

**General Specification for Plumbing Installation**  
**in Government Buildings of the Hong Kong Special Administrative Region**  
**2017 Edition (Incorporating Corrigendum No. GSPI01-2017)**

The General Specification for Plumbing Installation in Government Buildings of the Hong Kong Special Administrative Region 2017 Edition (hereinafter referred to as “General Specification for Plumbing Installation 2017 edition”) is reviewed from time to time to ensure that requirements stipulated in the document are clear, concise and in pace with technological advancements.

Corrigendum No. GSPI01-2017 is issued to incorporate updates and revisions to the General Specification for Plumbing Installation 2017 edition which are highlighted in the ensuing summary of major changes.

Electronic version of the General Specification for Plumbing Installation 2017 edition incorporating Corrigendum No. GSPI01-2017 can be viewed on the ArchSD Internet website.

After an introductory period of 3 months, the General Specification for Plumbing Installation 2017 edition (incorporating Corrigendum No. GSPI01-2017) shall apply to all tenders to be invited on or after **1 April 2020**.

**MAJOR CHANGES IN THE CORRIGENDUM (NO. GSPI01-2017) OF THE**  
**GENERAL SPECIFICATION FOR PLUMBING INSTALLATION**  
**IN GOVERNMENT BUILDINGS OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION**  
**2017 EDITION**

Old Ref. No.	New Ref. No.	Major Changes
<b>TABLE OF CONTENTS</b>		
Nil	A3.7	Added “Final Completion for Inspection of WSD”
A3.7	A3.8	Re-number
A3.8	A3.9	Re-number
A3.9	A3.10	Re-number
A3.10	A3.11	Re-number
A3.11	A3.12	Re-number
A3.12	A3.13	Re-number
A3.13	A3.14	Re-number
A3.14	A3.15	Re-number
A3.15	A3.16	Re-number
A3.16	A3.17	Re-number
A3.17	A3.18	Re-number
A3.18	A3.19	Re-number
Nil	A3.20	Added “Automatic Meter Reading”
B1.12	B1.12	Amended “cleaning and disinfection” into “cleansing and disinfection”
B1.12.2	B1.12.2	Amended “cleaning and disinfection” into “cleansing and disinfection”

Old Ref. No.	New Ref. No.	Major Changes
Nil	B1.14	Added “Modular Integrated Construction”
<b>PART A - SCOPE AND GENERAL REQUIREMENTS</b>		
<b>SECTION A1 –SCOPE OF SPECIFICATION</b>		
A1.3	A1.3	<ul style="list-style-type: none"> <li>- Added “AMR – Automatic Meter Reading”</li> <li>- Added “MiC” – Modular Integrated Construction</li> <li>- Added “The Hong Kong Accreditation Service”</li> </ul>
<b>SECTION A2 – STATUTORY OBLIGATIONS AND OTHER REGULATIONS</b>		
A2.1.1 (o)	A2.1.1 (o)	Delete “and”
A2.1.1 (p)	A2.1.1 (p)	Punctuation correction
A2.1.1 (q)	A2.1.1 (q)	Punctuation correction, added “and”
A2.1.2 (b)	A2.1.2 (b)	Practice Notes “for” Professional Persons Environmental Consultative Committee issued by EPD
A2.1.2 (c)	A2.1.2 (c)	Technical Requirements for Plumbing Works in Buildings issued by WSD
A2.1.2 (e)	A2.1.2 (e)	Guide to Application for Water Supply issued by WSD
A2.1.2 (q)	A2.1.2 (q)	Technical Memorandum to issue Air Pollution Abatement Notice to control Air Pollution from Stationary “Polluting” Processes issued by EPD
Nil	A2.1.2 (v)	Technical Specifications on Grey Water Reuse and Rainwater Harvesting by WSD
A2.1.3 (g)	A2.1.3 (g)	Code of Practice on “Avoidance of Damage” to Gas Pipes published by EMSD
<b>SECTION A3 – EXECUTION OF INSTALLATIONS</b>		
Nil	A3.7	Added a paragraph for “Final Completion for Inspection of WSD”
A3.7	A3.8	<ul style="list-style-type: none"> <li>- Renumber</li> <li>- Amend 2nd paragraph for provision of sample board to facilitate WSD’s inspection</li> </ul>
A3.8	A3.9	Renumber

