

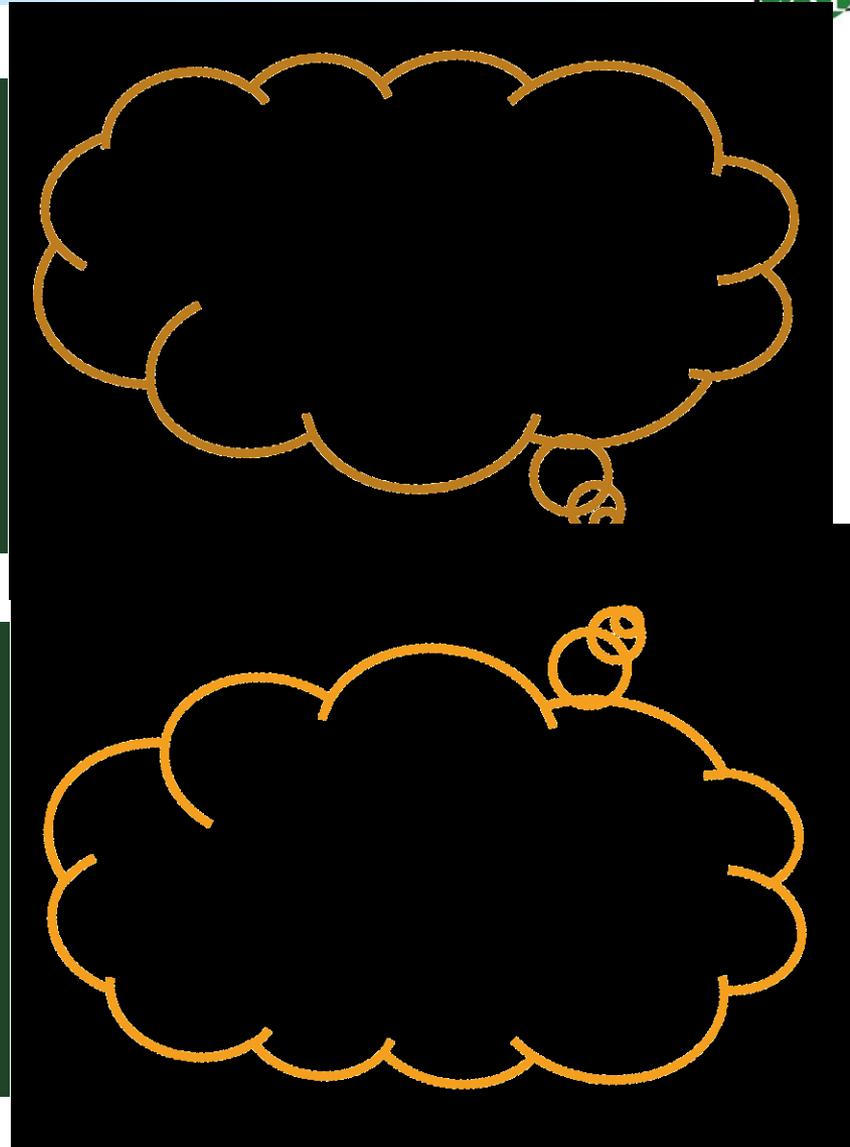
Improve Water Quality In Our Daily Life By Testing Services

從水質測試提升日常生活水質



*Presented by : Ms. Kacila Leung
(Enviro Labs Ltd.)*

Facts are judged by seeing?

