

SINGAPORE STANDARD

Code of practice for water services

(Formerly CP 48)



Published by

**Enterprise
Singapore**

SS 636 : 2018
(ICS 91.140.60)

SINGAPORE STANDARD

Code of practice for water services

All rights reserved. Unless otherwise specified, no part of this Singapore Standard 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.

ISBN 978-981-47-8494-8

This Singapore Standard was approved by the Building and Construction Standards Committee on behalf of the Singapore Standards Council on 9 March 2018.

First published as CP 48, 1990

First revision, 2005

Second revision and re-designated as SS 636, 2018

The Building and Construction Standards Committee, appointed by the Standards Council, consists of the following members:

	Name	Capacity
Chairman	: Ar. Chan Kok Way	<i>Individual Capacity</i>
Deputy Chairman	: Er. Clement Tseng	<i>Building and Construction Authority</i>
Secretary	: Ms Amy Sim	<i>Standards Development Organisation – The Institution of Engineers, Singapore</i>
Members	: Mr Bin Chee Kwan	<i>National Environment Agency</i>
	Er. Chan Ewe Jin	<i>The Institution of Engineers, Singapore</i>
	Mr Shawn Chan	<i>Singapore Manufacturing Federation</i>
	Er. Chee Kheng Chye	<i>Housing & Development Board</i>
	Mr Chng Chee Beow	<i>Real Estate Developers' Association of Singapore</i>
	Mr Dominic Choy	<i>Singapore Contractors Association Ltd</i>
	Er. Paul Fok	<i>Land Transport Authority</i>
	Mr Goh Ngan Hong	<i>Singapore Institute of Surveyors and Valuers</i>
	Mr Desmond Hill	<i>Individual Capacity</i>
	Prof Ho Puay Peng	<i>National University of Singapore</i>
	Ar. William Lau	<i>Individual Capacity</i>
	Ar. Benedict Lee	<i>Singapore Institute of Architects</i>
	Er. Lee Chuan Seng	<i>Individual Capacity</i>
	Assoc Prof Leong Eng Choon	<i>Nanyang Technological University</i>
	Mr Darren Lim	<i>Building and Construction Authority</i>
	Dr Lim Lan Yuan	<i>Association of Property and Facility Managers</i>
	Er. Lim Peng Hong	<i>Association of Consulting Engineers Singapore</i>
	Er. Mohd Ismadi	<i>Ministry of Manpower</i>
	Ms Kay Pungkothai	<i>National Parks Board</i>
	Er. Yvonne Soh	<i>Singapore Green Building Council</i>
	SAC Christopher Tan	<i>Singapore Civil Defence Force</i>
	Er. Tang Pei Luen	<i>JTC Corporation</i>
	Mr Young Joo Chye	<i>PUB, Singapore's National Water Agency</i>

The Technical Committee on Building Maintenance and Management, appointed by the Building and Construction Standards Committee and responsible for the preparation of this standard, consists of representatives from the following organisations:

	Name	Capacity
Chairman	: Dr Lim Lan Yuan	<i>Individual Capacity</i>
Deputy Chairman	: Er. Tang Pei Luen	<i>JTC Corporation</i>
Secretary	: Ms Lydia Yap	<i>Standards Development Organisation – The Institution of Engineers, Singapore</i>
Members	: Mr Eric Chan Kim Mun	<i>Association of Property and Facility Managers</i>
	Mr Bernard Cheng	<i>SETSCO Services Pte Ltd</i>
	Prof Michael Chew	<i>National University of Singapore</i>
	Mr David Goh	<i>Fire Safety Managers' Association (Singapore)</i>
	Mr Goh Sheng Jie	<i>Housing & Development Board</i>
	Dr Kang Kok Hin	<i>Institution of Facilities Management</i>
	Mr Eddy Lau	<i>Singapore Green Building Council</i>
	Mr Lee Wee Keong	<i>Singapore Civil Defence Force</i>
	Mr Lim Chong Yong	<i>Building and Construction Authority</i>
	Mr Kenneth Lim	<i>National Environment Agency</i>
	Dr John Minn	<i>Singapore Institute of Building Limited</i>
	Er. Ramahad Singh	<i>PUB, Singapore's National Water Agency</i>
	Dr Sun Qiqing	<i>TÜV SÜD PSB Pte Ltd</i>
	Mr Tan Ann Kiong	<i>Singapore Contractors Association Limited</i>
	Er. Roland Tan Juay Pah	<i>The Institution of Engineers, Singapore</i>
	Mr Too Yew Yong	<i>Energy Market Authority</i>
	Er. Yeow Mei Leng	<i>Association of Consulting Engineers Singapore</i>
Co-opted Members	: Mr Chue Fook Chee	<i>Individual Capacity</i>
	Mr Kua Soo Chong	<i>Individual Capacity</i>
	Mr K Ramanathan	<i>Individual Capacity</i>

The Working Group, appointed by the Technical Committee to assist in the preparation of this standard, comprises the following experts who contribute in their *individual capacity*:

	Name
Convenor	: Er. Yeow Mei Leng
Members	: Mr Thomas Ang
	Mr Kuang Kim Yaw
	Mr Johnny Ng
	Mr Amos Phua
	Er. Roland Tan Juay Pah
	Mr Tan Kah Kyee
	Mr Steven Tang Wah Keong
	Er. Denis Wong Tak Ming