Old Ref. No.	New Ref. No.	Major Changes
A3.9	A3.10	Re-number
A3.10	A3.11	Re-number
A3.11	A3.12	Re-number
A3.12	A3.13	Re-number
A3.13	A3.14	Re-number
A3.14	A3.15	Re-number
A3.15	A3.16	Re-number
A3.16	A3.17	Re-number
A3.17	A3.18	Re-number
A3.18	A3.19	Re-number
Nil	A3.20	Added new item regarding “Automatic Meter Reading”
<b>PART B – INSTALLATION METHODOLOGY</b>		
<b>SECTION B1 –PLUMBING SYSTEMS</b>		
B1.1(d)	B1.1(d)	Amended “Harvesting”
B1.2.3	B1.2.3	Spelling error on “levelled” to “levelled”
B1.12	B1.12	Amended “cleaning” into “cleansing”
B1.12.1	B1.12.1	Amended “cleaning” into “cleansing”
B1.12.2	B1.12.2	Amended “cleaning” into “cleansing”
Nil	B1.12.3	Added new item regarding “Systematic Flushing”
B1.12.3	B1.12.4	- Re-number - Added “and systematic flushing”

Old Ref. No.	New Ref. No.	Major Changes
		<ul style="list-style-type: none"> <li>- Added “The procedures of the water sampling tests shall be approved by the Supervising Officer.”</li> <li>- Added “or by the Hong Kong Accreditation Service (HKAS), or organisations accredited by an accreditation scheme mutually recognised by HOKLAS or HKAS.”</li> </ul>
Nil	B1.14	Added new item regarding “Modulated Integrated Construction”
<b>SECTION B3 –PAINTINGS, FINISHING AND IDENTIFICATION</b>		
B3.3	B3.3	Amended “BS ISO 3864-1: 2011” into “BS 1710: 2014”
<b>PART C – MATERIAL AND EQUIPMENT SPECIFICATION</b>		
<b>SECTION C1 – PLUMBING SYSTEMS</b>		
Table C1.2.1 Cold water potable and non-potable water supply systems	Table C1.2.1 Cold water potable and non-potable water supply systems	<ul style="list-style-type: none"> <li>- Added “Pipe and Fitting” into “Ductile iron Pipe and Fitting to BS EN 545: 2010”</li> <li>- Amended “Copper” into “Copper Pipe” and Copper Fitting to BS EN 1254-1 to 5: 1998 and BS EN 1254-6, 8: 2012</li> <li>- Amended “Stainless Steel” into “Stainless Steel Pipe”</li> <li>- Deleted “(&lt;50 mm dia.) and added “or” to BS EN 10217-7: 2014 (&gt;50 mm dia.), Stainless Steel Fitting to AS 3688: 2016.”</li> <li>- Added “For down feed and branch pipes serving drinking water circuit including drinking fountain, water dispenser, pantry, kitchen and the like: Stainless Steel Pipe Grade 316 to BS EN 10312:2002 +A1: 2005 or BS EN 10217-7:2014 (&gt;50 mm dia.), Stainless Steel Fitting to AS 3688:2016”</li> </ul>
Table C1.2.1 Hot water potable and non-potable water supply systems	Table C1.2.1 Hot water potable and non-potable water supply systems	<ul style="list-style-type: none"> <li>- Added “Copper Fitting to BS EN 1254-1 to 5: 1998 and BS EN 1254-6, 8: 2012,”</li> <li>- Amended “Stainless Steel to BS EN 10312: 2002 +A1:2005 (&lt;50 mm dia.) and BS EN 10217-7: 2014 (&gt;50 mm dia.)” into “Stainless Steel Pipe to BS EN 10312:2002 +A1: 2005 or BS EN 10217-7: 2014 (&gt;50 mm dia.), Stainless Steel Fitting to AS 3688: 2016”</li> <li>- Added “For down feed and branch hot water pipes serving drinking water circuit including water dispenser, pantry, kitchen and the like: Stainless Steel Pipe Grade 316 to BS EN 10312:2002 +A1:</li> </ul>

Old Ref. No.	New Ref. No.	Major Changes
		2005 or BS EN 10217-7:2014 (>50 mm dia.), Stainless Steel Fitting to AS 3688:2016”
Table C1.2.1 Flushing water supply system	Table C1.2.1 Flushing water supply system	<ul style="list-style-type: none"> <li>- Added “Pipe and Fitting” into “Ductile iron Pipe and Fitting to BS EN 545: 2010”</li> <li>- Amended “UPVC” into “UPVC Pipe” and “UPVC Fitting to BS 4346-1: 1969”</li> </ul>
Table C1.2.1 Reclaimed water distribution system	Nil	Deleted
C1.2.2	C1.2.2	Added BS EN 1254-3: 1998 and BS EN 1254-6, 8: 2012
C1.2.3	C1.2.3	Delete “for pipe size up to 50 mm diameter” and add “or”
<b>ANNEX I - LIST OF TECHNICAL STANDARDS AND QUALITY STANDARDS QUOTED IN THIS GENERAL SPECIFICATION</b>		
		<ul style="list-style-type: none"> <li>- Added “AS 3688: 2016 Water supply and gas systems - Metallic fittings and end connectors”</li> <li>- Added “BS EN 1254-3: 1998 Copper and copper alloys. Plumbing fittings. Fittings with compression ends for use with plastics pipes</li> <li>- Added “BS EN 1254-6: 2012 Copper and copper alloys. Plumbing fittings. Fittings with push-fit ends</li> <li>- Added “BS EN 1254-8: 2012 Copper and copper alloys. Plumbing fittings. Fittings with press ends for use with plastics and multilayer pipes</li> <li>- Amended “BS ISO 3864-1: 2011 Graphical symbols. Safety colours and safety signs. Design principles for safety signs and safety markings” into “BS 1710: 2014 Specification for identification of pipelines and services”</li> </ul>

