

# **Guide to Application for Water Supply**

**(October 2019 version)**



**Water Supplies Department**

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## **Preface**

Under Waterworks Ordinance, approval from the Water Authority is required in order to construct, install, alter or remove a plumbing installation. This guide is specially prepared to provide information to applicants, Authorised Persons (APs) and Licensed Plumbers (LPs) regarding the submission requirement at different stage of a plumbing works project.

This guide book should be read in conjunction with the Waterworks Ordinance (Cap 102), the Waterworks Regulations (Cap 102A), the Technical Requirements for Plumbing Works in Buildings and Circular Letters issued by Water Supplies Department.

Latest version of relevant forms for water supply applications can be found in WSD website,

<http://www.wsd.gov.hk/en/application-public-forms/index.html>

Applicants of Water Supply, APs and LPs should always be aware of the anti-corruption laws and avoid to contravene them during their course of works. For details, please refer to the website of Independent Commission Against Corruption at <http://www.icac.org.hk/>. Applicants, APs and LPs shall also aware of the legal requirements mentioned in “Integrity and Corruption Prevention Guide on Managing Relationship with Public Servants” which can be accessed at [https://www.icac.org.hk/filemanager/en/Content\\_216/ps.pdf](https://www.icac.org.hk/filemanager/en/Content_216/ps.pdf).

## **1. General**

### **1.1. Role of Water Authority on Checking of Plumbing Proposal**

Plumbing installation that receives water supply from the Waterworks has to comply with the waterworks requirements under the provision of the Waterworks Ordinance (Cap 102), the Waterworks Regulations (Cap 102A), the Technical Requirements for Plumbing Works in Buildings and Water Supplies Department Circular Letters. Approval from the Water Authority (“WA”) is required in order to construct, install, alter or remove a fire service or inside service, except for works of a minor nature.

### **1.2. Works of a Minor Nature**

Pursuant to Section 14 of the Waterworks Ordinance (WWO), a person must not construct, install, alter, or remove a fire service or inside service unless the Water Authority (WA) has granted a written permission for it. The WA may grant the written permission on application of a licensed plumber. Besides, Section 15 of the WWO also stipulates that, a person who is not a designated person must not carry out the construction, installation, maintenance, alteration, repair or removal of a fire service or inside service (i.e. specified plumbing works).

The WA may waive the requirement of permission under Section 14 of the WWO in the case of alterations to a fire service or inside service which are, in his opinion, of a minor nature. Moreover, under Section 15 of the WWO, a person who is not a designated person may carry out specified plumbing works if the works are alterations or repairs to a fire service or inside service that are, in the opinion of the WA, of a minor nature.

Alterations to a fire service or inside service must not be considered as of a minor nature if the alterations would, in the opinion of the WA, adversely affect the efficiency of the fire service or inside service in providing a reliable and adequate supply of water; or quality of the water. In the opinion of the WA, examples of alterations or repairs to inside services or fire services satisfying the following 5 conditions are considered as works of a minor nature :

- (1) do not change the purpose of supply (e.g. from domestic purpose to trade purpose<sup>1</sup>) or the existing usage (e.g. from fire fighting to vehicle washing or

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<sup>1</sup> “Domestic purpose” means a purpose connected solely with the occupation of a dwelling-house and does not include a purpose connected with a garden, lawn, playground or swimming pool appurtenant to a



internal cleansing in building, from irrigation to air-conditioning) of the plumbing installation already approved by the WA;

- (2) do not change from the indirect supply of the plumbing installation already approved by the WA to direct supply;
- (3) do not require dismantling and reinstallation of the water meter installed by the WA;
- (4) do not involve soldering for connecting copper pipes; and
- (5) do not require provision of backflow preventive devices for water using apparatus or water filter.

<b>A. At the inside service solely serving an individual flat/unit within a building</b>	<b>Examples</b>
i. Replacement of pipes or fittings <sup>2</sup>	<p>Within a domestic flat, a shop unit or an office</p> <ul style="list-style-type: none"> <li>- Replacement of pipes or fittings</li> <li>- Replacement of a water closet and its flushing cistern</li> <li>- Replacement of a water heater, provided that the type of water heater does not change</li> </ul>
ii. Repairs to leaking pipes or fittings	<ul style="list-style-type: none"> <li>- Rewashing of an existing tap</li> <li>- Tightening joints of leaking pipe</li> <li>- Fixing components of leaking fitting</li> </ul>
iii. Insertions or taking-out of valves along the existing pipeline within the same flat/unit	<ul style="list-style-type: none"> <li>- Insertion of a gate valve along the existing pipeline between a kitchen and a bathroom within a domestic flat</li> </ul>
iv. Extensions or reductions of the existing pipeline with additions of a new tap/new valves or abandonment of some existing taps/valves within the same flat/unit supplying a single additional draw-off point, appliance or device, provided that the	<p>Within a domestic flat, a shop unit or an office</p> <ul style="list-style-type: none"> <li>- Extension of the existing pipeline to supply the single additional draw-off point</li> <li>- Shortening and plugging of an existing pipeline supplying a tap</li> </ul>

dwelling-house. "Trade purpose" means water supplied for use for any purpose connected with a trade, manufacture or business, other than a construction purpose, shipping purpose or domestic purpose.

<sup>2</sup> "Fitting" means any apparatus, cistern, cock, equipment, machinery, material, tank, tap, valve and any appliance or device other than a meter installed by the WA, which is installed or used in a fire service or inside service.

draw-off point, appliance or device does not require the installation of a storage tank	- Extension of the existing pipeline to supply a water using apparatus such as washing machine/dish-washing machine or water filter
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<b>B. At the inside service or fire service within a building/lot boundary (other than A)</b>		<b>Examples</b>
i.	Replacement of pipes or fittings of length not exceeding 3 metres	- Replacement of about 2-metre long corroded/leaking pipe, valve, cock, tank or defective pumpset in communal pipe of inside service or fire service within a building
ii.	Repairs to leaking pipes or fittings	- Rewashing of an existing tap - Tightening joints of leaking pipe - Fixing components of leaking fitting

Minor alterations and repairs to inside services or fire services shall conform to waterworks requirement in respect of quality of workmanship and material. It is in the interest of the consumer/agent that in case of doubt to notify the WA of his intention, so that the WA can give advice to the consumer/agent.

### **1.3. Not Receiving Water Supply from the Water Authority**

Plumbing installation that is not to receive water supply from the waterworks does not need the approval of the Water Authority. However, it is advisable for the plumbing installation to follow the Waterworks requirements such that when a supply from the Waterworks becomes necessary, the modification of the plumbing installation to comply with the Waterworks requirements will be minimized.

## 2. Fundamental Principles/Items Considered by Water Authority in Plumbing Proposal

A plumbing proposal would involve the submissions of different types of drawings and documents. Among them, the vertical plumbing line diagram (VPLD) should form the basis for the design. The fundamental principles/items considered by the Water Authority (WA) in Plumbing Proposal include ensuring water safety, preventing contamination, preventing misuse, preventing waste and meter arrangement. Before submission of a plumbing proposal after the completion of design, the applicants, the Authorised Persons or the Licensed Plumbers shall carry out a self check to ensure that technical requirements as stipulated in the Technical Requirements for Plumbing Works in Buildings are complied with in the design by completing the Checklist for Vetting Plumbing Proposal (**Appendix 1**). The completed and duly signed checklist should be submitted together with Form WWO 542 for new building projects.

**Appendix 1A** summarizes the essential aspects of plumbing design in new buildings for the reference of plumbing designers/applicants. The details listed in Appendix 1A are considered essential and will always be checked during the vetting of a plumbing proposal by the WA. Nevertheless, this does not mean that the WA will not check other aspects of the plumbing proposal for compliance with statutory and other requirements. Plumbing designers/applicants are responsible to ensure that a plumbing proposal is in full compliance with the requirements in Waterworks Ordinance, Waterworks Regulations and “Technical Requirement for Plumbing Works in Buildings”<sup>3</sup>.

## 3. Submission Requirements at Proposal Stage

### 3.1. Pre-Submission Enquiry

Before submission of plumbing proposal, the Authorised Person (AP) for a plumbing works project may submit Form WWO 132 for obtaining from the WA information as are relevant to the design of the plumbing. The WA will as far as practical provide the information to the applicant such as location and size of connection points, water main, water pressures, single or double-end fed supply.

When applying for water supplies to new development, the application should include

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<sup>3</sup> Technical Requirements for Plumbing Works in Buildings can be obtained from the following website: <https://www.wsd.gov.hk/en/plumbing-engineering/requirements-for-plumbing-installation/technical-requirements-for-plumbing-works-in-bldgs/index.html>

both fresh and flushing water supply system unless there is a reliable private source to serve flushing purposes. For the existing developments presently not provided with government flushing supply, the relevant consumer may apply to WA for flushing supply. The plumbing installations of the internal flushing supply systems should fully comply with Section 4.3 of the “Technical Requirements for Plumbing Works in Buildings” before government flushing supply will be provided.

(From Circular Letter No. 1/99)

## **3.2. Submission of Plumbing Proposal**

### **3.2.1. Documents to be Included in the Submission**

A table showing the submission requirements for different types of application at different stages is in **Appendix 2**. Applicants should submit Application Form WWO 542 together with plumbing proposal and supplementary information as listed in **Appendix 2**. All the documents listed should be properly prepared and included in the plumbing proposal. Unless otherwise required, other documents not shown on the list should be irrelevant and will not be regarded as part of the plumbing proposals and hence will not be vetted. On the other hand, missing information or incomplete information will result in delays to the vetting and approval of the applications.

Applications with drawings should be submitted by hand or by mail to WSD Document Management Centre (DMC) at 43/F Immigration Tower, Wan Chai directly. For applications without drawings, they can be submitted by hand or by mail to DMC, or through the email or fax to WSD. The submission, whether approved or not, will not be returned to the applicant.

#### **3.2.1A. Pipes and Fittings to be Installed**

For all new applications of village type houses and separate metering, Form WWO 1149 (list of pipes and fittings intended to be installed) shall be submitted together with Form WWO 542 for early processing. Applicants may refer to Section 4.1.1. for the details of preparing Form WWO 1149.

For applications other than village type houses and separate metering (e.g. new buildings), the applicants may choose to submit Form WWO 1149 together with Form WWO 542 or to submit Form WWO 1149 prior to the commencement of the plumbing works (i.e. when submitting Part I & II of Form WWO 46). (Please refer to Section

4.1.1. for details).

### **3.2.2. Drawing Submission Standard**

#### **3.2.2.1. General Standards**

- (a) One set of drawing should be submitted.
- (b) Each drawing should bear a unique drawing number.
- (c) The version of a drawing should be annotated by suffix (Rev.A), (Rev.B) etc. to the drawing number.
- (d) The drawing title should describe clearly the contents of the drawing.
- (e) A suitably numbered or graphic scale should be provided, corresponding to the scale of the plan;
- (f) At least one drawing should carry a legend of all markings and symbols shown or used, preferably on the right hand side of the plan;
- (g) Lettering and numbering should not be covered by heavy hatching, dark shading or dark colouring.

#### **3.2.2.2. Drawing Index**

The Plumbing Proposal should be accompanied by a Drawing Index, if more than one drawing is submitted. The Drawing Index shall include the drawing number, the description of the drawing, the version and the date of drawing prepared/amended.

#### **3.2.2.3. Drawing Sizes**

A0 1189 mm x 841 mm  
A1 841 mm x 594 mm  
A2 594 mm x 420 mm  
A3 420 mm x 297 mm  
A4 297 mm x 210 mm

The dimensions are those of the outside edges of the sheet. A border is normally drawn inside the dimensions (limiting the actual drafting area). Plan sizes larger than A0 should be avoided. All drawings shall be folded to a plan size not exceeding the A4 size (i.e. 297 mm by 210 mm) and in such a way to display the drawing numbers and drawing titles.

#### **3.2.2.4. Borders**

Unused minimum borders should be provided on all 4 sides of an original as follows :

A0 - 20 mm

A1 - 20 mm

A2 - 10 mm

A3 - 10 mm

A4 - 10 mm

#### **3.2.2.5. Standard Drawing Symbols**

The drawing symbols (e.g. taps, valve, pumps, meter, etc) should be standardized as far as practicable. The list of drawing symbols showing in **Fig 1** should be adopted.

#### **3.2.2.6. Standard Line Type**

For consistency in the use of line type, the line type as shown in **Fig 1** should be adopted.

### **3.3. Plumbing Proposal for Online Replumbing Works**

Aging plumbing works require refurbishment and replacement. The most favourable method for carrying out these re-plumbing works is to install a new plumbing installation in the vicinity of the existing plumbing installation before the existing plumbing installation is dismantled. Due to limited space for accommodating the new plumbing installation in some cases, some re-plumbing works may be carried out along the existing alignment by directly replacing the existing plumbing installation with the new plumbing installation (i.e. online re-plumbing method). The following paragraphs stipulate the additional documents to be submitted, other than the documents as described in the previous section, in relation to application for fresh water

online replumbing works in occupied buildings. In this connection, the applicants shall indicate in their plumbing proposal the use of online replumbing method (i.e. to mark “online re-plumbing works” next to the types of water supply applied for “(g) Replumbing” on the Form WWO 542 and to indicate on the vertical plumbing line diagram the extent of the online re-plumbing works). Workflow for on-line replumbing works is at **Appendix 3**.

### 3.3.1. Control on Pipe Fittings and Pipe Jointing Methods

The applicants shall specify the details of jointing method(s) when they submit their applications for water supply via plumbing proposal. The responsible LPs shall follow the pretreatment protocol as set out in **Appendix 10** to pretreat fittings<sup>4</sup> before installation, or adopt fittings with low metal leaching rate<sup>5</sup> (such as fitting under Voluntary Low Metal Leaching Rate Pipes and Fittings Scheme “GA\*”) for the online replumbing works. List of “GA\*” fittings can be found at <https://ga.wsd.gov.hk/en>.

### 3.3.2. Temporary Water Supply Arrangement

Temporary water supply arrangement for drinking and cooking purposes shall be put in place during construction stage of these online re-plumbing works until approval of the whole re-plumbing works by the WA. A publicly accessible clean water source shall be provided. It can be in the form of metered standpipe, provision of water filters or distribution of bottled water, etc. The applicants are required to submit a proposal on temporary water supply arrangement for drinking and cooking purposes when they submit their Form WWO 542. Apart from detailing the arrangement on supplying water for drinking and cooking purposes during the construction stage, the proposal shall also explain the arrangement on notifying/alerting the affected consumers not to use tap water for drinking and cooking purposes until subsequent notification of the approval of the whole re-plumbing works by the WA.

Regarding the temporary water supply arrangement and arrangement to notify the consumers, the applicants can make use of the template form at **Appendix 4** as submission for the approval of WA (to be submitted together with Form WWO542). If the applicants opt to provide metered standpipe for provision of temporary water

<sup>4</sup> Only fittings (including taps) with copper alloy inner surfaces which will be in contact with potable water shall be required for pretreatment.

<sup>5</sup> Low metal leaching rate metallic plumbing products shall possess supporting document/test report to prove compliance with an Australian/New Zealand Standard AS/NZS 4020. For details please refer to [https://www.wsd.gov.hk/filemanager/common/licensed\\_plumbers/ga\\_star\\_scheme\\_e.pdf](https://www.wsd.gov.hk/filemanager/common/licensed_plumbers/ga_star_scheme_e.pdf)

supply, they shall submit another Form WWO 542 for that purpose. The type of water supplies applied for shall be “Others” specifying “metered standpipe for provision of temporary water supply for online replumbing works”. The type of services for the water meter on the standpipe shall be as follows:

<b>Type of premises within the scope of re-plumbing works</b>	<b>Type of services for the water meter on the standpipe</b>
Domestic buildings	<p>Domestic supply</p> <p>Please refer to the booklet “Classification of Water Consumer Accounts” for the classification code</p> <p>If there are premises of commercial uses which are subject to TES within the domestic buildings, separate meter following the approach in non-domestic buildings below should be provided on the standpipe as far as practicable for the use of commercial premises.</p>
Non-domestic buildings	<p>Non-domestic supply</p> <p><u>Case A:</u> If the re-plumbing works involve premises of Restaurant, Food Manufacturing and Beverage Industries, the classification code of the trade paying the highest Trade Effluent Surcharge (after reduction percentage) will be adopted.</p> <p><u>Case B:</u> If the works re-plumbing works premises other than Restaurant, Food Manufacturing and Beverage Industries, the classification code of “999998 – miscellaneous services/vacant” shall be used.</p> <p>Please refer to the booklet “Classification of Water Consumer Accounts” for the classification code. Please refer to the DSD website<sup>6</sup> for the trade effluent surcharge and the reduction percentage of the water supplied.</p>
Domestic and non-domestic buildings	Refer to the above type of services in domestic and non-domestic buildings to provide separate domestic and non-domestic meters respectively.

<sup>6</sup> [http://www.dsd.gov.hk/TC/Sewage\\_Services\\_Charging\\_Scheme/Sewage\\_Services\\_Charges/index.html](http://www.dsd.gov.hk/TC/Sewage_Services_Charging_Scheme/Sewage_Services_Charges/index.html)



### **3.3.3. Replacement of Old Meters in Conjunction with Replumbing**

The Water Authority would like to replace the old meters of the buildings in conjunction with the replumbing works. For better co-ordination of work, it is considered more appropriate to have the meter replacement works to be carried out by the same licensed plumber engaged in the replumbing works. In our approval to the application for replumbing works, the licensed plumber will be invited to carry out the meter replacement works and our District staff will inform the licensed plumber of the detailed arrangement.

### **3.4. Plumbing Proposal for Fresh Water Cooling Towers**

Prior to installation of the fresh water cooling towers (FWCT), the contractors should apply for participation in the “Fresh Water Cooling Towers Scheme” (FWCT Scheme) operated by the Electrical and Mechanical Services Department (EMSD). If the design of the FWCT meets the requirements of EMSD, the EMSD will accept it into FWCT Scheme and notify the WSD accordingly for processing the application for supply of water to the FWCT. The contractors should also advise their clients to ensure compliance with all other relevant legislative requirements, e.g. the provisions of the Building Ordinance” regarding structural support of the FWCT.

However, if the design of the FWCT cannot meet the prescribed requirements, the WSD will not permit the use of mains water for supply to the FWCT. Any person who constructs an inside service for supply of mains water to the FWCT without the permission of the WSD is in contravention of Section 14(1) of the Waterworks Ordinance. Also, any consumer who uses main water for supply to the FWCT without prior permission of the WSD is in contravention of Regulation 13(a) of the Waterworks Regulations. The WSD will consider taking prosecution action against the offender and may disconnect water supply to the unauthorized FWCT. The Licensed Plumbers/Consumers are thus reminded not to illegally connect mains water for supply to the FWCT if they cannot fully comply with the relevant requirements. The Licensed Plumbers/Consumers should consider adopting the use of other suitable types of air conditioning systems to avoid contravening the government legislation.

### **3.5. Plumbing Proposal for Fire Service**

The Director of Fire Services is responsible for approving proposals for installations of

or alterations to fire services. The fire service in a building such as the choice of the fire-fighting system and its capacity must satisfy the requirements of the Fire Services Department (FSD). Only the plumbing system of the fire service is subject to the requirements of the Water Authority (WA).

For installations which are to be connected to government mains, the method of supply and the materials used must be subject to the approval of the WA and their installation should comply with the Waterworks requirements. The fire service should be designed to guard against contamination, waste and misuse.

### **3.6. Submission of Calculation and Estimation of Consumption Flow Rates for High Draw-Off Rate Non-domestic Water Supply**

For high draw-off rate non-domestic water supply as listed in **Appendix 5**, the Applicant is required to provide a breakdown of the estimated water usage to justify the estimated daily consumption stated in the application (Form WWO 542) submitted together with the plumbing proposal to the WA. The Applicant is also required to state the maximum flow rate, i.e. the hourly draw-off rate in m<sup>3</sup>/hr, of the pipe connection to the water meter and submit calculation for verifying the required size of the pipe connection to the water meter.

The purpose of submitting the above information is for the WA's information and reference with respect to the selection of meter size and checking on adequacy of water supply in existing water supply network. The Applicant should ensure the completeness and correctness of calculation before submitting to the WA. The WA will neither check the correctness of the calculation nor give approval for the calculation. Nevertheless, the WA may reject the plumbing proposal if the calculation is not submitted with the Form WWO 542. Acceptance of the submission by the WA will not release the Applicant's obligations from complying with the relevant requirements in Waterworks Ordinance and Waterworks Regulations for changing of the meter in future if so determined by the WA.

### **3.7. Amendment or Modification of Proposal**

#### **3.7.1. Amendments or Modification Made by the Applicants**

If amendment to the plumbing proposal is required, the details of all the amendments shall be listed in a separate note and the amendments shall be highlighted or coloured

in the drawings for easy identification. The drawing index, in particular the version of the drawing and the date of amendment shall be updated. The applicant should follow the submission channel stipulated in Section 3.2.1. The submission, whether approved or not, will not be returned to the applicant. Once approved, no details in the submission shall be altered without the written approval of the WA.

### **3.7.2. Minor Amendment**

To facilitate processing of plumbing proposal which are considered by WA as minor amendments, the applicant or his representative would be invited by WSD staff by phone to make minor amendments to the documents or drawings, or supplement documents with covering letter with applicant's signature, in WSD Office within five working days after the date of the call. The amendment(s) or supplement(s) should be authenticated by applicant's signature. The phone call invitation will be confirmed by an email, if email address is available, to the applicant.

If applicant cannot show up for amendment, the applicant can send an authorisation letter to WSD to allow his/her representative to amend the drawings on his/her behalf. Applicants/representatives fail to show up within five working days after the phone call should be considered as giving up the chance of minor amendment in person. The application will be rejected in writing and re-submission through the submission channel stipulated in section 3.2.1 will then be required.

## **3.8. Charges**

Demand note on water deposit, charges, such as the connection work, administrative cost for the provision of water meters, and etc. would be issued to Applicant upon approval of the plumbing proposal. Applicant should pay the charges before effecting of water supply.

### **3.8.1. Excavation Permit Fee under the Land Ordinance (Miscellaneous Provision)**

According to Chapter 28 Land (Miscellaneous Provisions) Ordinance, any person who wishes to make any excavation in unleased land must apply for an excavation permit. Under the Ordinance, a fee is required for the excavation permit. To recover the cost, the Water Authority will issue a separate demand note on the estimated excavation

permit fees to applicants. This demand note is subject to adjustment according to the actual final excavation permit fees incurred for the work.

### **3.9. Authorizing Private Developers/Authorized Persons to Undertake Water Supply Connection Works**

Developers and Authorised Persons may now employ approved contractors to carry out water supply connection works under the Helping Business Programme. This Scheme improves developer's control of their development programmes. A trial scheme involving projects on Hong Kong Island in 1998 has proved that the issue of Occupation Permits could be advanced by up to three months.

An unified application form 'HBP1 – Application for Technical Audit of Drainage/Water Supply Connection Works Carried Out by a Member of the Public' and the Practitioner's Guidelines on the scheme can be found in Development Bureau's website<sup>7</sup>.

### **3.10. Delink Approvals for Plumbing Proposals from Designation of Connection Point for Village Type Houses Applications**

The approval of plumbing proposal is delinked from the designation of connection point including obtaining written consent of land owner(s) to lay connection pipes on private lands of a third party. Depending on the progress of processing plumbing proposals and determining the location of connection points, the WA may give approval to the plumbing proposal and advise the location of the connection point separately or in one go. Plumbing proposals would be approved without having to wait for the finalization of the location of the connection point, hence allowing the applicants to have an early start of any preparatory work relating to the plumbing proposal.

If the proposed connection point falls within private land and the connection is to be made by WSD, written consent from the owner(s) of the private land concerned must be obtained through the applicant prior to the commencement of the connection works. If written consent from relevant land owner(s) is not readily available, the connection point may be provisionally determined by the WA subject to the necessary consent being obtained later. The applicant should submit the consent as soon as possible

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<sup>7</sup> [https://www.devb.gov.hk/en/construction\\_sector\\_matters/contractors/helping\\_business/index.html](https://www.devb.gov.hk/en/construction_sector_matters/contractors/helping_business/index.html)

afterward.

(From WSD Circular Letter No. 6/2018)

### **3.11. Applications for Early Connection for Temporary Water Supplies for Construction Sites**

As early as possible before the commencement of a construction contract, the developer or AP can submit the Form WWO 542 with a plan showing the proposed location and size of the pipeworks at the boundary of the construction site to apply for an early connection to government mains for future temporary water supply to the construction site.

Once the application for early connection for temporary water supply is approved by the Water Authority, an approval letter together with the demand note for connection fee will be issued to the applicant. The connection works for extending the government water mains to the proposed connection point would be carried out by WSD once the payment for connection fee is received

When a contractor applies for temporary water supply to the construction site after the award of the construction contract, the application shall be submitted together with a written authorization issued by the developer or AP authorizing the contractor to make use of the early connection for temporary water supply installed under previous approval with relevant ASN quoted in the written authorization. In this case, the contractor will not be required to pay any connection fee for the temporary water supply.

If no application for temporary water supply is received from the contractor of the relevant construction site within 6 months after WSD's completion of the early connection works, WSD will consider that the early connection applied by the developer or AP is no longer required and WSD will abandon the connection point to avoid risks of unlawful taking of water through the connection. WSD will notify the developer or AP before taking this action. Extension of the 6 months period may be allowed with sufficient justification from the developer or AP.

(From WSD Circular Letter No. 5/2018)

### 3.12. Plumbing Proposal for Projects Adopting Modular Integrated Construction (MiC)<sup>8</sup> Method

The requirements stipulated in paragraphs 3.12, 4.13, 4.2A, 4.3.2A and 4.3.3A are only applicable to MiC projects with plumbing installations to be constructed off-site in a MiC factory. For MiC projects in which all plumbing installations are constructed in-situ at the building site in Hong Kong, the procedures and requirements for applications for water supply will be the same as normal new building projects.

For MiC projects with plumbing installations to be constructed off-site in a MiC factory, the Applicant for water supply shall provide the following additional information in the plumbing proposal.

- i. A **section** shall be included in the plumbing proposal to be submitted with Form WWO 542 clearly **specifying the part of the plumbing installations (plumbing works) to be constructed off-site in a MiC factory**. The extent of the plumbing installations to be constructed in the MiC factory should also be clearly indicated in the Vertical Plumbing Line Diagram, and other documents of the plumbing proposal as appropriate.
- ii. A **supervision plan of the construction of the plumbing installations at the MiC factory** shall be submitted before the commencement of the works **for agreement by the Water Authority (WA)**. The supervision plan shall specify the name, the qualification proof, the supervision frequency and the supervision period of the supervision personnel to ensure that there will be adequate supervision for the plumbing works in the MiC factory. It shall also contain the name, the address, the responsible contact person and the contact means of the MiC factory. The details of the supervision plan shall be determined based on the extent and complexity of the plumbing works. In general, the responsible Licensed Plumber (LP) who submit the Form WWO 46 for the plumbing works to be constructed in the MiC factory shall visit the MiC factory at least once a week to oversee and inspect the plumbing works, and continuous supervision of the plumbing works in the MiC factory shall be provided by a Registered Plumbing Worker (RPW)<sup>9</sup>.

(From WSD Circular Letter No. 2/2019)

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<sup>8</sup> Modular Integrated Construction (MiC) refers to a construction whereby free-standing integrated modules (completed with finishes, fixtures and fittings) are manufactured in a MiC factory and then transported to site for installation for the new building.

<sup>9</sup> As defined in Part 1 of the Schedule of the Waterworks Ordinance.

## **4. Submission Requirements at Construction Stage**

Flowcharts showing the submission requirements at Construction Stage are provided at **Appendix 6**.

### **4.1. Before Commencement of Work**

Before commencement of work, the licensed plumber (LP) employed by the applicant, i.e. the responsible LP, should seek the approval of the Water Authority (WA) for commencement of works by submitting Parts I, II of WWO 46 and Form WWO 1149 (only for applications other than village type houses and separate metering which have not submitted this form together with Form WWO 542). Part I shall also be signed by the Authorized Person for new building projects. WWO46 (excluding explanatory notes) can be mailed or faxed to the WA.

When signing Form WWO 46, the licensed plumber and the Authorized Person (if applicable) shall certify that all the pipes and fittings to be installed and materials to be used for the construction, installation, alteration or removal (construction etc.) of the Approved Plumbing Works shall be as prescribed by the Waterworks Regulations, Cap. 102A.

If the submission is in order, the WA will issue Part III of Form WWO 46 with a copy of Parts I and II of Form WWO 46. Upon receiving the Part III of Form WWO46, the LP can commence the plumbing works.

#### **4.1.1. Preparation of List of Pipes and Fittings to be Installed (Form WWO 1149)**

Pipes and fittings to be reported in Form WWO 1149 are listed in WSD website.<sup>10</sup>

To facilitate preparation of the submissions, WSD has provided a function in its webpage<sup>11</sup> for the applicants to search and select the pipes and fittings with valid GA and directly convert to the required format for Form WWO 1149. The prepared Form WWO 1149 can be downloaded for printing and signing and subsequent submission to the WA.

<sup>10</sup> [https://www.wsd.gov.hk/filemanager/en/share/pdf/pipes\\_and\\_fittings\\_to\\_be\\_reported\\_in\\_wwo1149\\_e.pdf](https://www.wsd.gov.hk/filemanager/en/share/pdf/pipes_and_fittings_to_be_reported_in_wwo1149_e.pdf)

<sup>11</sup> <http://ga.wsd.gov.hk/en>



If pipes and fittings with low metal leaching rate<sup>12</sup> other than those under Voluntary General Acceptance Star (“GA\*”) Scheme are adopted in the plumbing works, the responsible LP is required to provide such details as well as the test report(s)/certificate(s) showing their compliance in the submission of Form WWO 1149 to the WA.

#### **4.1.2. Water Efficiency Requirements for Fittings in Inside Service**

Subject to exemption as set out in **Appendix 7**, designated products (showers for bathing<sup>13</sup>, water taps<sup>14</sup> and urinal flushing valves) of prescribed water efficiency requirements registered under WELS shall be used in the following designated part of premises for all plumbing proposals submitted:

- (a) kitchens of the domestic premises
- (b) bathrooms and toilets of all premises

Details of such designated products shall be included in the Form WWO 1149.

#### **4.1.3. Submission of Additional Information for Projects Adopting MiC Method**

If any part of the plumbing installations constructed by MiC method will be covered up in the MiC factory, such that the plumbing installations will not be exposable for inspection and non-destructive tests at the building site upon delivery of the MiC modules to the building site in Hong Kong, the following additional details shall be submitted to the WA **for information** before the commencement of plumbing works in the MiC factory:

- iii. **Shop drawings** showing details of the plumbing installations in the MiC modules that will be covered up in the MiC factory.

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<sup>12</sup> Low metal leaching rate metallic plumbing products shall possess supporting document/test report to prove compliance with an Australian/New Zealand Standard AS/NZS 4020. For details please refer to [https://www.wsd.gov.hk/filemanager/common/licensed\\_plumbers/ga\\_star\\_scheme\\_e.pdf](https://www.wsd.gov.hk/filemanager/common/licensed_plumbers/ga_star_scheme_e.pdf)

<sup>13</sup> “Showers for bathing” cover showerheads installed to fixed arms/concealed pipes in the wall or ceiling, showerheads installed to pivotal arms and hand-held showers.

<sup>14</sup> “Water taps” cover mixing or non-mixing type water taps installed at bathroom/toilet washing basins and pantry/kitchen sinks. Water taps equipped with automatic sensing open/close device or automatic closing mechanism are also included. However, water taps installed at bath tub/shower, any system, machinery and devices such as irrigation system, washing machines, water dispensers etc. which serve for bathing/operational use, are excluded.



- iv. **Production schedule** of the MiC modules in particular the production schedule of the plumbing works in the MiC modules and the corresponding inspection schedule for the plumbing works to be covered up in the MiC modules at the MiC factory for the WA to arrange for interim inspection of the plumbing installations by his Inspection Agent before the concealed parts are covered up in the MiC factory.

(From WSD Circular Letter No. 2/2019)

## **4.2. Collection of Water Meters**

In order to shorten the time required for the meter installation process so that water supply can be effected as early as possible, water meters will be installed by licensed plumbers for all water supply applications for new buildings and new village houses. For water supply applications in connection with re-occupation of an existing premises for which no modification of inside services is required (i.e. re-fixing cases), meters shall remain to be installed by the Water Authority.

The administrative procedures for licensed plumbers to install water meters are detailed in the following sections.

### **4.2.1. Collection of Large Quantity of Water Meters (200 or more)**

- (i) At the time of submitting Parts I & II of Form WWO46, AP/LP is required to submit a meter acquisition programme giving the number and size of water meters and the time that the meters are expected to be available for installation.
- (ii) AP/LP will receive a reply letter. If the programme is not acceptable, it should be revised and re-submitted for consideration.
- (iii) AP/LP need to confirm the acquisition of each batch of water meters in writing at least three weeks before the proposed date of collection of the meters.
- (iv) AP/LP will then receive a reply letter (Form WWO465) giving the arrangement and contact staff for collection of the water meters. AP/LP will also receive an Undertaking (Form WWO466) for completion and return when he collects the meters.
- (v) AP/LP should make appointment with staff stipulated in Form WWO 465 to obtain “Collection Note” as well as the softcopy and/or hardcopy of the Meter Installation Table.
- (vi) AP/LP should bring along the “Collection Note” together with the duly completed Undertaking (Form WWO466) to the designated WSD Regional

Stores to collect the water meters. AP/LP or his authorized representative is required to sign on the Stock Issue Note with the company chop and hand in the duly completed Undertaking (Form WWO466) at the time of collecting the meters.

- (vii) LP should return the softcopy and/or hardcopy of the completed Meter Installation Table to the Document Management Centre at 43/F Immigration Centre 7 Gloucester Road Wanchai Hong Kong after satisfactorily completed the commissioning requirements (See Section 4.4).. The initial readings of the water meters shall be the readings after the systematic flushing had been satisfactorily completed.

#### **4.2.2. Collection of Small Quantity of Water Meters (Less than 200)**

- (i) LP can proceed to make appointment with staff stipulated in approval letter to obtain “Collection Note” as well as the softcopy and/or hardcopy of the Meter Installation Table after receiving Part III of Form WWO46.
- (ii) AP/LP should bring along the “Collection Note” together with the duly completed Undertaking (Form WWO466) to the designated WSD Regional Stores to collect the water meters. AP/LP or his authorized representative is required to sign on the Stock Issue Note with the company chop and hand in the duly completed Undertaking (Form WWO466) at the time of collecting the meters.
- (iii) LP should return the softcopy and/or hardcopy of the completed Meter Installation Table to the Document Management Centre at 43/F Immigration Centre 7 Gloucester Road Wanchai Hong Kong after satisfactorily completed the commissioning requirements (See Section 4.4). The initial readings of the water meters shall be the readings after the systematic flushing had been satisfactorily completed.

#### **4.2.3. Installation of Flow Restrictor for Temporary Construction Supply**

For temporary construction supply, a condition will be imposed by the WA in the approval letter to restrict the hourly draw-off rate for the temporary construction water supply according to the flow rate estimated in Section 3.6. The WA may require for the installation of a flow restrictor, by means of a stainless steel orifice plate at the downstream of the water meter (**Appendix 22**) to restrict the draw-off rate to below the “permanent flow rate” of the allocated meter size (**Appendix 23**). The Applicant/LP is required to make all necessary plumbing arrangements in the inside services,

including the provision and installation of a flow restrictor together with the pipework fittings as indicated in the typical details (**Appendix 22**) as determined by the WA, unless otherwise stated in the approval letter.

The LP should submit a duly completed Data Sheet of Flow Restrictor (**Appendix 24**) together with Parts I and II of Form WWO 46 (For the avoidance of doubt, the flow restrictor is not required to be included in the Form WWO 1149). The Applicant/LP is required to make all necessary arrangements for inspection on the installation of the flow restrictor during the interim/final inspection by the WA. Upon satisfying with the installation of the flow restrictor, WSD will provide a security wire and seal for installation in relevant pipes/fittings by the LP under the witness of WSD staff. Any unsatisfactory performance of the Applicant/LP in this aspect may cause delay in issuance of WWO 46 Part V by the WA.

Nonetheless, the WA may consider changing the meter size and/or demand the Applicant/LP to change the orifice diameter of flow restrictor if the WA is satisfied that the actual draw-off rate detected on site has or is likely to be outside the measurable range of the allocated water meter (i.e. from “transitional flow rate” to “overload flow rate”, see **Appendix 23** for reference). The Applicant/LP should make all necessary plumbing arrangements in the inside services at his own cost for the installation of the replacement meter and the provision and installation of replacement flow restrictor of revised size to suit.

(From WSD Circular Letter No. 7/2017)

#### **4.2A. Supervision of Plumbing Works in Projects Adopting MiC Method**

The responsible LP shall ensure that adequate supervision is provided for the plumbing works in the MiC factory in accordance with the supervision plan agreed by the WSD mentioned in paragraph 3.12 above. Proper supervision records shall be kept including the date and time of inspection and supervision of the plumbing works conducted by LP and RPW. The supervision records shall be submitted to the WA for inspection when required and the WA will assign agent to carry out audit checks of the supervision records at the MiC factory if considered necessary. A sample supervision record is at **Appendix 26** for reference. The responsible LP will be required to declare that plumbing works carried out in the MiC factory have been supervised according to the supervision plan.

(From WSD Circular Letter No. 2/2019)

### **4.3. Inspections**

#### **4.3.1. Submission of Part IV of Form WWO46 Requesting for Inspection of Works**

Water supply will only be effected after the inside service / fire service has been checked in order and the necessary commissioning requirements such as satisfactory water sampling test results are fulfilled. After completion of plumbing works, the licensed plumber concerned is required to report completion to the Water Authority (WA) and requests the WA to inspect the completed works via the submission of Form WWO46 Part IV together with a copy of Parts I, II and III. The inspection will be an interim inspection when the completed works are only part of the plumbing works such as underground pipeworks or an inside service or a fire service to be concealed. On the other hand, when the completed works are the whole of the plumbing works, the inspection conducted by the WA will be a final inspection.

##### **4.3.1.1. Submission of Typical Pipe Alignment Plans and As-built Drawings**

Typical pipe alignment plans of the completed works under inspection which show the jointing methods, pipe materials and size should be submitted together with Part IV of Form WWO46 by the Licensed Plumber to facilitate the planning of inspection and approval by the WA.

As-built records showing the pipe alignment of the underground or at grade pipe outside building, e.g. from connection point to the pump room or sump tank, shall be submitted together with Part IV of Form WWO46 (If the plumbing works are reported completion under several Parts IV of Form WWO46, the last Part IV of Form WWO46 should be referred. ). The standards for submission of as-built records are set out in **Appendix 8**. As-built records of inside services/fire services within buildings shall also be submitted in the form of VPLD of the completed works.

##### **4.3.1.2. Submissions related to Systematic Flushing in Unoccupied Buildings and Pretreatment of Fittings in Occupied Buildings (including Online Re-plumbing Works)**

For newly installed inside service for fresh water (excluding fresh water for flushing and fire service supply purposes) in unoccupied buildings, the LP is required to submit to the WA an undertaking of carrying out the systematic flushing using the form in **Appendix 9** together with Form WWO 46 Part IV for final inspection.

For newly installed inside services for fresh water purposes in occupied buildings (including online re-plumbing works), for which the implementation of systematic flushing is generally considered not practicable, the responsible LPs are required to arrange for pretreatment of fittings using the pretreatment protocol as set out in **Appendix 10** or shall adopt fittings with low metal leaching rate<sup>15</sup>. If pretreatment of fittings is adopted, the responsible LP is required to submit a confirmation to the WA using the form in **Appendix 11** that the new fittings, where applicable, have been pre-treated. This confirmation should be submitted to the WA together with the Form WWO 46 Part IV for final inspection.

