Fresh Water Cooling Towers Scheme

2016 Edition

EMSD

Fresh Water Cooling Towers Scheme

2016 EDITION

(DEC 2016)

Electrical and Mechanical Services Department

The Government of the Hong Kong Special Administrative Region

Contents

Definitions

In this brochure of the Fresh Water Cooling Towers Scheme (the Scheme Brochure), unless the context otherwise specifies,

"a cooling tower" means any device for lowering the temperature of water by evaporative cooling in which ambient air is in contact with falling water, thereby exchanging heat;

"drift" means water lost from the cooling tower as liquid droplets or aerosols entrained in the exhaust air, excluding condensation.

Part 1: Introduction

1. Background

1.1 The Preliminary Phase Consultancy Study on Wider Use of Water-cooled Air Conditioning Systems (WACS) in Hong Kong was completed in mid-1999. The study has established that WACS has greater environmental, economic and financial benefits than Air-cooled Air Conditioning Systems (AACS). Subsequently, a territory-wide implementation study was completed in mid-2003 for facilitating a full-scale implementation of WACS. The implementation study examined and identified areas suitable for wider use of WACS and also examined in detail the financial, regulatory, land administration, infrastructural, environmental and health issues, including the prevention of Legionnaires' disease.

1.2 An inter-departmental working group (hereinafter referred to as "the Working Group") was set up on 1 June 2000 to launch a pilot scheme for wider use of fresh water in evaporative cooling towers in energy-efficient air conditioning systems (the Pilot Scheme) in designated areas where existing water supplies and sewerage network would be adequate to meet the additional demand. Although both sea water and fresh water can be used as the condensing cooling media, the Pilot Scheme was only applicable to fresh water evaporative cooling after considering the source and capacity of existing water supply networks. The Working Group currently comprises members from two policy bureaux and seven government departments:

- Development Bureau (DEVB)
- Environment Bureau (ENB)
- Buildings Department (BD)
- Drainage Services Department (DSD)
- Electrical and Mechanical Services Department (EMSD)
- Department of Health (DH)
- Lands Department (LandsD)
- Planning Department (PlanD)
- Water Supplies Department (WSD)

1.3 The interim reviews in 2005 and 2007 of the Pilot Scheme have revealed the Scheme has been a promising way to ascertain the energy efficiency in air conditioning systems for new and existing non-domestic buildings without posing adverse impact on the existing water supply and sewerage infrastructures. As a result, with support of the policy bureaux concerned, the Pilot Scheme has operated as a standing scheme from 1 June 2008, and renamed as "Scheme for Wider Use of Fresh Water in Evaporative Cooling Towers for Energy-efficient Air Conditioning Systems" or, simply, as "Fresh Water Cooling Towers Scheme" or "FWCT Scheme" (hereinafter referred to as "the Scheme"). The regulatory and institutional framework of the Scheme basically remained unchanged except some updates in the operational and validation requirements.

1.4 A further review was conducted in 2010 to streamline the application procedures and update the requirements for joining the Scheme.

1.5 To cope with the latest requirements of relevant regulations and international standards, and be in line with current good trade practice for using fresh water cooling towers, a Task Force was set up in October 2015 to review the Scheme Brochure (2010 Edition) and the associated Code of Practice for Water-cooled Air Conditioning Systems: Parts 1, 2 & 3 (2006 Edition). The Task Force comprises members from eight government departments, three professional institutions and three trades unions:

- Architectural Services Department (ArchSD)
- Buildings Department (BD)
- Drainage Services Department (DSD)
- Electrical and Mechanical Services Department (EMSD)
- Environmental Protection Department (EPD)
- Department of Health (DH)
- Housing Department (HD)
- Water Supplies Department (WSD)
- The Association of Consulting Engineers of Hong Kong (ACEHK)
- ASHRAE (Hong Kong Chapter) (ASHRAE-HKC)
- Building Services Operation and Maintenance Executives Society (BSOMES)
- The Chartered Institution of Building Services Engineers (Hong Kong Branch) (CIBSE-HKB)
- The Hong Kong Air-conditioning & Refrigeration Association (HKACRA)
- The Hong Kong Institution of Engineers (HKIE)