**ARCHITECTURAL SERVICES DEPARTMENT**  
**BUILDING SERVICES BRANCH**  
  
**GENERAL SPECIFICATION FOR**  
**PLUMBING INSTALLATION**  
**IN GOVERNMENT BUILDINGS OF**  
**THE HONG KONG SPECIAL ADMINISTRATIVE REGION**  
  
**2017 EDITION**

**Corrigendum No. GSPI01-2017**

**(Effective from 1 April 2020)**

The following clauses are amended in the above edition of General Specification for Plumbing Installation.

**Clauses**

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**PART A – SCOPE AND GENERAL REQUIREMENTS**

**SECTION A1**

**SCOPE OF SPECIFICATION**

**A1.3 TERMS AND DEFINITIONS**

In this General Specification, all words and expressions shall have the meaning as assigned to them under the Conditions unless otherwise provided herein. The following words or expressions shall have the meanings assigned to them except when the context otherwise requires:-

A/C	Air Conditioning
A/C General Specification	General Specification for Air-conditioning, Refrigeration, Ventilation and Central Monitoring & Control System Installation in Government Buildings of the HKSAR issued by ArchSD
AISI	American Iron and Steel Institute



AMR	Automatic Meter Reading
ANSI	American National Standards Institute
ArchSD	Architectural Services Department, the Government of the Hong Kong Special Administrative Region
ASTM	American Society for Testing and Materials
BD	Buildings Department, the Government of the Hong Kong Special Administrative Region
BS	British Standards, including British Standard Specifications and British Standard Codes of Practice, published by the British Standards Institution
BS EN	European Standard adopted as British Standard
BSB	The Building Services Branch of the Architectural Services Department, the Government of the Hong Kong Special Administrative Region
Building Contractor	The Contractor employed by the Employer for the execution of the Works or the Specialist Contractor separately employed by the Employer to execute the Specialist Works as appropriate.
CCMS	Central Control and Monitoring System
CIBSE	The Chartered Institution of Building Services Engineers
Conditions	The “Conditions of Contract” as defined in the Contract. For Nominated Sub-contract works, the “Main Contract Conditions” and the “Sub-contract Conditions” as defined in the Nominated Sub-contract as appropriate
DI General Specification	The General Specification for Drainage Installation in Government Buildings of the HKSAR issued by ArchSD
DSD	Drainage Services Department, the

Government of the Hong Kong Special Administrative Region

EMSD	Electrical and Mechanical Services Department, the Government of the Hong Kong Special Administrative Region
EPD	Environmental Protection Department, the Government of the Hong Kong Special Administrative Region
EPDM	Ethylene propylene diene monomer (M-class)
FRP	Fibreglass reinforced polyester
FRR	Fire resistance rating as defined in the Code of Practice for Fire Safety in Buildings published by Buildings Department, the Government of the HKSAR
FSD	Fire Services Department, the Government of the Hong Kong Special Administrative Region
G.I.	Galvanised Iron
GRP	Glass Reinforced Plastics
HOKLAS	The Hong Kong Laboratory Accreditation Scheme
HKAS	The Hong Kong Accreditation Service
IEC	International Electrotechnical Commission
Installations	The work or services for the Plumbing Installation forming parts of the Works to be installed, constructed, completed, maintained and/or supplied in accordance with the Contract and includes Temporary Works
IP	Index of Protection
ISO	International Organization for Standardization
LPHW	Low Pressure Hot Water

