

ภาคผนวก ค-16

รายการผลการติดตามตรวจสอบ
การควบคุมเชื้อสปีชีส์โอเนลล่าในระบบฝังเย็น

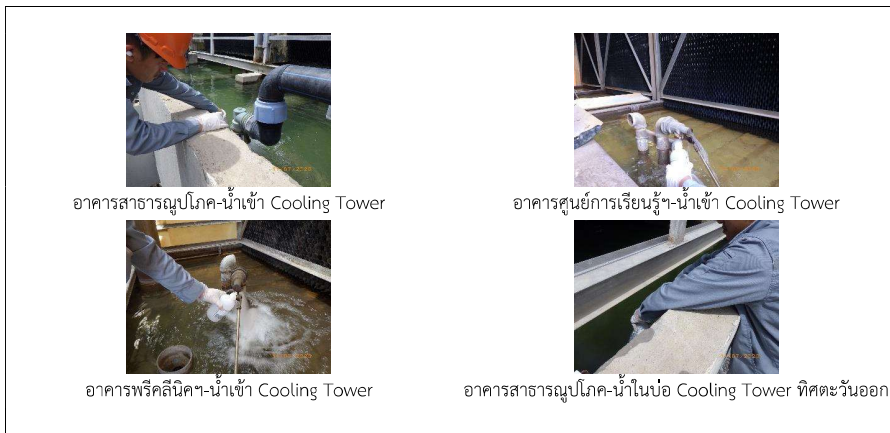
5.3 คุณภาพน้ำหอผึ่งเย็น

1) ผลการตรวจวิเคราะห์

จากการตรวจวิเคราะห์คุณภาพน้ำหอผึ่งเย็น ในวันที่ 11 กรกฎาคม พ.ศ. 2566 จำนวน 13 สถานี แสดงดังภาพที่ 3 และรายละเอียดผลการตรวจวิเคราะห์แสดงดังตารางที่ 6

2) สรุปผลการตรวจวิเคราะห์

เมื่อนำผลการตรวจวิเคราะห์น้ำหอผึ่งเย็นของทั้ง 13 สถานี มาเปรียบเทียบกับประกาศกรมอนามัย เรื่อง ข้อปฏิบัติการควบคุมเชื้อสลิโมเนลลาในหอผึ่งเย็นของอาคารในประเทศไทย พบว่า ทุกสถานีที่ทำการตรวจวิเคราะห์คุณภาพน้ำหอผึ่งเย็นมีค่า *Legionella spp.* อยู่ในเกณฑ์มาตรฐานดังกล่าวกำหนด



ภาพที่ 3 แสดงการเก็บตัวอย่างคุณภาพน้ำหอผึ่งเย็น



ภาพที่ 3 (ต่อ) แสดงการเก็บตัวอย่างคุณภาพน้ำหอผึ่งเย็น

ตารางที่ 6 สรุปผลการตรวจวิเคราะห์คุณภาพน้ำหอผึ่งเย็น

พารามิเตอร์	หน่วย	ผลการตรวจวิเคราะห์				มาตรฐาน
		อาคารสารอุณหภูมิ- น้ำเข้า Cooling Tower	อาคารสารอุณหภูมิ- น้ำในบ่อ Cooling Tower ทิศตะวันออก	อาคารสารอุณหภูมิ- น้ำในบ่อ Cooling Tower ทิศตะวันตก	อาคารสารอุณหภูมิ- น้ำที่ระบายออกจาก Cooling Tower	
<u>Metals Testing</u>						
<i>Legionella spp.</i>	CFU/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Standard Plate Count	CFU/mL	<1	>200	>200	>200	-
<u>Metals Testing</u>						
Iron	mg/L	-	0.02	0.02	0.03	-
<u>Water Testing</u>						
Ammonium	mg/L	-	<0.06	<0.06	<0.06	-
Chloride	mg/L	-	548	549	577	-
Conductivity	micromhos/cm	-	2,741	2,784	2,764	-
Methyl Orange Alkalinity	mg/L	-	243	243	233	-
pH	mg/L	-	8.8	8.7	8.8	-
Silica	mg/L	-	60.8	62.3	61.4	-
Sulfate	mg/L	-	434	834	452	-
Sulfide	mg/L	-	0.02	0.02	0.01	-
Total Hardness	mg/L	-	533	571	551	-

มาตรฐาน : ประกาศกรมอนามัย เรื่อง ข้อปฏิบัติการควบคุมเชื้อสิจิเอนเนสในหอผึ่งเย็นของอาคารในประเทศไทย

หมายเหตุ : Not Detected = ไม่สามารถตรวจพบได้ ตามวิธีการตรวจสอบที่กำหนด

ตารางที่ 6 (ต่อ) สรุปผลการตรวจวิเคราะห์คุณภาพน้ำหอผึ่งเย็น

พารามิเตอร์	หน่วย	ผลการตรวจวิเคราะห์				มาตรฐาน
		อาคารศูนย์การเรียนรู้ – น้ำเข้า Cooling Tower	อาคารศูนย์การเรียนรู้ – น้ำในบ่อ Cooling Tower ทิศตะวันออก	อาคารศูนย์การเรียนรู้ – น้ำในบ่อ Cooling Tower ทิศตะวันตก	อาคารศูนย์การเรียนรู้ – น้ำที่ระบายออกจาก Cooling Tower	
<u>Microbiological Testing</u>						
<i>Legionella spp.</i>	CFU/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Stadard Plate Count	CFU/mL	95	>200	>200	>200	-
<u>Metals Testing</u>						
Iron	mg/L	-	0.10	0.05	0.03	-
<u>Water Testing</u>						
Ammonium	mg/L	-	<0.06	<0.06	<0.06	-
Chloride	mg/L	-	150	955	1,019	-
Conductivity	micromhos/cm	-	866	4,012	4,039	-
Methyl Orange Alkalinity	mg/L	-	116	354	364	-
pH	mg/L	-	8.8	8.8	8.9	-
Silica	mg/L	-	17.1	66.8	67.1	-
Sulfate	mg/L	-	101	542	577	-
Sulfide	mg/L	-	0.01	0.01	<0.01	-
Total Hardness	mg/L	-	189	713	731	-

มาตรฐาน : ประกาศกรมอนามัย เรื่อง ข้อปฏิบัติการควบคุมเชื้อสิจิเอนเนสในหอผึ่งเย็นของอาคารในประเทศไทย

หมายเหตุ : ND (Not Detected) หมายถึง ไม่สามารถตรวจพบได้ ตามวิธีการตรวจสอบที่กำหนด

ตารางที่ 6 (ต่อ) สรุปผลการตรวจวิเคราะห์คุณภาพน้ำหอผึ่งเย็น

พารามิเตอร์	หน่วย	ผลการตรวจวิเคราะห์					มาตรฐาน
		อาคารพรีคลีนิกฯ - น้ำเข้า Cooling Tower	อาคารพรีคลีนิกฯ - น้ำในบ่อ Cooling Tower บ่อที่ 1	อาคารพรีคลีนิกฯ - น้ำในบ่อ Cooling Tower บ่อที่ 2	อาคารพรีคลีนิกฯ - น้ำในบ่อ Cooling Tower บ่อที่ 3	อาคารพรีคลีนิกฯ - น้ำที่ระบายออกจาก Cooling Tower	
Microbiological Testing <i>Legionella</i> spp.	CFU/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Stadard Plate Count	CFU/mL	>200	>200	>200	>200	>200	-
Metals Testing Iron	mg/L	-	0.17	0.61	0.24	0.50	-
Water Testing Ammonium	mg/L	-	<0.06	<0.06	<0.06	<0.06	-
Chloride	mg/L	-	84.4	192	177	228	-
Conductivity	micromhos/cm	-	661	1,332	829	1,310	-
Methyl Orange Alkalinity	mg/L	-	96	207	121	202	-
pH	mg/L	-	8.4	8.8	8.8	8.9	-
Silica	mg/L	-	15.2	28.9	18.4	28.0	-
Sulfate	mg/L	-	91.4	177	112	207	-
Sulfide	mg/L	-	0.01	0.01	<0.01	<0.01	-
Total Hardness	mg/L	-	29	95	59	94	-

มาตรฐาน : ประกาศกรมอนามัย เรื่อง ข้อปฏิบัติการควบคุมเชื้อสัจิโบนแลในหอผึ่งเย็นของอาคารในประเทศไทย

หมายเหตุ : ND (Not Detected) หมายถึง ไม่สามารถตรวจพบได้ ตามวิธีการตรวจสอบที่กำหนด

ahsglobal.com



Analysis / Test Report

Client : Chulabhapradinda Medical Institute, Faculty of Medicine Ramathubod Hospital, Mahidol University
111 Moo 14, Bang Ph, Bang Phli, Samutprakarn Thailand 10540
P/O : ศัญญาพร/007/2566(CNM)
Project Name : โรงพ่นยาสมุนไพรจีนตั้งศูนย์ฯ
Project Location :

Lot ID: 2378198
Date Received : Jul 11, 2023
Date Reported : Jul 29, 2023
Report Number : 2739902-1

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing <i>Legionella</i> spp.	CFU/L	-	-	Not Detected**	Not Detected	ISO 11731 (2017)	Bangkok
Standard Plate Count	CFU/100mL	-	-	<1	No Standard	Standard Methods for the Examination of Water and Wastewater, 23rd ed., 2017, pp. 1015 D	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bactere not found in agar plate.