1.6 The review has further updated some requirements stipulated in the Scheme Brochure (2010 Edition) and the Code of Practice for Water-cooled Air Conditioning Systems: Parts 1, 2 & 3 (2006 Edition). The titles of "Fresh Water Cooling Towers Scheme for Air Conditioning Systems" (2010 Edition) and "Code of Practice for Water-cooled Air Conditioning Systems: Parts 1, 2 & 3" (2006 Edition) have been renamed as "Fresh Water Cooling Towers Scheme" (2016 Edition) and "Code of Practice for Fresh Water Cooling Towers: Parts 1, 2 & 3"(2016 Edition) respectively.

2. The Scheme

2.1 Aim

The Scheme aims to:

(a) promote energy-efficient water-cooled air conditioning systems;

(b) monitor the additional water demand;

(c) monitor the quantity and quality of bleed-off effluent discharge from the systems;

(d) monitor the health and environmental effects arising from the systems; and

(e) compile data for formulating and updating plans to promote water-cooled air conditioning systems in Hong Kong.

2.2 Conditions of Participation

2.2.1 This scheme applies to all non-domestic buildings[1] and other buildings[2] where the use of fresh water for evaporative cooling is supplied for non-domestic usage within the designated areas (see Section 2.5 below). All property developers, landlords, property management agents, designers and system operators are welcome to apply for the use of fresh water for fresh water cooling towers in their buildings within the designated areas. Applications for buildings not within the designated areas are also welcomed and will be considered on a case-by-case basis in consultation with the WSD on the adequacy of fresh water supply. All applications should be submitted together with the required information as stipulated in Section 6 to the authorities concerned.

1 The definition of non-domestic buildings that include both new and existing buildings should be referred to the Buildings Ordinance (Cap. 123).

2 Other buildings include composite buildings, a detached (or stand-alone) clubhouse building ancillary to a residential development and "hotel-like" service apartment.

2.2.2 All participants should make sure that all applications should comply with all relevant statutory regulations as well as basic requirements as laid down in Part 2 for joining the Scheme. Besides, the participants are recommended to adopt the best practices related to the design, operation and maintenance of cooling towers as per the guidelines and recommendations given in relevant codes of practices.

2.2.3 All these requirements are set to achieve better energy efficiency, to protect the environment and to safeguard the public health and safety while using fresh water for evaporative cooling.

2.3 Conditions for Suspension or Cessation

2.3.1 Though the Scheme is aimed to be a standing scheme, it can still be suspended or ceased upon obtaining the endorsement from the Working Group under the following conditions:

(a) Water rationing is implemented in the territory; or

(b) An outbreak of Legionnaires' disease in the territory; or

(c) Water resources are anticipated to be inadequate or water supply infrastructure cannot cope with the demand by fresh water cooling tower systems.

2.3.2 If the Scheme is suspended or ceased under the above conditions, all new applications will not be processed. The water supply to the registered cooling towers installation will be subject to regulation by the Water Authority (WA). The trade will normally be notified not less than six (6) months in advance, unless the suspension or cessation should be executed immediately due to some severe situations.

2.4 Reviews

The conditions and requirements in the Scheme Brochure for registration of cooling towers under the Scheme will be subject to review by the Working Group so as to facilitate the promotion of the use of water-cooled air conditioning systems in Hong Kong.

2.5 Designated Areas

The designated areas for application for joining the Scheme are delineated in the latest location plans which can be downloaded at EMSD's website: http://www.emsd.gov.hk.

Part 2: Participation Procedures and Guidance

This part describes the statutory requirements, information required and processes involved with various government departments in the application for joining the FWCT Scheme.

