

Hong Kong Waterworks Standard Requirements For Plumbing Installation in Buildings

Revision History

| Revision | Date | Clauses Amended | Description |
|---------------------------------|------------|-----------------|---|
| 1. WSD circular Letter No. 3/96 | 9 Feb 1996 | 9.11 | Clause amended to require endorsement from the Director of Fire Services for exemption. |
| 2. WSD Circular Letter No. 2/98 | 4 Sep 1998 | 4.1 | Clause amended to require non-metallic overflow / warning pipes for portable water storage cisterns. |
| | | 4.4 | Clause amended to require warning pipe to be installed at a level below the overflow pipe and extended to outside of the building periphery for roof cistern or outside pump room for sump cistern. |
| | | 4.7 | Clause amended to require a physical break between two adjoining cisterns for potable and non-potable water. |
| | | 4.9 | Clause amended to require notice plate / board to record the dates of cleaning water cisterns. |
| | | 4.13 | Clause amended to require internal surfaces of floors, walls and soffits of potable water storage cisterns to be lined with a white non-toxic smooth finish. |
| | | 9.14 | Clause amended to require provision of metal / plastic strikers for fire hose reel outlets. |

| Revision | Date | Clauses Amended | Description |
|-----------------------------------|-------------|---|--|
| 3. WSD Circular Letter No.3/98 | 17 Dec 1998 | 1.9A 1.9B 7.17 7.18 10.2(c) | Requirement of cleansing supply at car park added. Requirement of meter position at construction site added. Requirement of cleansing supply at car park added. Requirement of meter position at construction site added. “BS 2871” is replaced by “BS EN 1057”. |
| 4. WSD Circular Letter No. 7/99 | 30 Nov 1999 | 4.5 5.10 9.14 | Requirement for storage cistern covers amended. The safety requirements for unvented electric thermal storage water heaters followed the Electrical Products(Safety) Regulation (Cap. 406 sub. leg.). Clause amended to require sticker / plate carrying warning message for fire hose reel outlets. |
| 5. WSD Circular Letter No. 1/2000 | 7 Jun 2000 | 1.6 2.7 3.9 | Clauses amended to reject water pipes embedded within loading bearing structural elements. |
| 6. WSD Circular Letter No. 1/2002 | 22 Feb 2002 | 8.2 8.2A to 8.2D 8.3 8.4 | Requirements for valve type flushing devices added. |

| Revision | Date | Clauses Amended | Description |
|-----------------------------------|-------------|--|--|
| 7.WSD Circular Letter No. 2/2003 | 14 Feb 2003 | 1.3A 2.5A 3.5A 7.4A | Requirement of section of copper pipe between the water meter position and the first pipe clamp using screw joints added. |
| 8. WSD Circular Letter No. 4/2003 | 21May 2003 | 1.4, 2.3, 3.2 & 7.7 1.4A, 2.3A & 3.2A 1.4B, 2.3B & 3.2B 1.5, 2.6 & 3.6 1.9B & 7.18 1.9C | Requirement of detail layout and elevation plan of the meter room/box added. Requirement of permanent display board added. Requirement of submission of as-built added Requirement of position of meter arranged in group amended. Requirement of meter position of a building supply to a construction site amended. Requirement of meter position for installation in a landscape area added. |

| Revision | Date | Clauses Amended | Description |
|-----------------------------------|--------------|--|---|
| 9 WSD Circular Letter No. 2/2007 | 20 June 2007 | 1.4(k) 2.3(k) 3.2(k) 7.7(k) 8.9A 9.5A 1.11A 1.16A 2.11 3.14 7.10 8.9B 9.5B | Requirement of straight length at upstream and downstream of check meter position added. Requirement of working clearance at check meter position added. |
| 10 WSD Circular Letter No. 4/2007 | 26 Oct 2007 | 4.1 | Clause amended to incorporate the requirement for twin cisterns |
| 11 WSD Circular Letter No. 2/2010 | 24 Sept 2010 | 1.4(a) 2.3(a) 3.2(a) 7.7(a) 1.4(f) 2.3(f) 3.2(f) 7.7(f) | Requirement for meter room amended Requirement for door of meter room amended |
| 12 WSD Circular Letter No. 7/2015 | 19 Oct 2015 | 1.8 2.8 3.10 7.14 5.11(b) 8.19 10.1 10.2 | Clause amended to align with the latest requirements |

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|-----------------------------------|-------------|-----------------------|---|
| 13 - | 2 June 2016 | 4.9 | Minor updating |
| 14 WSD Circular Letter No. 2/2017 | 20 Jan 2017 | 8.2D 10.1A 10.6 | Water Efficiency Requirements for Fittings in Inside Service added. |

Foreword

Section 14(3) of the Waterworks Ordinance (Chapter 102) empowers the Water Authority to prescribe the manner of construction or installation and the nature, size and quality of the pipes and fittings of an inside service or fire service for water supplies. All plumbing proposals for inside service and fire service are therefore subject to the approval of the Water Authority.

The Hong Kong Waterworks Standard Requirements is a set of normal requirements which are applicable to the installation of inside service and fire service in addition to the requirements that are set out in Schedule 2 of the Waterworks Regulations (Chapter 102) or modified under Regulation 25(1).

Where necessary, additional requirements may also be imposed on individual application for water supply depending on the nature and type of the plumbing installations.

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Chapter 1 : Fresh Water Supply to Domestic Buildings [New Buildings]

- 1.1 All domestic units shall be separately metered.
- 1.2 All pipework before meter positions shall be exposed or laid in a proper service duct to facilitate inspection and repairs. Provision should be made for checking leakage from any pipework laid underground.
- 1.3 Normally, a 15 mm diameter meter will be installed. Provision for this should be made as follows: 20 mm x 15 mm bushes, or reducers, at both sides of the meter position with a 200 mm (clear effective length) distance piece of 15 mm tube placed in between. The tube shall be hollow with conspicuous holes drilled through the body. A long screw (connector) shall be provided immediately after the bush or reducer at the delivery side. The meter position for meter of all sizes shall also be similarly provided with corresponding fittings of appropriate sizes. The length of the distance piece should be as follows:-

| Meter Size (mm) | 15 | 25 | 40 | 50 | 80 | 100 | 150 |
|---|-----|-----|-----|-----|-----|-----|-----|
| Clear Effective Length of Distance Piece (mm) | 200 | 311 | 346 | 310 | 413 | 483 | 500 |

- 1.3A For 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 should be jointed by screwed joints.
- 1.4 When the applicant submits the vertical plumbing line diagrams (VPLD), he/she will also be required to 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. All water meters, including vacant meter positions and check meter positions, shall be arranged in groups and housed in meter rooms or meter boxes. The meter rooms/boxes shall be used solely for housing water meters to protect them against exposure to weather, falling objects and other undue external interferences. They shall not be used as store rooms/boxes, etc. No other building services such as drainage systems, fire hoses, E&M installations (equipment, cables and ducting, etc.) shall pass through or be placed inside the meter rooms/boxes except lighting, ventilation and drainage, etc. solely to facilitate meter reading and maintenance of water meters. Unless otherwise accepted by the Water Authority, a typical meter room/box shall comply with the following requirements:
- (a) 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. Besides, 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 shall be 600mm;