Sampling By : Thanwa Jariya

Remarks :
- LOD : Limit of Detection
- "c" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

This above results are valid only for the analyzed/checked sample(s). It is intended for information only and does not constitute a warranty. The results are not to be used without written consent from the Laboratory. ALS Laboratory Group (Thailand) Private Public Partnership. This report is not reproduced except in full.

Approved by



Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามารวมศูนย์ศึกษาวิจัยและบำบัด

Project Location :

Lot ID: 2378198

Date Received : Jul 11, 2023

Date Reported : Jul 29, 2023

Report Number : 2730903-1

Page 1 of 1

Sample Number	2378198-2						
Sampled Date	Jul 11, 2023 9:30 AM						
Sample Description	Consumption Water						
Location	อาคารศูนย์การเย็นน้ำ - น้ำเข้า Cooling Tower						
Date Analysis Commenced	Jul 12, 2023						
Condition of Sample	Contained in three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
<i>Legionella spp.</i>	CFU/L	-	-	Not Detected**	Not Detected	ISO 11731 (2017)	Bangkok
Standard Plate Count	CFU/100mL	-	-	95	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

Scientist (3)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\All_GL.rpt (3:04PM)



Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามารวมศูนย์ศึกษาวิจัยและบำบัด

Project Location :

Lot ID: 2378198

Date Received : Jul 11, 2023

Date Reported : Jul 29, 2023

Report Number : 2730904-1

Page 1 of 1

Sample Number	2378198-3						
Sampled Date	Jul 11, 2023 10:00 AM						
Sample Description	Consumption Water						
Location	อาคารพรีคติน้ำ - น้ำเข้า Cooling Tower						
Date Analysis Commenced	Jul 12, 2023						
Condition of Sample	Contained in three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
<i>Legionella spp.</i>	CFU/L	-	-	Not Detected**	Not Detected	ISO 11731 (2017)	Bangkok
Standard Plate Count	CFU/100mL	-	-	>200	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

Scientist (3)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\All_GL.rpt (3:04PM)



Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามาธิบดีจังหวัดนครราชสีมา

Project Location :

Sample Number 2378198-4
Sampled Date Jul 11, 2023 11:00 AM
Sample Description Consumption Water
Location อาคารสารานุกรมโลก - น้ำในบ่อ Cooling Tower ที่สระวันออก
Date Analysis Commenced Jul 12, 2023
Condition of Sample Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.02	≤0.3	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Microbiological Testing							
<i>Legionella spp.</i> *	CFU/L	-	-	Not Detected**	No Standard	ISO 11731 (2017)	Bangkok
Standard Plate Count *	CFU/100mL	-	-	>200	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok
Water Testing							
Ammonium *	mg/L	-	0.06	<0.06	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 F	Bangkok
Chloride as Cl	mg/L	0.06	0.2	548	≤250	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Conductivity at 25 degree C *	micromhos/cm	-	0.5	2741	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Bangkok
Methyl Orange Alkalinity as CaCO3 *	mg/L	-	1	243	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Bangkok
pH at 25 degree C	-	-	-	8.8	6.5-8.5	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Silica as SiO2 *	mg/L	0.02	0.05	60.8	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO2 (D)	Bangkok

Approved by

Scientist (3)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\All_GL.rpt (3:05PM)



Accreditation No. 1031/47

Lot ID: 2378198

Date Received : Jul 11, 2023

Date Reported : Jul 29, 2023

Report Number : 2730905-1



Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามาธิบดีจังหวัดนครราชสีมา

Project Location :

Sample Number 2378198-4
Sampled Date Jul 11, 2023 11:00 AM
Sample Description Consumption Water
Location อาคารสารานุกรมโลก - น้ำในบ่อ Cooling Tower ที่สระวันออก
Date Analysis Commenced Jul 12, 2023
Condition of Sample Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfate	mg/L	0.15	0.5	434	≤250	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Sulfide as H2S *	mg/L	-	0.01	0.02	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (D)	Bangkok
Total Hardness as CaCO3	mg/L	-	1	533	≤300	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C, 2340 C	Bangkok

Guideline : เกณฑ์คุณภาพน้ำประปาดื่มได้ ประกาศ กรมอนามัย พ.ศ. 2563

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Approved by

Scientist (3)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\All_GL.rpt (3:05PM)



Accreditation No. 1031/47

Lot ID: 2378198

Date Received : Jul 11, 2023

Date Reported : Jul 29, 2023

Report Number : 2730905-1



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจักษุณดินทร์

Project Location:

Lot ID: 2378198

Date Received : Jul 11, 2023

Date Reported : Jul 29, 2023

Report Number : 2730906-1

Page 1 of 2

Sample Number	2378198-5
Sampled Date	Jul 11, 2023 10:55 AM
Sample Description	Consumption Water
Location	อาคารสารณูปโภค - น้ำในบ่อ Cooling Tower ที่ตตะวันตก
Date Analysis Commenced	Jul 12, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.02	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Microbiological Testing							
<i>Legionella spp. *</i>	CFU/L	-	-	Not Detected**	Not Detected	ISO 11731 (2017)	Bangkok
Standard Plate Count *	CFU/100mL	-	-	>200	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok
Water Testing							
Ammonium *	mg/L	-	0.06	<0.06	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 F	Bangkok
Chloride as Cl	mg/L	0.06	0.2	549	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Conductivity at 25 degree C *	micromhos/cm	-	0.5	2784	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Bangkok
Methyl Orange Alkalinity as CaCO3 *	mg/L	-	1	243	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Bangkok
pH at 25 degree C	-	-	-	8.7	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Silica as SiO2 *	mg/L	0.02	0.05	62.3	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO2 (D)	Bangkok

Approved by

Scientist (3)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\All_GL.rpt (3:05PM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจักษุณดินทร์

Project Location:

Lot ID: 2378198

Date Received : Jul 11, 2023

Date Reported : Jul 29, 2023

Report Number : 2730906-1

Page 2 of 2

Sample Number	2378198-5
Sampled Date	Jul 11, 2023 10:55 AM
Sample Description	Consumption Water
Location	อาคารสารณูปโภค - น้ำในบ่อ Cooling Tower ที่ตตะวันตก
Date Analysis Commenced	Jul 12, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfate	mg/L	0.15	0.5	834	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Sulfide as H2S *	mg/L	-	0.01	0.02	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (D)	Bangkok
Total Hardness as CaCO3	mg/L	-	1	571	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C, 2340 C	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Approved by

Scientist (3)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\All_GL.rpt (3:05PM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามารักษ์ตึกจักษุณตมรินทร์

Project Location :

Lot ID: 2378198

Date Received : Jul 11, 2023

Date Reported : Jul 29, 2023

Report Number : 2730907-1

Page 1 of 2

Sample Number	2378198-6
Sampled Date	Jul 11, 2023 9:45 AM
Sample Description	Consumption Water
Location	อาคารศูนย์การเรียนรู้ - น้ำในบ่อ Cooling Tower ที่ตึกวันออก
Date Analysis Commenced	Jul 12, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.10	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Microbiological Testing							
<i>Legionella spp. *</i>	CFU/L	-	-	Not Detected**	Not Detected	ISO 11731 (2017)	Bangkok
Standard Plate Count *	CFU/100mL	-	-	>200	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok
Water Testing							
Ammonium *	mg/L	-	0.06	<0.06	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 F	Bangkok
Chloride as Cl	mg/L	0.06	0.2	150	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Conductivity at 25 degree C *	micromhos/cm	-	0.5	866	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Bangkok
Methyl Orange Alkalinity as CaCO3 *	mg/L	-	1	116	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Bangkok
pH at 25 degree C	-	-	-	8.8	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Silica as SiO2 *	mg/L	0.02	0.05	17.1	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO2 (D)	Bangkok