3. Statutory Requirements

3.1 In general, the applicants should ensure that their cooling towers comply with, among others, the following Ordinances, Objectives, and Technical Memoranda:

- Waterworks Ordinance (WWO) (Cap. 102)
- Buildings Ordinance (BO) (Cap. 123)
- Sewage Services Ordinance (SSO) (Cap. 463)
- Water Pollution Control Ordinance (WPCO) (Cap. 358)
- Air Pollution Control Ordinance (APCO) (Cap. 311)
- Noise Control Ordinance (NCO) (Cap. 400)
- Occupational Safety and Health Ordinance (OSHO) (Cap. 509)
- Public Health and Municipal Services Ordinance (PHMSO) (Cap. 132)
- Buildings Energy Efficiency Ordinance (BEEO) (Cap. 610)
- Technical Memorandum on Standards for Effluent Discharged into Drainage and Sewerage System, Inland and Coastal Waters
- Technical Memorandum for the Assessment of Noise from Places other than Domestic Premises, Public Places or Construction Sites
- WSD's Water Quality Objectives of Sea Water for Flushing Supply (at Distribution)

3.2 Applicants are advised to check other relevant statutory requirements and seek professional advice from a Licensed Plumber (LP), an Authorized Person (AP) and a Registered Professional Engineer (RPE) of Building Services or Mechanical discipline when they have queries in the procedures and the standard of works required.

4. Codes of Practice

4.1 Besides the above statutory requirements, the participants of the Scheme are required to adopt the best practices related to the design, operation and maintenance of a cooling tower as per guidelines and recommendations given in the latest edition of the following codes of practice:

(a) Code of Practice for Prevention of Legionnaires' Disease (CoP(PLD))

(b) Code of Practice for Fresh Water Cooling Towers (CoP(FWCT)): Parts 1-3

5. Basic Requirements for Registration under the Scheme

5.1 For registration of cooling tower installation under the Scheme, the applications should meet the following five basic requirements of design and installation for their cooling towers:

(a) The exhaust of cooling tower should be distant from:

(i) the surrounding air intakes, exhaust, operable windows and public accessible area, other than those stated in (ii) below, with a minimum of 7.5m horizontal separation in general; and

(ii) for the cooling tower within 7.5m from its own building façade boundary, air intakes and exhausts and operable windows on its vertical building façade by a minimum of 7.5m below or 20m above.

Other separation requirements should be referred to CoP(FWCT) Part 1.

(b) A cooling tower should be provided with effective drift eliminators (with drift emission not more than 0.005% of maximum design water circulation rate) that minimise the formation and release of drift[3].

(c) A cooling tower should be provided with effective water treatment equipment and bleed-off device to control bacterial growth. Bleed-off water from a cooling tower should be discharged to the flushing tank (via a break tank if applicable) and reused for flushing purpose[4] as far as practicable.

(d) Dead legs should be minimised to avoid stagnant water as far as practicable in the cooling water circulation pipeworks for the cooling tower, and, where unavoidable, purge valves should be provided to the dead legs for regular draining.

(e) A cooling tower should be provided with adequate and safe access to allow for the maintenance, inspection and water sampling required under the Scheme.

5.2 Participants should also make sure the cooling towers meet other requirements as stipulated in CoP (FWCT), including the following:

(a) Cooling tower should be thoroughly cleaned, desludged and disinfected at least once every six (6) months[5].

3 Ref. CoP (FWCT) Pt. 1 – s.3.6

4 This arrangement is to minimise the burden of additional effluent to the sewage systems.

5 Ref. CoP (FWCT) Pt. 2 – s. 3.4.1

(b) A cooling tower should be maintained to ensure that the cooling tower has a total legionella count that is below 10 cfu/ml and a heterotrophic colony count that is below 100 000 cfu/ml[6]. The owners of the cooling tower should conduct water sampling tests for the cooling tower at least once every three (3) months for total legionella count; and at least once a month for heterotrophic colony count.

(c) Risk management plan[7] (or water safety plan[8]) should be provided for a cooling tower system to be installed at such facilities as stipulated in Section 7 of the CoP(FWCT): Part 1.

6. Information Required for Application

6.1 The applicants should appoint a Registered Professional Engineer of Building Services or Mechanical discipline (hereinafter referred to as the RPE) well in advance for advice on the proper design, installation, operation and maintenance of cooling tower.

6.2 At the early stage of cooling tower installation design, applicants should provide initial information as required in the application form (Form EMSD EE CT1A) for preliminary assessment and acceptance in principle of their application. Applicants should submit the plumbing proposal and the Form WWO 542 to the Water Authority. For buildings in non-designated area, applicants should submit Form EMSD EE CT1A to the EMSD who subsequently consult the WSD on adequacy of fresh water supply.

