

# Technical Briefing by Water Supply (Network) Department Introducing Singapore Standard 636: Code of Practice for Water Services



*Marina Barrage*

# Singapore Standard 636: Code of Practice for Water Services

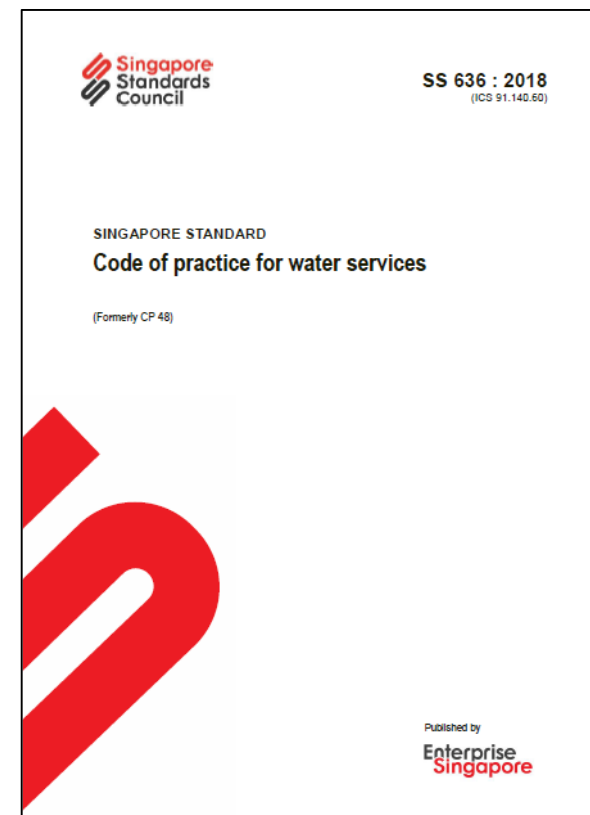
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- Publication of Enterprise Singapore
- Periodic review of Singapore Standards by Enterprise Singapore
- Replaces Singapore Standard CP48: Code of Practice for Water Services
- Review was done in consultation with industry representatives from:
  - Association of Consulting Engineers, Singapore
  - The Institution of Engineers, Singapore
  - Housing & Development Board
  - Singapore Plumbing Society
  - Singapore Sanitary Water Importers & Exporters Association
  - PUB, Singapore's National Water Agency

# Objective of this Review / Update

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- Editorial improvements to provide better clarity and readability
- General updates
  - i. Included other reference standards (*AS/NZS 3500, BS EN 1992-3 etc.*)
  - ii. Incorporated earlier amendments nos. 1 – 4
  - iii. Reflected latest industry practices
  - iv. Incorporated latest statutory requirements
- Inclusion of best practices



# Summary of changes

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## Definitions (Clause number in SS 636)

- Effective capacity (3.5) (New addition)
    - i. CP 48 - Not indicated
    - ii. SS 636 - The usable volume of the tank measured from the top water level to the draw off level of the tank.
  
  - Piping (3.13) (New addition)
    - i. CP 48 - Not indicated
    - ii. SS 636 - A network of pipe and fittings.
  
  - Top water level (3.22) (New addition)
    - i. CP 48 - Not indicated.
    - ii. SS 636 - The top water level is the water level measured up to at least 25mm below the warning alarm/invert.
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# Summary of changes

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- Water service worker (3.25) (New addition)
  - i. CP 48 - Not indicated.
  - ii. SS 636 - Plumbers licensed by the Authority and registered Professional Engineers.
  
- Removed clauses from CP 48
  - ~~i. 1.2.22 Water line~~

# Summary of changes

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## Services

- Clause 6.4.19 in SS636 vs 2.4.19 in CP 48
  - i. CP 48 - No potable water pipe should be laid below any non-potable water pipe. Where unavoidable, the potable water pipe shall be adequately protected against possible contamination.
  - ii. SS 636 - No potable water pipe should be laid below any non-potable water pipe. Where unavoidable, the potable water pipe shall be adequately protected against possible contamination **except for fire sprinkler pipes using potable water as source without joints at the points of pipe crossing.**

# Summary of changes

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## Hot water supply systems

- Clause 6.5.1 in SS636 vs 2.5.1 in CP 48
  - i. CP 48 - (The Authority allows direct connection of electric or gas instantaneous water heaters to the service pipes for cold water supply where applicable provided these heaters comply with the specifications and requirements of the manufacturer and the Authority and all other relevant statutory requirements.)
  - ii. SS 636 - (...)The design of the water reticulation system shall take into consideration the minimum operating pressure of such heater to ensure that satisfactory flow rates at the water fittings / appliances are achieved.