Approved by

Sitichok Inonguen
Scientist (3)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\All_GL.rpt (3:06PM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามารักษ์ตึกจักษุณตมรินทร์

Project Location :

Lot ID: 2378198

Date Received : Jul 11, 2023

Date Reported : Jul 29, 2023

Report Number : 2730907-1

Page 2 of 2

Sample Number	2378198-6
Sampled Date	Jul 11, 2023 9:45 AM
Sample Description	Consumption Water
Location	อาคารศูนย์การเรียนรู้ - น้ำในบ่อ Cooling Tower ที่ตึกวันออก
Date Analysis Commenced	Jul 12, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfate	mg/L	0.15	0.5	101	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Sulfide as H2S *	mg/L	-	0.01	0.01	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (D)	Bangkok
Total Hardness as CaCO3	mg/L	-	1	189	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C, 2340 C	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Approved by

Scientist (3)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\All_GL.rpt (3:06PM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามารักษ์ตึกจักษุณตมรินทร์

Project Location :

Lot ID: 2378198

Date Received : Jul 11, 2023

Date Reported : Jul 29, 2023

Report Number : 2730908-1

Page 1 of 2

Sample Number	2378198-7						
Sampled Date	Jul 11, 2023 9:40 AM						
Sample Description	Consumption Water						
Location	อาคารศูนย์การเรียนรู้ - น้ำในบ่อ Cooling Tower ทิศตะวันตก						
Date Analysis Commenced	Jul 12, 2023						
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.05	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Microbiological Testing							
<i>Legionella spp.</i> *	CFU/L	-	-	Not Detected**	Not Detected	ISO 11731 (2017)	Bangkok
Standard Plate Count *	CFU/100mL	-	-	>200	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok
Water Testing							
Ammonium *	mg/L	-	0.06	<0.06	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 F	Bangkok
Chloride as Cl	mg/L	0.06	0.2	955	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Conductivity at 25 degree C *	micromhos/cm	-	0.5	4012	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Bangkok
Methyl Orange Alkalinity as CaCO3 *	mg/L	-	1	354	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Bangkok
pH at 25 degree C	-	-	-	8.8	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Silica as SiO2 *	mg/L	0.02	0.05	66.8	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO2 (D)	Bangkok

Approved by

Scientist (3)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\All_GL.rpt (3:07PM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามารักษ์ตึกจักษุณตมรินทร์

Project Location :

Lot ID: 2378198

Date Received : Jul 11, 2023

Date Reported : Jul 29, 2023

Report Number : 2730908-1

Page 2 of 2

Sample Number	2378198-7						
Sampled Date	Jul 11, 2023 9:40 AM						
Sample Description	Consumption Water						
Location	อาคารศูนย์การเรียนรู้ - น้ำในบ่อ Cooling Tower ทิศตะวันตก						
Date Analysis Commenced	Jul 12, 2023						
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfate	mg/L	0.15	0.5	542	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Sulfide as H2S *	mg/L	-	0.01	0.01	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (D)	Bangkok
Total Hardness as CaCO3	mg/L	-	1	713	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C, 2340 C	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The Laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Approved by

Scientist (3)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\All_GL.rpt (3:07PM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามาธิบดีจักษุณตมดินทร์

Project Location :

Lot ID: 2378198

Date Received : Jul 11, 2023

Date Reported : Jul 29, 2023

Report Number : 2730909-1

Page 1 of 2

Sample Number	2378198-8
Sampled Date	Jul 11, 2023 10:20 AM
Sample Description	Consumption Water
Location	อาคารพรีคลินิก - น้ำในบ่อ Cooling Tower ภาที่ 1
Date Analysis Commenced	Jul 12, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.17	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Microbiological Testing							
<i>Legionella spp. *</i>	CFU/L	-	-	Not Detected**	Not Detected	ISO 11731 (2017)	Bangkok
Standard Plate Count *	CFU/100mL	-	-	>200	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok
Water Testing							
Ammonium *	mg/L	-	0.06	<0.06	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 F	Bangkok
Chloride as Cl	mg/L	0.06	0.2	84.4	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Conductivity at 25 degree C *	micromhos/cm	-	0.5	661	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Bangkok
Methyl Orange Alkalinity as CaCO3 *	mg/L	-	1	96	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Bangkok
pH at 25 degree C	-	-	-	8.4	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Silica as SiO2 *	mg/L	0.02	0.05	15.2	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO2 (D)	Bangkok

Approved by

Scientist (3)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\All_GL.rpt (3:07PM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามาธิบดีจักษุณตมดินทร์

Project Location :

Lot ID: 2378198

Date Received : Jul 11, 2023

Date Reported : Jul 29, 2023

Report Number : 2730909-1

Page 2 of 2

Sample Number	2378198-8
Sampled Date	Jul 11, 2023 10:20 AM
Sample Description	Consumption Water
Location	อาคารพรีคลินิก - น้ำในบ่อ Cooling Tower ภาที่ 1
Date Analysis Commenced	Jul 12, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfate	mg/L	0.15	0.5	91.4	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Sulfide as H2S *	mg/L	-	0.01	0.01	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (D)	Bangkok
Total Hardness as CaCO3	mg/L	-	1	29	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C, 2340 C	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The Laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Approved by

Scientist (3)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\All_GL.rpt (3:07PM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจัดจั่นถนนดินทร์

Project Location:

Lot ID: 2378198

Date Received : Jul 11, 2023

Date Reported : Jul 29, 2023

Report Number : 2730910-1

Page 1 of 2

Sample Number	2378198-9
Sampled Date	Jul 11, 2023 10:15 AM
Sample Description	Consumption Water
Location	อาคารพรีคลินิกฯ - น้ำในบ่อ Cooling Tower ภาที่ 2
Date Analysis Commenced	Jul 12, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.61	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Microbiological Testing							
<i>Legionella spp. *</i>	CFU/L	-	-	Not Detected**	Not Detected	ISO 11731 (2017)	Bangkok
Standard Plate Count *	CFU/100mL	-	-	>200	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok
Water Testing							
Ammonium *	mg/L	-	0.06	<0.06	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 F	Bangkok
Chloride as Cl	mg/L	0.06	0.2	192	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Conductivity at 25 degree C *	micromhos/cm	-	0.5	1332	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Bangkok
Methyl Orange Alkalinity as CaCO3 *	mg/L	-	1	207	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Bangkok
pH at 25 degree C	-	-	-	8.8	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Silica as SiO2 *	mg/L	0.02	0.05	28.9	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO2 (D)	Bangkok

Approved by

Sithichok Thongnuean
Scientist (3)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\All_GL.rpt (3:07PM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจัดจั่นถนนดินทร์

Project Location:

Lot ID: 2378198

Date Received : Jul 11, 2023

Date Reported : Jul 29, 2023

Report Number : 2730910-1

Page 2 of 2

Sample Number	2378198-9
Sampled Date	Jul 11, 2023 10:15 AM
Sample Description	Consumption Water
Location	อาคารพรีคลินิกฯ - น้ำในบ่อ Cooling Tower ภาที่ 2
Date Analysis Commenced	Jul 12, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfate	mg/L	0.15	0.5	177	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Sulfide as H2S *	mg/L	-	0.01	0.01	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (D)	Bangkok
Total Hardness as CaCO3	mg/L	-	1	95	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C, 2340 C	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The Laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Approved by

Scientist (3)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\All_GL.rpt (3:07PM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามารักษ์ตึกจักษุณตมรินทร์

Project Location:

Lot ID: 2378198

Date Received : Jul 11, 2023

Date Reported : Jul 29, 2023

Report Number : 2730911-1

Page 1 of 2

Sample Number	2378198-10
Sampled Date	Jul 11, 2023 10:10 AM
Sample Description	Consumption Water
Location	อาคารพรีคลินิก - น้ำในบ่อ Cooling Tower ภาที่ 3
Date Analysis Commenced	Jul 12, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.24	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Microbiological Testing							
<i>Legionella spp. *</i>	CFU/L	-	-	Not Detected**	Not Detected	ISO 11731 (2017)	Bangkok
Standard Plate Count *	CFU/100mL	-	-	>200	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok
Water Testing							
Ammonium *	mg/L	-	0.06	<0.06	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 F	Bangkok
Chloride as Cl	mg/L	0.06	0.2	177	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Conductivity at 25 degree C *	micromhos/cm	-	0.5	829	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Bangkok
Methyl Orange Alkalinity as CaCO3 *	mg/L	-	1	121	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Bangkok
pH at 25 degree C	-	-	-	8.8	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Silica as SiO2 *	mg/L	0.02	0.05	18.4	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO2 (D)	Bangkok