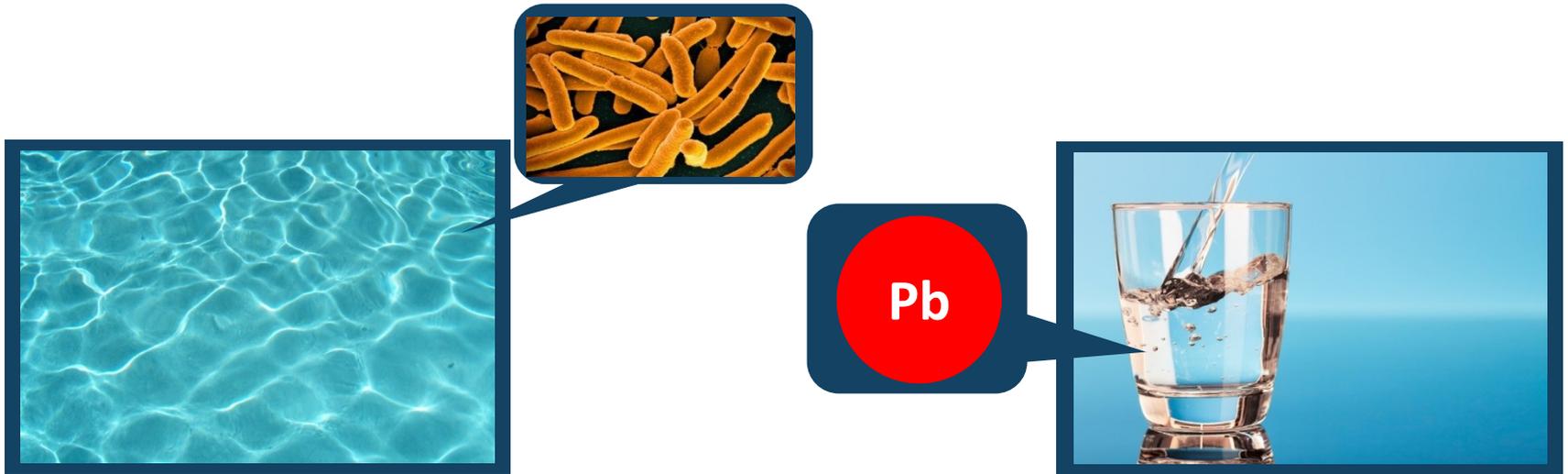


How to secure good quality life by testing?

Most of the contaminants in water are not easily visible

- ❗ Bacteria like *E. coli* and *Legionella pneumophila*
- ❗ Heavy metals like lead (Pb)

Through laboratory testing is the most effective way to ensure the water quality in our daily lives

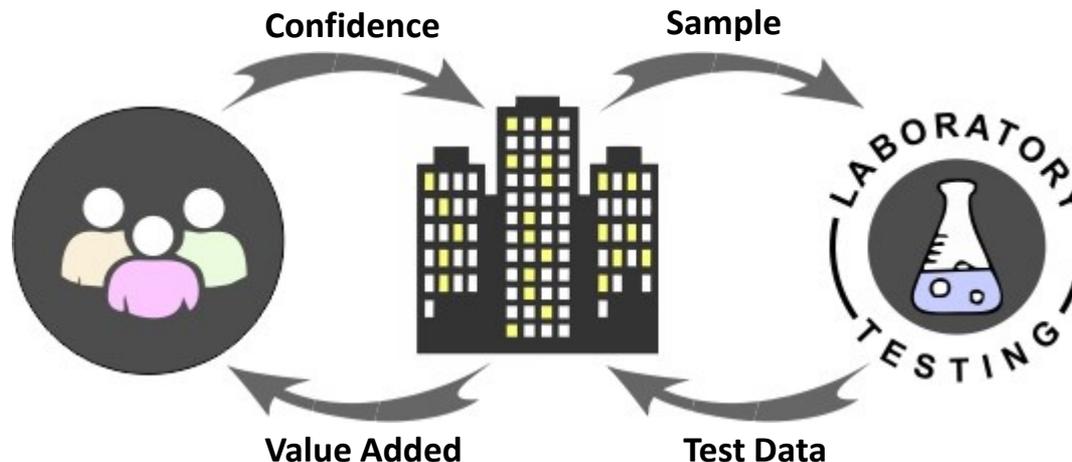


E. coli is invisible

Lead (Pb) ion is invisible

Why Testing is Important ?

- ❗ Assist the building or property owners and building management agents to conduct self-assessments
- ❗ Strengthen the capability of building management agents to achieve value-added performance
- ❗ Provide data that helps to take immediate measures to correct the abnormal
- ❗ Enable the public to have greater confidence



Enviro Labs Limited (HOKLAS Accredited Lab.)



