Issue date: 21 March 2025
Valid until: 31 October 2029

NO: SAMM 057
(Issue 2, 21 March 2025 replacement
of SAMM 057 dated 16 May 2024)

LABORATORY LOCATION:
(PERMANENT LABORATORY)

CHEMSAIN KONSULTANT SDN. BHD.
172, ROCK ROAD
93200 KUCHING
SARAWAK, MALAYSIA

FIELDS OF TESTING: **CHEMICAL, MICROBIOLOGY, MECHANICAL**

This laboratory has demonstrated its technical competence to operate in accordance with MS ISO/IEC 17025:2017 (ISO/IEC 17025:2017).

This laboratory's fulfillment of the requirements of ISO/IEC 17025 means the laboratory meets both the technical competence requirements and management system requirements that are necessary for it to consistently deliver technically valid test results and calibrations. The management system requirements in ISO/IEC 17025 are written in language relevant to laboratory operations and operate generally in accordance with the principles of ISO 9001 (see Joint ISO-ILAC-IAF Communiqué dated April 2017).

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Water and Wastewater	Color	APHA 2120 C, 2005 APHA 2120 C, 2017 APHA 2120 C, 2023
	Colour ADMI	APHA 2120 F, 2005 APHA 2120 F, 2017 APHA 2120 F, 2023
	Acidity	APHA 2310 B, 2005 APHA 2310 B, 2017 APHA 2310 B, 2023
	Alkalinity	APHA 2320 B, 2005 APHA 2320 B, 2017 APHA 2320 B, 2023
	Conductivity	APHA 2510 B, 2005 APHA 2510 B, 2017 APHA 2510 B, 2023
	Temperature	APHA 2550 B, 2005 APHA 2550 B, 2017
	Oxygen (Dissolved)	APHA 4500-O C, 2005 APHA 4500-O C, 2017 APHA 4500-O C, 2023
	Oxygen (Dissolved)	APHA 4500-O G, 2005 APHA 4500-O G, 2017 APHA 4500-O G, 2023

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Water and Wastewater	pH Value	APHA 4500-H^+ B, 2005 APHA 4500-H^+ B, 2017 APHA 4500-H^+ B, 2023
	Turbidity	APHA 2130 B, 2005 APHA 2130 B, 2017 APHA 2130 B, 2023
	Free Residual Chlorine (DPD)	In-house Method 0501 based on Palintest Comparator
	Combined Residual Chlorine (DPD)	In-house Method 0501 based on Palintest Comparator
	Total Residual Chlorine (DPD)	In-house Method 0501 based on Palintest Comparator
	Free and Total Chlorine	APHA 4500 Cl G, 2005 APHA 4500 Cl G, 2017 APHA 4500 Cl G, 2023
	Free Carbon Dioxide	APHA 4500-CO_2 C, 2005 APHA 4500-CO_2 C, 2017 APHA 4500-CO_2 C, 2023
	Hardness, ETDA Titrimetric	APHA 2340 C, 2005 APHA 2340 C, 2017 APHA 2340 C, 2023
	Hardness by Calculation	APHA 2340 B, 2005 APHA 2340 B, 2017 APHA 2340 B, 2023
	Calcium Hardness, EDTA Titrimetric	APHA 3500-Ca B, 2005 APHA 3500-Ca B, 2017
	Magnesium Hardness, Calculation Method	APHA 3500-Mg B, 2005 APHA 3500-Mg B, 2017
	Total Solids	APHA 2540 B, 2005 APHA 2540 B, 2017 APHA 2540 B, 2023
	Total Dissolved Solids	APHA 2540 C, 2005 APHA 2540 C, 2017 APHA 2540 C, 2023
	Total Suspended Solids	APHA 2540 D, 2005 APHA 2540 D, 2017 APHA 2540 D, 2023

