

Chinese Subtitle	English Subtitle
<p>地球真美 有花草樹木，亦有宏偉的建築物 這個這麼大的灰色盒子 是什麼？</p>	<p>How beautiful the Earth is! There are flowers, grasses, trees and magnificent buildings. This is such a huge grey box. What is it?</p>
<p>嘩！你是誰？ 你在這裡做什麼呢？ 你知不知道這是水塔的限制範圍？ 除緊急情況外，外人是禁止進出的</p>	<p>Wow! Who are you? And what are you doing here? Don't you know you're in the restricted area of the water towers? You are not allowed to enter this restricted area, except in emergencies.</p>
<p>你好！我是「Y」 我是第一次來地球的！你是誰？ 你在這做什麼呢？ 這裡為何不能進出？</p>	<p>Hey, my name is "Y". This is my first trip to the earth. Who are you? What are you doing here? How come I'm stuck here?</p>
<p>我是珍妮 我是機電工程署職員 現在在為水塔作定期檢查！ 你好像什麼都不知道 看來你對水塔好像沒什麼認識呢</p>	<p>My name is Jenny. I'm an employee of the Electrical and Mechanical Services Department. Now I'm conducting a regular inspection on the water towers. You look puzzled! You know nothing about water tower?</p>
<p>水塔？真的未曾聽過！ 不如你講解給我聽？</p>	<p>Water tower? I really have no idea about it. Can you tell me what it is?</p>
<p>好吧！剛剛我把工作做完 就跟你講解一下 水塔其實是簡稱 正式名稱是冷卻塔 而你身旁這個冷卻塔 由於是用淡水作媒介 所以稱作淡水冷卻塔 為空調系統散熱 它的運作原理 是透過蒸發式的冷卻作用降低水的溫度 水塔抽取外面的空氣 進來與流水接觸 吸收熱量 然後把熱氣排出大氣中 使用淡水冷卻塔的水冷式空調系統 比較氣冷式空調系統 可節省大概百份之二十的用電量</p>	<p>Sure! I've just finished my work. Let me explain it to you. Water tower is actually an abbreviated name. It's formal name should be cooling tower. Take a look at the cooling tower besides you. As fresh water is used as a medium of cooling, it is called fresh water cooling tower . It is used for heat rejection of an air-conditioning system. Concerning how it operates, through lowering the temperature of water by evaporative cooling, the ambient air is drawn in to contact with the falling water to absorb heat before discharged into the atmosphere. The water-cooled air-conditioning systems using fresh water cooling towers consume up to 20% less electricity</p>

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	than air-cooled air-conditioning system!
<p>這樣的水塔很好 既省電也環保 不過，今日的天氣這麼熱... 你為什麼不留在辦公室乘涼 還上來天台工作呢</p>	<p>Such water tower seems great. It is both energy efficient and environmental friendly. But today's weather is so hot. Why don't you stay indoors instead of working at the rooftop?</p>
<p>為了能讓大家可以安心地乘涼 就需要認真跟妥善地保養水塔 因為妥善地保養水塔 可以減少細菌傳播的風險</p>	<p>To let everyone enjoy an air-conditioned environment, it is necessary to maintain the water tower in a serious and proper manner. Proper maintenance of the water tower can reduce the risk of bacterial transmission</p>
<p>原來你的工作這麼重要的 在水裡會有什麼細菌呢</p>	<p>Oh, I see. Your work is so important So what kind of bacteria will there be in the water?</p>
<p>例如像退伍軍人桿菌 這種細菌可以在多種的環境中生存 特別適合在攝氏 20-45 度的溫水中生長 水塔就是其中一個適合退伍軍人桿菌生長的環境</p>	<p>Legionella is one of many examples. This bacterium can survive in various environments, particularly suitable for growing in warm water of 20 to 45 degrees Celsius. Water tower is one of the environments suitable for the growth of Legionella.</p>
<p>哦，原來這樣! 我還以為隨使用點鐵皮 就可以造成水塔</p>	<p>Oh, I see! I did think a water tower can be built with some iron sheets.</p>
<p>怎可能這般容易呢! 安裝淡水冷卻塔 需要符合很多條件的</p>	<p>No, it's not a piece of cake! A number of conditions have to be met prior to the installation of a fresh water cooling tower.</p>
<p>有什麼條件? 需要考試嗎?</p>	<p>What are the conditions? Do you need to take an exam?</p>
<p>不需要 如需要申請安裝及使用淡水冷卻塔 就要參加由機電工程署 管理的「淡水冷卻塔計劃」 只要樓宇在選定地區內的</p>	<p>No, I don't. If you need to apply for installation and use of fresh water cooling towers, you must participate in the "Fresh Water Cooling Towers Scheme" run by the Electrical and Mechanical Services Department As long as the premises are in non-domestic buildings,</p>