- (b) the clear width and height of the door entrance to the meter room shall not be less than 800 mm and 2000 mm respectively. The arrangement of the meter position(s) and the door opening of the meter box shall be arranged in such a manner that staff of the Water Authority would not be required to lean inwards to take meter readings or carry out maintenance works. For meter boxes, the clear depth measured from the outside face shall not be more than 800mm;
- (c) when the meter room is occupied for taking meter readings and/or maintenance of water meters, the illumination shall not be less than 120 lux at meter positions and the mechanical ventilation shall not be less than 6 air-changes per hour;
- (d) an entrance located at communal area for safe, free, and uninterrupted access to the meter room/box shall be provided;
- (e) provision of adequate drainage inside the meter room and the meter box positioned at floor level shall be made;
- (f) the door(s) to the meter room/box shall not be equipped with any self-closing device. The lock of the door to the meter room shall be located at a level between 0.9m and 1.1m above the finished floor level. The door to the meter room shall be equipped with handle to facilitate door opening. The door handle shall be either in the form of long cylindrical or spherical shape to facilitate handling. Covered or flat sectioned handles shall not be used;
- (g) the outside of the door(s) to the meter room/box shall be clearly marked 「水錶」, "Water Meters" in both Chinese and English of font size not less than 28 pt for easy identification;
- (h) if there are more than one water meter room/box inside a building block, master-key locks shall be used at all meter rooms/boxes and a duplicate master key for the Water Authority or his/her

staff's sole use shall be kept at the management office. In case there are more than 300 water meters or 30 meter rooms/boxes, two duplicate master keys shall be kept for the sole use of the Water Authority.

- (i) for high-rise building blocks, water meters shall be installed in meter rooms/boxes. For low-rise buildings with fenced-off area, water meters shall be installed in meter room(s)/box(es) located at the boundary and shall be accessible from the public area
- (j) meter rooms/boxes inside market/commercial complex shall be positioned in areas with clear access and with no risk of being obstructed by hawkers, etc.
- (k) for check meter of 100mm diameter or smaller, a straight length of pipe of 5 x D (where D is the nominal bore of the meter) should be provided upstream of the check meter position and a straight length of pipe of 2 x D at downstream. For check meter of diameter larger than 100mm, the straight lengths upstream and downstream are 10 x D and 5 x D respectively.

1.4A Upon completion of the water meter installation inside a meter room/box, the Licensed Plumber (LP) shall install a permanent display board at the wall/door inside the meter room/box showing the location and elevation of the meter positions. The top of the board shall not be higher than 1500 mm above the floor level and the bottom of the board shall not be lower than 500 mm for an individual meter above the floor level. This display board shall be constructed of durable plastic or corrosion-resistant plate engraved with words and diagrams in black on light colour background. The wordings should be of font size not less than 18 pt. Details of this display board shall be submitted by the applicant as part of the VPLD for the Water Authority's approval. This requirement can be waived for small meter boxes accommodating 3 meters or less.

1.4B Within two weeks after completion of the water meter installation, the LP shall submit as-built plans of the meter arrangements, the completed Meter Installation Table (MIT) and Part IV of the Form WWO 46 where amongst others the LP undertakes the correctness of the meter positions. The applicant/developer and the Authorised Person shall also countersign in Part IV of the Form WWO 46 to indicate their satisfaction of the correctness of the meter positions.

1.5 For meters arranged in groups, no meter position shall be lower than 300 mm nor higher than 1500 mm above the floor level. This requirement is also applicable for water meters installed inside meter boxes. For Housing Department estates 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.

- 1.6 All water pipes which come into direct contact with concrete shall be protected with suitable material. No water pipe shall be embedded within load bearing structural elements such as columns, beams and slabs in longitudinal direction. You are required to state explicitly in the submitted plumbing drawings that no water pipe will be embedded in load bearing structural elements. In this regard, vertical water pipes piercing through structural slabs and transfer plates; and horizontal water pipes piercing through beams, columns and structural walls may be permitted when such water pipes are protected by sleeving or other suitable means. It is advisable, whenever practicable, to arrange for inspection by the Water Authority prior to concreting on any pipework to be embedded in any structural elements or concealing any pipework by architectural features which cannot be easily removed for inspection and maintenance of the pipework after their installation. Moreover, in any event all underground pipework must be so inspected before it is backfilled or covered up.
- 1.7 Individual stop valves shall be provided at all draw-off points or at a series of draw-off points if situated close together.
- 1.8 Pipes made of ductile iron, unplasticized polyvinyl chloride (uPVC), lined galvanized steel, stainless steel, copper, polyethylene or polybutylene of approved grades may be used for a fresh water inside service. All uPVC pipes must be properly supported and shielded from direct sunrays and must be painted with white acrylic paint when exposed.
- 1.9 A tee-branch valve refers to an isolation valve at a branch pipe and which is located close to the main pipe. To facilitate maintenance and repair, tee-branch valves shall be provided:
 - (a) for all underground water pipes;
 - (b) if the main pipe is a communal inside service.
- 1.9A Sufficient cleansing taps shall be provided at car parks of a building for car/floor washing. The cleansing supply at the car park shall be given from a fresh water cistern with a separate meter unless it is a part of the cleansing supply system of the building.
- 1.9B The meter position of a building supply to a construction site shall be provided within a meter room or meter box located at the hoarding recess area so that reading and maintenance of the meter can be carried out outside the construction site. Safe, free and uninterrupted access to the meter room/box should be provided and maintained at all time. The door of the meter room or meter box shall be made of chicken-wire or provided with see-through glass panel. Details

of the meter room or meter box are subject to the approval of the Water Authority.

- 1.9C For a meter installed in a landscape area, it should be installed above ground level with a clear working headroom not less than 2m. A safe pedestrian access to the meter position should be provided.

For Direct Supply

- 1.10 A loose jumper type stopcock shall be provided and placed with the spindle in the vertical position at each meter position on the inlet side of the meter.
- 1.11 The connection to the common inside service will not be metered but a meter position shall be provided for the insertion of a check meter for checking and waste detection purposes. This meter position should be so located as to be free from flood and obstruction for ease of meter reading and maintenance at all times, and it should be located close to the lot boundary and connection to the Government mains.
- 1.11A The designer should provide minimum horizontally perpendicular and longitudinal working clearances at each check meter position. The table below stipulates 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.

| | Meter Size (mm) | | | |
|---|-----------------|-----|-----|-----|
| | 40 | 50 | 80 | 100 |
| Minimum horizontally perpendicular working clearance from the wall or any edge of a door when opened where the check meter position is clamped (mm) | 310 | 310 | 380 | 400 |

The minimum longitudinal working clearance between both end of meter flanges of the check meter position and a wall or any obstruction should be 200mm.

For Indirect Supply

- 1.12 Meters on indirect supply systems shall be sited at roof level or at other convenient locations.

- 1.13 A sump and pump system including a sump tank and a roof storage tank shall be fitted before meter positions when the meters are sited at roof level.
- 1.14 Fullway gate valves shall be fitted before meter positions when the meters are sited at roof level.
- 1.15 A loose jumper type stopcock shall be provided and placed with the 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.
- 1.16 The connection to the sump tank will not be metered but a meter position shall be provided for the insertion of a check meter for checking and waste detection purposes. This meter position should be so located as to be free from flood and obstruction for ease of meter reading and maintenance at all times, and it should be located 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.
- 1.16A The designer should provide minimum horizontally perpendicular and longitudinal working clearances at each check meter position. The table below stipulates 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.

| | Meter Size (mm) | | | |
|---|-----------------|-----|-----|-----|
| | 40 | 50 | 80 | 100 |
| Minimum horizontally perpendicular working clearance from the wall or any edge of a door when opened where the check meter position is clamped (mm) | 310 | 310 | 380 | 400 |

The minimum longitudinal working clearance between both end of meter flanges of the check meter position and a wall or any obstruction should be 200mm.