6.3 Before cooling tower installation works are commenced on site, applicants should submit Form EMSD EE CT1B with installation details in Form EMSD EE CT4 to EMSD. After receiving acceptance of plumbing proposal from the WA, applicants should submit Form WWO46 (Part I and II) to the WA for approval for the plumbing works to be commenced for cooling tower installation.

6.4 After cooling tower installation works are completed, applicants should submit Form EMSD EE CT2B (or Form EMSD EE CT2A, for phased completion of cooling tower installation) with site inspection report and Form EMSD EE CT3 for assessment. Applicants should submit WWO46(Part IV) to the WA for inspection of plumbing work.

6 Ref. CoP (FWCT) Pt. 2 – s. 2.5.3

7 Ref. CoP (FWCT) Pt. 1 – s. 7.2

8 Ref. s 4.1 of CoP(PLD), 2016)

6.5 The approval granted for each stage of submission by means of Forms EMSD EE CT1A or CT1B has a validity of five (5) years, counting from the approval date of each application. Applicants should submit Form EMSD EE CT1B (or Form EMSD EE CT2B) within five (5) years after the approval date of Form EMSD EE CT1A (or Form EMSD EE CT1B). If the applicants cannot proceed with their applications to the next application stage within the validity period, the applications are considered invalid.

6.6 All forms should be signed by a Registered Professional Engineer of Building Services or Mechanical discipline to certify that the cooling tower installation has been designed and installed in accordance with the requirements stipulated in the Scheme Brochure and Code of Practice for Fresh Water Cooling Towers.

6.7 If direct discharge of bleed-off water to public sewerage system is required, applicants should apply for discharge licence from EPD. Applicants should include the rate of total effluent and peak daily bleed-off volume in their submissions of drainage plan to BD. Application procedures and detailed information are stipulated in Section 11 below and process chart for application for direct discharge can be downloaded at EMSD's website: http://www.emsd.gov.hk.

6.8 In case a cooling tower is proposed to be installed at an existing composite building (residential & commercial) or existing domestic building, the owner of a cooling tower should consult relevant residents' associations or alike, if any, such as Owners' Corporations or Incorporated Owners, Management Committees or Owners' Committees, Mutual Aid Committees or alike, about the proposed location of a cooling tower at the initial project design stage. For new residential development, when the cooling towers proposed to be installed are likely to materially affect the enjoyment of the residential property, owners of cooling towers of the development (e.g. the developer or vendor) may need to notify the future buyers during the sale of the residential properties by any possible means such as including the proposed location of cooling towers in the sales brochure as set out in the Residential Properties (First-hand Sales) Ordinance.

7. Record Keeping during Operation

7.1 Records on Operational Conditions

Owners of cooling towers installation should monitor and properly operate their installations, and maintain their condition and performance. They are required to keep records on the following information (via Form EMSD EE CT3) on a monthly basis until the cooling towers are dismantled and put out of service. The owners of cooling towers should provide such records for inspection as requested by the EMSD.

(a) Condition of each cooling tower shell and its supporting framework;

(b) Daily operation time(s) and monthly sampling date;

(c) Monthly energy consumption for all water-side equipment of the cooling tower system(s);

(d) Monthly total water consumption volume of the system(s);

(e) Monthly total effluent discharge volume of the system(s);

(f) Quarterly sampling and testing of bleed-off water from the cooling tower installation by laboratory accredited under Hong Kong Laboratory Accreditation Scheme using accredited methods wherever applicable in respect of the following parameters[9]:

- Colour (H.U.);
- Turbidity (N.T.U.);
- Threshold Odour No. (T.O.N.);
- Ammoniacal Nitrogen;
- Suspended Solids (SS);
- Dissolved Oxygen (DO);
- 5-Day Biochemical Oxygen Demand (BOD5);
- Synthetic Detergents;
- Residual biocides/inhibitors concentration; and
- E. Coli/100 mL (ECL).