### **4.3.2. Interim Inspections**

The responsible LP shall report completion of underground/concealed plumbing works by Form WWO 46 Part IV for inspection by the WA before the works are covered up. WA will inform the LP about the arrangement of interim inspection to be carried out.

During interim inspections, the WA will use checklists to record findings. The LP or his authorised representative attending the inspection shall sign the checklist and he may make a copy of the checklist for retention if he so wishes.

During an interim inspection of plumbing works of any new building project, the WA may, apart from inspecting the part of the plumbing works reported as completed, also inspect other parts of the plumbing works not reported as completed but found on site, for the purpose of early detection of defects. Defects found in other parts of the plumbing works not reported as completed are not subject to the Point Penalty System (Section 4.3.5 refers).

#### **4.3.2A. Interim Inspection of Plumbing Works in Projects Adopting MiC Method**

For plumbing installations to be covered up in the MiC factory, the WA will arrange an Inspection Agent to carry out interim inspection in the MiC factory before the concealed parts of the plumbing installation are covered up to ensure that they comply in all respects with the provisions of the Waterworks Ordinance (WWO) / Waterworks Regulations (WWR) and all prevailing requirements of the WA<sup>17</sup>. The Inspection

<sup>15</sup> Low metal leaching rate metallic plumbing products shall possess supporting document/test report to prove compliance with an Australian/New Zealand Standard AS/NZS 4020. For details please refer to [https://www.wsd.gov.hk/filemanager/common/licensed\\_plumbers/ga\\_star\\_scheme\\_e.pdf](https://www.wsd.gov.hk/filemanager/common/licensed_plumbers/ga_star_scheme_e.pdf)

<sup>17</sup> Inspection will cover including but not limited to the aspects of material and size of pipes and fittings as

Agent will conduct inspections and carry out non-destructive tests for the plumbing installations. The responsible LP or his/her representative shall be present in all interim inspections such that any noncompliance identified during the inspections could be immediately communicated to the LP or his/her representative for rectification. If the plumbing installations to be covered up are in order, the Inspection Agent will also advise the LP or his/her representative on the spot.

The responsible LP shall coordinate and liaise with the Inspection Agent of the WA regarding the exact inspection dates of the plumbing installations to be covered up at the MiC factory. The responsible LP is not required to submit Form WWO 46 Part IV to WA for arranging interim inspection. If the inspection frequency so warrants, the responsible LP may be required to arrange a working place in the MiC factory for the Inspection Agent to field its resident staff for conducting interim inspection.

(From WSD Circular Letter No. 2/2019)

#### **4.3.3. Final Inspections**

Given that WSD's final inspections shall include but not limited to carrying out spot-check of the pipes and fittings at the premises and taking water samples at random locations of the Approved Plumbing Works, attention of the licensed plumber is drawn to the licensed plumber's duty to construct of the Approved Plumbing Works covered by the submitted Form WWO 46 in compliance with the approved plumbing proposals and the Waterworks Ordinance and Regulations.

Furthermore, neither the approval of the plumbing proposals nor the granting of the connection to the main and the installation of the part of the fire service or inside service on land held by the Government shall be construed as a ratification of any contravention of any of the provisions of the Waterworks Ordinance or the Waterworks Regulations.

To facilitate WA's inspection of an inside service or a fire service, the LP shall provide a sample board on site for new building projects where at least one building has more than 3 storeys. The sample board shall display samples of taps, shower mixers, valves, and pipes listed in the Form WWO 1149 as well as solder materials if used. Relevant certificates/testing reports/catalogues as appropriate are also required to be provided together with the sample board. The LP shall upon request provide for the WA's inspection relevant supporting documents for the pipes and fittings as listed in the Form

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well as their jointing method.



WWO 1149 (such as delivery notes, purchase order, product certificate or confirmation from relevant suppliers/distributors stating the place of origin of the pipes, fittings and solder materials).

During final inspection, the WA will use checklists to record findings. The LP or his authorised representative attending the inspection shall sign the checklist and he may make a copy of the checklist for retention if he so wishes.

For the final inspection of plumbing works of all new building projects except those relatively simple ones involving just one detached village type house, the LP being the person responsible for the completed plumbing works shall attend the final inspection such that defects found by the WA can be brought to the immediate attention of the LP. After the identified defects have been rectified, the LP should report to WA in writing the completion of rectification. WA will arrange further inspection.

#### **4.3.3A. Final Inspection and Commissioning Requirements of Plumbing Works in Projects Adopting MiC Method**

Applicant for water supply of a MiC project shall, as for all other plumbing projects, be required to submit Form WWO 46 Part IV upon completion of the plumbing works at the building site in Hong Kong. Upon receipt of Form WWO 46 Part IV, the WA will conduct final inspection of the completed plumbing installations at the building site. Approval of plumbing works of the MiC project will be granted by the WA subject to:

- i. satisfactory results of the final inspection stated in Section 4.3.3. above by the WA at the building site;
- ii. satisfactory results of the interim inspections carried out by the Inspection Agent of the WA on the concealed parts of the plumbing works before they are covered up in the MiC factory as stated in Part C above (in which case no opening up of concealed plumbing works for inspection will be required at the building site); and
- iii. the commissioning requirements specified in Section 4.4 being complied with.

(From WSD Circular Letter No. 2/2019)

#### **4.3.4. Non-Destructive Test for Solder Joints**

During inspection of the inside service, non-destructive tests of lead content for solder joints selected by the WA shall be carried out according to the requirement set out in **Appendix 12**.

#### **4.3.5. Defects Found in an Inspection**

WA operates a point penalty system (PPS) to assess the performance of LPs when conducting these inspections. Under the PPS, if defects are found in an inspection, penalty points will be given according to the Waterworks Form WWO1008<sup>18</sup>. If the total penalty point in a single inspection exceeds 10 points, a warning letter will be issued to the LP. When two warning letters are issued to the LP within a period of 12 months, the procedure for deliberating suspension of the LP's licence will be initiated. However, the PPS shall in no way restrict the licensing authority from exercising his power under Waterworks Regulation 37(1) to cancel/suspend an LP's licence. For the avoidance of any doubts, please be reminded that during the period when the plumber's licence is suspended, the holder of that suspended licence is not and shall not be regarded as a "licensed plumber" for the purposes of the Waterworks Ordinance or the Waterworks Regulations.

If the LP disagrees with a Form WWO1008 issued to the LP, the LP may submit an appeal to the Senior Engineer (Region) concerned with substantiation within 14 days from the date of the WA's letter issuing the WWO1008. The concerned Senior Engineer (Region) will investigate including conducting interviews with the LP as necessary and inform the LP of his decision. In case the issue of the WWO1008 might trigger the procedure for suspension of the LP's licence, the procedure will not commence until a decision on the appeal has been made by the concerned Senior Engineer (Region).

#### **4.3.6. Scheme on Voluntary Submission of Inspection Checklist**

The Licensed Plumber (LP) who opts to join the Scheme should arrange self-inspection of the plumbing works, and submit necessary inspection certificates and inspection checklists<sup>19</sup> corresponding to the type of inspection as follows:

<sup>18</sup> [http://www.wsd.gov.hk/filemanager/en/content\\_1137/annex1\\_wwo1008.pdf](http://www.wsd.gov.hk/filemanager/en/content_1137/annex1_wwo1008.pdf)

<sup>19</sup> The blank inspection certificates/checklists can be downloaded from the WSD's webpage at: [http://www.wsd.gov.hk/en/plumbing-engineering/requirements-for-plumbing-installation/wsd-circular-letters/index\\_id\\_458.html](http://www.wsd.gov.hk/en/plumbing-engineering/requirements-for-plumbing-installation/wsd-circular-letters/index_id_458.html)



#### 4.3.6.1. Interim Inspection of Underground Pipes

The procedures for voluntary submission of interim inspection checklist for underground pipes are set out in **Appendix 13**. The LP is required to submit the documents as set out in **Part A of Appendix 13** together with the Form WWO 46 Part IV and the WSD will process the submission according to procedures set out in **Part B of Appendix 13**. The inspection certificate in the form of **Appendix 14** has to be certified by qualified person with qualification set out in section 4.3.6.3. The Scheme does not cover interim inspection on concealed pipes above ground.

#### 4.3.6.2. Final Inspection

The procedures for voluntary submission of final inspection checklist are set out in **Appendix 15**. The LP is required to submit the documents as set out in **Part A of Appendix 15** and the WSD will process the submission according to procedures set out in **Part B of Appendix 15**. The inspection certificate in the form of **Appendix 16** has to be certified by qualified person with qualification set out in section 4.3.6.3.

#### 4.3.6.3. Qualified Person

The persons with the following qualifications are qualified to certify the inspection certificate:

- Registered Profession Engineer<sup>20</sup> (building services) [RPE(BSS)];
- Corporate member of the Hong Kong Institution of Engineers in building services discipline [MHKIE in (BSS)];
- Registered Profession Engineer (mechanical) [RPE(MCL)] with 2 years of relevant post-qualification experience in BS installation; or
- Corporate member of the Hong Kong Institution of Engineers in mechanical discipline [MHKIE in (MCL)] with 2 years of relevant post-qualification experience in BS installation.

The RPE(MCL) and MHKIE in (MCL) should provide curriculum vitae, certificate of Employment or the like to demonstrate his attainment of sufficient relevant experience. WSD will conduct audit check on the document provided by RPE(MCL) and MHKIE in MCL.

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<sup>20</sup> Registered professional engineer as defined in the Engineers Registration Ordinance (Cap 409).

#### **4.3.6.4. Enhancement on the Arrangement of Final Inspection of Plumbing Works**

Final inspections will be conducted for all cases. To further streamline the workflow under the Scheme, the final inspection arrangement for plumbing works under the Scheme is enhanced. The WSD will issue “Notification of the Selected Locations for Voluntary Submission of Final Inspection Checklists” (Notification) to the concerned LP and make appointment for final inspection within 7 working days of receipt of WWO46 Part IV. The WSD commits to conduct final inspections for at least 70% of the cases within 14 working days from the date of making appointment or, if final inspection cannot be arranged by the LP within 14 working days, on a date mutually agreed when making appointment with the LP, provided that the final inspection checklists by the LP are submitted within 7 working days from the date of issue of the Notification and the checklists prepared are satisfactory.

#### **4.4. Commissioning Requirements**

After satisfactory completion of final inspection including conducting non-destructive tests for solder joints, the WA will issue the Form WWO 46 Part V(a). The building contractor/LP is then required to follow the commissioning requirements as detailed below for effecting water supply.

##### **4.4.1. Fresh Water Supply for New Buildings and New Village Type Houses (excluding Fresh Water Flushing and Fire Service Supply)**

After satisfactory completion of final inspection including conducting non-destructive tests for solder joints, the WA will issue the Form WWO 46 Part V(a). The building contractor/LP is then required to carry out systematic flushing using the protocol stated in **Appendix 17**. (There is no need for the building contractor/LP to wait for the issue of Form WWO 46 Part V(a) before proceeding with the systematic flushing.) During the systematic flushing, the LP is required to keep record of systematic flushing carried out using the form in **Appendix 18 for village type house projects and Appendix 18A for new building projects**. The building contractor/LP shall then cleanse and disinfect the fresh water inside services according to the guidelines in Part (A) of **Appendix 25**. To ensure that the newly constructed fresh water inside services have been adequately cleansed, disinfected and flushed, water sampling for testing shall be carried out according to the requirements as stipulated in **Appendix 19**.

#### **4.4.1A. Fresh Water Flushing and Fire Service Supply for New Buildings**

The building contractor/LP shall cleanse and disinfect the connection point of fresh water flushing and fire service system according to the guidelines in Part (A) of **Appendix 25**. Water sampling for testing shall be carried out according to the requirements as stipulated in **Appendix 19**.

#### **4.4.2. Fresh Water Supply for Occupied Buildings and Village Type Houses (excluding Fresh Water Flushing and Fire Service Supply)**

After satisfactory completion of final inspection including conducting non-destructive tests for solder joints, the WA will first issue Form WWO 46 Part V(a). (There is no need for the building contractor/LP to wait for the issue of Form WWO 46 Part V(a) before proceeding to the next steps). The building contractor/LP shall cleanse and disinfect the pipes and fittings of the plumbing works for the potable water inside services either offsite or in-situ after they have been installed according to the guidelines in Part (B) of **Appendix 25**. The building contractor/LP shall carry out water sampling for testing according to the requirements as stipulated in **Appendix 19**.

#### **4.4.3. Submission of Water Sampling Test Reports**

The LP shall arrange with the accredited laboratories or the Water Science Division of WSD to send all the test reports for the water sampling tests directly to the WA via email and with a copy to the LP. The LP is not required to submit the test report to WA. The test reports should include the address of the premises, location of samples with photos, ASN number and CCID of the application case. Details of the email addresses per section are available at WSD website<sup>21</sup>. When the water sampling test reports indicating all water samples comply with the acceptance criteria stated, the WA will issue Form WWO 46 Part V(b).

#### **4.4.4. Retesting Arrangement**

If the result(s) of the water sampling test(s) fails to comply with any of the acceptance criterion, the building contractor/LP should carry out remedial works such as rectification of the plumbing works, cleansing, disinfection or flushing as appropriate for the part(s) of potable water inside services represented by the failed sample(s) and

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<sup>21</sup>[https://www.wsd.gov.hk/filemanager/en/content\\_1205/contact\\_list\\_for\\_new\\_application\\_case\\_status\\_enquiry.pdf](https://www.wsd.gov.hk/filemanager/en/content_1205/contact_list_for_new_application_case_status_enquiry.pdf)

collect further water sample(s) at the same location(s) of failed sample(s) for retesting.

Please refer to **Appendix 19** for the retesting arrangement.

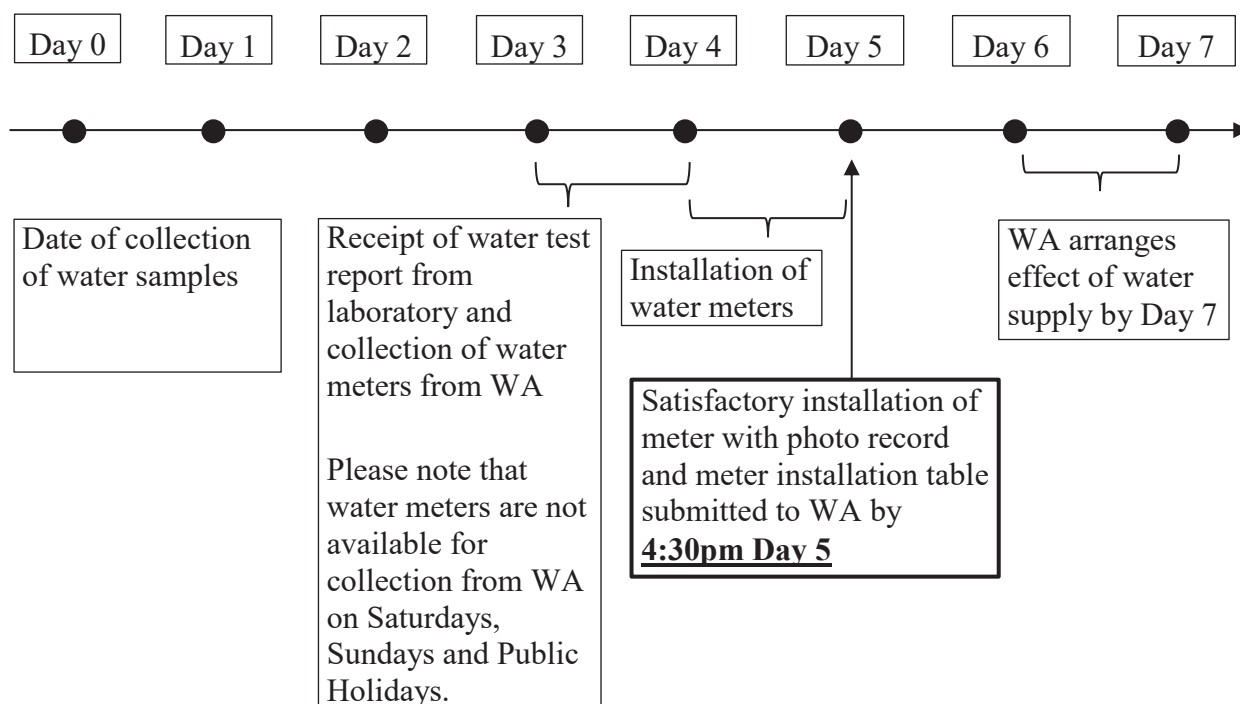
#### **4.5. Effect of Water Supply**

When (i) the water test reports indicating all water samples are within the acceptance criteria, (ii) the record of systematic flushing in **Appendix 18 or 18A**, and (iii) completed Meter Installation Table with meter readings recorded after completion of systematic flushing are received by the WA (for those plumbing works where systematic flushing is required and generally practicable), the WA will issue Form WWO 46 Part V(b). Upon the issue of Form WWO 46 Part V(b), the WA will effect water supply within seven days after the date of water sampling with satisfactory results at the connection point (the 7-day requirement). Form WWO 1005 will be issued upon request after water supply is effected.

#### 4.5.1. Workflow for Effecting Water Supply to New Village Type Houses

Water meters will be available for collection by the LP upon receipt of satisfactory test report issued by the laboratory for commissioning water sampling tests by the WA (Section 4.4.3. refers). The concerned LP shall proceed to collect water meters from the designated WSD Regional Stores as soon as possible after receipt of the water test report and shall install the water meters at the village houses as soon as possible.

If the LP can install the water meters and submit to the WA relevant photo records and meter installation table showing satisfactory installation of the water meters before 4:30pm on Day 5 after the collection of water samples, the WA will arrange to effect water supply on or before Day 7 to fulfil the “7-day requirement”. Workflow of the abovementioned arrangement is illustrated below:



The LP shall submit the photo records and meter installation tables to the respective Regional Office of WSD through the following email addresses:

Regional Office	Email Address
Hong Kong & Island Region (except Lantau)	wsd_hk_cs@wsd.gov.hk
Hong Kong & Island Region (Lantau only)	wsd_lantau_cs@wsd.gov.hk
Kowloon Region	wsd_k_cs@wsd.gov.hk
New Territories East Region	wsd_nte_cs@wsd.gov.hk

New Territories West Region	wsd_ntw_cs@wsd.gov.hk
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The WA will acknowledge receipt of records received through these email addresses.

#### **4.5.2. On Site Water Test for Effecting Water Supply to New Village Type Houses**

If the “7-day requirement” for effecting water supply cannot be met for new village type houses, the LP can adopt a simple on site water test in lieu of laboratory water test to allow early effecting of water supply.

If satisfactory installation of meters with record cannot be completed/submitted to the WA before 4:30pm on Day 5, the concerned LP is required to flush at the connection point by at least 3 volumes of water in the concerned pipe to ensure that all the stagnant water in the concerned pipe is replaced by fresh water with sufficient residual chlorine. To ensure that there is sufficient flushing, the LP is required to conduct water test using N,N-Diethyl-p-phenylenediamine sulphate (DPD) No. 1 tablet (viz. DPD water test) on site after carrying out the flushing detailed as follows:

- a) Dissolving a DPD No. 1 tablet in about 20 millilitres of flushed water sample collected from the connection point (crush the tablet if necessary). Development of a pink coloration indicates presence of free residual chlorine and hence sufficiency of flushing. DPD No. 1 tablet will be supplied by WSD and can be collected by LP from the responsible Regional Offices.
- b) The LP shall take video record on site for the whole process of the DPD water test conducted, including collection of water samples and the development of pink solution in one go. The video shall also include information such as date, time and village house location of the DPD water test conducted. Furthermore, the pink solution shall be recorded against a white background in order to easily distinguish the colour of solution from the background.
- c) If the pink coloration fails to develop, flushing and DPD water test shall be repeated until the pink coloration can be detected.

After successful completion of the DPD water test, the LP shall submit the video record

of the DPD water test together with records of satisfactory installation of meters and meter installation table to the WA through the relevant email address stated in paragraph 4.5.1.1 above. The WA will arrange to effect water supply within 7 days after the date of flushing.

The WSD will carry out random spot check on the flushing and DPD water tests carried out by the LP on site.

(From WSD Circular Letter No. 1/2019)

#### **4.6. Collecting Water Samples of Longer Stagnation Time for Data Acquisition and Evaluation**

To enable WSD to evaluate the feasibility of adopting longer stagnation water sampling tests as acceptance criteria in the long run, WSD will randomly select new plumbing works to collect longer stagnation samples (or water samples taken from potable water inside services that has been left stagnant for up to 24 hours) at sampling locations selected by WSD for carrying out water sampling test. WSD will inform building contractor and LP if his plumbing works are suitable for collecting such samples. Subject to agreement of the building contractor/LP, they shall make necessary arrangement to facilitate WSD to collect the samples for water sampling tests upon the WSD's notification. All the sampling and testing of longer stagnation samples will be carried out by WSD. The results of the longer stagnation samples are for WSD's reference only.

#### **4.7. Online Re-plumbing Works**

A flowchart showing the workflow for online re-plumbing works is at **Appendix 3**. Additional requirements during construction and inspection stage of online re-plumbing works are as follows:

##### **4.7.1. Control on Pipes and Fittings**

Please refer to the Section 3.3.1 and 4.3.1.2 for the requirements on the pipes and fittings.



#### **4.7.2. Temporary Resumption of Water Supply for Purposes other than Drinking and Cooking**

Water supply will be temporarily suspended during online re-plumbing works and temporarily resumed after completion of each section of works for purposes other than drinking and cooking. For any application for water supply to be temporarily resumed after completion of the section of works, the responsible LP or his representative is required to submit the form in **Appendix 20** together with relevant site photos including specific photos showing the relevant pipes or fittings concerned in the completed section of works to the WA via email/WhatsApp message to the responsible Regional office of WSD before 11:30am (for section of works completed in the morning session) or 4:30pm (for section of works completed in the afternoon session). Details of the email addresses/WhatsApp Nos. of our Regional offices are available at WSD website.<sup>23</sup>

Unless the responsible LP or his representative receives a notification from the WA not to resume water supply via email/WhatsApp message before 12:30pm (for section of works completed in the morning session) or 5:30pm (for section of works completed in the afternoon session), water supply can be temporarily resumed on the same day after sending the Submission for the completed section of works to the WA. Despite the temporary resumption of water supply for the completed section of works, the responsible LP will still be responsible for the satisfactory completion of the whole re-plumbing works and shall apply for inspection and approval of the whole re-plumbing works upon its full completion.

#### **4.7.3. Additional Submissions for Use of Soldering**

For each section of completed works, the responsible LP or his representative shall conduct non-destructive test of lead content at one newly completed solder joint and include the photo record(s) of such test(s) in the submission to WA for temporary resumption of water supply for the concerned completed section of works using the form in **Appendix 20**. The responsible LP shall also keep record of the result of the non-destructive test conducted for inspection by the WA upon request until issuance of WWO 46 Part V for the works. This requirement does not apply to the use of fittings with integral solder ring in these online re-plumbing works.

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<sup>23</sup>[https://www.wsd.gov.hk/filemanager/en/content\\_1205/contact\\_list\\_for\\_new\\_application\\_case\\_status\\_enquiry.pdf](https://www.wsd.gov.hk/filemanager/en/content_1205/contact_list_for_new_application_case_status_enquiry.pdf)



#### **4.7.4. Control Measures Taken by the WA on Re-plumbing works**

For online re-plumbing works required to follow the enhanced workflow, the WA will initiate random inspection of these online re-plumbing works during their construction. The responsible LP shall obtain necessary consent for entry to the site before commencement of the re-plumbing works to facilitate the WA to carry out such random inspection. During the random inspection, if the WA finds that the applicants fail to implement the temporary water supply arrangement and/or the responsible LPs fail to conduct the necessary non-destructive test for use of soldering, the applicants would have in fact failed to comply with the approval conditions for the Approved Plumbing Works and the WA will consider to withdraw the permission for proceeding with the Approved Plumbing Works given under WWO 46 Part III until necessary rectification works have been carried out.

#### **4.7.5. Supporting Documents to be submitted with Form WWO46 Part IV**

The responsible LPs shall also take sufficient relevant site photos (showing the records of pre-treatment of fittings, temporary water supply arrangement and non-destructive test conducted for completed solder joints, if applicable) which shall be submitted to the WA together with Form WWO 46 Part IV as supporting documents when the responsible LPs apply for WA's inspection and approval of the whole completed re-plumbing works. If the relevant supporting documents cannot be produced, the relevant parties shall take appropriate remedial actions as required by the WA for obtaining approval of the completed re-plumbing works. For example, if record of non-destructive test conducted for completed solder joints cannot be produced, additional completed solder joints will be selected by the WA for conducting the non-destructive test of lead content during final inspection.

#### **4.8. Change of LPs after Submission of Form WWO46**

When there is a change of LP, a fresh submission of Form WWO46 Parts I and II duly signed by parties concerned including the Applicant, the AP and the new LP together with a copy of the previously approved Form WWO46 and Form WWO 1149 are required to be made to the WA as soon as possible. For the avoidance of doubt, the change of LP by itself does not require submission of the plumbing proposal or Form WWO 1149 if there is no change to these submissions previously made to the WA.

## **5. Application for Temporary Water Supply for Systematic Flushing**

To facilitate the implementation of the systematic flushing protocol, the WSD introduces the following arrangement for the LPs to apply for provision of temporary water supply when water supply has not yet been effected:-

### **5.1. Buildings**

- (1) LP submits one Form WWO 542 for water supply to buildings and another Form WWO 542 for “construction meter for flushing purpose” (flushing meter) to WSD;
- (2) The LP reports partial completion (Form WWO 46 Part IV) for the sections of inside service for drinking water purposes from the connection to the sump tank as well as the parts with direct water supply, if any;
- (3) WSD will then carry out inspection on these completed sections;
- (4) If no irregularity is found in the inspection and with the support of satisfactory water sampling test results at the connection point, the LP can collect flushing meter and install it at master/check meter position. WSD will then effect water supply to the connection point for flushing purpose;
- (5) Upon completion of the remaining parts of the inside service, the LP will report completion to the WSD for the arrangement of a final inspection;
- (6) If no irregularity is found by the WSD and the water sampling tests for the remaining parts of inside service at the locations designated by WSD are satisfactory, LP can submit Form WWO 243 to terminate consumership of flushing meter with a record of its final meter reading. Form WWO 243 should only be specified with reason “changing to master meter” if flushing meter is installed at master meter position. (If the development is completed in phases, LP then submits another Form WWO 542 for another flushing meter for the next phase);
- (7) WSD will process Form WWO 243, remove the flushing meter if necessary and will issue Form WWO 46 Part V(a) to the LP accordingly if the above are completed in order.
- (8) The LP shall submit the completed Meter Installation Table showing the updated meter reading after carrying out the systematic flushing of the new plumbing works and before issuance of Form WWO 46 Part V(b)/Form WWO 1005 by WSD. The LP is also required to provide assistance to WSD for conducting the meters arrangement check.

## **5.2. Village Houses**

- (1) LP submits one Form WWO 542 for water supply to new premises and another Form WWO 542 for “construction meter for flushing purpose” (flushing meter) to WSD and WSD will determine the appropriate type of meter required. In general, a section of exposed pipe between meter box and the connection point should be designed for installing two non-return valves and the meter for flushing purpose;
- (2) The LP reports completion (Form WWO 46 Part IV) for the whole inside services for drinking water purposes for WSD’s inspection;
- (3) WSD will then carry out final inspection on these completed inside services;
- (4) If no irregularity is found, WSD will issue Form WWO 46 Part V(a) to the LP. The LP can collect flushing meter and install it with double non-return valve arrangement on the exposed pipe between meter box and the connection point. WSD will then effect water supply to the connection point for flushing purpose;
- (5) LP conducts systematic flushing and arranges laboratory to take samples at the locations designated by WSD and connection point;
- (6) If the water sampling tests results are satisfactory, LP can submit Form WWO 243 to terminate consumership of flushing meter with a record of its final meter reading and return the flushing meter to WSD. If the development is completed in phases, LP then submits another WWO 542 for another flushing meter for the next phase.
- (7) WSD will process Form WWO 243, issue domestic water meters and will issue Form WWO 46 Part V(b) to the LP accordingly if the above are completed in order.

## **6. Application for Water Supply for Two-Storey Warehouse through One Stop Centre (OSC)**

Applicant may apply for water supply for 2-storey warehouse through the One Stop Centre (OSC) operated under the Efficiency Office. The OSC is an option in addition to the existing channels of application. It aims to streamline the application process by setting a centralized office for receiving submissions of building plans and related applications (including technical audit for water supply connection works) and coordinating joint inspections for two-storey warehouses. Subject to satisfactory compliance with the Water Authority’s requirements, water supply could be made available immediately during the joint and final inspection. For more details, please

refer to the Efficiency Office's website<sup>24</sup>.

## **7. Provision of Sanitary Fitments and Fittings or Water Heaters in New Buildings**

### **7.1. Sanitary Fitments and Fittings**

In response to the recommendations of the Working Group on Construction Efficiency and Environment, the Building Authority (BA) issued Practice Note APP-114 (Formerly PNAP 245) "Waste Minimization – Provision of Fitments and Fittings in New Buildings"<sup>25</sup> which allows, subject to certain conditions, sanitary fitments and fittings to be installed after the issue of the occupation permit. The Practice Note states that any Authorized Person (AP) who wishes to take advantage of this arrangement should provide details on the extent of the sanitary fitments and fittings to be installed after the issue of the occupation permit in the application together with an undertaking to BA to the effect that :-

- (a) the outstanding sanitary fitments and fittings will be installed prior to the actual occupation of the relevant part of the premises;
- (b) the outstanding sanitary fitments and fittings will be installed in accordance with the provisions of the Building (Standards of Sanitary Sanitary fitments, Plumbing, Drainage Works and Latrines) Regulations and the requirements of the Water Authority (WA);
- (c) the outstanding sanitary fitments and fittings will be installed under the AP's supervision by the registered general building contractor who will employ a licensed plumber (LP) for carrying out the plumbing works; and
- (d) the WA will be notified via the submission of Form WWO 46 of the installation of the outstanding plumbing fittings.

The following paragraphs outline the procedures the WA will take in processing the BA approved applications for installing certain sanitary fitments and fittings of the inside service after the issue of the occupation permit.

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<sup>24</sup> <http://www.effo.gov.hk/en/our-work/citizen-centric-services/one-stop-warehouse-construction-permits.html>

<sup>25</sup> For details of Practice Note APP-114, please visit BD's website at <http://www.bd.gov.hk/english/documents/pnap/APP/APP114.pdf>

The BA will notify the WA of the approved applications together with a copy of the AP's undertaking. Upon receipt of the notification, the WA will acknowledge receipt of the copy of the AP's undertaking to the AP and will request the AP to confirm in writing together with vertical plumbing line diagrams (VPLD) which parts of the sanitary fitments and fittings of the inside service are proposed to be installed after the issue of the occupation permit. If the AP's proposal is in order, the WA will issue an acceptance letter to the AP.

Please note that for those inside service completed without final sanitary fitments and fittings installed, at least one tap with receptacle should be incorporated in each premises to facilitate checking of the water meter arrangement.

Upon completion of the inside service (without those parts of the sanitary fitments and fittings which will be installed after the issue of the occupation permit), the LP should submit via the AP to the WA

- (a) Part IV of Form WWO 46 notifying the WA of the completion of the relevant part of the inside service; or
- (b) submit Part I (in case the LP has not submitted this part before) and Part IV of Form WWO 46 notifying the WA of the completion of the relevant part of the inside service.

When the connections to the inside service of the premises are made and water supply becomes available, the WA will issue Form WWO 1005 (Certificate Regarding Water Supply Connection) to the AP upon request.

After the outstanding sanitary fitments and fittings of the inside service for a particular premises or a group of premises are installed, the LP is required to make a copy of the previously approved Form WWO 46 Part V(b) and submit it via the AP to the WA. The LP is required also to submit to the WA photographs certified by the AP as true records of the outstanding sanitary fitments and fittings of the inside service installed.

When all outstanding sanitary fitments and fittings of the inside service are installed, the AP is required to confirm in writing, together with a copy of the previously approved Form WWO 46 Part V(b), to the WA that all outstanding sanitary fitments and fittings of the inside service are installed in accordance with the requirements of the WA. If some or all outstanding sanitary fitments and fittings of the inside service remain outstanding one year after the issue of Form WWO 1005, the AP is required to give written explanation to the WA on why the outstanding sanitary fitments and fittings cannot be installed within the year and when they will be installed.

## 7.2. Water Heaters

The Water Authority (WA) may consider acceptance of plumbing installation and a supply to be given without heaters installed on the following conditions:-

- (a) If VPLD indicates that heaters will not be installed but plumbing details are shown to provide supply points for heaters, a written undertaking must be obtained from the architect/developer with full description of the type of heaters intended to be installed in future so that VPLD should be checked and approved to comply with Waterworks requirements for the installation of the particular heaters.
- (b) If heaters are shown on VPLD but cannot be installed in place ready for final inspection, an advance written undertaking should be obtained from the architect/developer giving a prescribed date for the heaters to be installed.
- (c) A warning plate should be secured in a proper and conspicuous place as near to the heater position as possible and etched with the following instruction in both English and Chinese:  
 “Only [*type of water heater*] water heaters should be installed.  
 Prior approval must be obtained from the Water Authority.”  
 “只准安裝[熱水器種類]熱水器，並須先向水務監督申請”

The WA shall carry out re-inspections to the premises 6 months after the installation of meters to check if the correct type of heaters have been installed.

## 8. Random Inspection of New Plumbing Works during Construction Stage

To enhance the regulatory control on new plumbing installations, random inspection of plumbing works will be carried out by the Water Authority (WA) during the construction stage in addition to interim inspection and final inspection carried out under the Waterworks Regulations.

Under the scheme, a number of relevant new plumbing installations under construction will be selected bimonthly for random inspection on a risk-based approach taking into account the risk factors and consequence of non-compliance. The risk factors include (i) the scale and nature of the projects; (ii) the workload, past performance, experience



and Continuing Professional Development credits<sup>26</sup> of the licensed plumbers (LPs) engaged; (iii) whether the plumbing contractors engaged are included in the “Plumbing Installation” category on the List of Approved Specialist Contractors for Public Works maintained by the Development Bureau or in the “Plumbing” category on the List of Registered Subcontractor maintained by the Construction Industry Council; and (iv) whether soldering/brazing materials are used.

For a new plumbing project selected for random inspection, the WA will contact the LP concerned about two weeks in advance of the scheduled date of the intended random inspection and ask the LP to advise about one week before the inspection whether (i) there are any plumbing works under construction available for inspection; (ii) the applicant / authorized person / main contractor agree to the WA’s entry into the site for inspection; (iii) he/she or representatives from the applicant / authorized person / main contractor will accompany the WA to carry out the inspection; and (iv) the scheduled date of the inspection can be confirmed.

During the inspection, plumbing materials found on site and plumbing works including the pipes, fittings and solder/brazed joints constructed/installed on site will be randomly selected for checking and non-destructive testing. The LP concerned will be notified of the irregularities identified for his/her rectification. In addition, site personnel carrying out plumbing works will be checked for compliance with Section 15 of the Waterworks Ordinance. Since it is not an acceptance inspection, the point penalty system is not applicable. A project, which has been selected for random inspection, will normally not be selected for conducting random inspection again within six months, subject to the number and seriousness of irregularities found during the inspection.

## 9. Common Mistakes

To facilitate the applicant in preparing the plumbing proposal, the common mistakes found in the submissions are summarised in **Appendix 21**. Before submission of plumbing proposal, the applicants shall carry out a self-check to ensure the items mentioned in **Appendix 2** have been properly prepared and included in the submission.

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<sup>26</sup> Please refer to WSD Circular Letter No. 3/2016 “Voluntary Continuing Professional Development Scheme for Licensed Plumbers” for details.

## **Appendix 1: Checklist for Vetting Plumbing Proposals**



## **Appendix 1: (1) Checklists for Vetting Plumbing Proposal - New Building**

### **Cover Page**

Address of Premises:

Name of Consumer:

Contact Tel. No.:

ASN No./CCID NO. (if applicable)

The plumbing proposal has been checked against the following checklists and all the technical requirements stated on the checklists have been taken into account in preparing the plumbing proposal.

\*Chapter 3      Meter

\*Chapter 4      Inside Service

\*Chapter 5      Fire Service

\*Chapter 6      Water Cisterns, Water Pumps and Other Miscellaneous

\*Chapter 7      Water Conservation

Checklists prepared by,  
(Authorised Person or  
person signing the drawings)

Signature: \_\_\_\_\_

Name: \_\_\_\_\_

*\*please delete whichever is not applicable*

## Checklists for Vetting Plumbing Proposal - New Building

### Chapter 3 - Metering

**Type:** S = Statutory Requirements  
E = Essential for approval of works

# Referring to the clauses in Technical Requirements for Plumbing Works in Buildings (TR). You may cross out the clauses if not applicable

^ Please✓ as appropriate

	Type	Checked^	Remarks
<b>#3.1 General</b>			
<u>3.1.3</u>			
All domestic unit shall be separately metered	E	<input type="checkbox"/>	<input type="text"/>
<u>3.1.4</u>			
(a) Meter shall be sited in a meter room/box/chamber at convenient location in accessible communal area	E	<input type="checkbox"/>	<input type="text"/>
(b) For indirect supply system, the meter shall be sites in a meter room/box/chamber in accessible communal area at roof level or at other convenient locations	E	<input type="checkbox"/>	<input type="text"/>
<u>3.1.5</u>			
In case the meters are sited at roof level, and system pressure is lower than 15m, fullway gate valves shall be fitted before meter positions.	E	<input type="checkbox"/>	<input type="text"/>
<u>3.1.6</u>			
For connections up to and including 40 mm diameter, a loose jumper type stopcock shall be provided and placed with spindle in the vertical position at each meter position on the inlet side of the meter where the meter is not sited at roof level and where the pressure is considered adequate.	E	<input type="checkbox"/>	<input type="text"/>
<u>3.1.7</u>			
For connections larger than 40 mm diameter, a gate valve shall be provided before the meter position and a non-return or check valve fitted on the delivery side as close as possible to the meter.	E	<input type="checkbox"/>	<input type="text"/>
<u>3.1.9 &amp; 3.1.10</u>			
For salt water flushing supply,			
(a) a meter position shall be provided for the purpose of periodic checking of consumption. It should be close to the lot boundary and connection to the Government mains or close to the point of connection from internal distribution mains whichever is applicable.	E	<input type="checkbox"/>	<input type="text"/>
(b) stop valve shall be fitted at the inlet side of the meter position and a non-return or check valve shall be fitted on the delivery side as close as possible to the meter.	E	<input type="checkbox"/>	<input type="text"/>
<b>3.2 Meter Position</b>			
<u>3.2.1 (General Requirements for Meter Position)</u>			
<u>3.2.1.1</u>			
The following practice should be adopted in plumbing works design for meter positions:-	E	<input type="checkbox"/>	<input type="text"/>

(a) fitting at meter position shall facilitate easy installation and removal of the water meter without the need to work on other pipe

(b) when sump and pump system is adopted and the meters are sited on convenient locaitons at roof level, the sump and pump system (including a sump tank and a roof storage tank) shall be fitted before meter position

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### 3.2.1.2

(a) For 15mm meter

(i) 20mm x 15mm bushes, or reducers at both sides of the meter position

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(ii) 200mm (clear effective length) distance piece of 15mm tube placed in between

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(iii) a long screw connector is provided immediately after the brush or reducer at the delivery side

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(b) For all meter size,

(i) the meter position shall also be provided similarly to 15mm meter with corresponding fittings and appropriate sizes.

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(ii) the length of distance piece should be referred to Figure 4 of the TR

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### 3.2.1.3

If a section of copper pipe is used either before or after a water meter position, that section of copper pipe between the water meter position and the first pipe clamp is jointed by screwed or flanged joints.