Main Services :

Environmental and food testing

Potable waters analysis

Spa, swimming pool water and cooling tower water analysis

Food testing includes microbiology testing

Provide regular sampling and testing service to customer



Our Water Testing Services from Sources

One-Stop Solution

Sampling



Drinking Water

Testing



Swimming Pool Water

Consultant



Spa and Jacuzzi

Follow-Up



Cooling Tower Water

News of Drinking Water Incidents



蘋果日報

近年水禍不斷 公屋鉛水轟動

2017年11月21日 5:45

【本報訊】近年香港公共屋邨食水多次被發現含有雜質，當中以二〇一五年初揭發的食水含鉛事件尤為嚴重，當時啟德啟晴邨率先被發現食水含有污染物，接連亦有十一座屋邨相繼發現食水安全問題，事件轟動全港，房屋署和水務署其後抽取食水樣本化驗，證實食水含鉛量超標。事隔逾兩年，雖然食水含鉛事件已告一段落，大部分受影響市民的血含鉛量已恢復正常，惟仍有小部分受影響市民血含鉛量略高，會否影響健康仍有待觀察。

葵青荃灣異味食水 疑兇配水庫工程

明報 | 2017年11月21日 6:45



葵青區居民稱停飲用異味食水，紛紛湧向取水。

筲箕灣愛東邨爆「瀝青水」疑雲 食水有黑點沙石過濾網佈滿黑色異物

星島日報 | 2017年11月17日 18:31



筲箕灣邨十戶居民投訴指，在食水中發現大量黑點並呈咖啡色，有住戶的水龍頭濾網更佈滿黑色沉澱物。民主黨提供

WHO Guideline for Drinking Water Quality



World Health Organization

92 + **19** parameters

WHO + **Non-WHO**

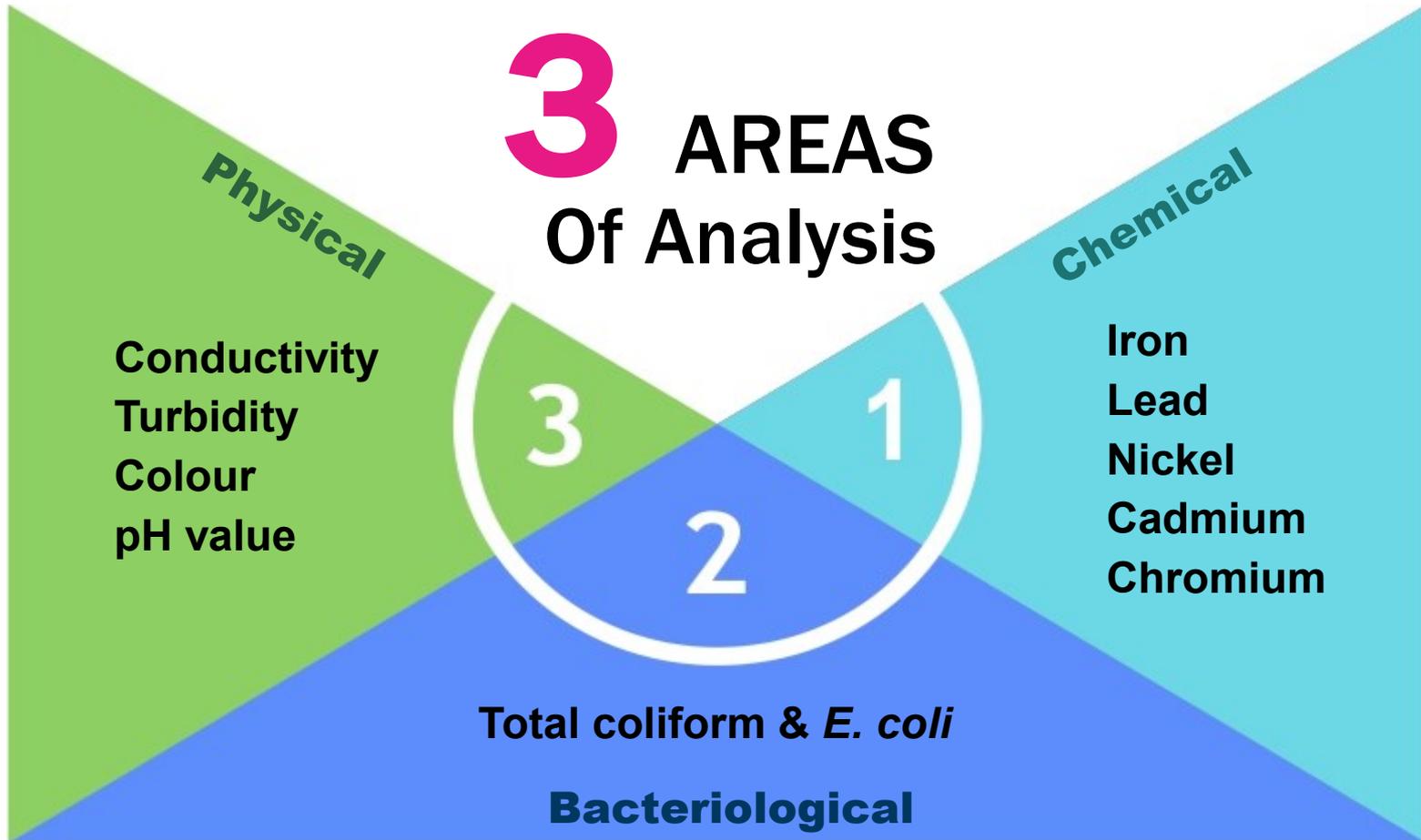


水務署
Water Supplies Department

Title of Parameter	Quantity	Key Parameter(s)
Metal	12	Cadmium (鎘), Chromium (鉻), Copper (銅), Lead (鉛), Mercury (汞)
Pesticides	33	DDT (滴滴涕), Lindane (林丹), Chlorpyrifos (毒死蜱)
Disinfectants	3	Chlorine (氯)
Disinfectant by-products	14	Chloroform (氯仿), Chlorate (氯酸鹽)
Other Inorganic Chemicals	3	Fluoride (氟化物)
Other Organic Chemicals	24	Benzene (苯), Styrene (苯乙烯)
Microbiological	1	<i>E. coli</i> (埃希氏大腸桿菌)
Radiological	2	Gross alpha activity (總α活度), Gross beta activity (總β活度)