(g) Monthly sampling and testing of the cooling water of the cooling tower installation in respect of the following parameters:

- Suspended Solids (SS);
- Total dissolved solids (TDS);
- Conductivity;
- Calcium hardness;
- pH;
- Temperature;
- Chemical Oxygen Demand (COD);
- Residual Cl/ Oxidation Reduction Potential (ORP);
- 5-Day Biochemical Oxygen Demand (BOD5);
- Residual biocide(s); and
- Residual corrosion/scale inhibiting chemical(s).

9 The parameters, other than residual biocides/inhibitors, are monitored for meeting WSD's Water Quality Objectives of Sea Water for Flushing Supply (at Distribution).

(h) Monthly sampling and testing of the cooling water of the cooling tower installation for heterotrophic colony count;

(i) Quarterly sampling and testing (or whenever required by the approving authority such as after commissioning or major alterations) of cooling water of the cooling tower installation for total legionella count (comprising categories of legionella pneumophila serogroup 1, legionella pneumophila serogroup 2 to 14, and other species of legionella) for validation of the effectiveness of the preventive measures against the growth of legionella; and

(j) Maintenance records of each cooling tower as stipulated in the current version of Section 7 of the Code of Practice for Prevention of Legionnaires' Disease and Appendix 2E of Part 2 of the Code of Practice for Fresh Water Cooling Towers.

7.2 Annual Audit Report

The owners of cooling towers should engage an independent and competent auditor to conduct an annual audit for their cooling towers system in accordance with Section 4.3 of Part 2 of the Code of Practice for Fresh Water Cooling Towers. They should submit the annual audit report to EMSD every year during the service life of the cooling tower system.

7.3 Notification Required during Operation

7.3.1 Alterations of Cooling Tower Installation

(a) Minor alterations of a cooling tower

For minor alterations of a cooling tower, such as a change of water treatment system, the owners of the cooling tower should notify the EMSD with submission of Form EMSD EE CT4 as soon as possible.

(b) Replacement of a cooling tower

For works involving replacement of an existing cooling tower at the same location, Form EMSD EE CT1B and Form EMSD EE CT4 should be submitted to the EMSD for approval before the replacement works of cooling tower are commenced.

(c) Major alterations of a cooling tower installation

For works involving following major alterations:

(i) Change in number of cooling towers;

(ii) Change in a cooling tower location; or

(iii) Any factors affecting separation between buildings' accessible areas, openings/louvers and cooling tower intakes/exhausts.

Form EMSD EE CT1A should be submitted to the EMSD for approval before the works are commenced.

7.3.2 Change of Ownership of Cooling Tower

When transfer of installation ownership occurs, the existing owner and new owner of approved cooling tower installation should complete the notification Form EMSD EE CT5 and submit to EMSD for update of records.

7.3.3 De-registration

(a) The owner of cooling tower is required to notify the EMSD and WSD in writing within 30 days after removing or permanently discontinuing use of cooling tower.

(b) Cooling tower will be de-registered from the Scheme if the cooling tower system is no longer found to be complied with the requirements under the Scheme.

8. Waterworks

8.1 Prior to any submission of proposal for new plumbing installations or alteration to existing plumbing installations for main water supply to a cooling tower, the applicant should obtain from the WA such information which is relevant to the design of the plumbing works. The applicant should submit to the WA the plumbing proposal and consumership undertaking by Form WWO 542.

8.2 Upon receipt of the plumbing proposal to use main water for a cooling tower, the WA will reply to the applicant in writing within 20 working days informing him whether such proposal is acceptable or not. Under normal circumstance, separate metering, thus separate water account, for this kind of supply is required. The applicant is reminded that a break tank for retaining bleed-off water from the cooling tower for reuse in internal flushing is normally required. The break tank shall be designed and constructed similar to that as stated in Clause 8.14 of the Hong Kong Waterworks Standard Requirements for Plumbing Installation in Buildings. Any subsequent alteration, revision and modification of the approved proposal should be submitted to the WA for approval.