- 1.17 The total volume of the roof storage tank and sump tank shall be on the basis of 135 litres for each of the first 10 flats and 90 litres thereafter for each additional flat. The proportion of capacity of sump tank to roof tank shall be in the order of 1:3 or as advised by the Water Authority.
- 1.18 No draw-off point in the inside services shall be subject to excessive high pressure. In case of excessive high pressure, a break pressure tank or cistern shall be provided at a suitable level to reduce the water pressure. If this is not practicable, the installation of pressure reducing valves can be pursued with the following requirements:-

- (a) a bypass arrangement be incorporated with the provision of a second pressure reducing valve to enable isolation of any defective pressure reducing valve for repair and replacement when necessary;
- (b) a pressure indicator be provided for pressure monitoring;
- (c) the associated pipes and fittings be able to withstand the maximum static pressure that may arise upon failure of the pressure reducing valve.

Chapter 2 : Separate Metering of Existing Properties on Direct Supply of Fresh Water

- 2.1 The inside service shall be constructed from each flat to the existing common meter connection or in such other locations as determined by the Water Authority.
- 2.2 All pipework before meter positions shall be exposed or laid in a proper service duct to facilitate inspection and repairs.
- 2.3 When the applicant submits the vertical plumbing line diagrams (VPLD), he/she will also be required to 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. All water meters, including vacant meter positions and check meter positions, shall be arranged in groups and housed in meter rooms or meter boxes. The meter rooms/boxes shall be used solely for housing water meters to protect them against exposure to weather, falling objects and other undue external interferences. They shall not be used as store rooms/boxes, etc. No other building services such as drainage systems, fire hoses, E&M installations (equipment, cables and ducting, etc.) shall pass through or be placed inside the meter rooms/boxes except lighting, ventilation and drainage, etc. solely to facilitate meter reading and maintenance of water meters. Unless otherwise accepted by the Water Authority, a typical meter room/box shall comply with the following requirements:
 - (a) 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. Besides, 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 shall be 600mm;
 - (b) the clear width and height of the door entrance to the meter room shall not be less than 800 mm and 2000 mm respectively. The arrangement of the meter position(s) and the door opening of the meter box shall be arranged in such a manner that staff of the Water Authority would not be required to lean inwards to take meter readings or carry out maintenance works. For meter boxes,

the clear depth measured from the outside face shall not be more than 800mm;

- (c) when the meter room is occupied for taking meter readings and/or maintenance of water meters, the illumination shall not be less than 120 lux at meter positions and the mechanical ventilation shall not be less than 6 air-changes per hour;
- (d) an entrance located at communal area for safe, free, and uninterrupted access to the meter room/box shall be provided;
- (e) provision of adequate drainage inside the meter room and the meter box positioned at floor level shall be made;
- (f) the door(s) to the meter room/box shall not be equipped with any self-closing device. The lock of the door to the meter room shall be located at a level between 0.9m and 1.1m above the finished floor level. The door to the meter room shall be equipped with handle to facilitate door opening. The door handle shall be either in the form of long cylindrical or spherical shape to facilitate handling. Covered or flat sectioned handles shall not be used;
- (g) the outside of the door(s) to the meter room/box shall be clearly marked 「水錶」, "Water Meters" in both Chinese and English of font size not less than 28 pt for easy identification;
- (h) if there are more than one water meter room/box inside a building block, master-key locks shall be used at all meter rooms/boxes and a duplicate master key for the Water Authority or his/her staff's sole use shall be kept at the management office. In case there are more than 300 water meters or 30 meter rooms/boxes, two duplicate master keys shall be kept for the sole use of the Water Authority.
- (i) for high-rise building blocks, water meters shall be installed in meter rooms/boxes. For low-rise buildings with fenced-off area, water meters shall be installed in meter room(s)/box(es) located at the boundary and shall be accessible from the public area;
- (j) meter rooms/boxes inside market/commercial complex shall be positioned in areas with clear access and with no risk of being obstructed by hawkers, etc.

- (k) for check meter of 100mm diameter or smaller, a straight length of pipe of 5 x D (where D is the nominal bore of the meter) should be provided upstream of the check meter position and a straight length of pipe of 2 x D at downstream. For check meter of diameter larger than 100mm, the straight lengths upstream and downstream are 10 x D and 5 x D respectively.

2.3A Upon completion of the water meter installation inside a meter room/box, the Licensed Plumber (LP) shall install a permanent display board at the wall/door inside the meter room/box showing the location and elevation of the meter positions. The top of the board shall not be higher than 1500 mm above the floor level and the bottom of the board shall not be lower than 500 mm for an individual meter above the floor level. This display board shall be constructed of durable plastic or corrosion-resistant plate engraved with words and diagrams in black on light colour background. The wordings should be of font size not less than 18 pt. Details of this display board shall be submitted by the applicant as part of the VPLD for the Water Authority's approval. This requirement can be waived for small meter boxes accommodating 3 meters or less.

2.3B Within two weeks after completion of the water meter installation, the LP shall submit as-built plans of the meter arrangements, the completed Meter Installation Table (MIT) and Part IV of the Form WWO 46 where amongst others the LP undertakes the correctness of the meter positions. The applicant/developer and the Authorised Person shall also countersign in Part IV of the Form WWO 46 to indicate their satisfaction of the correctness of the meter positions.

2.4 A loose jumper type stopcock shall be provided and placed with the spindle in the vertical position at each meter position on the inlet side of the meter.

2.5 The meter position for 15 mm diameter meter shall be constructed to include 20 mm x 15 mm bushes, or reducers, at both sides of the meter position with a 200 mm (clear effective length) distance piece of 15 mm tube placed in between. The tube shall be hollow with conspicuous holes drilled through the body. A long screw (connector) shall be provided immediately after the bush or reducer at the delivery side. The meter position for meter of all sizes shall also be similarly provided with corresponding fittings of appropriate sizes. The length of the distance piece should be as follows:-

| Meter Size (mm) | 15 | 25 | 40 | 50 | 80 | 100 | 150 |
|---|-----|-----|-----|-----|-----|-----|-----|
| Clear Effective Length of Distance Piece (mm) | 200 | 311 | 346 | 310 | 413 | 483 | 500 |

- 2.5A For 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 should be jointed by screwed joints.
- 2.6 For meters arranged in groups, no meter position shall be lower than 300 mm nor higher than 1500 mm above the floor level. This requirement is also applicable for water meters installed inside meter boxes. For Housing Department estates 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.
- 2.7 All water pipes which come into direct contact with concrete shall be protected with suitable material. No water pipe shall be embedded within load bearing structural elements such as columns, beams and slabs in longitudinal direction. You are required to state explicitly in the submitted plumbing drawings that no water pipe will be embedded in load bearing structural elements. In this regard, vertical water pipes piercing through structural slabs and transfer plates; and horizontal water pipes piercing through beams, columns and structural walls may be permitted when such water pipes are protected by sleeving or other suitable means. It is advisable, whenever practicable, to arrange for inspection by the Water Authority prior to concreting on any pipework to be embedded in any structural elements or concealing any pipework by architectural features which cannot be easily removed for inspection and maintenance of the pipework after their installation. Moreover, in any event all underground pipework must be so inspected before it is backfilled or covered up.
- 2.8 Pipes made of ductile iron, unplasticized polyvinyl chloride (uPVC), lined galvanized steel, stainless steel, copper, polyethylene or polybutylene of approved grades may be used for a fresh water inside service. All uPVC pipes must be properly supported and shielded from direct sunrays and must be painted with white acrylic paint when exposed.
- 2.9 In an occupied building, a temporary bypass arrangement as close to the delivery side of the meter as possible shall be provided to maintain water supply to various units of accommodation when plumbing work is being carried out on separate meter conversion. The temporary arrangement should be such that the consumption is still measured by the bulk meter. This bypass arrangement must be removed immediately after the new separate meters are fixed. The bulk meter should also be removed if no longer required.
- 2.10 A tee-branch valve refers to an isolation valve at a branch pipe and which is located close to the main pipe. To facilitate maintenance and repair, tee-branch valves shall be provided:
- (a) for all underground water pipes;
 - (b) if the main pipe is a communal inside service

2.11 The designer should provide minimum horizontally perpendicular and longitudinal working clearances at each check meter position. The table below stipulates 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.

| | Meter Size (mm) | | | |
|---|-----------------|-----|-----|-----|
| | 40 | 50 | 80 | 100 |
| Minimum horizontally perpendicular working clearance from the wall or any edge of a door when opened where the check meter position is clamped (mm) | 310 | 310 | 380 | 400 |

The minimum longitudinal working clearance between both end of meter flanges of the check meter position and a wall or any obstruction should be 200mm.

