

Chinese Subtitle	English Subtitle
<p>地球真美 有花草树木，亦有宏伟的建筑物 这个这么大的灰色盒子 是什么？</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>哗！你是谁？ 你在这里做什么呢？ 你知不知道这是水塔的限制范围？ 除紧急情况外，外人是禁止进出的</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」 我是第一次来地球的！你是谁？ 你在这做什么呢？ 这里为何不能进出？</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 我是机电工程署职员 现在在为水塔作定期检查！ 你好像什么都不知道 看来你对水塔好像没什么认识呢</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？真的未曾听过！ 不如你讲解给我听？</p>	<p>Water tower? I really have no idea about it. Can you tell me what it is?</p>
<p>好吧！刚刚我把工作做完 就跟你讲解一下 水塔其实是简称 正式名称是冷却塔 而你身旁这个冷却塔 由于是用淡水作媒介 所以称作淡水冷却塔 为空调系统散热 它的运作原理 是透过蒸发式的冷却作用降低水的温度 水塔抽取外面的空气 进来与流水接触 吸收热量 然后把热气排出大气中 使用淡水冷却塔的水冷式空调系统 比较气冷式空调系统 可节省大概百分之二十的用电量</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>这样的水塔很好 既省电也环保 不过，今日的天气这么热... 你为什么不在办公室乘凉 还上来天台工作呢</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>为了能让大家可以安心地乘凉 就需要认真跟妥善地保养水塔 因为妥善地保养水塔 可以减少细菌传播的风险</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>原来你的工作这么重要的 在水里会有什么细菌呢</p>	<p>Oh, I see. Your work is so important So what kind of bacteria will there be in the water?</p>
<p>例如像退伍军人杆菌 这种细菌可以在多种的环境中生存 特别适合在摄氏 20-45 度的温水中生长 水塔就是其中一个适合退伍军人杆菌生长的环境</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，原来这样! 我还以为随使用点铁皮 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>怎可能这般容易呢! 安装淡水冷却塔 需要符合很多条件的</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>有什么条件? 需要考试吗?</p>	<p>What are the conditions? Do you need to take an exam?</p>
<p>不需要 如需要申请安装及使用淡水冷却塔 就要参加由机电工程署 管理的「淡水冷却塔计划」 只要楼宇在选定地区内的</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>非住用建筑物、综合用途建筑物 附属于住宅发展的独立式会所 及「酒店式」服务住宅 就可以申请参加计划 至于选定地区以外的建筑物 我们也会按照每一宗申请的情况 来作出考虑</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>根据计划的要求 申请者有责任 按照《淡水冷却塔实务守则》 为水塔进行设计 安装及调试、操作及维修的工作 并按守则的要求 为系统选择合适的水处理方法 来保持水质处于妥善的状况 减少对公众造成的滋扰</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>为方便冷却塔拥有人 妥善操作及维修水塔 我们也出版了 《淡水冷却塔操作及维修的良好作业》 小册子给业界参考</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>那设计上有什么要求? 在水塔的设计上 我们有五个基本要求 第一个是距离上的要求 不如我们一起坐你的宇宙飞 船飞上天，我跟你讲解一下</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，冷却塔空气进风口或排气口与 与附近室外进风口 排气口、可开启窗户 及公众开放地区之间 一般须保持最少 7.5 米的水平距离 如果水平距离不足 7.5 米 就需要考虑有足够的垂直距离 意思是，如果水塔以下有进风口、 排气口及可开启窗户 就需要保持最少 7.5 米的垂直距离</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>如果水塔以上有进风口 排气口及可开启窗户 就需要保持最少 20 米的垂直距离</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>第二个要求 就是冷却塔应设置有效的收水器 作减少飘水</p>	<p>The second requirement is that cooling towers should be equipped with effective drift eliminators to reduce drift.</p>