L.V.	Low Voltage
MiC	Modular Integrated Construction
OD	Outside Diameter
Or equivalent standards	Means internationally recognised standards acceptable to the Supervising Officer having similar requirements and specification as regards to the type of construction, functions, performance, general appearance and standard of quality of manufacture and approved by the Supervising Officer
O&M	Operation and Maintenance
Particular Specification	The specifications drawn up specifically for the Installations of a particular project
Plumbing Contractor	The Nominated Sub-contractor, the Specialist Sub-contractor, or the Sub-contractor employed by the Building Contractor or the Contractor directly employed by the Employer as appropriate for the execution of the Plumbing Installations in accordance with the Contract
PN	Practice Notes for Authorised Persons, Registered Structural Engineers and Registered Geotechnical Engineers issued by Buildings Department
Proprietary brand name products or materials	The phrase “or alternative products or materials having equivalent functions or performance” is deemed to be included wherever products or materials are specified by proprietary brand names in the Contract. Alternative products or materials of different brands or manufacture having equivalent functions or performance maybe submitted for the consideration of the Supervising Officer.
PVC	Polyvinyl Chloride
SCCU	Statutory Compliance Checking Unit

	established within ArchSD
Supervising Officer	The Supervising Officer or the Maintenance Surveyor defined in the Contract as appropriate
Tender	The Contractor's tender for the Contract or the Nominated Sub-contractor's tender for the Nominated Sub-contract as appropriate
UL	Underwriters Laboratories
UPVC	Unplasticised Polyvinyl Chloride
UV	Ultra-violet
VSD	Variable Speed Drive
WA	Water Authority, the Government of the Hong Kong Special Administrative Region
WRAS	Water Regulations Advisory Scheme of United Kingdom (UK)
WSD	Water Supplies Department, the Government of the Hong Kong Special Administrative Region

## **SECTION A2**

### **STATUTORY OBLIGATIONS AND OTHER REGULATIONS**

#### **A2.1 STATUTORY OBLIGATIONS AND OTHER REQUIREMENTS**

The Installations shall conform in all respects with the followings:-

##### **A2.1.1 Statutory Obligations**

All Enactments and Regulations, in particular, the Plumbing Contractor's attention is drawn to the followings:

- (o) Environmental Impact Assessment Ordinance (Cap. 499), and other subsidiary legislation made under the Ordinance;
- (p) Land (Miscellaneous Provisions) Ordinance (Cap. 28), and

other subsidiary legislation made under the Ordinance;

- (q) Buildings Energy Efficiency Ordinance (Cap. 610), and other subsidiary legislation made under the Ordinance; and

#### A2.1.2 Other Requirements

- (b) Practice Notes for Professional Persons Environmental Consultative Committee issued by EPD;
- (c) Technical Requirements for Plumbing Works in Buildings issued by WSD;
- (e) Guide to Application for Water Supply issued by WSD;
- (q) Technical Memorandum to issue Air Pollution Abatement Notice to control Air Pollution from Stationary Polluting Processes issued by EPD;
- (v) Technical Specifications on Grey Water Reuse and Rainwater Harvesting by WSD;

#### A2.1.3 Safety Requirements

- (g) Code of Practice on Avoidance of Damage to Gas Pipes published by EMSD.

### **SECTION A3**

#### **EXECUTION OF INSTALLATIONS**

##### **A3.7 FINAL COMPLETION FOR INSPECTION OF WSD**

The Plumbing Contractor shall coordinate with WSD for the final inspections which 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 or WWO 1149 in compliance with the approved plumbing proposals and the Waterworks Ordinance and Regulations. During inspection of the inside service, non-destructive tests of lead content for solder joints selected by the WA shall also be carried out according to the WSD's requirement.

### **A3.8 SAMPLE BOARD**

Within 6 weeks of the acceptance of his Tender and prior to the commencement of the Installations, the Plumbing Contractor shall submit to the Supervising Officer for approval a sample board of essential components proposed to be used in the Contract. However, the Plumbing Contractor may request the Supervising Officer in writing for a longer period for submission if 6 weeks are practically insufficient.

To facilitate WSD's inspection of an inside service or a fire service, the Plumbing Contractor shall provide a sample board on site in full compliance of WSD's requirements and with prior approval of the Supervising Officer. The sample board shall display samples of taps, shower mixers, valves, and pipes listed in the Annex to Form WWO46 or WWO 1149 as well as solder materials if used. Relevant product certificates/testing reports/catalogues, delivery notes, purchase order or confirmation from relevant suppliers/distributors stating the place of origin of the pipes, fittings and solder materials as appropriate are also required to be provided together with the sample board. Each sample, with clear numbering and labelling, shall be firmly fixed onto a rigid wooden or metal board. Samples rejected by the Supervising Officer shall be replaced as soon as possible. Upon approval of all items, the Supervising Officer will endorse the list on the sample board and the Plumbing Contractor shall deliver the board to the site office of the Supervising Officer's Representative for reference.