Approved by

Scientist (3)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\All_GL.rpt (3:08PM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามารักษ์ตึกจักษุณตมรินทร์

Project Location:

Lot ID: 2378198

Date Received : Jul 11, 2023

Date Reported : Jul 29, 2023

Report Number : 2730911-1

Page 2 of 2

Sample Number	2378198-10
Sampled Date	Jul 11, 2023 10:10 AM
Sample Description	Consumption Water
Location	อาคารพรีคลินิก - น้ำในบ่อ Cooling Tower ภาที่ 3
Date Analysis Commenced	Jul 12, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfate	mg/L	0.15	0.5	112	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Sulfide as H2S *	mg/L	-	0.01	<0.01	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (D)	Bangkok
Total Hardness as CaCO3	mg/L	-	1	59	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C, 2340 C	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Approved by

Scientist (3)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\All_GL.rpt (3:08PM)



Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามาธิบดีจักรีนฤเบศร

Project Location :

Sample Number 2378198-11
Sampled Date Jul 11, 2023 10:50 AM
Sample Description Consumption Water
Location อาคารสารณูปโภค - น้ำที่ระบายออกจาก Cooling Tower
Date Analysis Commenced Jul 12, 2023
Condition of Sample Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.03	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Microbiological Testing							
<i>Legionella spp.</i> *	CFU/L	-	-	Not Detected**	Not Detected	ISO 11731 (2017)	Bangkok
Standard Plate Count *	CFU/100mL	-	-	>200	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok
Water Testing							
Ammonium *	mg/L	-	0.06	<0.06	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 F	Bangkok
Chloride as Cl	mg/L	0.06	0.2	577	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Conductivity at 25 degree C *	micromhos/cm	-	0.5	2764	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Bangkok
Methyl Orange Alkalinity as CaCO3 *	mg/L	-	1	233	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Bangkok
pH at 25 degree C	-	-	-	8.8	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Silica as SiO2 *	mg/L	0.02	0.05	61.4	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO2 (D)	Bangkok

Approved by

Scientist (3)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\All_GL.rpt (3:11PM)



Accreditation No. 1031/47

Lot ID: 2378198

Date Received : Jul 11, 2023

Date Reported : Jul 29, 2023

Report Number : 2730912-1



Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามาธิบดีจักรีนฤเบศร

Project Location :

Sample Number 2378198-11
Sampled Date Jul 11, 2023 10:50 AM
Sample Description Consumption Water
Location อาคารสารณูปโภค - น้ำที่ระบายออกจาก Cooling Tower
Date Analysis Commenced Jul 12, 2023
Condition of Sample Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfate	mg/L	0.15	0.5	452	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Sulfide as H2S *	mg/L	-	0.01	0.01	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (D)	Bangkok
Total Hardness as CaCO3	mg/L	-	1	551	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C, 2340 C	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The Laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Approved by

Scientist (3)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\All_GL.rpt (3:11PM)



Accreditation No. 1031/47

Lot ID: 2378198

Date Received : Jul 11, 2023

Date Reported : Jul 29, 2023

Report Number : 2730912-1



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจักษุณดินทร์

Project Location :

Lot ID: 2378198

Date Received : Jul 11, 2023

Date Reported : Jul 29, 2023

Report Number : 2730913-1

Page 1 of 2

Sample Number	2378198-12
Sampled Date	Jul 11, 2023 9:35 AM
Sample Description	Consumption Water
Location	อาคารศูนย์การเรียนรู้ - น้ำที่ระบายออกจาก Cooling Tower
Date Analysis Commenced	Jul 12, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.03	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Microbiological Testing							
<i>Legionella spp. *</i>	CFU/L	-	-	Not Detected**	Not Detected	ISO 11731 (2017)	Bangkok
Standard Plate Count *	CFU/100mL	-	-	>200	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok
Water Testing							
Ammonium *	mg/L	-	0.06	<0.06	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 F	Bangkok
Chloride as Cl	mg/L	0.06	0.2	1019	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Conductivity at 25 degree C *	micromhos/cm	-	0.5	4039	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Bangkok
Methyl Orange Alkalinity as CaCO3 *	mg/L	-	1	364	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Bangkok
pH at 25 degree C	-	-	-	8.9	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Silica as SiO2 *	mg/L	0.02	0.05	67.1	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO2 (D)	Bangkok

Approved by

Scientist (3)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\All_GL.rpt (3:11PM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจักษุณดินทร์

Project Location :

Lot ID: 2378198

Date Received : Jul 11, 2023

Date Reported : Jul 29, 2023

Report Number : 2730913-1

Page 2 of 2

Sample Number	2378198-12
Sampled Date	Jul 11, 2023 9:35 AM
Sample Description	Consumption Water
Location	อาคารศูนย์การเรียนรู้ - น้ำที่ระบายออกจาก Cooling Tower
Date Analysis Commenced	Jul 12, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfate	mg/L	0.15	0.5	577	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Sulfide as H2S *	mg/L	-	0.01	<0.01	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (D)	Bangkok
Total Hardness as CaCO3	mg/L	-	1	731	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C, 2340 C	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The Laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Approved by

Scientist (3)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\All_GL.rpt (3:11PM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจักษุณดินทร์

Project Location :

Lot ID: 2378198

Date Received : Jul 11, 2023

Date Reported : Jul 29, 2023

Report Number : 2730914-1

Page 1 of 2

Sample Number	2378198-13
Sampled Date	Jul 11, 2023 12:05 AM
Sample Description	Consumption Water
Location	อาคารพรีคลินิก - น้ำที่ระบายออกจาก Cooling Tower
Date Analysis Commenced	Jul 12, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.50	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Microbiological Testing							
<i>Legionella spp. *</i>	CFU/L	-	-	Not Detected**	Not Detected	ISO 11731 (2017)	Bangkok
Standard Plate Count *	CFU/100mL	-	-	>200	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok
Water Testing							
Ammonium *	mg/L	-	0.06	<0.06	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 F	Bangkok
Chloride as Cl	mg/L	0.06	0.2	228	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Conductivity at 25 degree C *	micromhos/cm	-	0.5	1310	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Bangkok
Methyl Orange Alkalinity as CaCO3 *	mg/L	-	1	202	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Bangkok
pH at 25 degree C	-	-	-	8.9	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Silica as SiO2 *	mg/L	0.02	0.05	28.0	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO2 (D)	Bangkok

Approved by

Scientist (3)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\All_GL.rpt (3:12PM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจักษุณดินทร์

Project Location :

Lot ID: 2378198

Date Received : Jul 11, 2023

Date Reported : Jul 29, 2023

Report Number : 2730914-1

Page 2 of 2

Sample Number	2378198-13
Sampled Date	Jul 11, 2023 12:05 AM
Sample Description	Consumption Water
Location	อาคารพรีคลินิก - น้ำที่ระบายออกจาก Cooling Tower
Date Analysis Commenced	Jul 12, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfate	mg/L	0.15	0.5	207	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Sulfide as H2S *	mg/L	-	0.01	<0.01	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (D)	Bangkok
Total Hardness as CaCO3	mg/L	-	1	94	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C, 2340 C	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The Laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Approved by

Scientist (3)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\All_GL.rpt (3:12PM)

