

SS 272:2022
(ICS 23.040.20; 23.040.45; 91.140.80)

SINGAPORE STANDARD

Specification for unplasticised PVC pipes and fittings below ground for sanitary drainlines



SS 272:2022

(ICS 23.040.20; 23.040.45; 91.140.80)

SINGAPORE STANDARD

Specification for unplasticised PVC pipes and fittings below ground for sanitary drainlines

Published by Enterprise Singapore

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilised in any form or by any means, electronic or mechanical, including photocopying and microfilming, without permission in writing from Enterprise Singapore. Request for permission can be sent to: standards@enterprisesg.gov.sg.

© Enterprise Singapore 2022

ISBN 978-981-5073-64-5

Contents

	Page
Foreword _____	5
1 Scope _____	7
2 Normative references _____	7
3 Terms and definitions _____	8
4 Symbols and abbreviations _____	9
5 Pipe and fitting material _____	10
6 General characteristics _____	12
7 Geometrical characteristics _____	12
8 Jointing _____	19
9 Types of fittings _____	21
10 Mechanical characteristics _____	25
11 Sampling (one-time testing) _____	26
12 Marking _____	28

Annexes

A Determination of dimensions of pipe _____	29
B Softening post test _____	30
C Method for determining the PVC and titanium dioxide content of uPVC pipes and fittings _____	32
D Tensile test _____	37
E Heat reversion test for pipe _____	39
F Impact test for pipe _____	40
G Hydrostatic pressure test _____	43
H Test for opacity _____	45
I Stress relief test (for injection moulded fittings only) _____	46
J Angular deflection test (type test) _____	47
K Hydrostatic pressure test (quality control test for factory made solvent welded assemblies)	48
L Diameter distortion test (type test for joint assemblies) _____	49
M Negative pressure test for elastomeric seal joints _____	51

Tables

1 Formulation characteristics of pipes _____	11
2 Formulation characteristics of fittings _____	11
3 Mean outside diameters _____	13
4 Wall thickness _____	13
5 Minimum radius (R) for long bends made from extruded pipe _____	15

6	Diameters and lengths of elastomeric ring seal sockets and spigots _____	16
6A	Minimum thickness of spigot _____	16
7	Wall thickness of sockets _____	18
8	Diameters and lengths of adhesive joint sockets and spigots _____	19
9	Test requirements and frequency of sampling for pipes _____	27
10	Test requirements and frequency of sampling for fittings and joint assembly _____	28
B.1	Physical characteristics of pipes _____	30
B.2	Physical characteristics of fittings _____	31
F	Total mass for impact test at 20 °C _____	41
L	Percentage reduction _____	49

Figures

1	Effective length of pipe _____	14
2	Spigot length of fitting _____	17
3	Basic dimensions of sockets and spigots for elastomeric ring seal joints _____	17
4	Typical groove designs for elastomeric ring seal sockets _____	17
5	Example for measuring the effective sealing point _____	17
6	Example for calculation of the wall thickness of sockets with retaining cap _____	18
7	Basic dimensions of sockets and spigots for solvent cement joints _____	19
8.1	Single junction _____	21
8.2	Single sweep junction _____	21
8.3	Bend _____	22
8.4	Reducer _____	22
8.5	Tumbling jay junction _____	22
8.6	Back drop junction _____	22
8.7	Long radius bends _____	23
8.8	Single socket (with or without register) _____	23
8.9	Double socket (with or without register) _____	23
8.10	Coupling for screwed cap _____	23
8.11	Adaptor non uPVC spigot cap to uPVC _____	23
8.12	Socket plug _____	24
8.13	Cap (loose) _____	24
8.14	Saddle solvent cement _____	24
8.15	Mechanical saddle _____	24
8.16	P-Trap _____	24
8.17	S-Trap _____	24
D	Cutting edge of punch _____	38
F	Impact testing machine _____	42

G	End connections for pressure test _____	44
L	Essential features of apparatus for diameter distortion test _____	50
	Bibliography _____	52

Foreword

This Singapore Standard was prepared by the Working Group on Unplasticised Polyvinyl Chloride (PVC) Pipes and Fittings Below Ground for Sanitary Drainlines set up by the Technical Committee on Building Maintenance and Management under the purview of the Building and Construction Standards Committee.