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<p>非住用建築物、綜合用途建築物 附屬於住宅發展的獨立式會所 及「酒店式」服務住宅 就可以申請參加計劃 至於選定地區以外的建築物 我們也會按照每一宗申請的情況 來作出考慮</p>	<p>composite buildings, detached clubhouse buildings ancillary to residential developments and “hotel-like” service apartments in the designated areas they can apply for participation in the scheme. As for the buildings outside the designated areas, applications will also be considered on a case-by-case basis!</p>
<p>根據計劃的要求 申請者有責任 按照《淡水冷卻塔實務守則》 為水塔進行設計 安裝及調試、操作及維修的工作 並按守則的要求 為系統選擇合適的水處理方法 來保持水質處於妥善的狀況 減少對公眾造成的滋擾</p>	<p>As required under the scheme it is the applicant’s responsibility to design, install and commission, operate and maintain the water tower in compliance with the “Code of Practice for Fresh Water Cooling Towers” . And as required by the Code, applicants shall select appropriate water treatment methods for the system in a bid to keep the water quality in a proper condition and reduce the nuisance caused to the public.</p>
<p>為方便冷卻塔擁有人 妥善操作及維修水塔 我們也出版了 《淡水冷卻塔操作及維修的良好作業》 小冊子給業界參考</p>	<p>In order to facilitate cooling tower owners to properly operate and maintain their water towers, we have also published the pamphlet "Good Operation and Maintenance Practice of Fresh Water Cooling Towers" for the trade’s reference.</p>
<p>那設計上有什麼要求? 在水塔的設計上 我們有五個基本要求 第一個是距離上的要求 不如我們一起坐你的太空船 飛上天，我跟你講解一下</p>	<p>What are the design requirements? Regarding the design of the water tower we have five basic requirements The first one is the separation distance requirements Let’s take a space ride on your spaceship and I’ll explain it to you.</p>
<p>首先，冷卻塔空氣進風口或排氣口與 與附近室外進風口 排氣口、可開啟窗戶 及公眾開放地區之間 一般須保持最少 7.5 米的水平距離 如果水平距離不足 7.5 米 就需要考慮有足夠的垂直距離 意思是，如果水塔以下有進風口、 排氣口及可開啟窗戶 就需要保持最少 7.5 米的垂直距離</p>	<p>First, the cooling tower air intakes or exhausts shall be distant from the surrounding outdoor air intakes and exhausts, operable windows and public open areas, generally with a minimum 7.5m horizontal separation. If the horizontal separation is less than 7.5m, you need to consider whether there is enough vertical separation. It means that if there are air intakes, air exhausts and operable windows beneath the water tower, a minimum 7.5m vertical separation should be</p>