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### 3.2.1.4

PVC-U fittings shall be used at the meter position if PVC-U materials are used as inside services. Brass longcrew (connector) shall be used at TMF position. Brass fittings shall be used at the meter position if copper, lined galvanized steel or thermo-plastic materials are used as inside service.

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## 3.2.2(Architectural and M&E Requirement for meter room)

### 3.2.2.1

All water meters, including vacant meter positions and check meter positions, shall be arranged in groups of more than one meter positions and housed in meter rooms / boxes / cabinet / chamber.

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### 3.2.2.2

(a) The meter rooms/boxes/cabinets/chambers shall be designed solely for housing water meters to protect them against exposure to weather, falling objects and other undue external interferences and to facilitate reading and maintenance of water meters.

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(b) When preparing VPLD submission, the applicant shall submit the layout and elevation plans of the meter rooms/boxes with dimensions, including the width and height of the entrances (door openings in case of meter boxes) for the Water Authority's approval.

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### 3.2.2.3

No other building services such as drainage systems, fire hoses, M&E installations (equipment, cables and ducting, etc.) shall pass through or be placed inside the meter rooms/meter boxes/master meter rooms except lighting, ventilation, drainage, and smart metering if required by the WA etc., solely to facilitate meter reading and maintenance of water meters.

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3.2.2.4

The following architectural requirements shall be met:-

(a) (i) For meter rooms, the minimum distance between the outward face of the meter group and the wall/door opening directly opposite the meter group shall be 1000mm and there shall be no obstacles in between.	E	<table><tr><td></td><td></td></tr></table>		
(a) (ii) If the door to the meter room is to be opened at an inward position and it is at the opposite side of the meter group, the minimum perpendicular distance between the outward face of the meter group and the door (the point on the door that is nearest to the meter group) when it is fully opened is 600mm	E	<table><tr><td></td><td></td></tr></table>		
(b) (i) Minimum clear width of the door entrance to the meter room is 800mm	E	<table><tr><td></td><td></td></tr></table>		
(b) (ii) Maximum clear height of the door entrance to the meter room is 2000mm	E	<table><tr><td></td><td></td></tr></table>		
(b) (iii) Maximum clear depth of meter boxes measured from the outside face is 800mm	E	<table><tr><td></td><td></td></tr></table>		
(c) An entrance located at communal area for safe, free, and uninterrupted access to the meter room/box/cabinet/chamber shall be provided.	E	<table><tr><td></td><td></td></tr></table>		
(d) (i) Checked all door(s) to the meter room/box/cabinet and confirmed no self-closing device on it.	E	<table><tr><td></td><td></td></tr></table>		
(d) (ii) The lock of the door to the meter room is located at a level between 0.9m to 1.1m above the finished floor level.	E	<table><tr><td></td><td></td></tr></table>		
(d) (iii) Door to the meter room is equipped with handle either in the form of long cylindrical or spherical shape. Covered or flat sectioned handles shall not be used.	E	<table><tr><td></td><td></td></tr></table>		
(e) Outside of the door(s) to the meter room/box is clearly marked 「水錶」, "Water Meters" in both Chinese and English of font size not less than 30mm	E	<table><tr><td></td><td></td></tr></table>		
(f) If there are more than one water meter room/box/cabinet inside a building block, master-key locks are used at all meter rooms/boxes/cabinets.	E	<table><tr><td></td><td></td></tr></table>		
(h) Meter rooms/boxes inside market/commercial complex are positioned in areas with clear access and with no obstruction.	E	<table><tr><td></td><td></td></tr></table>		

3.2.2.5

(a) (i) Minimum illumination at meter positions is 120 lux.	E	<table><tr><td></td><td></td></tr></table>		
(a) (ii) Minimum mechanical ventilation at the meter positions is 6 air-changes per hour.	E	<table><tr><td></td><td></td></tr></table>		
(b) Provision of adequate drainage inside the meter room and the meter box positioned at floor level	E	<table><tr><td></td><td></td></tr></table>		

3.2.3 (Permanent Display Board showing water meter details)3.2.3.1

(a) Upon completion of the water meter installation, the Licensed Plumber (LP) shall install a permanent display board at the wall/door inside the meter room/box.	E	<table><tr><td></td><td></td></tr></table>		
(b) Top of the board shall not be higher than 1800 mm above the floor level	E	<table><tr><td></td><td></td></tr></table>		
(c) Bottom of the board shall not be lower than 500 mm for an individual meter above the floor level	E	<table><tr><td></td><td></td></tr></table>		
(d) This display board is constructed of durable plastic or corrosion-resistant plate	E	<table><tr><td></td><td></td></tr></table>		
	E	<table><tr><td></td><td></td></tr></table>		

(e) Words in block letters and diagrams on the display board are in black on light colour background with font size of standardized font type and be not less than 18 points (i.e. 7 mm in height).

(f) Details of this display board are submitted by the applicant as part of the VPLD

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### 3.2.4 (Mounting Height of Water Meters in Meter Rooms/Boxes)

#### 3.2.4.1

(a) For meters arranged in groups and meters installed inside meter boxes and cabinets, no meter position shall be lower than 300 mm nor higher than 1500 mm above the floor level

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(b) For projects where corridor meter arrangement is chosen and accepted, individual meter positions shall be at a suitable height not less than 750 mm but not more than 1500 mm above the floor level.

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(c) Minimum clearance should be provided for meters of trade supply according to Fig. 36.

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### 3.2.6 Location of Water Meter at Landscape Areas

#### 3.2.6.1

For a meter installed in a landscape area, it should be installed above ground level. In case the meter is installed in a meter box/cabinet, there shall be a proper working space in front of the meter box/cabinet with a clear working headroom not less than 2m.

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#### 3.2.6.2

A safe pedestrian access to the meter position should be provided.

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## **3.3 Master Meter and Check Meter**

### 3.3.2 Principles of Master Meters Provision

#### 3.3.2.1

Master meter(s) shall be provided to fresh water and TMF inside service and fire service of all new developments with more than 1 building block, regardless of the total length of underground buried and concealed pipes.

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### 3.3.3 Sub-meters provision for buried fresh water inside service and fire service

#### 3.3.3.2

(a) (i) Sub-meter chambers with check meter positions shall be provided at underground branch mains on a building-cluster basis except for developments with 5 or less building blocks of the same type only.

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(a) (ii) Each building-cluster shall not include more than 5 building blocks of the same type in general.

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(b) For typical configuration of master meter and sub-meter chambers in a multiple-block development, Fig. 24 of TR shall be referred.

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(c) For details of sub-meter chambers, Fig. 25 of TR shall be referred.

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#### 3.3.3.3

The installation of sub-meter chambers for TMF inside service are not required.

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#### 3.3.3.4

Construction of a separate sub-meter chamber at a branch main is not required if:

- (i) the check meter room inside a building block is located less than one straight pipe length of 6m from the tee-connection; or
- (ii) all the pipework between the tee-connection and the building block is exposed.

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### 3.3.4 Arrangements of Master Meter

#### 3.3.4.1

One master meter shall be installed for each FW/TMF/FS inlet pipe supplying a development site at the lot boundary irrespective of the number of connection points to the government mains.

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#### 3.3.4.4 to 3.3.4.6

(a) In general, a minimum straight pipe lengths immediately upstream and downstream of a master meter or check meter shall be provided to ensure accuracy of master meters and check meters.

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(b) (i) Electromagnetic type master meters would be used for pipe diameter larger than or equal to 80mm.

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(b) (ii) The straight pipe length upstream and downstream shall not be less than 3 and 2 times the nominal diameter of the master meter respectively.

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(c) For master meters with pipe diameter less than 80mm, the length upstream shall be increased to not less than 5 times the nominal diameter of the master meter.

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#### 3.3.4.9

(a) Master meters of diameter less than or equal to 100mm could be housed in a box or cabinet as shown in Fig. 31 of TR.

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(b) A master meter room will be required for master meters larger than 100mm in diameter.

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#### 3.3.4.10 to 3.3.4.12

(a) If the water main is to be laid underneath private roads which is scheduled to be handed over to government within 5 years after completion, master meters shall be installed for each FW/TMF/FS inlet pipe supplying each group of buildings/podia at their respective boundaries. On top of this, master meters are also required at the estate's boundary as illustrated in Fig. 24 of TR.

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(b) If the handover is scheduled beyond 5 years after completion, the said master meter positions mentioned in Clause 3.3.4.10 are still required, except the positions are temporarily bridged over by short pieces.

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#### 3.3.4.12

Fire service needs to be separated from the potable supply right at the lot boundary.

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#### 3.3.4.13

Architectural and M&E requirements for the master meter room shall comply with the requirements in Sections 3.2.2.4 and 3.2.2.5. However, applicant may request for relaxation of the requirement with justifications and flexibility may be allowed at the discretion of the Water Authority.

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3.3.4.14

A strainer shall be installed upstream of all master meter.

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3.3.5 Check Meter Requirement3.3.5.1

A check meter position shall be provided close to the end of the underground communal service supplying a building block for all fresh water and flushing water inside service and fire service.

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3.3.5.2, 3.3.5.3 and 3.3.5.4

(a) The check meter position shall be located at accessible communal areas for ease of meter reading and maintenance at all times.

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(b) For check meter position to be mounted in a cabinet, horizontally perpendicular and longitudinal working clearances at each check meter position shall be provided. Table 3.3.5.3.1 stipulated the minimum horizontally perpendicular working clearance, meaning the shortest distance between the longitudinal centre line of the check meter position and a wall or any edge of a door when opened.

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(c) Minimum longitudinal working clearances of 200mm between both end of meter flanges of the check meter position and a wall or any obstruction

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## Checklists for Vetting Plumbing Proposal - New Building

### Chapter 4 - Inside Service

**Type:** S = Statutory Requirements  
E = Essential for approval of works

# Referring to the clauses in Technical Requirements for Plumbing Works in Buildings (TR). You may cross out the clauses if not applicable

^ Please✓ as appropriate

	Type	Checked^	Remarks
<b><u>#4.1 Pipe &amp; Fitting Materials*</u></b>			
<b><u>4.1.1 General</u></b>			
<b><u>4.1.1.1</u></b>			
Pipes and fittings shall conform to the relevant standards as listed in Part B of TR and the WWR.	E	<input type="checkbox"/>	<input type="text"/>
<b><u>4.1.2 Requirements of Minimum Pipe Sizes</u></b>			
<b><u>4.1.2.1</u></b>			
A pipe must not be less than 20mm in diameter, except that a branch pipe may be of 15mm or more in diameter if the pipe length is not longer than 3m and the pipe supplies only one draw-off point.	S	<input type="checkbox"/>	<input type="text"/>
<b><u>4.2 Fresh Water Supply</u></b>			
<b><u>4.2.1 General Requirements</u></b>			
<b><u>4.2.1.1</u></b>			
All fresh water supplies to inside service, including TMF, shall be metered.	S	<input type="checkbox"/>	<input type="text"/>
<b><u>4.2.1.2</u></b>			
(a) All domestic supplies and concessionary supplies shall be separately metered.	E	<input type="checkbox"/>	<input type="text"/>
(b) For different applications of concessionary supplies, Section 4.2.5 of TR shall be referred.	E	<input type="checkbox"/>	<input type="text"/>
<b><u>4.2.1.3 and 4.2.1.4</u></b>			
(a) Not Used.	S	<input type="checkbox"/>	<input type="text"/>
(b) Not Used.	S	<input type="checkbox"/>	<input type="text"/>
<b><u>4.2.2.2</u></b>			
Fresh water supply to buildings with an overall height of more than 12m shall be supplied solely by indirect supply systems as illustrated in Fig. 6 (i.e. a sump and pump system, a hydro-pneumatic pump system) or any equivalent system as approved by the WA for all floors. [applicable to new applications with Form 132 submitted on or after 1 September 2018 or with Form WWO 542 submitted on or after 1 January 2019 only.]	E	<input type="checkbox"/>	<input type="text"/>
<b><u>4.2.3 Backflow/ Cross-connection Prevention</u></b>			
<b><u>4.2.3.1 Protection of Water Supplies</u></b>			



4.2.3.1.1

All water supply systems shall be designed, installed, and maintained in order to prevent contaminants from being introduced into the fresh water supply systems.

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4.2.3.1.2

No device or system that may cause contamination of a water supply shall be connected directly or indirectly to any part of an inside service without appropriate cross-connection prevention or backflow prevention control suitable for the level of hazard.

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4.2.3.3 Provision of Backflow Prevention Devices4.2.3.3.1

(a) The fresh water supply shall be protected from the hazard(s) by installing appropriate device listed in Table 4.2.3.7.1.

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(b) Hazard ratings for some typical installations are listed in Table 4.2.3.7.2 for reference.

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4.2.3.3.2

Backflow prevention devices shall comply with the latest BS EN 1717 and all relevant standard(s) for the devices.

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4.2.3.4 Water Downstream of Backflow Prevention Device4.2.3.4.1

Piping conveying water downstream of backflow prevention device, installed for high or medium hazard protection, shall be clearly and permanently labelled 'WARNING! NOT FOR DRINKING' at every outlet.

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4.2.3.5 Commissioning and Maintenance4.2.3.5.2

If backflow prevention devices applicable to high hazard cases, e.g. backflow preventer/reduced pressure zone valve etc., they shall only be used with a maintenance program. If such program is unavailable, the backflow prevention devices shall not be fitted and break tank shall be provided.

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4.2.3.6 Backflow Prevention Device in Hot Water Systems4.2.3.6.1

The backflow prevention device used in hot water systems shall be suitable for the specific hot water installation.

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4.2.3.7 Backflow Prevention Device and Hazard Levels for Applications4.2.3.7.1

Tables 4.2.3.7.1 and 4.2.3.7.2 shall be referred commonly used backflow prevention devices and hazard levels for different applications. For concessionary water supplies, Clause 4.2.5.2 shall be referred.

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4.2.4 General Pipework Arrangement4.2.4.1

(a) All plumbing works between the lot boundary and any master meter or check meter positions shall be exposed or laid in a proper service trench/duct to facilitate inspection and repairs.

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(b) Adequate drainage shall be provided to remove water inside the trench/duct.

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4.2.4.2

If the connection is not laid in an exposed manner at the lot boundary, then it shall be laid inside underground service trench/duct with adequate cover. The underground/buried water mains should be laid with cover according to the latest required minimum depth of services and associated installations stipulated by Highways Department.

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4.2.4.3

No water pipe shall be embedded within load bearing structural elements in longitudinal direction. Such structural elements include, but not limited to, columns, beams and slabs. Screeding above slabs should not be considered as structural elements. Hence, water pipe embedded in screeding is acceptable. The water pipe in screeding shall be considered as embedded pipes.

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4.2.4.5

Tee-branch valve has been provided in

(a) all underground water pipes and for all communal inside service; and

(b) shall be located close to the main pipe

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4.2.4.6

(a) Sufficient cleansing taps shall be provided at each floors of car parks of a building

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(b) If it is not part of the cleansing supply system of the building, the cleansing supply at the car park shall be given from a fresh water cistern with a separate meter.

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4.2.4.7

No draw-off point in the inside services shall be subject to a excessive pressure of 6 bar or above.

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4.2.4.9 & 4.2.4.10

(a) For new sump and pump systems, a standby pumpset shall be provided.

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(b) The existing sump and pump system shall be provided with a standby pumpset unless this proves to be impracticable.

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4.2.5 Concessionary Usage of Mains Water4.2.5.1

Concession usage of mains water are for the purpose listed in Clause 4.2.5.2

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4.2.5.2

Compliance with the concessionary usages and requirements in this clause

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4.2.5.4

Draw-off tap that is freely accessible by the general public should be kept under lock and key.

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4.2.5.4a

If an automatic irrigation system is used. Off-tank supply is required.

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4.2.5.5

Installation of water points for internal cleansing of open yards and for other miscellaneous domestic purposes in private houses of bungalow type or the like can be permitted as part of the domestic supply. This will not be taken as a concessionary supply. It is not necessary to install any receptacle for this type of water points.

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#### 4.2.6 Metered Supply for Other Purposes

##### 4.2.6.2 Supply for Temporary Structures and Modified/Converted Structures

###### 4.2.6.2.2

The premises shall have separate access, proper drainage system and bear a proper postal address.

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##### 4.2.6.3 Water Supply for Cooling / Air-conditioning / Humidification Purposes

###### #4.2.6.3.1

Water supply shall not be used for any heating, cooling or humidification purposes except with the approval of the WA. Either fresh or salt mains water supply may be given for cooling / air-conditioning / humidification purposes if the system designed belongs to one of the categories specified in this clause

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###### #4.2.6.3.3

The application of mains water in evaporative type plants for purposes other than industrial process is limited to those cases where the cooling / air-conditioning / humidification system(s) is/ are critical for normal operation. The type of evaporative plant used should be of an enclosed design, so that wastage of water due to splashing is prevented.

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###### 4.2.6.3.4

Prior to the installation of the fresh water cooling towers, applicants should apply for participation in the 'Fresh Water Cooling Towers Scheme' (FWCT Scheme) for air-conditioning systems administered by the Electrical and Mechanical Services Department (EMSD). The participation in the FWCT Scheme should comply with the requirements stipulated in the 'Code of Practice for Fresh Water Cooling Towers' promulgated by EMSD and the requirements of WSD

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#### 4.2.7 Hot Water Systems

##### 4.2.7.1 Non-Centralized Hot Water System

###### 4.2.7.1.1

When the factory test pressure of the heater is at least 1.5 times the maximum static pressure at the mains water supply point, non-pressure type heaters, cistern type water heaters, unvented electric thermal storage water heaters satisfying the requirements stipulated in Clauses 4.2.7.1.12 and instantaneous water heaters are permitted to be connected direct to the supply pipe without the necessity of providing storage.

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###### 4.2.7.1.2

When the factory test pressure of the heater is less than 1.5 times the maximum static water pressure at the mains water supply point then, for premises on direct supply, a water heater must be supplied with water from a cold water cistern.

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###### 4.2.7.1.3

A separate mains water storage cistern of 45 litres capacity shall be provided for each flat to supply such hot water apparatus in Clause 4.2.7.1.2.

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4.2.7.1.4

Pressure type thermal storage heaters other than unvented electric thermal storage water heaters satisfying the requirements stipulated in Clauses 4.2.7.1.12 shall be supplied from storage cisterns no matter what the pressure at inlet point should be, except these are installed in flats supplied through the indirect or sump and pump system.

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4.2.7.1.5

For premises on direct supply, a separate mains water storage cistern of 45 litres capacity shall be provided for each flat to supply such hot water apparatus in Clause 4.2.7.1.4.

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4.2.7.1.6

For flats supplied from the roof storage cistern of an indirect or sump and pump system, no separate storage for hot water apparatus will be required but the supply to the apparatus shall be by a separate down feed supplying the apparatus only unless the arrangement in Clause 4.2.7.1.7 is applied.

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4.2.7.1.7

If the flats on the indirect system are supplied through an oversized down feed pipe, the pipe supplying the hot water apparatus shall be branched from the down feed at a point above the top of the apparatus.

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4.2.7.1.8

When gas geysers are to be installed on the top floor of a building supplied through storage cisterns, gas geysers with low pressure governors should be installed when the head available is less than 5 metres to the highest hot water draw-off point.

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4.2.7.1.9

If mixing valves, water blenders or combination fittings are to be used, the cold water supply to these fixtures shall be drawn from the same source as is supplying the hot water apparatus. In order to provide a balanced pressure and to obviate the risk of scalding should the supply at the source fail or be restricted for any reason.

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4.2.7.1.10

All pressure type thermal storage heaters shall be provided with a vent or expansion pipe taken from its highest point and discharge in the atmosphere above the storage cistern at sufficient height to prevent a constant outflow of hot water therefrom except for unvented electric thermal storage water heaters satisfying the requirements stipulated in Clauses 4.2.7.1.12 and 4.2.7.1.13 of TR.

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4.2.7.1.11

A loose jumper type valve shall be fitted on the inlet of the water heater if a non-return valve is not incorporated in such water heater, but this requirement does not apply to an electric water heater of the thermal storage type satisfying the requirements stipulated in Clauses 4.2.7.1.12 and 4.2.7.1.13 of Part A of TR.

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4.2.7.1.12

All unvented electric thermal storage water heaters shall comply with the safety requirements under the Electrical Products (Safety) Regulation (Cap. 406 sub. leg.)

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#### 4.2.7.1.13

Every system incorporating an unvented electric water heater of the thermal storage type shall be provided with:-

- (a) a supply pipe that branches off from the feed pipe at a point above the top of the water heater, or some other device to prevent the water from draining down from the water heater if there is a failure at the source of water supply;
- (b) an anti-vacuum valve or some other device to prevent heated water from being syphoned back to the supply pipe; and
- (c) a vessel to accommodate the expansion of heated water where that expansion is constrained by a non-return valve or some other device, incorporated at the inlet of the water heater.

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#### 4.2.7.2 Centralized Hot Water System

##### 4.2.7.2.1 & 4.2.7.2.2

(a) The cold water feed pipe from the roof storage cistern shall supply the hot water system only

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(b) The cold water feed pipe from sump tank with booster pump shall also be the same source for the hot water system.

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##### 4.2.7.2.3

(a) If mixing valves, water blenders or combination fittings are to be used, the cold water supply to these fixtures shall be drawn by a separate down feed from the hot water storage cistern.

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(b) This outlet from storage tank shall be slightly lower than the feed to the hot water system in order to provide a balanced pressure and obviate the risk of scalding should the mains supply fail or be restricted.

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##### 4.2.7.2.4

(a) All centralised hot water systems utilising a boiler and cylinder, or calorifer, shall be provided with an expansion pipe taken from the highest point of the cylinder or calorifer, or if a secondary circulation system, from the highest point of such system.

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(b) In either case the expansion pipe shall discharge to the atmosphere above the storage cistern at sufficient height to prevent a constant outflow of hot water therefrom.

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##### 4.2.7.2.5

No safety valves, air valves or relief valves be used as a substitute or replacement for an expansion pipe.

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##### 4.2.7.2.6

No control valve be installed on the expansion pipes between the highest point of the cylinder or calorifer, and the free end of such pipes

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##### 4.2.7.2.7

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When a centralised hot water system of the boiler /cylinder or calorifer type is installed, in addition to the vent pipe as required in Clause 4.2.7.2.4 of TR, A safety valve or pressure relief valve shall be provided to the boiler or to the primary flow pipe as close to the boiler as possible. Such valve shall be set to discharge when the pressure in the boiler exceeds 35kPa above that of the static pressure of the system.

#### 4.2.7.2.8

No tap or other means of drawing off water, (other than a screwed plug with a removable key for emptying the system for cleansing and repair), shall be connected to any part of the hot water system below the top of the hot water cylinder in such a way that the level of the water in cylinder can be lowered.

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#### 4.2.7.2.9

In a hot water system comprising more than one storage cylinders at different levels, Clause 4.2.7.2.8 should read as applying to the lowest cylinder.

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#### 4.2.7.2.10

To avoid wastage of water when repairs are being effected, a stop valve shall be fitted on the cold feed pipe at the outlet from the storage cistern.

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#### 4.2.7.2.11

If the storage cylinder is installed in a lower floor, an additional stop valve shall be fitted near the inlet to the cylinder.

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#### 4.2.7.2.12

Such stop valve shall have loose keys or hand-wheels which shall be kept in a safe place to prevent unauthorised interference.

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#### 4.2.7.2.13

A screwed plug with a removable key shall be provided at the lower part of the system for the purpose of draining down or emptying the system.

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#### 4.2.7.2.14

No stop valve shall be installed in the primary flow or return pipes except when a vent pipe is connected to the boiler and such installation shall only be made under skilled supervision.

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#### 4.2.7.2.16

Installation of boilers/ steam boilers shall comply with the relevant Boilers and Pressure Vessels Regulations [HK Law Chapter 56].

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#### 4.2.7.2.17

Temperature and pressure relief valve, air vent and vacuum breaker shall be provided to hot water storage tanks and calorifers.

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### **4.3 Flushing Water Supply**

#### 4.3.1 Sources of Flushing Water Supply

##### #4.3.1.1

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For inside service using government water supply for flushing, it shall comply with the requirements of the WWO/WWR and that of the WA.

### 4.3.2 Pipe and Fitting Materials

#### 4.3.2.1

All water tanks, pipes and fittings of flushing water systems must be of salt water resistant materials to the approval of the WA. Pipes and fittings shall conform to the relevant standards as listed in Part B of TR and the WWR.

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### 4.3.3 Metering Requirements

#### 4.3.3.1

All flushing water supply systems shall be separate water supply systems.

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#### 4.3.3.3

Water meter shall be installed in each flushing system receiving a TMF supply. TMF flushing water supply would normally be given to the entire building t Requirements stipulated in Section 3 of this TR is applicable.

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#### 4.3.4.2

Flushing water supply to buildings with an overall height of more than 12m shall be supplied solely by indirect supply systems with a sump and pump system as illustrated in Fig. 14 or any equivalent system as approved by the WA for all floors. [applicable to new applications with Form WWO 132 submitted on or after 1 September 2018 or with Form WWO 542 on or after 1 January 2019 only.]

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### 4.3.5 General Pipework Arrangement

#### #4.3.5.1

Under the provision of Buildings Ordinance (Chapter 123), all new buildings shall be provided with a plumbing system to supply water for flushing purposes and every part of such plumbing system, including the storage tank, shall be constructed of such materials that are suitable for use with salt water.

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#### 4.3.5.2

A separate water storage tank shall be provided for flushing purpose

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#### 4.3.5.3

The inlet pipe to the separate storage tank should not be less than 40 mm diameter; its portion before meter position shall be exposed or laid in a proper service duct and extended to the lot boundary.

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#### 4.3.5.4

To facilitate meter installation, a meter position shall be provided in the communal area of the building as close to the fresh supply meters as possible. Regarding general requirements for meter positions, Section 3.2 of Part A of TR shall be referred.

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#### 4.3.5.5

In case a temporary mains fresh water supply is proposed to be provided as the alternative source to augment an existing independent (not Government) supply, the storage tank for the flushing cistern shall be constructed in accordance with Fig. 15.

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4.3.5.6

No draw-off point in the inside services shall be subject to pressure of 6 bar or above. E

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4.3.5.7

A tee-branch valve shall be provided for all underground flushing water pipes, and for all pipe serving more than one domestic or commercial unit. E

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4.3.5.8

Concerning requirement for flushing water storage capacity, Clause 6.2.5 shall be referred. E

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**4.4 Pipework for Inside Services in New Reclamation Area**4.4.1

In choosing the material for pipes and fittings, the type of the water to be conveyed and the nature of the ground which the pipes are to be laid shall be taken into account. E

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## Checklists for Vetting Plumbing Proposal - New Building

### Chapter 5 - Fire Service

**Type:** S = Statutory Requirements  
E = Essential for approval of works

# Referring to the clauses in Technical Requirements for Plumbing Works in Buildings (TR). You may cross out the clauses if not applicable

^ Please✓ as appropriate

	Type	Checked^	Remarks
<b><u>#5.1 General</u></b>			
<b><u>5.1.3</u></b>			
Plumbing systems using government water supply for fire services shall comply with the requirements of the WA.	E	<input type="checkbox"/>	<input type="checkbox"/>
<b><u>5.1.4</u></b>			
The use of water from fire service for purposes other than firefighting is prohibited.	S	<input type="checkbox"/>	<input type="checkbox"/>
<b><u>5.2 Metering Requirements</u></b>			
<b><u>5.2.1</u></b>			
Details of master meter and check meter positions shall be referred to Section 3.3.	E	<input type="checkbox"/>	<input type="checkbox"/>
<b><u>5.3 Pipe Materials</u></b>			
<b><u>5.3.1</u></b>			
Pipe and fittings shall conform to the relevant standards as listed in Part B of TR and the WWR.	E	<input type="checkbox"/>	<input type="checkbox"/>
<b><u>5.3.2</u></b>			
Consideration can be given for the use of wrought iron pipe and black steel pipe without being galvanized, upon application, for a fresh water fire service after a positive air break, i.e. fire service tank or sump tank.	E	<input type="checkbox"/>	<input type="checkbox"/>
<b><u>5.3.3</u></b>			
The materials for pipes and pipe fittings on a salt water fire service shall be capable of withstanding the corrosive effect of salt water.	E	<input type="checkbox"/>	<input type="checkbox"/>
<b><u>5.4 Supply Types and Arrangements</u></b>			
<b><u>5.4.1 General</u></b>			
<b><u>5.4.1.1 and 5.4.1.2</u></b>			
(a) Fire service supply may be from fresh water or salt water source. The supply must be from an independent connection, i.e. entirely independent of other water supply arrangements within the building or development concerned.	E	<input type="checkbox"/>	<input type="checkbox"/>
(b) For existing buildings, fire service installations obtaining water supply from existing fresh water tanks may be considered case-by-case by the WA and the Director of Fire Services.	E	<input type="checkbox"/>	<input type="checkbox"/>
<b><u>5.4.1.4</u></b>			
	E	<input type="checkbox"/>	<input type="checkbox"/>

(a) All plumbing works between the lot boundary and master/check meter positions shall be exposed or laid in a proper service trench/duct to facilitate inspection and repairs.

(b) Adequate drainage shall be provided to remove water inside the trench/duct.

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#### 5.4.1.5

If the connection is not laid in an exposed manner at the lot boundary, then it shall be laid inside underground service trench/duct with adequate cover. The underground/buried water mains should be laid with cover according to the latest required minimum depth of services and associated installations stipulated by Highways Department.

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#### 5.4.1.6

A fullway gate valve and a non-return valve have to be installed on the fire services as close to the Government water supply connection as possible.

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### 5.4.2 Sprinkler/Drencher System

#### 5.4.2.2

Connection of Sprinkler / Drencher System

(a) For system situated in the recognised Waterworks unrestricted industrial supply, a dual connection from the Government unrestricted supply ring will be provided.

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(b) For a system outside the recognised Waterworks unrestricted industrial supply, twin connection, one from an unrestricted supply and one from a distribution will be provided.

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#### 5.4.2.3

Where it is not practical to connect the fire services sprinkler / drencher system to an unrestricted supply main:

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Fire Services Department may require the provision of fire service tank to serve as secondary source for the fire service installation. Dependent upon Fire Services Department's requirements, a single or dual connection can be given to serve the fire service tank of secondary source.

#### 5.4.2.4

Usage of supplies to fire services / drencher system

(a) No part of any fire service sprinkler / drencher system supplied from the Government mains shall be used for supplying any other services including other fire service installations, e.g. hose reels, except that a common suction tank can be used for both sprinkler / drencher and hose reel systems.

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(b) Any exemption from requirement in 15(a) should have the endorsement of the Director of Fire Services

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#### 5.4.2.5

Where direct connections to sprinkler / drencher system are to be from the Government mains, an additional butterfly valve, without stop screw and lock nut on handle and strapped in open position, shall be installed at a point on the supply pipe before the fire service inlet and as close as possible to the control valves of the connections.

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#### 5.4.2.6

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FSD's endorsement shall be sought for the application for improvised sprinkler systems.

### 5.4.3 Fire Hydrant/Hose Reel System

#### 5.4.3.1

(a) Supply to hydrant / fire hose reel outlet must not be fed directly from the Government mains.

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(b) Fire hose reel outlets

(i) Fire hose reel outlets shall be housed in glass-fronted cabinets secured under lock and key.

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(ii) The glass panel shall:

(1) be of a frangible type;

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(2) not exceed 1.5mm in thickness;

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(3) be of such size and design so as not to cause any undue obstruction to the free use of hose reel.

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(iii) A metal or plastic striker shall be provided in the vicinity of the cabinet

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#### 5.4.3.2

(a) Common tank arrangements for fire-fighting and flushing or other purposes are not acceptable when a Government supply is involved.

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(b) Where a building is to be provided with a non-Government flushing supply and where it is proposed to feed the fire service from that supply, the developer is advised to install an independent fire service system if it is envisaged that the fire service system may require to be connected to the Government mains at a later stage.

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#### 5.4.3.3

Warning message shall be securely fixed on or near every hose reel outlet and the message shall be easily visible by the occupier.

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### 5.4.5 Fire Service Ring Mains

#### 5.4.5.1

Fire service ring main in a large industrial complex shall be connected to an unrestricted supply main, if practical. In case this is not practical, a "dual" connection from the Government ring main shall be given.

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#### 5.4.5.2

Fire service ring mains shall not be connected to or used for supplying any other service, except with the approval of the Water Authority.

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### 5.4.7 Installation of Sprinkler System for SCB/PCP and Composite Buildings

#### 5.4.7.2

For applications to install the improvised sprinkler systems stated in (b) and (c) in Clause 5.4.7.1, endorsement and referral from the FSD must be provided when applying for water supply from WSD.

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## Checklists for Vetting Plumbing Proposal - New Building

### Chapter 6 - Water Cisterns, Water Pumps and Other Miscellaneous

**Type:** S = Statutory Requirements  
E = Essential for approval of works

# Referring to the clauses in Technical Requirements for Plumbing Works in Buildings (TR). You may cross out the clauses if not applicable ^ Please ✓ as appropriate

	Type	Checked <sup>^</sup>	Remarks
<b>#6.1 General</b>			
<b>6.1.1</b>			
No cistern for the storage of cold water shall be installed or used except with the permission in writing of the Water Authority who shall specify the maximum permitted capacity.	S	<input type="checkbox"/>	<input type="text"/>
<b>6.1.2</b>			
No cistern for the storage of fresh water supplied from the waterworks shall, without the written permission of the WA, be so connected that it can be used for the storage of any water other than that supplied from the waterworks.	S	<input type="checkbox"/>	<input type="text"/>
<b>6.2 Cold Water Cisterns (or Cold Water Tanks)</b>			
<b>6.2.1 Location</b>			
<b>6.2.1.1 Access for Maintenance and Inspection</b>			
<b>6.2.1.1.1</b>			
Water Storage Tanks shall be installed so that they are easily accessible for cleaning or repairs.	S	<input type="checkbox"/>	<input type="text"/>
<b>6.2.1.1.2</b>			
Safe access shall be provided to all cisterns by means of a secure permanent ladder or readily available portable ladder.	S	<input type="checkbox"/>	<input type="text"/>
<b>6.2.1.1.3</b>			
Where a cistern is installed inside a building and, due to limited headroom available, it is fixed with limited clearance from the ceiling or underside of the roof, a quickly detachable fitting must be used to enable it to be easily removed for cleansing and repair.	S	<input type="checkbox"/>	<input type="text"/>
<b>6.2.1.1.4</b>			
For a water cisterns with top access, the access on top of the cisterns should have a minimum headroom of 800mm.	E	<input type="checkbox"/>	<input type="text"/>
<b>6.2.1.2 Protection against Pollution of Potable Water by Non-Portable Meter</b>			
<b>6.2.1.2.1</b>			
If a cistern for non-potable water is placed adjoining to a cistern for potable water, a physical break must be provided between the cisterns, such that the walls and slabs of the cisterns are separated, however, tie beams linking the cisterns for structural requirements may be fitted and, if fitted, must be constructed in a way that cross contamination of the cisterns via the tie beams is not possible.	S	<input type="checkbox"/>	<input type="text"/>

## 6.2.2 Material Requirements

### 6.2.2.1

A cistern must be watertight, of adequate strength, properly supported and be made of concrete, stainless steel or fibre glass.

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### 6.2.2.2

For concrete fresh water cisterns/storage tank, all internal surface of floors, walls (to full height) and soffits (except the cistern openings) of potable water storage cisterns should be lined with a white non-toxic smooth finish such as ceramic tiles for cleaning purpose.

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### 6.2.2.4

When fibreglass storage tank is to be used, prior approval by the Water Authority must be sought. Fibreglass storage cistern for potable water shall be of an approved type or certified to contain no toxic materials and suitable for storage of potable water.

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## 6.2.3 Cover for Water Tanks

### 6.2.3.1

A cistern must be so located as to minimize the risk of contamination of stored water and be fitted with a suitable close fittings lockable cover that is not airtight. The cover must be so positioned as to facilitate inspection and cleaning. The covers must be so positioned as to facilitate inspection and cleaning.

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### 6.2.3.2

(a) Every storage cistern shall have a lockable close fitting rigid cover secured by mechanical means which excludes light and the ingress of particles and / or insects from the cistern.

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(b) The cover shall be made of a material or materials which do not shatter or fragment when broken and which will not contaminate any condensate which may form on its underside or the stored water.

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(c) For the potable water storage cistern, the cover and its base frame shall possess double upstand edges interlocking one another to provide additional protection.

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### 6.2.3.3

Double sealed covers with locking devices shall be provided for all storage cisterns other than cisterns that provide supply solely for irrigation, flushing and fire-fighting. The double-sealed covers prevent the ingress of surface water.

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## 6.2.4 Installation Requirements for Inlet and Outlet Pipe

### 6.2.4.2 Controlling Incoming Water Supply

#### 6.2.4.2.1

The inlet of a single cistern fed by a gravity supply must be fitted with a ball float valve and stop valve.

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#### 6.2.4.2.2

(a) For ball float valves of a nominal diameter not exceeding 50mm, their valve bodies must be made of copper alloy or stainless steel.

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(b) For ball float valves of a nominal diameter exceeding 50mm, their valve bodies must be made of copper alloy, stainless steel, epoxy coated cast iron or epoxy coated ductile iron.

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#### 6.2.4.2.3

(a) Floats for use with fresh water must be made of copper alloy or stainless steel.

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(b) Floats for use with salt water must be made of plastic or stainless steel.

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#### 6.2.4.2.4

Ball float valves fitted to a cistern must have the size of the orifice, the size of the float and the length of the lever so proportioned to one another that, when the float is immersed to an extent not exceeding half its volume, the valve is watertight against the highest pressure at which the valve may be required to work.

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#### 6.2.4.2.5

A ball float valve or float-operated valve fitted to a cistern must be

(a) securely fixed to the cistern above the waterline of the float of the valve, and

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(b) must be supported independently of the inlet pipe (unless the inlet pipe is itself rigid and securely fixed to the cistern), in a position that no part of the body of the valve is submerged when the cistern is charged to the overflowing level.

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#### 6.2.4.2.6

(a) If a ball float valve or float-operated valve is provided with a pipe so arranged as to discharge water into a cistern below its overflowing level, an air hole must be provided in the outlet chamber of the valve above the overflowing level.

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(b) The air hole must be of a size sufficient to prevent syphonage of water back through the valve.

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#### 6.2.4.2.7

Ball float valves must not be fitted to a cistern that is used to contain heated water.

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#### 6.2.4.2.8

The inlet of a single cistern fed by a pumped supply must be fitted with an automatic control switch and without any stop valve.

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#### 6.2.4.2.9

(a) The ball valve or control switch shall shut off the supply when the water level is 25mm below the invert of the overflow pipe or the warning pipe if there exists one.

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(b) The invert of the inlet pipe or the face of the outlet nose of the ball valve shall be not less than 25mm above the top of the overflow pipe.

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#### 6.2.4.2.10

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(a) In case of a mixed flushing water supplies, the water tank shall be fitted with a ball float valve with submerged float control and a fullway gate valve for controlling and isolating the inflow of mains supply respectively.

(b) For other source of flushing water supply, a ball float valve and a fullway gate valve shall be provided.

(c) Performance of the ball float valve shall meet the requirements specified in case of gravity supply.

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### 6.2.4.3 Outlet Water Pipes

#### 6.2.4.3.1

The invert of an outlet pipe from a water storage tank with capacity less than 5000 litres shall be at least 30 mm above the bottom of the tank; this distance shall be increased to 100 mm if the storage tank capacity is 5000 litres or more.

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#### 6.2.4.3.2

A stop valve must be provided at the outlet of a cistern. and provision shall be made for a drain-off pipe to enable the cistern to be emptied.