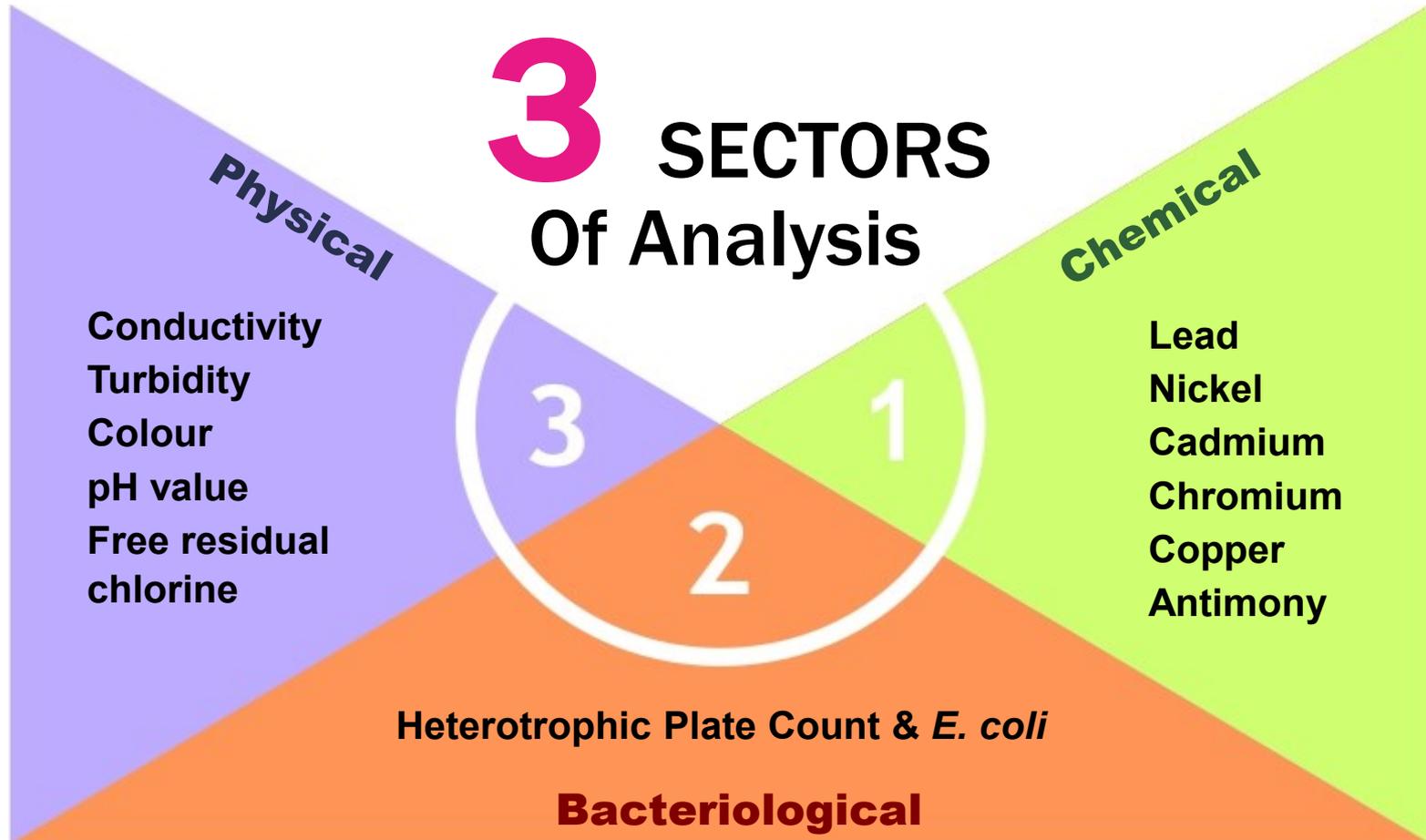
Quality Water Supply Scheme for Buildings

Fresh Water (Plus)



New Requirements for Plumbing Works

Circular Letter No. 9/2017 & No. 10/2017



Case Study No. 1

Some data are inter-correlated.



Customer Sample ID.	No.	Parameter	Test Result	Acceptable Limits	Units
Pantry Tap Water	OO1	Colour	33	≤15	HU
		Conductivity	150	≤300	μS/cm 25°C
		pH (at 25 °C)	8.5	6.5-9.2	---
		Turbidity	8.3	≤3	NTU
		Cadmium	<1.5	≤3	μg/L
		Chromium	<7.5	≤50	μg/L
		Nickel	<15	≤70	μg/L
		Lead	<1.5	≤10	μg/L
		Iron	1.0	≤0.3	mg/L
		<i>E. coli</i>	Not Detected	Not Detected	cfu/100mL
		Total Coliform	Not Detected	Not Detected	cfu/100mL

Case Study No. 2

Total Coliform is detected while *E. coli* is not detected.

What is the difference between Total coliform and *E. coli* ?

