



# GOOD PRACTICE GUIDE ON PLUMBING WORKS



# CONTENTS

<b>1.</b>	<b>INTRODUCTION</b>	2
<b>2.</b>	<b>CLASSIFICATION OF PLUMBING WORKS</b>	4
2.1	Type I Plumbing Works	4
2.2	Type II Plumbing Works	5
<b>3.</b>	<b>ROLES AND RESPONSIBILITIES OF RELEVANT STAKEHOLDERS IN PLUMBING WORKS</b>	6
3.1	Developer/Client	6
3.2	Main Contractor/Plumbing Contractor	7
3.3	Licensed Plumber	8
3.4	Plumbing Workers	8
<b>4.</b>	<b>TYPE I PLUMBING WORKS</b>	9
	<b>Design of Plumbing Works</b>	9
4.1	Design Stage	9
	<b>Construction of Plumbing Works</b>	11
4.2	Material Procurement Stage	11
4.3	Pipe Installation Stage	16
4.4	Completion Stage	17
<b>5.</b>	<b>TYPE II PLUMBING WORKS</b>	23
	<b>Design of Plumbing Works</b>	23
5.1	Design Stage	23
	<b>Construction of Plumbing Works</b>	23
5.2	Material Procurement Stage	23
5.3	Pipe Installation Stage	25
5.4	Completion Stage	27