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Water and Wastewater	Chloride	APHA 4500-Cl^- B, 2005 APHA 4500-Cl^- B, 2017 APHA 4500-Cl^- B, 2023
	Sulphate	APHA 4500-SO_4^{2-} C, 2005 APHA 4500-SO_4^{2-} C, 2017
	Sulphate	APHA 4500-SO_4^{2-} E, 2005 APHA 4500-SO_4^{2-} E, 2017
	Fluoride	APHA 4500- F^- C, 2005 APHA 4500- F^- C, 2017 APHA 4500- F^- C, 2023
	Phosphorus	APHA 4500-P D, 2005 APHA 4500-P D, 2017 APHA 4500-P D, 2023
	Nitrate Nitrogen/Nitrate	APHA 4500-NO^{3-} E, 2005 APHA 4500-NO^{3-} E, 2017 APHA 4500-NO^{3-} E, 2023
	Nitrite Nitrogen/Nitrite	APHA 4500-NO^{2-} B, 2005 APHA 4500-NO^{2-} B, 2017 APHA 4500-NO^{2-} B, 2023
	Ammoniacal Nitrogen/ Ammonia	APHA 4500-NH_3 B & C, 2005 APHA 4500-NH_3 B & C, 2017 APHA 4500-NH_3 B & C, 2023
	Ammoniacal Nitrogen/ Ammonia	APHA 4500-NH_3 B & F, 2005 APHA 4500-NH_3 B & F, 2017 APHA 4500-NH_3 B & F, 2023
	Total Nitrogen, Kjeldahl	APHA 4500-Norg B, 2005 APHA 4500-Norg B, 2017 APHA 4500-Norg B, 2023
	Biochemical Oxygen Demand (BOD) 5 days @ 20 °C	APHA 5210 B & APHA 4500-O C, 2005 APHA 5210 B & APHA 4500-O C, 2017 APHA 5210 B & APHA 4500-O C, 2023
	Biochemical Oxygen Demand (BOD) 5 days @ 20 °C	APHA 5210 B & APHA 4500-O G, 2005 APHA 5210 B & APHA 4500-O G, 2017 APHA 5210 B & APHA 4500-O G, 2023
	Chemical Oxygen Demand (COD)	APHA 5220 B, 2005 APHA 5220 B, 2017 APHA 5220 B, 2023
	Chemical Oxygen Demand (COD)	APHA 5220 C, 2005 APHA 5220 C, 2017 APHA 5220 C, 2023

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Water and Wastewater	Silver, Cadmium, Chromium, Copper, Iron, Manganese, Nickel, Lead, Zinc, Sodium, Potassium, Calcium, Magnesium	APHA 3030 F & APHA 3111 B, 2005 APHA 3030 F & APHA 3111 B, 2017 APHA 3030 F & APHA 3111 B, 2023
	Barium, Molybdenum, Vanadium, Silicon, Aluminium	APHA 3030 F & APHA 3111 D, 2005 APHA 3030 F & APHA 3111 D, 2017
	Tin	In-house Method 0502 based on APHA 3111 D, 2005 In-house Method 0502 based on APHA 3111 D, 2017
	Arsenic	APHA 3114 B & C, 2005 APHA 3114 B & C, 2017 APHA 3114 B & C, 2023
	Selenium	APHA 3114 C, 2005 APHA 3114 C, 2017 APHA 3114 C, 2023
	Aluminium	APHA 3500-Al B, 2005 APHA 3500-Al B, 2017 APHA 3500-Al B, 2023
	Mercury	In-house Method 0535 based on APHA 3112 B, 2005 In-house Method 0535 based on APHA 3112 B, 2017
	Total Mercury	In-house Method 0574 based on USEPA 1631
	Methyl Mercury	In-house Method 0575 based on USEPA 1630
	Boron	APHA 4500-B B, 2005 APHA 4500-B B, 2017 APHA 4500-B B, 2023
	Boron	APHA 4500-B C, 2005 APHA 4500-B C, 2017 APHA 4500-B C, 2023
	Chromium Hexavalent	APHA 3500-Cr B, 2005 APHA 3500-Cr B, 2017
	Chromium Trivalent	In-house Method 0508 based on APHA 3500-Cr B, 1998

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Water and Wastewater	Sulphide	APHA 4500 S^{2-} D, 2005 APHA 4500 S^{2-} D, 2017 APHA 4500 S^{2-} D, 2023
	Sulphide	APHA 4500-S^{2-} F, 2005 APHA 4500-S^{2-} F, 2017 APHA 4500-S^{2-} F, 2023
	Cyanide	APHA 4500-CN C & E, 2005 APHA 4500-CN C & E, 2017 APHA 4500-CN C & E, 2023
	Cyanide	APHA 4500-CN C & F, 2005 APHA 4500-CN C & F, 2017 APHA 4500-CN C & F, 2023
	Phenol	APHA 5530 B & C, 2005 APHA 5530 B & C, 2017 APHA 5530 B & C, 2023
	Anionic Surfactant as MBAS	APHA 5540 C, 2005 APHA 5540 C, 2017 APHA 5540 C, 2023
	Formaldehyde	In-house Method 0527 based on AOAC 931.08
	Total Organic Carbon	APHA 5310 B, 2005 APHA 5310 B, 2017 APHA 5310 B, 2023
	Total Organic Carbon	APHA 5310 C, 2005 APHA 5310 C, 2017 APHA 5310 C, 2023
	Oil and Grease	APHA 5520 B, 2005 APHA 5520 B, 2017 APHA 5520 B, 2023
	Hydrocarbons/Mineral Oil (Commonly known as Total Petroleum Hydrocarbon)	APHA 5520 F, 2005 APHA 5520 F, 2017 APHA 5520 F, 2023
	Total Petroleum Hydrocarbon	In-house Method 0539 based on TNRCC method 1005, rev 03, 1st June 2001