# Summary of changes

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## Mode of water supply

- Changes from CP 48 in red

The mode of water supply adopted by the Authority are generally as follows:

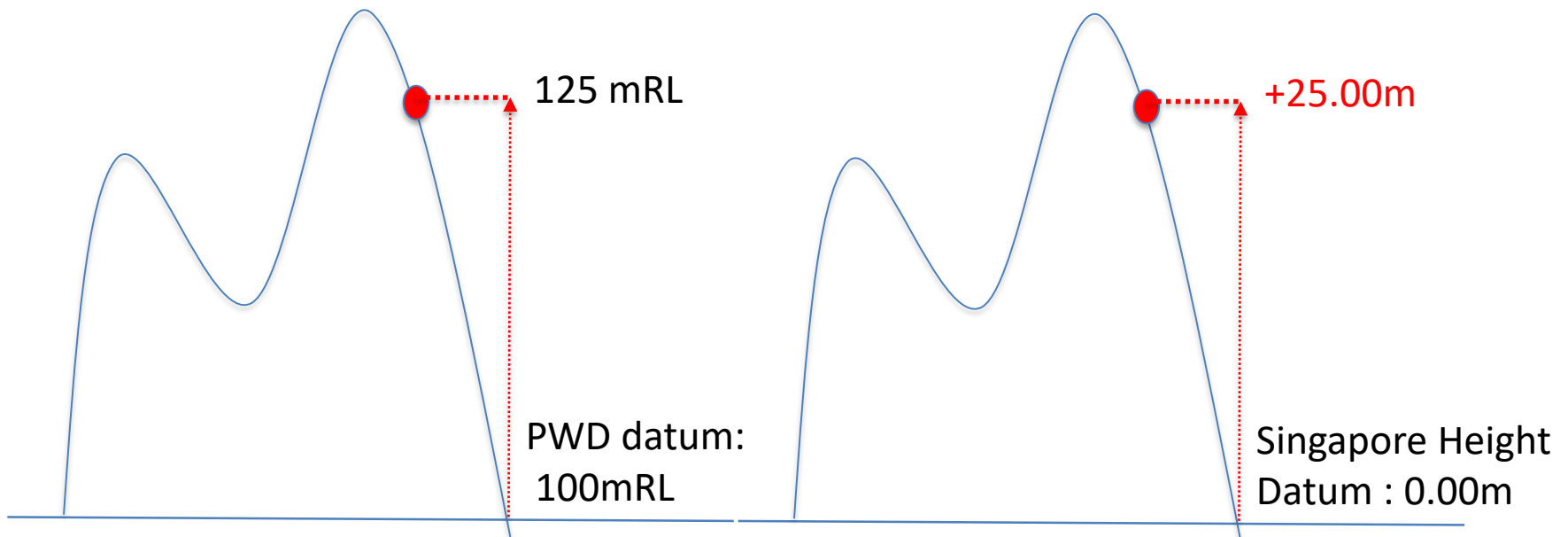
Height of Fittings	Methods of Supply
(a) Water fittings located up to 25 m above mean sea level	Direct (See Figure 1)
(b) Water fittings higher than 25 m above mean sea level but up to 37 m above mean sea level	Indirect supply through high level storage tank (See Figure 2)
(c) Water fittings higher than 37 m above mean sea level	Indirect supply through low level tank with pumping to high level tanks (See Figure 3 and Figure 4)



# Summary of changes

## Mode of water supply

- Changes from CP 48 in red



# Summary of changes

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## Storage

- Clause 7.1.14 in SS636 vs 3.1.14 in CP 48
  - i. CP 48 - (Every isolated compartment of a storage tank shall be fitted with a) tap for sampling purposes located midway between the top operating water level and the floor of the tank or on the outlet pipe from the compartment of the storage tank. Such a tap shall be under lock and key and accessible only to authorised persons.
  - ii. SS 636 - (...) tap for sampling purposes located **anywhere** between the top operating water level and the **outlet pipe level** or on the outlet pipe from the compartment of the storage tanks. **The tap located on the tank should be made accessible for sampling purpose.** Such a tap shall be under lock and key and accessible only to authorised persons.

