321:2025

This Australian Standard® was prepared by WS-009, Rolled And Welded Steel Pipes. It was approved on behalf of Standards Australia's Standards Development and Accreditation Committee on 24 April 2025.

This Standard was published on 16 May 2025.

The following are represented on Committee WS-009:

Australian Chamber of Commerce and Industry
Australian Industry Group
Australian Steel Association
Bureau of Steel Manufacturers of Australia
Engineers Australia
Plumbing Products Industry Group
Water Services Association of Australia
Weld Australia

This Standard was issued in draft form for comment as DR AS 4321:2024.

Keeping Standards up-to-date

Ensure you have the latest versions of our publications and keep up-to-date about Amendments, Rulings, Withdrawals, and new projects by visiting:
www.standards.org.au

ISBN 978 1 76175 163 9

Fusion-bonded medium-density polyethylene coating and lining for pipes and fittings

Originated as AS 4321—1995.
Previous edition 2001.
Reconfirmed 2019.
Third edition 2025.

© Standards Australia Limited 2025

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968 (Cth).

Preface

This Standard was prepared by the Standards Australia Committee WS-009, Rolled and Welded Steel Pipes, to supersede AS 4321:2001.

The objective of this document is to provide a standard specification for fusion-bonded medium-density polyethylene coating and lining for pipes and fittings, for use by the manufacturers and purchasers of these products.

This revised edition differs from the 2001 edition as follows:

(a) Withdrawn/superseded standards have been updated.

(b) Alternative test methods have been added.

(c) The requirements for the use of the reinstatement compound have been made clearer.

(d) More detail has been specified for the test reports.

The terms “normative” and “informative” are used in Standards to define the application of the appendices to which they apply. A “normative” appendix is an integral part of a Standard, whereas an “informative” appendix is only for information and guidance.

© Standards Australia Limited 2025

Contents

Preface ii

1 Scope 1

2 Normative references 1

3 Terms and definitions 2

4 Materials 3
4.1 General 3
4.2 Polyethylene coating (and lining) compound 3
4.2.1 Composition 3
4.2.2 Dispersion of additives 3
4.3 Polyethylene reinstatement compound 3
4.3.1 Composition 3
4.3.2 Dispersion of additives 3

5 Coating and lining application 4
5.1 Preparation of surface 4
5.2 Application 4
5.3 Cleaning of pipe and fitting ends 4
5.4 End treatment 4

6 Test requirements 4
6.1 Type test 4
6.1.1 General 4
6.1.2 Polyethylene coating (and lining) compound 4
6.1.3 Polyethylene reinstatement compound 5
6.2 Application process qualification 6
6.3 Production tests 6
6.3.1 General 6
6.3.2 Thickness 6
6.3.3 Continuity test 6
6.3.4 Bond strength 6

7 Reinstatement 7
7.1 General 7
7.2 Application of reinstatement 7
7.3 Reinstatement test requirements 8

8 Repairs 8
8.1 General 8
8.2 Repair limits 8
8.2.1 Coating repairs 8
8.2.2 Lining repairs 8
8.3 Repair test methods 8

9 Test frequency 9

10 Effect of FBPE lining on water quality 9

11 Storage, handling, transport and marking 9
11.1 Handling and storage of coated pipes and fittings 9
11.2 Transport of coated pipes and fittings 9
11.3 Marking 9

Appendix A (normative) **Means for demonstrating compliance** 11

Appendix B (informative) **Purchasing guidelines** 16

Appendix C (normative) **Thermal stability test** 17

Appendix D (normative) **Water absorption test** 19

Appendix E (normative) **Penetration resistance test** **21**
Appendix F (normative) **Method for the determination of tensile stress at yield** **23**
Appendix G (normative) **Method for the determination of environmental stress-cracking resistance** **24**
Appendix H (normative) **Preparation of coating and lining test specimens** **26**
Appendix I (normative) **Impact resistance test** **28**
Appendix J (normative) **Adhesion of polyethylene reinstatement compound to steel** **29**
Appendix K (normative) **Adhesion of polyethylene reinstatement compound to polyethylene compound** **31**
Appendix L (normative) **Cathodic disbonding resistance test** **33**
Appendix M (normative) **Continuity test** **38**
Appendix N (normative) **Bond strength test** **40**

Australian Standard®

Fusion-bonded medium-density polyethylene coating and lining for pipes and fittings

1 Scope

This document specifies requirements for factory-applied fusion-bonded medium-density polyethylene coating and lining of pipes and fittings, for protection against corrosion.

Polyethylene materials conforming to this document are intended for application to pipes and fittings where the pipeline operating temperatures are not less than –40 °C nor more than 70 °C for the coating and 50 °C for the lining.

The coating is intended for use on pipes and fittings for underground and underwater service, including steel piling. The lining is intended for use on pipes and fittings for pipelines conveying wastewater and water intended for human consumption.

Methods for determining compliance with this document are given in Appendix A.

NOTE Guidelines on requirements that are to be specified by the purchaser at the time of enquiry or order are given in Appendix B.

2 Normative references

AS 1199, *Sampling procedures and tables for inspection by attributes*

AS 1281, *Cement mortar lining of steel pipes and fittings*

AS 1627.2, *Metal finishing—Preparation and pretreatment of surfaces, Part 2: Power tool cleaning*

AS 1627.4, *Metal finishing—Preparation and pretreatment of surfaces, Part 4: Abrasive blast cleaning*

AS 3894.3, *Site testing of protective coatings, Method 3: Determination of dry film thickness*

AS 4352, *Tests for coating resistance to cathodic disbonding*

AS 4822, *External field joint coatings for steel pipelines*

AS ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

AS/NZS 3500.0, *National Plumbing and Drainage Code, Part 0: Glossary of terms*

AS/NZS 4020, *Products for use in contact with drinking water*

AS/NZS 4131, *Polyethylene (PE) compounds for pressure pipes and fittings*

ISO 2859-1, *Sampling procedures for inspection by attributes, Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

ISO 527-3, *Plastics — Determination of tensile properties — Part 3: Test conditions for films and sheets*

ISO 1183-1, *Plastics—Methods for determining the density of non-cellular plastics, Part 1: Immersion method, liquid pycnometer method and titration method*

ISO 39511, *Sequential sampling plans for inspection by variables for percent nonconforming (known standard deviation)*

ASTM D1238, *Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer*

ASTM D1693, *Test Method for Environmental Stress-cracking of Ethylene Plastics*

© Standards Australia Limited 2025