---

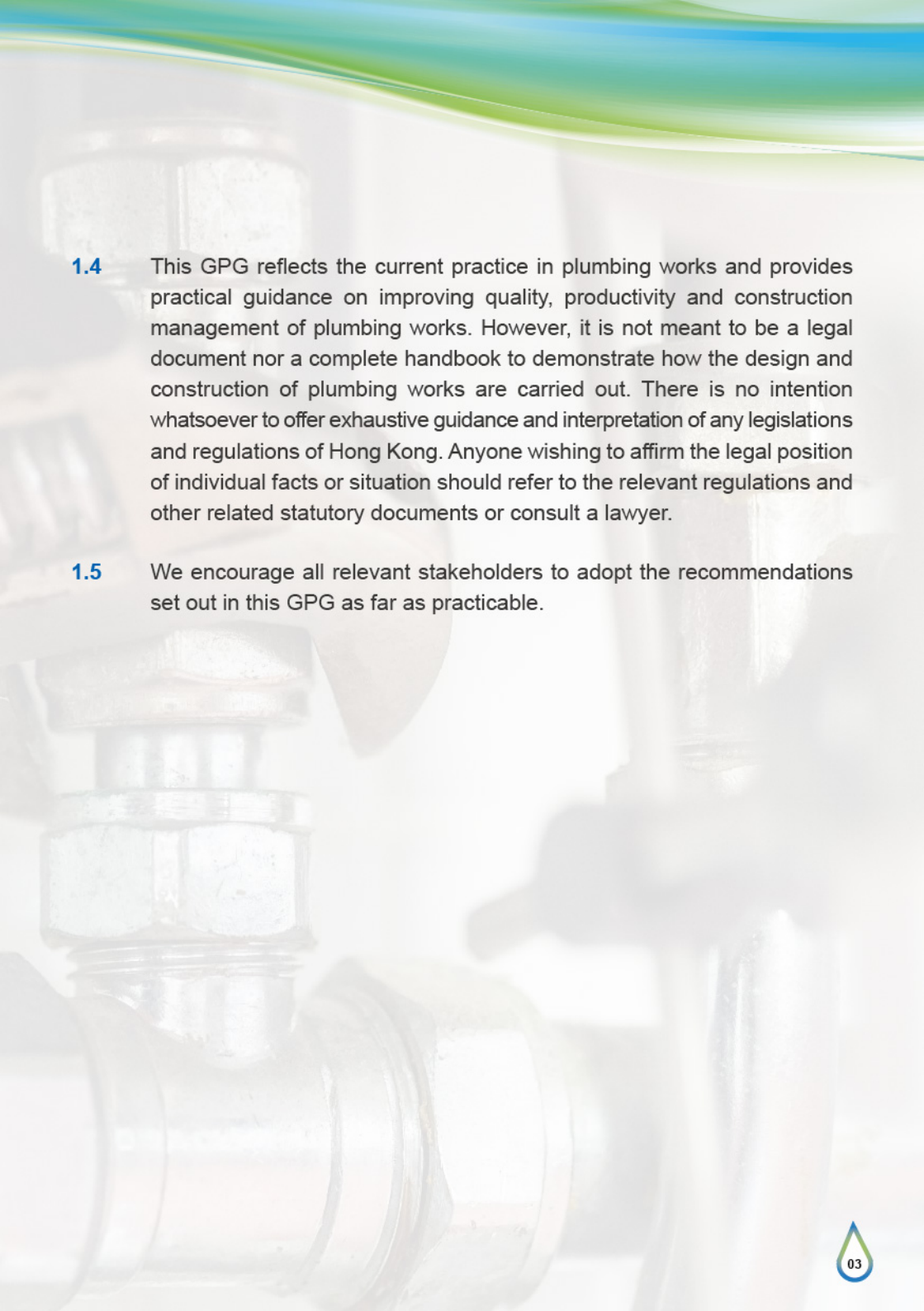
## 1. INTRODUCTION

- 1.1** The Commission of Inquiry into Excess Lead Found in Drinking Water<sup>1</sup> (COI) issued its report in May 2016. Amongst other recommendations, the COI recommends that the roles, involvements and responsibilities of parties who are in practice involved in the design, construction and maintenance of inside service should be defined. The COI also recommends that relevant stakeholders involved in plumbing works should devise and execute effective control measures in relation to plumbing materials and supervision and inspection for plumbing work.
- 1.2** Various stakeholders, including developers/clients, main contractors, plumbing contractors, licensed plumbers and plumbing workers, play an important role in plumbing works. They take different responsibilities in order to ensure that the plumbing works comply with contractual and statutory requirements.
- 1.3** The main objective of this Good Practice Guide on Plumbing Works (GPG) is to enhance quality, productivity and construction management of plumbing works. This GPG recommends some good practices to relevant stakeholders for carrying out design and construction of different types of plumbing works which require the permission from the Water Authority (WA). These plumbing works are grouped into two types, namely Type I and Type II, in this GPG.

---

1. The COI was appointed by the Chief Executive in Council in August 2015 under the Commissions of Inquiry Ordinance to inquire into the incidents of excess lead found in drinking water.



- 
- 1.4** This GPG reflects the current practice in plumbing works and provides practical guidance on improving quality, productivity and construction management of plumbing works. However, it is not meant to be a legal document nor a complete handbook to demonstrate how the design and construction of plumbing works are carried out. There is no intention whatsoever to offer exhaustive guidance and interpretation of any legislations and regulations of Hong Kong. Anyone wishing to affirm the legal position of individual facts or situation should refer to the relevant regulations and other related statutory documents or consult a lawyer.
- 1.5** We encourage all relevant stakeholders to adopt the recommendations set out in this GPG as far as practicable.

---

## 2. CLASSIFICATION OF PLUMBING WORKS

The classification used in this GPG applies to those plumbing works which requires the permission from the WA. Hence, it is not applicable to alteration works of a minor nature.

### 2.1 Type I Plumbing Works

**2.1.1** This type of plumbing works refers to construction of a large-scale, complex plumbing system in which significant design effort and extensive liaison with other building and buildings services work during construction is needed.

#### 2.1.2 Examples of Type I plumbing works are:-

- ⦿ Construction & installation of new plumbing systems in buildings works with sump and pump system.
- ⦿ Re-plumbing work to the extent that it is in fact re-design of Type I plumbing works.

## 2.2 Type II Plumbing Works

**2.2.1** This type of plumbing works refers to construction of simpler or more typical plumbing system in which the design effort is less and relatively simple liaison with works in other areas during construction is needed. Other plumbing works, such as alteration and removal of existing plumbing system, in which the design effort is less and the construction work is simpler are also classified as Type II plumbing works.

### 2.2.2 Examples of Type II plumbing works are:-

- Construction & installation of new plumbing systems in village houses.
- Re-plumbing work without the need of much design effort<sup>2</sup>
- Installation of separate water meters.
- Removal of existing plumbing system.

---

2. For example, re-plumbing of plumbing systems in villages houses or buildings without sump and pump systems, re-plumbing of plumbing systems without the need of revising sump and pump system, etc.



---

## 3. ROLES AND RESPONSIBILITIES OF RELEVANT STAKEHOLDERS IN PLUMBING WORKS

### 3.1 Developer/Client

**3.1.1** Developer/Client has the fundamental responsibility of ensuring that all aspects, including plumbing installations, of their development projects are in compliance with relevant statutory requirements. It is also their own interest that their development projects can be completed satisfactorily before inspection by relevant statutory authorities to avoid substantial rectification works which could be costly and time-consuming thereby delaying the commissioning of the development projects.

**3.1.2** Developer/Client of large-scale development projects usually engage **Project Team** which comprises professionals such as engineers, architects, surveyors, etc, to design the projects so as to reflect their requirements, including the relevant statutory requirements, in the construction contracts. The Project Team will exercise periodic supervision by carrying out surveillance checks and tests.