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#### 6.2.4.3.3

Fullway gate valves shall be used with as the stop valves in Cl. 6.2.4.3.2 at the outlet pipe of every water storage cistern. The drain-off pipe shall be properly plugged or adequate means shall be provided to prevent any unauthorized operation of the control valve at drain-off pipe. If the outlet of a flushing water cistern is of nominal size 50mm or below, a ball valve can be used to substitute the above gate valve.

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### 6.2.4.4 Overflow Pipes and Warning Pipes

#### 6.2.4.4.1

All overflow and warning pipes of potable water storage cisterns shall be constructed of corrosion-resisting material.

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#### 6.2.4.4.2

An overflow pipe shall be at least one commercial size larger than the inlet pipe and shall in no case be less than 25 mm in diameter must be fitted to a cistern and be extended to terminate in a conspicuous position. The overflow pipe must not be connected to a drain or sewer or to the overflow pipe from another cistern.

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#### 6.2.4.4.3

The position of discharge should be in a communal area easily visible and accessible by the occupants.

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#### 6.2.4.4.4

If the overflow pipe is not extended to terminate in a conspicuous position, the overflow pipe shall be installed with an overflow alarm with signal transferred to a 24-hourly manned management office for timely notification. Full justifications for such arrangement shall be provided to the WA for consideration and approval.

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#### 6.2.4.4.5

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In case of mixed flushing water supply as shown in Fig. 15, the overflow shall be twice the diameter of largest inlet or of nominal diameter 40mm, whichever is greater.

#### 6.2.4.4.6

No part of the overflow pipe shall be submerged inside the storage tank

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#### 6.2.4.4.7

A grating and a self-closing non-return flap shall be provided at the overflow pipe outside the storage tank.

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#### 6.2.4.4.9

The warning pipes shall be installed at a level below the overflow pipe and shall be either extended to conspicuous location, i.e. outside of the building periphery for roof tank or outside the pump room for sump tank, or installed with signal transferred to a 24-hourly manned management office.

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### 6.2.5 Size of Storage Tanks for Flushing, Domestic and Trade/Commercial Water Uses

#### 6.2.5.1

The proportion of capacity of sump cistern to roof cistern is recommended to be in the order of 1:3. Otherwise, the designer shall demonstrate that the proposed ratio of sump cistern to roof cistern is capable of fulfilling the designed demand.

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#### 6.2.5.2

The capacity of the flushing water storage shall be designed according to the criteria in Table 6.2.5.2.1 with a minimum capacity of 250 litres. [applicable to new applications with Form WWO 542 submitted on or after 1 January 2019 only.]

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#### 6.2.5.3

Storage criteria for fresh water supply for domestic flats are given in Table 6.2.5.3.1.

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#### 6.2.5.4

For industrial building:

(a) The entire internal services shall be supplied from storage cisterns with separate outlets / downpipes feeding independent systems to serve separately the industrial and processing purposes and the other general and ablution appliances.

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(b) These independence systems serving separately the industrial and processing purposes and the other general and ablution appliances should not be interconnected.

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### 6.2.6 Other Recommendation/Requirement

#### 6.2.6.1

Structural design of the cistern and its supports should be subject to the requirements of the Building Authority.

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#### 6.2.6.2



When the capacity of water cistern exceeds 5000 litres, adoption of twin-tank system is required. The applicability shall also be subject to factors such as availability of plant room space.

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#### 6.2.6.3 to 6.2.6.5

(a) A set of inlet, outlet and associated overflow and drain pipes shall be provided to each cistern compartment.

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(b) Each inlet of a twin-cistern fed by a pumped supply must be fitted with an automatic control switch and a stop valve for temporary isolation purpose.

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(c) For water supplies other than pumped supply, this inlet shall comply with requirements stated in Clause 6.2.4.2.1 of Part A of TR.

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### **6.3 Water Pumps**

#### 6.3.1

(a) Where a sump-and-pump system is used, it shall be provided with a duplicate pumpset.

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(b) The pumping capacity of the pumps shall not be less than the designed out-flow rate of the storage tank being supplied.

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### **6.5 Pressure Reducing Valves**

#### 6.5.1

No part in the internal pipework and/or draw-off point shall be subject to excessive high pressure. In case of excessive high pressure, provision of break pressure tanks at a suitable level of the internal supply system would be a positive and viable means to reduce the water pressure. Alternatively, pressure reducing valves may be provided in lieu of break pressure tank.

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#### 6.5.2

Whenever a pressure reducing valve is installed,

(a) a bypass arrangement shall be incorporated with the provision of a second pressure reducing valve, except for fire service installations, to enable isolation of any defective pressure reducing valve for repair and replacement when necessary;

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(b) A pressure indicator shall be provided for pressure monitoring and the associated pipes and fittings shall be able to withstand the maximum pressure that may arise upon the failure of the pressure reducing valve as far as practicable. Fault alarm shall be installed with signal transferred to a 24-hourly manned management office for timely notification, except for fire service installations.

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### **6.6 Stop Valves for Draw-off Points**

#### 6.6.1

Individual stop valves shall be provided at all draw-off points or at a series of draw-off points if situated close together.

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### **6.7 Water Taps**

#### 6.7.1 Application of Water Taps

##### 6.7.1.1

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When infra-red sensor operated automatic taps are used as inside services, a stop cock or gate valve must be installed at the upstream of each fitting for manual isolation of water supply.

#### 6.7.1.2

Self-closing taps, of non-concussive type and of approved pattern, or infra-red operated automatic taps, shall be used for the public or communal lavatory basins.

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#### 6.7.1.3

Except with the written permission of the Water Authority, fitting with a threaded outlet, or any device facilitating the connecting of rubber hose or another type of flexible hose, must not be used.

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### 6.7.2 Installation Requirements for Sanitary Fixtures Supplied by Water Taps

#### 6.7.2.1

All taps supplying baths, lavatory basins, sinks or similar apparatus shall have a stop valve fixed in a readily accessible position to control the supply to each fitting or branch pipe supplying a range of fittings.

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#### 6.7.2.2

Every inlet to a bath, lavatory basin or sink shall be distinct from, and unconnected with, any outlet therefrom and every outlet for emptying such bath, lavatory basin or sink shall be provided with a well-fitting and easily accessible watertight plug or some other equally suitable apparatus.

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#### 6.7.2.3

The level of the hot or cold water draw-off point to a bath, lavatory basin or sink shall be above the level of the overflow. In the absence of overflow in the fixtures, the top edge of the bath, basin or sink shall be considered instead.

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#### 6.7.2.4

If water supply to any bidets, sitz bath, slop and sluicing sink or similar apparatus is liable to be submerged, the following shall be provided:-

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(a) a storage cistern supplying water to such apparatus only;

(b) a storage cistern for flushing purposes only; or

(c) a hot water distribution system supplying such apparatus only.

## **6.8 Domestic Appliances**

### 6.8.1 Water Purifiers/Filters

#### 6.8.1.2

Domestic water purifiers/ filters must not be connected directly to the mains supply because of the possibility of contamination.

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#### 6.8.1.4

In case further water treatment is needed for special needs, requirements for backflow prevention and written permission from the WA for typical types of water filters are summarized in Table 6.10.1.4.1.

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### 6.8.2 Washing Machines/Dishwashing Machines

6.8.2.2

Washing machines/ dishwashing machines with submerged inlets are considered to have high level of contamination hazard and must be installed with appropriate backflow prevention devices according to Table 4.2.3.7.1.

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**6.10 Flushing Apparatus**6.10.1 General Requirements6.10.1.2

(a) A flushing cistern must in all cases be supplied from a cistern. Except with the written permission of the Water Authority, the cistern must not be used to supply any other apparatus, appliance or fitting.

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(b) The cistern must be fitted with a suitable close fitting cover and provided with appropriate access to enable the cistern to be entered and cleaned.

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6.10.1.3

A trough water-closet or urinal must be fitted with a flushing cistern.

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6.10.1.4

A water-closet fitment or slop sink must be fitted with a flushing cistern. However, a pressure flushing valve may be installed for flushing without the provision of a flushing cistern if there is a suitable head of water.

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6.10.1.5

The internal diameter of flushing pipes shall:-

(a) in the case of water closet fitments, trough water closets and slop sinks, be not less than 30mm;

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(b) in the case of urinals (other than trough urinals), be not less than 15mm for each basin and stall; and

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(c) in the case of trough urinals, be not less than 15mm for every metre thereof.

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6.10.1.6

A flushing apparatus must be operated by mechanical means or a sensor. In the case of an automatic flushing apparatus, the method of control and the volume and frequency of the flushes must be designed to ensure adequate cleaning.

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6.10.2 Flushing Cisterns6.10.2.1

(a) A flushing cistern must be fitted with a flushing device of the valveless syphonic or valve type.

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(b) A stop valve must be fixed in a readily accessible position so as to control the water supply to the cistern.

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6.10.2.2

A flushing cistern for a water-closet fitment or slop sink must be capable of giving a flush of not more than 15 litres of water on each occasion the fitment is used.

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6.10.2.3S 

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The capacity of the flushing cistern in the case of trough water closets and urinals shall be approved by the WA subject to the discharge in the case of trough water closets being not less than 9 litres of water for every metre of the channel and the discharge in the case of urinal being not less than 4.5 litres of water for every basin or stall, or in the case of a trough urinal, every metre thereof.

#### 6.10.2.4

The WA would have no objection to accepting the use of flushing cisterns with discharge less than that required by the current regulations provided that the design flushing volume is compatible with the toilet bowl to ensure effective clearance of waste by a single flush and the flushing apparatus meets the requirements of the WA. [Ref. PNAP APP-99]

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#### 6.10.2.5

A flushing cistern operated by mechanical means or a sensor must be fitted with a ball float valve that is arranged to refill the cistern within 2 minutes.

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#### 6.10.2.6

Every flushing cistern shall have an overflow which shall discharge in a conspicuous location.

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#### 6.10.2.8

The requirements on the use of valve type flushing cisterns are as follows:-

(a) The valve seal of the flushing device shall be easily replaceable.

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(b) A dual flush valve which is designed to give two different volumes of flush shall have a readily discernible method of actuating the flush at different volumes. Such method should be illustrated clearly and permanently displayed at the cistern nearby.

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(c) For dual flush devices, the reduced flushing volume shall not be more than two-thirds of the larger flushing volume.

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(d) The flushing devices must pass the 200,000-cycle endurance test.

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#### 6.10.2.9

The components of all valve type flushing devices shall be of material that is suitable for the use of salt water

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#### 6.10.2.10

For an existing building with permission to use government water supply for flushing purposes, any existing flushing apparatus found unsuitable shall be replaced with a proper apparatus as specified under Section 6.10.

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#### 6.10.2.11

A filter which is readily accessible for inspection and cleaning shall be installed before a flushing valve. This filter can be replaced by a built-in strainer, which can be readily inspected and cleaned, in the flushing device.

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### 6.10.3 Flushing Valves (Flushometers)

#### 6.10.3.1

The installation of flushing valves (flushometers) shall be permitted when the following requirements are fulfilled:-

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(a) A filter/strainer shall be installed before a flushing valve or a group of flushing valves;	E		
(b) The cartridge and other valve components shall be easily replaceable.	E		
(c) Flushing valves shall be used within the range of working pressures specified by the manufacturer.	E		
(d) The flushing devices must pass the 200,000-cycle endurance test.	E		
(e) An effective maintenance management system shall be provided for frequent inspection and cleaning of filters, i.e. normally only public toilets (administered by government, quasi-government bodies, hotel operators, commercial complex management offices etc.) will be considered	E		
(f) A plate etched with the name of the responsible party and the telephone number in both Chinese and English shall be provided to facilitate users to report defective flushing valves. Other effective arrangements may also be considered; and	E		
(g) Flushing valve shall be of water efficiency Grade 1 or Grade 2 under Water Efficiency Labelling Scheme (WELS).	E		

### 6.10.3.2

The valve components shall be of material that is suitable for the use of salt water	S		
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### 6.10.3.3

For an existing building with permission to use mains water (fresh or salt) for flushing purposes, any existing flushing apparatus found unsuitable shall be replaced with a proper apparatus as specified under section 6.10	S	<table><tr><td></td><td></td></tr></table>		

## **6.11 Earthing**

### 6.11.1

Inside service as an earth electrode

(a) The metal work of an inside service shall not be used as an earth electrode.	E	
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## Checklists for Vetting Plumbing Proposal - New Building

### Chapter 7 - Water Conservation

**Type:** S = Statutory Requirements  
E = Essential for approval of works

# Referring to the clauses in Technical Requirements for Plumbing in Hong Kong (TR). You may cross out the clauses if not applicable

^ Please ✓ as appropriate

**Type Checked^ Remarks**

#### **#7.1 General**

##### **7.1.1**

For all proposed plumbing works submitted using the Form WWO 46 for designated part of premises as listed below, the proposed products to be used for shower head for bathing, water tap and urinal flushing valve should comply with prescribed water efficiency grades registered under WELS.

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#### **7.2 Minimum Flow Requirements for Fittings in Inside Service**

##### **7.2.1**

The minimum flow requirements for draw-off taps, single and combination taps shall conform to the specification in the relevant international standards. Relevant standards for respective tapware has been summarized in Part B of TR.

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#### **7.3 Water Efficiency Requirements for Fittings in Inside Service (Circular Letter 2/2017)**

##### **7.3.1**

Subject to exemption stipulated in Section 7.5 of Part A of TR, designated products (showers for bathing, water taps and urinal flushing valves) of prescribed water efficiency requirements registered under WELS shall be used in the following designated part of premises:-

- (i) Kitchens of the domestic premises; and
- (ii) Bathrooms and toilets of all premises.

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##### **7.3.2**

The products shall comply with the prescribed water efficiency requirements in Table 7.3.2.1 of TR

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#### **7.4 Alternatives to Application of WELS Products**

##### **7.4.1**

The flow controller shall be a registered product under WELS and shall be of appropriate water efficiency grade to form a 'combined' water saving device that meets the prescribed water efficiency requirements.

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## **Appendix 1: (2) Checklists for Vetting Plumbing Proposal - Village House**

### **Cover Page**

Address of

Premises: Name of

Consumer: Contact

Tel. No.:

ASN No./CCID NO. (if applicable)

The plumbing proposal has been checked against the following checklists and all the technical requirements stated on the checklists have been taken into account in preparing the plumbing proposal.

\*Chapter3 Meter

\*Chapter4 Inside Service

\*Chapter6 Water Cisterns, Water Pumps and Other Miscellaneous

Checklists prepared by,  
(Authorised Person or  
person signing the drawings)

Signature: \_\_\_\_\_

Name: \_\_\_\_\_

*\*please delete whichever is not applicable*

## **Checklists for Vetting Plumbing Proposal - Village House**

### **Chapter 3 - Metering**

**Type:** S = Statutory Requirements  
E = Essential for approval of works

# Referring to the clauses in Technical Requirements for Plumbing Works in Buildings(TR). You may cross out the clauses if not applicable

^ Please ✓ as appropriate

	Type	Checked <sup>^</sup>	Remarks
<b><u>#3.1 General</u></b>			
<b><u>3.1.3</u></b>			
All domestic unit shall be separately metered	E	<input type="checkbox"/>	<input type="text"/>
<b><u>3.1.4</u></b>			
Location of water meter			
(a) For direct supply system, the meter shall be sited in a meter room/box/chamber at convenient location in accessible communal area	E	<input type="checkbox"/>	<input type="text"/>
(b) For indirect supply system, the meter shall be sites in a meter room/box/chamber in accessible communal area at roof level or at other convenient locations	E	<input type="checkbox"/>	<input type="text"/>
<b><u>3.1.6</u></b>			
For connections up to and including 40 mm diameter, a loose jumper type stopcock shall be provided and placed with spindle in the vertical position at each meter position on the inlet side of the meter where the meter is not sited at roof level and where the pressure is considered adequate.	E	<input type="checkbox"/>	<input type="text"/>
<b><u>3.1.9 &amp; 3.1.10</u></b>			
For salt water flushing supply,			
(a) a meter position shall be provided for the purpose of periodic checking of consumption. It should be close to the lot boundary and connection to the Government mains or close to the point of connection from internal distribution mains whichever is applicable.	E	<input type="checkbox"/>	<input type="text"/>
(b) stop valve shall be fitted at the inlet side of the meter position and a non-return or check valve shall be fitted on the delivery side as close as possible to the meter.	E	<input type="checkbox"/>	<input type="text"/>
<b><u>3.2 Meter Position</u></b>			
<b><u>3.2.1 (General Requirements for Meter Position)</u></b>			
<b><u>3.2.1.1</u></b>			
The following practice should be adopted in plumbing works design for meter positions:-			
(a) fitting at meter position shall facilitate easy installation and removal of the water meter without the need to work on other pipe	E	<input type="checkbox"/>	<input type="text"/>
<b><u>3.2.1.2</u></b>			
(a) For 15mm meter			
(i) 20mm x 15mm bushes, or reducers at both sides of the meter position	E	<input type="checkbox"/>	<input type="text"/>



- |  |   |                      |                      |
|--|---|----------------------|----------------------|
| (ii) 200mm (clear effective length) distance piece of 15mm tube placed in between  | E | <input type="text"/> | <input type="text"/> |
| (iii) a long screw connector is provided immediately after the brush or reducer at the delivery side                     | E | <input type="text"/> | <input type="text"/> |
| (b) For all meter size,  |   |                      |                      |
| (i) the meter position shall also be provided similarly to 15mm meter with corresponding fittings and appropriate sizes. | E | <input type="text"/> | <input type="text"/> |
| (ii) the length of distance piece should be referred to Figure 4 of the TR   | E | <input type="text"/> | <input type="text"/> |

### 3.2.1.3

If a section of copper pipe is used either before or after a water meter position, that section of copper pipe between the water meter position and the first pipe clamp is jointed by screwed or flanged joints.	E	<input type="text"/>	<input type="text"/>
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### 3.2.1.4

uPVC fittings shall be used at the meter position if uPVC materials are used as inside services. Brass long screw (connector) shall be used at TMF position. Brass fittings shall be used at the meter position if copper, lined galvanized steel or thermo-plastic materials are used as inside service.	E	<input type="text"/>	<input type="text"/>
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## 3.2.2(Architectural and M&E Requirement for meter room)

### 3.2.2.1

All water meters, including vacant meter positions and check meter positions, shall be arranged in groups of more than one meter positions and housed in meter rooms / boxes / cabinet / chamber.	E	<input type="text"/>	<input type="text"/>
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### 3.2.2.2

(a) The meter rooms/boxes/cabinets/chambers shall be designed solely for housing water meters to protect them against exposure to weather, falling objects and other undue external interferences to facilitate reading and maintenance of water meters.	E	<input type="text"/>	<input type="text"/>
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(b) When preparing VPLD submission, the applicant shall submit the layout and elevation plans of the meter rooms/boxes with dimensions, including the width and height of the entrances (door openings in case of meter boxes) for the Water Authority's approval.	E	<input type="text"/>	<input type="text"/>
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### 3.2.2.3

No other building services such as drainage systems, fire hoses, M&E installations (equipment, cables and ducting, etc.) shall pass through or be placed inside the meter rooms/meter boxes/master meter rooms except lighting, ventilation, drainage, and smart metering if required by the WA etc., solely to facilitate meter reading and maintenance of water meters.	E	<input type="text"/>	<input type="text"/>
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### 3.2.2.4

The following architectural requirements shall be met:-

(b) (iii) Maximum clear depth of meter boxes measured from the outside face is 800mm	E	<input type="text"/>	<input type="text"/>
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(c) An entrance located at communal area for safe, free, and uninterrupted access to the meter room/box/cabinet/chamber shall be provided.	E	<input type="text"/>	<input type="text"/>
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E	<input type="text"/>	<input type="text"/>
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(d) (i) Checked all door(s) to the meter room/box/cabinet and confirmed no self-closing device on it.

(e) Outside of the door(s) to the meter room/box is clearly marked 「水錶」, "Water Meters" in both Chinese and English of font size not less than 30mm

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(g) For village type buildings and similar, water meters shall be installed in meter room(s)/box(es)/cabinet(s) located at the boundary and shall be accessible from the public area.

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### 3.2.2.5

(b) Provision of adequate drainage inside the meter room and the meter box positioned at floor level

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## 3.2.4 (Mounting Height of Water Meters in Meter Rooms/Boxes)

### 3.2.4.1

(a) For meters arranged in groups and meters installed inside meter boxes and cabinets, no meter position shall be lower than 300 mm nor higher than 1500 mm above the floor level

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## 3.2.6 Location of Water Meter at Landscape Areas

### 3.2.6.1

For a meter installed in a landscape area, it should be installed above ground level. In case the meter is installed in a meter box/cabinet, there shall be a proper working space in front of the meter box/cabinet with a clear working headroom not less than 2m.

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### 3.2.6.2

A safe pedestrian access to the meter position should be provided.

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## **3.3 Master Meter and Check Meter**

### 3.3.2 Principles of Master Meters Provision

#### 3.3.2.2

For single detached village type buildings and single block buildings, master meters will not be required but all pipework between the connection to the main and meter positions shall be exposed or laid in a proper service trench/duct, except that branch mains of less than one straight pipe length of 6 metres from tee-connection to a building block may be buried.

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**Checklists for Vetting Plumbing Proposal****Chapter 4 - Inside Service**

**Type:** S = Statutory Requirements  
E = Essential for approval of works

# Referring to the clauses in Technical Requirements for Plumbing Works in Buildings (TR). You may cross out the clauses if not applicable

^ Please ✓ as appropriate

**Type Checked^ Remark**

**#4.1 Pipe & Fitting Materials****4.1.1 General****4.1.1.1**

Pipes and fittings shall conform to the relevant standards as listed in Part B of TR and the WWR.

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**4.1.2 Requirements of Minimum Pipe Sizes****4.1.2.1**

A pipe must not be less than 20mm in diameter, except that a branch pipe may be of 15mm or more in diameter if the pipe length is not longer than 3m and the pipe supplies only one draw-off point.

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**4.2 Fresh Water Supply****4.2.1 General Requirements****4.2.1.1**

All fresh water supplies to inside service , including TMF, shall be metered.

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**4.2.1.2**

(a) All domestic supplies and concessionary supplies shall be separately metered.

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(b) For different applications of concessionary supplies, Section 4.2.5 of TR shall be referred.

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**4.2.1.3 and 4.2.1.4**

(a) Not Used.

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(b) Not Used.

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**4.2.3 Backflow/ Cross-connection Prevention****4.2.3.1 Protection of Water Supplies****4.2.3.1.1**

All water supply systems shall be designed, installed, and maintained in order to prevent contaminants from being introduced into the fresh water supply systems.

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**4.2.3.1.2**

No device or system that may cause contamination of a water supply shall be connected directly or indirectly to any part of an inside service without

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appropriate cross-connection prevention or backflow prevention control suitable for the level of hazard.

#### 4.2.3.3 Provision of Backflow Prevention Devices

##### 4.2.3.3.1

(a) The fresh water supply shall be protected from the hazard(s) by installing appropriate device listed in Table 4.2.3.7.1. E

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(b) Hazard ratings for some typical installations are listed in Table 4.2.3.7.2 for reference. E

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##### 4.2.3.3.2

Backflow prevention devices shall comply with the latest BS EN 1717 and all relevant standard(s) for the devices. E

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#### 4.2.3.4 Water Downstream of Backflow Prevention Device

##### 4.2.3.4.1

Piping conveying water downstream of backflow prevention device, installed for high or medium hazard protection, shall be clearly and permanently labelled 'WARNING! NOT FOR DRINKING' at every outlet. E

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#### 4.2.3.5 Commissioning and Maintenance

##### 4.2.3.5.2

If backflow prevention devices applicable to high hazard cases, e.g. backflow preventer/reduced pressure zone valve etc., they shall only be used with a maintenance program. If such program is unavailable, the backflow prevention devices shall not be fitted and break tank shall be provided. E

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#### 4.2.3.6 Backflow Prevention Device in Hot Water Systems

##### 4.2.3.6.1

The backflow prevention device used in hot water systems shall be suitable for the specific hot water installation. E

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#### 4.2.3.7 Backflow Prevention Device and Hazard Levels for Applications

##### 4.2.3.7.1

Tables 4.2.3.7.1 and 4.2.3.7.2 shall be referred commonly used backflow prevention devices and hazard levels for different applications. For concessionary water supplies, Clause 4.2.5.2 shall be referred. E

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#### 4.2.4 General Pipework Arrangement

##### 4.2.4.3

No water pipe shall be embedded within load bearing structural elements in longitudinal direction. Such structural elements include, but not limited to, columns, beams and slabs. Screeding above slabs should not be considered as structural elements. Hence, water pipe embedded in screeding is acceptable. The water pipe in screeding shall be considered as embedded pipes. E

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##### 4.2.4.5

Tee-branch valve has been provided in

(a) all underground water pipes; and E

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(b) and for all communal inside service E

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4.2.4.7

No draw-off point in the inside services shall be subject to a excessive pressure of 6 bar or above.

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4.2.5 Concessionary Usage of Mains Water4.2.5.1

Concession usage of mains water are for the purpose listed in Clause 4.2.5.2

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4.2.5.2

Compliance with the concessionary usages and requirements in this clause

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4.2.5.5

Installation of water points for internal cleansing of open yards and for other miscellaneous domestic purposes in private houses of bungalow type or the like can be permitted as part of the domestic supply. This will not be taken as a concessionary supply. It is not necessary to install any receptacle for this type of water points.

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4.2.7 Hot Water Systems4.2.7.1 Non-Centralized Hot Water System4.2.7.1.1

When the factory test pressure of the heater is at least 1.5 times the maximum static pressure at the mains water supply point, non-pressure type heaters, cistern type water heaters, unvented electric thermal storage water heaters satisfying the requirements stipulated in Clauses 4.2.7.1.12 and instantaneous water heaters are permitted to be connected direct to the supply pipe without the necessity of providing storage.

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4.2.7.1.2

When the factory test pressure of the heater is less than 1.5 times the maximum static water pressure at the mains water supply point then, for premises on direct supply, a water heater must be supplied with water from a cold water cistern.

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4.2.7.1.3

A separate mains water storage cistern of 45 litres capacity shall be provided for each flat to supply such hot water apparatus in Clause 4.2.7.1.2.

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4.2.7.1.4

Pressure type thermal storage heaters other than unvented electric thermal storage water heaters satisfying the requirements stipulated in Clauses 4.2.7.1.12 shall be supplied from storage cisterns no matter what the pressure at inlet point should be, except these are installed in flats supplied through the indirect or sump and pump system.

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4.2.7.1.5

For premises on direct supply, a separate mains water storage cistern of 45 litres capacity shall be provided for each flat to supply such hot water apparatus in Clause 4.2.7.1.4.

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4.2.7.1.6

For flats supplied from the roof storage cistern of an indirect or sump and pump system, no separate storage for hot water apparatus will be required but the supply to the apparatus shall be by a separate down feed supplying the apparatus only unless the arrangement in Clause 4.2.7.1.7 is applied.

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#### 4.2.7.1.7

If the flats on the indirect system are supplied through an oversized down feed pipe, the pipe supplying the hot water apparatus shall be branched from the down feed at a point above the top of the apparatus.

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#### 4.2.7.1.8

When gas geysers are to be installed on the top floor of a building supplied through storage cisterns, gas geysers with low pressure governors should be installed when the head available is less than 5 metres to the highest hot water draw-off point.

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#### 4.2.7.1.9

If mixing valves, water blenders or combination fittings are to be used, the cold water supply to these fixtures shall be drawn from the same source as is supplying the hot water apparatus. In order to provide a balanced pressure and to obviate the risk of scalding should the supply at the source fail or be restricted for any reason.

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#### 4.2.7.1.10

All pressure type thermal storage heaters shall be provided with a vent or expansion pipe taken from its highest point and discharge in the atmosphere above the storage cistern at sufficient height to prevent a constant outflow of hot water therefrom except for unvented electric thermal storage water heaters satisfying the requirements stipulated in Clauses 4.2.7.1.12 and 4.2.7.1.13 of TR.

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#### 4.2.7.1.11

A loose jumper type valve shall be fitted on the inlet of the water heater if a non-return valve is not incorporated in such water heater, but this requirement does not apply to an electric water heater of the thermal storage type satisfying the requirements stipulated in Clauses 4.2.7.1.12 and 4.2.7.1.13 of Part A of TR.

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#### 4.2.7.1.12

All unvented electric thermal storage water heaters shall comply with the safety requirements under the Electrical Products (Safety) Regulation (Cap. 406 sub. leg.)

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#### 4.2.7.1.13

Every system incorporating an unvented electric water heater of the thermal storage type shall be provided with:-

(a) a supply pipe that branches off from the feed pipe at a point above the top of the water heater, or some other device to prevent the water from draining down from the water heater if there is a failure at the source of water supply;

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(b) an anti-vacuum valve or some other device to prevent heated water from being syphoned back to the supply pipe; and

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(c) a vessel to accommodate the expansion of heated water where that expansion is constrained by a non-return valve or some other device, incorporated at the inlet of the water heater.

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### **4.3 Flushing Water Supply**

#### **4.3.1 Sources of Flushing Water Supply**

##### **#4.3.1.1**

For inside service using government water supply for flushing, it shall comply with the requirements of the WWO/WWR and that of the WA..

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#### **4.3.2 Pipe and Fitting Materials**

##### **4.3.2.1**

All water tanks , pipes and fittings of flushing water systems must be of salt water resistant materials to the approval of the WA. Pipes and fittings shall conform to the relevant standards as listed in Part B of TR and the WWR.

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#### **4.3.3 Metering Requirements**

##### **4.3.3.1**

All flushing water supply systems shall be separate water supply systems.

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##### **4.3.3.3**

Water meter shall be installed in each flushing system receiving a TMF supply. TMF flushing water supply would normally be given to the entire building Requirements stipulated in Section 3 of this TR is applicable.

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#### **4.3.5 General Pipework Arrangement**

##### **4.3.5.1**

Under the provision of Buildings Ordinance (Chapter 123), all new buildings shall be provided with a plumbing system to supply water for flushing purposes and every part of such plumbing system, including the storage tank, shall be constructed of such materials that are suitable for use with salt water.

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##### **4.3.5.2**

A separate water storage tank shall be provided for flushing purpose

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##### **4.3.5.3**

The inlet pipe to the separate storage tank should not be less than 40 mm diameter; its portion before meter position shall be exposed or laid in a proper service duct and extended to the lot boundary.

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##### **4.3.5.4**

To facilitate meter installation, a meter position shall be provided in the communal area of the building as close to the fresh supply meters as possible. Regarding general requirements for meter positions, Section 3.2 of Part A of TR shall be referred.

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##### **4.3.5.5**

In case a temporary mains fresh water supply is proposed to be provided as the alternative source to augment an existing independent (not Government)

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supply, the storage tank for the flushing cistern shall be constructed in accordance with Fig. 15.

#### 4.3.5.6

No draw-off point in the inside services shall be subject to pressure of 6 bar or above. E

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#### 4.3.5.7

A tee-branch valve shall be provided for all underground flushing water pipes, flushing and for all pipes serving more than one domestic or commercial unit. E

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#### 4.3.5.8

Concerning requirement for flushing water storage capacity, Clause 6.2.5 shall be referred. E

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## Checklists for Vetting Plumbing Proposal

### Chapter 6 - Water Cisterns, Water Pumps and Other Miscellaneous

**Type:** S = Statutory Requirements  
E = Essential for approval of works

# Referring to the clauses in Technical Requirements for Plumbing Works in Buildings(TR). You may cross out the clauses if not applicable

^ Please✓ as appropriate

**Type Checked^ Remarks**

#### #6.1 General

##### 6.1.1

No cistern for the storage of cold water shall be installed or used except with the permission in writing of the Water Authority who shall specify the maximum permitted capacity.

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##### 6.1.2

No cistern for the storage of fresh water supplied from the waterworks shall, without the written permission of the WA, be so connected that it can be used for the storage of any water other than that supplied from the waterworks.

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#### 6.2 Cold Water Cisterns (or Cold Water Tanks)

##### 6.2.1 Location

##### 6.2.1.1 Access for Maintenance and Inspection

##### 6.2.1.1.1

Water Storage Tanks shall be installed so that they are easily accessible for cleaning or repairs.

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##### 6.2.1.1.2

Safe access shall be provided to all cisterns by means of a secure permanent ladder or readily available portable ladder.

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##### 6.2.1.1.3

Where a cistern is installed inside a building and, due to limited headroom available, it is fixed with limited clearance from the ceiling or underside of the roof, a quickly detachable fitting must be used to enable it to be easily removed for cleansing and repair.

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##### 6.2.1.1.4

For a water cisterns with top access, the access on top of the cisterns should have a minimum headroom of 800mm.

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#### 6.2.2 Material Requirements

##### 6.2.2.1

A cistern must be watertight, of adequate strength, properly supported and be made of concrete, stainless steel or fibre glass.

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6.2.2.2

For concrete fresh water cisterns/storage tank, all internal surface of floors, walls (to full height) and soffits (except the cistern openings) of potable water storage cisterns should be lined with a white non-toxic smooth finish such as ceramic tiles for cleaning purpose.

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6.2.2.4

When fibreglass storage tank is to be used, prior approval by the Water Authority must be sought. Fibreglass storage cistern for potable water shall be of an approved type or certified to contain no toxic materials and suitable for storage of potable water.

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6.2.3 Cover for Water Tanks6.2.3.1

A cistern must be so located as to minimize the risk of contamination of stored water and be fitted with a suitable close fittings lockable cover that is not airtight. The cover must be so positioned as to facilitate inspection and cleaning. The covers must be so positioned as to facilitate inspection and cleaning.

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6.2.3.2

(a) Every storage cistern shall have a lockable close fitting rigid cover secured by mechanical means which excludes light and the ingress of particles and / or insects from the cistern.

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(b) The cover shall be made of a material or materials which do not shatter or fragment when broken and which will not contaminate any condensate which may form on its underside or the stored water.

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6.2.4 Installation Requirements for Inlet and Outlet Pipe6.2.4.2 Controlling Incoming Water Supply6.2.4.2.1

The inlet of a single cistern fed by a gravity supply must be fitted with a ball float valve and stop valve.

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6.2.4.2.2

(a) For ball float valves of a nominal diameter not exceeding 50mm, their valve bodies must be made of copper alloy or stainless steel.

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(b) For ball float valves of a nominal diameter exceeding 50mm, their valve bodies must be made of copper alloy, stainless steel, epoxy coated cast iron or epoxy coated ductile iron.

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6.2.4.2.3

(a) Floats for use with fresh water must be made of copper alloy or stainless steel.

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(b) Floats for use with salt water must be made of plastic or stainless steel.

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6.2.4.2.4

Ball float valves fitted to a cistern must have the size of the orifice, the size of the float and the length of the lever so proportioned to one another that, when the float is immersed to an extent not exceeding half its volume, the valve is watertight against the highest pressure at which the valve may be required to work.

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6.2.4.2.5

A ball float valve or float-operated valve fitted to a cistern must be

- (a) securely fixed to the cistern above the waterline of the float of the valve, and S
- (b) must be supported independently of the inlet pipe (unless the inlet pipe is itself rigid and securely fixed to the cistern), in a position that no part of the body of the valve is submerged when the cistern is charged to the overflowing level. S

#### 6.2.4.2.6

- (a) If a ball float valve or float-operated valve is provided with a pipe so arranged as to discharge water into a cistern below its overflowing level, an air hole must be provided in the outlet chamber of the valve above the overflowing level. S
- (b) The air hole must be of a size sufficient to prevent syphonage of water back through the valve. S

#### 6.2.4.2.7

Ball float valves must not be fitted to a cistern that is used to contain heated water. S

#### 6.2.4.2.8

The inlet of a single cistern fed by a pumped supply must be fitted with an automatic control switch and without any stop valve. S

#### 6.2.4.2.9

- (a) The ball valve or control switch shall shut off the supply when the water level is 25mm below the invert of the overflow pipe or the warning pipe if there exists one. S
- (b) The invert of the inlet pipe or the face of the outlet nose of the ball valve shall be not less than 25mm above the top of the overflow pipe. S

#### 6.2.4.2.10

- (a) In case of a mixed flushing water supplies, the water tank shall be fitted with a ball float valve with submerged float control and a fullway gate valve for controlling and isolating the inflow of mains supply respectively. E
- (b) For other source of flushing water supply, a ball float valve and a fullway gate valve shall be provided. E
- (c) Performance of the ball float valve shall meet the requirements specified in case of gravity supply. E

### 6.2.4.3 Outlet Water Pipes

#### 6.2.4.3.1

The invert of an outlet pipe from a water storage tank with capacity less than 5000 litres shall be at least 30 mm above the bottom of the tank; this distance shall be increased to 100 mm if the storage tank capacity is 5000 litres or more. E

#### 6.2.4.3.2

A stop valve must be provided at the outlet of a cistern. and provision shall be made for a drain-off pipe to enable the cistern to be emptied. S

#### 6.2.4.3.3

Fullway gate valves shall be used with as the stop valves in Cl. 6.2.4.3.2 at the outlet pipe of every water storage cistern. The drain-off pipe shall be properly plugged or adequate means shall be provided to prevent any unauthorized operation of the control valve at drain-off pipe. If the outlet of a flushing water E

cistern is of nominal size 50mm or below, a ball valve can be used to substitute the above gate valve.

#### 6.2.4.4 Overflow Pipes and Warning Pipes

##### 6.2.4.4.1

All overflow and warning pipes of potable water storage cisterns shall be constructed of corrosion-resisting material. S

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##### 6.2.4.4.2

The overflow pipe shall be at least one commercial size larger than the inlet pipe and shall in no case be less than 25 mm in diameter must be fitted to a cistern and be extended to terminate in a conspicuous position. The overflow pipe must not be connected to a drain or sewer or to the overflow pipe from another cistern. S

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##### 6.2.4.4.3

The position of discharge should be in a communal area easily visible and accessible by the occupants. E

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##### 6.2.4.4.4

If the overflow pipe is not extended to terminate in a conspicuous position, the overflow pipe shall be installed with an overflow alarm with signal transferred to a 24-hourly manned management office for timely notification. Full justifications for such arrangement shall be provided to the WA for consideration and approval. E

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##### 6.2.4.4.5

In case of mixed flushing water supply as shown in Fig. 15, the overflow shall be twice the diameter of largest inlet or of nominal diameter 40mm, whichever is greater. E

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##### 6.2.4.4.6

No part of the overflow pipe shall be submerged inside the storage tank E

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##### 6.2.4.4.7

A grating and a self-closing non-return flap shall be provided at the overflow pipe outside the storage tank. E

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##### 6.2.4.4.9

The warning pipes shall be installed at a level below the overflow pipe and shall be either extended to conspicuous location, i.e. outside of the building periphery for roof tank or outside the pump room for sump tank, or installed with signal transferred to a 24-hourly manned management office. E

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#### 6.2.5 Size of Storage Tanks for Flushing, Domestic and Trade/Commercial Water Uses

##### 6.2.5.1

The proportion of capacity of sump cistern to roof cistern is recommended to be in the order of 1:3. Otherwise, the designer shall demonstrate that the proposed ratio of sump cistern to roof cistern is capable of fulfilling the designed demand. E

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**6.2.5.2**

The capacity of the flushing water roof cistern shall be designed according to the criteria in Table 6.2.5.2.1 with a minimum capacity of 250 litres. [applicable to new applications with Form WWO 542 submitted on or after 1 January 2019 only.]

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**6.2.5.3**

Storage criteria for fresh water supply for domestic flats is listed in Table 6.2.5.3.1.

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**6.2.6 Other Recommendation/Requirement****6.2.6.1**

Structural design of the cistern and its supports should be subject to the requirements of the Building Authority.

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**6.2.6.3 to 6.2.6.5**

(a) A set of inlet, outlet and associated overflow and drain pipes shall be provided to each cistern compartment.

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(b) Each inlet of a twin-cistern fed by a pumped supply must be fitted with an automatic control switch and a stop valve for temporary isolation purpose.