## Summary of changes

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- Clause 7.1.15 (a) in SS636 vs 3.1.15 point 1 in CP 48
  - i. CP 48 - [No storage tank and its associated water pipes and pumps (where applicable) shall be installed in such a position that: it is directly below any sanitary pipe, floor trap, sewer pipe, reclaimed water pipe, ] waste pipe or any other pipes conveying fluids that may cause contamination to the water in the storage tanks.
  - ii. SS 636 - [...] waste pipe, **sprinkler pipe, wet riser pipe** or any other pipes conveying fluids that may cause contamination to the water in the storage tanks.

## Summary of changes

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- Clause 7.1.19 (a) in SS636 vs 3.1.19 point 1 in CP 48, Amendment 4, (8)
  - i. CP 48 - [For water tanks in developments other than landed residential premises: the water tanks and their ancillary equipment shall be housed in an adequately secured and locked dedicated tank / pump room or located within an adequately secured and locked enclosure.] The room/enclosure housing the water tanks and their ancillary equipment shall be segregated from other services such as services for telecommunications, lifts or fire-fighting.
  - ii. SS 636 - [...] The room/enclosure housing the water tanks and their ancillary equipment shall be segregated from other services such as equipment for telecommunications, lifts, firefighting or ACMV. The enclosure for water storage tanks shall not be used for storage of items such as flammable liquids or chemicals.

# Summary of changes

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## Storage Tanks

- Clause 7.3.3 in SS636 vs 3.3.3 in CP 48
  - i. CP 48 - (Storage tanks shall be fixed in such positions that will enable the interiors to be readily inspected and cleaned, and where they will not be exposed to high temperature. Adequate spacing of at least 0.6 m shall be provided all around the) tank for maintenance and inspection purposes.
  - ii. SS 636 - (...) sides of the tank with at least 1 m spacing from the top of the tank to the ceiling for maintenance, repair and inspection purposes.

# Summary of changes

## Appliances

- Self-closing delayed action taps

Changes in clause 8.2.4 in SS636 vs 4.2.3 in CP48 highlighted in red

**Table 2 – Maximum allowable flow rates and timing for self-closing delayed-action taps**

Usage	Flow Rate	Timing
i) Basin	6 L/min	2 - 3
ii) Basin (public toilets)	2 L/min	2 - 3
iii) Shower	9 L/min	13 - 15

# Summary of changes

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- Handheld bidet spray

Clause 8.3.3 in SS636 (New addition)

- i. CP 48 - Not indicated
- ii. SS 636 - **Handheld bidet spray.**

Handheld bidet spray (connected to a flexible hose) located next to a water closet shall be installed with a check valve and vacuum breaker. The flow rate of the handheld bidet spray should not be more than 8 litres per minute.

# Summary of changes

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- Solar heater

Clause 8.3.5 in SS636 vs 4.3.5 in CP 48

- i. CP 48 - (The water supply for the solar heating system shall be derived from a feed tank. Alternatively, the mains pressure solar water heater may be installed by direct connection to the service pipe provided that a combined pressure and temperature relief valve together with a controlling stopcock), non-return valve and anti vacuum relief valve are also fitted to the cold water supply side of the heater in accordance with the specifications and requirements of the manufacturers.
- ii. SS 636 - (...) and an efficient device which will prevent the siphonage of water back through the inlet are also fitted to the cold water supply side of the heater in accordance with the specifications and requirements of the manufacturers.



# Summary of changes

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## Work on site > Jointing of pipes

- Clause 9.1.1 in SS636 vs 5.1.1 in CP 48
  - i. CP 48 - All proprietary joints shall be made in accordance with the manufacturer's instructions. Care shall be taken to establish satisfactory jointing techniques for all water service pipework. When making joints by welding, brazing or soldering, precautions shall be taken to avoid the risk of fire and care taken to avoid inhalation of fumes from the jointing process. Lead based solders shall not be used in potable water services. All burrs shall be removed from the ends of pipes and any jointing materials used shall be prevented from entering the water system. All piping and fittings shall be cleaned internally and shall be free from particles of sand, soil, metal filings and chips.

# Summary of changes

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## Continued from previous slide

- ii. SS 636 - All proprietary joints shall be made in accordance with the manufacturer's instructions. Care shall be taken to establish satisfactory jointing techniques for all water service pipework. When making joints by welding, brazing or soldering, precautions shall be taken to avoid the risk of fire and care taken to avoid inhalation of fumes from the jointing process. **Soldering alloys with lead and brazing alloys with cadmium shall not be used in potable water services.** All burrs shall be removed from the ends of pipes and any jointing materials used shall be prevented from entering the water system. All piping and fittings shall be cleaned internally and shall be free from particles of sand, soil, metal filings and chips

# Summary of changes

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- Clause 9.1.3(c) and 9.1.5(c) in SS636 (New addition)  
*(Both clauses are similar just copper or stainless steel)*
  - i. CP 48 - Not indicated
  - ii. SS 636 - **Press-fit joints.**

Press fit coupling system shall be carried out by means of a suitable mechanical clamping jaw to crimp a specially designed copper / stainless steel fitting to a standard copper / stainless steel pipe. The copper / stainless steel fitting shall consist of an “O” ring seal.