<p>第三个要求 就是需要安装有效的水处理装置 及泄放设备 来控制细菌的滋生 冷却塔的泄放水 应排放至冲厕水缸 并尽可能循环再用作冲厕用途</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>什么是泄放水? 泄放水是冷却塔系统的排水 用作维持冷却水的总溶解物 和悬浮物的含量达至可接受水平 这样就可以确保冷却塔有效运作</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>第四个要求，就是设计喉管的时候 尽量减少冷却塔的 冷却水循环管道内的死角 避免积存死水 如果避免不到死角 就需要安装冲洗阀定期排水</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>最后一项基本要求 是冷却塔应设有足够的安全通道 以方便进行维修保养、检查 及抽取水样本的工作</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>是不是根据守则设计 安装水塔就可以?</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>当然不止，除了以上所说 冷却塔还需要适当的维修保养 首先，冷却塔和水处理设施 必需定期由冷却塔操作 和维修的承建商来进行保养及维修 另外，冷却水必须经过化学处理</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>或其他经过验证的物理水处理方法 控制腐蚀、积垢和微生物的生长</p>	<p>chemicals or other proven physical water treatment methods to control corrosion, scaling and microbial growth.</p>
<p>除此以外，冷却塔系统必须 定期检查及妥善维修 范围包括所有机械设备 水箱、水处理设施及主要部件 例如填料、收水器等 冷却塔水盘内水的透明度 气味、表面杂物 水藻及温度亦应该检查 需确保冷却塔内各部分清洁 以及整体系统运作良好</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须清洁和维修 以确保不会发生生物积垢、腐蚀 水垢和其他沉积现象 这样就可以维持正常的热性能 和防范过度飘水</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>对于有死角的喉管 应该在每星期的例行检查中 透过人手阀排水至少 15 分钟 冲洗死角内的滞水 同时也需要每星期运行所有 备用冷凝水设备至少一小时 以避免喉管内有滞水的情况</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>原来这样 你们的「淡水冷却塔计划」 不论在设计、安装、维修 和保养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>当然不止，除了以上所说 冷却塔系统包括水盘和冷却塔的内部表面 也至少每六个月需要清洁 清空淤泥及消毒一次 这样才可以维持冷却塔的有效运作</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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和有效地控制细菌的滋生	and effectively control bacterial growth.
那怎么知道冷却塔里有没有细菌?	So how do you know whether the cooling tower contains bacteria?
<p>冷却塔系统拥有人或物业管理公司 必须雇用冷却塔承建商 安排抽取冷却塔水样本 并将样本交予认可的实验室化验 淡水冷却塔的退伍军人杆菌 总浓度测试 必须至少每季进行一次 而异养菌浓度测试 必须至少每月进行一次 拥有人必须确定退伍军人杆菌 总浓度在每毫升十个菌落 形成单位以下 而异养菌含菌量 就需在每毫升十万个菌落形成单位以下</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.</p> <p>Testing of total Legionella count shall be carried out quarterly and testing of heterotrophic colony count shall be conducted monthly.</p> <p>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>如果含菌量等于或超过控制上限 就要根据实务守则 进行在线消毒或紧急消毒 除此以外，冷却塔系统拥有人 或物业管理公司 应妥善保存与冷却塔相关的文件 包括操作及维修手册 及相关的维修保养记录 方便我们的职员在有需要时 提供检查及复制</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.</p> <p>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>冷却塔系统拥有人或物业管理公司 须雇用独立的审核人员 每年为系统进行操作 及维修的审核 检查操作及维修手册 记录及进行目视检查 和辨出风险和问题 并建议补救措施 记住审核报告要每年准时 提交到机电工程署</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.</p> <p>Please remember the audit report should be submitted to the Electrical and Mechanical</p>

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	Services Department punctually every year
<p>麻烦了 刚刚你说得太快...我记不住.. 不用怕，我是模范员工 才把所有数据放入脑而已</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>如果你需要以上小册子和实务守则 我可给你一套带回去你的星球参考 但这些数据也可在机电工程署网页 能下载得到， 如果有任何查询 也可以拨打以下电话 记住 如需要安装淡水冷却塔 就要参与我们的 「淡水冷却塔计划」</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! 忘记了你是外星人呢...</p>	<p>But... I can't read the words of the Earth.. Oh! I've forgotten that you are an alien...</p>