This standard is a revision of SS 272:2012, "Specification for unplasticised PVC pipes below ground for drainlines and sewers". In this edition, the title of the standard has been changed to "Specification for unplasticised PVC pipes and fittings below ground for sanitary drainlines". This revision brings the standard up-to-date and makes it more comprehensive by incorporating provisions from the latest relevant international and overseas standards.

The key changes in this revision are as follows:

- Clarification of product covered (Clause 1);
- Addition of terms and definitions (Clause 3);
- Introduction of symbols and abbreviations (Clause 4);
- Deletion of former clause on dimension of "O-ring type sockets"; and
- Re-classification of clauses under pipe, fitting, and sockets and spigots.

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

1. BS 7874:1998 Method of test for microbiological deterioration of elastomeric seals for joints in pipework and pipelines
2. BS EN 681-1:1996 Elastomeric seals – Material requirements for pipe joint seals used in water and drainage applications – Part 1: Vulcanized rubber
3. BS EN 681-2:2000 Elastomeric seals – Material requirements for pipe joint seals used in water and drainage applications – Part 2: Thermoplastic elastomers
4. BS EN 682:2002 Elastomeric seals – Materials requirements for seals used in pipes and fittings carrying gas and hydrocarbon fluids
5. BS EN 13598-1:2020 Plastics piping systems for non-pressure underground drainage and sewerage – Unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) Part 1: Specifications for ancillary fittings and shallow chambers
6. SS 213:1998 Unplasticised PVC pipes and fittings for soil, waste and vent applications
7. SS 270:2015 Elastomeric seals for joints in pipework and pipelines

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

1. European Committee for Standardization (CEN)
 - EN 1401-1:2019 Plastics piping systems for non-pressure underground drainage and sewerage – Unplasticized poly(vinyl chloride) (PVC-U) – Part 1: Specifications for pipes, fittings and the system

2. Standards Australia

- AS 1462.18-1988 Methods of test for unplasticized PVC (UPVC) pipes and fittings – Methods for determination of PVC and titanium dioxide content

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 unplasticised PVC pipes and fittings below ground for sanitary drainlines

1 Scope

This standard specifies the requirements for solid wall pipes. It covers pipes with/within the following:

- Smooth internal and external surfaces;
- The same formulation throughout the wall, fittings and the system of unplasticised polyvinyl chloride (uPVC) piping systems; and
- Non-pressure underground sanitary drainlines.

This standard also specifies the parameters for the test methods.

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.

BS EN ISO 580	Plastics piping and ducting systems – Injection-moulded thermoplastics fittings – Methods for visually assessing the effects of heating
BS EN ISO 2505	Thermoplastics pipes – Longitudinal reversion – Test methods and parameters
BS EN ISO 2507-1	Thermoplastics pipes and fittings – Vicat softening temperature – Part 1: General test method (ISO 2507-1:1995)
BS EN ISO 2507-2	Thermoplastics pipes and fittings – Vicat softening temperature – Part 2: Test conditions for unplasticized poly(vinyl chloride) (PVC-U) or chlorinated poly(vinyl chloride) (PVC-C) pipes and fittings and for high impact resistance poly (vinyl chloride) (PVC-HI) pipes (ISO 2507-1:1995)
BS EN ISO 6259-1	Thermoplastics pipes. Determination of tensile properties. General test method
BS EN ISO 6259-2	Thermoplastics pipes. Determination of tensile properties Pipes made of unplasticized poly(vinyl chloride) (PVC-U), oriented unplasticized poly(vinyl chloride) (PVC-O), chlorinated poly (vinyl chloride) (PVC-C) and high-impact poly (vinyl chloride) (PVC-HI)
BS EN ISO 13254	Thermoplastics piping systems for non-pressure applications – Test method for watertightness
BS ISO 18373-1	Rigid PVC pipes – Differential scanning calorimetry (DSC) method – Part 1: Measurement of the processing temperature
EN ISO 1167-1:2006	Thermoplastics pipes, fittings and assemblies for the conveyance of fluids – Determination of the resistance to internal pressure – Part 1: General method (ISO 1167-1:2006)
EN ISO 1167-2:2006	Thermoplastics pipes, fittings and assemblies for the conveyance of fluids –

Determination of the resistance to internal pressure – Part 2: Preparation of pipe test pieces (ISO 1167-2:2006)

ISO 3126

Plastics piping systems – Plastics components – Determination of dimensions

SS 270

Elastomeric seals for joints in pipework and pipelines