# Summary of changes

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## Ductile Iron Pipes > Spigot and socket push-on joints

- Clause 9.1.9.1 in SS636 (New addition)
  - i. CP 48 - Not indicated
  - ii. SS 636 - Flexible joint that uses compression of synthetic rubber gasket to provide a water-tight seal that can accommodate angular deflection.

# Summary of changes

## Water Conservation

- Removal of clause 7.2(c) [*partial*] from CP48
  - i. CP 48 - Install constant flow regulators at all wash basin mixers, shower mixers and bib taps.
  - ii. SS 636 - ~~Install constant flow regulators at all wash basin mixers, shower mixers and bib taps.~~

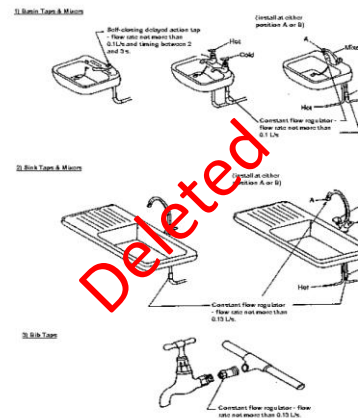


Figure 11 – Installation of water saving devices for various taps

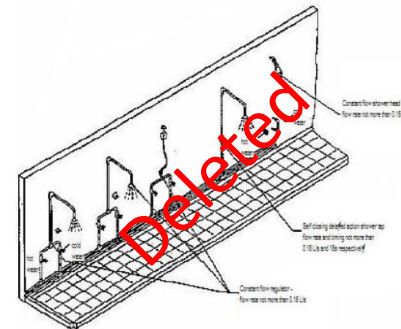


Figure 12 – Installation of water saving devices for shower taps and mixers

Please also note the above deletions from CP 48

# Summary of changes

## Private water meters

- Clause 11.3 in SS 636 (New addition)
  - i. CP 48 - Not indicated
  - ii. SS 636 - Private water meters to measure and monitor the amount of water use at each water usage areas specified in the second column of Table 5 shall be installed for non-domestic use with an estimated average monthly consumption of at least **3000 m<sup>3</sup>** .....

**Table 5 – Water usage areas where water use is to be monitored**

Sector to which consumer belongs	Water usage areas where water use is to be monitored
1. Industries	(a) Process (b) Cooling tower (c) Boiler

Snapshot of Table 5

# Summary of changes

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## Annex A

### Inspection and cleaning procedures

- Clause A.1.1.10 in SS636 vs A1.1.10 in CP48
  - i. CP 48 - All workers involved in the cleaning work shall wash, clean and disinfect themselves thoroughly before entering the tank.
  - ii. SS 636 - All workers involved in then cleaning work shall **be certified by a medical doctor to be free from water-borne diseases. Workers should be vaccinated or immunized against water-borne diseases such as typhoid, cholera and infectious hepatitis.**

# Summary of changes

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## Disinfection procedure

- Clause A.1.2.13 in SS 636 vs A1.2.13 in CP 48
  - i. CP 48 - Observe procedures A.1.2.1 to A1.2.11 but add sufficient chemicals to give the water a dose of 500 mg/litre of free chlorine. Then keep the sterilized water in the tank for at least 2 hours before draining off completely.
  - ii. SS 636 - Observe procedures A.1.2.1 to A1.2.11 **and** add sufficient chemicals to give the water a dose of **200** mg/litre of free chlorine. ~~Then~~, keep the disinfected water in the tank for at least 2 ~~hours~~ before draining off completely.



# Summary of changes

## Annex B – Water Sampling test for leaching of heavy metals

- Entire Annex B in SS 636 (**New addition**)
  - i. CP 48 - Not indicated
  - ii. SS 636 -

### **Annex B** (normative)

#### **Water sampling test for leaching of heavy metals**

**B.1** In addition to bacteriological and chemical tests, the licensed water service plumber shall carry out additional water sampling tests for leaching of heavy metals.