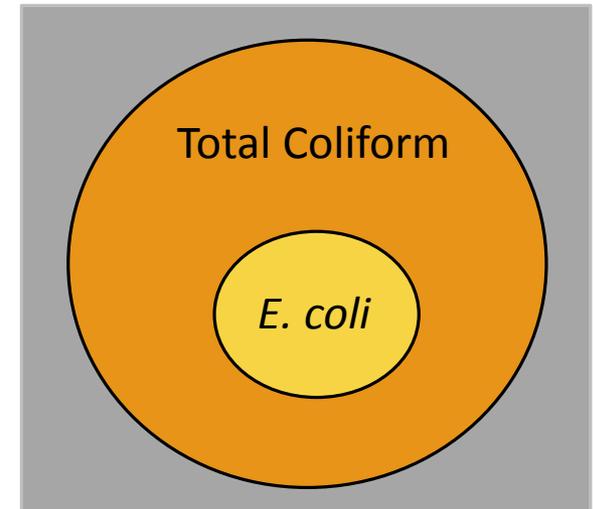
Customer Sample ID.	No.	Parameter	Test Result	Acceptable Limits	Units
Water Tank	001	Colour	2	≤15	HU
		Conductivity	86	≤300	μS/cm 25°C
		pH (at 25 °C)	7.9	6.5-9.2	---
		Turbidity	0.30	≤3	NTU
		Iron	<0.03	≤0.3	mg/L
		Heterotrophic Plate Count	25	≤100	cfu/mL
		<i>E. coli</i>	Not Detected	Not Detected	cfu/100mL
		Total Coliform	70	Not Detected	cfu/100mL

What is Total Coliform?

- ❗ Total coliform (總大腸桿菌) is a group of bacteria all round us, most of them are not dangerous to human health
- ❗ No immediate health concern but further investigation is important
- ❗ *E. coli* (埃希氏大腸桿菌) is a subgroup within the total coliform group which primarily come from the feces of warm blooded animals

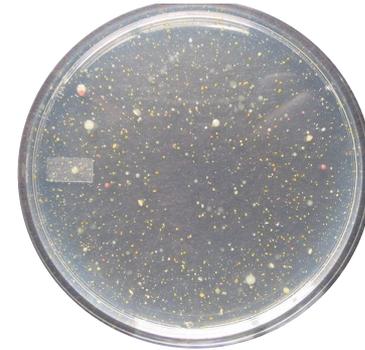


Total coliform under SEM



Case Study No. 3

Heterotrophic Plate Count **fails**, why ?
Maybe water tank is not cleaned well



Customer Sample ID.	No.	Parameter	Test Result	Acceptable Limits	Units
Potable Water Tank	OO1	Heterotrophic Plate Count	<1	≤ 100	cfu/mL
Potable Water Tank	OO2	Heterotrophic Plate Count	180	≤ 100	cfu/mL
Potable Water Tank	OO3	Heterotrophic Plate Count	740	≤ 100	cfu/mL
Potable Water Tank	OO4	Heterotrophic Plate Count	160	≤ 100	cfu/mL

Spa and Swimming Pool Water Testing



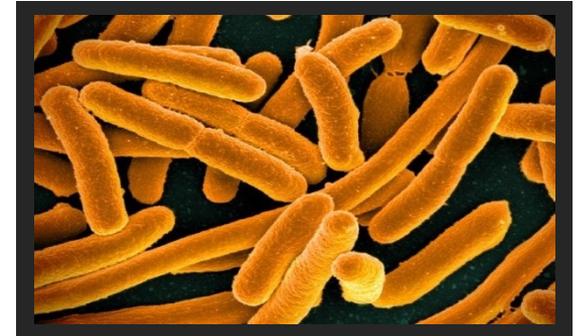


Cap. 132CA Swimming Pools Regulation

	Test Parameter	Requirement
Standard of Clarity	pH	7.0-7.8
	Turbidity	< 5 NTU
	Colour	< 5 Hazen Units
Bacteriological Quality	<i>E.coli</i>	Nil per 100 mL
	Total Bacterial Count	< 200 cfu/mL

Cares in Swimming Pools and Jacuzzi

- ⚠ *E. coli* (埃希氏大腸桿菌) is one of the faecal coliform bacteria which is abundance in faeces and usually used as a faecal indicator



Escherichia coli (E.coli) under SEM

- ⚠ If pool contains *Legionella pneumophila* (嗜肺軍團菌), users may get Legionnaires' disease (退伍軍人症) which is fatal