Chapter 3 : Separate Metering of Existing Properties on Indirect Supply of Fresh Water

- 3.1 All pipework before meter positions shall be exposed or laid in a proper service duct to facilitate inspection and repairs. Approved provision should be made for checking leakage from any pipework laid underground.
- 3.2 When the applicant submits the vertical plumbing line diagrams (VPLD), he/she will also be required to 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. All water meters, including vacant meter positions and check meter positions, shall be arranged in groups and housed in meter rooms or meter boxes. The meter rooms/boxes shall be used solely for housing water meters to protect them against exposure to weather, falling objects and other undue external interferences. They shall not be used as store rooms/boxes, etc. No other building services such as drainage systems, fire hoses, E&M installations (equipment, cables and ducting, etc.) shall pass through or be placed inside the meter rooms/boxes except lighting, ventilation and drainage, etc. solely to facilitate meter reading and maintenance of water meters. Unless otherwise accepted by the Water Authority, a typical meter room/box shall comply with the following requirements:
- (a) 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. Besides, 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 shall be 600mm;
 - (b) the clear width and height of the door entrance to the meter room shall not be less than 800 mm and 2000 mm respectively. The arrangement of the meter position(s) and the door opening of the meter box shall be arranged in such a manner that staff of the Water Authority would not be required to lean inwards to take meter readings or carry out maintenance works. For meter boxes, the clear depth measured from the outside face shall not be more than 800mm;
 - (c) when the meter room is occupied for taking meter readings and/or maintenance of water meters, the illumination shall not be

less than 120 lux at meter positions and the mechanical ventilation shall not be less than 6 air-changes per hour;

- (d) an entrance located at communal area for safe, free, and uninterrupted access to the meter room/box shall be provided;
- (e) provision of adequate drainage inside the meter room and the meter box positioned at floor level shall be made;
- (f) the door(s) to the meter room/box shall not be equipped with any self-closing device. The lock of the door to the meter room shall be located at a level between 0.9m and 1.1m above the finished floor level. The door to the meter room shall be equipped with handle to facilitate door opening. The door handle shall be either in the form of long cylindrical or spherical shape to facilitate handling. Covered or flat sectioned handles shall not be used;
- (g) the outside of the door(s) to the meter room/box shall be clearly marked 「水錶」, "Water Meters" in both Chinese and English of font size not less than 28 pt for easy identification;
- (h) if there are more than one water meter room/box inside a building block, master-key locks shall be used at all meter rooms/boxes and a duplicate master key for the Water Authority or his/her staff's sole use shall be kept at the management office. In case there are more than 300 water meters or 30 meter rooms/boxes, two duplicate master keys shall be kept for the sole use of the Water Authority.
- (i) for high-rise building blocks, water meters shall be installed in meter rooms/boxes. For low-rise buildings with fenced-off area, water meters shall be installed in meter room(s)/box(es) located at the boundary and shall be accessible from the public area;
- (j) meter rooms/boxes inside market/commercial complex shall be positioned in areas with clear access and with no risk of being obstructed by hawkers, etc.
- (k) for check meter of 100mm diameter or smaller, a straight length of pipe of $5 \times D$ (where D is the nominal bore of the meter) should be provided upstream of the check meter position and a straight length of pipe of $2 \times D$ at downstream. For check meter

of diameter larger than 100mm, the straight lengths upstream and downstream are 10 x D and 5 x D respectively.

- 3.2A Upon completion of the water meter installation inside a meter room/box, the Licensed Plumber (LP) shall install a permanent display board at the wall/door inside the meter room/box showing the location and elevation of the meter positions. The top of the board shall not be higher than 1500 mm above the floor level and the bottom of the board shall not be lower than 500 mm for an individual meter above the floor level. This display board shall be constructed of durable plastic or corrosion-resistant plate engraved with words and diagrams in black on light colour background. The wordings should be of font size not less than 18 pt. Details of this display board shall be submitted by the applicant as part of the VPLD for the Water Authority's approval. This requirement can be waived for small meter boxes accommodating 3 meters or less.
- 3.2B Within two weeks after completion of the water meter installation, the LP shall submit as-built plans of the meter arrangements, the completed Meter Installation Table (MIT) and Part IV of the Form WWO 46 where amongst others the LP undertakes the correctness of the meter positions. The applicant/developer and the Authorised Person shall also countersign in Part IV of the Form WWO 46 to indicate their satisfaction of the correctness of the meter positions.
- 3.3 The existing sump and pump system shall be provided with a standby pumpset unless this proves to be impracticable.
- 3.4 Fullway gate valves shall be fitted before meter positions when the meters are sited at roof level.
- 3.5 The meter position for 15 mm diameter meter shall be constructed to include 20 mm x 15 mm bushes, or reducers, at both sides of the meter position with a 200 mm (clear effective length) distance piece of 15 mm tube placed in between. The tube shall be hollow with conspicuous holes drilled through the body. A long screw (connector) shall be provided immediately after the bush or reducer at the delivery side. The meter position for meter of all sizes shall also be similarly provided with fittings of appropriate sizes. The length of the distance piece should be as follows:-

| Meter Size (mm) | 15 | 25 | 40 | 50 | 80 | 100 | 150 |
|---|-----|-----|-----|-----|-----|-----|-----|
| Clear Effective Length of Distance Piece (mm) | 200 | 311 | 346 | 310 | 413 | 483 | 500 |

- 3.5A For 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 should be jointed by screwed joints.

- 3.6 For meters arranged in groups, no meter position shall be lower than 300 mm nor higher than 1500 mm above the floor level. This requirement is also applicable for water meters installed inside meter boxes. For Housing Department estates 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.
- 3.7 The connection to the sump tank will not be metered but a meter position shall be provided for the insertion of a check meter for checking and waste detection purposes. This meter position should be so located as to be free from flood and obstruction for ease of meter reading and maintenance at all times, and it should be located 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.
- 3.8 A loose jumper type stopcock shall be provided and placed with the 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.
- 3.9 All water pipes which come into direct contact with concrete shall be protected with suitable material. No water pipe shall be embedded within load bearing structural elements such as columns, beams and slabs in longitudinal direction. You are required to state explicitly in the submitted plumbing drawings that no water pipe will be embedded in load bearing structural elements. In this regard, vertical water pipes piercing through structural slabs and transfer plates; and horizontal water pipes piercing through beams, columns and structural walls may be permitted when such water pipes are protected by sleeving or other suitable means. It is advisable, whenever practicable, to arrange for inspection by the Water Authority prior to concreting on any pipework to be embedded in any structural elements or concealing any pipework by architectural features which cannot be easily removed for inspection and maintenance of the pipework after their installation. Moreover, in any event all underground pipework must be so inspected before it is backfilled or covered up.
- 3.10 Pipes made of ductile iron, unplasticized polyvinyl chloride (uPVC), lined galvanized steel, stainless steel, copper, polyethylene or polybutylene of approved grades may be used for a fresh water inside service. All uPVC pipes must be properly supported and shielded from direct sunrays and must be painted with white acrylic paint when exposed.
- 3.11 In an occupied building, a temporary bypass arrangement shall be provided to maintain water supply to the various units of accommodation when plumbing work is being carried out on separate meter conversion. The temporary arrangement should be such that the consumption is till measured by the bulk meter. This bypass arrangement must be removed immediately after the new

separate meters are fixed. The bulk meter should also be removed if no longer required.