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<p>如果水塔以上有進風口 排氣口及可開啟窗戶 就需要保持最少 20 米的垂直距離</p>	<p>maintained. If there are air intakes, air exhausts and operable windows above the water tower, a minimum 20m vertical separation should be maintained.</p>
<p>第二個要求 就是冷卻塔應設置有效的收水器 作減少飄水</p>	<p>The second requirement is that cooling towers should be equipped with effective drift eliminators to reduce drift.</p>
<p>第三個要求 就是需要安裝有效的水處理裝置 及泄放設備 來控制細菌的滋生 冷卻塔的泄放水 應排放至沖廁水缸 並盡可能循環再用作沖廁用途</p>	<p>The third requirement is that effective water treatment device and bleed-off equipment should be installed to control bacterial growth. Bleed-off water from cooling towers should be discharged into flushing tanks and reused for flushing purpose as far as practicable.</p>
<p>什麼是泄放水? 泄放水是冷卻塔系統的排水 用作維持冷卻水的總溶解物 和懸浮物的含量達至可接受水平 這樣就可以確保冷卻塔有效運作</p>	<p>What is bleed-off water? Bleed-off water is the water discharged from cooling tower systems and is used to maintain the total dissolved and suspended solids content of the cooling water to an acceptable level This will ensure effective operation of cooling towers.</p>
<p>第四個要求，就是設計喉管的時候 盡量減少冷卻塔的 冷卻水循環管道內的死角 避免積存死水 如果避免不到死角 就需要安裝沖洗閥定期排水</p>	<p>The fourth requirement is that in designing pipeworks, dead-legs shall 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 installed for regular draining.</p>
<p>最後一項基本要求 是冷卻塔應設有足夠的安全通道 以方便進行維修保養、檢查 及抽取水樣本的工作</p>	<p>The last basic requirement is that cooling towers shall be provided with adequate and safe access to allow for the maintenance, inspection and water sampling.</p>
<p>是不是根據守則設計 安裝水塔就可以?</p>	<p>All we have to do is merely installing a water tower in compliance with the design code. Is it as simple as that?</p>
<p>當然不止，除了以上所說 冷卻塔還需要適當的維修保養 首先，冷卻塔和水處理設施 必需定期由冷卻塔操作 和維修的承建商來進行保養及維修 另外，冷卻水必須經過化學處理</p>	<p>It's not of course as simple as that. Apart from the above, cooling towers have to be properly maintained. First, cooling towers and water treatment facilities must be regularly maintained by contractors operating and servicing the cooling towers. In addition, cooling water must be treated with</p>

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<p>或其他經過驗證的物理水處理方法 控制腐蝕、積垢和微生物的生長</p>	<p>chemicals or other proven physical water treatment methods to control corrosion, scaling and microbial growth.</p>
<p>除此以外，冷卻塔系統必須 定期檢查及妥善維修 範圍包括所有機械設備 水箱、水處理設施及主要部件 例如填料、收水器等 冷卻塔水盤內水的透明度 氣味、表面雜物 水藻及溫度亦應該檢查 需確保冷卻塔內各部分清潔 以及整體系統運作良好</p>	<p>Besides, cooling tower systems must be regularly inspected and properly maintained. The coverage include all mechanical equipment, water tanks, water treatment facilities and major components such as fills and drift eliminators. The clarity, odour, surface debris, algae and temperature of the water in the water basin of the cooling tower should also be checked to ensure that all parts of the cooling tower are clean and the overall system works well.</p>
<p>另外收水器和填料必須清潔和維修 以確保不會發生生物積垢、腐蝕 水垢和其他沉積現象 這樣就可以維持正常的熱性能和防範過度飄水</p>	<p>The drifts eliminators and fills must be cleaned and maintained to ensure that biofouling, corrosion, scale and other depositions do not occur, thereby maintaining normal thermal performance and preventing excessive drift.</p>
<p>對於有死角的喉管 應該在每星期的例行檢查中 透過人手閥排水至少 15 分鐘 沖洗死角內的滯水 同時也需要每星期運行所有 備用冷凝水設備至少一小時 以避免喉管內有滯水的情況</p>	<p>For those pipeworks with dead-legs, drain stagnant water in dead-legs by manual purging for at least 15 minutes during weekly routine inspection. Also, it is necessary to run all standby condensing water-side equipment at least one hour per week to avoid accumulation of stagnant water inside the pipeworks.</p>
<p>原來這樣 你們的「淡水冷卻塔計劃」 不論在設計、安裝、維修 和保養方面的要求都很全面</p>	<p>I see. The "Fresh Water Cooling Towers Scheme" is comprehensive in terms of design, installation and maintenance requirements.</p>
<p>當然不止，除了以上所說 冷卻塔系統包括水盤和冷卻塔的内部表面 也至少每六個月需要清潔 清空淤泥及消毒一次 這樣才可以維持冷卻塔的有效運作</p>	<p>It's a lot more than that. In addition to the above, cooling tower systems including water basin and internal surfaces of cooling towers should be cleaned, desludged and disinfected at least every six months to maintain effective operation of the cooling tower</p>

