

Approval & Reception Procedure

DEE – Departamento de Estruturas e Edifícios		
Building Water Distribution System – Copper Pipes and Accessories	Document No.:	ARP/DEE/010
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1 Reference standard

Regulations No. 46/96/M	Regulamento de Águas e de Drenagem de Águas Residuais de Macau (RADARM)
AS/NZS 4020:2005	Testing of products for use in contact with drinking water
BS 6920-1:2014	Suitability of non-metallic materials and products for use in contact with water intended for human consumption with regard to their effect on the quality of the water. Specification
BS EN 1057:2006+A1:2010	Copper and copper alloys. Seamless, round copper tubes for water and gas in sanitary and heating applications
BS EN 1254-1:1998	Copper and copper alloys. Plumbing fittings. Fittings with ends for capillary soldering or capillary brazing to copper tubes
BS EN 1254-2:1998	Copper and copper alloys. Plumbing fittings. Fittings with compression ends for use with copper tubes
BS EN 1254-4:1998	Copper and copper alloys. Plumbing fittings. Fittings combining other end connections with capillary or compression ends
BS EN 1254-5:1998	Copper and copper alloys. Plumbing fittings. Fittings with short ends for capillary brazing to copper tubes
BS EN 12449:2012	Copper and copper alloys. Seamless, Round tubes for general purposes
ISO 9453:2014	Soft solder alloys -- Chemical compositions and forms
ISO 17672:2016	Brazing -- Filler metals
BS 7786:2006	Specification for unsintered PTFE tapes for general use
Hong Kong WSD Circular Letter No. 9/2017	New commissioning requirements for new plumbing works
Hong Kong WSD Circular Letter No. 10/2017	New commissioning requirements for plumbing works in occupied buildings/ village houses

2 Approval procedures

All materials (pipes, fittings/accessories, exterior coatings, interior linings, welding rods, fluxes, sealing tapes, etc) are required to be approved in advance, and the following documents should be submitted for the approval:

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- Products specification
- Test reports or related recognized documents
- Method statements

2.1 Product specification

1. Include product dimensions, mechanical properties, water-tightness properties, chemical composition, construction guidelines, etc.
2. Solders should comply with the requirements of lead-free solder alloys in ISO 9453, and ISO 17672, as well as construction guidelines.
3. Unless otherwise specified in the engineering design, the submitted materials should comply with the requirements of the reference specification.

2.2 Test reports or related recognized documents

1. Test reports or recognized documents must be issued by third-party organization.
2. Submit test reports issued in recent three years.
3. The test contents of test reports include dimensions, mechanical properties, water-tightness properties, and chemical composition analysis.
4. If the pipe sections are connected by welding, the test reports of the selected solder must include the chemical composition analysis. If the project has no specified standard, the analysis results of the relevant reports must be proved to comply with the requirements of BS EN 1254-1 Table 6 and BS EN 806-4 (Annex A.6.3.1).
5. If the installed pipelines are used for drinking water, all materials of the pipelines are required to submit valid certification documents that can be used for drinking water. If the relevant documents have not specified the effective date, it is advisable to submit the documents issued in recent three years.

2.3 Method statements

The method statements should comply with the requirements of RADARM and the designer, and should follow the construction guidelines of the product manufacturers. The contents of the method statements must state the transportation, preservation, installation and cleaning, etc, of the materials. If welding is included in the method statements, the information of solders and the welding methods must be provided.

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3 Reception procedure

3.1 Documents to be submitted

The source certificates issued by the material manufacturers and the invoices issued by the suppliers must be submitted.

3.2 Field tests

1. If the pipelines are connected by welding, after the installation is completed, non-destructive lead test (such as LeadCheck™ Swabs) should be performed on the pipeline welding joints. The sampling method should be performed in accordance with Table 1:

Table 1

Type	Sampling method
Building of storeys ≥ 4	For every five storeys, select three joints at the pipes and fittings (including concealed parts), including: (i) two joints at communal pipes; (ii) one joint in individual units.
Building of storeys < 4	Select three joints at the pipes and fittings (including concealed parts)
Separate meter	Select two joints

If the above-mentioned sampling test results are found to contain lead, the construction unit should review the construction method, identify the cause of the problem and propose the improvement methods, or perform further tests to determine whether the lead content of the above samples exceeds the standard (e.g., scanning electron microscope (SEM), inductively coupled plasma optical emission spectrometry/mass spectrometry (ICP-OES/MS) analyzer) .

2. After installation, water-tightness tests should be performed in accordance with Article 191 of RADARM in all pipe sections.
3. After flushing of the main water supply system, under the permission of the owner, water sampling tests should be performed.