The board shall contain samples of all "compact" sized materials and accessories to be used in the Installations. Written approval of all samples and technical details shall be obtained from the Supervising Officer before commencement of any installation work.

In the context of this General Specification the term "compact" means any item that will fit into a 300 mm cube.

The following items shall be included in the sample board as a minimum:

- (a) Pipework, fitting and their support complete with fixing accessories;
- (b) Valves; and
- (c) Taps, shower mixers and solder materials if used.

Relevant certificates/testing reports/catalogues as appropriate are also required to be provided together with the sample board.

Additional items may be required by the Supervising Officer and/or specified in the Particular Specification.

### **A3.9       ADVICE OF ORDER PLACED**

The Plumbing Contractor shall submit copies of all orders placed for major items of equipment and materials to the Supervising Officer for record.

### **A3.10       RECORD OF MATERIALS DELIVERY**

All materials and equipment delivered to Site shall be accurately listed and recorded in the site record books maintained by the Supervising Officer's Representative on Site.

Such materials and equipment shall not be removed from Site without the prior approval of the Supervising Officer in writing.

Where the Building Contractor is in overall control of the Site, the Building Contractor may also be required to record details of all incoming/outgoing materials and equipment. In this case, the Plumbing Contractor shall comply with the Building Contractor's arrangements.

The Plumbing Contractor shall print the major technical details on equipment/materials or supporting documents (e.g. delivery note), or else submit a written declaration to confirm compliance of the equipment/materials with the approved technical details so as to facilitate checking of equipment/materials delivered on site.

### **A3.11       PROTECTION OF MATERIALS AND EQUIPMENT**

Unless the responsibility is clearly defined in the Contract that the protection on Site for delivered equipment, materials and installation is solely by other contractors, the Plumbing Contractor shall be responsible for the safe custody of all materials and equipment as stored or installed by him. In addition, the Plumbing Contractor shall protect all work against theft, fire, damage or inclement weather and carefully store all materials and equipment received on Site but not yet installed in a safe and secure place unless otherwise specified.

All cases of theft and fire must immediately be reported to the police, the Building Contractor, the Supervising Officer and his Representative on Site with full details.

Where necessary the Plumbing Contractor shall provide lockable steel container or other equally secure enclosures placed within a securely fenced-in compound provided by the Building Contractor on Site for the storage of materials and equipment.

The Plumbing Contractor shall co-ordinate and arrange with the Building Contractor who shall provide clean, reasonably finished and lockable secure accommodation for the storage of sensitive and/or expensive items before installation.

If there is no Building Contractor, all the storage facilities and spaces shall be provided by the Plumbing Contractor.

### **A3.12 SERVICE CONDITION**

The following service conditions shall apply to materials and equipment

- (a) Climate : Hong Kong (tropical);
- (b) Ambient temperature : Peak  $-5^{\circ}\text{C}$  to  $+40^{\circ}\text{C}$  (continuously 4 hours)  
Average  $0^{\circ}\text{C}$  to  $+35^{\circ}\text{C}$  (over 24 hours);
- (c) Altitude : up to 2000 m above sea level; and
- (d) Relative humidity : 99% maximum.

### **A3.13 VOLTAGE COVERED BY THIS GENERAL SPECIFICATION**

Unless otherwise specified, all apparatus, equipment, materials and wiring shall be suitable for use with a 3-phase and neutral, 4-wire, 380/220 V  $\pm 6\%$ , 50 Hz  $\pm 2\%$ .

### **A3.14 LABEL**

In order to make cross reference to the Operation/Maintenance/Service Manuals and Schematic Drawings, etc., the Plumbing Contractor shall provide labels for marking all valves, pipework, filtration tanks, fuses, terminals, lamps, switches, handles, keys, instruments, gauges, control and other equipment, etc. and elsewhere to facilitate maintenance or as directed by the Supervising Officer with engraved multi-layer laminate or similar material. Wording shall be submitted to the Supervising Officer for approval before manufacture.

All labels shall be of adequate size as to give clearance between lettering and fixings to ensure an aesthetic arrangement on completion. Pipeline labels shall generally be not smaller than 100 mm x 20 mm. Where applicable, labels shall be fixed utilising non-ferrous round head bolts and nuts or woodscrews. Adhesives or self tapping screws are not acceptable.



For pipelines or valves, where applicable, labels shall be fixed by means of a key ring attached to the upper corner of the pipe mounting bracket or the hand wheel of valves. The labels shall be suspended from brass or stainless steel chain loops over the relevant pipe.

The Plumbing Contractor shall submit a schedule for all labels, notices, identifications for the Supervising Officer's approval prior to order and installation. The information of the schedule shall include the description of the items, height and font type of the text, dimensions of the labels and material used.

