

Name of Laboratory : ALS Laboratory Group (Thailand) Co., Ltd. (Rayong Branch)  
Address : 616/10 Moo 5, Tambon Maenamkoo, Amphoe Pluak Daeng,  
Changwat Rayong 21140 Thailand  
Accreditation Number : Testing - 0042  
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Initial Issue Date : 30<sup>th</sup> September 2009  
Issue Date : 28<sup>th</sup> May 2026  
Expired date : 23<sup>rd</sup> April 2029  
Standard : ISO/IEC 17025:2017  
Reference No. : 0303/5400

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| Item Number | Test Material / Product | Test Item / Range of Testing                                                                                                                         | Test Method / Technique Used                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1           | Water                   | <p>- pH<br/>4.0 to 10.0</p> <p>- Cyanide<br/>0.005 mg/L to 0.2 mg/L</p> <p>- Total dissolved solids<br/>dried at 180 °C<br/>5 mg/L to 2 000 mg/L</p> | <p>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA &amp; WEF, 24<sup>th</sup> ed., 2023, part 4500-H<sup>+</sup> B</p> <p>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA &amp; WEF, 24<sup>th</sup> ed., 2023, part 4500-CN<sup>-</sup> C and E</p> <p>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA &amp; WEF, 24<sup>th</sup> ed., 2023, part 2540 C</p> |

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| Item Number  | Test Material / Product | Test Item / Range of Testing                                                                                   | Test Method / Technique Used                                                                                                                                                                                                                                                            |
|--------------|-------------------------|----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1<br>(Cont.) | Water                   | - Total solids<br>dried from 103 °C to 105 °C<br>5 mg/L to 2 000 mg/L<br><br>- Fluoride<br>0.2 mg/L to 50 mg/L | Standard Methods for the Examination<br>of Water and Wastewater, APHA,<br>AWWA & WEF, 24 <sup>th</sup> ed., 2023,<br>part 2540 B<br><br>Standard Methods for the Examination<br>of Water and Wastewater, APHA,<br>AWWA & WEF, 24 <sup>th</sup> ed., 2023,<br>part 4500-F <sup>-</sup> C |

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|--------------|------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1<br>(Cont.) | Water<br>- Non-portable<br>- Surface water<br>- Ground water<br>- portable<br>- Mineral water<br>- Ice<br>- Bottled drinking water | - Mercury<br>0.0005 mg/L to 0.005 mg/L<br><br>- Beryllium<br>- Cadmium<br>- Strontium<br>- Lithium<br>0.002 mg/L to 3 mg/L<br><br>- Chromium<br>- Manganese<br>0.002 mg/L to 100 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3112 B<br><br>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3120 B, 3030 F |

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| Item Number  | Test Material / Product                                                                                                            | Test Item / Range of Testing                                                                                                              | Test Method / Technique Used                                                                                                             |
|--------------|------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 1<br>(Cont.) | Water<br>- Non-portable<br>- Surface water<br>- Ground water<br>- Portable<br>- Mineral water<br>- Ice<br>- Bottled drinking water | - Arsenic<br>- Vanadium<br>- Titanium<br>0.005 mg/L to 3 mg/L<br><br>- Barium<br>- Cobalt<br>- Nickel<br>- Lead<br>0.005 mg/L to 100 mg/L | Standard Methods for the Examination<br>of Water and Wastewater, APHA,<br>AWWA & WEF, 24 <sup>th</sup> ed., 2023,<br>part 3120 B, 3030 F |

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| Item Number  | Test Material / Product                                                                                                               | Test Item / Range of Testing                                                                                                                                                                                                                                  | Test Method / Technique Used                                                                                                    |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| 1<br>(Cont.) | Water<br>- Non-portable<br>- Surface water<br>- Ground water<br>- Portable<br>- Mineral water<br>- Ice<br>- Bottled<br>drinking water | - Antimony<br>- Molybdenum<br>- Selenium<br>- Silver<br>- Boron<br>- Tin<br>0.01 mg/L to 3 mg/L<br>- Trivalent chromium<br>- Copper<br>- Iron<br>- Zinc<br>0.01 mg/L to 100 mg/L<br>- Thallium<br>0.05 mg/L to 3 mg/L<br>- Aluminium<br>0.05 mg/L to 100 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3120 B, 3030 F |

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| Item Number  | Test Material / Product                                                                                                            | Test Item / Range of Testing                                                                                                                                                                                                                                             | Test Method / Technique Used                                                                                                                                                                                                                               |
|--------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1<br>(Cont.) | Water<br>- Non-portable<br>- Surface water<br>- Ground water<br>- Portable<br>- Mineral water<br>- Ice<br>- Bottled drinking water | - Calcium<br>- Magnesium<br>- Phosphorus<br>- Potassium<br>- Sodium<br>0.05 mg/L to 1 000 mg/L<br>- Total Hardness<br>(Calculated as CaCO <sub>3</sub> )<br>0.5 mg/L to 6 600 mg/L<br>- Calcium hardness<br>(Calculated as CaCO <sub>3</sub> )<br>0.5 mg/L to 2 400 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3120 B, 3030 F<br>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 2340 B |

