

**Summary of Major Changes for
Fresh Water Cooling Towers (FWCT) Scheme Brochure (2016 Edition) and
Code of Practice for Fresh Water Cooling Towers (2016 Edition)**

Part A: FWCT Scheme Brochure

2010 Edition	2016 Edition	Major Changes in FWCT Scheme Brochure
Title	Title	To rename the title of the Scheme Brochure from “ <i>Fresh Water Cooling Towers Scheme for Air Conditioning Systems</i> ” to “ <i>Fresh Water Cooling Towers Scheme</i> ”.
Section 2.2	Section 2.2.1	To specify the buildings covered by the FWCT Scheme, including non-domestic buildings and other buildings, such as composite building, detached (or stand-alone) clubhouse building ancillary and hotel-like service apartment. Section 2.2.1 “ <i>This scheme applies to all buildings¹ and other buildings² where the use of fresh water for evaporative cooling is supplied for non-domestic usage within the designated areas...</i> ”.
Section 6	Section 6.1 to 6.4	To update and streamline the application procedures of FWCT Scheme.
N/A	Section 6.5	To specify the validity of five (5) years for approval of each stage of submission by means of Forms CT1A or CT1B, counting from the approval date of each application.
Section 8.4	Section 6.8	To specify that consultation is required to be sought from the resident associations if a cooling tower is proposed to be installed at an existing composite building (residential & commercial) or existing domestic building. The resident associations to be consulted include Owners’ Corporations or Incorporated Owners, Management Committees or Owners’ Committees, Mutual Aid Committees or alike.

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.

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		To specify that, for new residential development, owner 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.
Section 7.4.1	Section 7.3.1	To update the information required in case of alteration of cooling tower installation. Depending on the scope of alterations, relevant application forms should be submitted as below: i) Minor alterations – Submission of Form CT4. ii) Replacement – Submission of Form CT1B & CT4. iii) Major alterations – Submission of Form CT1A.
N/A	Section 7.3.3	To include the conditions of de-registration. <i>“The owner of cooling tower(s) is required to notify EMSD and WSD in writing within 30 days after removing or permanently discontinuing use of cooling tower(s).”</i> <i>“Cooling tower(s) will be de-registered from the Scheme if the cooling tower(s) system is no longer found to be complied with the requirements under the Scheme.”</i>
Section 8	-	To delete the section on “General Preamble” and include the general requirements in relevant sections.
Section 9.1. – 9.4	Section 8.1 – 8.4	To update the application procedures on waterworks. Please refer to Section 8 for details.
N/A	Section 8.5	To include a new section on temporary water supply for testing and commissioning. If there is no appropriate water source available for testing and commissioning of the cooling tower, applicants may submit Form CT3 to EMSD within six (6) months after Form CT2B (or Form CT2A) is accepted by EMSD. The Water Authority will provide temporary water supply for carrying out the testing and commissioning within the specified period for the specific conditions.
Section 10	Section 9	To update the general requirements on Building Works. Please refer to Section 9 for more details.
Section 12	Section 11	To include the information required for application of a discharge licence. <i>“...For application of discharge licence, the prospective discharger (or the applicant) should submit a</i>

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		<i>duly completed Form A to EPD... ”</i>
Section 15	Section 14	To include nuisances arises from cooling water of the cooling towers under PHMSO as part of nuisance control.
N/A	Section 16	To include a new section on requirement of Buildings Energy Efficiency relating to FWCT.

Part B: Code of Practice for Fresh Water Cooling Towers (Part 1)

2006 Edition	2016 Edition	Major Changes in Code of Practice for Fresh Water Cooling Towers (Part 1)
Title	Title	To rename the title of Code of Practice from “ <i>Code of Practice for Water-cooled Air Conditioning Systems - Part 1: Design, Installation and Commissioning of Cooling Towers</i> ” to “ <i>Code of Practice for Fresh Water Cooling Towers Part 1: Design, Installation and Commissioning.</i> ”
Definition	Definition	To replace the term “ <i>Pedestrian thoroughfares</i> ” by “ <i>Public accessible area</i> ”, which includes other areas that are accessible by the public or building occupants.
Relevant sections CoP	Relevant sections CoP	To replace the term “ <i>Cooling Tower Specialist Contractor</i> ” by relevant personnel, such as “ <i>operation and maintenance contractor</i> ” or “ <i>water treatment service provider</i> ”.
Section 2.2	Section 2.2	To update the types of indirect-contact cooling tower (coil shed cooling tower) and evaporative condenser.
Section 4.1.3 and Section 4.1.4	Section 4.1.4(a) and Section 4.1.5	<p>To update the separation requirement between public accessible area and cooling tower. Public accessible area should be distant from cooling tower intake by minimum 5m, and cooling tower exhaust by minimum 7.5m.</p> <p>To add the definitions of critical outdoor air intake and critical exhaust air outlet.</p> <p><i>“Critical outdoor air intake refers to fresh air intakes of the building air conditioning systems (e.g. primary air unit, air handling unit, lift vent) or any intake that draws fresh air into the occupied area.”</i></p> <p><i>“Critical exhaust air outlet refers to kitchen exhaust, toilet exhaust, car park exhaust, food processing exhaust, laboratory exhaust or any exhaust that can contaminate the cooling water or pollute the cooling air.”</i></p>
N/A	Section 4.1.4(b)	To include new requirements on vertical separation distance. The vertical separation distance