All English lettering used on labels shall be "Bold" capitals (except otherwise directed) with black letters on white labels for normal purposes. Where special colours or details are required these shall be as specified or directed.

All labels shall be in English complete with translation in Chinese characters. The Chinese translations shall be referred to the "Glossaries of Terms Commonly Used in Government Departments" issued by Civil Service Bureau of the Government of the HKSAR. Sample of label and notice shall be submitted to the Supervising Officer for agreement. In general, height for the English lettering shall be of 8mm with that for Chinese characters to match.

For electrical panels or other items, lettering shall be:-

- (a) Black on white for normal purposes;
- (b) Red letters on white where connected to essential supply; and
- (c) Green letters on white where operated by direct current.

### **A3.15 WARNING NOTICE**

Warning notices shall be provided as required by the Electricity Ordinance (Cap. 406) and the Code of Practice for the Electricity (Wiring) Regulations (Cap. 406E). In addition, the following warning notices in English and Chinese shall be provided at the appropriate positions :-

- (a) A label having minimum size of 65 x 50 mm marked with the words 'DANGER - HIGH VOLTAGE' in red lettering not less than 5 mm high to be fixed on every container or enclosure of equipment for operating at voltages exceeding "Low voltage"; and
- (b) A label to be fixed in such a position that any person may gain access to any moving parts of an item of equipment or enclosure will notice or be warned of such a danger.

### **A3.16 GUARD AND RAILING FOR MOVING OR ROTATING PARTS OF EQUIPMENT**

All moving or rotating parts of equipment shall be provided with an approved guard and railing complying with the Factories & Industrial Undertakings (Guarding and Operation of Machinery) Regulations, (Cap. 59Q), together with any amendments made thereto.

Guards shall be rigid and of substantial construction and shall consist of heavy galvanised mild steel angle frames, hinged and latched with either heavy galvanised mild steel wire crimped mesh securely fastened to frames or galvanised sheet metal of 1.2 mm minimum thickness. All apertures shall be such that finger access to dangerous part is not possible. All sections shall be bolted or riveted. Railings shall be made of 32 mm dia. galvanised mild steel pipe and railing fittings.

### **A3.17 EQUIPMENT DEVIATIONS**

Subsequent to the acceptance of his Tender, and only in exceptional circumstances where it is demonstrated in writing by the Plumbing Contractor that the original equipment offered cannot be obtained, the Supervising Officer may, subject to the Conditions, consider and approve, in writing, alternative equipment and materials proposed by the Plumbing Contractor provided always that these are fully in compliance with the relevant Specification and Drawings and do not impose any additional contractual or financial liabilities onto the Employer.

### **A3.18 WATERPROOFING**

Where any work requires piercing waterproofing layers or structures, the method of installation must have prior approval, in writing, from the Supervising Officer.

Unless otherwise specified or instructed, the Plumbing Contractor shall provide all necessary sleeves, puddle flanges, caulking and flashing as appropriate to make these penetrations absolutely watertight.

### **A3.19 SURVEYS AND MEASUREMENTS**

The Plumbing Contractor shall relate all horizontal and vertical measurements taken and/or applied, to establish bench marks such as design drawing grid lines, finished floor levels, etc. and shall thus establish satisfactory lines and levels for all work.

All works shall be installed to these established lines and levels and the Plumbing Contractor shall verify all measurements on Site and check the correctness thereof as related to the Installations.

Primary bench base line, datum level, horizontal reference grid, secondary grid and transferred bench mark on each structural level will be provided by the Building Contractor. The Plumbing Contractor shall co-ordinate with the Building Contractor to obtain all necessary datum and reference grids prior to their surveys and measurements.

### **A3.20 AUTOMATIC METER READING**

To facilitate the implementation of the Automatic Meter Reading (AMR) System for water supply, AMR Outstations and the associated cabling shall be provided as applicable. The supply, installation, testing and commissioning of the AMR Outstation shall be in accordance with WSD's requirements and any other requirements as specified by the WA from time to time.

## **PART B – INSTALLATION METHODOLOGY**

### **SECTION B1**

#### **PLUMBING SYSTEMS**

##### **B1.1 GENERAL**

The Scope of Installations under this section shall include the complete plumbing installation for fresh, flush, fire service pipework systems as shown on the Drawings and as specified, including but not limited to:

- (d) Rainwater Harvesting system including associated pumps and pipework installations and water treatment equipment, where shown on the Drawings or as specified;

##### **B1.2 HANDLING AND STORAGE**

B1.2.3 Pipes and fittings shall be stored under cover and clear of a levelled, well-drained and maintained hard-standing ground. Do not rest pipes on their sockets.