## 3.2 Main Contractor/Plumbing Contractor

**3.2.1** In Type I plumbing works, two types of contractual arrangement in delivering plumbing works are commonly found nowadays. Traditionally, Developer/Client will employ Main Contractor to deliver the whole development project. The Main Contractor usually sub-contracts the plumbing works to a Plumbing Contractor which is known as **Plumbing Sub-contractor**. In this type of contractual arrangement, the Main Contractor is responsible for the overall site coordination of all the sub-contractors and the entire construction process. It is the responsibility of the Main Contractor to provide continuous supervision and all necessary superintendence for proper fulfillment of his obligations under the contract. The Main Contractor shall take responsibility for all non-compliance of works, including plumbing works, under the main contract as well as sub-contracts.

**3.2.2** There is another type of contractual arrangement in which Developer/Client will direct contract with the Plumbing Contractor to deliver the plumbing works. In this type of contractual arrangement, the Main Contractor does not exist and the Plumbing Contractor will take up the responsibilities of the Main Contractor to ensure all plumbing works comply with the contractual and statutory requirements.

**3.2.3** Similarly, the Main Contractor normally will not be involved in Type II plumbing works and the Plumbing Contractor will be responsible to ensure all plumbing works comply with the contractual and statutory requirements.

### **3.3 Licensed Plumber**

- 3.3.1** Licensed plumber (LP) is a person licensed under the Waterworks Regulations (WWR) to carry out various types of plumbing work.
- 3.3.2** The LP is responsible for taking all necessary steps to ensure that all the installed plumbing works comply with Waterworks Ordinance (WWO) and WWR.

### **3.4 Plumbing Workers**

- 3.4.1** Plumbing Workers are responsible for personally carrying out the plumbing works under the supervision of the Main Contractor/Plumbing Contractor and the LP. Plumbing Workers should acquire necessary knowledge and skill required in carrying out the plumbing works.
- 3.4.2** In current practice, plumbing workers may be skilled workers or semi-skilled workers registered under the Construction Workers Registration Ordinance with the trade divisions applicable to the plumbing works required under the project or other workers who work under the instruction and supervision of these skilled or semi-skilled workers or LP.



---

## 4. TYPE I PLUMBING WORKS

### Design of Plumbing Works

#### 4.1 Design Stage

4.1.1 **Project Team** is recommended to adopt the following practices:-

- (a) Engage plumbing professionals to design the plumbing works and prepare plumbing drawings, specifications, tender documents and contract documents, etc. The plumbing professionals should have adequate training in design of plumbing works which are comparable to Type I plumbing works required under the project and should possess relevant post-training experience.
- (b) Require the design team to make use of standard details in preparation of the plumbing drawings. For example, some standard details provided in the Handbook on Plumbing Installation for Buildings may serve as a reference, which can be found in the following webpage:-

[http://www.wsd.gov.hk/filemanager/en/content\\_150/HBonPIB\\_06.pdf](http://www.wsd.gov.hk/filemanager/en/content_150/HBonPIB_06.pdf)

- (c) Before submission of plumbing proposal to the WA for approval, arrange verification check on the quality of the plumbing proposal to ensure it comply with the prevailing WA's requirements which are specified in the following documents:-
- Waterworks Ordinance and Waterworks Regulations
  - Hong Kong Waterworks Standard Requirements
  - Handbook on Plumbing Installation for Buildings
  - Water Supplies Department (WSD) Circular Letters
- (d) Require the verification team to make use of checklist in conducting the verification check. For example, the checklist for vetting plumbing proposals provided in the Handbook on Plumbing Installation for Buildings may serve as a reference, which can be found in the following webpage:-
- [http://www.wsd.gov.hk/filemanager/en/content\\_150/HBonPIB\\_02.pdf](http://www.wsd.gov.hk/filemanager/en/content_150/HBonPIB_02.pdf)
- (e) Adopt pipe materials and jointing methods free from the risk of misuse of leaded solder joints in plumbing works, e.g. the use of mechanical joints for copper pipes, stainless steel pipes or crosslinked polyethylene pipes.
- (f) Exclude plumbing installation in the production process of off-site precast components such as precast kitchen, etc., which are fabricated outside Hong Kong if it is expected that LPs cannot supervise the plumbing works effectively.

## Construction of Plumbing Works

### 4.2 Material Procurement Stage

4.2.1 **Project Team** is recommended to adopt the following practices:-

- (a) Require the Main Contractor/Plumbing Contractor to submit material submissions of essential components<sup>3</sup>, including soldering and brazing materials, for approval.
- (b) Upon delivery of the essential components to site, including soldering and brazing materials, conduct verification check of materials with the Main Contractor/Plumbing Contractor and the LP by visual inspection and checking against approved samples, respective catalogues and certificates in accordance with the contractual requirements. Random samples should be selected for checks on the appearance, dimensions against relevant standards and whether there are visible defects.