3.12 The total volume of the roof storage tank and sump tank shall be on the basis of 135 litres for each of the first 10 flats and 90 litres thereafter for each additional flat. The proportion of capacity of sump tank to roof tank shall be in the order of 1:3 or as advised by the Water Authority.

3.13 A tee-branch valve refers to an isolation valve at a branch pipe and which is located close to the main pipe. To facilitate maintenance and repair, tee-branch valves shall be provided:

- (a) for all underground water pipes;
- (b) if the main pipe is a communal inside service.

3.14 The designer should provide minimum horizontally perpendicular and longitudinal working clearances at each check meter position. The table below stipulates 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.

| | Meter Size (mm) | | | |
|---|-----------------|-----|-----|-----|
| | 40 | 50 | 80 | 100 |
| Minimum horizontally perpendicular working clearance from the wall or any edge of a door when opened where the check meter position is clamped (mm) | 310 | 310 | 380 | 400 |

The minimum longitudinal working clearance between both end of meter flanges of the check meter position and a wall or any obstruction should be 200mm.

Chapter 4 : Installation of Storage Cisterns [or Water Tanks]

- 4.1 Cisterns shall be fitted with a ball valve and a fullway gate valve at the inlet in the case of a gravity supply. In the case of a pumped supply to a single cistern, the cistern shall be fitted with an automatic control switch and without any stop valve. In the case of a pumped supply to twin cisterns, each cistern shall be fitted with an automatic control switch and a stop valve for temporary isolation purpose. 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. 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. All overflow and warning pipes of potable water storage cisterns shall be constructed of non-metallic pipe materials.
- 4.2 Fullway gate valves shall be provided on all the outlets of every cistern and provision shall be made for a drain-off pipe to enable the cistern to be emptied. 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.
- 4.3 Every storage cistern shall be provided with an overflow pipe which shall discharge overflowed water to a conspicuous position in a communal area easily visible and accessible by the occupants. 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. No part of the overflow pipe shall be submerged inside the storage cistern. A grating and a self-closing non-return flap shall be provided at the overflow pipe outside the storage cistern.
- 4.4 Where necessary a warning pipe may be installed in addition to an overflow pipe. Except that a warning pipe can be of any size not less than 25mm in diameter, it shall comply with all other requirements of an overflow pipe. The warning pipe shall be installed at a level below the overflow pipe and shall be extended to outside of the building periphery for roof cistern or outside the pump room for sump cistern.
- 4.5 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. 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. For the potable water storage cistern, the cover and its base frame shall possess double upstand edges interlocking one another to provide additional protection.

- 4.6 Storage cisterns shall be so positioned that they are free from obstruction and readily accessible via safe access for cleansing and to facilitate repairs. It shall be located so as to minimise the risk of contamination of the stored water.
- 4.7 When the storage cistern for potable water is to be placed adjoining to a storage cistern for non-potable water, a physical break shall be provided between the two cisterns, i.e. walls and slabs of the two cisterns must be separated while tie beams linking the cisterns for structural requirements are acceptable. The tie beams shall be constructed in such a manner that cross contamination of two cisterns via the tie beams is not possible.
- 4.8 All outlet pipes from the storage cistern should, whenever possible, be positioned at the opposite side to the inlet supply pipe.
- 4.9 Every water storage tank and cistern shall at all times be kept in a clean and wholesome condition. In this respect, every cistern is recommended to be thoroughly cleaned and scrubbed with a solution of chloride of lime or bleaching powder containing not less than fifty parts of chlorine in one million parts of water at least once every three months. A notice plate/board should be provided to record the dates of cleaning of the water cisterns. The notice plate/board together with the cleaning date's records should be securely fixed at a conspicuous location easily accessible and visible by the residents and the building management staff.
- 4.10 Structural design of the cistern and its supports should be subject to the requirements of the Building Authority.
- 4.11 Fibreglass storage cisterns for potable water shall be of an approved type or certified to contain no toxic materials and to be suitable for storage of potable water.
- 4.12 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.
- 4.13 To facilitate cleansing of water storage tanks, 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. In connection with this, it is also advisable to have the same finish for the internal surfaces of floors and walls of flushing and fire service water storage cisterns.

Chapter 5 : Non-Centralized Hot Water System

- 5.1 When the factory test pressure of the heater is in excess of 1.5 times the maximum static pressure at the mains water supply point, non-pressure type heaters, cistern type water heaters, and instantaneous water heaters are permitted to be connected direct to the supply pipe without the necessity of providing storage. Unvented electric thermal storage water heaters satisfying the requirements stipulated in paragraphs 5.10 and 5.11 are also permitted to be connected direct to the supply pipe.
- 5.2 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 separate mains water storage cistern of 45 litres capacity shall be provided for each flat to supply the hot water apparatus.
- 5.3 Pressure type thermal storage heaters other than unvented electric thermal storage water heaters satisfying the requirements stipulated in paragraphs 5.10 and 5.11 shall be supplied from storage cisterns as stipulated in paragraph 5.2, 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.
- 5.4 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 paragraph 5.5 is applied.
- 5.5 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.
- 5.6 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.
- 5.7 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.
- 5.8 Except for unvented electric thermal storage water heaters satisfying the requirements stipulated in paragraphs 5.10 and 5.11, 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.

- 5.9 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 paragraphs 5.10 and 5.11.
- 5.10 All unvented electric thermal storage water heaters shall comply with the safety requirements under the Electrical Products (Safety) Regulation (Cap. 406 sub. leg.)
- 5.11 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.
- 5.12 It is advisable that lagged copper pipes are used for hot water system where re-circulation system is designed.
- 5.13 A tee-branch valve refers to an isolation valve at a branch pipe and which is located close to the main pipe. To facilitate maintenance and repair, tee-branch valves shall be provided:
- (a) for all underground water pipes;
 - (b) if the main pipe is a communal inside service.

Chapter 6 : Centralized Hot Water System

- 6.1 The cold feed pipe from the roof storage cistern shall supply the hot water system only.
- 6.2 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. This outlet 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.
- 6.3 All centralised hot water systems utilising a boiler and cylinder, or calorifier, shall be provided with a vent or expansion pipe taken from the highest point of the cylinder or calorifier, or if a secondary circulation system, from the highest point of such system. In either case the vent or expansion pipe shall discharge to the atmosphere above the storage cistern at sufficient height to prevent a constant outflow of hot water therefrom.
- 6.4 Under no circumstances shall safety valves, air valves or relief valves be used as a substitute or replacement for a vent or expansion pipe nor should any control valve be installed on the vent or expansion pipes between the highest point of the cylinder or calorifier, and the free end of such pipes.
- 6.5 When a centralised hot water system of the boiler /cylinder or calorifier type is installed, in addition to the vent pipe as required in paragraph 6.3 above, 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.
- 6.6 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.
- 6.7 In a hot water system comprising more than one storage cylinders at different levels, paragraph 6.6 should read as applying to the lowest cylinder.
- 6.8 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.
- 6.9 If the storage cylinder is installed in a lower floor, and additional stop valve shall be fitted near the inlet to the cylinder.