Initial Issue Date 30<sup>th</sup> September 2009

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| Item Number  | Test Material / Product                    | Test Item / Range of Testing                                 | Test Method / Technique Used                                                                                                                                                                                                                                                                |
|--------------|--------------------------------------------|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1<br>(Cont.) | Water<br>- Surface water<br>- Ground water | - Hexavalent chromium<br>0.01 mg/L to 8 mg/L                 | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3500-Cr B                                                                                                                                                                  |
| 2            | Wastewater                                 | - pH<br>4.0 to 10.0<br><br>- Cyanide<br>0.005 mg/L to 5 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 4500-H <sup>+</sup> B<br><br>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 4500-CN <sup>-</sup> C and E |

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| Item Number  | Test Material / Product | Test Item / Range of Testing                                                                                                                                                                       | Test Method / Technique Used                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2<br>(Cont.) | Wastewater              | - Total dissolved solids<br>dried at 180 °C<br>50 mg/L to 20 000 mg/L<br><br>- Total suspended solids<br>dried from 103 °C to 105 °C<br>5 mg/L to 2 000 mg/L<br><br>- BOD<br>2 mg/L to 10 000 mg/L | Standard Methods for the Examination<br>of Water and Wastewater, APHA,<br>AWWA & WEF, 24 <sup>th</sup> ed., 2023,<br>part 2540 C<br><br>Standard Methods for the Examination<br>of Water and Wastewater, APHA,<br>AWWA & WEF, 24 <sup>th</sup> ed., 2023,<br>part 2540 D<br><br>Standard Methods for the Examination<br>of Water and Wastewater, APHA,<br>AWWA & WEF, 24 <sup>th</sup> ed., 2023,<br>part 5210 B, 4500-O G |

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| Item Number  | Test Material / Product | Test Item / Range of Testing                                                                                           | Test Method / Technique Used                                                                                                                                                                                                                                                                                                                                                                         |
|--------------|-------------------------|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2<br>(Cont.) | Wastewater              | - COD<br>25 mg/L to 20 000 mg/L<br><br>- Oil and grease<br>3 mg/L to 200 mg/L<br><br>- Fluoride<br>0.2 mg/L to 50 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 5220 D<br><br>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 5520 B<br><br>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 4500-F <sup>-</sup> C |

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| Item Number  | Test Material / Product | Test Item / Range of Testing                                                                                         | Test Method / Technique Used                                                                                                                                                                                                                                                                                                                                              |
|--------------|-------------------------|----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2<br>(Cont.) | Wastewater              | - Formaldehyde<br>0.1 mg/L to 10 mg/L<br><br>- Phenol<br>0.01 mg/L to 1.00 mg/L<br><br>- Color<br>5 ADMI to 700 ADMI | Wastewater analysis manual, Environmental Engineering Association of Thailand, 4 <sup>th</sup> ed., 2004<br><br>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 5530 B, D<br><br>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 2120 F |

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| Item Number  | Test Material / Product                          | Test Item / Range of Testing                                                  | Test Method / Technique Used                                                                                                                                     |
|--------------|--------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2<br>(Cont.) | Wastewater                                       | - Total kjeldahl nitrogen<br>1 mg/L to 500 mg/L                               | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 4500-N <sub>org</sub> C, 4500-NH <sub>3</sub> D |
|              | - Domestic wastewater<br>- Industrial wastewater | - Mercury<br>0.0005 mg/L to 0.020 mg/L                                        | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3112 B                                          |
|              |                                                  | - Beryllium<br>- Cadmium<br>- Strontium<br>- Lithium<br>0.002 mg/L to 15 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3120 B, 3030 F                                  |

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| Item Number  | Test Material / Product                                        | Test Item / Range of Testing                                                                                                                                                                              | Test Method / Technique Used                                                                                                    |
|--------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| 2<br>(Cont.) | Wastewater<br>- Domestic wastewater<br>- Industrial wastewater | - Chromium<br>- Manganese<br>0.002 mg/L to 1 000 mg/L<br><br>- Arsenic<br>- Vanadium<br>- Titanium<br>0.005 mg/L to 15 mg/L<br><br>- Barium<br>- Cobalt<br>- Lead<br>- Nickel<br>0.005 mg/L to 1 000 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3120 B, 3030 F |