---

3. Essential components include all items to be reported in Annex to Form WWO 46 as required by the WA. The list for reporting shall refer to the WSD's webpage:-  
[http://www.wsd.gov.hk/filemanager/en/content\\_138/annex\\_to\\_wwo46.pdf](http://www.wsd.gov.hk/filemanager/en/content_138/annex_to_wwo46.pdf)



- (c) Upon delivery of the essential components to site, including soldering and brazing materials, conduct verification check of materials with the Main Contractor/Plumbing Contractor and the LP by selecting random samples for testing of their chemical composition against relevant British Standards<sup>4</sup> (BS) by accredited laboratories<sup>5</sup>. The Project Team should work with the Main Contractor/Plumbing Contractor and the LP to determine the scope and frequency of random sampling such that non-compliant pipes and fittings which pose high risk<sup>6</sup> to drinking water quality can be discovered upon delivery as early as possible and in an economic way before putting them in use in plumbing works. Relevant factors including but not limited to consequence of using non-compliant pipes and fittings, quality control measures taken by suppliers for such pipes and fittings, total number of such pipes and fittings in a project, etc. should be considered.

- 
4. British Standards applicable to inside service and fire service can be found in this webpage:-  
[http://www.wsd.gov.hk/en/plumbing\\_and\\_engineering/fittings\\_to\\_be\\_installed\\_or\\_use/standards\\_of\\_pipe\\_and\\_fitting/index.html](http://www.wsd.gov.hk/en/plumbing_and_engineering/fittings_to_be_installed_or_use/standards_of_pipe_and_fitting/index.html)
  5. Refer to WSD Circular Letter 6/2015 which can be found in this webpage:-  
<http://www.wsd.gov.hk/filemanager/article/en/upload/358/cir0615.pdf>
  6. Non-compliant soldering materials, brazing materials, copper alloy fittings, etc., will leach excess lead/cadmium are considered as some examples of non-compliant fittings which pose high risk to drinking water quality.

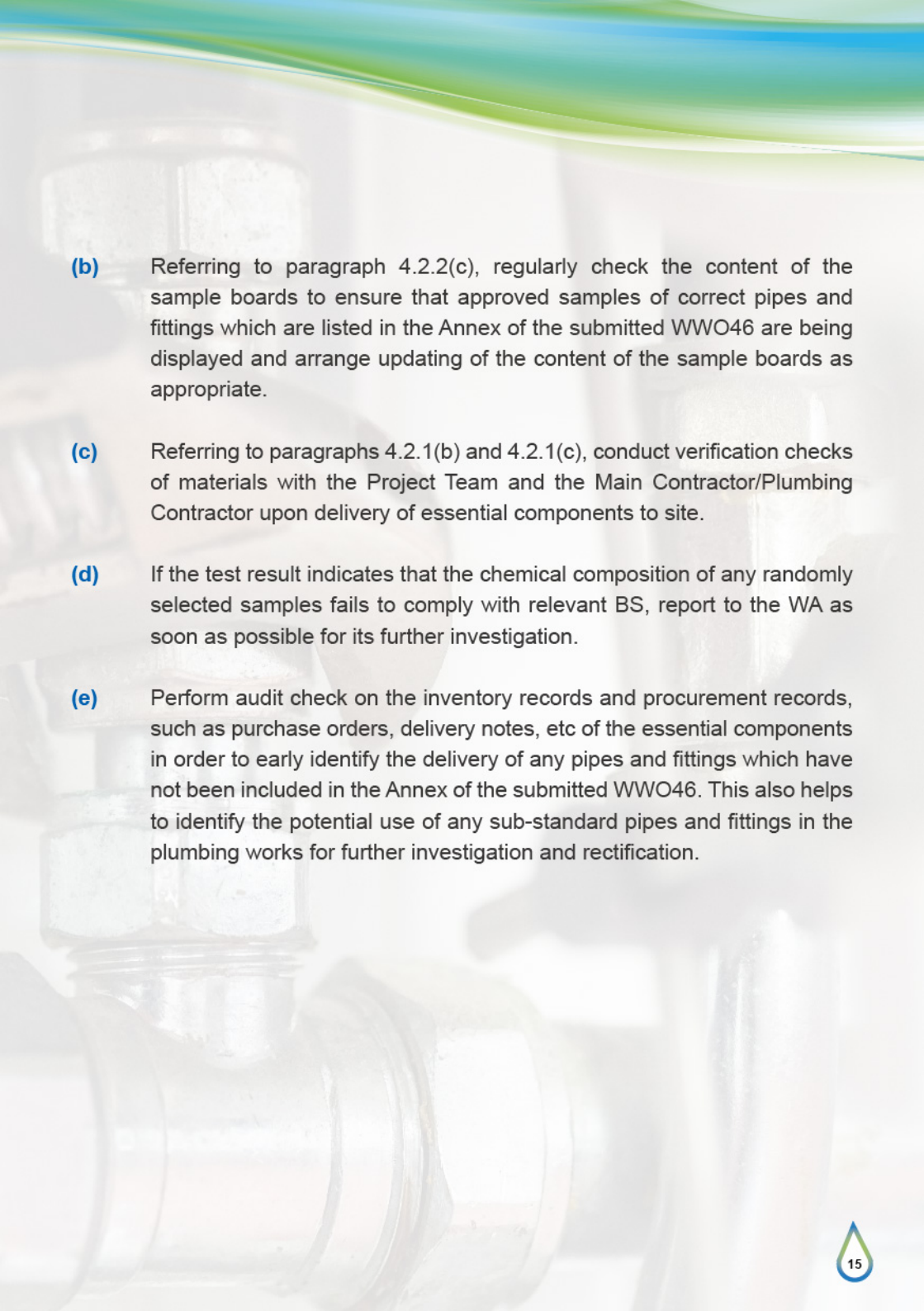
**4.2.2 Main Contractor/Plumbing Contractor** is recommended to adopt the following practices:-