8.3 Prior to commencement of the plumbing works for main water supply of a cooling tower shown on any approved plumbing proposal, the applicant shall submit to the WA by Licensed Plumber Form WWO 46 (Parts I and II). The WA will return Form WWO 46 (Part III) to the applicant for whether the permission to commence plumbing works is granted. The approval of providing metered water supply will not confer any legal implication on structural status of the a cooling tower nor carry any effect of precluding action being taken in respect of the structure by another authority. As the building works for the a cooling tower is under the jurisdiction of the Building Authority, it is premises owners' responsibility to obtain relevant consent from the Building Authority for these works where applicable. Failure to do so may result in removal of these cooling tower by the Building Authority.

8.4 Upon completion of the cooling tower installation, the owner should submit Form EMSD EE CT2B together with a site inspection report and Form EMSD EE CT3 completed by the RPE to EMSD. EMSD will notify the applicant for whether the cooling tower installation is accepted under this Scheme. The applicant and the licensed plumber should apply to the WA for inspection of plumbing works by Form WWO 46 (Part IV). The WA will notify the applicant by Form WWO 46 (Part V) for whether the plumbing works up to make-up tank are completed satisfactorily. The applicant should ensure that all works other than waterworks are completed satisfactorily and acceptable to EMSD and the Building Authority. In case phased completion for the cooling tower installation is required, the applicant should submit Form EMSD EE CT2A together with a site inspection report and Form EMSD EE CT3 completed by an RPE to EMSD. EMSD will notify the applicant whether the phased completion of the cooling tower installation is accepted under this Scheme. The applicant should request the WA for water supply for phased completion. The WA will arrange concessionary water supply to the cooling tower installation under phased completion provided that the plumbing works concerned are completed satisfactorily. The applicant should inform EMSD when the whole installation is completed.

8.5 Temporary Water Supply for Testing and Commissioning

8.5.1 If there is no appropriate water source available for testing and commissioning of the cooling tower, applicants may submit Form EMSD EE CT3 to EMSD within six (6) months after Form EMSD EE CT2B (or Form EMSD EE CT2A) is accepted by EMSD. The WA will provide temporary water supply for carrying out the testing and commissioning within the specified period for the following two conditions:

(i) submissions of Form EMSD EE CT2B (or Form EMSD EE CT2A) is accepted by the EMSD; and

(ii) inside service and water testing results in relation to the cooling towers system are in compliance with the latest standards and requirements as required by the WA.

If the applicants fail to submit the Form EMSD EE CT3 to the EMSD within the specified period, the WA will consider disconnection of the temporary water supply to the cooling tower.

8.5.2 After obtaining the EMSD's acceptance of Form EMSD EE CT3 and if change in water consumership is involved, applicants should report the reading of the water meter together with submission of Form WWO 1145 to the WSD. If there is no change in water consumership, applicants should formally notify the WSD by writing to report the reading of water meter with date stamped photo certifying the reading of the water meter.

9. Building Works

9.1 Any person who intends to carry out building works such as supporting structures for a cooling tower, and water tanks for air conditioning systems is required under the Buildings Ordinance (BO) to appoint an Authorized Person, and where necessary a Registered Structural Engineer, to prepare and submit plans for the approval of Building Authority (BA) and apply for consent to commence building works before the commencement of the works. He is also required to appoint a registered contractor to carry out the building works. Upon completion of the building works, the Authorized Person is required to certify that the building works have been carried out in accordance with the approved building plans.

9.2 It is strongly recommended that professional advice of an Authorized Person/ Registered Structural Engineer should be sought well in advance. The BA maintains separate registers of Authorized Persons, Registered Structural Engineers and registered contractors including Registered General Building Contractors and Registered Minor Works Contractors. The registers are available at the website of Buildings Department: http://www.bd.gov.hk.

9.3 Building works designated as minor works may be carried out without obtaining prior approval and consent from the BA, but should comply with the simplified requirements of the Minor Works Control System, including the appointment of prescribed building professionals and/or prescribed registered contractors. Whether the building works are minor works, they still have to comply with the building standards such as fire safety and structural safety standards stipulated in the Building Regulations. For the details of the Minor Works Control System, please refer to "General Guidelines on Minor Works Control System" and "Technical Guidelines on Minor Works Control System" published by the Buildings Department.

9.4 The BA may take enforcement action by serving orders on the owners for unauthorised building works and/or prosecution action against offenders.