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Water and Wastewater	Polycyclic Aromatic Hydrocarbon (see Appendix A)	In-house Method 0538 based on USEPA 3510 C, December 1996 & In-house Method 0534 based on USEPA 8270 C, December 1996
	Benzene, Toluene, Ethyl Benzene and o, p, m – Xylene (BTEX)	In-house Method 0521 based on USEPA 8260/5030 C, 1996
	Glyphosate/ Amminomethyl phosphonic acid	In-house Method 0566 based on Agilent Application Note 5091-3621 E
	Organochlorinated pesticides Aldrin Dieldrin Cis Chlordane Trans Chlordane 4,4'-DDE 4,4'-DDT 4,4'-DDD Heptachlor Heptachlor Epoxide Lindane (ɤ BHC) α-BHC β-BHC δ-BHC Endosulfan I Endosulfan II Endosulfan Sulfate Endrin Endrin Ketone Endrin Aldehyde Methoxychlor	In-house Method 0587 based on USEPA 3510 C, 508 & 608
	Polychlorinated biphenyls 2-Chlorobiphenyl (1) 3,3'-Dichlorobiphenyl (11) 2,4,5-Trichlorobiphenyl (29) 2,2',4,4'-Tetrachlorobiphenyl (47) 2,3',4,5',6-Pentachlorobiphenyl (121) 2,2',3,3',6,6'-Hexachlorobipheny (136) 2,2',3,4,5,5',6-Heptachlorobiphenyl (185) 2,2',3,3',4,4',5,5'-Octachlorobiphenyl (194) 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (206) Decachlorobiphenyl (209)	In-house Method 0596 based on USEPA 3510 C and USEPA 8270 C

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Water and Wastewater	2,4 D 2,4,5-T 2,4,5-TP (Silvex)	In-house Method 0599 based on American Laboratory Technical Article 36154
	Methyl Tert-Butyl Ether (MTBE)	In-house Method 5997 based on USEPA 5030 C & USEPA 8260 C
	Vinyl Chloride	In-house Method 0576 based on USEPA 5030 C & USEPA 8260 C
	Carbon Dioxide by Calculation	APHA 4500-CO_2 D, 2017 APHA 4500-CO_2 D, 2023
	Arsenic III	APHA 3500-As B, 2017
	Total Nitrogen by Calculation	In-house Method 5996 based on USEPA Definition of Total Nitrogen
	Paraquat	In-house Method 0598 based on 134-A of Manual of Pesticides Residual Analysis, Volume II, DFG
	Chlorophyll a	APHA 10200 H, 2017
	*Oil and Grease (Mineral)	APHA 5520 F, 2005 APHA 5520 F, 2017 APHA 5520 F, 2023
	*Oil and Grease (Emulsified Edible)	APHA 5520 B & F, 2005 APHA 5520 B & F, 2017 APHA 5520 B & F, 2023
	Calcium	APHA 3030 F & APHA 3111 D, 2005 APHA 3030 F & APHA 3111 D, 2017

Note:

- *As per National Water Quality Standards for Malaysia DFG- Deutsche Forschungsgemeinschaft

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Water and Wastewater	Silver (Ag) Aluminium (Al) Arsenic (As) Boron (B) Barium (Ba) Beryllium (Be) Bismuth (Bi) Calcium (Ca) Cadmium (Cd) Cobalt (Co) Chromium (Cr) Copper (Cu) lron (Fe) Potassium (K) Lithium (Li) Magnesium (Mg) Manganese (Mn) Molybdenum (Mo) Sodium (Na) Nickel (Ni) Phosphorus (P) Lead (Pb) Sulphur (S) Antimony (Sb) Selenium (Se) Tin (Sn) Strontium (Sr) Titanium (Ti) Thalium (Tl) Vanadium (V) Zinc (Zn) Tellurium (Te) Uranium (U) Platinum (Pt) Gold (Au) Palladium (Pd) lridium (lr)	APHA 3030 F & APHA 3120 B, 2005 APHA 3030 F & APHA 3120 B, 2017 APHA 3030 F & APHA 3120 B, 2023
	Volatile Organic Compounds (Appendix B)	In-house Method 6042 based on USEPA 5030 C & USEPA 8260 D
	Trihalomethanes: Chloroform Bromodichloromethane Chlorodibromomethane Bromoform	In-house Method 0521 based on USEPA 5030 C & USEPA 8260 D

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Water and Wastewater	**<u>Organochlorinated Pesticides</u>** Aldrin Dieldrin Cis Chlordane Trans Chlordane 4,4'-DDE 4,4'-DDT 4,4'-DDD Heptachlor Heptachlor Epoxide Lindane (γ-BHC) α-BHC β-BHC δ-BHC Endosulfan I Endosul{an II Endosulfan Sulfate Endrin Endrin Ketone Endrin Aldehyde Methoxychlor	In-house Method 6040 based on USEPA 608 & USEPA 8270 E