- (a) Prepare and submit material submissions of the essential components, including soldering and brazing materials, to the Project Team for approval.
- (b) Implement or require the Plumbing Sub-Contractor to implement central procurement of the essential components, including soldering and brazing materials.
- (c) Provide sample boards displaying approved samples of pipes and fittings, including soldering and brazing materials, listed in the Annex of the submitted WWO46 together with associated relevant certificates/testing reports/catalogues as appropriate.
- (d) Referring to paragraphs 4.2.1(b) and 4.2.1(c), conduct verification checks of materials with the Project Team and the LP upon delivery of essential components to site.
- (e) If the test result indicates that the chemical composition of any randomly selected samples fails to comply with relevant BS, investigate the cause of non-compliance and its effect on plumbing works already completed and take rectification actions.

- (f) Establish a system that will record details of all incoming/outgoing plumbing materials, including those of the Main Contractor/Plumbing Contractor and the Plumbing Sub-contractor.
- (g) Maintain inventory records and procurement records, such as purchase orders, delivery notes, etc of the essential components, including soldering and brazing materials delivered to site.
- (h) Store the verified soldering and brazing materials in lockable storeroom and maintain a daily consumption ledger for soldering and brazing materials.

**4.2.3 Licensed Plumber** is recommended to adopt the following practices:-

- (a) Keep track on the situation of material submissions of the essential components, including soldering and brazing materials, and make necessary amendment to the Annex of the submitted WWO46 for submission to the WA timely. This also helps to prevent the use of sub-standard pipes and fittings in the plumbing works.

- 
- (b)** Referring to paragraph 4.2.2(c), regularly check the content of the sample boards to ensure that approved samples of correct pipes and fittings which are listed in the Annex of the submitted WWO46 are being displayed and arrange updating of the content of the sample boards as appropriate.
  - (c)** Referring to paragraphs 4.2.1(b) and 4.2.1(c), conduct verification checks of materials with the Project Team and the Main Contractor/Plumbing Contractor upon delivery of essential components to site.
  - (d)** If the test result indicates that the chemical composition of any randomly selected samples fails to comply with relevant BS, report to the WA as soon as possible for its further investigation.
  - (e)** Perform audit check on the inventory records and procurement records, such as purchase orders, delivery notes, etc of the essential components in order to early identify the delivery of any pipes and fittings which have not been included in the Annex of the submitted WWO46. This also helps to identify the potential use of any sub-standard pipes and fittings in the plumbing works for further investigation and rectification.



## 4.3 Pipe Installation Stage

**4.3.1 Project Team** is recommended to adopt the following practices:-

- (a) Employ qualified persons with plumbing experience, such as Building Services Engineers (BSE), Clerk of Works, Building Services Inspectors, to carry out adequate and regular field inspection.
  
- (b) Accord different level of inspection/inspection percentages (but should not less than 10% checking) for different items of plumbing works depending on their level of risk. Check on solder pipe joints and soldering process should be included in the inspection items. As a good practice, it is suggested to conduct 100% checking to the following items of plumbing works:
  - Installation of expansion joints and flexible connectors at underground water supply pipes
  
  - Connection of underground water supply pipes to existing in-service mains
  
  - Lead test of soldering joints of copper pipes for potable water system as referred to paragraph 4.3.1(c). The frequency of conducting the lead test should follow paragraph 4.3.1(c).
  
  - Hydraulic test for underground and concealed pipeworks.
  
  - Cleaning and sterilizing water tanks and pipeworks before they are put into operation.

- (c) Conduct systematic on-site non-destructive tests (NDT) of completed pipe joints with the Main Contractor/Plumbing Contractor and the LP regularly by quick test or using portable x-ray fluorescence analyser to ensure that soldering materials with excess lead<sup>7</sup> are not used for jointing copper pipes. As a good practice, the frequency of conducting the NDT should be determined such that any irregularities can be discovered as early as possible for taking prompt rectification actions. For plumbing works in multi-storey buildings, minimum 2 soldering pipe joints (1 at communal pipes and 1 at individual units) from every storey should be selected randomly for conducting the NDT for the detection of lead content in the soldering pipe joints.
- (d) Regularly review the performance of the Main Contractor/Plumbing Contractor in management of the LPs who have undertaken different portion of plumbing works of the project.