- 6.10 Such stop valve as provided under paragraphs 6.8 and 6.9 shall have loose keys or hand-wheels which shall be kept in a safe place to prevent unauthorised interference.
- 6.11 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.
- 6.12 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.
- 6.13 It is advisable that lagged copper pipes are used for hot water system where re-circulation system is designed.
- 6.14 Installation of boilers/ steam boilers shall comply with the relevant Boilers and Pressure Vessels Regulations [HK Law Chapter 56].
- 6.15 A tee-branch valve refers to an isolation valve at a branch pipe and which is located close to the main pipe. To facilitate maintenance and repair, tee-branch valves shall be provided:
- (a) for all underground water pipes;
 - (b) if the main pipe is a communal inside service.

Chapter 7 : Fresh Water Supply to Commercial and Industrial Buildings

- 7.1 For industrial buildings, the entire internal services shall be supplied from storage tanks with separate outlets / downpipes feeding independent systems to serve separately the industrial and processing purposes and the other general and ablution appliances. These independent systems should not be interconnected. The permissible capacity of storage tanks for industrial use is one-day demand when the industrial buildings are situated outside the full supply zones during water restriction.
- 7.2 For office buildings, theatres and other places of entertainment the provision of storage will not be obligatory, and if storage is to be provided, this shall not exceed the capacity determined by the Water Authority.
- 7.3 All pipework before meter positions shall be exposed or laid in a proper service duct to facilitate inspection and repairs. Provisions should be made for checking leakage from any pipework laid underground.
- 7.4 The meter position for 15 mm diameter meter shall be constructed to include 20 mm x 15 mm bushes, or reducers, at both sides of the meter position with a 200 mm (clear effective length) distance piece of 15 mm tube placed in between. The tube shall be hollow with conspicuous holes drilled through the body. A longscrew (connector) shall be provided immediately after the bush or reducer at the delivery side. The meter position for meter of all sizes shall also be similarly provided with corresponding fittings of appropriate sizes. The length of the distance piece should be as follows:-

| Meter Size (mm) | 15 | 25 | 40 | 50 | 80 | 100 | 150 |
|---|-----|-----|-----|-----|-----|-----|-----|
| Clear Effective Length of Distance Piece (mm) | 200 | 311 | 346 | 310 | 413 | 483 | 500 |

- 7.4A For 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 should be jointed by screwed joints.
- 7.5 A loose jumper type stopcock shall be provided and placed with the spindle in the vertical position before the meter on all connections up to and including 40 mm diameter.
- 7.6 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.
- 7.7 When the applicant submits the vertical plumbing line diagrams (VPLD), he/she will also be required to 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. All water meters, including vacant meter positions and check meter positions, shall be arranged in groups and housed in meter rooms or meter boxes. The meter rooms/boxes shall be used solely for housing water meters to protect them against exposure to weather, falling objects and other undue external interferences. They shall not be used as store rooms/boxes, etc. No other building services such as drainage systems, fire hoses, E&M installations (equipment, cables and ducting, etc.) shall pass through or be placed inside the meter rooms/boxes except lighting, ventilation and drainage, etc. solely to facilitate meter reading and maintenance of water meters. Unless otherwise accepted by the Water Authority, a typical meter room/box shall comply with the following requirements:

- (a) 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. Besides, 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 shall be 600mm;
- (b) the clear width and height of the door entrance to the meter room shall not be less than 800 mm and 2000 mm respectively. The arrangement of the meter position(s) and the door opening of the meter box shall be arranged in such a manner that staff of the Water Authority would not be required to lean inwards to take meter readings or carry out maintenance works. For meter boxes, the clear depth measured from the outside face shall not be more than 800mm;
- (c) when the meter room is occupied for taking meter readings and/or maintenance of water meters, the illumination shall not be less than 120 lux at meter positions and the mechanical ventilation shall not be less than 6 air-changes per hour;
- (d) an entrance located at communal area for safe, free, and uninterrupted access to the meter room/box shall be provided;
- (e) provision of adequate drainage inside the meter room and the meter box positioned at floor level shall be made;

- (f) the door(s) to the meter room/box shall not be equipped with any self-closing device. The lock of the door to the meter room shall be located at a level between 0.9m and 1.1m above the finished floor level. The door to the meter room shall be equipped with handle to facilitate door opening. The door handle shall be either in the form of long cylindrical or spherical shape to facilitate handling. Covered or flat sectioned handles shall not be used;
- (g) the outside of the door(s) to the meter room/box shall be clearly marked 「水錶」, "Water Meters" in both Chinese and English of font size not less than 28 pt for easy identification;
- (h) if there are more than one water meter room/box inside a building block, master-key locks shall be used at all meter rooms/boxes and a duplicate master key for the Water Authority or his/her staff's sole use shall be kept at the management office. In case there are more than 300 water meters or 30 meter rooms/boxes, two duplicate master keys shall be kept for the sole use of the Water Authority.
- (i) for high-rise building blocks, water meters shall be installed in meter rooms/boxes. For low-rise buildings with fenced-off area, water meters shall be installed in meter room(s)/box(es) located at the boundary and shall be accessible from the public area;
- (j) meter rooms/boxes inside market/commercial complex shall be positioned in areas with clear access and with no risk of being obstructed by hawkers, etc.
- (k) for check meter of 100mm diameter or smaller, a straight length of pipe of 5 x D (where D is the nominal bore of the meter) should be provided upstream of the check meter position and a straight length of pipe of 2 x D at downstream. For check meter of diameter larger than 100mm, the straight lengths upstream and downstream are 10 x D and 5 x D respectively.

7.8 Fullway gate valves shall be fitted before meter positions when the meters are sited at roof level.

7.9 A loose jumper type stopcock shall be provided and placed with the spindle in 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.

- 7.10 For building to be supplied via a sump and pump system, the connection to the sump tank will not be metered but a check meter position shall be provided for checking and waste detecting purposes. This meter position should be so located as to be free from flood and obstruction for ease of meter readings and maintenance at all times, and 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.

The designer should provide minimum horizontally perpendicular and longitudinal working clearances at each check meter position. The table below stipulates 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.

| | Meter Size (mm) | | | |
|---|-----------------|-----|-----|-----|
| | 40 | 50 | 80 | 100 |
| Minimum horizontally perpendicular working clearance from the wall or any edge of a door when opened where the check meter position is clamped (mm) | 310 | 310 | 380 | 400 |

The minimum longitudinal working clearance between both end of meter flanges of the check meter position and a wall or any obstruction should be 200mm.

- 7.11 Spring taps, of non-concussive type and of approved pattern, shall be used for the public or communal lavatory basins except for those in private clubs in which the use of screw down tap is permissible.
- 7.12 All G.I. piping which comes into direct contact with concrete shall be bitumen-coated and wrapped with hessian or other suitable material or where such pipe passes through a wall or suspended floor, it may be protected by sleeving or other suitable means. It is advisable, whenever practicable, to arrange for inspection by the Water Authority prior to concreting any pipework to be embedded in any wall or suspended slab and in any event all underground pipework must be so inspected before it is backfilled or covered up. However, the pipework arrangement should be so designed as to minimize concealed piping as far as possible.
- 7.13 Individual stop valves shall be provided at all draw-off points or at a series of draw-off points if situated close together.
- 7.14 Pipes made of ductile iron, unplasticized polyvinyl chloride (uPVC), lined galvanized steel, stainless steel, copper, polyethylene or polybutylene of approved grades may be used for a fresh water inside service. All uPVC pipes must be properly supported and shielded from direct sunrays and must be painted with white acrylic paint when exposed.