5.3 คุณภาพน้ำหอผึ่งเย็น

1) ผลการตรวจวิเคราะห์

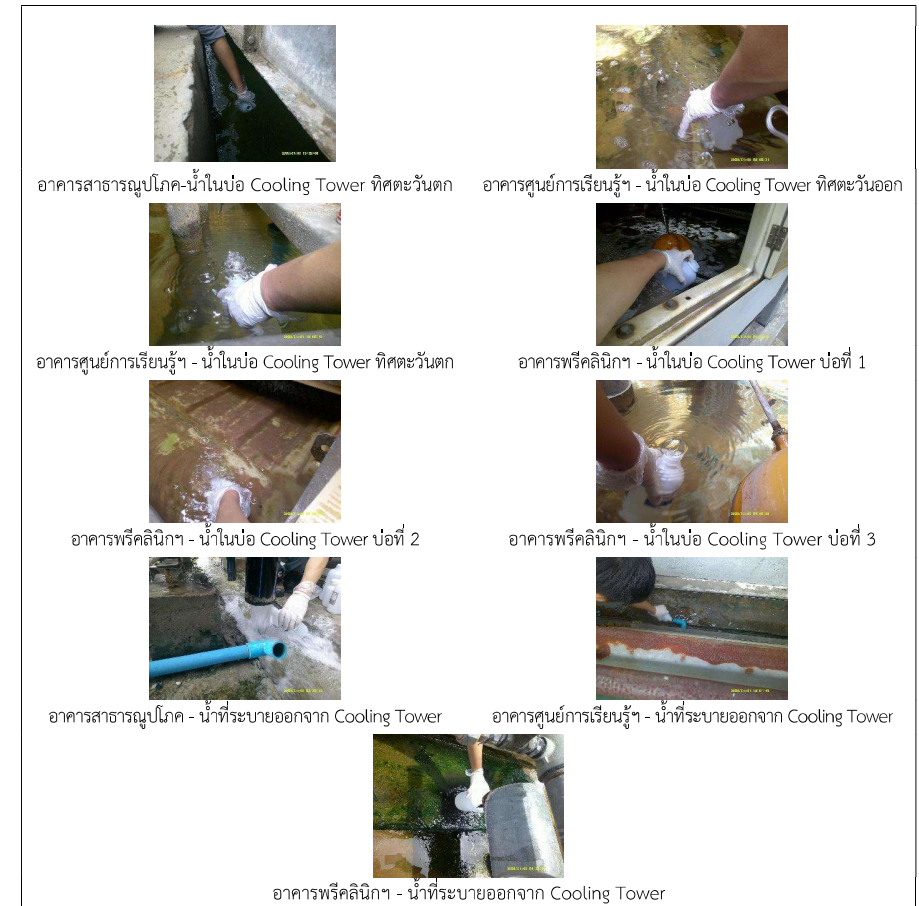
จากการตรวจวิเคราะห์คุณภาพน้ำหอผึ่งเย็น ในวันที่ 6 ตุลาคม พ.ศ. 2566 จำนวน 13 สถานี แสดงดังภาพที่ 3 และรายละเอียดผลการตรวจวิเคราะห์แสดงดังตารางที่ 6

2) สรุปผลการตรวจวิเคราะห์

เมื่อนำผลการตรวจวิเคราะห์น้ำหอผึ่งเย็นของทั้ง 13 สถานี มาเปรียบเทียบกับประกาศกรมอนามัย เรื่อง ข้อปฏิบัติการควบคุมเชื้อสลิโมเนลลาในหอผึ่งเย็นของอาคารในประเทศไทย พบว่า ทุกสถานีที่ทำการตรวจวิเคราะห์คุณภาพน้ำหอผึ่งเย็นมีค่า *Legionella spp.* อยู่ในเกณฑ์มาตรฐานดังกล่าวกำหนด



ภาพที่ 3 แสดงการเก็บตัวอย่างคุณภาพน้ำหอผึ่งเย็น



ภาพที่ 3 (ต่อ) แสดงการเก็บตัวอย่างคุณภาพน้ำหอผึ่งเย็น

ตารางที่ 6 สรุปผลการตรวจวิเคราะห์คุณภาพน้ำหอผึ่งเย็น

พารามิเตอร์	หน่วย	ผลการตรวจวิเคราะห์				มาตรฐาน
		อาคารสารอุปโภค-น้ำเข้า Cooling Tower	อาคารสารอุปโภค-น้ำในบ่อ Cooling Tower ทิศตะวันออก	อาคารสารอุปโภค-น้ำในบ่อ Cooling Tower ทิศตะวันตก	อาคารสารอุปโภค-น้ำที่ระบายออกจาก Cooling Tower	
<u>Metals Testing</u>						
<i>Legionella spp.</i>	CFU/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Standard Plate Count	CFU/mL	<1	>200	>200	>200	-
<u>Metals Testing</u>						
Iron	mg/L	-	Not Detected	Not Detected	<0.005	-
<u>Water Testing</u>						
Ammonium	mg/L	-	<0.06	<0.06	<0.06	-
Chloride	mg/L	-	253	256	258	-
Conductivity	micromhos/cm	-	1,746	1,755	1,759	-
Methyl Orange Alkalinity	mg/L	-	101	126	187	-
pH	mg/L	-	8.4	8.8	8.8	-
Silica	mg/L	-	63.4	63.8	64.1	-
Sulfate	mg/L	-	2,031	2,054	236	-
Sulfide	mg/L	-	<0.01	<0.01	<0.01	-
Total Hardness	mg/L	-	335	349	345	-

มาตรฐาน : ประกาศกรมอนามัย เรื่อง ข้อปฏิบัติการควบคุมเชื้อสิจิโณเนลลาในหอผึ่งเย็นของอาคารในประเทศไทย

หมายเหตุ : Not Detected = ไม่สามารถตรวจพบได้ ตามวิธีการตรวจสอบที่กำหนด

ตารางที่ 6 (ต่อ) สรุปผลการตรวจวิเคราะห์คุณภาพน้ำหอผึ่งเย็น

พารามิเตอร์	หน่วย	ผลการตรวจวิเคราะห์				มาตรฐาน
		อาคารศูนย์การเรียนรู้ – น้ำเข้า Cooling Tower	อาคารศูนย์การเรียนรู้ – น้ำในบ่อ Cooling Tower ทิศตะวันออก	อาคารศูนย์การเรียนรู้ – น้ำในบ่อ Cooling Tower ทิศตะวันตก	อาคารศูนย์การเรียนรู้ – น้ำที่ระบายออกจาก Cooling Tower	
<u>Microbiological Testing</u>						
<i>Legionella spp.</i>	CFU/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Standard Plate Count	CFU/mL	>200	>200	>200	>200	-
<u>Metals Testing</u>						
Iron	mg/L	-	0.06	0.04	0.10	-
<u>Water Testing</u>						
Ammonium	mg/L	-	<0.06	<0.06	<0.06	-
Chloride	mg/L	-	40.0	40.3	44.4	-
Conductivity	micromhos/cm	-	421	431	456	-
Methyl Orange Alkalinity	mg/L	-	51	106	56	-
pH	mg/L	-	8.4	8.2	8.5	-
Silica	mg/L	-	14.0	12.7	16.8	-
Sulfate	mg/L	-	43.8	43.6	50.1	-
Sulfide	mg/L	-	<0.01	<0.01	<0.01	-
Total Hardness	mg/L	-	96	132	73	-

มาตรฐาน : ประกาศกรมอนามัย เรื่อง ข้อปฏิบัติการควบคุมเชื้อสิจิโณเนลลาในหอผึ่งเย็นของอาคารในประเทศไทย

หมายเหตุ : ND (Not Detected) หมายถึง ไม่สามารถตรวจพบได้ ตามวิธีการตรวจสอบที่กำหนด

ตารางที่ 6 (ต่อ) สรุปผลการตรวจวิเคราะห์คุณภาพน้ำหอผึ่งเย็น

พารามิเตอร์	หน่วย	ผลการตรวจวิเคราะห์					มาตรฐาน
		อาคารพรีคลีนิกฯ - น้ำเข้า Cooling Tower	อาคารพรีคลีนิกฯ - น้ำในบ่อ Cooling Tower บ่อที่ 1	อาคารพรีคลีนิกฯ - น้ำในบ่อ Cooling Tower บ่อที่ 2	อาคารพรีคลีนิกฯ - น้ำในบ่อ Cooling Tower บ่อที่ 3	อาคารพรีคลีนิกฯ - น้ำที่ระบายออกจาก Cooling Tower	
Microbiological Testing <i>Legionella</i> spp.	CFU/L	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Stadard Plate Count	CFU/mL	>200	>200	>200	>200	>200	-
Metals Testing Iron	mg/L	-	0.09	0.02	0.03	0.09	-
Water Testing Ammonium	mg/L	-	<0.06	<0.06	<0.06	<0.06	-
Chloride	mg/L	-	111	25.8	30.4	113	-
Conductivity	micromhos/cm	-	988	287	326	992	-
Methyl Orange Alkalinity	mg/L	-	137	51	20	162	-
pH	mg/L	-	8.8	8.1	8.2	8.8	-
Silica	mg/L	-	37.3	13.4	14.1	36.6	-
Sulfate	mg/L	-	109	35.0	40.1	107	-
Sulfide	mg/L	-	<0.01	<0.01	<0.01	<0.01	-
Total Hardness	mg/L	-	35	9	13	36	-

มาตรฐาน : ประกาศกรมอนามัย เรื่อง ข้อปฏิบัติการควบคุมเชื้อสัณฐานในหอผึ่งเย็นของอาคารในประเทศไทย

หมายเหตุ : ND (Not Detected) หมายถึง ไม่สามารถตรวจพบได้ ตามวิธีการตรวจสอบที่กำหนด

ahsglobal.com



Analysis / Test Report

Client : Chulabhornabodindra Medical Institute, Faculty of Medicine Ramathubod Hospital, Mahidol University
111 Moo 14, Bang Phli, Bang Phli, Samutprakarn Thailand 10540
P/O : ศิริกานต์/00772566(QNH)
Project Name : โรงพ่นยาสมุนไพรจีนตั้งศูนย์แพทย์
Project Location :

Lot ID: 23116714
Date Received : Oct 06, 2023
Date Reported : Oct 25, 2023
Report Number : 2815356-1

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing <i>Legionella</i> spp.	CFU/L	-	-	Not Detected**	Not Detected	ISO 11731 (2017)	Bangkok
Standard Plate Count	CFU/100mL	-	-	<1	No Standard	Standard Methods for the Examination of Water and Wastewater, 23rd ed., 2017, pp. 1015 D	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remarks :

- LOD : Limit of Detection
- <1 : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

This above results are valid only for the analyzed/checked sample(s). It is intended in the laboratory for information only. The results are not to be used for legal or regulatory purposes without written consent from the Laboratory. ALS Laboratory Group (Thailand) Private Limited. The report is not reproduced except in full.