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(c) For water supplies other than pumped supply, this inlet shall comply with requirements stated in Clause 6.2.4.2.1 of Part A of TR.

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**6.5 Pressure Reducing Valves****6.5.1**

No part in the internal pipework and/or draw-off point shall be subject to excessive high pressure. In case of excessive high pressure, provision of break pressure tanks at a suitable level of the internal supply system would be a positive and viable means to reduce the water pressure. Alternatively, pressure reducing valves may be provided in lieu of break pressure tank.

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**6.5.2**

Whenever a pressure reducing valve is installed,

(a) a bypass arrangement shall be incorporated with the provision of a second pressure reducing valve, except for fire service installations, to enable isolation of any defective pressure reducing valve for repair and replacement when necessary;

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(b) A pressure indicator shall be provided for pressure monitoring and the associated pipes and fittings shall be able to withstand the maximum pressure that may arise upon the failure of the pressure reducing valve as far as practicable. Fault alarm shall be installed with signal transferred to a 24-hourly manned management office for timely notification, except for fire service installations.

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**6.6 Stop Valves for Draw-off Points****6.6.1**

Individual stop valves shall be provided at all draw-off points or at a series of draw-off points if situated close together.

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**6.7 Water Taps**

### 6.7.1 Application of Water Taps

#### 6.7.1.1

When infra-red sensor operated automatic taps are used as inside services, a stop cock or gate valve must be installed at the upstream of each fitting for manual isolation of water supply.

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#### 6.7.1.2

Self-closing taps, of non-concussive type and of approved pattern, or infra-red operated automatic taps, shall be used for the public or communal lavatory basins.

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#### 6.7.1.3

Except with the written permission of the Water Authority, fitting with a threaded outlet, or any device facilitating the connecting of rubber hose or another type of flexible hose, must not be used.

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### 6.7.2 Installation Requirements for Sanitary Fixtures Supplied by Water Taps

#### 6.7.2.1

All taps supplying baths, lavatory basins, sinks or similar apparatus shall have a stop valve fixed in a readily accessible position to control the supply to each fitting or branch pipe supplying a range of fittings.

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#### 6.7.2.2

Every inlet to a bath, lavatory basin or sink shall be distinct from, and unconnected with, any outlet therefrom and every outlet for emptying such bath, lavatory basin or sink shall be provided with a well-fitting and easily accessible watertight plug or some other equally suitable apparatus.

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#### 6.7.2.3

The level of the hot or cold water draw-off point to a bath, lavatory basin or sink shall be above the level of the overflow. In the absence of overflow in the fixtures, the top edge of the bath, basin or sink shall be considered instead.

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#### 6.7.2.4

If water supply to any bidets, sitz bath, slop and sluicing sink or similar apparatus is liable to be submerged, the following shall be provided:-

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- (a) a storage cistern supplying water to such apparatus only;
- (b) a storage cistern for flushing purposes only; or
- (c) a hot water distribution system supplying such apparatus only.

### 6.8 Domestic Appliances

#### 6.8.1 Water Purifiers/Filters

##### 6.8.1.2

Domestic water purifiers/ filters must not be connected directly to the mains supply because of the possibility of contamination.

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##### 6.8.1.4

In case further water treatment is needed for special needs, requirements for backflow prevention and written permission from the WA for typical types of water filters are summarized in Table 6.10.1.4.1.

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## 6.8.2 Washing Machines/Dishwashing Machines

### 6.8.2.2

Washing machines/ dishwashing machines with submerged inlets are considered to have high level of contamination hazard and must be installed with appropriate backflow prevention devices according to Table 4.2.3.7.1.

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## 6.10 Flushing Apparatus

### 6.10.1 General Requirements

#### 6.10.1.2

(a) A flushing cistern must in all cases be supplied from a cistern. Except with the written permission of the Water Authority, the cistern must not be used to supply any other apparatus, appliance or fitting.

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(b) The cistern must be fitted with a suitable close fitting cover and provided with appropriate access to enable the cistern to be entered and cleaned.

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#### 6.10.1.3

A trough water-closet or urinal must be fitted with a flushing cistern.

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#### 6.10.1.4

A water-closet fitment or slop sink must be fitted with a flushing cistern. However, a pressure flushing valve may be installed for flushing without the provision of a flushing cistern if there is a suitable head of water.

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#### 6.10.1.5

The internal diameter of flushing pipes shall:-

(a) in the case of water closet fitments, trough water closets and slop sinks, be not less than 30mm;

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(b) in the case of urinals (other than trough urinals), be not less than 15mm for each basin and stall; and

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(c) in the case of trough urinals, be not less than 15mm for every metre thereof.

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#### 6.10.1.6

A flushing apparatus must be operated by mechanical means or a sensor. In the case of an automatic flushing apparatus, the method of control and the volume and frequency of the flushes must be designed to ensure adequate cleaning.

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### 6.10.2 Flushing Cisterns

#### 6.10.2.1

(a) A flushing cistern must be fitted with a flushing device of the valveless syphonic or valve type.

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(b) A stop valve must be fixed in a readily accessible position so as to control the water supply to the cistern.

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#### 6.10.2.2

A flushing cistern for a water-closet fitment or slop sink must be capable of giving a flush of not more than 15 litres of water on each occasion the fitment is used.

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6.10.2.3

The capacity of the flushing cistern in the case of trough water closets and urinals shall be approved by the WA subject to the discharge in the case of trough water closets being not less than 9 litres of water for every metre of the channel and the discharge in the case of urinal being not less than 4.5 litres of water for every basin or stall, or in the case of a trough urinal, every metre thereof.

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6.10.2.4

The WA would have no objection to accepting the use of flushing cisterns with discharge less than that required by the current regulations provided that the design flushing volume is compatible with the toilet bowl to ensure effective clearance of waste by a single flush and the flushing apparatus meets the requirements of the WA. [Ref. PNAP APP-99]

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6.10.2.5

A flushing cistern operated by mechanical means or a sensor must be fitted with a ball float valve that is arranged to refill the cistern within 2 minutes.

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6.10.2.6

Every flushing cistern shall have an overflow which shall discharge in a conspicuous location.

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6.10.2.8

The requirements on the use of valve type flushing cisterns are as follows:-

(a) The valve seal of the flushing device shall be easily replaceable.

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(b) A dual flush valve which is designed to give two different volumes of flush shall have a readily discernible method of actuating the flush at different volumes. Such method should be illustrated clearly and permanently displayed at the cistern nearby.

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(c) For dual flush devices, the reduced flushing volume shall not be more than two-thirds of the larger flushing volume.

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(d) The flushing devices must pass the 200,000-cycle endurance test.

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6.10.2.9

The components of all valve type flushing devices shall be of material that is suitable for the use of salt water

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6.10.2.10

For an existing building with permission to use government water supply for flushing purposes, any existing flushing apparatus found unsuitable shall be replaced with a proper apparatus as specified under Section 6.10.

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6.10.2.11

A filter which is readily accessible for inspection and cleaning shall be installed before a flushing valve. This filter can be replaced by a built-in strainer, which can be readily inspected and cleaned, in the flushing device.

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6.10.3 Flushing Valves (Flushometers)6.10.3.1



The installation of flushing valves (flushometers) shall be permitted when the following requirements are fulfilled:-

- |   |   |   |  |  |
|---|---|---|--|--|
| (a) A filter/strainer shall be installed before a flushing valve or a group of flushing valves;   | E | <table border="1"><tr><td></td><td></td></tr></table> |  |  |
|   |   |   |  |  |
| (b) The cartridge and other valve components shall be easily replaceable.   | E | <table border="1"><tr><td></td><td></td></tr></table> |  |  |
|   |   |   |  |  |
| (c) Flushing valves shall be used within the range of working pressures specified by the manufacturer.  | E | <table border="1"><tr><td></td><td></td></tr></table> |  |  |
|   |   |   |  |  |
| (d) The flushing devices must pass the 200,000-cycle endurance test.  | E | <table border="1"><tr><td></td><td></td></tr></table> |  |  |
|   |   |   |  |  |
|   |   |   |  |  |
| (e) An effective maintenance management system shall be provided for frequent inspection and cleaning of filters, i.e. normally only public toilets (administered by government, quasi-government bodies, hotel operators, commercial complex management offices etc.) will be considered | E | <table border="1"><tr><td></td><td></td></tr></table> |  |  |
|   |   |   |  |  |
| (f) A plate etched with the name of the responsible party and the telephone number in both Chinese and English shall be provided to facilitate users to report defective flushing valves. Other effective arrangements may also be considered; and  | E | <table border="1"><tr><td></td><td></td></tr></table> |  |  |
|   |   |   |  |  |
| (g) Flushing valve shall be of water efficiency Grade 1 or Grade 2 under Water Efficiency Labelling Scheme (WELS).  | E | <table border="1"><tr><td></td><td></td></tr></table> |  |  |
|   |   |   |  |  |

#### 6.10.3.2

The valve components shall be of material that is suitable for the use of salt water	S	<table border="1"><tr><td></td><td></td></tr></table>		

#### 6.10.3.3

For an existing building with permission to use mains water (fresh or salt) for flushing purposes, any existing flushing apparatus found unsuitable shall be replaced with a proper apparatus as specified under Section 6.10.	S	<table border="1"><tr><td></td><td></td></tr></table>		

### **6.11 Earthing**

#### 6.11.1

Inside service as an earth electrode

- |  |   |   |  |  |
|--|---|---|--|--|
| (a) The metal work of an inside service shall not be used as an earth electrode. | E | <table border="1"><tr><td></td><td></td></tr></table> |  |  |
|  |   |   |  |  |

## **Appendix 1: (3) Checklists for Vetting Plumbing Proposal - Separate Meter**

### **Cover Page**

Address of Premises:

Name of Consumer:

Contact Tel. No.:

ASN No./CCID NO. (if applicable)

The plumbing proposal has been checked against the following checklists and all the technical requirements stated on the checklists have been taken into account in preparing the plumbing proposal.

\*Chapter 3 Meter

\*Chapter 4 Inside Service

\*Chapter 6 Water Cisterns, Water Pumps and Other Miscellaneous

\* please delete as appropriate

Checklists prepared by,  
(Authorised Person or  
person signing the drawings)

Signature: \_\_\_\_\_

Name: \_\_\_\_\_

*\*please delete whichever is not applicable*

## Checklists for Vetting Plumbing Proposal - Separate Meter

### Chapter 3 - Metering

**Type:** S = Statutory Requirements  
E = Essential for approval of works

# Referring to the clauses in Technical Requirements for Plumbing Works in Buildings(TR). You may cross out the clauses if not applicable

^ Please ✓ as appropriate

**Type Checked^ Remarks**

#### #3.1 General

##### 3.1.4

(a) Meter shall be sited in a meter room/box/chamber at convenient location in accessible communal area

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(b) For indirect supply system, the meter shall be sites in a meter room/box/chamber in accessible communal area at roof level or at other convenient locations

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##### 3.1.6

For connections up to and including 40 mm diameter, a loose jumper type stopcock shall be provided and placed with spindle in the vertical position at each meter position on the inlet side of the meter where the meter is not sited at roof level and where the pressure is considered adequate.

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##### 3.1.7

For connections larger than 40 mm diameter, a gate valve shall be provided before the meter position and a non-return or check valve fitted on the delivery side as close as possible to the meter.

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#### 3.2 Meter Position

##### 3.2.1 (General Requirements for Meter Position)

##### 3.2.1.1

The following practice should be adopted in plumbing works design for meter positions:-

(a) fitting at meter position shall facilitate easy installation and removal of the water meter without the need to work on other pipe

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##### 3.2.1.2

(a) For 15mm meter

(i) 20mm x 15mm bushes, or reducers at both sides of the meter position

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(ii) 200mm (clear effective length) distance piece of 15mm tube placed in between

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(iv) a long screw connector is provided immediately after the brush or reducer at the delivery side

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(b) For all meter size,

(i) the meter position shall also be provided similarly to 15mm meter with corresponding fittings and appropriate sizes.

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(ii) the length of distance piece should be referred to Figure 4 of the TR

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3.2.1.3

If a section of copper pipe is used either before or after a water meter position, that section of copper pipe between the water meter position and the first pipe clamp is jointed by screwed or flanged joints.

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3.2.1.4

PVC-U fittings shall be used at the meter position if PVC-U materials are used as inside services. Brass longcrew (connector) shall be used at TMF position. Brass fittings shall be used at the meter position if copper, lined galvanized steel or thermo-plastic materials are used as inside service.

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3.2.2(Architectural and M&E Requirement for meter room)3.2.2.2

When preparing VPLD submission, the applicant shall submit the layout and elevation plans of the meter rooms/boxes with dimensions, including the width and height of the entrances (door openings in case of meter boxes) for the Water Authority's approval.

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3.2.4 (Mounting Height of Water Meters in Meter Rooms/Boxes)3.2.4.1

(a) For meters arranged in groups and meters installed inside meter boxes and cabinets, no meter position shall be lower than 300 mm nor higher than 1500 mm above the floor level

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(b) For projects where corridor meter arrangement is chosen and accepted, individual meter positions shall be at a suitable height not less than 750 mm but not more than 1500 mm above the floor level.

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(c) Minimum clearance should be provided for meters of trade supply according to Fig. 36.

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**3.5 Separate Metering in Existing Premises**3.5.1

The inside service shall be constructed from each flat to the existing common meter positions.

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3.5.2

In an occupied building,

(a) provide a temporary bypass arrangement as close to the delivery side of the meter as possible; and

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(b) the consumption of the temporary arrangement is measured by bulk meter.

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3.5.3

If part of an inside service is required to be retained as communal service, it is necessary to obtain an undertaking from the Developer/Owner, Management Committee, Landlords Association, Residents Association, Incorporated Owners, Mutual Aid Committee or an individual resident flat owner to accept responsibility for the common inside service from the connection to the main. If there is no consent for using the existing common inside service, a new connection is required for the conversion of some existing premises from a communal meter to separate meters and the new separate inside services become the responsibility of individual consumers.

E

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## Checklists for Vetting Plumbing Proposal - Separate Meter

### Chapter 4 - Inside Service

**Type:** S = Statutory Requirements  
E = Essential for approval of works

# Referring to the clauses in Technical Requirements for Plumbing Works in Buildings(TR). You may cross out the clauses if not applicable

^ Please✓ as appropriate

**Type Checked^ Remarks**

#### #4.1 Pipe & Fitting Materials

##### 4.1.1 General

##### 4.1.1.1

Pipes and fittings shall conform to the relevant standards as listed in Part B of TR and the WWR.

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##### 4.1.2 Requirements of Minimum Pipe Sizes

##### 4.1.2.1

A pipe must not be less than 20mm in diameter, except that a branch pipe may be of 15mm or more in diameter if the pipe length is not longer than 3m and the pipe supplies only one draw-off point.

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#### 4.2 Fresh Water Supply

##### 4.2.1 General Requirements

##### 4.2.1.1

All fresh water supplies to inside service, including TMF, shall be metered.

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##### 4.2.1.2

(a) All domestic supplies and concessionary supplies shall be separately metered.

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(b) For different applications of concessionary supplies, Section 4.2.5 of TR shall be referred.

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##### 4.2.1.3 and 4.2.1.4

(a) Not Used.

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(b) Not Used.

S 

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##### 4.2.3 Backflow/ Cross-connection Prevention

##### 4.2.3.1 Protection of Water Supplies

##### 4.2.3.1.1

All water supply systems shall be designed, installed, and maintained in order to prevent contaminants from being introduced into the fresh water supply systems.

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##### 4.2.3.1.2

No device or system that may cause contamination of a water supply shall be connected directly or indirectly to any part of an inside service without appropriate cross-connection prevention or backflow prevention control suitable for the level of hazard.

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### 4.2.3.3 Provision of Backflow Prevention Devices

#### 4.2.3.3.1

(a) The fresh water supply shall be protected from the hazard(s) by installing appropriate device listed in Table 4.2.3.7.1.

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(b) Hazard ratings for some typical installations are listed in Table 4.2.3.7.2 for reference.

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#### 4.2.3.3.2

Backflow prevention devices shall comply with the latest BS EN 1717 and all relevant standard(s) for the devices.

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### 4.2.3.4 Water Downstream of Backflow Prevention Device

#### 4.2.3.4.1

Piping conveying water downstream of backflow prevention device, installed for high or medium hazard protection, shall be clearly and permanently labelled 'WARNING! NOT FOR DRINKING' at every outlet.

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### 4.2.3.5 Commissioning and Maintenance

#### 4.2.3.5.2

If backflow prevention devices applicable to high hazard cases, e.g. backflow preventer/reduced pressure zone valve etc., they shall only be used with a maintenance program. If such program is unavailable, the backflow prevention devices shall not be fitted and break tank shall be provided.

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### 4.2.3.6 Backflow Prevention Device in Hot Water Systems

#### 4.2.3.6.1

The backflow prevention device used in hot water systems shall be suitable for the specific hot water installation.

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### 4.2.3.7 Backflow Prevention Device and Hazard Levels for Applications

#### 4.2.3.7.1

Tables 4.2.3.7.1 and 4.2.3.7.2 shall be referred commonly used backflow prevention devices and hazard levels for different applications. For concessionary water supplies, Clause 4.2.5.2 shall be referred.

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### 4.2.4 General Pipework Arrangement

#### 4.2.4.3

No water pipe shall be embedded within load bearing structural elements in longitudinal direction. Such structural elements include, but not limited to, columns, beams and slabs. Screeding above slabs should not be considered as structural elements. Hence, water pipe embedded in screeding is acceptable. The water pipe in screeding shall be considered as embedded pipes.

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#### 4.2.4.5

Tee-branch valve has been provided in

(a) all underground water pipes; and

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(b) shall be located close to main pipe

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4.2.4.7

No draw-off point in the inside services shall be subject to a excessive pressure of 6 bar and above.

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4.2.5 Concessionary Usage of Mains Water4.2.5.1

Concession usage of mains water are for the purpose listed in Clause 4.2.5.2

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4.2.5.2

Compliance with the concessionary usages and requirements in this clause

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4.2.5.4

Draw-off tap that is freely accessible by the general public should be kept under lock and key.

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4.2.5.4a

If an automatic irrigation system is used. Off-tank supply is required.

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4.2.6 Metered Supply for Other Purposes4.2.6.2 Supply for Temporary Structures and Modified/Converted Structures4.2.6.2.2

The premises shall have separate access, proper drainage system and bear a proper postal address.

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4.2.7 Hot Water Systems4.2.7.1 Non-Centralized Hot Water System4.2.7.1.1

When the factory test pressure of the heater is at least 1.5 times the maximum static pressure at the mains water supply point, non-pressure type heaters, cistern type water heaters, unvented electric thermal storage water heaters satisfying the requirements stipulated in Clauses 4.2.7.1.12 and instantaneous water heaters are permitted to be connected direct to the supply pipe without the necessity of providing storage.

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4.2.7.1.2

When the factory test pressure of the heater is less than 1.5 times the maximum static water pressure at the mains water supply point then, for premises on direct supply, a water heater must be supplied with water from a cold water cistern.

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4.2.7.1.3

A separate mains water storage cistern of 45 litres capacity shall be provided for each flat to supply such hot water apparatus in Clause 4.2.7.1.2.

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4.2.7.1.4

Pressure type thermal storage heaters other than unvented electric thermal storage water heaters satisfying the requirements stipulated in Clauses 4.2.7.1.12 shall be

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supplied from storage cisterns no matter what the pressure at inlet point should be, except these are installed in flats supplied through the indirect or sump and pump system.

#### 4.2.7.1.5

For premises on direct supply, a separate mains water storage cistern of 45 litres capacity shall be provided for each flat to supply such hot water apparatus in Clause 4.2.7.1.4.

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#### 4.2.7.1.6

For flats supplied from the roof storage cistern of an indirect or sump and pump system, no separate storage for hot water apparatus will be required but the supply to the apparatus shall be by a separate down feed supplying the apparatus only unless the arrangement in Clause 4.2.7.1.7 is applied.

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#### 4.2.7.1.7

If the flats on the indirect system are supplied through an oversized down feed pipe, the pipe supplying the hot water apparatus shall be branched from the down feed at a point above the top of the apparatus.

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#### 4.2.7.1.8

When gas geysers are to be installed on the top floor of a building supplied through storage cisterns, gas geysers with low pressure governors should be installed when the head available is less than 5 metres to the highest hot water draw-off point.

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#### 4.2.7.1.9

If mixing valves, water blenders or combination fittings are to be used, the cold water supply to these fixtures shall be drawn from the same source as is supplying the hot water apparatus. In order to provide a balanced pressure and to obviate the risk of scalding should the supply at the source fail or be restricted for any reason.

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#### 4.2.7.1.10

All pressure type thermal storage heaters shall be provided with a vent or expansion pipe taken from its highest point and discharge in the atmosphere above the storage cistern at sufficient height to prevent a constant outflow of hot water therefrom except for unvented electric thermal storage water heaters satisfying the requirements stipulated in Clauses 4.2.7.1.12 and 4.2.7.1.13 of TR.

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#### 4.2.7.1.11

A loose jumper type valve shall be fitted on the inlet of the water heater if a non-return valve is not incorporated in such water heater, but this requirement does not apply to an electric water heater of the thermal storage type satisfying the requirements stipulated in Clauses 4.2.7.1.12 and 4.2.7.1.13 of Part A of TR.

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#### 4.2.7.1.12

All unvented electric thermal storage water heaters shall comply with the safety requirements under the Electrical Products (Safety) Regulation (Cap. 406 sub. leg.)

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4.2.7.1.13

Every system incorporating an unvented electric water heater of the thermal storage type shall be provided with:-

(a) a supply pipe that branches off from the feed pipe at a point above the top of the water heater, or some other device to prevent the water from draining down from the water heater if there is a failure at the source of water supply;

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(b) an anti-vacuum valve or some other device to prevent heated water from being syphoned back to the supply pipe; and

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(c) a vessel to accommodate the expansion of heated water where that expansion is constrained by a non-return valve or some other device, incorporated at the inlet of the water heater.

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## **Checklists for Vetting Plumbing Proposal - Separate Meter**

### **Chapter 6 - Water Cisterns, Water Pumps and Other Miscellaneous**

**Type:** S = Statutory Requirements  
E = Essential for approval of works

# Referring to the clauses in Technical Requirements for Plumbing Works in Buildings(TR). You may cross out the clauses if not applicable

^ Please ✓ as appropriate

	Type	Checked <sup>^</sup>	Remarks
<b><u>#6.1 General</u></b>			
<b><u>6.1.1</u></b>			
No cistern for the storage of cold water shall be installed or used except with the permission in writing of the Water Authority who shall specify the maximum permitted capacity.	S	<input type="checkbox"/>	<input type="checkbox"/>
<b><u>6.1.2</u></b>			
No cistern for the storage of fresh water supplied from the waterworks shall, without the written permission of the WA, be so connected that it can be used for the storage of any water other than that supplied from the waterworks.	S	<input type="checkbox"/>	<input type="checkbox"/>
<b><u>6.2 Cold Water Cisterns (or Cold Water Tanks)</u></b>			
<b><u>6.2.1 Location</u></b>			
<b><u>6.2.1.1 Access for Maintenance and Inspection</u></b>			
<b><u>6.2.1.1.1</u></b>			
Water Storage Tanks shall be installed so that they are easily accessible for cleaning or repairs.	S	<input type="checkbox"/>	<input type="checkbox"/>
<b><u>6.2.1.1.2</u></b>			
Safe access shall be provided to all cisterns by means of a secure permanent ladder or readily available portable ladder.	S	<input type="checkbox"/>	<input type="checkbox"/>
<b><u>6.2.1.1.3</u></b>			
Where a cistern is installed inside a building and, due to limited headroom available, it is fixed with limited clearance from the ceiling or underside of the roof, a quickly detachable fitting must be used to enable it to be easily removed for cleansing and repair.	S	<input type="checkbox"/>	<input type="checkbox"/>
<b><u>6.2.1.1.4</u></b>			
For a water cisterns with top access, the access on top of the cisterns should have a minimum headroom of 800mm.	E	<input type="checkbox"/>	<input type="checkbox"/>
<b><u>6.2.2 Material Requirements</u></b>			
<b><u>6.2.2.1</u></b>			
A cistern must be watertight, of adequate strength, properly supported and be made of concrete, stainless steel or fibre glass.	S	<input type="checkbox"/>	<input type="checkbox"/>
<b><u>6.2.2.2</u></b>			

For concrete fresh water cisterns/storage tank, all internal surface of floors, walls (to full height) and soffits (except the cistern openings) of potable water storage cisterns should be lined with a white non-toxic smooth finish such as ceramic tiles for cleaning purpose.

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#### 6.2.2.4

When fibreglass storage tank is to be used, prior approval by the Water Authority must be sought. Fibreglass storage cistern for potable water shall be of an approved type or certified to contain no toxic materials and suitable for storage of potable water.

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### 6.2.3 Cover for Water Tanks

#### 6.2.3.1

A cistern must be so located as to minimize the risk of contamination of stored water and be fitted with a suitable close fittings lockable cover that is not airtight. The cover must be so positioned as to facilitate inspection and cleaning. The covers must be so positioned as to facilitate inspection and cleaning.

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#### 6.2.3.2

(a) Every storage cistern shall have a lockable close fitting rigid cover secured by mechanical means which excludes light and the ingress of particles and / or insects from the cistern.

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(b) The cover shall be made of a material or materials which do not shatter or fragment when broken and which will not contaminate any condensate which may form on its underside or the stored water.

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(c) For the potable water storage cistern, the cover and its base frame shall possess double upstand edges interlocking one another to provide additional protection.

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#### 6.2.3.3

Double sealed covers with locking devices shall be provided for all storage cisterns other than cisterns that provide supply solely for irrigation, flushing and fire-fighting. The double-sealed covers prevent the ingress of surface water.

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### 6.2.4 Installation Requirements for Inlet and Outlet Pipe

#### 6.2.4.2 Controlling Incoming Water Supply

##### 6.2.4.2.1

The inlet of a single cistern fed by a gravity supply must be fitted with a ball float valve and stop valve.

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##### 6.2.4.2.2

(a) For ball float valves of a nominal diameter not exceeding 50mm, their valve bodies must be made of copper alloy or stainless steel.

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(b) For ball float valves of a nominal diameter exceeding 50mm, their valve bodies must be made of copper alloy, stainless steel, epoxy coated cast iron or epoxy coated ductile iron.

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##### 6.2.4.2.3

(a) Floats for use with fresh water must be made of copper alloy or stainless steel.

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6.2.4.2.4

Ball float valves fitted to a cistern must have the size of the orifice, the size of the float and the length of the lever so proportioned to one another that, when the float is immersed to an extent not exceeding half its volume, the valve is watertight against the highest pressure at which the valve may be required to work.

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6.2.4.2.5

A ball float valve or float-operated valve fitted to a cistern must be

- (a) securely fixed to the cistern above the waterline of the float of the valve, and  
(b) must be supported independently of the inlet pipe (unless the inlet pipe is itself rigid and securely fixed to the cistern), in a position that no part of the body of the valve is submerged when the cistern is charged to the overflowing level.

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6.2.4.2.6

- (a) If a ball float valve or float-operated valve is provided with a pipe so arranged as to discharge water into a cistern below its overflowing level, an air hole must be provided in the outlet chamber of the valve above the overflowing level.

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- (b) The air hole must be of a size sufficient to prevent syphonage of water back through the valve.

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6.2.4.2.7

Ball float valves must not be fitted to a cistern that is used to contain heated water.

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6.2.4.2.8

The inlet of a single cistern fed by a pumped supply must be fitted with an automatic control switch and without any stop valve.

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6.2.4.2.9

- (a) The ball valve or control switch shall shut off the supply when the water level is 25mm below the invert of the overflow pipe or the warning pipe if there exists one.

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- (b) The invert of the inlet pipe or the face of the outlet nose of the ball valve shall be not less than 25mm above the top of the overflow pipe.

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6.2.4.2.10

- (a) In case of a mixed flushing water supplies, the water tank shall be fitted with a ball float valve with submerged float control and a fullway gate valve for controlling and isolating the inflow of mains supply respectively.

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- (c) Performance of the ball float valve shall meet the requirements specified in case of gravity supply.

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6.2.4.3 Outlet Water Pipes6.2.4.3.1

The invert of an outlet pipe from a water storage tank with capacity less than 5000 litres shall be at least 30 mm above the bottom of the tank; this distance shall be increased to 100 mm if the storage tank capacity is 5000 litres or more.

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6.2.4.3.2

A stop valve must be provided at the outlet of a cistern, and provision shall be made for a drain-off pipe to enable the cistern to be emptied.

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6.2.4.3.3

Fullway gate valves shall be used with as the stop valves in Cl. 6.2.4.3.2 at the outlet pipe of every water storage cistern. The drain-off pipe shall be properly plugged or adequate means shall be provided to prevent any unauthorized operation of the control valve at drain-off pipe. If the outlet of a flushing water cistern is of nominal size 50mm or below, a ball valve can be used to substitute the above gate valve.

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6.2.4.4 Overflow Pipes and Warning Pipes6.2.4.4.1

All overflow and warning pipes of potable water storage cisterns shall be constructed of corrosion-resisting material.

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6.2.4.4.2

The overflow pipe shall be at least one commercial size larger than the inlet pipe and shall in no case be less than 25 mm in diameter must be fitted to a cistern and be extended to terminate in a conspicuous position. The overflow pipe must not be connected to a drain or sewer or to the overflow pipe from another cistern.

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6.2.4.4.3

The position of discharge should be in a communal area easily visible and accessible by the occupants.

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6.2.4.4.4

If the overflow pipe is not extended to terminate in a conspicuous position, the overflow pipe shall be installed with an overflow alarm with signal transferred to a 24-hourly manned management office for timely notification. Full justifications for such arrangement shall be provided to the WA for consideration and approval.

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6.2.4.4.6

No part of the overflow pipe shall be submerged inside the storage tank

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6.2.4.4.7

A grating and a self-closing non-return flap shall be provided at the overflow pipe outside the storage tank.

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6.2.4.4.9

The warning pipes shall be installed at a level below the overflow pipe and shall be either extended to conspicuous location, i.e. outside of the building periphery for roof tank or outside the pump room for sump tank, or installed with signal transferred to a 24-hourly manned management office.

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6.2.5 Size of Storage Tanks for Flushing, Domestic and Trade/Commercial Water Uses6.2.5.1

The proportion of capacity of sump cistern to roof cistern is recommended to be in the order of 1:3. Otherwise, the designer shall demonstrate that the proposed ratio of sump cistern to roof cistern is capable of fulfilling the designed demand.

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#### 6.2.5.2

The capacity of the flushing water storage shall be designed according to the criteria in Table 6.2.5.2.1 with a minimum capacity of 250 litres. [applicable to new applications with Form WWO 542 submitted on or after 1 January 2019 only.]

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#### 6.2.5.3

Storage criteria for fresh water supply for domestic flats is listed in Table 6.2.5.3.1.

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#### 6.2.5.4

For industrial building:

(a) The entire internal services shall be supplied from storage cisterns with separate outlets / downpipes feeding independent systems to serve separately the industrial and processing purposes and the other general and ablution appliances.

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(b) These independence systems serving separately the industrial and processing purposes and the other general and ablution appliances should not be interconnected.

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### 6.2.6 Other Recommendation/Requirement

#### 6.2.6.1

Structural design of the cistern and its supports should be subject to the requirements of the Building Authority.

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#### 6.2.6.2

When the capacity of water cistern exceeds 5000 litres, adoption of twin-tank system is required. The applicability shall also be subject to factors such as availability of plant room space.

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#### 6.2.6.3 to 6.2.6.5

(a) A set of inlet, outlet and associated overflow and drain pipes shall be provided to each cistern compartment.

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(b) Each inlet of a twin-cistern fed by a pumped supply must be fitted with an automatic control switch and a stop valve for temporary isolation purpose.

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(c) For water supplies other than pumped supply, this inlet shall comply with requirements stated in Clause 6.2.4.2.1 of Part A of TR.

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## **6.5 Pressure Reducing Valves**

#### 6.5.1

No part in the internal pipework and/or draw-off point shall be subject to excessive high pressure. In case of excessive high pressure, provision of break pressure tanks at a suitable level of the internal supply system would be a positive and viable means to reduce the water pressure. Alternatively, pressure reducing valves may be provided in lieu of break pressure tank.

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#### 6.5.2

Whenever a pressure reducing valve is installed,

(a) a bypass arrangement shall be incorporated with the provision of a second pressure reducing valve, except for fire service installations, to enable isolation of any defective pressure reducing valve for repair and replacement when necessary;

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(b) A pressure indicator shall be provided for pressure monitoring and the associated pipes and fittings shall be able to withstand the maximum pressure that may arise upon the failure of the pressure reducing valve as far as practicable. Fault alarm shall be installed with signal transferred to a 24-hourly manned management office for timely notification, except for fire service installations.

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## **6.6 Stop Valves for Draw-off Points**

### **6.6.1**

Individual stop valves shall be provided at all draw-off points or at a series of draw-off points if situated close together.

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## **6.7 Water Taps**

### **6.7.1 Application of Water Taps**

#### **6.7.1.1**

When infra-red sensor operated automatic taps are used as inside services, a stop cock or gate valve must be installed at the upstream of each fitting for manual isolation of water supply.

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#### **6.7.1.2**

Self-closing taps, of non-concussive type and of approved pattern, or infra-red operated automatic taps, shall be used for the public or communal lavatory basins.

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#### **6.7.1.3**

Except with the written permission of the Water Authority, fitting with a threaded outlet, or any device facilitating the connecting of rubber hose or another type of flexible hose, must not be used.

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### **6.7.2 Installation Requirements for Sanitary Fixtures Supplied by Water Taps**

#### **6.7.2.1**

All taps supplying baths, lavatory basins, sinks or similar apparatus shall have a stop valve fixed in a readily accessible position to control the supply to each fitting or branch pipe supplying a range of fittings.

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#### **6.7.2.2**

Every inlet to a bath, lavatory basin or sink shall be distinct from, and unconnected with, any outlet therefrom and every outlet for emptying such bath, lavatory basin or sink shall be provided with a well-fitting and easily accessible watertight plug or some other equally suitable apparatus.

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#### **6.7.2.3**

The level of the hot or cold water draw-off point to a bath, lavatory basin or sink shall be above the level of the overflow. In the absence of overflow in the fixtures, the top edge of the bath, basin or sink shall be considered instead.

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**6.7.2.4**

If water supply to any bidets, sitz bath, slop and sluicing sink or similar apparatus is liable to be submerged, the following shall be provided:- S

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- (a) a storage cistern supplying water to such apparatus only;
- (b) a storage cistern for flushing purposes only; or
- (c) a hot water distribution system supplying such apparatus only.

**6.8 Domestic Appliances****6.8.1 Water Purifiers/Filters****6.8.1.2**

Domestic water purifiers/ filters must not be connected directly to the mains E

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**6.8.1.4**

In case further water treatment is needed for special needs, requirements for backflow prevention and written permission from the WA for typical types of water filters are summarized in Table 6.10.1.4.1. E

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**6.8.2 Washing Machines/Dishwashing Machines****6.8.2.2**

Washing machines/ dishwashing machines with submerged inlets are considered to have high level of contamination hazard and must be installed with appropriate backflow prevention devices according to Table 4.2.3.7.1. E

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**6.11 Earthing****6.11.1**

Inside service as an earth electrode

- (a) The metal work of an inside service shall not be used as an earth electrode. E

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## Appendix 1A – Essential aspects of plumbing design in new buildings

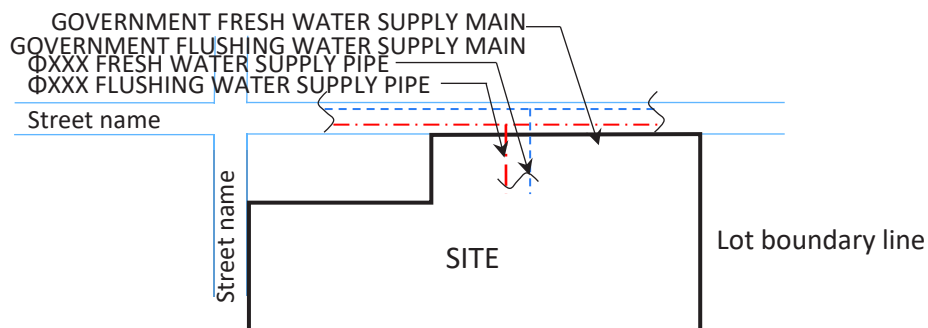
*(For reference only. Please refer to the Technical Requirements of Plumbing Works in Buildings)*

### Section A – Connection

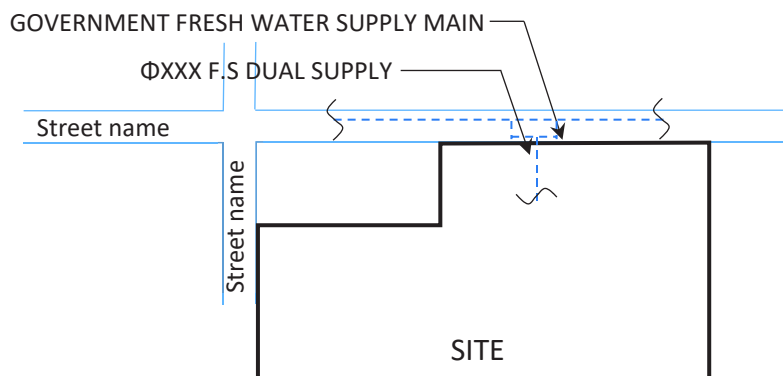
#### Essential items:

1. Provide site location plan in scale 1:1000
2. Provide connection layout plan with the following details:
  - (a) Show the lot boundary line clearly
  - (b) Show the location(s) of connection pipe(s)
  - (c) Show the size(s) of connection pipe(s) and size(s) to be justified by estimated consumption
  - (d) Show the type of connection (single/dual/twin)
  - (e) **[For FS]:** provide independent connection for FS
  - (f) **[For FS]:** provide appropriate type of connection (single/dual feed)

Example: Connection details (Fresh and Flushing Water Supply)



Example: Connection details (Fire Service Supply)



## Section B – Master Meter (MM), sub-meters (SM), check meters (CM) details

### Essential items:

1. [FW, TMF, FS]: Development more than 1 building block

Y → Go to Item 2A, 2B

N → Go to Item 2C

2A. General Arrangement of MM and CM:

- Conform to Fig. 1

2B. General Arrangement of SM at branch mains

- [FW, FS]: Conform to Fig. 1

2C. General Arrangement details:

- Conform to Fig. 2

Otherwise MM is required, go to Item 2A.