- 7.15 A sump and pump system shall be provided with a standby pumpset. The proportion of capacity of sump tank to roof tank shall be in the order of 1:3 or as advised by the Water Authority.
- 7.16 A tee-branch valve refers to an isolation valve at a branch pipe and which is located close to the main pipe. To facilitate maintenance and repair, tee-branch valves shall be provided:
- (a) for all underground water pipes;
 - (b) if the main pipe is a communal inside service.
- 7.17 Sufficient cleansing taps shall be provided at car parks of a building for car/floor washing. The cleansing supply at the car park shall be given from a fresh water cistern with a separate meter unless it is a part of the cleansing supply system of the building.
- 7.18 The meter position of a building supply to a construction site shall be provided within a meter room or meter box located at the hoarding recess area so that reading and maintenance of the meter can be carried out outside the construction site. Safe, free and uninterrupted access to the meter room/box should be provided and maintained at all time. The door of the meter room or meter box shall be made of chicken-wire or provided with see-through glass panel. Details of the meter room or meter box are subject to the approval of the Water Authority.

Chapter 8 : Flushing Supply from Government Mains [Fresh or Salt]

- 8.1 A separate water storage tank shall be provided for flushing purposes.
- 8.2 The water discharge mechanism of flushing devices shall either be one of the following types:
- (a) with a flushing cistern:
 - (i) valveless siphonic;
 - (ii) drop valve;
 - (iii) flap valve; or
 - (iv) dual flush valve;
 - (b) without a flushing cistern:
 - (i) flushing valve (flushometer valve).

They can either be actuated by mechanical means or by sensors.

- 8.2A Every flushing cistern shall have an overflow terminating in a conspicuous position.
- 8.2B The discharge volume of the flushing devices shall be preset at the smallest compatible with the toilet bowl to ensure that effective clearance can be achieved by a single flush of water.
- 8.2C The requirements on the use of valve type flushing cisterns (refer to paragraphs 8.2(a)(ii), (iii) and (iv) above) are as follows:
- (a) The valve seal of the flushing devices shall be easily replaceable.
 - (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 or nearby.
 - (c) For dual flush devices, the reduced flushing volume shall not be more than two-thirds of the larger flushing volume.
 - (d) The components of all valve type flushing devices shall be resistant to salt water corrosion.
 - (e) The flushing devices must pass the 200,000-cycle endurance test.
- 8.2D The requirements on the use of flushing valves (refer to paragraph 8.2 (b) above)

are as follows:

- (a) Installation of a filter before a flushing valve or a group of flushing valves is required.
- (b) The cartridge and other valve components shall be easily replaceable.
- (c) The valve components shall be resistant to salt water corrosion.
- (d) Flushing valves shall be used within the range of working pressures specified by the manufacturer.
- (e) The flushing devices must pass the 200,000-cycle endurance test.
- (f) Flushing valve shall only be used where there is a good maintenance management system for frequent inspection and cleaning of filters. Normally only public toilets (such as those administered by government, quasi-government bodies, hotel operators, commercial complex management offices, etc.) will be considered.
- (g) To facilitate users to report defective flushing valves in case they occur, it is advisable to secure in a conspicuous place in the public toilet, where the flushing valves are installed, a plate etched with the name of the responsible party and the telephone number in both Chinese and English. Other effective arrangements may also be considered.
- (h) Flushing valve shall be of water efficiency Grade 1 or Grade 2 under Water Efficiency Labelling Scheme (WELS).

8.3 Not used.

8.4 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 paragraphs 8.2 and 8.2A to 8.2D above.

8.5 It is the requirement under the Buildings Ordinance [HK Law Chapter 123] that 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.

- 8.6 If the water supply pressure is high, a break pressure tank or cistern shall be provided at a suitable level to prevent excessive water pressure in the supply system. If this is not practicable, pressure reducing valves shall be provided to meet the following requirements:-
- (a) a bypass arrangement shall be provided for the installation of a second pressure reducing valve allowing the other pressure reducing valve to be isolated for repair and replacement when necessary;
 - (b) a pressure indicator on the low pressure side of the pressure reducing valve shall be provided for pressure monitoring;
 - (c) the associated pipes and fittings shall be able to withstand the maximum permissible pressure that may arise upon the failure of the pressure reducing valve.
- 8.7 A tee-branch valve refers to an isolation valve at a branch pipe and which is located close to the main pipe. To facilitate maintenance and repair, tee-branch valves shall be provided:
- (a) for all underground water pipes;
 - (b) in a flushing system if the main pipe serves more than one domestic unit or commercial floor.

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- 8.8 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.
- 8.9 To facilitate meter installation, a meter position shall be provided in the communal area of the building as close to the existing potable supply meters as possible.
- 8.9A For check meter of 100mm diameter or smaller, a straight length of pipe of $5 \times D$ (where D is the nominal bore of the meter) should be provided upstream of the check meter position and a straight length of pipe of $2 \times D$ at downstream. For check meter of diameter larger than 100mm, the straight lengths upstream and downstream are $10 \times D$ and $5 \times D$ respectively.
- 8.9B The designer should provide minimum horizontally perpendicular and longitudinal working clearances at each check meter position. The table below stipulates 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.

| | Meter Size (mm) | | | |
|---|-----------------|-----|-----|-----|
| | 40 | 50 | 80 | 100 |
| Minimum horizontally perpendicular working clearance from the wall or any edge of a door when opened where the check meter position is clamped (mm) | 310 | 310 | 380 | 400 |

The minimum longitudinal working clearance between both end of meter flanges of the check meter position and a wall or any obstruction should be 200mm.

- 8.10 The meter position for 15 mm diameter meter shall be constructed to include 20 mm x 15 mm bushes, or reducers, at both sides of the meter position with a 200 mm (clear effective length) distance piece of 15 mm tube placed in between. The tube shall be hollow with conspicuous holes drilled through the body. A longscrew (connector) shall be provided immediately after the bush or reducer at the delivery side. The meter position for meter of all sizes shall also be similarly provided with corresponding fittings of appropriate sizes. The length of the distance piece should be as follows:-

| Meter Size (mm) | 15 | 25 | 40 | 50 | 80 | 100 | 150 |
|---|-----|-----|-----|-----|-----|-----|-----|
| Clear Effective Length of Distance Piece (mm) | 200 | 311 | 346 | 310 | 413 | 483 | 500 |

- 8.11 A loose jumper type stopcock shall be provided and placed with the spindle in the vertical position before the meter on all connections up to and including 40 mm diameter.
- 8.12 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.
- 8.13 The capacity of the water storage tank shall be limited to 45 litres per flushing apparatus with a minimum of 250 litres.
- 8.14 In case of 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 Waterworks Drawing No. W 1543/5B.

For Mains Salt Water Flushing Supply

- 8.15 The inlet pipe to the separate storage tank shall not be less than 40 mm diameter.
- 8.16 Salt water supply will not be metered, but a meter position shall be provided for the purpose of periodic checking of consumption. This meter position should be so located as to be free from flood and obstruction for ease of meter reading and maintenance at all times, and 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.
- 8.17 A fullway gate 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.
- 8.18 There is no specific requirement for the storage capacity, but a storage not less than half a day's consumption is recommended.
- 8.19 All flushing water tanks and associated fittings and pipeworks etc. must be of salt water resistant materials, e.g. uPVC, vitreous earthenware, cast iron, gunmetal etc. to the approval of the Water Authority. All uPVC pipes must be properly supported and shielded from direct sunrays and must be painted with white acrylic paint when exposed.