Approved by





Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจังหวัดกรุงเทพมหานคร

Project Location :

Lot ID: 23116714

Date Received : Oct 06, 2023

Date Reported : Oct 25, 2023

Report Number : 2815357-1

Page 1 of 1

Sample Number	23116714-2						
Sampled Date	Oct 06, 2023 12:00 PM						
Sample Description	Consumption Water						
Location	อาคารศูนย์การเรียนรู้ - น้ำเข้า Cooling Tower						
Date Analysis Commenced	Oct 07, 2023						
Condition of Sample	Contained in three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
<i>Legionella spp.</i>	CFU/L	-	-	Not Detected**	Not Detected	ISO 11731 (2017)	Bangkok
Standard Plate Count	CFU/100mL	-	-	>200	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

Section Head

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\AIL_GL_rpt (10:09AM)



Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจังหวัดกรุงเทพมหานคร

Project Location :

Lot ID: 23116714

Date Received : Oct 06, 2023

Date Reported : Oct 25, 2023

Report Number : 2815358-1

Page 1 of 1

Sample Number	23116714-3						
Sampled Date	Oct 06, 2023 1:00 PM						
Sample Description	Consumption Water						
Location	อาคารพรีคลินิก - น้ำเข้า Cooling Tower						
Date Analysis Commenced	Oct 07, 2023						
Condition of Sample	Contained in three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Microbiological Testing							
<i>Legionella spp.</i>	CFU/L	-	-	Not Detected**	Not Detected	ISO 11731 (2017)	Bangkok
Standard Plate Count	CFU/100mL	-	-	>200	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)

Approved by

Section Head

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\AIL_GL_rpt (10:09AM)



Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจักษุณตมดินทร์

Project Location:



Accreditation No. 1031/47

Lot ID: 23116714

Date Received : Oct 06, 2023

Date Reported : Oct 25, 2023

Report Number : 2815359-1

Sample Number	23116714-4
Sampled Date	Oct 06, 2023 10:45 AM
Sample Description	Consumption Water
Location	อาคารสารานุกรมโลก - น้ำในบ่อ Cooling Tower ที่ตมดินทร์
Date Analysis Commenced	Oct 07, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Page 1 of 2

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Microbiological Testing							
<i>Legionella spp. *</i>	CFU/L	-	-	Not Detected**	No Standard	ISO 11731 (2017)	Bangkok
Standard Plate Count *	CFU/100mL	-	-	>200	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok
Water Testing							
Ammonium *	mg/L	-	0.06	<0.06	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 F	Bangkok
Chloride as Cl	mg/L	0.06	0.2	253	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Conductivity at 25 degree C *	micromhos/cm	-	0.5	1746	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Bangkok
Methyl Orange Alkalinity as CaCO3 *	mg/L	-	1	101	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Bangkok
pH at 25 degree C	-	-	-	8.4	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Silica as SiO2 *	mg/L	0.02	0.05	63.4	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO2 (D)	Bangkok

Approved by

Section Head

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\AIL_GL_rpt (10:09AM)



Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจักษุณตมดินทร์

Project Location:



Accreditation No. 1031/47

Lot ID: 23116714

Date Received : Oct 06, 2023

Date Reported : Oct 25, 2023

Report Number : 2815359-1

Sample Number	23116714-4
Sampled Date	Oct 06, 2023 10:45 AM
Sample Description	Consumption Water
Location	อาคารสารานุกรมโลก - น้ำในบ่อ Cooling Tower ที่ตมดินทร์
Date Analysis Commenced	Oct 07, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Page 2 of 2

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfate	mg/L	0.15	0.5	2031	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Sulfide as H2S *	mg/L	-	0.01	<0.01	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (D)	Bangkok
Total Hardness as CaCO3	mg/L	-	1	335	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Approved by

Section Head

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\AIL_GL_rpt (10:09AM)



Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจักษุณตมดินทร์

Project Location:



Accreditation No. 1031/47

Lot ID: 23116714

Date Received : Oct 06, 2023

Date Reported : Oct 25, 2023

Report Number : 2815360-1

Sample Number	23116714-5
Sampled Date	Oct 06, 2023 10:40 AM
Sample Description	Consumption Water
Location	อาคารสารานุกรมโลก - น้ำในบ่อ Cooling Tower ที่ตมดินทร์
Date Analysis Commenced	Oct 07, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Page 1 of 2

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	Not Detected	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Microbiological Testing							
Legionella spp. *	CFU/L	-	-	Not Detected**	No Standard	ISO 11731 (2017)	Bangkok
Standard Plate Count *	CFU/100mL	-	-	>200	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok
Water Testing							
Ammonium *	mg/L	-	0.06	<0.06	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 F	Bangkok
Chloride as Cl	mg/L	0.06	0.2	256	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Conductivity at 25 degree C *	micromhos/cm	-	0.5	1755	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Bangkok
Methyl Orange Alkalinity as CaCO3 *	mg/L	-	1	126	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Bangkok
pH at 25 degree C	-	-	-	8.8	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Silica as SiO2 *	mg/L	0.02	0.05	63.8	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO2 (D)	Bangkok

Approved by

Section Head

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\AIL_GL_rpt (10:09AM)



Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจักษุณตมดินทร์

Project Location:



Accreditation No. 1031/47

Lot ID: 23116714

Date Received : Oct 06, 2023

Date Reported : Oct 25, 2023

Report Number : 2815360-1

Sample Number	23116714-5
Sampled Date	Oct 06, 2023 10:40 AM
Sample Description	Consumption Water
Location	อาคารสารานุกรมโลก - น้ำในบ่อ Cooling Tower ที่ตมดินทร์
Date Analysis Commenced	Oct 07, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Page 2 of 2

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfate	mg/L	0.15	0.5	2054	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Sulfide as H2S *	mg/L	-	0.01	<0.01	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (D)	Bangkok
Total Hardness as CaCO3	mg/L	-	1	349	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Approved by

Section Head

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\AIL_GL_rpt (10:09AM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจักษุณตมดินทร์

Project Location:

Lot ID: 23116714

Date Received : Oct 06, 2023

Date Reported : Oct 25, 2023

Report Number : 2815361-1

Page 1 of 2

Sample Number	23116714-6
Sampled Date	Oct 06, 2023 12:15 PM
Sample Description	Consumption Water
Location	อาคารศูนย์การเรียนรู้ - น้ำในบ่อ Cooling Tower ที่ตตะวันตก
Date Analysis Commenced	Oct 07, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.06	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Microbiological Testing							
<i>Legionella spp. *</i>	CFU/L	-	-	Not Detected**	Not Detected	ISO 11731 (2017)	Bangkok
Standard Plate Count *	CFU/100mL	-	-	>200	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok
Water Testing							
Ammonium *	mg/L	-	0.06	<0.06	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 F	Bangkok
Chloride as Cl	mg/L	0.06	0.2	40.0	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Conductivity at 25 degree C *	micromhos/cm	-	0.5	421	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Bangkok
Methyl Orange Alkalinity as CaCO3 *	mg/L	-	1	51	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Bangkok
pH at 25 degree C	-	-	-	8.4	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Silica as SiO2 *	mg/L	0.02	0.05	14.0	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO2 (D)	Bangkok

Approved by

Section Head

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\AIL_GL_rpt (10:10AM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจักษุณตมดินทร์

Project Location:

Lot ID: 23116714

Date Received : Oct 06, 2023

Date Reported : Oct 25, 2023

Report Number : 2815361-1

Page 2 of 2

Sample Number	23116714-6
Sampled Date	Oct 06, 2023 12:15 PM
Sample Description	Consumption Water
Location	อาคารศูนย์การเรียนรู้ - น้ำในบ่อ Cooling Tower ที่ตตะวันตก
Date Analysis Commenced	Oct 07, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfate	mg/L	0.15	0.5	43.8	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Sulfide as H2S *	mg/L	-	0.01	<0.01	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (D)	Bangkok
Total Hardness as CaCO3	mg/L	-	1	96	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Approved by

Section Head

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\AIL_GL_rpt (10:10AM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจักษุณดินทร์

Project Location:

Lot ID: 23116714

Date Received : Oct 06, 2023

Date Reported : Oct 25, 2023

Report Number : 2815362-1

Sample Number	23116714-7						
Sampled Date	Oct 06, 2023 12:10 PM						
Sample Description	Consumption Water						
Location	อาคารศูนย์การเรียนรู้ - น้ำในบ่อ Cooling Tower ทิศตะวันตก						
Date Analysis Commenced	Oct 07, 2023						
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Page 1 of 2

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.04	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Microbiological Testing							
<i>Legionella spp. *</i>	CFU/L	-	-	Not Detected**	Not Detected	ISO 11731 (2017)	Bangkok
Standard Plate Count *	CFU/100mL	-	-	>200	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok
Water Testing							
Ammonium *	mg/L	-	0.06	<0.06	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 F	Bangkok
Chloride as Cl	mg/L	0.06	0.2	40.3	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Conductivity at 25 degree C *	micromhos/cm	-	0.5	431	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Bangkok
Methyl Orange Alkalinity as CaCO3 *	mg/L	-	1	106	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Bangkok
pH at 25 degree C	-	-	-	8.2	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Silica as SiO2 *	mg/L	0.02	0.05	12.7	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO2 (D)	Bangkok

Approved by

Suwannee Chuamkeaw

Section Head

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\AIL_GL_rpt (10:10AM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจักษุณดินทร์

Project Location:

Lot ID: 23116714

Date Received : Oct 06, 2023

Date Reported : Oct 25, 2023

Report Number : 2815362-1

Sample Number	23116714-7						
Sampled Date	Oct 06, 2023 12:10 PM						
Sample Description	Consumption Water						
Location	อาคารศูนย์การเรียนรู้ - น้ำในบ่อ Cooling Tower ทิศตะวันตก						
Date Analysis Commenced	Oct 07, 2023						
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Page 2 of 2

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfate	mg/L	0.15	0.5	43.6	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Sulfide as H2S *	mg/L	-	0.01	<0.01	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (D)	Bangkok
Total Hardness as CaCO3	mg/L	-	1	132	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Approved by

Suwannee Chuamkeaw

Section Head

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\AIL_GL_rpt (10:10AM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจัดจลินถุณดินทร์

Project Location:

Lot ID: 23116714

Date Received : Oct 06, 2023

Date Reported : Oct 25, 2023

Report Number : 2815363-1

Sample Number	23116714-8						
Sampled Date	Oct 06, 2023 1:10 PM						
Sample Description	Consumption Water						
Location	อาคารพรีคลินิก - น้ำในภา Cooling Tower ภาที่ 1						
Date Analysis Commenced	Oct 07, 2023						
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Page 1 of 2

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.09	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Microbiological Testing							
<i>Legionella spp. *</i>	CFU/L	-	-	Not Detected**	Not Detected	ISO 11731 (2017)	Bangkok
Standard Plate Count *	CFU/100mL	-	-	>200	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok
Water Testing							
Ammonium *	mg/L	-	0.06	<0.06	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 F	Bangkok
Chloride as Cl	mg/L	0.06	0.2	111	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Conductivity at 25 degree C *	micromhos/cm	-	0.5	988	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Bangkok
Methyl Orange Alkalinity as CaCO3 *	mg/L	-	1	137	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Bangkok
pH at 25 degree C	-	-	-	8.8	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Silica as SiO2 *	mg/L	0.02	0.05	37.3	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO2 (D)	Bangkok

Approved by

Section Head

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports_All_GL_pt (10:10AM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจัดจลินถุณดินทร์

Project Location:

Lot ID: 23116714

Date Received : Oct 06, 2023

Date Reported : Oct 25, 2023

Report Number : 2815363-1

Sample Number	23116714-8						
Sampled Date	Oct 06, 2023 1:10 PM						
Sample Description	Consumption Water						
Location	อาคารพรีคลินิก - น้ำในภา Cooling Tower ภาที่ 1						
Date Analysis Commenced	Oct 07, 2023						
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Page 2 of 2

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfate	mg/L	0.15	0.5	109	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Sulfide as H2S *	mg/L	-	0.01	<0.01	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (D)	Bangkok
Total Hardness as CaCO3	mg/L	-	1	35	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Approved by

Section Head

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports_All_GL_pt (10:10AM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจักษุณตมดินทร์

Project Location:

Lot ID: 23116714

Date Received : Oct 06, 2023

Date Reported : Oct 25, 2023

Report Number : 2815364-1

Page 1 of 2

Sample Number	23116714-9
Sampled Date	Oct 06, 2023 1:20 PM
Sample Description	Consumption Water
Location	อาคารพรีคลินิก - น้ำในภา Cooling Tower ภาที่ 2
Date Analysis Commenced	Oct 07, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.02	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Microbiological Testing							
<i>Legionella spp. *</i>	CFU/L	-	-	Not Detected**	Not Detected	ISO 11731 (2017)	Bangkok
Standard Plate Count *	CFU/100mL	-	-	>200	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok
Water Testing							
Ammonium *	mg/L	-	0.06	<0.06	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 F	Bangkok
Chloride as Cl	mg/L	0.06	0.2	25.8	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Conductivity at 25 degree C *	micromhos/cm	-	0.5	287	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Bangkok
Methyl Orange Alkalinity as CaCO3 *	mg/L	-	1	51	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Bangkok
pH at 25 degree C	-	-	-	8.1	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Silica as SiO2 *	mg/L	0.02	0.05	13.4	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO2 (D)	Bangkok

Approved by

Section Head

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\AIL_GL_pt (10:10AM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจักษุณตมดินทร์

Project Location:

Lot ID: 23116714

Date Received : Oct 06, 2023

Date Reported : Oct 25, 2023

Report Number : 2815364-1

Page 2 of 2

Sample Number	23116714-9
Sampled Date	Oct 06, 2023 1:20 PM
Sample Description	Consumption Water
Location	อาคารพรีคลินิก - น้ำในภา Cooling Tower ภาที่ 2
Date Analysis Commenced	Oct 07, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfate	mg/L	0.15	0.5	35.0	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Sulfide as H2S *	mg/L	-	0.01	<0.01	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (D)	Bangkok
Total Hardness as CaCO3	mg/L	-	1	9	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Approved by

Section Head

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\AIL_GL_pt (10:10AM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามารักษ์ตึกจักษุณตมรินทร์

Project Location:

Lot ID: 23116714

Date Received : Oct 06, 2023

Date Reported : Oct 25, 2023

Report Number : 2815365-1

Page 1 of 2

Sample Number	23116714-10						
Sampled Date	Oct 06, 2023 1:15 PM						
Sample Description	Consumption Water						
Location	อาคารพรีคลินิก - น้ำในภา Cooling Tower ภาที่ 3						
Date Analysis Commenced	Oct 07, 2023						
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.03	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Microbiological Testing							
<i>Legionella spp. *</i>	CFU/L	-	-	Not Detected**	Not Detected	ISO 11731 (2017)	Bangkok
Standard Plate Count *	CFU/100mL	-	-	>200	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok
Water Testing							
Ammonium *	mg/L	-	0.06	<0.06	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 F	Bangkok
Chloride as Cl	mg/L	0.06	0.2	30.4	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Conductivity at 25 degree C *	micromhos/cm	-	0.5	326	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Bangkok
Methyl Orange Alkalinity as CaCO3 *	mg/L	-	1	20	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Bangkok
pH at 25 degree C	-	-	-	8.2	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Silica as SiO2 *	mg/L	0.02	0.05	14.1	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO2 (D)	Bangkok

Approved by

Section Head

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\AIL_GL_pt (10:10AM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามารักษ์ตึกจักษุณตมรินทร์

Project Location:

Lot ID: 23116714

Date Received : Oct 06, 2023

Date Reported : Oct 25, 2023

Report Number : 2815365-1

Page 2 of 2

Sample Number	23116714-10						
Sampled Date	Oct 06, 2023 1:15 PM						
Sample Description	Consumption Water						
Location	อาคารพรีคลินิก - น้ำในภา Cooling Tower ภาที่ 3						
Date Analysis Commenced	Oct 07, 2023						
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfate	mg/L	0.15	0.5	40.1	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Sulfide as H2S *	mg/L	-	0.01	<0.01	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (D)	Bangkok
Total Hardness as CaCO3	mg/L	-	1	13	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Approved by