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	and 4.1.5	<p>requirements are specified in Table 1.2 and Table 1.3.</p> <p>To update the requirements on vertical separation distance between cooling tower and public accessible area that an addition of 1.8m above ground is required for breathing zone for pedestrian.</p>
Section 4.5	Section 4.5	<p>To specify other installation locations that require to carry out technical assessment.</p> <p><i>“If the horizontal separation distance between the cooling tower exhaust and the domestic buildings or medical and health care premises is within 20m, applicants should carry out a technical assessment and submit a copy of technical assessment report to the EMSD with the satisfaction of EMSD...”</i></p> <p>Please refer to Section 4.5 for details.</p>
N/A	Section 4.8	<p>To include new requirements on cooling towers located at composite building (residential and commercial).</p> <p><u>Section 4.8.1:</u> <i>“...an applicant should also carry out a technical assessment...”</i></p> <p><u>Section 4.8.2:</u> <i>“The preferred installation location of cooling towers should be distant from the domestic block the farthest, and cause the least nuisance to the residents and nearby occupants.”</i></p> <p><u>Section 4.8.3:</u> <i>“Cooling tower exhaust air should be discharged away from buildings’ operable windows and outdoor air intakes...”</i></p> <p><u>Section 4.8.4:</u> <i>“...the exhaust of cooling tower should be facing upwards or appropriate direction to avoid direct facing to the nearby occupants.”</i></p> <p><u>Section 4.8.5:</u> <i>“Plume abatement measure should be adopted...”</i></p> <p><u>Section 4.8.6:</u> <i>“Risk management plan for the cooling tower system should be prepared and submitted...”</i></p> <p>Please refer to Section 4.8 for more details.</p>

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Section 5.2.1	Section 5.2.1	To specify that timer control or manual bleed-off is not preferred unless automatic bleed-off by a conductivity sensor is not practicable.
N/A	Section 7.2.5	To specify the conditions for reviewing Risk Management Plan. <i>“Risk management plan is required to be reviewed under the following circumstances: a) Results of checks indicate that mitigation measures are ineffective; or b) If a case of Legionnaires’ disease is associated with a building”</i>
Figure 1.9	Appendix 1A	To update the typical schematic diagram of fresh water cooling tower condensing water circuit.
Appendix 1A	Appendix 1B	To include the general guidance notes and reference cases/diagrams on measurement of minimum separation requirements for cooling towers.
N/A	Appendix 1C	To include samples of notices and labels for cooling tower system.

Part C: Code of Practice for Fresh Water Cooling Towers (Part 2)

2006 Edition	2016 Edition	Major Changes in Code of Practice for Fresh Water Cooling Towers (Part 2)
Title	Title	To rename the title of Code of Practice from <i>“Code of Practice for Water-cooled Air Conditioning Systems - Part 2: Operation and Maintenance of Cooling Towers”</i> to <i>“Code of Practice for Fresh Water Cooling Towers Part 2: Operation and Maintenance”</i> .
Relevant sections CoP	Relevant sections CoP	To replace the term “Cooling Tower Specialist Contractor” by relevant personnel, such as “operation and maintenance contractor” or “water treatment service provider”.
Section 2.4.1	Section 2.4.1	To specify that timer control or manual bleed-off is not preferred unless automatic bleed-off by a conductivity sensor is not practicable.

