

## Test on Cooling Towers and Evaporator Condenser

### Monthly total bacteria and quarterly Legionella testing on Cooling Towers and Evaporator Condenser of Makmur Enterprises Pty Ltd

Makmur Enterprises is a frozen food manufacturer. The company has installed and been using the Silver Colloidal Nano Technology treatment system for Cooling Towers and Evaporator Condensers.

Samples from cooling towers and evaporator condensers are collected every month to test for the monthly total bacteria, HCC (EML) and TPC (Amdel), and the quarterly Legionella. The summary of monthly total bacteria and quarterly Legionella testing results are attached.

From March 2004 to Jan 2005, the total bacterial count was *rarely* reached over the maximum level of 100,000 HCC/mL and Legionella totals always stayed below 10 cfu/mL. These have demonstrated the effectiveness of using Silver Colloid Nano Technology treatment system killing bacteria and preventing the growth of microbes in the cooling tower. As stated by Carl Greenaway, Makmur Enterprises, "monthly total bacteria (HCC) and quarterly Legionella testing results reflect the effectiveness of the new treatment. Since the commencement of the Silver Colloid Nano Technology treatment system, the cooling tower bacterial counts are the lower ever recorded and the appearance of the cooling tower water is clear and free of particulate matter."

#### Monthly Total Bacteria (HCC/mL) Testing Results of Makmur Enterprises' Cooling Towers (C/T) and Evaporator Condensers (E/C) from March 2004 to September 2004

Samples	March	April	May	June	July	August	September
C/T 1	24000	2000	< 2000	2000	2000	38000	30000
C/T 2	22000	4000	2000	8000	2000	48000	34000
E/C 1	64000	< 2000	< 2000	12000	4000	380000	34000
E/C 2	N/A	2000	2000	< 2000	2000	170000	24000

#### Quarterly Legionella (cfu/mL) Testing Results of Makmur Enterprises' Cooling Towers (C/T) and Evaporator Condensers (E/C) from April 2004 to September 2004

Samples	April			June			August			September		
	Legionella Species cfu/mL LpneSG1	LpneSG2+	L other	Legionella Species cfu/mL LpneSG1	LpneSG2+	L other	Legionella Species cfu/mL LpneSG1	LpneSG2+	L other	Legionella Species cfu/mL LpneSG1	LpneSG2+	L other
C/T 1	<10	<10	<10	<10	<10	<10	Pending			<10	<10	<10
C/T 2	<10	<10	<10	<10	<10	<10	Pending			<10	<10	<10
E/C 1	<10	<10	<10	<10	<10	<10	Pending			<10	<10	<10
E/C 2	<10	<10	<10	<10	<10	<10	Pending			<10	<10	<10

< = Less than ~ = Estimated spp = Species Y = Yeast M = Moulds

HCC = Heterotrophic Colony Count Lpne = Legionella

SG = Scrogroup N/D = Not detected - = Not tested N/A = Not Available

**Above samples are tested by EML Consulting Services Pty Ltd.**

**Monthly Total Bacteria (TPC) Testing Results of Cooling Towers (C/T) and Evaporator Condensers (E/C)  
from Oct 2004 to Feb 2005**

	<b>Oct 04</b>	<b>Nov 04</b>	<b>Dec 04</b>	<b>Jan 05</b>
Samples	Total Plate Count (TPC) CFU/mL	Total Plate Count (TPC) CFU/mL	Total Plate Count (TPC) CFU/mL	Total Plate Count (TPC) CFU/mL
C/T 1	55000	28000	~17000	~22000
C/T 2	80000	~ 14000	~ 4600	56000
E/C 1	78000	~ 20000	~ 7800	55000
E/C 2	390	2500	~ 16000	51000

**Quarterly Legionella (cfu/mL) Testing Results of Makmur Enterprises' Cooling Towers (C/T) and Evaporator  
Condensers (E/C)  
from Oct 2004 to Dec 2004**

	<b>Oct 2004</b>	<b>Dec 2004</b>
Samples	Legionella Species cfu/mL	Legionella Species cfu/mL
C/T 1	<10	<10
C/T 2	<10	<10
E/C 1	<10	<10
E/C 2	<10	<10

Sample Storage: - Refrigeration at 2 – 8 degrees C; unless specified otherwise in sample comments, analysis commenced within 24 hours of sampling; ND = Not Detected; NR = No Result; spr = Spreaders Present. Incubation conditions: 37 degrees C/48 hours.

**Above samples are tested by Amdel.**