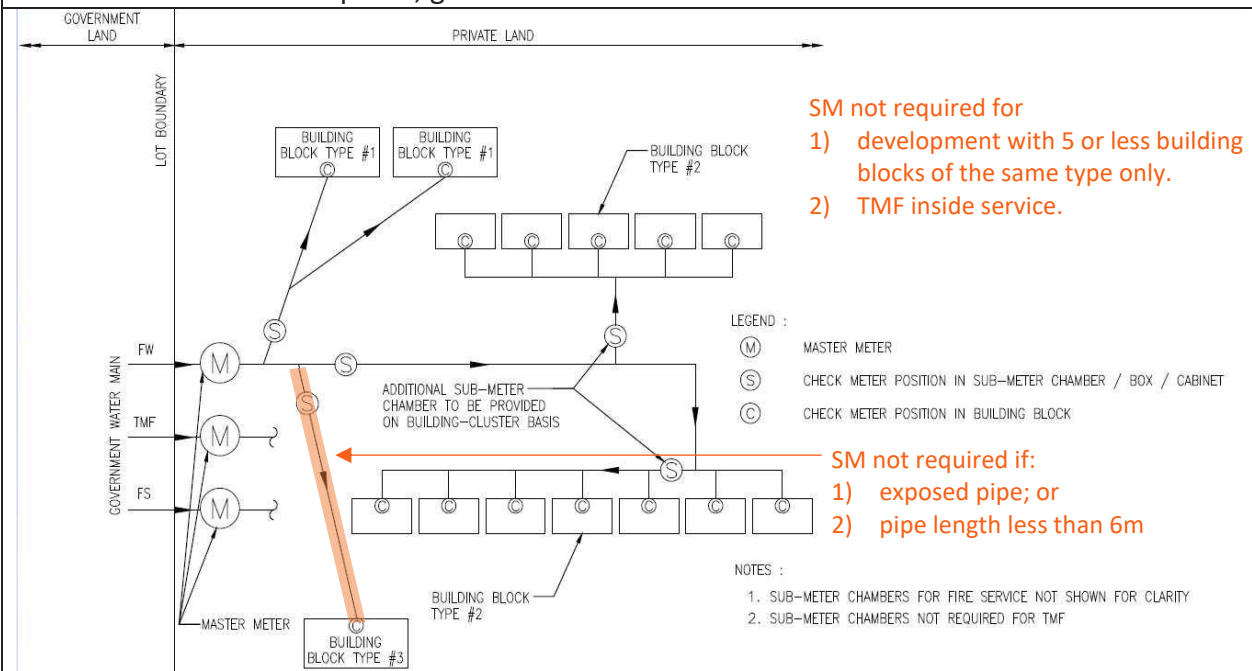


Fig. 1 Typical configuration of Master meter and Sub-meter chambers in Multiple-Block Development

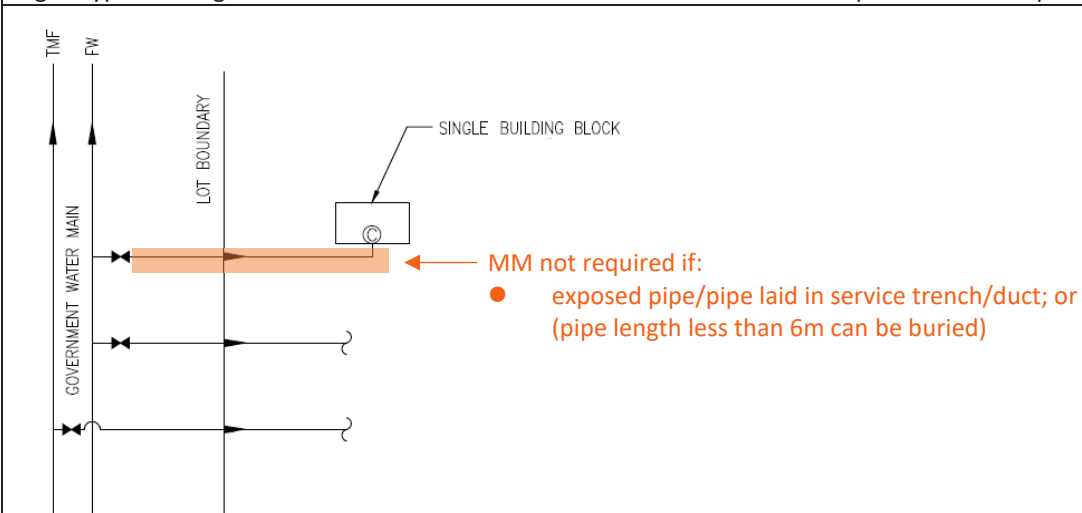


Fig. 2 Typical configuration of Master meter and Sub-meter chambers in Single-Block Development

## Section B – Master Meter (MM), sub-meters (SM), check meters (CM) details

### 3A. [MM]: Pipe diameter $\leq 100\text{mm}$

- master meter box/cabinet, details conforms to Fig. 3.

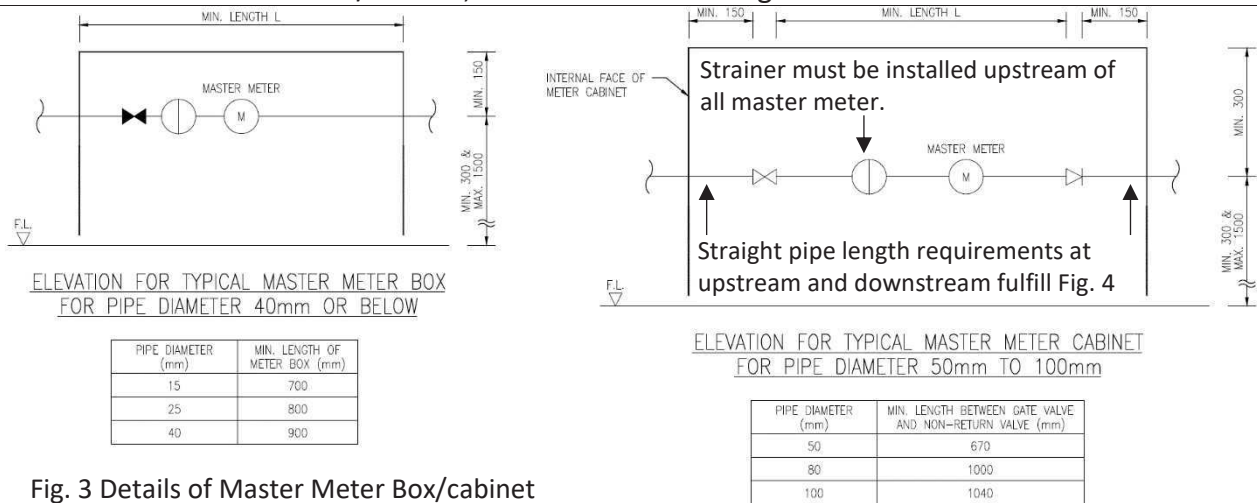


Fig. 3 Details of Master Meter Box/cabinet

### 3B. [MM]: Pipe diameter $> 100\text{mm}$

- master meter room, details conforms to Fig. 4.

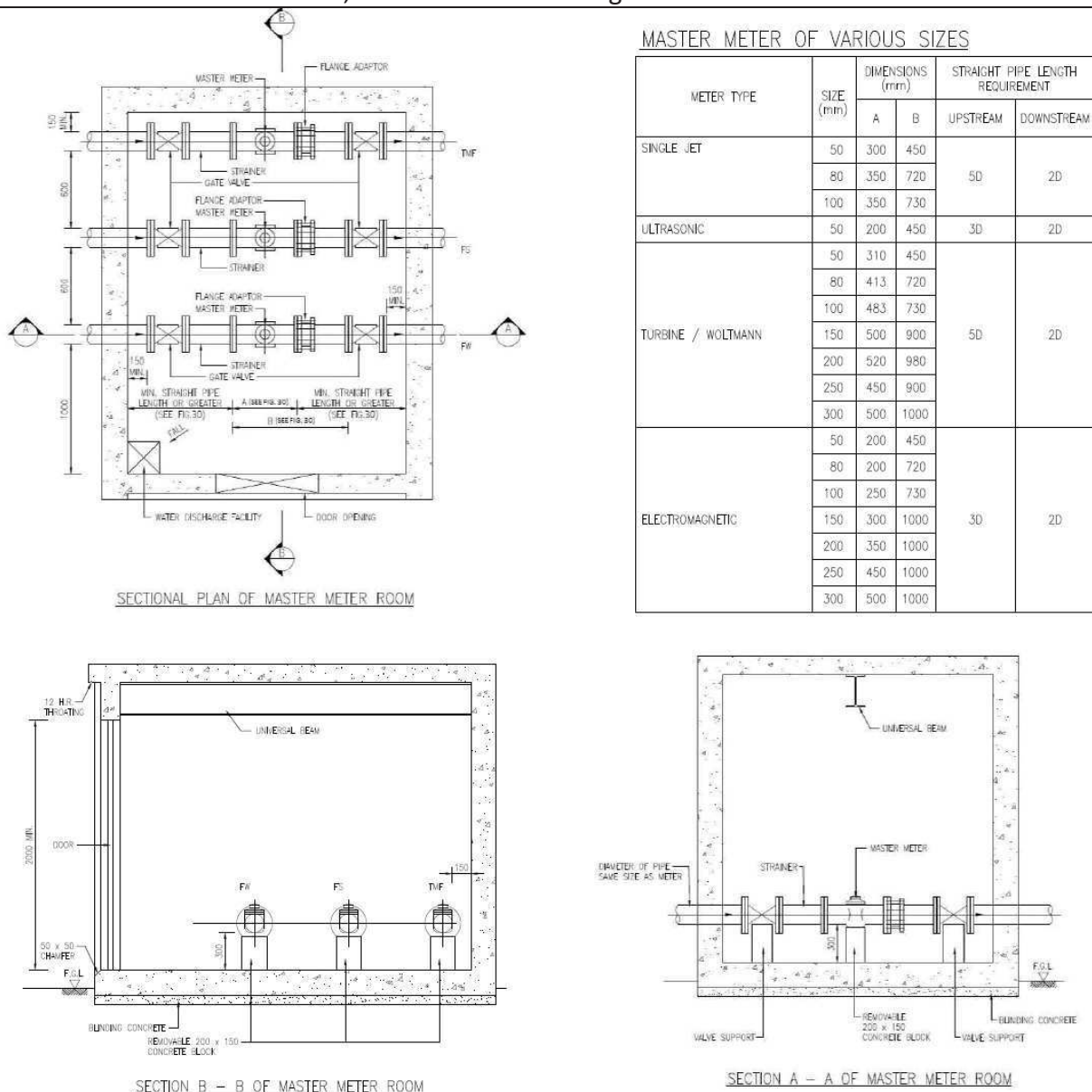


Fig. 4

Typical details of master meter room

### Section B – Master Meter (MM), sub-meters (SM), check meters (CM) details

4. **[MM]**: Master meter room architectural requirements conform to Fig. 5.

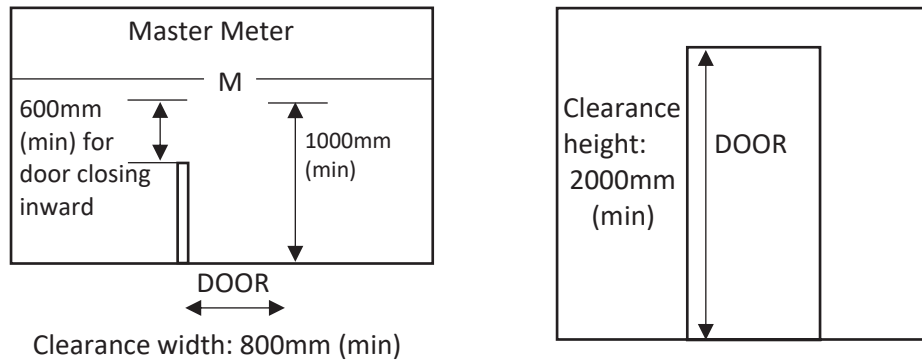


Fig. 5 Typical plan view and elevation view of master meter room

5. **[SM]**: Sub-meter chambers conform to Fig. 6.

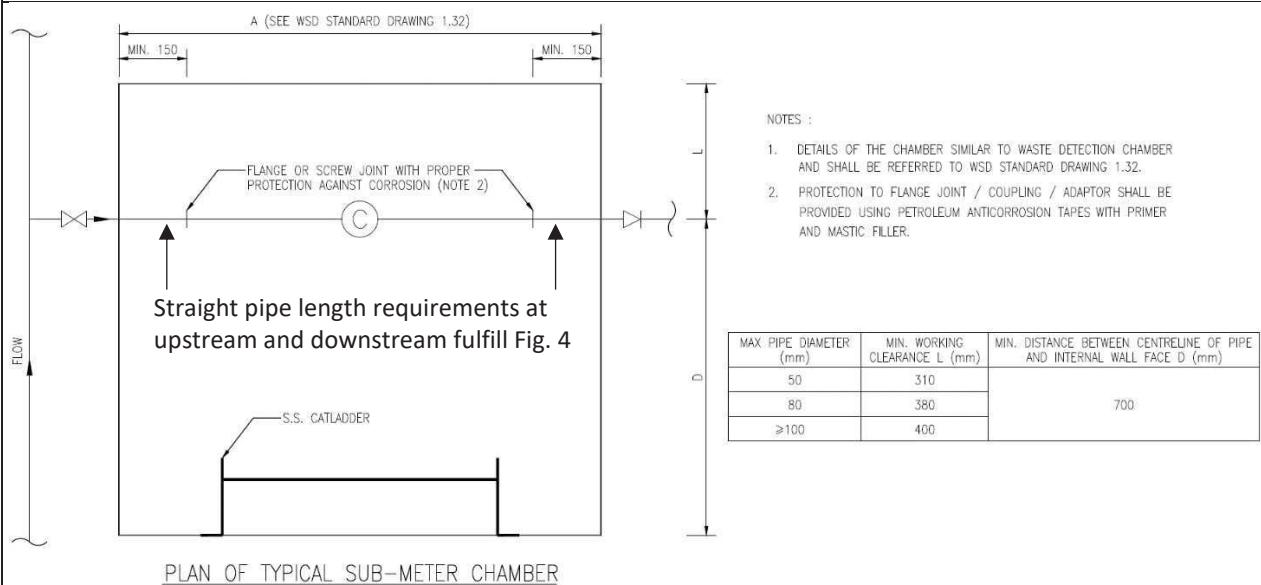


Fig. 6 Details of sub-meter chamber

6. **[SM]**: Sub-meter box/cabinet conform to Fig. 7.

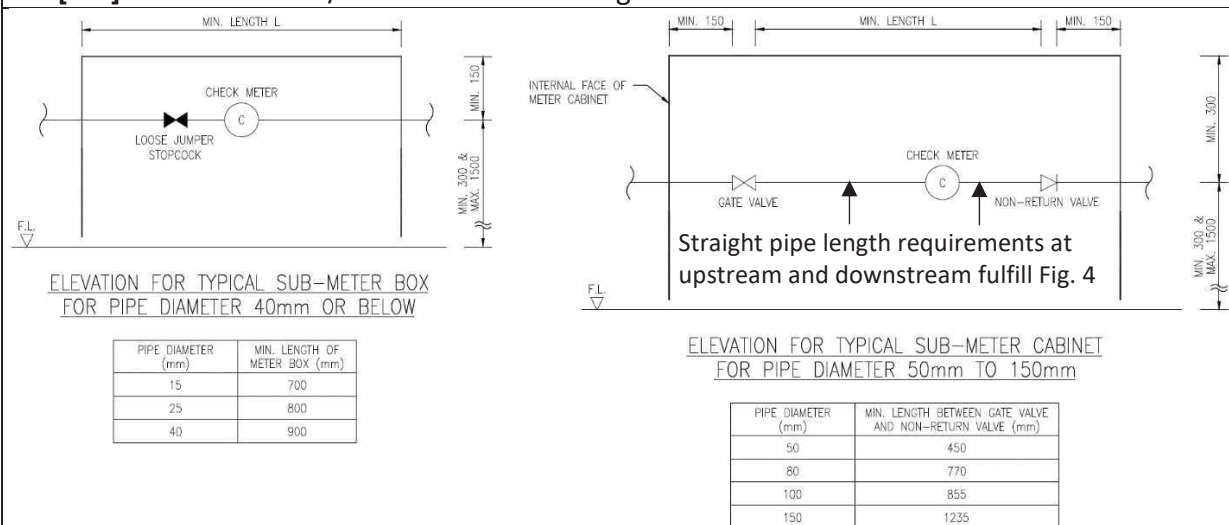
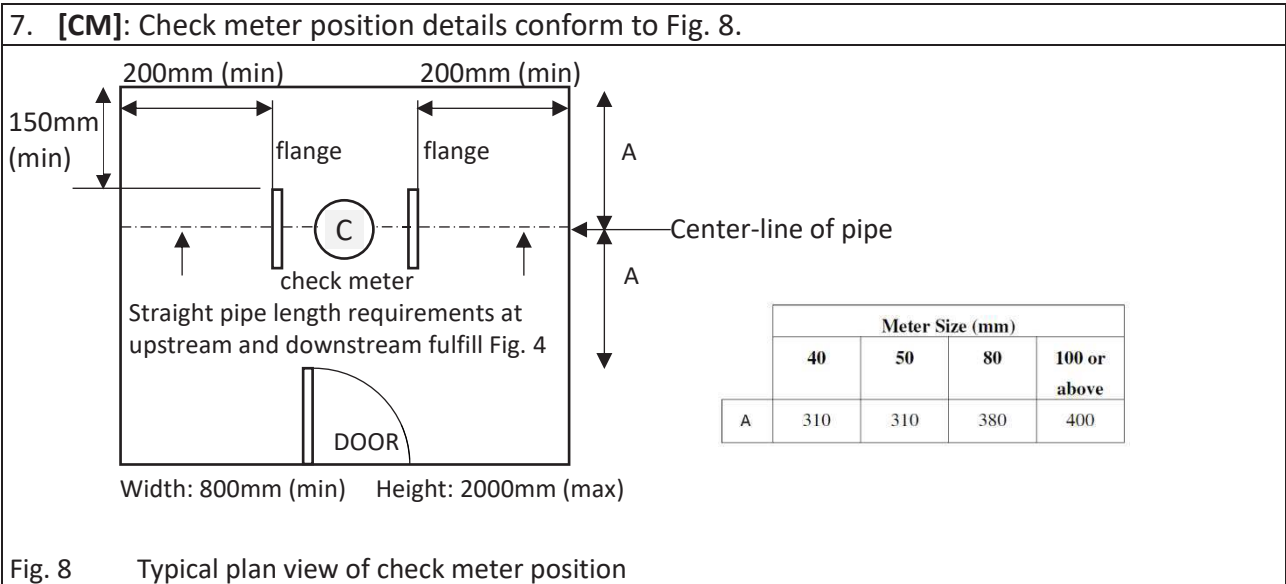


Fig. 7 Details of sub-meter Box/cabinet

Section B – Master Meter (MM), sub-meters (SM), check meters (CM) details



## Section C – Water storage tank details

### Essential items:

1. Storage volume/size of storage required justified with design criteria below:

#### [FW] Storage Criteria:

- Domestic (sump and pump system)

Up to 10 flats	135 litres/flat (total storage including sump tank), minimum 500 litres
More than 10 flats	90 litres for each additional flat

- Trade/Commercial premises:

Food Shop	(Small)	900 litres	Not including provision of stores, fruiterers, etc.
	(Large)	1800 litres	
Restaurants		25 litres/seat (0.929m <sup>2</sup> /person on net area) (1.394m <sup>2</sup> /person on gross area)	
Barber's Shop and Beauty Parlour		135 litres/chair	
Funeral Parlour		45 litres/92.903m <sup>2</sup> on gross area	
School	Drinking	4.5 litres/head	
	Laboratory	45 litres/sink	
Industry		100% of daily demand	
Clinic		250 litres (surgery only)	
Dentist		250 litres/dental unit	
Clubs	Kitchen	2.5 litres/member	
	Changing Rooms	90 litres/shower (hot and cold combined)	
Office Blocks		45 litres/point	
Cinemas/Theatres		45 litres/point	
Hotels	Bedrooms	45 litres/single room (hot and cold combined) 70 litres/double room (hot and cold combined)	
	Pantries, Bars and Laundries	Individual consideration	
Boarding Houses and Staff Quarters		25 litres/bed (hot and cold combined)	
Fire Stations, Police Quarters, Army Barracks		45 litres/person x 50% of establishment (ablution rooms only – hot and cold combined)	

- Laundry:

Laundry Allowable Storage = $\frac{L}{T} \times 120 \text{ min.} \times N$	
where	L = Litres/complete operational cycle
	T = Time/complete operational cycle
	N = No. of machines

- Hospital: one day's consumption as given by hospital authorities
- Industrial use: one-day demand
- Boilers: Consider on a case-by-case basis. Formula for reference:

$$\text{Allowable Storage (litres)} = (\text{Boiler capacity (kW)} \times 15 - \text{percentage of water return (\%)}) \times \text{working hours.}$$

[FLW] Storage cistern capacity fulfilled the requirements below:

Building Types	Litres per flushing apparatus	Minimum capacity
Residential (Water closet)	30	250 litres
Commercial		
<ul style="list-style-type: none"> <li>● Urinal</li> <li>● Water closet</li> </ul>	30 40	

## Section C – Water storage tank details

2. Storage volume does not exceed maximum permitted capacity.
3. Storage volume exceeds 5,000 litres:
  - Y → twin-tank system is required. (subject to availability of plant room space and for potable and flushing water tank)
  - N → either single or twin-tank is acceptable.
4. General arrangement of water cistern conforms to Fig. 9 below:
  - (a) Inlet, outlet pipe and drain-off pipe for each compartment
  - (b) Overflow pipe one commercial size > inlet pipe and extended to conspicuous position (or with overflow alarm with signal transferred to 24-hr manned management office)
  - (c) Warning pipe below overflow pipe and extended to conspicuous location (or with signal transferred to 24-hr manned management office)
  - (d) Stop valve, ball float valve and automatic control switch at inlet
  - (e) Physical break between potable and non-potable cistern
  - (f) **[FS]**: separate supply tank for fire service sprinkler/drencher system and any other FS (e.g. hose reel)

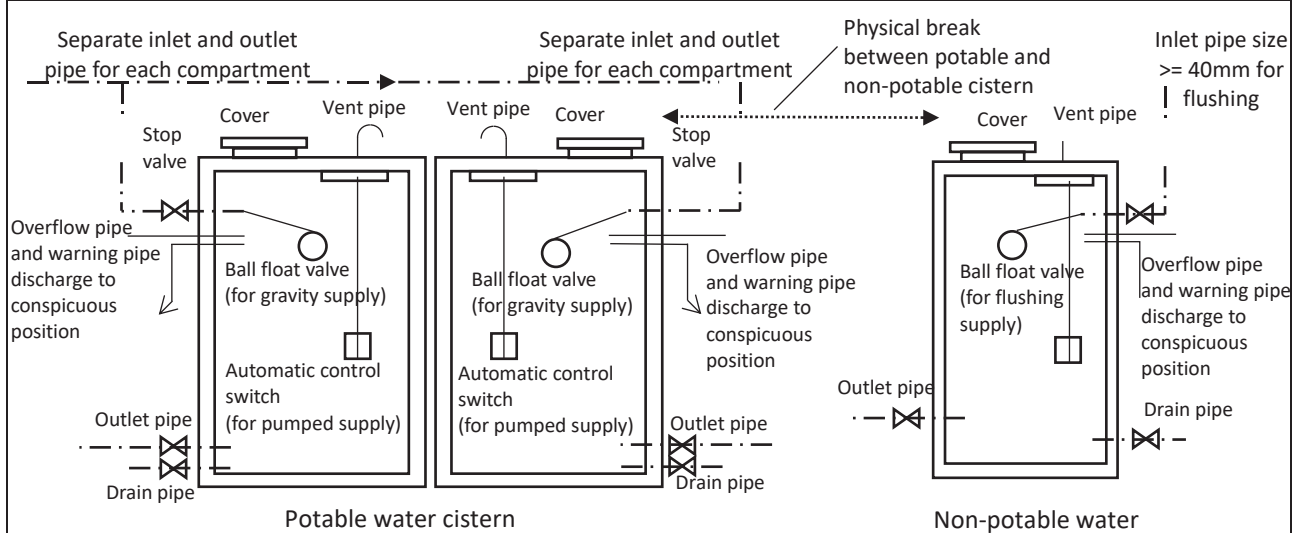


Fig. 9 Typical layout of water cistern  
(For mixed supply in flushing storage cistern, please refer to Fig. 15 of TR)



## Section D – Water meter details

### Essential items:

- |  |
|--|
| 1. Water meters (other than master meter, sub-meters and check meters) |
| (a) Concessionary supplies must be separately metered.                 |
| (b) Meter room/box/cabinet/chamber details conform to Fig. 10.         |

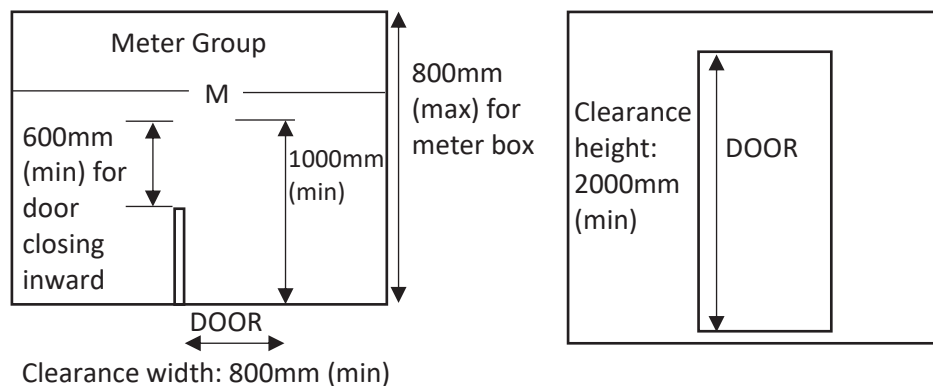


Fig. 10 Typical plan view and elevation of meter room/box

- (c) Meter position (dimension and arrangement) inside meter box/cabinet conform to Fig. 11.

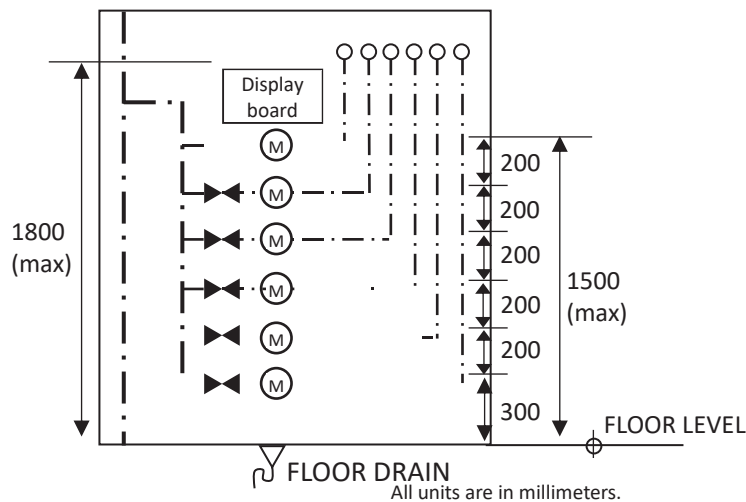
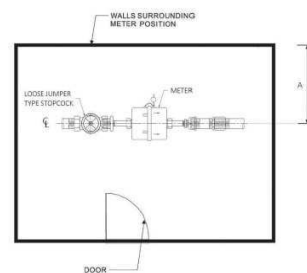
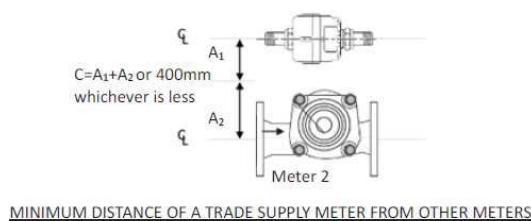
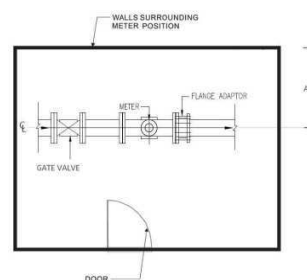


Fig. 11 Typical layout of 15mm meter position in a meter box/chamber/room

- (d) Minimum clearance should be provided for meters of trade supply according to Fig. 11a



### SMALL SIZED METERS (15MM – 40MM)



### LARGE SIZED METERS (50MM AND ABOVE)

NOMINAL SIZE OF WATER METERS (MM)	MIN. DISTANCE BETWEEN CENTERLINE OF TRADE SUPPLY METERS AND THE SURROUNDING WALL (MM) [A]	MIN. DISTANCE OF A TRADE SUPPLY METER FROM OTHER METERS (MM) [C]
15	100	$A_1 + A_2$ or 400MM Whichever is less  ( $A_1$ & $A_2$ REPRESENT THE CORRESPONDING DIMENSION 'A' OF THE METERS, SEE ABOVE ILLUSTRATION)
25	100	
40	125	
50	380	
80	400	
$\geq 100$	400	

Fig. 11a

## Section E – Other Miscellaneous details

### 1. [FW]: Water using appliances and other water application

- Prevention of backflow device(s) to be provided in the following applications:

Application	Backflow prevention devices
<ul style="list-style-type: none"> <li>● Irrigation (outlet &gt;150mm above soil level, no fertilizer or insecticides, manual point supply)</li> <li>● General ablution (basin, showers)</li> <li>● Fire services</li> </ul>	<ul style="list-style-type: none"> <li>● Check-valve/non-return valve</li> <li>● double check valve</li> <li>● anti-vacuum valve</li> </ul>
<ul style="list-style-type: none"> <li>● Irrigation (outlet &lt;150mm above soil level, no fertilizer or insecticides, drip-feed pipes)</li> <li>● Kitchen with submerged inlet</li> <li>● Commercial laundries</li> <li>● Industrial processes</li> </ul>	<ul style="list-style-type: none"> <li>● Break tank</li> <li>● Backflow preventer/Reduced Pressure Zone Device</li> </ul>

### 2. [FW]: Concessionary usages and supplies:

- Off-tank supply to be provided (including automatic irrigation system)
- Requirements for mains supply to be fulfilled (for irrigation uses by point supply, nurseries, sports field and planter at footbridges, flyovers and roadways)

### 3. [FLW/TMF]: Flushing apparatus:

(a) Flushing cistern supplied by flushing storage tank

(b) Trough water-closet or urinal fitted with flushing storage tank

(c) water-closet fitment or slop sink fitted with flushing storage tank or pressure flushing valve

### 4. [FS]: Hydrant / fire hose reel must be supply off-tank.

### 5. [Cooling tower]: Must have joined the “Fresh Water Cooling Towers Scheme”.

### [Non-centralized HW]:

#### 1. Factory test pressure of heater $\geq 1.5$ times maximum static pressure at mains water supply point:

Y → heater supplied without providing storage

N → heater supplied from cold water cistern of 45 litres for each flat

#### 2. Roof storage cistern of indirect system:

- separate down feed supplying to the apparatus; or
- supplied through an oversized down feed pipe, the pipe supplying the hot water apparatus branched from the down feed at a point above the top of the apparatus

#### 3. Layout of unvented electric thermal storage heater conform to Fig. 12.

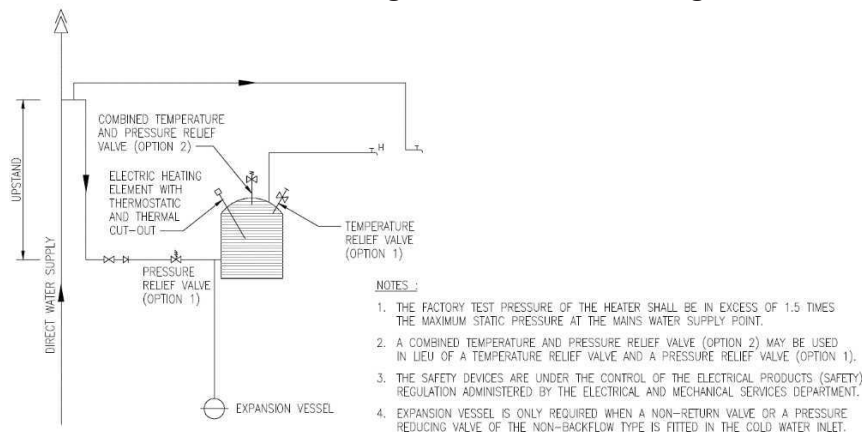
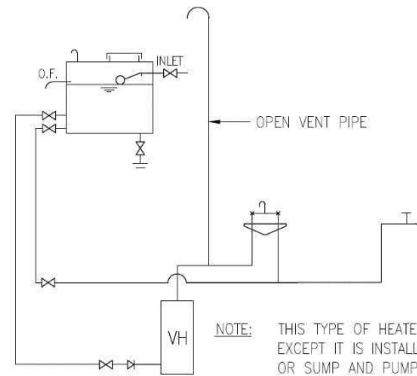


Fig. 12 Typical layout of unvented electric thermal storage type water heater

## Section E – Other Miscellaneous details

4. Layout of pressure type thermal storage heater conform to Fig. 13.



Storage cistern of 45 litres for each flat for direct supply system.

Fig. 13 Typical layout of pressure type thermal storage type water heater

5. Gas Geysers installed on top floor through storage cistern:
- low pressure governors required when head available < 5m at the highest hot water draw-off point
6. Cold water supply to mixing valves, water blenders or combination fittings:
- drawn by same source as is supplying the hot water apparatus

### [Centralized HW]

7. Layout conform to Fig. 14.

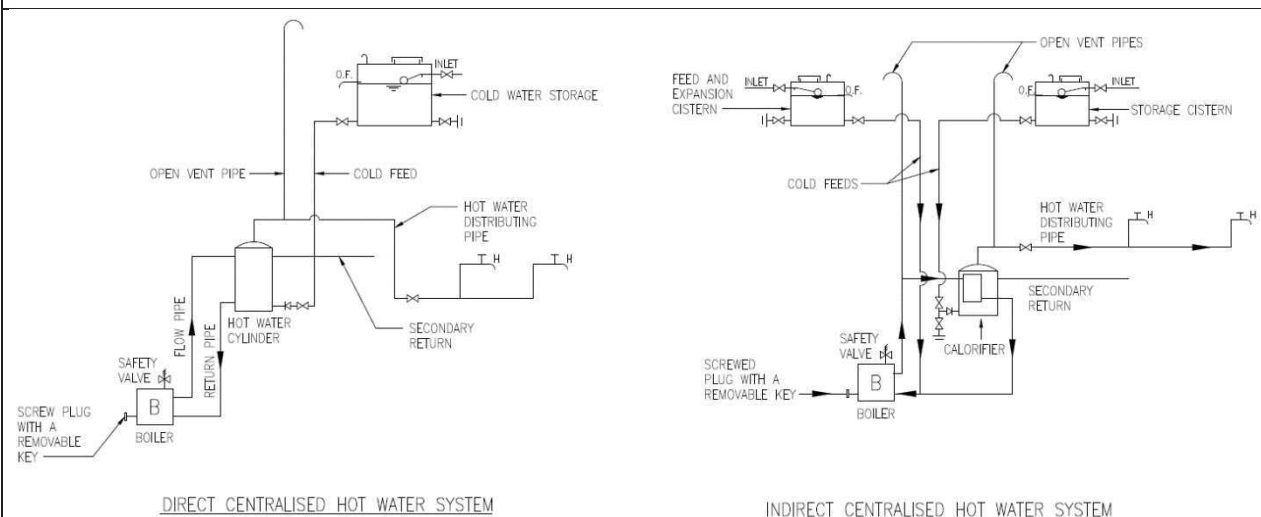


Fig. 14 Typical layout of centralized hot water system

8. Cold water supply to mixing valves, water blenders or combination fittings:
- drawn by a separate down feed from the hot water storage cistern
  - outlet from storage tank shall be slightly lower than the feed to the hot water system

-END-

## Appendix 2: Submission Requirements for Different Types of Application at Different Stages

### (I) Proposal Stage

		A. New Building	B. New Village House	Replumbing		Trade Supply		G. Temporary construction supply	H. Separate / Enlarge / relocate Meter
				C. online	D. offline	E. Food Production Business	F. Non-food production business		
Form WWO542									
1	Duly signed Form WWO542	✓ selecting “New Building” type	✓ selecting “Village Type House”	✓ selecting “Replumbing” type, mentioning “online replumbing works” next to the selection box	✓ selecting “Replumbing” type	✓ selecting “Others” type, specifying “food production business”	✓ selecting “Others” type, specifying the type of business	✓ selecting “Temporary water supply for a construction site” type	✓ selecting “separate metering” type, or “relocate/enlarge” type
2	Copy of BR for company submission	✓	✓	✓	✓	✓	✓	✓	✓
3	Copy of ID card for individual applicant	✓	✓	✓	✓	✓	✓		✓
Drawings									
4	<u>Site location plan in scale not less than 1:1000</u> – showing the location and boundary of the development	✓	✓	✓	✓	✓	✓	✓	✓
5	<u>Connection layout plan</u> – showing the alignment and size of the proposed connection pipes from the government main up to the development	✓	✓	✓	✓	✓	✓	✓	
6	<u>Underground pipes layout plan</u> – showing the proposed alignment and size of underground pipes to be laid in the development	✓		✓	✓			✓	
7	<u>Vertical plumbing line diagrams (VPLD)</u> – showing the draw off points, locations, pipe size, materials, valves, jointing methods and information on the type of water using apparatus	✓ (for MiC project, specifying the extent of plumbing installation to be constructed in MiC factory)	✓	✓ specifying “online replumbing” and the extent of online replumbing works	✓ specifying “offline replumbing”	✓	✓	✓	✓
8	<u>Building floor layout plan (if involving separate meter for trade purpose)</u> – showing the locations of these types of businesses and their respective meter position	✓			✓ other than typical residential floor layout	✓	✓		✓
9	Location of meter room/box	✓	✓			✓	✓	✓	✓
10	Meter room layout/meter box details and meter position arrangement details	✓	✓			✓	✓	✓	✓

		A. New Building	B. New Village House	Replumbing		Trade Supply		G. Temporary construction supply	H. Separate / Enlarge / relocate Meter
				C. online	D. offline	E. Food Production Business	F. Non-food production business		
11	Meter schedule	✓							
12	Fitment schedule	✓							
13	Estimated consumption	✓ daily				✓ maximum hourly flow rate	✓ maximum hourly flow rate	✓ maximum hourly flow rate	
14	Water storage tank schedule	✓				✓	✓	✓	
15	Pump schedule	✓							
16	Form WWO 1149	* (Optional)	✓						✓
Others									
16	Form WWO542 for temporary water supply	✓ for construction meter for flushing purpose	✓ for potable meter for systematic flushing	✓ if opt for adopting metered standpipe as means of temporary water supply					
17	Temporary water supply plumbing proposal for drinking and cooking purpose (Template form in Appendix 4)			✓					
18	Method on notifying customers not to use concerned taps for drinking and cooking purpose (Template form in Appendix 4)			✓					
19	Consent from relevant landlord if proposed connecting falls within private land and the connection is made by WSD	✓	✓			✓	✓	✓	
20	Checklists for Vetting Plumbing Proposal (Appendix 1)	✓							
Remarks	If WA considers pipe alignment plan for specific locations is necessary, WA will specify in the first reply to the applicant.	✓		✓	✓	✓	✓		✓

\* Applicant may opt to submit Form WWO 1149 together with Form WWO 542 or to be submitted together with Part I & II of Form WWO 46 during before commencement of works stage (See Part (II) below).

## (II) Before Commencement of Works (Form WWO46 Parts I&amp;II)

		A. New Building	B. New Village House	Replumbing		Trade Supply		G. Temporary construction supply	H. Separate / Enlarge / relocate Meter
				C. online	D. offline	E. Food Production Business	F. Non-food production business		
1	Duly completed Form WWO46 Part I & II - with Applicant's signature - Chop for company applicant	✓ and AP's signature	✓	✓	✓	✓	✓	✓ and AP's signature	✓
2	Form WWO 1149 *	✓ ***		✓ ** ***	✓ ***	✓ ***	✓ ***	✓ ***	
3	Meter acquisition programme (for meter >200 nos.)	✓							
4	Catalogue of water using apparatus if any (except drinking fountain and water dispenser)	✓			✓	✓	✓		
5	Data sheet for flow restrictor							✓	
6	<b>Supervision Plan</b> for plumbing installations carried out at off-site MiC factory	✓ (for MiC project only)							
7	<b>Shop Drawings and Production Schedule</b> for plumbing installations to be concealed in MiC modules	✓ (for MiC project only)							

\* Remarks: No GA Letter issued by WA is required to be enclosed in Form WWO 1149.

\*\* Remarks: In addition to provide the details of pipe materials and fittings intended to be installed, applicants are required to provide the details of low metal leaching rate fittings if opt to use low metal leaching rate fittings (Test report(s)/certificate(s) to prove compliance with an Australian/New Zealand Standard AS/NZS 4020 are to be submitted if low metal leaching rate fittings under Voluntary Low Metal Leaching Rate Pipes and Fittings Scheme "GA\*" are not adopted).