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Wastewater from Rubber and Palm Oil Mills	Biochemical Oxygen Demand 3 days @ 30°C	DOE 2019, Reference Method DOE 2019, Alternative Method
	Chemical Oxygen Demand Suspended Solids Oil & Grease Ammoniacal Nitrogen Total Nitrogen, Kjeldhal	DOE 2019, Reference Method
Environmental Monitoring • Sludge, Soil, Sediment and Waste	Hexane Extractable Matter (Commonly Known as Oil & Grease)	USEPA 9071 B, April 1998
	Hydrocarbon	In-house Method 0559 based on USEPA 9071 B & USEPA 1664
	Total Petroleum Hydrocarbon	In-house Method 0539 based on TNRCC method 1005, rev 03, 1st June 2001
	Polycyclic Aromatic Hydrocarbon (list of PAH as per appendix A)	In-house Method 0537 based on USEPA 3540 C in combination with In-house Method 0534 based on USEPA 8270 C December 1996
	Total Cyanide	In-house Method 0562 based on USEPA 9010 C & USEPA 9213 (By ISE)
	Organic Carbon	MS 2469: 2012
	Toxicity Characteristic Leaching Procedure (TCLP)	USEPA 1311 (Metals Only)

Note:
- DOE: Department of Environmental

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Sludge, Soil, Sediment and Waste	Aluminium (as Al) Cadmium as (Cd) Copper as (Cu) Iron (as Fe) Lead (Pb) Nickel (Ni) Zinc (Zn)	USEPA 3050 B, December 1996 & USEPA 7000 B, Feb 2007
	Aluminium (as Al) Cadmium as (Cd) Chromium as (Cr) Copper as (Cu) Iron (as Fe) Lead (Pb) Sodium (as Na) Zinc (Zn)	USEPA 200.2, Revision 2.8, EMMC V & USEPA 7000 B, Feb 2007
	Arsenic (As)	USEPA 200.2, Revision 2.8, EMMC V & USEPA 206.3
	pH	USEPA 9045 D Issue 4: 2004
	pH	MS 2457: 2012
	pH	USEPA 9040 C
	Methyl Mercury	In-house Method 5994 based on USEPA 1630 and Analytica Chimica Acta, 281(1993) 135-152

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Sludge, Soil, Sediment and Waste	Silver (Ag) Aluminium (Al) Arsenic (As) Boron (B) Barium (Ba) Beryllium (Be) Bismuth (Bi) Calcium (Ca) Cadmium (Cd) Cobalt (Co) Chromium (Cr) Copper (Cu) lron (Fe) Potassium (K) Lithium (Li) Magnesium (Mg) Manganese (Mn) Molybdenum (Mo) Sodium (Na) Nickel (Ni) Phosphorus (P) Lead (Pb) Sulphur (S) Antimony (Sb) Selenium (Se) Tin (Sn) Strontium (Sr) Titanium (Ti) Thalium (Tl) Vanadium (V) Zinc (Zn) Tellurium (Te) Uranium (U) Platinum (Pt) Gold (Au) Palladium (Pd) lridium (lr)	USEPA 200.2 & USEPA 6010 D

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Sludge, Soil, Sediment and Waste	**<u>Polychlorinated biphenyls PCB</u>** 2-Chlorobiphenyl (1) 3,3'-Dichlorobiphenyl (11) 2,4,5-Trichlorobiphenyl (29) 2,2',4,4' -Tetrachlorobiphenyl (47) 2,3',4,5',6-Pentachlorobiphenyl (121) 2,2',3,3',6,6'-Hexachlorobipheny (136) 2,2',3,4,5,5',6-Heptachlorobiphenyl (185) 2,2',3,3',4,4',5,5'-Octachlorobiphenyl (194) 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (206) Decachlorobiphenyl (209)	In-house Method 0519 based on USEPA 3540 C and 8270 C
	Mercury	USEPA 200.2 & USEPA 245.5
Environmental Monitoring • Sludge, Soil and Sediment	Phosphorus	In-house Method 0592 based on USEPA 200.2 & MS 417 Part 4, 1994

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Solid Waste	**Toxicity Characteristic Leaching Procedure (TCLP)** Silver (Ag) Aluminium (Al) Arsenic (As) Boron (B) Barium (Ba) Beryllium (Be) Bismuth (Bi) Calcium (Ca) Cadmium (Cd) Cobalt (Co) Chromium (Cr) Copper (Cu) Iron (Fe) Potassium (K) Lithium (Li) Magnesium (Mg) Manganese (Mn) Molybdenum (Mo) Sodium (Na) Nickel (Ni) Phosphorus (P) Lead (Pb) Sulphur (S)	USEPA 1311 & USEPA 6010 D
Environmental Monitoring • Solid Waste	**Toxicity Characteristic Leaching Procedure (TCLP)** Antimony (Sb) Selenium (Se) Tin (Sn) Strontium (Sr) Titanium (Ti) Thalium (Tl) Vanadium (V) Zinc (Zn) Tellurium (Te) Uranium (U) Platinum (Pt) Gold (Au) Palladium (Pd) Iridium (Ir)	USEPA 1311 & USEPA 6010 D
• Soil/Sediment/Solids	Particle Size Distribution	In-house Method 0588 based on BS 1377 1990, Part: 2
• Soil/Sediment/Sludge/Solids • Semisolid/Biosolids	Dry Solids/Total Solids Moisture	In-house Method 6010 based on USEPA 1684