Legionella pneumophila under SEM

Case Study No. 4

Heterotrophic Plate Count **exceeds** acceptable limit

Suggested action : Empty pool water, thoroughly clean up regularly

Customer Sample ID.	No.	Parameters	Test Results	Acceptable Limits	Units
Main Pool	OO1	Chlorine (Free residual)	1.6	≤ 3	mg/L
		pH	7.5	7.0 - 7.8	---
		Turbidity	0.20	≤ 5	NTU
		Heterotrophic Plate Count	5,000	≤ 200	cfu/mL
		<i>E. coli</i>	Not Detected	Not Detected	cfu/100mL

Recommendation: Pool to be emptied of water and thoroughly cleaned at least once a year



Cooling Tower Water

Function: A heat removal device, normally applied in centralized air-conditioning area

Risk : Combined with the contaminants in the feed water. Warm and moist environment of cooling tower favors the growth of *Legionella* bacteria

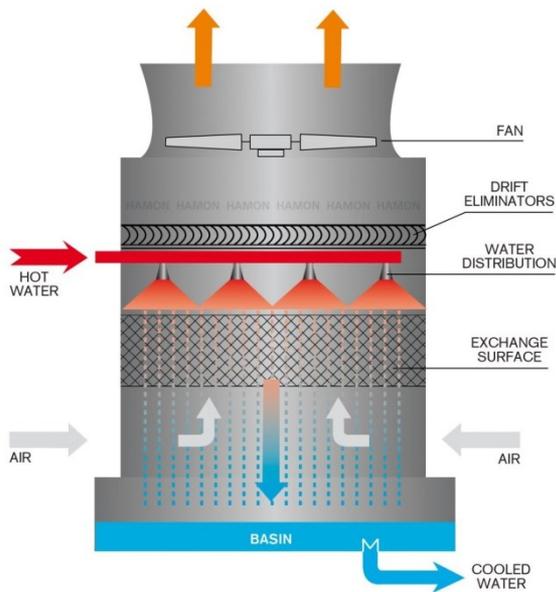


Fig. 1 Functional diagram of cooling tower ⁽¹⁾



Fig. 2. Tower inside before cleaning ⁽²⁾



Fig.3 Tower inside after cleaning ⁽³⁾

Tips : Factors favour *Legionella* besides warm environment

1. Presence of sediment, sludge, biofilms, organic materials
2. pH= 5.5-8.1
3. Presence of ferrous ions and scales
4. Stagnating water

Therefore, regular maintenance and cleaning of cooling tower is important in order to prevent the growth of *Legionella* bacteria.

Letter from EMSD



Have you received below letter from EMSD ?

Summary:

EMSD found Legionella bacteria abnormal in a water sample of a cooling tower, and then ask for corrective actions within 28 days.

敬啟者：

冷卻塔水樣本測試
- 冷卻塔驗出退伍軍人桿菌及/或過量異養菌的補救行動
冷卻塔所在建築物地點:

檢查日期: 2017年3月23日

多謝讓我們在上述日期收集水樣本，以檢查閣下冷卻塔冷卻水細菌含量的質素。
水樣本化驗結果顯示您/貴公司的冷卻水塔驗出退伍軍人桿菌。

退伍軍人桿菌總濃度

每毫升 110 菌落.

這顯示您/貴公司冷卻塔的運作和維修及水處理需要檢討及改善。現促請 貴公司在此信日期的 28 日內，對冷卻塔進行下列補救措施：

ACTIONS

1. Clean up the cooling tower thoroughly
2. Contact Enviro Labs Ltd. for water testing after cleaning

Case Study No.5

Heterotrophic Plate Count **exceeds** acceptable limits

Customer Sample ID.	Parameters	Test Result	Acceptable Limits	Units
Cooling Tower	Heterotrophic Plate Count	490,000	$\leq 100,000$	cfu/mL
	Total Legionella	Not Detected	≤ 10	cfu/mL
	<i>Legionella pneumophila</i> Serogroup 1	Not Detected	≤ 10	cfu/mL
	<i>Legionella pneumophila</i> Serogroup 2-14	Not Detected	≤ 10	cfu/mL
	Other <i>Legionella</i> spp.	Not Detected	≤ 10	cfu/mL