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| Item Number  | Test Material / Product                                        | Test Item / Range of Testing                                                                                                                                                                                | Test Method / Technique Used                                                                                                                                                                                                                                                              |
|--------------|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2<br>(Cont.) | Wastewater<br>- Domestic wastewater<br>- Industrial wastewater | - Antimony<br>- Molybdenum<br>- Selenium<br>- Silver<br>- Boron<br>- Tin<br>0.01 mg/L to 15 mg/L<br><br>- Trivalent chromium<br>0.01 mg/L to 200 mg/L<br><br>- Hexavalent chromium<br>0.01 mg/L to 200 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3120 B, 3030 F<br><br><br><br><br><br><br><br>Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3500-Cr B |

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| Item Number  | Test Material / Product                                        | Test Item / Range of Testing                                                                                                                                                                                           | Test Method / Technique Used                                                                                                    |
|--------------|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| 2<br>(Cont.) | Wastewater<br>- Domestic wastewater<br>- Industrial wastewater | - Copper<br>- Iron<br>- Zinc<br>0.01 mg/L to 1 000 mg/L<br><br>- Thallium<br>0.05 mg/L to 15 mg/L<br><br>- Aluminium<br>- Calcium<br>- Magnesium<br>- Phosphorus<br>- Potassium<br>- Sodium<br>0.05 mg/L to 1 000 mg/L | Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 24 <sup>th</sup> ed., 2023, part 3120 B, 3030 F |

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|-------------|-------------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3           | Air                     |                                                                                             |                                                                                                                                                          |
|             | - Workplace             | - Total dust<br>$0.15 \text{ mg/m}^3$ to $28 \text{ mg/m}^3$                                | In - house method : STM 02-022<br>based on NIOSH Manual of Analytical Method, 4 <sup>th</sup> ed., NMAM, method 0500<br>Issue 2, 1994 (Include sampling) |
|             |                         | - Respirable dust<br>$0.15 \text{ mg/m}^3$ to $10 \text{ mg/m}^3$                           | In - house method : STM 02-023<br>based on NIOSH Manual of Analytical Method, 4 <sup>th</sup> ed., NMAM, method 0600<br>Issue 3, 1998 (Include sampling) |
|             | - Ambient air           | - Total suspended particulate<br>$0.002 \text{ mg/m}^3$ to $0.75 \text{ mg/m}^3$            | United States Environmental Protection Agency 40 CFR, method 50, Appendix B,<br>July 1, 2008 (Include sampling)                                          |
|             |                         | - Particulate matter (PM <sub>10</sub> )<br>$0.002 \text{ mg/m}^3$ to $0.30 \text{ mg/m}^3$ | United States Environmental Protection Agency 40 CFR, method 50, Appendix J,<br>July 1, 2008 (Include sampling)                                          |

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|--------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| 3<br>(Cont.) | Air<br>- Emission from stationary sources | - Total suspended particulate<br>0.5 mg/m <sup>3</sup> to 500 mg/m <sup>3</sup><br>(At actual O <sub>2</sub> )<br>0.5 mg/m <sup>3</sup> to 10 000 mg/m <sup>3</sup><br>(At 7% O <sub>2</sub> ) | United States Environmental Protection Agency 40 CFR method 5, Appendix A, December 7, 2020 (Include sampling) |

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|-------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4           | Environmental noise     | - Noise level<br>Equivalent sound level<br>$L_{eq,T}$ 30 dB (A) to 130 dB (A)<br>Maximum sound level<br>$L_{max}$ 30 dB (A) to 130 dB (A) | - ISO 1996-1: 2016<br>- Notification of the Department of Industrial Works, Method of measuring nuisance period noise level, 24-hour average sound level and maximum sound level from plant operation, 2024<br>- Notification of the Pollution Control Board, Method of measuring the background noise level, non nuisance period noise level, the measuring and calculation of noise level from nuisance period, the calculation of Nuisance level and record form of nuisance noise measurement, 2022 |

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|--------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4<br>(Cont.) | Environmental noise     | - Noise nuisance<br>Background noise level<br>$L_{A90}$ 30.0 dB (A) to 130.0 dB (A)<br>Noise level without disturbance<br>$L_{Aeq,T}$ 30.0 dB (A) to 130.0 dB (A)<br>Noise level with disturbance<br>$L_{Aeq,T}$ 30.0 dB (A) to 130.0 dB (A)<br>Noise nuisance level<br>0.7 dB (A) to 30.0 dB (A) | - Notification of the Department of Industrial Works, Method of measuring nuisance period noise level, 24-hour average sound level and maximum sound level from plant operation, 2024<br>- Notification of the Pollution Control Board, Method of measuring the background noise level, non nuisance period noise level, the measuring and calculation of noise level from nuisance period, the calculation of Nuisance level and record form of nuisance noise measurement, 2022 |

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