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Water • Marine Water • Estuarine Water • Formation Water/Produce Water	Color	APHA 2120 C, 2005 APHA 2120 C, 2017 APHA 2120 C, 2023
	Colour ADMI	APHA 2120 F, 2005 APHA 2120 F, 2017 APHA 2120 F, 2023
	Conductivity	APHA 2510 B, 2005 APHA 2510 B, 2017 APHA 2510 B, 2023
	Salinity	APHA 2520B, 2017 APHA 2520B, 2023
	Acidity	APHA 2310 B, 2005 APHA 2310 B, 2017 APHA 2310 B, 2023
	Alkalinity	APHA 2320 B, 2005 APHA 2320 B, 2017 APHA 2320 B, 2023
	Temperature	APHA 2550 B, 2005 APHA 2550 B, 2017
	Oxygen (Dissolved)	APHA 4500-O C, 2005 APHA 4500-O C, 2017 APHA 4500-O C, 2023
	Oxygen (Dissolved)	APHA 4500-O G, 2005 APHA 4500-O G, 2017 APHA 4500-O G, 2023
	pH Value	APHA 4500-H^+ B, 2005 APHA 4500-H^+ B, 2017 APHA 4500-H^+ B, 2023
	Turbidity	APHA 2130 B, 2005 APHA 2130 B, 2017 APHA 2130 B, 2023
	Free Residual Chlorine (DPD)	In-house Method 0501 based on Palintest Comparator
	Combined Residual Chlorine (DPD)	In-house Method 0501 based on Palintest Comparator
	Total Residual Chlorine (DPD)	In-house Method 0501 based on Palintest Comparator
	Free and Total Chlorine	APHA 4500 Cl G, 2005 APHA 4500 Cl G, 2017 APHA 4500 Cl G, 2023

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Water • Marine Water • Estuarine Water • Formation Water/Produce Water	Free Carbon Dioxide	APHA 4500-CO_2 C, 2005 APHA 4500-CO_2 C, 2017 APHA 4500-CO_2 C, 2023
	Hardness, ETDA Titrimetric	APHA 2340 C, 2005 APHA 2340 C, 2017 APHA 2340 C, 2023
	Calcium Hardness, EDTA Titrimetric	APHA 3500-Ca B, 2005 APHA 3500-Ca B, 2017
	Magnesium Hardness, Calculation Method	APHA 3500-Mg B, 2005 APHA 3500-Mg B, 2017
	Total Solids	APHA 2540 B, 2005 APHA 2540 B, 2017 APHA 2540 B, 2023
	Total Dissolved Solids	APHA 2540 C, 2005 APHA 2540 C, 2017 APHA 2540 C, 2023
	Total Suspended Solids	APHA 2540 D, 2005 APHA 2540 D, 2017 APHA 2540 D, 2023
	Chloride	APHA 4500-Cl^- B, 2005 APHA 4500-Cl^- B, 2017 APHA 4500-Cl^- B, 2023
	Sulphate	APHA 4500-SO_4^{2-} C, 2005 APHA 4500-SO_4^{2-} C, 2017
	Sulphate	APHA 4500-SO_4^{2-} E, 2005 APHA 4500-SO_4^{2-} E, 2017
	Fluoride	APHA 4500- F^- C, 2005 APHA 4500- F^- C, 2017 APHA 4500- F^- C, 2023
	Phosphorus	APHA 4500-P D, 2005 APHA 4500-P D, 2017 APHA 4500-P D, 2023
	Nitrate Nitrogen/Nitrate	APHA 4500-NO^{3-} E, 2005 APHA 4500-NO^{3-} E, 2017 APHA 4500-NO^{3-} E, 2023
	Nitrite Nitrogen/Nitrite	APHA 4500-NO^{2-} B, 2005 APHA 4500-NO^{2-} B, 2017 APHA 4500-NO^{2-} B, 2023