2006 Edition	2016 Edition	Major Changes in Code of Practice for Fresh Water Cooling Towers (Part 2)														
Section 2.5.3	Section 2.5.3	To delete Table 2.2 on indicative cooling water quality for sea water type cooling tower.														
Section 2.5.3.1	Section 2.5.3.1	<p>To update the criteria of three parameters of cooling water quality as below:</p> <table border="1"> <thead> <tr> <th>Parameters</th> <th>Original Cooling Water Quality Criteria</th> <th>New Cooling Water Quality Criteria</th> </tr> </thead> <tbody> <tr> <td>Total dissolved solids</td> <td>Less than 1500 ppm</td> <td>Less than 1 000 ppm</td> </tr> <tr> <td>Suspended solids</td> <td>Less than 180 ppm</td> <td>Less than 150 ppm</td> </tr> <tr> <td>pH</td> <td>8 – 10</td> <td>7 – 10</td> </tr> </tbody> </table> <p>Remark: Form CT3 has been updated and parameters such as chloride, sulphate and total iron have been included.</p>	Parameters	Original Cooling Water Quality Criteria	New Cooling Water Quality Criteria	Total dissolved solids	Less than 1500 ppm	Less than 1 000 ppm	Suspended solids	Less than 180 ppm	Less than 150 ppm	pH	8 – 10	7 – 10		
Parameters	Original Cooling Water Quality Criteria	New Cooling Water Quality Criteria														
Total dissolved solids	Less than 1500 ppm	Less than 1 000 ppm														
Suspended solids	Less than 180 ppm	Less than 150 ppm														
pH	8 – 10	7 – 10														
Section 2.5.4.2	Section 2.5.4.2	<p>To add six parameters (Colour, Turbidity, Threshold Odour No., Ammoniacal Nitrogen, Synthetic Detergents, E. Coli) to Table 2.3 for flushing water quality as below:</p> <table border="1"> <thead> <tr> <th>Parameters</th> <th>Target Chemical values expressed in mg/l (parts per millia)</th> </tr> </thead> <tbody> <tr> <td>Colour (H.U.)</td> <td>< 20</td> </tr> <tr> <td>Turbidity (N.T.U.)</td> <td>< 10</td> </tr> <tr> <td>Threshold Odour No. (T.O.N.)</td> <td>< 100</td> </tr> <tr> <td>Ammoniacal Nitrogen</td> <td>< 1</td> </tr> <tr> <td>Synthetic Detergents</td> <td>< 5</td> </tr> <tr> <td>E. Coli/ 100mL</td> <td>< 1 000</td> </tr> </tbody> </table>	Parameters	Target Chemical values expressed in mg/l (parts per millia)	Colour (H.U.)	< 20	Turbidity (N.T.U.)	< 10	Threshold Odour No. (T.O.N.)	< 100	Ammoniacal Nitrogen	< 1	Synthetic Detergents	< 5	E. Coli/ 100mL	< 1 000
Parameters	Target Chemical values expressed in mg/l (parts per millia)															
Colour (H.U.)	< 20															
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Ammoniacal Nitrogen	< 1															
Synthetic Detergents	< 5															
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Section 3.4.3 b)	Section 3.4.3 b)	To update the procedures of Cleaning and Disinfection. The duration of circulation is increased from 4 hours to 6 hours.														

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Section 3.6.2 d)	Section 3.6.2 d)	To eliminate the conditions of pH value in the procedures of Cleaning and Disinfection.
Section 4.3	Section 4.3	To include Higher Certificate in air-conditioning system in the qualification of auditor.
Appendix 2F	Appendix 2F	To update the sample independent audit report format and include the new section on personal declaration by the auditor and owner of cooling tower system

Part D: Code of Practice for Fresh Water Cooling Towers (Part 3)

2006 Edition	2016 Edition	Major Changes in Code of Practice for Fresh Water Cooling Towers (Part 3)
Title	Title	To rename the title of Code of Practice from “ <i>Code of Practice for Water-cooled Air Conditioning Systems - Part 3: Water Treatment Methods for Cooling Towers</i> ” to “ <i>Code of Practice for Fresh Water Cooling Towers Part 3: Water Treatment Methods</i> ”.
Relevant sections CoP	Relevant sections CoP	To replace the term “Cooling Tower Specialist Contractor” by relevant personnel, such as “operation and maintenance contractor” or “water treatment service provider”.
Section 3.4.4	Section 3.4.4	To add a precaution on the use of magnetic devices. <i>“The device may require protection from electromagnetic field generated by high-voltage electronic devices.”</i>
Section 3.4.5	Section 3.4.5	To rename “Electronic de-scaling technology” as “Electromagnetic technology” and review relevant content. Please refer to the section for more details.
NA	Section 4.3.3 and 4.3.4	To add sections for “Magnetic devices” and “Electromagnetic technology”, as they serve the purpose of bacterial and microbiological control. Please refer to the sections for more details.