\*\*\* Applicable if the Form WWO 1149 is not submitted together with Form WWO 542 at proposal stage or there is no previously approved Form WWO 1149 for the plumbing works in the application. Please refer to Section 4.1.

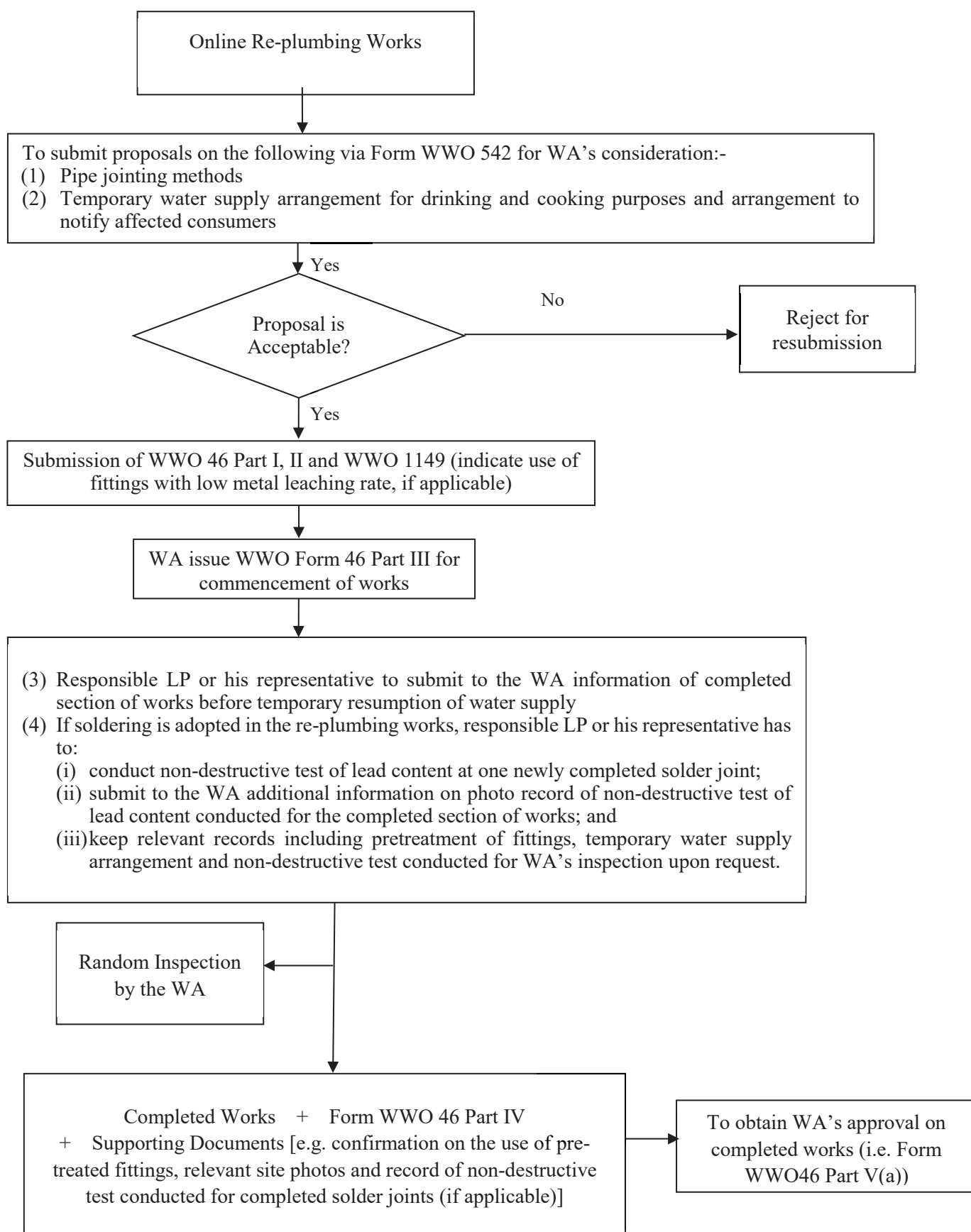


**(IV) After Issuance of Form WWO46 Part V(a)**

		A. New Building	B. New Village House	Replumbing		Trade Supply		G. Temporary construction supply	H. Separate / Enlarge / relocate Meter
				C. online	D. offline	E. Food Production Business	F. Non-food production business		
1	WWO243 to terminate consumership of flushing meter and change to master meter if construction meter for flushing purpose is applied	✓							
2	Record of systematic flushing	✓ (Appendix 18A)	✓ (Appendix 18)						
3	Meter Installation Table	✓	✓						



### Appendix 3: Workflow for Online Re-plumbing Works



## Appendix 4: Proposed Arrangement for Temporary Water Supply and Notification of Consumers

I/We, the undersigned, being the occupier(s)/person(s) responsible for the management of the premises at the following service address:

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hereby propose the temporary water supply and notification of consumers' arrangement for the online re-plumbing works to be carried out in the above address in accordance with the requirements stated in "Guide to Application for Water Supply" issued by Water Supplies Department as follows:

### **Temporary water supply arrangement**

#### **Means of arrangement: (Please tick at the appropriate box)**

- ☐ Provision of standpipe (Submission of another Form WWO 542 for the standpipe is required)
- ☐ Provision of temporary water tanks
- ☐ Provision of filters<sup>1</sup> to consumers
- ☐ Provision of bottled water to consumers
- ☐ To provide a water taking point from a tap within the premises in which the supply to this tap is from a plumbing system that is independent from the plumbing system involving the online re-plumbing works
- ☐ To provide a water taking point from a tap within the premises in which filter<sup>1</sup> is to be installed on this tap
- ☐ Require the consumers to flush the water tap for 2 minutes before taking water for drinking and cooking purpose
- ☐ Not applicable as there will be no affected consumers.
- ☐ Others (Please briefly describe the arrangement): \_\_\_\_\_

---



---

### **Arrangement for Notification of consumers**

#### **Means of arrangement: (Please tick at the appropriate box)**

- ☐ To post notice at conspicuous locations that can be seen by the customers within the buildings
- ☐ To send letter/notice to individual consumer
- ☐ Not applicable as there will be no affected consumers.
- ☐ Others (Please briefly describe the arrangement): \_\_\_\_\_

---

Date:

Consumer's signature/  
Signature of authorized  
person and company's  
chop: \_\_\_\_\_

<sup>1</sup> the installation of filter shall comply with the WSD's requirements:  
<http://www.wsd.gov.hk/en/faqs/index.html#8-139>

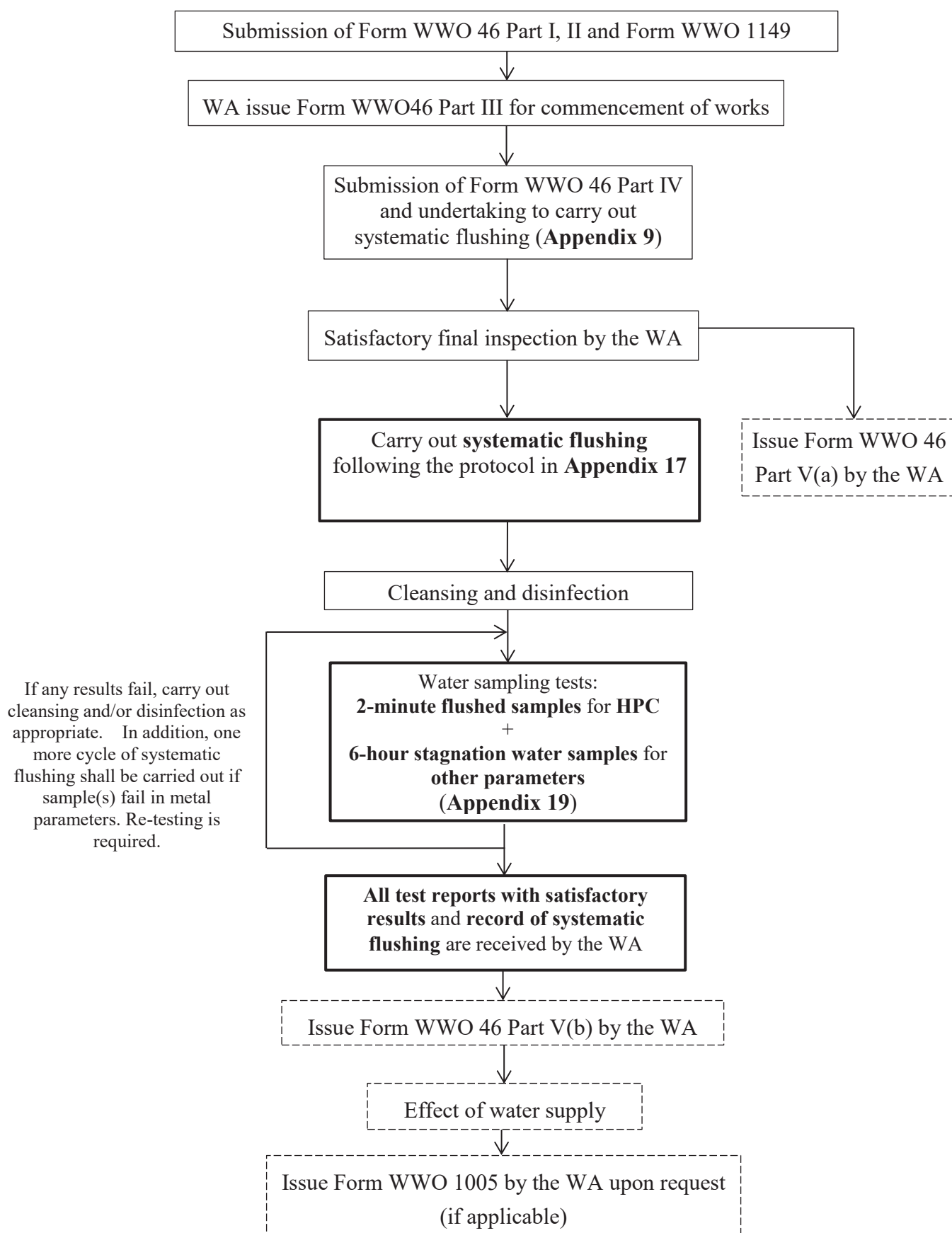
## Appendix 5: List of High Draw-Off Rate Non-Domestic Water Supply 高取水量的非住宅用水列表

<b>Business Account Categories:</b> Classification code 商業用戶類別: 種類編碼	<b>Description 說明</b> (see Classification of Water Consumer Accounts published in WSD website for details) (詳細說明參閱水務署網頁內水錶用戶分類)
<b>Restaurants 餐館業:</b>	
641100	restaurant – Chinese 餐館業 - 中式
641998	restaurant - other eating places 餐館業 - 其他飲食場所
641200	restaurant - non Chinese 餐館業 - 非中式
641300	restaurant - fast food shops 餐館業 - 快餐店
<b>Construction 建築業:</b>	
599998	construction, decoration, repair & maintenance 建築、裝修、維修和保養
<b>Concessionary Supply (Private) 特許供水(私人):</b>	
030030	cleansing & dust suppression for private use 私人清洗及去塵用水
030060	air conditioning for private use 私人空調設備
030040	gardens lawns and tennis courts for private use 私人花園、草坪及網球場
030020	private swimming pools & boating ponds 私人游泳池及泛舟池
<b>Private Clubs &amp; Institutions 私家會所和機構業:</b>	
938887	private academic & sport institution 私立教育和體育機構
938889	private clubs institution and religious organizations 未有於別處分類的私立會所、機構和宗教組織

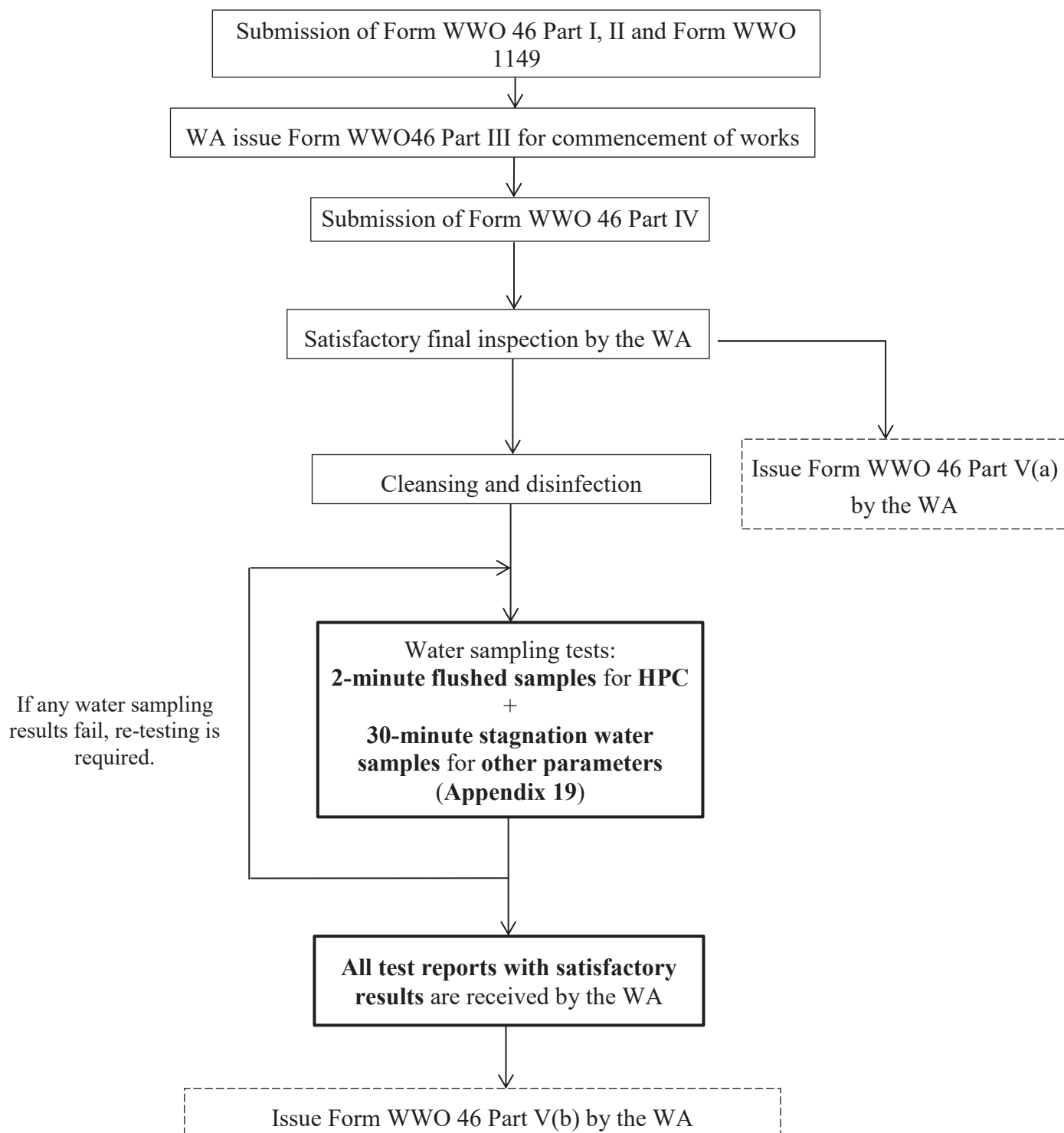
## Appendix 6: Flowchart for the Submission Requirements at Construction

### Stage

#### (A) Fresh Water Supply for New Buildings



## (B) Fresh Water Supply for Occupied Buildings/Village Houses



## **Appendix 7: Criteria for Exemption from Water Efficiency Requirements for Fittings in Inside Service**

Applicants may apply for exemption from the requirements within the scope of designated part of premises under the following scenarios:

### **Scenario (A)**

All premises with tenders/quotations concerning the installation of showers for bathing, water taps or urinal flushing valves therein invited before 1 February 2017 may be eligible for exemption from the mandatory use of designated products registered under WELS.

To apply for exemption, in the submission of the Form WWO 1149, the applicant shall:

- (a) submit documentary proof of such tender/quotation or the existence of such tender/quotation; and
- (b) demonstrate that the specifications stipulated under the said tender/quotation for the use of those designated products could not fulfill the prescribed water efficiency requirements to the WA for verification and approval.

### **Scenario (B)**

For all premises, applications for exemption based on technical issues like inadequate water pressure for the operation of water heater after the installation of designated products will also be considered on a case-by-case basis. To apply for exemption, the applicant shall provide information to fully justify why the mandatory use of designated WELS products cannot be complied with in the submission of the Form WWO 1149.

### **Scenario (C)**

For all premises, applications for relaxation of requirements based on reasons other than those under scenarios (A) or (B) will also be considered on a case-by-case basis. The relaxation may be in the form of relaxing the flow rate requirements of certain designated products or exempting certain designated part of premises from the mandatory requirements. To apply for the relaxation, the applicant shall provide detailed information in the submission of the Form WWO 1149 to fully justify why the mandatory use of designated WELS products cannot be fully complied with.

## **Appendix 8: Standards for Submission of As-built Records of Inside Service and Fire Service outside building structures**

1. The as-built records/drawings of the inside service (IS) and fire service (FS) outside building structures shall be submitted to WSD. This normally refers to underground or exposed pipes from the connection at lot boundary up to the connection at building boundary. The records shall include details of the IS/FS and its associated facilities and structures such as valves, fittings, fire hydrants, chambers, concrete thrust blocks/surrounds and the like.
2. Standard formats for hard copy of the IS/FS records shall be as follows:
  - (a) Full size paper drawing prints showing the alignment of IS/FS with scale preferably in 1:200 or 1:500, but not smaller than 1:500.
  - (b) A4 size Annex A for information not shown in the drawing in item (a) above.
3. The drawings should contain the following information where appropriate:
  - (a) horizontal alignment and vertical profile;
  - (b) size and type of pipe material;
  - (c) crown level in metre above Principle Datum (mPD) at vertical bends and points on vertical alignment with change in crown level >300 mm, otherwise at intervals not exceeding 40 metres, and at points of change of horizontal alignment;
  - (d) locations of valves, air valves, washouts, fire hydrant etc.;
  - (e) pressure rating of water mains;
  - (f) cathodic protection, if any;
  - (g) pipe environment, i.e. underground, exposed, pipe in sleeve, pipe in trough, pipe in tunnel etc;
  - (h) extent of water mains protected by leakage collection system;
  - (i) extent of the shallow cover mains when the cover of a section is less than the applicable requirement of Highways Department;

4. In addition of hard copy, submission of electronic copy is also required for new buildings project and optional for other projects. The electronic copy shall be delivered in the following formats:
  - (a) One set of drawings in AutoCAD (.dwg) or in Geographic Information System (GIS) format such as shapefile (.shp) format, personal geodatabase format or file geodatabase format;
  - (b) One set of electronic copy in Acrobat (.pdf) format;
  - (c) One set of Annex A in MS Word (.doc) format.
5. The electronic copy shall be stored in CD.



**Annex A to Appendix 8****Information not shown in drawings:**

No.	Description	Content
1	Owner	
2	Date of Completion of Works	
3		
4		

## **Appendix 9: Undertaking of Carrying Out Systematic Flushing in New Plumbing Works**

To the Water Authority,

We hereby undertake that systematic flushing will be carried out in the Approved Plumbing Works covered by Form WWO 46 Part IV (ASN No. \_\_\_\_\_) using the prescribed systematic flushing protocol set out in Appendix 17 of “Guide to Application for Water Supply” issued by Water Supplies Department.

\_\_\_\_\_  
Signature of Licensed Plumber

\_\_\_\_\_  
Name in full

\_\_\_\_\_  
Plumber’s License No.

Date: \_\_\_\_\_

## **Appendix 10: Pretreatment Protocol**

The pretreatment protocol for new fittings before installation is set out below :

- (1) Immerse the fittings<sup>1</sup> in container(s) with water for 5 days.
- (2) The fittings need to be in fully open position to ensure their inner surfaces are completely immersed into water.
- (3) The water needs to be changed once every day with a simple flush of the fittings by water.
- (4) During the immersion of fittings, the container(s) shall be covered with lid(s) to maintain good hygiene.

---

<sup>1</sup> The pretreatment is only applicable to fittings (including taps) with copper alloy inner surfaces which will be in contact with potable water. Please be cautioned that immersion of the part of fittings containing iron should be avoided during the pretreatment.

## **Appendix 11: Confirmation on the Use of Pre-treated Fittings**

To the Water Authority,

I hereby confirm that the fittings that are applicable for pretreatment and installed for the construction, installation, alteration or removal of the Approved Plumbing Works covered by the WWO 46 Part IV (ASN No. \_\_\_\_\_) in which this undertaking is attached to have been pre-treated using the pretreatment protocol as prescribed in Appendix 10 of “Guide to Application for Water Supply” issued by Water Supplies Department.

\_\_\_\_\_  
Signature of Licensed Plumber

\_\_\_\_\_  
Name in full

\_\_\_\_\_  
Plumber's Licence No.

Date: \_\_\_\_\_

## Appendix 12: Guidelines for Solder Joint Sampling for Newly Constructed Fresh Water Inside Services

Type	For Each Building (Newly Constructed Fresh Water Inside Services)	For Each Building (Potable Water Inside Services in Occupied Buildings)
(a) Building of storeys $\geq 4$	<p>During inspections of concealed pipes and fittings, two joints selected by representatives of the Water Authority for each inspection.</p> <p>During final inspection, two joints selected by representatives of the Water Authority for every five storeys, including :</p> <p>(i) One joint at communal pipes; and (ii) One joint in individual units.</p> <p>For four-storey buildings, two joints will be selected by representatives of the Water Authority, including:</p> <p>(i) one joint at communal pipes; and (ii) one joint in individual units.</p>	<p>During inspections of concealed pipes and fittings, three joints selected by representatives of the Water Authority for each inspection.</p> <p>During final inspection, three joints selected by representatives of the Water Authority for every five storeys, including :</p> <p>(iii) Two joints at communal pipes; and (iv) One joint in individual units.</p> <p>For four-storey buildings, three joints will be selected by representatives of the Water Authority, including:</p> <p>(iii) Two joints at communal pipes; and (iv) one joint in individual units.</p>
(b) Village House (c) Building of storeys $< 4$	Two joints selected by representatives of the Water Authority.	Three joints selected by representatives of the Water Authority.
(d) Separate Meter	One joint selected by representatives of the Water Authority.	Two joints selected by representatives of the Water Authority.

### Remarks :

1. The method of non-destructive tests on solder joints shall be agreed by the Water Authority. The tests shall be arranged by the Licensed Plumber (LP) and witnessed by representatives of the Water Authority. The Water Authority may choose to carry out the test itself if considered necessary.
2. For non-compliance on solder joints sampled, the LP shall examine all the pipe joints in the concerned part of inside service and rectify the non-compliance. After the rectification works have been completed, the LP shall apply to the Water Authority for re-inspection of the concerned part of inside service. Sampling of the pipe joints shall be conducted for nondestructive testing in accordance with the above table.

## **Appendix 13: Procedures for Voluntary Submission of Interim Inspection Checklists on Underground Pipes**

### **Part A**

1. When submitting Form WWO 46 Part IV to apply for interim inspection, the LP shall include the following documents:
  - (i) a covering letter indicating the licensed plumber opts for the “**Voluntary Scheme**”;
  - (ii) a completed checklist for interim inspection (Colour photos attached to the inspection checklists shall be submitted in both hard copy and soft copy (in PDF format and supplied in a CD ROM));
  - (iii) a report on the hydraulic test as set out in **Annex to Appendix 13**;
  - (iv) a certificate of interim inspection in the form of **Appendix 14** certified by qualified certifying persons; and
  - (v) curriculum vitae, certificate, certificate of Employment or the like of the [RPE(MCL)/(BSS)] or MHKIE in (MCL)/(BSS) and his representative (if applicable) to demonstrate their attainment of sufficient qualification and relevant working experience.

### **Part B**

2. Upon receipt of WWO46 Part IV and the documents mentioned in paragraph 1 above, WSD will make an appointment with the LP for interim inspection on a random basis. The licensed plumber will be notified whether the application is selected for inspection. In the event the application is not selected for inspection and the interim inspection checklists are checked with no apparent irregularity, the Water Authority will issue the approval for covering up the plumbing works.
3. In case the submission is of inferior quality in respect of completeness, correctness and clarity of the information provided, WSD may reject the inspection checklists. If the inspection checklist is rejected, WSD will notify LP the reasons of rejection and the LP is not allowed to re-submit the inspection checklists and the application will be handled as if it has not been submitted for voluntary submission of checklists.
4. The approval on the underground pipes or the notification that the interim inspection report is rejected shall be given to the licensed plumber within 7 working days of the receipt of WWO 46 Part IV. In case the application is selected for carrying out interim inspection, WSD will make an appointment with the LP for interim inspection within 7 working days of the receipt of WWO 46 Part IV. In case the inspection checklist submitted by the LP is rejected, WSD will make an appointment with the LP for interim inspection within 7 working days from the day on which the inspection checklist is rejected.
5. During the interim inspection of selected cases, WSD inspectorate would verify the “Inspection Results” of the submitted interim inspection checklists and record photos. Inspection will be carried out on items of the checklist inspected by the LP and certified by the qualified certifying persons, and on items not inspected by the LP on a random basis.
6. During the interim inspection, in case there is any disagreement on the “Inspection Results”, the WSD inspectorate shall indicate on the checklist as appropriate and both the WSD inspectorate and the LP shall sign next to the amendment.
7. During the interim inspection, if defect exists, its location with photo details should be recorded on the checklist. The LP and the WSD inspectorate should sign on the checklists and WWO 1008 will be issued.

**Annex to Appendix 13: Standard Template for Hydraulic Test Report**

Description of Works :

Diameter of Pipes (mm) :

Location :

Test Date and Time :

Length of Pipeline (m) :

Maximum static pressure<sup>1</sup> (m) :

Testing Pressure Head<sup>2</sup> (m) :

Details of discernible leakage of water from the pipeline during the test (if any):

---

Results of Pressure Test:

Pass ☐

Fail ☐

---

(Signature of LP)

---

(Name in full)

Date:

Note: Copy of testing record sheet should be attached together with this report

<sup>1</sup> Maximum static pressure = top water level (TWL) of supplied service reservoir - elevation head of the pipes being tested.

<sup>2</sup> Testing pressure head shall be 1.5 times the maximum static pressure if the maximum static pressure does not exceed 1.5 MPa (150m head); or 1.3 times the maximum static pressure if the maximum static pressure exceeds 1.5 MPa (150m head)

## Appendix 14: Certificate of Interim Inspection of Inside Service/Fire Service [For Underground Pipes]

**Address:** \_\_\_\_\_

To the Water Authority

I refer to the letter under reference \_\_\_\_\_ dated \_\_\_\_\_ submitted by (name of licensed plumber in full) \_\_\_\_\_ enclosing the Form WWO 46 Part IV.

I confirm that \*I/my representative<sup>1</sup> who has the qualification as given in the footnote below (name in full) \_\_\_\_\_ has witnessed the inspection by the licensed plumber of the underground pipes mentioned in the above Form WWO 46 Part IV and the hydraulic test on the concerned underground pipes carried out at the captioned address on (date) \_\_\_\_\_. I certify that the underground pipes mentioned in the above Form WWO 46 Part IV comply in all respects with the provisions of the Waterworks Ordinance (Cap. 102), the Waterworks Regulations (Cap. 102A), the requirements of the Water Authority and the applicable requirements set out in the Technical Requirements for Plumbing Works in Buildings, the Water Supplies Department Circular Letters to Licensed Plumbers and Authorized Persons and the Guide to Application for Water Supply issued by the Water Authority. I have reviewed and am satisfied with the attached completed inspection checklist(s) and hydraulic test report prepared by the licensed plumber.

I certify that the concerned underground pipes were satisfactorily tested to 1.5 times the maximum static pressure<sup>2</sup> if the maximum static pressure does not exceed 1.5 MPa (150m head); or 1.3 times the maximum static pressure if the maximum static pressure exceeds 1.5 MPa (150m head).

\_\_\_\_\_  
Signature of \*registered professional engineer<sup>3</sup> /  
member of the Hong Kong Institution of Engineers<sup>4</sup>

\_\_\_\_\_  
Name in full

\_\_\_\_\_  
\*RPE No. / MHKIE No.

\_\_\_\_\_  
\*Email / Correspondence Address

Date: \_\_\_\_\_

\* Delete where inappropriate

<sup>1</sup> The representative should have a Diploma or Higher Certificate in Electrical Engineering, Mechanical Engineering, Electrical Installation and Building Services, or Building Services (BS) Engineering from a Hong Kong polytechnic university/polytechnic, the Hong Kong Institute of Vocational Education or technical institute/technical college, or equivalent; and possess 3 years' relevant post-qualification experience in BS installation.

<sup>2</sup> Maximum static pressure = TWL of supplied service reservoir - elevation head of the pipes being tested.

<sup>3</sup> Registered professional engineer as defined in the Engineers Registration Ordinance (Cap 409). Registered Professional Engineers (Mechanical) with 2 years of relevant working experience in BS installation or Registered Professional Engineers (Building Services) are qualified for certification.

<sup>4</sup> Corporate member of the Hong Kong Institution of Engineers in the Mechanical discipline with 2 years of relevant working experience in BS installation or in the Building Services discipline are qualified for certification.



## Appendix 15: Procedures for Voluntary Submission of Final Inspection Checklists

### Part A

1. When submitting WWO46 Part IV to apply for final inspection, the LP shall indicate in the covering letter that he opts for joining the “**Voluntary Scheme**” on voluntary submission of inspection checklists. The name, email, RPE No./MHKIE no., curriculum vitae, certificate, certificate of Employment or the like of the certifying person – [RPE(MCL)/REP(BSS)] or MHKIE in (MCL)/(BSS) and his representative (if applicable) to demonstrate their attainment of sufficient qualification and relevant working experience should also be submitted.
2. Upon receipt of WWO46 Part IV, WSD shall issue “**Notification of the Selected Locations for Voluntary Submission of Final Inspection Checklists**” (Notification) by email advising the certifying person the selected zones for inspection and submission of the checklist within 7 working days of receipt of WWO46 Part IV. A sample of the Notification is attached at **Annex to Appendix 15** for reference. WSD shall also make appointment with LP for the date of final inspection when issuing the Notification. WSD’s target is to arrange final inspection for at least 70% of the cases within 14 working days (or on a date mutually agreed when making appointment with the LP if final inspection cannot be arranged by the LP within 14 working days) from the time making the appointment. The LP shall submit the following documents within 7 working days upon the issuance of the Notification:
  - (i) a completed checklist for final inspection (Colour photos attached to the inspection checklists shall be submitted in both hard copy and soft copy (in PDF format and supplied in a CD ROM)); and
  - (ii) a certificate of final inspection certified by qualified certifying persons as set out in **Appendix 16**.

### Part B

3. If the completed checklists were found to be not in order, WSD may require the LP to amend the completed checklist and provide supplementary document. If the LP does not submit the completed checklist within 7 working days of the issue of the Notification or the checklist is not amended or supplemented to the satisfaction of the WSD before the final inspection date, the inspection checklist will be rejected. Beside, in case the submission is of inferior quality in respect of completeness, correctness and clarity of the information provided such as out of focus photos, illegible handwriting and unclear description, WSD may reject the inspection checklists. If the inspection checklist is rejected, WSD will notify the LP the reasons of rejection and the LP is not allowed to re-submit the inspection checklists and the application will be handled as if it has not been submitted for voluntary submission. WSD will make an appointment with the LP for final inspection within 7 working days from the day on which the inspection checklist is rejected.
4. For new buildings, since some of the target items to be inspected (e.g. meter cabinet) are typically the same within the selected zones (e.g. high zone 15/F to 21/F), the LP shall prepare one set of typical inspection checklists (FI-A to FI-H as appropriate) with record photos for each individual zone selected by WSD.

5. During the final inspection, WSD would verify the “Inspection Results” of the submitted inspection checklists and record photos. WSD inspectorate may select extra sample(s)/location(s) for final inspection (e.g. another meter cabinet upstairs / downstairs) if necessary.
6. In case there is any disagreement on the “Inspection Results”, the WSD inspectorate shall indicate on the checklist as appropriate and both the WSD inspectorate and the LP shall sign next to the amendment.
7. If defect exists, its location with photo details should be recorded on the checklist. The LP and the WSD inspectorate should sign on the checklists and WWO 1008 will be issued.

- End -

**Annex to Appendix 15:****Notification of the Selected Locations for Voluntary Submission of Final Inspection Checklist**

ASN : \_\_\_\_\_

**(I) Check List FI-A (Tank and Pump Room)**

	Roof Tank	Intermediate Tank	Sump Tank and Pump Room	Break Pressure Tank	Break Tank	Other (As specify)
Fresh Water (FW)			✓			
Flushing Water (FLW)						
Fire Service (FS)						

**(II) Check List FI-B (Meter/Check Meter/Meter Position and Adjoining Pipes and Fittings/Master Meter Room)**

	Master Meter	Check Meter	Meter Position and Adjoining Pipes and Fittings	Master Meter Room
Fresh Water (FW)			✓	
Flushing Water (FLW)				
Fire Service (FS)				

**(III) Check List FI-C (Meter Cabinet/Room)**

	Zone		Floor	Meter Cabinet	Meter Room
Typical	Upper	✓	15/F to 21/F	✓	
	Middle				
	Lower				
Non-typical					

**(IV) Check List FI-E (Connection)**

	Connection
Fresh Water (FW)	✓
Flushing Water (FLW)	
Fire Service (FS)	

\_\_\_\_\_

**(V) Check List FI-F (Communal Part)**

	Zone		Floor	Riser Pipe & Valve	Down-feed Pipe & Valve
Fresh Water (FW)	Upper	✓	15/F to R/F	✓	✓
	Middle				
	Lower				
Flushing Water (FLW)	Upper				
	Middle				
	Lower				
Fire Service (FS)	Upper				
	Middle				
	Lower				

**(VI) Check List FI-G (Communal Part)**

		Swimming Pool (with balancing tank)	Swimming Pool (with feed tank)	Irrigation	Cleansing	Others (e.g. Hydrant, Hose Reel, Sprinkler, Fountain etc.)
Fresh Water (FW)	✓					Hot Water System
Flushing Water (FLW)						
Fire Service (FS)						

**(VII) Check List FI-H (Individual Household Flat/Unit)**

	Zone		Floor	Flat /unit No.
Typical	Upper	✓	15/F to 21/F	A
	Middle			
	Lower			
Non-typical				

**(VIII) Check List FI-I (Building of Storey <4, Village House and Construction Supply)**

	Connection	Meter / Cabinet Box	Communal Part	Individual Household Flat/Unit	Water Tank	Other (As specify)
Fresh Water (FW)						
Flushing Water (FLW)						
Fire Service (FS)						

**Appendix 16: Certificate of Final Inspection of Inside Service/Fire Service****Address:** \_\_\_\_\_

To the Water Authority

I refer to the letter under reference \_\_\_\_\_ dated \_\_\_\_\_ submitted by (name of licensed plumber in full) \_\_\_\_\_ enclosing the Form WWO 46 Part IV.

I confirm that \*I/my representative<sup>1</sup> who has the qualification as given in the footnote below (name in full) \_\_\_\_\_ has witnessed the inspection by the licensed plumber of the completed plumbing works mentioned in the above Form WWO 46 Part IV carried out at the captioned address on (date) \_\_\_\_\_. I certify that the completed plumbing works mentioned in the above Form WWO 46 Part IV comply in all respects with the provisions of the Waterworks Ordinance (Cap. 102), the Waterworks Regulations (Cap. 102A), the requirements of the Water Authority and the applicable requirements set out in the Technical Requirements for Plumbing Works in Buildings, the Water Supplies Department Circular Letters to Licensed Plumbers and Authorized Persons and the Guide to Application for Water Supply issued by the Water Authority. I have reviewed and am satisfied with the attached completed inspection checklist(s).

\_\_\_\_\_  
Signature of \*registered professional engineer<sup>2</sup> /  
member of the Hong Kong Institution of Engineers<sup>3</sup>

\_\_\_\_\_  
Name in full

\_\_\_\_\_  
\*RPE No. / MHKIE No.

\_\_\_\_\_  
\*Email / Correspondence Address

Date: \_\_\_\_\_

\_\_\_\_\_  
\* Delete where inappropriate

<sup>1</sup> The representative should have a Diploma or Higher Certificate in Electrical Engineering, Mechanical Engineering, Electrical Installation and Building Services, or Building Services (BS) Engineering from a Hong Kong polytechnic university/polytechnic, the Hong Kong Institute of Vocational Education or technical institute/technical college, or equivalent; and possess 3 years' relevant post-qualification experience in BS installation.

<sup>2</sup> Registered professional engineer as defined in the Engineers Registration Ordinance (Cap 409). Registered Professional Engineers (Mechanical) with 2 years of relevant working experience in BS installation or Registered Professional Engineers (Building Services) are qualified for certification.

<sup>3</sup> Corporate member of the Hong Kong Institution of Engineers in the Mechanical discipline with 2 years of relevant working experience in BS installation or in the BS discipline are qualified for certification.

## **Appendix 17: Flushing Protocol**

The building contractors/Licensed Plumbers (LP) are required to carry out three flushing cycles according to the following systematic flushing protocol [each cycle consists of steps (i) to (iv) below] for the completed inside services to cleanse the newly installed plumbing system-

- (i) Thoroughly flush the inside services at drinking water tap(s);
- (ii) Allow the water to stand for at least 3 hours;
- (iii) Thoroughly flush the inside services at drinking water taps(s) after (ii); and
- (iv) Allow the water in the inside services to stand overnight for at least 12 hours.

The inside service shall be thoroughly flushed again at drinking water tap(s) upon completion of all systematic flushing cycles.

The followings should be observed when carrying out systematic flushing:

- (i) All drinking water taps of newly installed inside service should be thoroughly flushed throughout the systematic flushing cycles.
- (ii) All strainers, if installed at the drinking water taps, must be removed before carrying out systematic flushing.

**Appendix 18: Record of Systematic Flushing for new village houses**

(Only one record is required for each village house)

ASN: \_\_\_\_\_

Location of new plumbing works: \_\_\_\_\_

Systematic Flushing has been carried out at the above-mentioned plumbing works as follows:

Cycle	Date	Steps	Start Time	End Time
1		Thoroughly flush at drinking water tap(s)		
		Water stagnation for at least 3 hours		
		Thoroughly flush at drinking water tap(s) again		
		Overnight water stagnation		
2		Thoroughly flush at drinking water tap(s)		
		Water stagnation for at least 3 hours		
		Thoroughly flush at drinking water tap(s) again		
		Overnight water stagnation		
3		Thoroughly flush at drinking water tap(s)		
		Water stagnation for at least 3 hours		
		Thoroughly flush at drinking water tap(s) again		
		Overnight water stagnation		
-		Final thorough flushing at drinking water tap(s) after three cycles of systematic flushing		

Record of additional systematic flushing before re-testing (if applicable):

Cycle	Date	Steps	Start Time	End Time
-		Thoroughly flush at drinking water tap(s)		
		Water stagnation for at least 3 hours		
		Thoroughly flush at drinking water tap(s) again		
		Overnight water stagnation		
-		Final thorough flushing at drinking water tap(s) after additional cycle of systematic flushing		

\_\_\_\_\_  
Signature of Licensed Plumber\_\_\_\_\_  
Name in full\_\_\_\_\_  
Plumber's License No.