Section Head

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\AIL_GL_pt (10:10AM)



Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามารักษ์ตึกจักษุณตมรินทร์

Project Location:



Accreditation No. 1031/47

Lot ID: 23116714

Date Received : Oct 06, 2023

Date Reported : Oct 25, 2023

Report Number : 2815366-1

Sample Number	23116714-11
Sampled Date	Oct 06, 2023 10:48 AM
Sample Description	Consumption Water
Location	อาคารสารณูปโภค - น้ำที่ระบายออกจาก Cooling Tower
Date Analysis Commenced	Oct 07, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Page 1 of 2

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	<0.005	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Microbiological Testing							
<i>Legionella spp. *</i>	CFU/L	-	-	Not Detected**	Not Detected	ISO 11731 (2017)	Bangkok
Standard Plate Count *	CFU/100mL	-	-	>200	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok
Water Testing							
Ammonium *	mg/L	-	0.06	<0.06	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 F	Bangkok
Chloride as Cl	mg/L	0.06	0.2	258	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Conductivity at 25 degree C *	micromhos/cm	-	0.5	1759	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Bangkok
Methyl Orange Alkalinity as CaCO3 *	mg/L	-	1	187	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Bangkok
pH at 25 degree C	-	-	-	8.8	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Silica as SiO2 *	mg/L	0.02	0.05	64.1	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO2 (D)	Bangkok

Approved by

Section Head

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\AIL_GL_pt (10:11AM)



Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามารักษ์ตึกจักษุณตมรินทร์

Project Location:



Accreditation No. 1031/47

Lot ID: 23116714

Date Received : Oct 06, 2023

Date Reported : Oct 25, 2023

Report Number : 2815366-1

Sample Number	23116714-11
Sampled Date	Oct 06, 2023 10:48 AM
Sample Description	Consumption Water
Location	อาคารสารณูปโภค - น้ำที่ระบายออกจาก Cooling Tower
Date Analysis Commenced	Oct 07, 2023
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)

Page 2 of 2

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfate	mg/L	0.15	0.5	236	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Sulfide as H2S *	mg/L	-	0.01	<0.01	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (D)	Bangkok
Total Hardness as CaCO3	mg/L	-	1	345	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Approved by

Section Head

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\AIL_GL_pt (10:11AM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจักษุณดินทร์

Project Location:

Lot ID: 23116714

Date Received : Oct 06, 2023

Date Reported : Oct 25, 2023

Report Number : 2815367-1

Page 1 of 2

Sample Number	23116714-12						
Sampled Date	Oct 06, 2023 12:05 PM						
Sample Description	Consumption Water						
Location	อาคารศูนย์การเรียนรู้ - น้ำที่ระบายออกจาก Cooling Tower						
Date Analysis Commenced	Oct 07, 2023						
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.10	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Microbiological Testing							
<i>Legionella spp. *</i>	CFU/L	-	-	Not Detected**	Not Detected	ISO 11731 (2017)	Bangkok
Standard Plate Count *	CFU/100mL	-	-	>200	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok
Water Testing							
Ammonium *	mg/L	-	0.06	<0.06	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 F	Bangkok
Chloride as Cl	mg/L	0.06	0.2	44.4	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Conductivity at 25 degree C *	micromhos/cm	-	0.5	456	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Bangkok
Methyl Orange Alkalinity as CaCO3 *	mg/L	-	1	56	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Bangkok
pH at 25 degree C	-	-	-	8.5	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Silica as SiO2 *	mg/L	0.02	0.05	16.8	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO2 (D)	Bangkok

Approved by

Section Head

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\AIL_GL_pt (10:11AM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามธิบดีจักษุณดินทร์

Project Location:

Lot ID: 23116714

Date Received : Oct 06, 2023

Date Reported : Oct 25, 2023

Report Number : 2815367-1

Page 2 of 2

Sample Number	23116714-12						
Sampled Date	Oct 06, 2023 12:05 PM						
Sample Description	Consumption Water						
Location	อาคารศูนย์การเรียนรู้ - น้ำที่ระบายออกจาก Cooling Tower						
Date Analysis Commenced	Oct 07, 2023						
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfate	mg/L	0.15	0.5	50.1	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Sulfide as H2S *	mg/L	-	0.01	<0.01	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (D)	Bangkok
Total Hardness as CaCO3	mg/L	-	1	73	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Approved by

Section Head

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\AIL_GL_pt (10:11AM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามารักษ์ตึกจักษุณตมรินทร์

Project Location :

Lot ID: 23116714

Date Received : Oct 06, 2023

Date Reported : Oct 25, 2023

Report Number : 2815368-1

Page 1 of 2

Sample Number	23116714-13						
Sampled Date	Oct 06, 2023 1:05 PM						
Sample Description	Consumption Water						
Location	อาคารพรีคลินิกฯ - น้ำที่ระบายออกจาก Cooling Tower						
Date Analysis Commenced	Oct 07, 2023						
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Metals Testing							
Iron	mg/L	0.003	0.005	0.09	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 3125 B, 3030 F	Bangkok
Microbiological Testing							
<i>Legionella spp.</i> *	CFU/L	-	-	Not Detected**	Not Detected	ISO 11731 (2017)	Bangkok
Standard Plate Count *	CFU/100mL	-	-	>200	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 9215 D	Bangkok
Water Testing							
Ammonium *	mg/L	-	0.06	<0.06	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-NH3 F	Bangkok
Chloride as Cl	mg/L	0.06	0.2	113	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Conductivity at 25 degree C *	micromhos/cm	-	0.5	992	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2510 B	Bangkok
Methyl Orange Alkalinity as CaCO3 *	mg/L	-	1	162	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2320 B	Bangkok
pH at 25 degree C	-	-	-	8.8	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500 - H (B)	Bangkok
Silica as SiO2 *	mg/L	0.02	0.05	36.6	No Standard	Based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-SiO2 (D)	Bangkok

Approved by

Section Head

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\AIL_GL_pt (10:11AM)



Accreditation No. 1031/47

Analysis / Test Report

Client : Chakri Naruebodindra Medical Institute, Faculty of Medicine Ramathibodi Hospital, Mahidol University
111 Moo 14, Bang Pla, Bang Phli, Samutprakarn Thailand 10540

P/O : สัญญาเลขที่C017/2566(CNMI)

Project Name : โรงพยาบาลรามารักษ์ตึกจักษุณตมรินทร์

Project Location :

Lot ID: 23116714

Date Received : Oct 06, 2023

Date Reported : Oct 25, 2023

Report Number : 2815368-1

Page 2 of 2

Sample Number	23116714-13						
Sampled Date	Oct 06, 2023 1:05 PM						
Sample Description	Consumption Water						
Location	อาคารพรีคลินิกฯ - น้ำที่ระบายออกจาก Cooling Tower						
Date Analysis Commenced	Oct 07, 2023						
Condition of Sample	Contained in six plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)						

Analyte	Unit	LOD	LOQ (LOR)	Result	Guideline / Specification	Method	Testing Location
Water Testing							
Sulfate	mg/L	0.15	0.5	107	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4110 B	Bangkok
Sulfide as H2S *	mg/L	-	0.01	<0.01	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 4500-S2 (D)	Bangkok
Total Hardness as CaCO3	mg/L	-	1	36	No Standard	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 23rd ed., 2017, part 2340 C	Bangkok

Guideline : Notification of Department of Health about Legionella Control in Cooling Tower.

Note : ** Not Detected mean Bacteria not found in agar plate.

Sampling By : Thanwa Jariya

Remark :

- LOD : Limit of Detection
- "<" : Lower than LOQ (Limit of Quantitation) / LOR (Limit of Reporting)
- Analyte(s) marked * is/are not included in scope of Accreditation ISO/IEC 17025.
- The laboratory has been accepted as an accredited laboratory complying with the ISO/IEC 17025.

Approved by

Section Head

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any form without written consent from the Laboratory, ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

ADDRESS 104 Phatthanakan 40, Phatthanakan Rd., Khwaeng Phatthanakan, Khet Suan Luang, Bangkok 10250 Thailand | PHONE +66 0 2760 3000 | FAX +66 0 2760 3197
ALS LABORATORY GROUP (THAILAND) CO., LTD. An ALS Limited Company

Life Sciences

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

19503-22

S:\Reports\AIL_GL_pt (10:11AM)