**4.3.2 Main Contractor/Plumbing Contractor** is recommended to adopt the following practices:-

- (a) Engage specialist plumbing sub-contractor registered in "Plumbing Installation" under Development Bureau's approved list of "Approved Suppliers of Materials and Specialist Contractors for Public Works" or "Plumbing" under Construction Industry Council's "Subcontractors Registration Scheme" to carry out the plumbing works.

---

7. Lead-free solder shall comply with the requirement of BS EN ISO 9453:2014. According to the BS EN ISO 9453:2014, the maximum lead contents of lead-free solder is 0.07%

- (b)** Employ qualified persons with plumbing experience, such as BSE, Building Services Coordinator, to carry out adequate site supervision and coordination works with the Project Team and the LP.
- (c)** Implement plumbing sub-contractor management plan incorporating stringent supervision and monitoring of the plumbing sub-contractor to ensure lead-free solder is used. Such a plan may include measures such as central procurement of soldering materials; checking soldering/brazing materials upon delivery to site before putting them under quarantine, and at any time during construction stage; and recording the works completed by individual workers so that they become more traceable, etc.
- (d)** Referring to paragraph 4.3.1(c), conduct systematic on-site NDT of completed pipe joints with the Project Team and the LP regularly by quick test or using portable x-ray fluorescence analyser to ensure that soldering materials with excess lead are not used for jointing copper pipes.
- (e)** If any of the soldering pipe joints are found with excess lead content, investigate the cause of non-compliance and its effect on plumbing works already completed and take rectification actions. The affected plumbing works should have to be removed and re-provided.
- (f)** Arrange regular site meetings with the Plumbing Sub-contractor and the LP at least bi-weekly to review matters including progress of plumbing works, LP's site inspection and site attendance records, records of material verification tests, records of updated submissions to the WA, etc.

- (g) Regularly monitor the performance and workload of the LP to assess whether the LP can effectively supervise the portion of plumbing works undertaken by them.
- (h) Regularly review the need to deploy more LPs to undertake different portions of the plumbing works taking into account all relevant factors including but not limited to scale and complexity of the plumbing works, programme and progress of the plumbing works, performance and workload of LP already engaged, etc.
- (i) Provide adequate information and training such as on-site construction mock-up, posters, briefing, etc., to enable plumbing workers to understand different features of leaded and lead-free soldering materials and the adverse consequence arising from the use of leaded soldering materials in plumbing works.

#### 4.3.3 **Licensed Plumber** is recommended to adopt the following practices:-

- (a) Conduct adequate site supervision and inspection over the plumbing works undertaken by him to ensure:-
  - the pipes and fittings to be installed and any material to be used are in accordance with the requirements stipulated in WWR.
  - the plumbing works are in accordance with the approved plumbing proposal.
  - the standard of the plumbing works.



- (b) Properly record the site inspection result using inspection checklists with site photos showing all relevant details. For example, the inspection checklists provided in WSD Circular Letter No. 2/2016 may serve as a reference, which can be found in the following webpage:-

[http://www.wsd.gov.hk/filemanager/en/content\\_138/cir0216\\_sample\\_checklist\\_blank\\_e.xlsx](http://www.wsd.gov.hk/filemanager/en/content_138/cir0216_sample_checklist_blank_e.xlsx)

- (c) Regularly review the frequency of site inspection taking into account all relevant factors including but not limited to scale and complexity of the plumbing works undertaken by him, programme and progress of the plumbing works, workmanship of the plumbing works, past site inspection results, past record of irregularities identified on site, etc. As a good practice, the LP should conduct site inspection not less than once a week.
- (d) Referring to paragraph 4.3.1(c), conduct systematic on-site NDT of completed pipe joints with the Project Team and the Main Contractor/Plumbing Contractor regularly by quick test or using portable x-ray fluorescence analyser to ensure that soldering materials with excess lead are not used for jointing copper pipes.
- (e) Referring to 4.3.2(f), attend regular site meetings with the Main Contractor/Plumbing Contractor and the Plumbing Sub-contractor at least bi-weekly to report matters including progress of plumbing works, LP's site inspection and site attendance records, records of material verification tests, records of updated submissions to the WA, etc. All the records should be properly documented.

- (f) Attend plumbing continuing professional development (CPD) courses to keep equipping himself with the updated knowledge on latest waterworks requirements, plumbing materials and plumbing installation and supervision techniques, etc.

