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Australian Standard 1281—1981

THE CEMENT MORTAR LINING OF STEEL PIPES AND FITTINGS



STANDARDS ASSOCIATION OF AUSTRALIA
Incorporated by Royal Charter



THE FOLLOWING SCIENTIFIC, INDUSTRIAL AND GOVERNMENTAL ORGANIZATIONS and departments were officially represented on the committee entrusted with the preparation of this standard:

Brisbane City Council
Confederation of Australian Industry
Department of Housing and Construction
Department of Local Government, Qld
Department of Public Works, N.S.W.
Engineering and Water Supply Department, S.A.
Gas and Fuel Corporation of Victoria
Hobart City Council
Hunter District Water Board
Melbourne and Metropolitan Board of Works
Metal Trades Industry Association of Australia
Metropolitan Water Sewerage and Drainage Board, N.S.W.
Metropolitan Water Supply, Sewerage and Drainage Board, W A.
Public Works Department, W.A.
Snowy Mountains Hydro-electric Authority
State Electricity Commission of Victoria
State Rivers and Water Supply Commission of Victoria
Water Works Trusts Association of Victoria

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AUSTRALIAN STANDARD

THE CEMENT MORTAR LINING OF STEEL PIPES AND FITTINGS

AS 1281—1981

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PREFACE

This edition of this standard was prepared by the Association's Committee on Rolled and Welded Steel Pipes.

This standard applies to cement mortar linings applied in the factory, and does not include those applied in-situ which are dealt with in AS 1516.

In this edition the format has been changed to that adopted in other current Australian standards, contractual requirements have been removed from the text and are covered by notes, and an appendix details purchasing guidelines. The technical content remains the same.

This standard may require reference to the following standards:

- AS 1152 Test Sieves
- AS 1315 Specification and Methods of Test for Portland Cement
- AS 1465 Dense Natural Aggregates for Concrete
- AS 1579 Arc Welded Steel Pipes for Water and Gas
- BS 3148 Tests for Water for Making Concrete

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

for

THE CEMENT MORTAR LINING OF STEEL PIPES AND FITTINGS

1 SCOPE. This standard specifies requirements for the cement mortar lining of steel pipes and fittings of 100 nominal size and larger, by either the spinning or hand application method, prior to their installation in pipelines.

Details of admixtures and of ends of mortar linings are not provided. This standard does not apply to the in-situ cement mortar lining of pipelines.

NOTES:

1. For actual mean diameter to wall thickness ratios above 130, the manufacturer should be consulted on the practicability of applying the cement mortar lining.
2. Guidelines to purchasers on requirements that must or may need to be agreed upon at the time of enquiry or order are given in Appendix A.
3. Details of ends of mortar lining are a matter for agreement between the purchaser and manufacturer (see Appendix A, Paragraph A3(a)).

2 DEFINITIONS. For the purpose of this standard, the following definitions apply:

2.1 Curing—the development of mortar strength under conditions that inhibit shrinkage and cracking, e.g. by retention of moisture in the mortar.

2.2 Laitance—a chalky surface layer composed of finer fractions of mortar which can readily be removed from the lining by scraping with the blade of a pen-knife or similar implement after the lining has cured.

2.3 Lining—a protective coating to the internal surface of a pipe or fitting.

2.4 Mortar—cement mortar consisting of portland cement, inert aggregates and water.

2.5 Nominal size—the nominal inside diameter of the pipe. This parameter is for reference purposes only.

2.6 Spinning—a process by which mortar is spread and compacted on the inside surface of a pipe by the spinning of the pipe about its longitudinal axis.

3 MATERIALS.

3.1 Aggregates. Aggregates used for the manufacture of the mortar or concrete shall comply with AS 1465. The following additional grading requirements shall also apply:

- (a) not more than 7 percent of the aggregate shall pass a 150 μm sieve; and
- (b) all the aggregate shall pass a sieve having apertures nearest to one-third of the specified thickness of the mortar lining.

The sieves used shall comply with AS 1152.

NOTE: In the absence of aggregates complying with AS 1465 and the additional requirements of this standard, other aggregate material may be used by agreement between the purchaser and manufacturer provided that the resultant lining complies in all other respects with this standard (see Appendix A, Paragraph A4 (a)).

3.2 Cement. Unless otherwise specified, portland cement used for the manufacture of the mortar or concrete shall comply with AS 1315 Type A.

NOTE: Type A cement has been found suitable under most conditions; however where certain circumstances warrant, e.g. where H_2S attack may be expected, the type of cement used should be agreed between the purchaser and manufacturer (see Appendix A, Paragraph A3(b)).

3.3 Water. Water shall be clean and free from injurious amounts of acid, alkali, oil, organic material and other deleterious substances.

NOTE: Where there is doubt concerning its quality, the water should be checked by means of the tests given in BS 3148.

3.4 Admixtures. Admixtures may be used only with the approval of the purchaser (see Appendix A, Paragraph A2(b)).

4 PROPORTIONING OF MATERIALS.

4.1 Aggregate: Cement Ratio. The aggregate: cement ratio shall be as follows:

- (a) For linings less than 16 mm thick not exceeding 2:1.
- (b) For linings 16 mm thick and greater not exceeding 3:1.

4.2 Water:Cement Ratio. The water:cement ratio shall be the least that will produce a workable mortar mix.

NOTE: No limit has been set for the water: cement ratio because the optimum ratio depends on the mix proportions, the diameter of the pipe to be lined, and the method of applying the mortar to the pipe. The water: cement ratio in mortar linings after spinning is usually in the range of 0.25 to 0.40.

5 MEASUREMENT AND MIXING OF MATERIALS. Materials for the mortar shall be mixed in batches.

The proportions of aggregate and cement shall preferably be measured by mass. Where proportioning is by volume, the volume proportions shall be determined by measurement of mass. Account shall be taken of the moisture content of the aggregate when the required amount of mixing water is calculated, and the additional mixing water shall be measured to an accuracy of 3 percent.

6 PREPARATION OF STEEL SURFACE. At the time of application of the mortar, the surface of the pipe or fitting shall be clean. Loose rust, loose millscale, dirt, debris, oil, grease and other detrimental material shall be removed by manual, mechanical or chemical means. If chemicals deleterious to steel or cement mortar are used to clean the steel surface, such chemicals shall be removed at the completion of the cleaning process.