SS 183:2022
(ICS 91.140.80)

SINGAPORE STANDARD

Specification for concrete cylindrical pipes and fittings including manholes

Singapore Standards Council

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Foreword

This Singapore Standard was prepared by the Working Group on Concrete Cylindrical Pipes and Fittings including Manholes set up by the Technical Committee on Building Maintenance and Management under the purview of the Building and Construction Standards Committee.

In this revision, the title of the standard has been changed to “Specification for concrete cylindrical pipes and fittings including manholes”. This revision brings the standard up-to-date and makes it more comprehensive by incorporating provisions from the latest relevant international and overseas standards.

Some of the major changes include:

- expanded specifications to adequately address the performance requirements of pipes to be constructed by pipe jacking method;
- requirements for anti-corrosion protective lining in concrete pipes used in sewerage environment;
- addition of new pipe materials, namely polymer concrete and calcium aluminate concrete;
- new classification of pipes according to installation depth and the standardisation of crushing load requirements for the respective pipe class;
- requirements for structural and water tightness design and test at factory and water tightness testing of completed lengths of pipes at site;

It is presupposed that in the course of their work, users will comply with all relevant regulatory and statutory requirements. Some examples of relevant regulations and acts are listed in the Bibliography. The Singapore Standards Council and Enterprise Singapore shall not be responsible for identifying all of such legal obligations.

In preparing this standard, reference was made to the following publications:

1. BS EN 1295-1 Structural design of buried pipelines under various conditions of loading – General requirements.
2. Code of practice on surface water drainage.
3. PUB standard specifications for sewerage works from Water Reclamation (Network) Department (WRND), Section 6 and 9.

Permission has also been sought from the following organisations for the reproduction of materials from their publications into this standard:

1. BSI Standards Limited

   - BS 5911-1:2002+A2:2010 Concrete pipes and ancillary concrete products

   Permission to reproduce and adapt extracts from British Standards is granted by BSI Standards Limited. No other use of this material is permitted.

2. European Committee for Standardization

   - EN 1610:2015 Construction and testing of drains and sewers

- EN 1916:2002 Concrete pipes and fittings, unreinforced, steel fibre and reinforced

- EN 1917:2002 Concrete manholes and inspection chambers, unreinforced, steel fibre and reinforced

- EN 14636-1:2009 Plastics piping systems for non-pressure drainage and sewerage – Polyester resin concrete (PRC) – Part 1: Pipes and fittings with flexible joints

3. International Organization for Standardization

- ISO 25780:2011 Plastics piping systems for pressure and non-pressure water supply, irrigation, drainage or sewerage. Glass-reinforced thermosetting plastics (GRP) systems based on unsaturated polyester (UP) resin. Pipes with flexible joints intended to be installed using jacking techniques.

ISO standards can be purchased from Enterprise Singapore.

Acknowledgement is made for the use of information from the above publications.

Attention is drawn to the possibility that some of the elements of this Singapore Standard may be the subject of patent rights. Enterprise Singapore shall not be held responsible for identifying any or all such patent rights.

NOTE

1. *Singapore Standards (SSs) and Technical References (TRs) are reviewed periodically to keep abreast of technical changes, technological developments and industry practices. The changes are documented through the issue of either amendments or revisions. Where SSs are deemed to be stable, i.e. no foreseeable changes in them, they will be classified as "mature standards". Mature standards will not be subject to further review unless there are requests to review such standards.*

2. *An SS or TR is voluntary in nature except when it is made mandatory by a regulatory authority. It can also be cited in contracts making its application a business necessity. Users are advised to assess and determine whether the SS or TR is suitable for their intended use or purpose. If required, they should refer to the relevant professionals or experts for advice on the use of the document. Enterprise Singapore and the Singapore Standards Council shall not be liable for any damages whether directly or indirectly suffered by anyone or any organisation as a result of the use of any SS or TR. Although care has been taken to draft this standard, users are also advised to ensure that they apply the information after due diligence.*

3. *Compliance with a SS or TR does not exempt users from any legal obligations.*

Specification for concrete cylindrical pipes and fittings including manholes

1 Scope

The standard specifies requirements for cylindrical pipes and fittings including manhole sections intended for conveyance of sewage or surface water under gravity flow conditions within the following scope:

a) Concrete cylindrical pipes and fittings, either traditional reinforced concrete with steel or unreinforced as in polymer concrete;

b) With flexible joints between cylindrical sections and water seals either integrated or supplied separately; and

c) Of nominal sizes not exceeding 3000 mm in diameter.

2 Normative references

The following referenced documents are indispensable for the application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ASTM C596	Standard test method for drying shrinkage of mortar containing hydraulic cement
ASTM D543	Standard practices for evaluating the resistance of plastics to chemical reagents
BS 4921	Specification for sherardized coatings on iron and steel
BS 5911-1	Concrete pipes and ancillary concrete. Part 1: Unreinforced and reinforced concrete pipes (including jacking pipes) and fittings with flexible joints (complementary to BS EN 1916:2002) – Specification
BS EN 196-1	Methods of testing cement. Determination of strength
BS EN 196-2	Method of testing cement. Chemical analysis of cement
BS EN 598	Ductile iron pipes, fittings, accessories and their joints for sewerage applications - Requirements and test methods
BS EN 934 / SS EN 934	Admixtures for concrete, mortar and grout
BS EN 1008	Mixing water for concrete – Specification for sampling, testing and assessing the suitability of water, including water recovered from processes in the concrete industry, as mixing water for concrete
BS EN 1015-12	Methods of test for mortar for masonry. Determination of adhesive strength of hardened rendering and plastering mortars on substrates
BS EN 1097-6	Tests for mechanical and physical properties of aggregates – Determination of particle density and water absorption
BS EN 10025-1	Hot rolled products of structural steels – General technical delivery conditions

BS EN 10025-2	Hot rolled products of structural steels – Technical delivery conditions for non-alloy structural steels
BS EN 10080	Steel for the reinforcement of concrete – Weldable reinforcing steel – General
BS EN 14647	Calcium aluminate cement - Composition, specifications and conformity criteria
BS EN ISO 1461	Hot dip galvanized coatings on fabricated iron and steel articles – Specifications and test methods
EN 681-1	Elastomeric seals – Materials requirements for pipe joint seals used in water and drainage applications – Part 1: Vulcanized rubber
ISO 1920-4	Testing of concrete – Part 4: Strength of hardened concrete
ISO 3384	Rubber, vulcanized or thermoplastic – Determination of stress relaxation in compression at ambient and at elevated temperatures
SS 270	Specification for elastomeric seals for joints in pipework and pipelines
SS EN 197 series	Cement
SS EN 12620	Aggregates for concrete