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和有效地控制細菌的滋生	and effectively control bacterial growth.
那怎麼知道冷卻塔裡有沒有細菌？	So how do you know whether the cooling tower contains bacteria?
<p>冷卻塔系統擁有人或物業管理公司 必須僱用冷卻塔承建商 安排抽取冷卻塔水樣本 並將樣本交予認可的實驗室化驗 淡水冷卻塔的退伍軍人桿菌 總濃度測試 必須至少每季進行一次 而異養菌濃度測試 必須至少每月進行一次 擁有人必須確定退伍軍人桿菌 總濃度在每毫升十個菌落 形成單位以下 而異養菌含菌量 就需在每毫升十萬個菌落形成單位以下</p>	<p>The owner of the cooling tower system or the property management company shall engage a cooling tower contractor to arrange water sampling for testing by an accredited laboratory. Testing of total Legionella count shall be carried out quarterly and testing of heterotrophic colony count shall be conducted monthly. The owner shall ensure that the total Legionella count is below 10 colony forming units (cfu) per ml while the heterotrophic colony count is below 100,000 colony forming units (cfu) per ml</p>
<p>如果含菌量等於或超過控制上限 就要根據實務守則 進行在線消毒或緊急消毒 除此以外，冷卻塔系統擁有人 或物業管理公司 應妥善保存與冷卻塔相關的文件 包括操作及維修手冊 及相關的維修保養記錄 方便我們的職員在有需要時 提供檢查及複製</p>	<p>If the bacterial count equals or exceeds the upper threshold, online decontamination or emergency decontamination is required to be carried out according to the code of practice. In addition, the cooling tower system owner or the property management company should properly keep the documents relating to the cooling towers including operation and maintenance manuals and related maintenance records to facilitate inspection and reproduction by our staff when needed</p>
<p>冷卻塔系統擁有人或物業管理公司 須僱用獨立的審核人員 每年為系統進行操作 及維修的審核 檢查操作及維修手冊 記錄及進行目視檢查 和辨出風險和問題 並建議補救措施 記住審核報告要每年準時 提交到機電工程署</p>	<p>The owner of the cooling tower system or the property management company shall engage an independent auditor to conduct an annual audit of the operation and maintenance of the system, check operation and maintenance manuals, record and perform visual inspection, identify the risks and problems and suggest remedial measures. Please remember the audit report should be submitted to the Electrical and Mechanical</p>

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	Services Department punctually every year
<p>麻煩了 剛剛你說得太快...我記不住.. 不用怕，我是模範員工 才把所有資料放入腦而已</p>	<p>I am having trouble.. Just now, you've spoken too fast.. I'm finding it hard to follow you.. No worries! I am a model employee. I've put all the information into my mind</p>
<p>如果你需要以上小冊子和實務守則 我可給你一套帶回去你的星球參考 但這些資料也可在機電工程署網頁 能下載得到， 如果有任何查詢 也可以撥打以下電話 記住 如需要安裝淡水冷卻塔 就要參與我們的 「淡水冷卻塔計劃」</p>	<p>If you need the above pamphlet and code of practice, I can send one copy of each to your planet for reference. But this information can also be downloaded from the EMSD's website. Should you have any enquiries, Please call the following number. Bear in mind that if you need to install a fresh water cooling tower, you should join our "Fresh water Cooling Towers Scheme".</p>
<p>可是.. 我不懂看地球人的文字啊 噢！ 忘記了你是外星人呢...</p>	<p>But.. I can't read the words of the Earth.. Oh! I've forgotten that you are an alien...</p>