## 4.4 Completion Stage

**4.4.1 Project Team/Main Contractor/Plumbing Contractor** is recommended to adopt the following practices:-

- (a) Require the responsible LP to conduct joint site handover inspection of plumbing works undertaken by him.
- (b) During joint site handover inspection, verify the general arrangement of plumbing works against approved plumbing drawings and the pipes and fittings against the approved Form WWO46.
- (c) During joint site handover inspection, conduct additional on-site NDT of completed pipe joints by quick test or using portable x-ray fluorescence analyser to ensure that soldering materials with excess lead are not used for jointing copper pipes.

**4.4.2 Licensed Plumber** is recommended to adopt the following practices:-

- (a) Referring to paragraph 4.4.1(a), attend the joint site handover inspection with the Project Team and the Main Contractor/Plumber Contractor and provide all necessary assistance.
- (b) Properly record the site inspection result using inspection checklists with site photos showing all relevant details. For example, the inspection checklists provided in WSD Circular Letter No. 2/2016 may serve as a reference, which can be found in the following webpage:-

[http://www.wsd.gov.hk/filemanager/en/content\\_138/cir0216\\_sample\\_checklist\\_blank\\_e.xlsx](http://www.wsd.gov.hk/filemanager/en/content_138/cir0216_sample_checklist_blank_e.xlsx)

- (c) Allow sufficient time for arranging accredited laboratories<sup>8</sup> or WSD's Water Science Division to take water samples for testing in order to ensure that water supply can be effected to the development timely.

---

8. Please refer the following website for HOKLAS accredited laboratories for : General water sample testing:

<http://www.itc.gov.hk/en/quality/hkas/hoklas/directory.htm> (under Environmental Testing);  
and Perform analysis of lead, cadmium, chromium and nickel in water:  
[http://www.itc.gov.hk/en/quality/hkas/doc/CAB\\_accredited\\_for\\_all\\_4\\_trace\\_metals.pdf](http://www.itc.gov.hk/en/quality/hkas/doc/CAB_accredited_for_all_4_trace_metals.pdf)

---

## 5. TYPE II PLUMBING WORKS

### Design of Plumbing Works

#### 5.1 Design Stage

**5.1.1 Developer/Client** is recommended to adopt the following practices:-

- (a) Engage plumbing practitioners who have adequate training in design of plumbing works and should possess relevant post-training experience, to design the plumbing works and prepare plumbing drawings, etc.
- (b) Require the design team to make use of standard details in preparation of the plumbing drawings. For example, some standard details provided in the Handbook on Plumbing Installation for Buildings may serve as a reference, which can be found in the following webpage:-

[http://www.wsd.gov.hk/filemanager/en/content\\_150/HBonPIB\\_06.pdf](http://www.wsd.gov.hk/filemanager/en/content_150/HBonPIB_06.pdf)

- (c) Adopt pipe materials and jointing methods free from the risk of misuse of leaded solder joints in plumbing works, e.g. the use of mechanical joints for copper pipes, stainless steel pipes or crosslinked polyethylene pipes.

### Construction of Plumbing Works

#### 5.2 Material Procurement Stage

**5.2.1 Plumbing Contractor** is recommended to adopt the following practices:-

- (a) Implement central procurement of the essential components, including soldering and brazing materials.



- (b) Upon delivery of the essential components to site, including soldering and brazing materials, conduct verification check of materials with the LP by visual inspection and checking against approved samples, respective catalogues and certificates in accordance with the contractual requirements. Random samples should be selected for checks on the appearance, dimensions against relevant standards and whether there are visible defects.
- (c) Establish a system that will record details of all incoming/outgoing plumbing materials.
- (d) Maintain inventory records and procurement records, such as purchase orders, delivery notes, etc of the essential components, including soldering and brazing materials delivered to site.
- (e) Store the verified soldering and brazing materials in lockable storeroom and maintain a daily consumption ledger for soldering and brazing materials.

**5.2.2 Licensed Plumber** is recommended to adopt the following practices:-

- (a) Referring to paragraph 5.2.1(b), conduct verification check of materials with the Plumbing Contractor upon delivery of essential components to site.
- (b) Perform audit check on the inventory records and procurement records, such as purchase orders, delivery notes, etc of the essential components in order to early identify the delivery of any pipes and fittings which have not been included in the Annex of the submitted WWO46. This also helps to identify the potential use of any sub-standard pipes and fittings in the plumbing works for further investigation and rectification.