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Water • Marine Water • Estuarine Water • Formation Water/Produce Water	Ammoniacal Nitrogen/Ammonia	APHA 4500-NH_3 B & C, 2005 APHA 4500-NH_3 B & C, 2017 APHA 4500-NH_3 B & C, 2023
	Ammoniacal Nitrogen/Ammonia	APHA 4500-NH_3 B & F, 2005 APHA 4500-NH_3 B & F, 2017 APHA 4500-NH_3 B & F, 2023
	Total Nitrogen, Kjeldahl	APHA 4500-Norg B, 2005 APHA 4500-Norg B, 2017 APHA 4500-Norg B, 2023
	Biochemical Oxygen Demand (BOD) 5 days @ 20 °C	APHA 5210 B & APHA 4500-O C, 2005 APHA 5210 B & APHA 4500-O C, 2017 APHA 5210 B & APHA 4500-O C, 2023
	Biochemical Oxygen Demand (BOD) 5 days @ 20 °C	APHA 5210 B & APHA 4500-O G, 2005 APHA 5210 B & APHA 4500-O G, 2017 APHA 5210 B & APHA 4500-O G, 2023
	Chemical Oxygen Demand (COD)	In-house Method 0560 based on APHA 5220 C, 2017 & USGS-Method of Analysis of organic substances in water-Chemical Oxygen Demand
	Aluminium	APHA 3500-Al B, 2005 APHA 3500-Al B, 2017 APHA 3500-Al B, 2023
	Total Mercury	In-house Method 0574 based on USEPA 1631
	Methyl Mercury	In-house Method 0575 based on USEPA 1630
	Boron	APHA 4500-B C, 2005 APHA 4500-B C, 2017 APHA 4500-B C, 2023
	Chromium Hexavalent	APHA 3500-Cr B, 2005 APHA 3500-Cr B, 2017 APHA 3500-Cr B, 2023
	Sulphide	APHA 4500 S^{2-} D, 2005 APHA 4500 S^{2-} D, 2017 APHA 4500 S^{2-} D, 2023
	Sulphide	APHA 4500-S^{2-} F, 2005 APHA 4500-S^{2-} F, 2017 APHA 4500-S^{2-} F, 2023

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Water • Marine Water • Estuarine Water • Formation Water/Produce Water	Cyanide	APHA 4500-CN C & E, 2005 APHA 4500-CN C & E, 2017 APHA 4500-CN C & E, 2023
	Cyanide	APHA 4500-CN C & F, 2005 APHA 4500-CN C & F, 2017 APHA 4500-CN C & F, 2023
	Phenol	APHA 5530 B & C, 2005 APHA 5530 B & C, 2017 APHA 5530 B & C, 2023
	Anionic Surfactant as MBAS	APHA 5540 C, 2005 APHA 5540 C, 2017 APHA 5540 C, 2023
	Formaldehyde	In-house Method 0527 based on AOAC 931.08
	Total Organic Carbon	APHA 5310 B, 2005 APHA 5310 B, 2017 APHA 5310 B, 2023
	Total Organic Carbon	APHA 5310 C, 2005 APHA 5310 C, 2017 APHA 5310 C, 2023
	Oil and Grease	APHA 5520 B, 2005 APHA 5520 B, 2017 APHA 5520 B, 2023
	Hydrocarbons/Mineral Oil (Commonly known as Total Petroleum Hydrocarbon)	APHA 5520 F, 2005 APHA 5520 F, 2017 APHA 5520 F, 2023
	Total Petroleum Hydrocarbon	In-house Method 0539 based on TNRCC method 1005, rev 03, 1st June 2001
	Polycyclic Aromatic Hydrocarbon (see Appendix A)	In-house Method 0538 based on USEPA 3510 C December 1996 & In-house Method 0534 based on USEPA 8270 C December 1996

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Water • Marine Water • Estuarine Water • Formation Water/Produce Water	Benzene, Toluene, Ethyl Benzene and o, p, m – Xylene (BTEX)	In-house Method 0521 based on USEPA 8260/5030 C, 1996
Water • Marine Water • Estuarine Water • Formation Water/Produce Water	**<u>Polychlorinated biphenyls</u>** 2-Chlorobiphenyl (1) 3,3'-Dichlorobiphenyl (11) 2,4,5-Trichlorobiphenyl (29) 2,2',4,4'-Tetrachlorobiphenyl (47) 2,3',4,5',6-Pentachlorobiphenyl (121) 2,2',3,3',6,6'-Hexachlorobipheny (136) 2,2',3,4,5,5',6-Heptachlorobiphenyl (185) 2,2',3,3',4,4',5,5'-Octachlorobiphenyl (194) 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (206) Decachlorobiphenyl (209) Reporting Limit: <10µg/L	In-house Method 0596 based on USEPA 3510 C and USEPA 8270 C
	Unionised Ammonia by Calculation	In-house Method 0590 adopted from Unionised Ammonia Calculator V 1.2 by Florida Dept. of Environmental Protection
	Methyl Tert-Butyl Ether (MTBE)	In-house Method 5997 based on USEPA 5030 C & USEPA 8260 C
	Total Nitrogen by Calculation	In-house Method 5996 based on USEPA Definition of Total Nitrogen

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Water • Marine Water • Estuarine Water • Formation Water/Produce Water	**<u>Organochlorinated Pesticides</u>** Aldrin Dieldrin Cis Chlordane Trans Chlordane 4,4'-DDE 4,4'-DDT 4,4'-DDD Heptachlor Heptachlor Epoxide Lindane (γ-BHC) α-BHC β-BHC δ-BHC Endosulfan I Endosulfan ll Endosulfan Sulfate Endrin Endrin Ketone Endrin Aldehyde Methoxychlor	In-house Method 6040 based on USEPA 608 & USEPA 8270 E
	Volatile Organic Compounds (Appendix B)	In-house Method 6042 based on USEPA 5030 C & USEPA 8260 D
	Trihalomethanes Chloroform Bromodichloromethane Chlorodibromomethane Bromoform	In-house Method 0521 based on USEPA 5030 C & USEPA 8260 D
• River Water	Ferrous Iron	APHA 3500 Fe B, 2017