Date: \_\_\_\_\_

**Appendix 18A: Record of Systematic Flushing for new building**

(One record is required for each floor)

ASN: \_\_\_\_\_

Location of new plumbing works: \_\_\_\_\_

Systematic Flushing has been carried out at the above-mentioned plumbing works as follows:

Floor	Cycle	Date	Steps	Start Time	End Time
	1		Thoroughly flush at all drinking water tap(s)		
			Water stagnation for at least 3 hours		
			Thoroughly flush at all drinking water tap(s) again		
			Overnight water stagnation for at least 12 hours		
	2		Thoroughly flush at all drinking water tap(s)		
			Water stagnation for at least 3 hours		
			Thoroughly flush at all drinking water tap(s) again		
			Overnight water stagnation for at least 12 hours		
	3		Thoroughly flush at all drinking water tap(s)		
			Water stagnation for at least 3 hours		
			Thoroughly flush at all drinking water tap(s) again		
			Overnight water stagnation for at least 12 hours		
	-		Final thorough flushing at all drinking water tap(s) after three cycles of systematic flushing		

LP should note that all strainers, if installed at drinking water taps, must be removed before carrying out systematic flushing.

Record of additional systematic flushing before re-testing (if applicable):

Floor	Cycle	Date	Steps	Start Time	End Time
	-		Thoroughly flush at drinking water tap(s)		
			Water stagnation for at least 3 hours		
			Thoroughly flush at drinking water tap(s) again		
			Overnight water stagnation for at least 12 hours		
	-		Final thorough flushing at drinking water tap(s) after additional cycle of systematic flushing		

The records of water meter readings at the above-mentioned floor are detailed as follows: (only record readings before and after completion of all systematic flushing cycles)

Meter No.							
Reading before start of systematic flushing							
Reading after end of systematic flushing							
Meter No.							
Reading before start of systematic flushing							
Reading after end of systematic flushing							
Meter No.							
Reading before start of systematic flushing							
Reading after end of systematic flushing							

Signature of Licensed Plumber (LP)

Name in full

LP's License No.

Date



## Appendix 19: Water Sampling Requirements

### (A) Water Sampling Locations

Type	Fresh water inside service (excluding fresh water flushing supply and fire service supply)	
	new plumbing works	plumbing works in occupied buildings
<b>Building of storeys &gt;=4</b>		
Indirect Supply System	<ul style="list-style-type: none"><li>● 1 sample at one of the roof tanks</li><li>● 1 sample at one of the sump tanks</li><li>● 1 sample at drinking water tap for each downpipe</li></ul>	<ul style="list-style-type: none"><li>● 1 sample at one of the *roof tanks</li><li>● 1 sample at one of the *sump tanks</li><li>● 1 sample at **drinking water tap/sampling tap for ***each downpipe/supply system</li></ul>
Direct Supply System	<ul style="list-style-type: none"><li>● 1 sample at the drinking water tap in the supply system</li><li>● 1 sample at the drinking water tap at another location within the supply system</li></ul>	<ul style="list-style-type: none"><li>● 1 sample at **drinking water tap/sampling tap in the supply system</li><li>● 1 sample at drinking water tap/sampling tap at another location within the supply system</li></ul>
Underground pipe	<ul style="list-style-type: none"><li>● 1 sample at each connection point</li></ul>	<ul style="list-style-type: none"><li>● 1 sample at each connection point</li></ul>
<b>Village House and Building of storeys &lt;4</b>		
Direct Supply System	<ul style="list-style-type: none"><li>● 1 sample at drinking water tap of the supply system</li></ul>	<ul style="list-style-type: none"><li>● 1 sample at **drinking water tap/sampling tap of the supply system</li></ul>
Underground pipe	<ul style="list-style-type: none"><li>● 1 sample at each connection point</li></ul>	<ul style="list-style-type: none"><li>● 1 sample at each connection point****</li></ul>
<b>Temporary Houses/Squatters</b>		
	<ul style="list-style-type: none"><li>● If the Licensed Plumber carries out the flushing for the whole pipe in one go, 1 sample at drinking water tap of the supply system shall be collected.</li></ul>	
<b>Separate Meter</b>		
	<ul style="list-style-type: none"><li>● 1 sample at drinking water tap in the supply system</li></ul>	<ul style="list-style-type: none"><li>● 1 sample at drinking water tap in the supply system</li></ul>
<b>Sampling Protocol</b>		
	Paragraph 2, Part (B) of Appendix 19 (6 hour stagnation sampling)	Paragraph 2, Part (B) of Appendix 19 (30 mins stagnation sampling)

Type	Fresh water flushing and fire services supply (non-potable fresh water supply)	
	new plumbing works	plumbing works in occupied buildings
<b>All building and application types</b>		
	● 1 sample at each connection point	● 1 sample at each connection point****
<b>Sampling Protocol</b>		
	Paragraph 2A, Part (B) of Appendix 19	Paragraph 2A, Part (B) of Appendix 19

\* If the extent of plumbing works involve roof tanks/sump tanks

\*\* If the extent of plumbing works do not involve inside service for individual units, samples taken at sampling taps installed on the plumbing works are accepted

\*\*\* If the extent of plumbing works do not involve downpipe, samples will be taken at random locations of the supply system

\*\*\*\* Applicable if the extent of plumbing works involve connection to WSD's mains.

Licensed Plumbers (LPs) shall arrange accredited laboratories to carry out water sampling and analysis at all sampling locations (including at connection point) and for any pipe size. List of laboratories accredited for testing lead, cadmium, chromium, nickel, antimony and copper in water with all reporting limits meeting the Hong Kong Drinking Water Standards can be found at:

[https://www.itc.gov.hk/en/quality/hkas/doc/CAB\\_accredited\\_for\\_all\\_6\\_trace\\_metals.pdf](https://www.itc.gov.hk/en/quality/hkas/doc/CAB_accredited_for_all_6_trace_metals.pdf)

LPs may also request Water Science Division of the WSD to carry out water sampling and analysis at connection point of all pipe size. The contact person for making such request are as follows:

Areas	Contact Person	Telephone No.
Hong Kong and Outlying Islands	Waterworks Chemist/Treatment (1)	2294 2738
Kowloon and New Territories East	Waterworks Chemist/Treatment (2)	2691 7689
New Territories West	Waterworks Chemist/Treatment (3)	2450 6121

## **(B) Sampling Protocol for Commissioning Test of Fresh Water Plumbing System**

### **1. General**

- 1.1 This sampling protocol is applicable for collection of water samples at water sampling tap and connection point for commissioning of newly installed or replaced inside services for fresh water supply in occupied or unoccupied buildings.
- 1.2 Site supervisors/testing laboratories shall take necessary measures and maintain relevant records to ensure that the water samples are:
- a) taken by a competent person with proper training supported by relevant training records on the sampling procedures and handling of the water samples.
  - b) representativeness of the water quality of the new plumbing system at the time of sampling
  - c) free from contamination during the course of sampling, sample storage and transportation.
- 1.3 Sample Bottles
- 1.3.1 Sample for Metal Tests: Sample bottles shall be made of PE, PP, FEP, PE-HD or PTFE<sup>1</sup>, with a capacity of 1-litre each. Sample bottles and caps shall be: (i) thoroughly cleaned with a phosphate-free detergent solution; (ii) thoroughly rinsed with deionised water; (iii) soaked in dilute nitric acid (~10% volume dilution of concentrated HNO<sub>3</sub>) or dilute hydrochloric acid (~25% volume dilution of concentrated HCl) for 24 hours; (iv) rinsed with deionised water several times, and (v) dried and kept tightly capped in storage.
- 1.3.2 Sample for Chemical and Physical Tests: Sample bottles shall be made of plastics or glass except soda glass with a capacity of 500mL. The bottles shall be prepared in accordance with the ISO 5667-3.
- 1.3.3 Sample for Bacteriological Tests: Sample bottles shall be glass or plastics with a capacity of 250mL and the recommendations for sample bottles given in ISO 19458 shall be followed. The bottles shall be prepared in accordance with the ISO 19458. Sufficient amount of sodium thiosulfate (7.1 mg of sodium thiosulfate (pentahydrate) can neutralise 1 mg of residual chlorine) shall be added into the sample bottle to remove the residual disinfectant present in the water sample.

---

<sup>1</sup> FEP: perfluoro(ethylene-propylene) plastic; PE: polyethylene; PP polypropylene; PE-HD: high density polyethylene; PTFE: polytetrafluoroethylene

- 1.4 Water samples shall not be taken at the following drinking water tap or sampling tap:
- a) Leaking tap;
  - b) Drinking water tap installed with an inline water filter or a point-of-use filter with no bypass switch;
  - c) Insufficient space below the tap to accommodate the sampling bottle;
  - d) Environment with high risk of contamination such as close to works site or dusty environment or dirty water tap.
- 1.5 All information and observation regarding the sampling location shall be recorded, in particular, when a tap at a sampling location is considered not representative and rejected due to conditions mentioned in Clause 1.4 above.
- 1.6 Never rinse sample bottle prior to sample collection.
- 2. Collection of Water Sample from Fresh Water Plumbing System (excluding fresh water flushing and fire service supply)**
- 2.1 Collection of Water Samples for Heterotrophic Plate Count (HPC) Test at Water tap/Connection Point.
- 2.1.1 For fresh water inside service in unoccupied buildings, before flushing, remove and cleanse the strainer. Flush the temporary sampling pipe/tap (for connection point) or water tap for at least 2 minutes. Close the sampling pipe/tap or water tap and reinstall the strainer after flushing. Disinfect the sampling pipe/tap or water tap in accordance with ISO 19458. Open the sampling pipe/tap or water tap and flush briefly<sup>2</sup> with a view to collecting a representative sample from the plumbing system for commissioning test. Place a sterile sample bottle under the sampling pipe/tap or water tap and take 250-mL sample for testing of HPC. For fresh water inside service in occupied buildings, after collecting the water sample for testing of HPC as above, the strainer is removed and cleansed again, followed by 3 minutes flushing at the sampling pipe/tap or water tap. Then the strainer is reinstalled to the water tap before commencing the 30 minutes stagnation period as stated in clause 2.2.1.
- 2.2 Collection of Water Samples for metal, chemical, physical and E. coli tests after water stagnation.

---

<sup>2</sup> Flush briefly only to overcome influence of disinfection of the tap or to remove non-representative volume of sample trapped inside temporary sampling pipe and tap which is not part of the new plumbing system.

2.2.1 Always collect the water sample for metal testing first after the stagnation period (For fresh water inside service in unoccupied buildings, the stagnation period is minimum 6 hours. For fresh water inside service in occupied buildings, the stagnation period is minimum 30 minutes) followed by collection of water samples for analysis of chemical, physical parameters and E. coli. The start time of stagnation and the collection time of stagnation samples shall be recorded.

## 2.2.2 Sample Collection at Water Tap

2.2.2.1 At the end of the required stagnation period, place a 1-L sample bottle for metal testing under the tap. Collect 1-litre of water with the tap opened as much as possible without spillage. Never rinse the sample bottle before sample collection.

2.2.2.2 Immediately after collection of 1-L of water sample, place a 500mL sample bottle for chemical and physical testing under the tap and collect 500mL of water. Close the tap after sample collection.

2.2.2.3 Disinfect the tap in accordance with ISO 19458. Open the tap and flush briefly<sup>2</sup> with a view to collecting a representative sample from the new plumbing system for commissioning test. Place a sterile sample bottle under the tap and take 250-mL sample for testing of E. coli.

## 2.2.3 Sample Collection at Connection Point

2.2.3.1 For sample collected from temporary sampling pipe/tap, at the end of the required stagnation period, open the sampling pipe/tap and flush briefly<sup>2</sup> with a view to collecting a representative sample from the plumbing system for commissioning test. Place a 1-L sample bottle for metal testing under the sampling pipe/tap immediately after the brief flushing. Collect 1-L of water without spillage. Never rinse the sample bottle before collection.

2.2.3.2 Follow clauses 2.2.2.2 and 2.2.2.3 to collect water samples for chemical, physical and E. coli testing.

## **2A. Collection of Water Sample from fresh water flushing and fire service supply**

2A.1 Collection of Water Samples for Physical, Chemical and Bacteriological Tests at Connection Point

- 2A.1.1 Flush the temporary sampling pipe/tap for connection point for at least 2 minutes. Place a 500 mL sampling bottle for physical and chemical tests under the sampling pipe/tap and collect 500 mL of water. Close the sampling pipe/tap after sample collection.
- 2A.1.2 Disinfect the sampling pipe/tap in accordance with ISO 19458. Open the sampling pipe/tap and flush briefly<sup>3</sup> with a view to collecting a representative sample from the new plumbing system for commissioning test. Place a sterile sample bottle under the sampling pipe/tap and take 250 mL sample for bacteriological tests (i.e. *E. coli* and HPC).

### 3. Sample Labelling and Transfer

- 3.1 All sample bottles shall be properly labelled immediately after sample collection to avoid inadvertent mislabelling and sample mix-up. Pack each water sample bottle in a plastic bag and store them in a cold box for transportation. Deliver the samples to an accredited laboratory for analysis as soon as possible after completion of the sampling. Care shall be taken to avoid sample contamination during sample collection, handling, storage and transportation.

### 4. Retesting Arrangement

- 4.1 The retesting arrangement in Table 1 shall be followed when any result(s) of parameter(s) fail(s) to comply with the acceptance criteria in Table 2.

Table 1: Retesting Arrangement

Parameters	Scenarios		
Metal parameters	fail	pass	pass
Physical and Chemical parameters	pass or fail	fail	pass
Bacteriological parameters ( <i>E. coli</i> and Heterotrophic Plate Count (HPC))	pass or fail	pass	fail
<b>Parameters to be retested</b>	all parameters	all parameters other than metal	

Table 2: Acceptance Criteria

<sup>3</sup> Flush briefly only to overcome influence of disinfection of the tap or to remove non-representative volume of sample trapped inside temporary sampling pipe and tap which is not part of the new plumbing system.

Parameter	Acceptance Criteria
<i>Chemical and Physical</i>	
Turbidity	$\leq 3.0$ NTU
Colour	$\leq 5$ Hazen Unit
pH at 25°C	$\geq 6.5$ and $\leq 9.2$
Free Residual Chlorine	$> 0$ mg/L and $\leq 1.5$ mg/L
Conductivity at 25°C	$\leq 300$ $\mu$ S/cm
<i>Metals</i>	
Lead	$\leq 10$ $\mu$ g/L
Chromium	$\leq 50$ $\mu$ g/L
Nickel	$\leq 70$ $\mu$ g/L
Cadmium	$\leq 3$ $\mu$ g/L
Copper	$\leq 2000$ $\mu$ g/L
Antimony	$\leq 20$ $\mu$ g/L
<i>Bacteriological</i>	
HPC	$\leq 20$ cfu/mL
<i>E. coli</i>	0 cfu/100mL

## 5 References:

- 5.1 ISO 5667-3:2012 “Water Quality -Sampling Part 3: Preservation and handling of water samples”
- 5.2 ISO 19458:2006 “Water Quality – Sampling for microbiological analysis”

## Appendix 20: Submission for Temporary Resumption of Water Supply for Purposes other than Drinking and Cooking for Online Re-plumbing Works

To the Water Authority,

ASN: \_\_\_\_\_

Address of works: \_\_\_\_\_

I hereby submit to you the following section of works that had been completed:

### (A) Works Completed :-

Location of works	Description of completed works

### (B) Site photo(s) showing the completed works described in (A) and the relevant pipes and fittings to be attached on separate sheet(s):-

*(Note: If soldering is adopted for connecting copper pipes, please also attach relevant photo(s) to show a satisfactory result of non-destructive test of lead content for the copper pipe joint.)*

### (C) I undertake and declare that the information given in this submission and photos attached is true, correct and complete.

\_\_\_\_\_  
Signature of Licensed Plumber/  
Representative of Licensed Plumber

\_\_\_\_\_  
Name in full

\_\_\_\_\_  
Plumber's Licence No.

Date: \_\_\_\_\_



## Appendix 21: Common Mistakes Found in the Plumbing Submissions

The followings are some common mistakes found in the plumbing submissions.

### A) Common Mistakes for Meter/Check Meter Positions

1. The check meter positions are not located close to the lot boundary and connection to the Government mains.
2. Size of potable and flushing supply connections is not indicated.
3. A loose jumper type valve in lieu of a fullway gate valve is fixed at the inlet side of the salt water flushing supply check meter position. A non-return valve has not been fitted on the delivery side as close as possible to the check meter position.
4. Detailed drawing with dimensions showing the arrangement of meter position in meter box/cabinet and the fitting at the meter position is not given, e.g. a clear side distance from the centre of meter position on the delivery side to the internal wall of the meter cabinet/room should be indicated and the vertical distance space between each meter position should be indicated.
5. The meters are housed in a multi-function room used for other purpose, e.g. fire service.
6. No proper floor drain is provided in the meter room.
7. The meter positions in the meter room are arranged in groups with front-row and back-row making meter reading and maintenance difficult.
8. Meter sizes are not indicated. The premises that the meters are serving to are not specified.
9. All pipework before meter positions are not exposed or laid in a proper service duct to facilitate inspection and repairs.
10. No safe, free and uninterrupted access to the meter room/box is provided as an entrance at communal area .
11. For meters arranged in groups, no meter position shall be lower than 300mm nor higher than 1500mm above the floor level.
12. Meter/check meter position is not close to the connection point.
13. The clear effective pipe length and interval height at check meter position are not indicated.
14. The proposed meters / check meter positions are not located in an area easily accessible for meter reading.

15. For check meter of 100mm diameter or smaller, a straight length of pipe of 5 x D and 2 x D is not provided upstream and downstream of the check meter position respectively, which should be clearly shown on the drawing. (where D is the nominal bore of the meter).
16. A short piece is not provided at the check meter position.
17. A safe access to the master meter room is not shown clearly on the drawing.
18. Drain / weep holes on the master meter room, water meter cabinet and check meter cabinet are not shown on the drawing.
19. Universal beams capable of lifting up 2.5 times the weight of the meter are not provided in Master Room.

#### B) Common Mistakes for Inside Service

1. Types of water heaters to be used are not indicated.
2. Sizes of supply pipes are not specified.
3. Stop valve is not provided to the supply pipe serving the series of draw-off points.
4. The hot-water draw-off point is not at the left hand side according to the conventional practice.
5. A receptacle, e.g. a sink is not indicated at the draw-off point.
6. The piping which solely serve a particular flat/unit is not avoided running through other flats/units.
7. Size of proposed incoming connection(s)/metered connection/ water meter(s) are not correctly sized in the whole system.
8. Flushing water pipe spans across and over the fresh water tank.
9. Tee-branch valve is missing.
10. A loose jumper type stopcock is not provided and placed with their spindle in the vertical position.
11. The type of washing machine (submerged inlet or non-submerged inlet) is not stated on the drawings.
12. The installation of jacuzzi in domestic flat is not installed off tank with independent water meter.
13. The bleed-off tank of the cooling plant is not discharged into the flushing water tanks (for saving the flushing water demand of the entire building).

### C) Common Mistakes for Sump and Pump System

1. Details of the storage tank, e.g. storage capacity, materials of the tank and the silencer pipe in the storage tank are not specified.
2. A fullway gate valve is not provided on the drain-off pipe.
3. Details of overflow pipe, e.g. size, alignment are not indicated.
4. The overflow pipe was submerged inside the storage cistern and sited above the inlet.
5. Fullway gate valves have not been provided to the outlet of the storage cistern. The outlet was not positioned at the opposite side to the inlet supply pipe. Size of outlet pipe was not shown.
6. Pump rate and head are not specified.
7. Cistern is not fitted with a ball valve and a fullway gate valve at the inlet in the case of a gravity supply or with an automatic control switch and without any stop valve in the case of a pumped supply. Size of inlet pipe was not shown.
8. The drain-off pipe is not properly plugged.
9. The overflow pipe is not at least one commercial size larger than the inlet pipe, or less than 25mm in diameter.
10. Overflow pipe size is not twice the diameter of largest inlet for flushing water tank with more than one inlet.
11. No physical break at sump tank is provided between the potable and non-potable water tanks.
12. The safety access to the water tank (such as irrigation tank & cleansing water tank) is not provided and shown clearly on the layout drawings.
13. A grating and self-closing non-return flap valve are not provided at the overflow pipe of the storage cisterns.
14. Warning pipe is of size less than 25mm in diameter.
15. The size of overflow pipe of the roof flushing water tank is not larger than the inlet pipe.

### D) Common Mistakes for Watering Flower Beds Plumbing System

1. Detailed dimensions showing the arrangement of the water meter in a meter box and the fittings at the meter position are not shown.

2. No check meter position is provided. The check meter position is not located close to the lot boundary and connection to the Government mains.
3. Tee-branch valves are not provided at the branch pipe serving a series of supply points.
4. A stop valve is not installed on each vertical supply standpipe.
5. The total aggregate planting area and the estimated daily consumption are not given. The flower beds are not highlighted on the layout plan for easy identification.
6. The orientation of the site is not indicated.
7. Meter position is not indicated on the layout plan.
8. Sizes of supply pipes is not specified.
9. The layout plan is not drawn to scale.
10. The aggregated area of watering flower bed under concessionary usage is less than 30 square meters.
11. The height of draw-off standpipe is not indicated.
12. The minimum distance between each irrigation point is not provided.
13. Anti-vacuum valve, check or non-return valve are not provided for direct feed irrigation system.

#### E) Common Mistakes for Fire Service

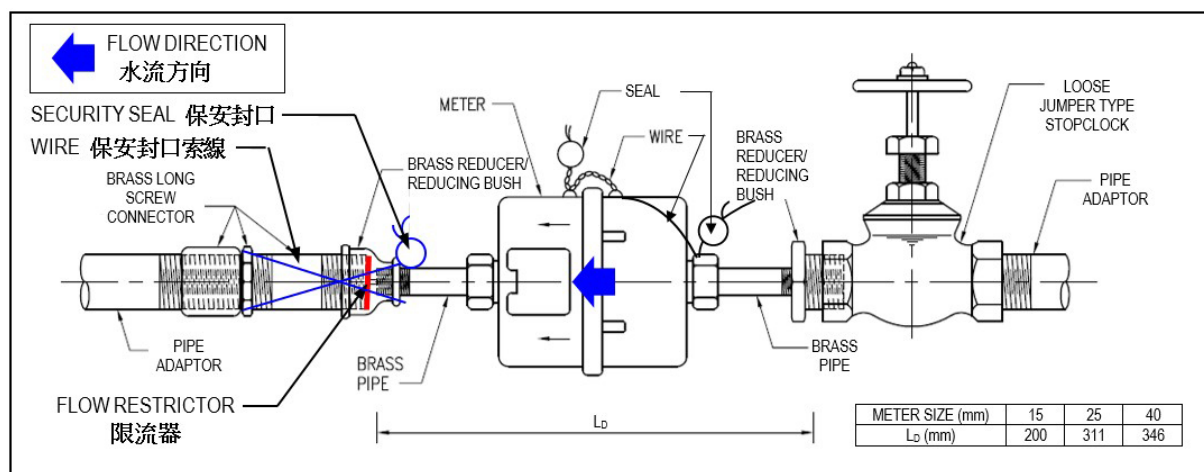
1. A fullway gate valve and a non-return valve are not installed on the fire service close to the government water supply connection.
2. Size of check meter is not indicated. Detailed drawing showing the arrangement of check meter position is not given.
3. No additional butterfly valve is provided for the direct fed sprinkler system.
4. The check meter is housed inside a pump room, not in a designated meter room.
5. A tee-branch valve is not provided to the underground water pipes to facilitate maintenance and repair.
6. Individual stop valve is not provided for the street fire hydrant.
7. No typical installation details for the street fire hydrant is given.
8. No fullway gate valve is provided to the supply pipe of each hose reel.
9. The fire hose reel outlets is not housed in glass-fronted cabinets secured under lock and key.

10. Check meter position is not provided for each of the systems (Fire hose reel, sprinkler, drencher, street fire hydrant, etc.)
11. The grid reference of the fire service hose reel (FSHR) is not provided.

#### F) Other Common Mistakes

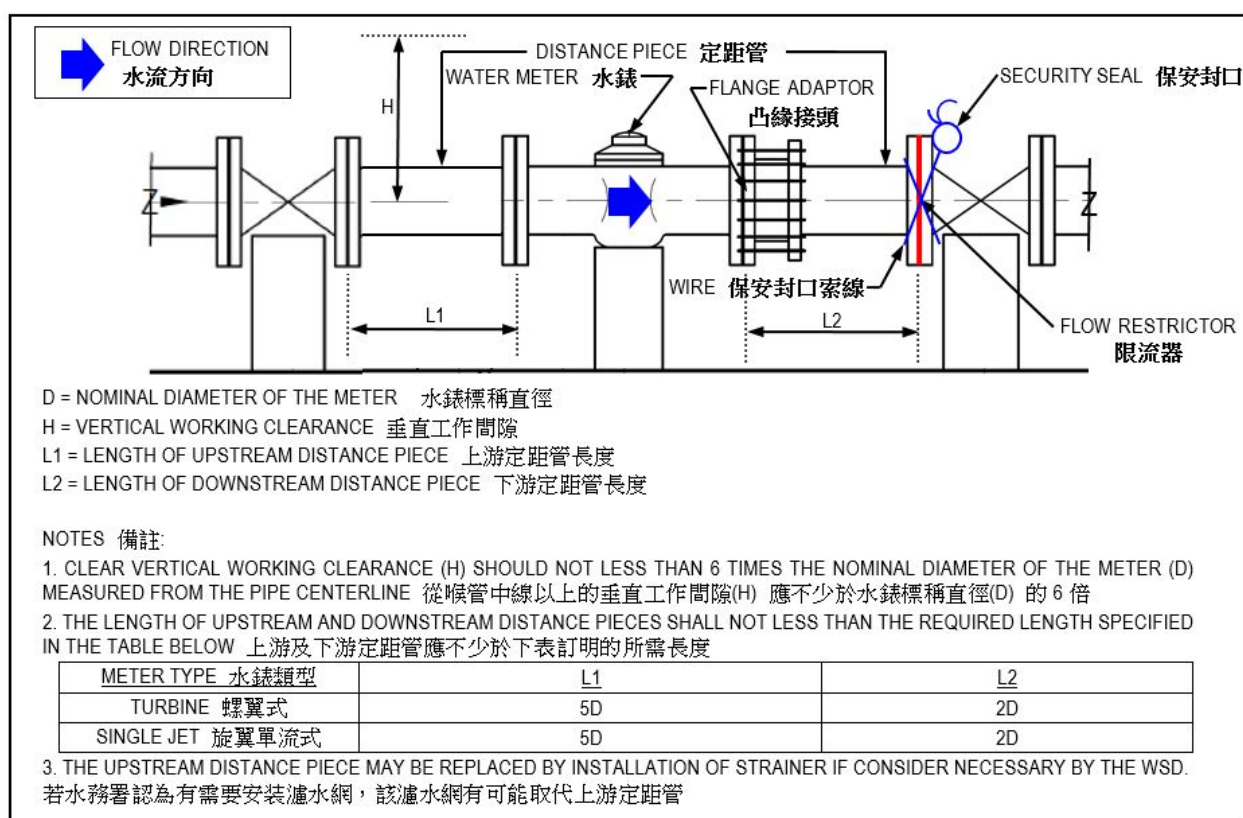
1. Underground water pipe is not laid with at least 1000 mm depth over the carriageway of the pipe.
2. The street name & orientation is not clearly indicated on the layout plan.
3. Boundary line of the lot is not clearly marked on the schematic diagram.

## Appendix 22: Typical Configuration of Flow Restrictor and Security Seal



### ARRANGEMENT FOR WATER METER WITH DIAMETER OF 15mm to 40mm

直徑 15 毫米 至 40 毫米水錶的安排



### ARRANGEMENT FOR WATER METER WITH DIAMETER OF 50mm OR ABOVE

直徑 50 毫米或以上水錶的安排

## Appendix 23: Operational Range and Specifications of Different Type and Size of Meters

### A. For small size water meter (DN15mm) 小型水錶尺寸(15 毫米)

Nominal Size 標稱尺寸	mm 毫米	15
Type 類型	-	Rotary Piston 旋轉活塞溶積式
Overload Flowrate <sup>(1)</sup> , Q <sub>4</sub> 過載流量	m <sup>3</sup> /hr 立方米/小時	3.125
Permanent Flowrate, Q <sub>3</sub> 常用流量	m <sup>3</sup> /hr 立方米/小時	2.5
Transitional Flowrate, Q <sub>2</sub> 分界流量	m <sup>3</sup> /hr 立方米/小時	0.025
Minimum Flowrate, Q <sub>1</sub> 最小流量	m <sup>3</sup> /hr 立方米/小時	0.0156

### B. For medium size water meter (from DN25 to DN100mm) 中型水錶尺寸(25 - 100 毫米)

#### (i) From DN25 to DN40mm 由 25 至 40 毫米

Nominal Size 標稱尺寸	mm 毫米	25		40
		Exiting Specifications 現時規格	Revised Specifications for the New Supply Tender to be Issued in 2017 2017 年調整新標書規格	
Type 類型	-	Rotary Piston 旋轉活塞溶積式		
Overload Flowrate, Q <sub>4</sub> <sup>(1)</sup> 過載流量	m <sup>3</sup> /hr 立方米/小時	7	7.875	20
Permanent Flowrate, Q <sub>3</sub> 常用流量	m <sup>3</sup> /hr 立方米/小時	3.5	6.3	10
Transitional Flowrate, Q <sub>2</sub> 分界流量	m <sup>3</sup> /hr 立方米/小時	0.28	0.063	0.8
Minimum Flowrate, Q <sub>1</sub> 最小流量	m <sup>3</sup> /hr 立方米/小時	0.08	0.039	0.20

#### (ii) From DN50 to DN100mm 由 50 至 100 毫米

Nominal Size 標稱尺寸	mm 毫米	50		80		100	
Type 類型	-	Turbine 螺翼式/ Woltmann (Higher Q <sub>4</sub> )	Single Jet 旋翼單 流式	Turbine 螺 翼式 / Woltmann (Higher Q <sub>4</sub> )	Single Jet 旋翼單 流式	Turbine 螺翼式 / Woltmann (Higher Q <sub>4</sub> )	Single Jet 旋翼單 流式
Overload Flowrate, Q <sub>4</sub> <sup>(1)</sup> 過載流量	m <sup>3</sup> /hr 立方米/小時	90	30	200	60	250	100
Permanent Flowrate, Q <sub>3</sub> 常用流量	m <sup>3</sup> /hr 立方米/小時	50	15	120	30	180	50
Transitional Flowrate, Q <sub>2</sub> 分界流量	m <sup>3</sup> /hr 立方米/小時	1	0.225	2	0.45	2	0.75
Minimum Flowrate, Q <sub>1</sub> 最小流量	m <sup>3</sup> /hr 立方米/小時	0.35	0.09	0.5	0.18	1.2	0.3

**C. For large size water meter (from DN150 to DN300mm)  
大型水錶尺寸 (由 150 至 300 毫米)**

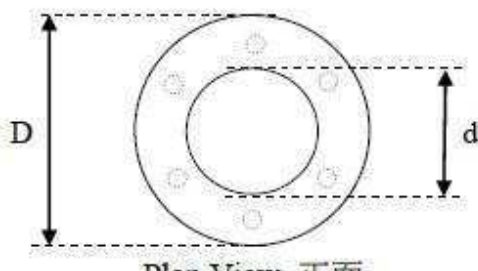
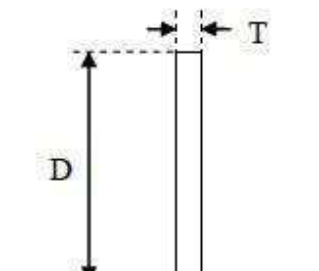
Nominal Size 標稱尺寸	mm 毫米	150	200	250	300
Type 類型	-	Turbine 螺翼式/ Woltmann (Higher 較高 Q <sub>4</sub> )			
Overload Flowrate, Q <sub>4</sub> <sup>(1)</sup> 過載流量	m <sup>3</sup> /hr 立方米/小時	600	1,000	1,500	2,000
Permanent Flowrate, Q <sub>3</sub> 常用流量	m <sup>3</sup> /hr 立方米/小時	450	700	1,000	1,400
Transitional Flowrate, Q <sub>2</sub> 分界流量	m <sup>3</sup> /hr 立方米/小時	4	6	11	15
Minimum Flowrate, Q <sub>1</sub> 最小流量	m <sup>3</sup> /hr 立方米/小時	1.8	4	6	12

<sup>(1)</sup> The flow rates are the maximum flow rate that a meter of the corresponding size can operate for a short period of time without problem. However, a meter operates continuously at this flow rate would lead to meter malfunction.



## Appendix 24: Data Sheet of Flow Restrictor (Stainless Steel Orifice Plate)

The following data to be provided by Applicant/LP to suit the inside services arrangements.  
以下資料由申請人或持牌水喉匠填寫以配合屋內供水設備安排

 <p>Plan View 正面</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p> Bolt Hole (for meter size of 50mm or above) 螺栓孔 (水錶尺寸為50毫米或以上適用)</p> </div>	 <p>Side View 側面</p>								
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Outer Diameter 外圈直徑 (D)</td> <td style="width: 50%; text-align: right;">(mm/毫米)</td> </tr> <tr> <td>Orifice Diameter 內孔直徑 (d)<sup>#</sup></td> <td style="text-align: right;">(mm/毫米)</td> </tr> <tr> <td>Thickness 厚度 (T)</td> <td style="text-align: right;">(mm/毫米)</td> </tr> <tr> <td>Stainless Steel Grade 不銹鋼型號 *</td> <td style="text-align: center;">304 / 316</td> </tr> </table>		Outer Diameter 外圈直徑 (D)	(mm/毫米)	Orifice Diameter 內孔直徑 (d) <sup>#</sup>	(mm/毫米)	Thickness 厚度 (T)	(mm/毫米)	Stainless Steel Grade 不銹鋼型號 *	304 / 316
Outer Diameter 外圈直徑 (D)	(mm/毫米)								
Orifice Diameter 內孔直徑 (d) <sup>#</sup>	(mm/毫米)								
Thickness 厚度 (T)	(mm/毫米)								
Stainless Steel Grade 不銹鋼型號 *	304 / 316								
<p><small>* Please delete the inappropriate type 請刪去不適用者</small></p> <p><small><sup>#</sup> The dimension (d) should be equal to the required orifice diameter specified in the approval letter. (d) 的尺寸須與批准信內要求的內孔直徑相同</small></p>									

Please provide the following data if the size of water meter is 50mm or above.

如水錶尺寸為50毫米或以上請提供以下資料

<u>Stainless Steel Orifice Plate 帶孔不銹鋼片<sup>^</sup></u>	
Number of Bolt Hole 螺栓孔數量	(number/個)
Bolt Hole Diameter 螺栓孔直徑	(mm/毫米)
Pitch Circle Diameter of Bolt 螺栓節距圓直徑 (PCD)	(mm/毫米)
<p><small><sup>^</sup> The stainless steel orifice plate to be inserted between flanges at the joint should have suitable gasket and bolt holes for installation. 夾於接頭凸緣間的帶孔不銹鋼片須備有合適的軟墊及螺栓孔以作安裝</small></p>	
<u>Gasket 軟墊</u>	
Material 物料	
Thickness 厚度	(mm/毫米)

## **Appendix 25: Guidelines on Cleansing and Disinfection of Fresh Water Inside Service**

### **(A) Newly Installed Fresh Water Inside Service**

The newly installed fresh water inside service shall be cleaned and disinfected to the satisfaction of the Water Authority in accordance with the following procedures.

#### **(I) Newly Installed Underground Fresh Water Mains**

- (1) Remove all extraneous materials inside the water mains. Fill the fresh water mains slowly with water and carry out the required water pressure testing. If the result of the test is satisfactory, clean the fresh water mains internally and flush them with potable water. For fresh water mains of sizes less than 600 mm in diameter, swab to remove the dirt and materials inadvertently left in the water mains and flush them with potable water.
- (2) Fill the water mains completely with a homogeneous solution of chloride of lime for disinfection. The concentration of the solution has to meet the requirement that when the water mains are filled up with water, the free residual chlorine in the water will be at least 30 ppm. Keep the water mains under disinfection for at least 24 hours. After disinfection, flush the water mains thoroughly with potable water to remove disinfectant remaining in the mains.
- (3) Arrange with Water Science Division of WSD or accredited laboratories to conduct water sampling tests following the requirements in **Appendix 19**.
- (4) To avoid possible re-contamination, the fresh water mains concerned shall be put into operation within 7 days from the date of water sampling with satisfactory results. In this respect, LPs are advised to allow sufficient time to carry out water sampling and analysis and to avoid arranging disinfection and water sampling immediately before long public holidays.

**(II) Newly Installed Fresh Water Inside Service other than Those covered in (A)(I) above**

- (1) Flush the inside service concerned thoroughly with potable water.
- (2) After flushing, follow one of the three procedures stated below to disinfect the inside service concerned.

**Methods Using Chlorine as a disinfectant**

- (i) Fill the inside service concerned with a homogeneous solution of chloride of lime for disinfection. The concentration of the solution has to meet the requirement that when the inside service is filled up with water, the free residual chlorine in the water will be at least 30 ppm. After keeping the inside service under disinfection for at least 24 hours, the inside service shall be immediately drained and thoroughly flushed with potable water.

or

- (ii) Fill the inside service concerned with chlorinated water at an initial concentration of 50 ppm for a contact period of one hour. If the free residual chlorine measured at the end of the contact period is less than 30 ppm, the disinfection process shall be repeated. After successful disinfection, the inside service shall be immediately drained and thoroughly flushed with potable water.

or

**Methods Using Disinfectants other than Chlorine**

- (iii) Fill the inside service concerned with the disinfectant solution other than chlorine at the initial concentration and for the contact time specified by the manufacturer of the disinfectant. The disinfectant solution shall not contain any substances in quantities capable of causing deleterious or injurious health effects to consumers using the inside service disinfected in accordance with the manufacturer's instructions/ recommendations. If the residual of the disinfectant at the

end of the contact time is less than the manufacturer's recommendation, the disinfection procedure shall be repeated. After successful disinfection, the inside service shall be immediately drained and thoroughly flushed with potable water. Flushing shall continue in accordance with the disinfectant manufacturer's instructions/recommendations or until there is no evidence of the disinfectant chemical being present, or it is at a level that is no higher than that present in the potable water supplied.

- (3) Arrange with Water Science Division of WSD or accredited laboratories to conduct water sampling tests following the requirements in **Appendix 19**.
- (4) To avoid possible re-contamination, the fresh water mains concerned shall be put into operation within 7 days from the date of water sampling with satisfactory results. In this respect, LPs are advised to allow sufficient time to carry out water sampling and analysis and to avoid arranging disinfection and water sampling immediately before long public holidays.

### **(B) Repair or Maintenance of Fresh Water Inside Service**

#### **(I) Repair or Maintenance of Underground Fresh Water Mains**

- (1) Keep the excavation surfaces of trench clear from the pipe body and remove all extraneous materials in the fresh water mains. If the trench is flooded, pump water out of the trench.
- (2) Clean the internal surface of the exposed pipe ends and the replacement pipe with a solution of chloride of lime. The concentration of free residual chlorine in the solution shall be at least 30 ppm.
- (3) Fill the section of the water mains that has been shut down for repair or maintenance with a homogeneous solution of chloride of lime for disinfection. The concentration of the solution has to meet the requirement that when the water mains are completely filled with water, the free residual chlorine in the water will be at least 30 ppm. Fill the water mains with water and isolate them

when filling is completed. Keep the water mains under disinfection for at least 30 minutes. After disinfection, flush the water mains thoroughly with potable water through a fire hydrant, washout or, if no such facilities are available, through a submain temporarily put out of service.

**(II) Repair or Maintenance of Fresh Water Inside Service other than Those covered in (B)(I) above**

After completion of repair or maintenance works, fill the concerned inside service that has been shut down for repair or maintenance with a homogeneous solution of chloride of lime for disinfection. The concentration of the solution has to meet the requirement that when the inside service is completely filled with water, the free residual chlorine in the water will be at least 30 ppm. Isolate the inside service when filling is completed and keep the inside service under disinfection for at least 30 minutes. After disinfection, flush the inside service thoroughly with potable water.