The organisations in which the experts of the Working Group are involved are:

Association of Consulting Engineers Singapore

Housing & Development Board

PUB, Singapore's National Water Agency

Singapore Plumbing Society

Singapore Sanitary Ware Importers & Exporters Association

The Institution of Engineers, Singapore

Contents

	Page
Foreword _____	7
1 Scope _____	8
2 Normative references _____	8
3 Terms and definitions _____	9
4 Preliminaries _____	11
4.1 General _____	11
4.2 Supplies from the Authority _____	11
4.3 NEWater _____	12
5 Standards of materials and fittings _____	12
6 Distribution _____	13
6.1 Pipework _____	13
6.2 Choice of materials for piping _____	14
6.3 Mains _____	15
6.4 Services _____	16
6.5 Hot water supply systems _____	18
6.6 Mode of water supply _____	19
6.7 Distribution in tall buildings _____	25
6.8 Firefighting services _____	25
7 Storage _____	25
7.1 General _____	25
7.2 Storage capacity _____	28
7.3 Storage tanks _____	29
8 Fittings and appliances _____	29
8.1 Water efficiency _____	29
8.2 Fittings _____	30
8.3 Appliances _____	33
9 Work on site _____	34
9.1 Jointing of pipes _____	34
9.2 Connections between different materials _____	36
9.3 Jointing pipes to cisterns and tanks _____	36
9.4 Mainlaying _____	37
9.5 Service pipes _____	38
9.6 Meters _____	38
9.7 Pipework in services _____	47
9.8 Draw-off taps _____	47

	Page
9.9 Disinfection of installation _____	48
10 Inspection, testing and maintenance _____	48
10.1 General _____	48
10.2 Mains _____	48
10.3 Services _____	49
10.4 Maintenance _____	49
11 Water conservation _____	51
11.1 General _____	51
11.2 Water conservation measures _____	51
11.3 Private water meters _____	53

Annexes

A Disinfection of installation _____	55
B Water sampling test for leaching of heavy metals _____	59

Tables

1 Flow rates at various fittings or appliances _____	30
2 Maximum allowable flow rates and timing for self-closing delayed-action taps _____	31
3 Recommended meter sizes _____	39
4 Spacing of fixings for piping _____	47
5 Water usage areas where water use is to be monitored _____	54
B.1 Tests for heavy metals _____	59
B.2 Sample points _____	59

Figures

1 Mode of water supply to water fittings located up to 25 m above mean sea level _____	21
2 Mode of water supply to water fittings located higher than 25 m above mean sea level but up to 37 m above mean sea level _____	22
3 Mode of water supply to water fittings located above 37m above mean sea level _____	23
4 System for raising and distributing water in high-rise buildings with multi-stage pumping _____	24
5 Water meter in chamber _____	40
6 Water meter in chamber (with separate underground valve chamber) _____	41
7 Water meter and valves in chamber _____	42
8 Water meter and valves in chamber (alternate view) _____	43
9 Meter fixed horizontally and enclosed in gate pillar (for landed properties) _____	44
10 Sub-meters fixed vertically and enclosed in service duct _____	45
11 Sub-meters fixed horizontally and enclosed in service duct _____	46

Foreword

This Singapore Standard was prepared by a Working Group appointed by the Technical Committee on Building Maintenance and Management under the direction of the Building and Construction Standards Committee.

The standard is a revision of CP 48 : 2005 “Code of practice for water services” and has been re-designated as SS 636.

This revision is to bring the standard up-to-date with the latest relevant overseas standards, in particular, the alignment of testing methods with international practices.

This standard is expected to be used by Professional Engineers, registered Architects and licensed Water Services Plumbers in the design, installation, fixing, testing and maintenance of water services in all residential, commercial and industrial buildings/premises.

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

Code of practice for water services

1 Scope

This code deals with services for the supply of potable water to all residential, commercial and industrial buildings/premises. The scope of the code extends from the Authority's water supply to the point where the water is drawn off for use, including storage. It does not cover all aspects of services for the supply of water for firefighting.

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.

AS/NZS 3500	Plumbing and drainage
AS/NZS 4020:2005	Testing of products for use in contact with drinking water
BS 1710	Specification for identification of pipelines and services
BS 5546 : 2010	Specification for installation and maintenance of gas-fired water-heating appliances of rated input not exceeding 70 kW net
BS 6920	Suitability of non-metallic products for use in use in contact with water intended for human consumption with regard to their effect on the quality of the water
BS 6956-5	Jointing and materials and compounds – Specification for jointing compounds for use with water, low pressure saturated steam, 1 st family gases (excluding coal gas) and 2 nd family gases
BS 7291-2	Thermoplastics pipes and associated fittings for hot and cold water for domestic purposes and heating installations in buildings – Specification for polybutylene (PB) pipe and associated fittings
BS EN 1982	Copper and copper alloys. Ingots and castings
BS EN 12163	Copper and copper alloys. Rod for general purposes
BS EN 12165	Copper and copper alloys. Wrought and unwrought forging stock
BS EN 12420	Copper and copper alloys. Forgings
SS 270:2015	Specification for elastomeric seals for joints in pipework and pipelines
SS 375 Series	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
SS 375-1	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 – Part 1 : Specification
SS 638	Code of practice for electrical installations
SS EN 1992-3	Design of concrete structures – Liquid retaining and containing structures