1. Clean up the cooling tower thoroughly
2. Take water sample for re-testing after cleaning
3. Review cooling tower maintenance procedure

Cooling Tower Management

Code of Practice for Water-cooled Air Conditioning Systems
Published by Electrical and Mechanical Services Department (EMSD)

Parameter	Cooling Water Quality Criteria (Fresh Water Typed Tower)	Minimum Monitoring Frequency
Heterotrophic colony count	< 100,000 cfu/ml	Monthly
<i>Legionella</i> bacteria count	< 10 cfu/ml	Quarterly



Clean up the tower thoroughly once per 6 months

More about *Legionella pneumophila*

Fact File

Legionnaires' disease [LD, 退伍軍人症] : Bacterial pneumonia caused by legionella

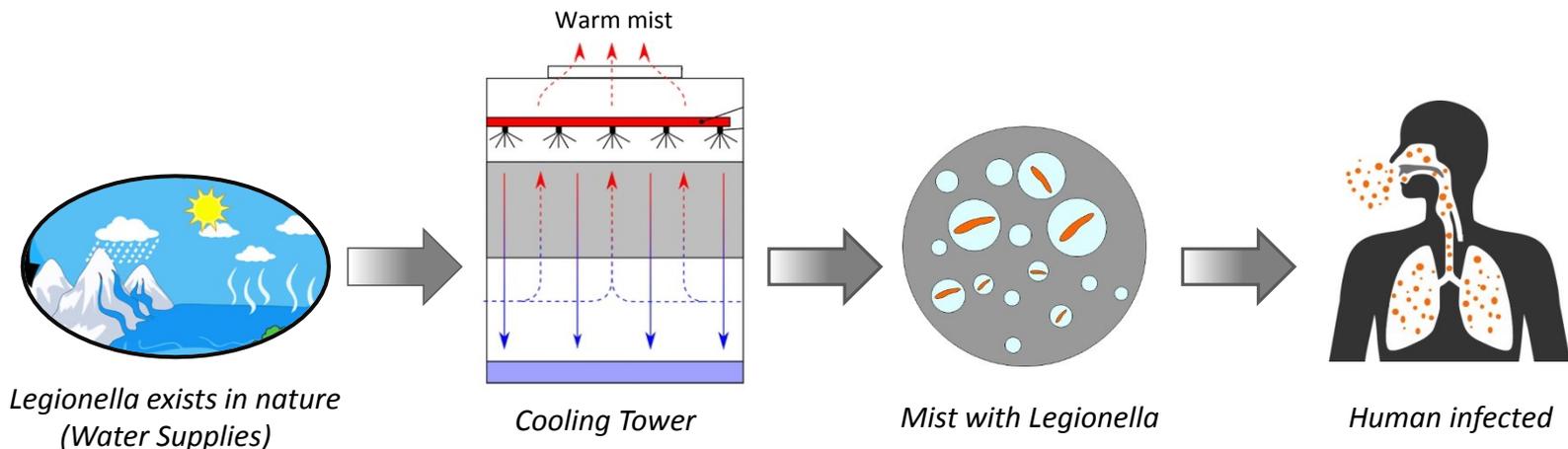
Symptoms : Fever, headache, malaise

Legionella pneumophila serogroup 1 : Most commonly responsible for LD outbreaks

Optimum temp. for bacteria growth : 20-45°C, particularly in 35-43°C

Transmission of bacteria : Inhalation of aerosols or mist containing bacteria into lungs

Infection Pathway



Enviro Labs Can Serve You !



Contact us for service



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<https://www.facebook.com/envirolabs/>



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HOKLAS accredited testing
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Urgent/Express Service
Express: 4 working days
Urgent :3 working days



Professional Team
ELL has experienced chemists,
Microbiologists and engineers



Well Experienced
Over 20 years in
testing service



Pick Up & Sampling
Pick up & sampling services
can be provided if required



PROFESSIONAL IN ENVIRONMENTAL TESTING



Thank You