## **B1.12 CLEANSING AND DISINFECTION OF INSTALLATIONS**

### **B1.12.1 General**

The plumbing installation pipework and water storage tanks shall be thoroughly flushed clean to remove rust, sludge and sediment upon commissioning. Fresh water distribution pipework and associated water storage tanks shall be further disinfected and flushed thoroughly with potable water upon completion of cleansing and before water supply is resumed. The Plumbing Contractor shall arrange with the Water Authority to collect water samples for testing.

Disinfection of plumbing installation for potable use shall be carried out not more than 7 days before hand over the installation to users for operation. Where the plumbing installation for potable use is not brought into use immediately after commissioning, it shall be disinfected before use unless it has been flushed weekly to maintain a flow of water.

### **B1.12.2 Methodology of Cleansing and Disinfection**

The Plumbing Contractor shall carry out the cleansing and disinfection in accordance with the requirements as required by WSD and as stipulated in the Testing and Commissioning Procedure for Plumbing Installation in Government Buildings Hong Kong issued by the Building Services Branch, Architectural Services Department, and to the satisfaction of the Water Authority.

For pipework downstream of the water tank or downstream of the water meter for the case of direct feed system, the disinfection process shall be in accordance with the requirements of WSD.

The Plumbing Contractor shall submit a cleansing and disinfection plan indicating the scope of work, detail of the compartmentation if any, work schedule, method statement, procedures and equipment for checking and testing, location of sampling, method statement for the de-chlorination, etc. for the Supervising Officer's approval prior to carrying out the work.

Any discharge of disinfectant solution or used water for disinfection shall comply with the Water Pollution Control Ordinance (Cap. 358). The Plumbing Contractor shall submit a method statement for the de-contamination of used water to the Supervising Officer for approval.

### B1.12.3 Systematic Flushing

For newly installed inside service for potable water purpose in new buildings, the Plumbing Contractor is required to carry out systematic flushing and submit to WSD the records of carrying out the systematic flushing according to WSD's requirements before carrying out water sampling tests. The procedures of systematic flushing shall be approved by the Supervising Officer.

### B1.12.4 Water Quality Test

The Plumbing Contractor shall arrange water sampling tests upon completion of the cleansing and disinfection, and systematic flushing of the plumbing installations. The water sampling tests shall also comply with the requirements of WSD and to the satisfaction of the Water Authority. The procedures of the water sampling tests shall be approved by the Supervising Officer.

Sampling and analysis of the water samples shall be carried out by the Water Authority or by accredited laboratories under the HOKLAS or by the Hong Kong Accreditation Service (HKAS), or organisations accredited by an accreditation scheme mutually recognised by HOKLAS or HKAS. For water samples to be tested by accredited laboratories, the water samples shall be taken on site by the accredited laboratories in accordance with the sampling procedures developed with reference to BS EN ISO 5667-5: 2006.

If any of the water samples fails to comply with WSD's requirement, the Plumbing Contractor shall investigate the cause, take necessary rectification action and re-arrange water quality testing for the concerned part of installations.

## **B1.14 MODULAR INTEGRATED CONSTRUCTION**

For projects involve the adoption of the "Modular Integrated Construction" (MiC) method with plumbing installation, the Plumbing Contractor shall make all necessary provisions for the application, supervision and inspection to the satisfaction of the Supervising Officer and the Water Authority. Details shall be in accordance with guidelines and procedures set out by the WSD.

## **SECTION B3**

### **PAINTINGS, FINISHING AND IDENTIFICATION**

#### **B3.3 IDENTIFICATION OF PIPELINES**

All pipework in the pump rooms shall be finished generally in accordance with BS 1710: 2014. All pipework, where exposed on surfaces outside the pump room, shall be painted either as in the pump room or to match the surrounding surface with distinguishing colour code bands plus flow arrows in the specified colour scheme as directed by the Supervising Officer.

Pipes and pipelines shall be painted in colours either in accordance with BS 1710: 2014 or as directed by the Supervising Officer completed with the identification colour code indicators. The basic identification colour or the decoration colour shall be applied over the whole length of the pipe with colour code indicators placed at all junctions, at both sides of valves, wall penetrations and at any other places where identification is necessary as directed by the Supervising Officer.

Valves may be painted in the same colour as the associated pipework. However, if the pipeline is part of the fire service installation and has been coded only with the safety colour, the valves involved shall be fully painted "safety-red".

The direction of flow of fluid shall be indicated by an arrow over the basic identification colour and painted white or black in order to contrast clearly with the basic identification colour.

Schedule of paint colours shall be to BS 4800: 2011.