## 5.3 Pipe Installation Stage

5.3.1 **Plumbing Contractor** is recommended to adopt the following practices:-

- (a) Conduct systematic on-site NDT of completed pipe joints with the LP regularly by quick test or using portable x-ray fluorescence analyser to ensure that soldering materials with excess lead are not used for jointing copper pipes. As a good practice, the frequency of conducting the NDT should be determined such that any irregularities can be discovered as early as possible for taking prompt rectification actions. For plumbing works in multi-storey buildings, minimum 2 soldering pipe joints (1 at communal pipes and 1 at individual units) from every storey should be selected randomly for conducting the NDT for the detection of lead content in the soldering pipe joints.
- (b) If any of the soldering pipe joints are found with excess lead, investigate the cause of non-compliance and its effect on plumbing works already completed and take rectification actions. The affected plumbing works should have to be removed and re-provided.
- (c) Arrange site meetings with the LP to review matters including progress of plumbing works, LP's site inspection and site attendance records, records of material verification tests, records of updated submissions to the WA, etc.
- (d) Regularly monitor the performance and workload of the LP to assess whether the LP can effectively supervise the portion of plumbing works undertaken by them.

- (e) Provide adequate information and training such as posters, briefing, etc., to enable plumbing workers to understand different features of leaded and lead-free soldering materials and the adverse consequence arising from the use of leaded soldering materials in plumbing works.

**5.3.2 Licensed Plumber** is recommended to adopt the following practices:-

- (a) Conduct adequate site supervision and inspection over the plumbing works undertaken by him to ensure:-
  - ⦿ the pipes and fittings to be installed and any material to be used are in accordance with the requirements stipulated in WWR.
  - ⦿ the plumbing works are in accordance with the approved plumbing proposal.
  - ⦿ the standard of the plumbing works.
- (b) Properly record the site inspection result using inspection checklists with site photos showing all relevant details. For example, the inspection checklists provided in WSD Circular Letter No. 2/2016 may serve as a reference, which can be found in the following webpage:-

[http://www.wsd.gov.hk/filemanager/en/content\\_138/cir0216\\_sample\\_checklist\\_blank\\_e.xlsx](http://www.wsd.gov.hk/filemanager/en/content_138/cir0216_sample_checklist_blank_e.xlsx)



- (c) Regularly review the frequency of site inspection taking into account all relevant factors including but not limited to scale and complexity of the plumbing works undertaken by him, programme and progress of the plumbing works, workmanship of the plumbing works, past site inspection results, past record of irregularities identified on site, etc. As a good practice, the LP should conduct site inspection not less than once a week.
- (d) Referring to paragraph 5.3.1(a), conduct systematic on-site NDT of completed pipe joints with the Plumbing Contractor regularly by quick test or using portable x-ray fluorescence analyser to ensure that soldering materials with excess lead are not used for jointing copper pipes.
- (e) Referring to 5.3.1(c), attend site meetings with the Plumbing Contractor to report matters including progress of plumbing works, LP's site inspection and site attendance records, records of material verification tests, records of updated submissions to the WA, etc. All records should be properly documented.
- (f) Attend plumbing CPD courses to keep equipping himself with the updated knowledge on latest waterworks requirements, plumbing materials and plumbing installation and supervision techniques, etc.

## 5.4 Completion Stage

- 5.4.1 **Developer/Client/Plumbing Contractor** is recommended to adopt the following practices:-
  - (a) Require the responsible LP to conduct joint site handover inspection of plumbing works undertaken by him.



- (b) During joint site handover inspection, verify the general arrangement of plumbing works against approved plumbing drawings and the pipes and fittings against the approved Form WWO46.
- (c) During joint site handover inspection, conduct additional on-site NDT of completed pipe joints by quick test or using portable x-ray fluorescence analyser to ensure that soldering materials with excess lead are not used for jointing copper pipes.


**5.4.2 Licensed Plumber** is recommended to adopt the following practices:-

- (a) Referring to paragraph 5.4.1(a), attend the joint site handover inspection with the Developer/Client and the Plumber Contractor and provide all necessary assistance.
- (b) Properly record the site inspection result using inspection checklists with site photos showing all relevant details. For example, the inspection checklists provided in WSD Circular Letter No. 2/2016 may serve as a reference, which can be found in the following webpage:-

[http://www.wsd.gov.hk/filemanager/en/content\\_138/cir0216\\_sample\\_checklist\\_blank\\_e.xlsx](http://www.wsd.gov.hk/filemanager/en/content_138/cir0216_sample_checklist_blank_e.xlsx)

- (c) Allow sufficient time for arranging accredited laboratories or WSD's Water Science Division to take water samples for testing in order to ensure that water supply can be effected to the development timely.





**Water Supplies Department**

48/F, Immigration Tower

7 Gloucester Road

Wanchai

Hong Kong

Tel. : 2829 4500

Fax. : 2824 0578

Email : [wsdinfo@wsd.gov.hk](mailto:wsdinfo@wsd.gov.hk)

Website : [www.wsd.gov.hk](http://www.wsd.gov.hk)

**Construction Industry Council**

38/F, COS Centre

56 Tsun Yip Street

Kwun Tong

Kowloon

Tel. : 2100 9000

Fax. : 2100 9090

Email : [enquiry@cic.hk](mailto:enquiry@cic.hk)

Website : [www.cic.hk](http://www.cic.hk)