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Water • Marine Water • Estuarine Water • Formation Water/Produce Water	Chlorophyll a	APHA 10200 H, 2017
	Tributyltin	In-house Method 0589 based on APHA 6710 B, 2017
	*Oil and Grease (Mineral)	APHA 5520 F, 2005 APHA 5520 F, 2017 APHA 5520 F, 2023
	*Oil and Grease (Emulsified Edible)	APHA 5520 B & F, 2005 APHA 5520 B & F, 2017 APHA 5520 B & F, 2023
	Dissolved/Dispersed Petroleum Hydrocarbon (DDPH) (as Chrysene)	In-house Method 6001 based on MARPOLMON-P & Agilent Application Note 5989-7953EN

Note:
- *As per National Water Quality Standards for Malaysia
- MARPOLMON-P: Procedure for the Petroleum Component of the IOC Marine Pollution Monitoring System

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Water • Marine Water • Estuarine Water	Silver (Ag) Aluminium (Al) Arsenic (As) Boron (B) Barium (Ba) Beryllium (Be) Bismuth (Bi) Calcium (Ca) Cadmium (Cd) Cobalt (Co) Chromium (Cr) Copper (Cu) lron (Fe) Potassium (K) Lithium (Li) Magnesium (Mg) Manganese (Mn) Molybdenum (Mo) Sodium (Na) Nickel (Ni) Phosphorus (P) Lead (Pb) Sulphur (S) Antimony (Sb) Selenium (Se) Tin (Sn) Strontium (Sr) Titanium (Ti) Thalium (Tl) Vanadium (V) Zinc (Zn) Tellurium (Te) Uranium (U) Platinum (Pt) Gold (Au) Palladium (Pd) lridium (lr)	APHA 3030 F & APHA 3125 B, 2005 APHA 3030 F & APHA 3125 B, 2017 APHA 3030 F & APHA 3125 B, 2023

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Solvent • Ammonia Solution	Concentration of Ammonia Solution	In-house Method 6007 based on JECFA
	Chloride	In-house Method 6008 based on AnalaR Standards for Laboratory Chemical
	Sulphate	In-house Method 6009 based on AnalaR Standards for Laboratory Chemical

Note:

- JECFA- Joint FAO/WHO Expert Committee on Food Additives

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Drinking Water Mineral Water Dialysis Water Reverse Osmosis Water River Water Surface Water	Silver (Ag) Aluminium (Al) Arsenic (As) Boron (B) Barium (Ba) Beryllium (Be) Bismuth (Bi) Calcium (Ca) Cadmium (Cd) Cobalt (Co) Chromium (Cr) Copper (Cu) Iron (Fe) Potassium (K) Lithium (Li) Magnesium (Mg) Manganese (Mn) Molybdenum (Mo) Sodium (Na) Nickel (Ni) Phosphorus (P) Lead (Pb) Sulfur (S) Antimony (Sb) Selenium (Se) Tin (Sn) Strontium (Sr) Titanium (Ti) Thalium (Tl) Vanadium (V) Zinc (Zn) Tellurium (Te) Uranium (U) Platinum (Pt) Gold (Au) Palladium (Pd) Iridium (Ir)	APHA 3030 F & APHA 3125 B, 2005 APHA 3030 F & APHA 3125 B, 2017 APHA 3030 F & APHA 3125 B, 2023

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Water Drinking Water, Mineral Water, Dialysis Water, Reverse Osmosis Water, River Water, Surface Water, Ground Water, Swimming Pool and Spa Water **Environmental Monitoring** Industrial Effluent Leachates Sewage Water	Mercury	In-house Method 6055 based on APHA 3120 B & 3114 B, 2023
Water Marine Water, River Water, Drinking Water	Arsenious Acid As III	In-house Method 6054 based on Agilent application note 5991-5933EN
	Chromium Hexavalent	In-house Method 6053 based on Agilent application note 5991-2878EN
Water Drinking Water, Mineral Water, Dialysis Water, Reverse Osmosis Water, River Water, Surface Water, Swimming Pool and Spa Water	Monochloramine	In-house Method 6052 based on Palintest Comparator
Water Cooling Water, Denim Water, Steam Raising / Boiler Water	Reactive Silica	APHA 4500 SiO_2 C, 2023