## **PART C – MATERIAL AND EQUIPMENT SPECIFICATION**

### **SECTION C1**

#### **PLUMBING SYSTEMS**

#### **C1.2 PIPES, JOINTS AND FITTINGS**

##### **C1.2.1 General**

The application of pipework types to the various plumbing systems shall be as stated in Table C1.2.1 if not specified in the Contract. All

pipes and fittings shall comply with the relevant standards and shall have suitable markings to indicate the standards.

Table C1.2.1 - Application of Pipework Types

Application	Type
Cold water potable and non-potable water supply systems	<p><u>For mains supply and up feed riser:</u> Ductile iron pipe and fitting to BS EN 545: 2010, Class 100 with minimum thickness in full compliance with the following Table C1.2.4 with internal cement lining</p> <p><u>For down feed pipes:</u> Copper pipe to BS EN 1057: 2006 +A1:2010, copper pipe fitting to BS EN 1254-1 to 5: 1998 and BS EN 1254-6, 8:2012, or stainless steel pipe to BS EN 10312:2002 +A1: 2005 or BS EN 10217-7:2014 (&gt;50 mm dia.), stainless steel pipe fitting to AS 3688:2016</p> <p>For down feed and branch pipes serving drinking water circuit including drinking fountain, water dispenser, pantry, kitchen and the like: Stainless steel pipe Grade 316 to BS EN 10312:2002 +A1: 2005 or BS EN 10217-7:2014 (&gt;50 mm dia.), stainless steel pipe fitting to AS 3688:2016</p>
Fire service mains supply	To the requirements of General Specification for Fire Service Installation in Government Buildings of the HKSAR
Hot water potable and non-potable water supply systems	<p>Copper pipe to BS EN 1057: 2006 +A1:2010, copper pipe fitting to BS EN 1254-1 to 5: 1998 and BS EN 1254-6, 8: 2012, or stainless steel pipe to BS EN 10312: 2002 +A1:2005 -or BS EN 10217-7:2014 (&gt;50 mm dia.), stainless steel pipe fitting to AS 3688:2016</p> <p>For down feed and branch hot water pipes serving drinking water circuit including water dispenser, pantry, kitchen and the like, stainless</p>

	steel pipe Grade 316 to BS EN 10312:2002 +A1: 2005 or BS EN 10217-7:2014 (>50 mm dia.), stainless steel pipe fitting to AS 3688:2016
Flushing water supply system	<p><u>For mains supply and up feed riser:</u> Ductile iron pipe and fitting to BS EN 545: 2010, Class 100 with minimum thickness in full compliance with the following Table C1.2.4 with internal cement lining</p> <p><u>For down feed pipes:</u> Ductile iron pipe and fitting to BS EN 545: 2010, Class 100 with minimum thickness in full compliance with the following Table C1.2.4 with internal cement lining or UPVC Pipe to BS EN ISO 1452-2: 2009 series S8 or above, or UPVC to BS 3505: 1986 Class E. UPVC Fitting to BS 4346-1:1969</p>

#### C1.2.2 Copper Pipes, Joints and Fittings

Copper pipe shall be of hard drawn temper copper tubes to BS EN 1057: 2006 +A1: 2010. For pipe sizes with nominal diameter equal to or below 28 mm, half hard temper copper tubes to BS EN 1057: 2006 +A1: 2010 is acceptable.

Copper and copper alloy fittings such as end feed capillary, integral solder capillary and compression type bushes, reducers, bends and tees shall comply with BS EN 1254-1: 1998, BS EN 1254-2: 1998, BS EN 1254-3:1998, BS EN 1254-4: 1998, BS EN 1254-5: 1998 and BS EN 1254-6, 8: 2012.

Copper pipes for cold water application shall be encapsulated with factory applied moisture resistant polyethylene sheath.

Joints and fittings, such as end feed capillary, integral solder capillary and compression type bushes, reducers, bends and tees for cold water application shall be encapsulated with moisture resistant polyethylene sheath or other approved type sheath for protection.

Copper pipes for hot water application above 30°C but below 80°C shall be pre-insulated with factory applied thermal insulation polyethylene sheath with internal profile to entrap air and provide thermal barrier. Thermal insulation for pipework install inside plant



room and pipe duct shall refer to other section of this Specification.

Lead-free soldering alloys and cadmium-free brazing alloy shall be used in installations for water for human consumption and shall fully comply with the requirements of WSD and Section B1.4.3.

### C1.2.3 Stainless Steel Pipes, Joints and Fittings

Stainless steel pipe shall be to BS EN 10312: 2002+A1: 2005 light gauge stainless steel tubes or

Stainless steel pipe shall be to BS EN 10217-7: 2014 for pipe size greater than 50 mm diameter.

Stainless Steel pipe fitting shall be to AS 3688:2016.