9.5 Under the BO, any person, who carried out building works (except minor works) without the prior approval and consent of the BA, commits an offence and shall be liable on conviction to a fine and imprisonment. Any person, who arranged for the minor works to be commenced or carried out, has knowingly failed to appoint the prescribed building professional and/or prescribed registered contractor required by the regulations to be appointed in respect of the minor works concerned, commits an offence and shall be liable on conviction to a fine.

10. Sewage Services Charge

10.1 According to the Sewage Services Ordinance, all water account holders whose premises are connected, whether directly or indirectly, to a communal drain or a communal sewer are liable to pay sewage charge (SC), except for water supplied specifically for flushing purposes. The water consumed by the WACS is subject to SC and the amount is calculated based on the prescribed SC rate multiplied by the total water consumption volume.

10.2 If the consumer or agent, as the case may be, considers that the volume of wastewater being discharged to the public sewerage or drainage systems (including the volume of bleed-off water from a cooling tower discharged to flushing tank) is not more than 85% of the total water consumption volume, he can apply to the Drainage Authority for a reduction of SC based on a revision on the discharge factor. He will be required to provide information on the volumes of water consumed and wastewater discharged in his application. For the provision of such information, it will be preferable for the consumer or agent to install sub-meters to measure the volume of wastewater discharged at the terminal drainage outlet of the premises. If the consumer or agent has technical difficulties in installing these sub-meters, he should explain in his application on the situation and provide alternative information sufficient for the Drainage Authority to assess his application.

10.3 For the purpose of verifying information that is needed in determining the factor to be charged for the SC, the Drainage Authority may, if deemed necessary, enter the premises of a consumer at all reasonable times for site inspection.

10.4 The information collected during handling of the application may be disclosed to other government departments and their authorised agencies, if applicable, for law enforcement purposes should it be deemed necessary. Also, such information may be disclosed to EMSD solely to facilitate their review of the requirements for the Scheme.

11. Water Pollution Control

All discharges containing polluting matter must be licensed under the Water Pollution Control Ordinance (WPCO). Any contravention to the WPCO will be subject to enforcement action. Environmental Protection Department (EPD) will generally follow the effluent standards specified in the Technical Memorandum issued under the WPCO. For discharges containing biocides, however, the licence standards usually need to be determined on a case-by-case basis.

Prospective dischargers should provide the EPD in advance with details of the biocides they intend to use, including the nature and properties of the biocides, the proposed method of the biocides application, the discharge location, etc. For application of discharge licence, the prospective discharger (or the applicant) should submit a duly completed Form A to EPD as specified in the Second Schedule of the Water Pollution Control (General) Regulations together with a Drainage Plan. Moreover, the following information should be provided together with the submission of Form A to the EPD (if appropriate):

(a) General information of the cooling tower installation;

(b) Maximum temperature and flow rate of cooling water discharge or bleed-off;

(c) Relevant information of residual chlorine and other chemical additives, if used in the cooling tower system (e.g. dosage, duration and frequency of application, estimated maximum residual concentration of the chemical(s) at discharge location, toxicity information, evidence of approval of use of the chemical additives, etc.);

(d) Any other relevant information by request from EPD.

12. Air Pollution Control

The emissions, including water mist, from a cooling tower would be actionable under the Air Pollution Control Ordinance (APCO) if the emission causes a nuisance and the EPD would issue an abatement notice where necessary. The most practical solution for tackling any tower fogging is to locate the tower where visible plume will not be objectionable.

13. Noise Control

Noise from any evaporative a cooling tower is controlled under section 13 of the Noise Control Ordinance (NCO). Should the noise emanated therefrom exceed the relevant criteria stipulated in the "Technical Memorandum for the Assessment of Noise from Places other than Domestic Premises, Public Places or Construction Sites", the EPD would issue a Noise Abatement Notice requiring the Noise Producer to rectify the problem and to comply with the statutory noise standard.