**B.1.1** A 1-litre water sample is to be taken as a first drawn sample (i.e. without flushing) from the water service installation after the water has been left stagnant in the water service installation for at least 24 h.

**B.1.2** The following heavy metals shall be tested and their respective maximum allowable concentrations are indicated in Table B.1.

Table B.1 – Tests for heavy metals

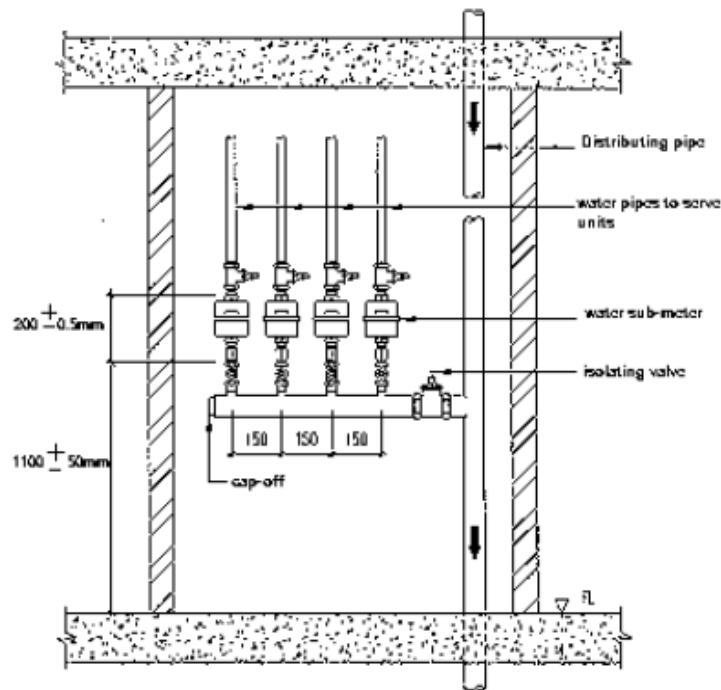
Parameter	Max. allowable concentration (ppm)
Antimony	0.02

Snapshot of Annex B

# Summary of changes

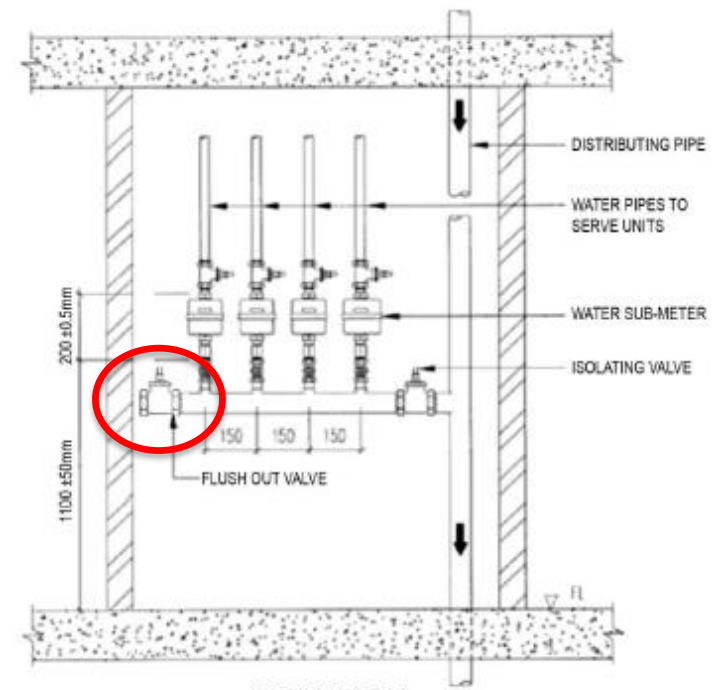
## Meters

- Fig in SS 636 vs CP 48 – addition of valve for flushing the manifold pipe



**ELEVATION**

CP 48



**ELEVATION**

SS 636

# Summary of changes

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## Meters

- Fig notes in SS 636 vs CP 48
  - i. CP 48 - Permanent unit tags are to be provided.
  - ii. SS 636 - Permanent unit tags are to be provided **and properly secured upstream of the sub meters.**

## Additional things to note

- Legal and statutory requirements omitted from the Code  
e.g.. “All the firefighting services shall comply with the Public Utilities (Water Supply) Regulations and ..... In accordance with Singapore Civil Defence Force”

*Has since been replaced with*

It is presupposed that firefighting services are in compliance with applicable statutory and regulatory requirements.

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# Q & A

*Marina Barrage*

# Thank You

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