Chapter 9 : Installation of a Fresh / Salt Water Fire Service

- 9.1 A fresh / salt water fire service must be entirely independent of the other water supply arrangements within the building or development concerned.
- 9.2 A fresh or salt water fire-fighting supply may be approved. A salt water installation may be "primed" with fresh water to inhibit corrosion etc. Such priming arrangements must be approved by the Water Authority prior to installation.
- 9.3 Cast iron, ductile iron, galvanized wrought iron, galvanized steel or copper pipes and fittings of approved grades will be used for a fresh water fire service. Consideration can also 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).
- 9.4 Cast iron, ductile iron and fittings capable of withstanding the corrosive effect of salt water must be used in a salt water fire service.
- 9.5 An independent connection shall be provided from the Government water mains for the fire service installation. The fire service connection will not be metered but a check meter position shall be provided for checking and waste detecting purposes. This meter position should be so located as to be free from flood and obstruction for ease of meter reading and maintenance at all times, and should be located 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. All pipework before the check meter position shall be exposed or laid in a proper service duct to facilitate inspection and /or repairs. Provision should be made for checking leakage from any pipework laid underground.
- 9.5A For check meter of 100mm diameter or smaller, a straight length of pipe of $5 \times D$ (where D is the nominal bore of the meter) should be provided upstream of the check meter position and a straight length of pipe of $2 \times D$ at downstream. For check meter of diameter larger than 100mm, the straight lengths upstream and downstream are $10 \times D$ and $5 \times D$ respectively.
- 9.5B The designer should provide minimum horizontally perpendicular and longitudinal working clearances at each check meter position. The table below stipulates 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.

| |
|-----------------|
| Meter Size (mm) |
|-----------------|

| | 40 | 50 | 80 | 100 |
|---|-----|-----|-----|-----|
| Minimum horizontally perpendicular working clearance from the wall or any edge of a door when opened where the check meter position is clamped (mm) | 310 | 310 | 380 | 400 |

The minimum longitudinal working clearance between both end of meter flanges of the check meter position and a wall or any obstruction should be 200mm.

- 9.6 A fullway gate valve and a non-return valve have to be installed on the fire service as close to the Government water supply connection as possible.
- 9.7 A tee-branch valve refers to an isolation valve at a branch pipe and which is located close to the main pipe. To facilitate maintenance and repair, tee-branch valves shall be provided for all underground water pipes.

Sprinkler / Drencher System

- 9.8 A dual connection from the Government unrestricted supply ring main will be provided for a fire service sprinkler / drencher system situated in the recognized Waterworks unrestricted industrial supply zone. Twin connections, one from an unrestricted supply main and one from a distribution main, will be provided for a fire service sprinkler / drencher system situated outside the recognized unrestricted industrial supply zone, where practicable.
- 9.9 Where it is not practical to connect the fire service sprinkler /drencher system to an unrestricted supply main, 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.
- 9.10 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.
- 9.11 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. Any exemption from this requirement should have the endorsement of the Director of Fire Services.

Hydrant / Hose Reel System

- 9.12 Common tank arrangements for fire-fighting and flushing or other purposes are not acceptable when a Government supply is involved. 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.
- 9.13 Supply to hydrant / hose reel system must not be fed directly from the Government mains.
- 9.14 Fire hose reel outlets shall be housed in glass-fronted cabinets secured under lock and key. The glass panel shall be of a frangible type and shall not exceed 1.5mm in thickness, and that it shall be of such size and design so as not to cause any undue obstruction to the free use of the hose reel. Furthermore, a metal or plastic striker shall be provided in the vicinity of the cabinet for the purpose of breaking the glass panel in case of emergency. To prevent misuse of fire hose reels, a sticker or plate carrying the following warning message should be securely fixed on or near every hose reel outlet and the message should be easily visible by the residents.

消 防 用 水
嚴 禁 作 其 他 用 途

USE OF WATER FROM FIRE SERVICES
FOR PURPOSES OTHER THAN FIRE
FIGHTING IS STRICTLY PROHIBITED

水務監督辦事處

Office of the Water Authority

Fire Service Ring Mains

- 9.15 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.
- 9.16 The fire service ring main shall not be connected to or used to supply any other services.

Chapter 10 : The Use of Pipes and Fittings and the Associated Installation Requirements in Inside Service

10.1 The type of pipe materials to be used in an inside service shall be detailed in the plumbing proposal. All pipes and fittings shall comply with the version of the relevant British Standard listed out on WSD’s website.

10.1A Subject to exemption stipulated in Clause 10.6, designated products (showers for bathing^[1], water taps^[2] and urinal flushing valves) of prescribed water efficiency requirements registered under WELS shall be used in the following designated part of premises for all proposals submitted using the Form WWO 46:

- (i) kitchens of the domestic premises
- (ii) bathrooms and toilets of all premises

Details of such designated products shall be included in Annex to Form WWO 46 and the products shall comply with the prescribed water efficiency requirements as below:

| <i>Designated products</i> | <i>Prescribed water efficiency requirements</i> |
|--|---|
| Showers for bathing | Grade 1 or Grade 2 |
| Water taps (for use in kitchen sinks) | Grade 1, Grade 2 or Grade 3 |
| Water taps (for use in washing basins of bathrooms and toilets) | Grade 1 or Grade 2 |
| Urinal flushing valves | Grade 1 or Grade 2 |

^[1] “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.

^[2] “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.

For a water tap or shower for bathing not complying with the above water efficiency requirements, the Water Authority (WA) will accept the alternative of installing inside the water tap or shower for bathing a flow controller registered under WELS and of appropriate water efficiency grade to form a “combined” water saving device that meets the prescribed water efficiency requirements above. The applicant would be required to submit, together with the Form WWO 46, test reports¹ of flow rate test of the combined water saving device conducted within 5 years before the date of submission to demonstrate compliance with the prescribed water efficiency requirements.

¹ The flow rate test and the submission of such reports are optional before 1 February 2019 but shall become mandatory with effect from 1 February 2019.

- 10.2 The Licensed Plumber is required to fill in details of pipes and fittings to be used in the Annex to Form WWO 46:-
- (i) All pipes intended to be used for the plumbing works covered by Form WWO 46 are required to be included in the Annex.
 - (ii) For fittings intended to be used for the plumbing works covered by Form WWO 46, those fittings listed in the WSD's website need to be included in the Annex.
- 10.3 uPVC fittings shall be used at the meter position if uPVC materials are used as inside service. Brass fittings shall be used at the meter position if copper, lined galvanized steel or thermo-plastic materials are used as inside service.
- 10.4 The metal work of an inside service shall not be used as an earth electrode. [Paragraph 12C(1)(b) of the Code of Practice for the Electricity (Wiring) Regulations, 1992 Edition]. Therefore, the use of non-metallic pipes or fittings should not have had any effect on the earthing arrangement of the building.
- 10.5 However, for some old buildings metallic water pipes might have been used to form part of the earthing arrangement. Under such circumstances, whenever an electrical insulation is to be introduced in the inside service, the applicant or his licensed plumber is advised to consult his registered electrician to confirm that the earthing arrangement in the premises / building is still acceptable. If the earthing arrangement becomes substandard, then actions should be taken to comply with the Electricity (Wiring) Regulations [HK Law Chapter 406].
- 10.6 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 46, 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 46.

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 46 to fully justify why the mandatory use of designated WELS products cannot be fully complied with.