14. Nuisance Control

If the emission of air or the discharge of water from a cooling tower in any premises cause a nuisance or a nuisance arises from cooling water of the cooling towers, it would be actionable under Public Health and Municipal Services Ordinance (PHMSO). The Authority would issue a Nuisance Notice to the nuisance producer to require him to abate the nuisance within the period specified in the notice, and the notice may, if the Authority thinks fit, specify any works to be executed for that purpose.

The owner should allow EMSD's authorised officers or representatives to enter the premises to inspect the cooling tower installation, and take water samples for testing if necessary for validation of operational conditions.

15. Occupational Safety and Health

Under the General Duties of Occupational Safety and Health Ordinance (OSHO), employers or occupiers must ensure safety and health at work of all employees, for example by providing or maintaining a good work environment, and providing information, instruction, training and supervision to the employees. In the operation of air cooling plant unit for ventilation of a building, attention should be paid to avoid or reduce any health risks arising from the associated work activities or the working environment, such as the risks of Legionnaires' diseases occurred among employees and overexposure to chemicals used for treatment of the cooling water. Good maintenance is important to avoid contamination of the ventilation system. Knowledge on handling chemicals could reduce health risks to minimal.

16. Buildings Energy Efficiency

The energy performance of a cooling tower should comply with the relevant requirements stipulated in the Code of Practice for Energy Efficiency of Building Services Installation (BEC) of Part 9 of the Buildings Energy Efficiency Ordinance (BEEO).

Part 3: Information for Application and Enquiry

17. Forms

The updated proforma forms of application and registration listed hereunder can be downloaded at EMSD's website: http://www.emsd.gov.hk

Form No.	Usage
EMSD EE CT1A	Application for Participation (Preliminary Assessment)
EMSD EE CT1B	Notice of Commencement of Cooling Tower Installation Work
EMSD EE CT2A	Notification of Phased Completion of Cooling Tower Installation
EMSD EE CT2B	Notification of Completion of Cooling Tower Installation
EMSD EE CT3	Summary of Operational Information for Cooling Tower Installation
EMSD EE CT4	Cooling Tower Installation Details
EMSD EE CT5	Notification of Change of Ownership for Cooling Tower Installation

18. Process Chart

The latest process chart of application for the FWCT Scheme can be downloaded at the EMSD's website: http://www.emsd.gov.hk.

19. Enquiries

For more information about the Scheme, please contact the following departments during office hour for relevant information:

Electrical & Mechanical Services Department (energy efficiency and water quality of cooling towers) **Energy Efficiency Office** 7/F, 3 Kai Shing Street, Kowloon Bay, Kowloon, Hong Kong	Website: http://www.emsd.gov.hk E-mail: info@emsd.gov.hk Tel: 3757 6156 Fax: 2890 6081
Water Supplies Department (Water connection and water supply of cooling towers, conservation and charge) **Headquarters Office** 43/F, Immigration Tower, 7 Gloucester Road, Wan Chai, Hong Kong	Website: http://www.wsd.gov.hk E-mail: wsdinfo@wsd.gov.hk Tel: 2824 5000 Fax: 2802 7333
Buildings Department (building works and supporting framework for cooling towers) 12/F, Pioneer Building, 750 Nathan Road, Mongkok, Kowloon	Website: http://www.bd.gov.hk E-mail: enquiry@bd.gov.hk Tel: 2626 1616 Fax: 2537 4992
Environmental Protection Department (air pollution control, noise pollution control, and water pollution control as well as sewage treatment and direct discharge of bleed-off water from cooling tower) 33/F, Revenue Tower, 5 Gloucester Road, Wan Chai, Hong Kong	Website: http://www.epd.gov.hk E-mail: enquiry@epd.gov.hk Tel/Fax: 2838 3111 (Customer Service Centre)
Drainage Services Department (sewage services charge, direct discharge of bleed-off water from cooling tower) **Customer Services Section** G/F, Western Magistracy, 2A Pok Fu Lam Road, Hong Kong	Website: http://www.dsd.gov.hk E-mail: enquiry@dsd.gov.hk Tel: 2834 9432 Fax: 2574 5645
Other enquires	Website: http://www.1823.gov.hk/ E-mail: tellme@1823.gov.hk Tel: 1823

Energy Efficiency EMSD

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Printed on recycled paper

Revised in December 2016