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Foods • Food and Food Products	Total Nitrogen / Protein (including feedstuff)	In-house Method 0506 based on Pearson's Chemical Analysis of Food (8th Ed.)
	Sulphur dioxide (in unpreserved fresh prawn)	In-house Method 0505 based on Pearson's Chemical Analysis of Food (8th Ed.)
	Moisture	In-house Method 0509 based on Pearson's Chemical Analysis of Food (8th Ed.)
	Ash	In-house Method 0510 based on Pearson's Chemical Analysis of Food (8th Ed.)
	Carbohydrate (by difference)	In-house Method 0512 based on Method of Analysis for Nutrition Labeling (AOAC 1993)
	Energy (by calculation)	In-house Method 0513 based on Method of Analysis for Nutrition Labeling (AOAC 1993)
	Fat by Soxhlet Extraction	In-house Method 0511 based on Pearson's Chemical Analysis of Food (8th Ed.)
	Fat by Rose Gottlieb Method	In-house Method 0514 based on Pearson's Chemical Analysis of Food (8th Ed)
Foods • Fish • Prawn • Soy Sauce • Tomato Sauce	**Heavy Metals** Antimony Arsenic Cadmium Lead Tin	In-house Method 0544 based on AOAC 999.11

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Foods • Edible Bird Nest	Nitrite & Nitrate	In-house Method 0540 based on AOAC 973.31 & APHA 4500 NO_2 B & NO_3 E, 2012
• Fish and Prawn	Mercury	In-house Method 0558 based on APHA 3112 B, 2012
• Fish	Formaldehyde	In-house Method 0536 based on AOAC 964.21
• Honey	Chloramphenicol	In-house Method 0569 based on Agilent Application Note 5990-5975 EN
• Soy Sauce, Honey, Fish Balls, Meat Balls, Syrup, Soft Drinks	Benzoic acid and/or Sorbic acid	In-house Method 0568 based on Agilent Application Note 5990-6082 EN
• Honey • Cordial Drink	Ascorbic Acid	In-house Method 0567 based on Agilent Application Note 5990-8270 EN
• Honey • Palm Sugar	Sugar Profile: Sucrose Glucose Fructose Maltose Lactose	In-house Method 6000 based on Agilent Data Sheet 820629-008D
Cereal and cereal products Milk and Milk products Cocoa and Cocoa products Sauces Non-alcoholic beverages Flour and confectionery Sugar and sugar products Honey and honey products	Total Sugar Reducing sugar	In-house method 6051 based on Pearson's Chemical Analysis of Food, 8th Ed., 1981 (Lane and Eynon Titration)
• Beer • Wine	Alcohol (as Ethanol)	In-house Method 6056 based on AOAC and Journals of Food and Drug Analysis (2003)

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Agricultural Products and Materials • Fertilizers	Nitrogen Phosphorus Potassium Magnesium Boron	In-house Method 0515 MS 417- 4: 2020 In-house Method 0517 based on MS 417- 5: 2020 MS 417- 6: 2020 MS 417- 7: 2020
• Compost	Organic Carbon	MS 2469: 2012
• Palm Oil and Palm Oil Products	Lovibond Colour Moisture and Volatile Matter Impurities Acidity Iodine Value Slip Melting Point Carotene Content DOBI	MPOB P4.1: 2004 MPOB P2.1: 2004 MPOB P2.2: 2004 MPOB P2.5: 2004 MPOB P3.2: 2004 AOCS Cd 1b-87 MPOB P4.2: 2004 MPOB P2.6: 2004 MPOB P2.9: 2004
Others • Aluminium Sulphate	Water Soluble Aluminium Compounds / Aluminium content as Al_2O_3 Basicity (as Al_2O_3) Determination of Iron (as Fe_2O_3)	MS 699: 2008: Annex B1 MS 699: 2008: Annex C MS699: 2008: Annex F3
• Hydrated Lime	Available Lime (Alternative Method)	BS EN 12485: 2010 (E)

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Petroleum & Petroleum Products	Density	ASTM D 1298-12b (Reapproved 2017)
• Biodiesel Blend	Water Content	ASTM D 6304-20 (Procedure A)
	Flash Point	ASTM D 93-20 (Procedure A)
• Biodiesel	Density	ASTM D 1298-12b (Reapproved 2017)
	Density Correction	EN 14214:2008 (E) Annex C
	Water Content	ASTM D 6304-20 (Procedure A)
• Petroleum Distillates	Determination of Aromatic Hydrocarbon Type	EN 12916-2006
• Jet A1/ Diesel	Flash Point	ASTM D 93-20 (Procedure A)
• Scheduled Waste (Spent Lubricating Oil/ Spent Hydraulic Oil/ Liquid Waste)	Flash Point	USEPA 1010A
• Transformer Oil	Water Content	ASTM D 6304-20 (Procedure A)
Transformer Oil	Dielectric Breakdown Voltage	ASTM D1816-12
Petroleum Oil	Ash Content	ASTM D482-19

SCOPE OF TESTING: CHEMICAL

SITE

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Water and Wastewater • Marine Water • Estuarine Water	pH Value	APHA 4500-H^+ B, 2005 APHA 4500-H^+ B, 2017 APHA 4500-H^+ B, 2023
	Free Residual Chlorine (DPD)	In-house Method 0501 based on Palintest Comparator
	Combined Residual Chlorine (DPD)	In-house Method 0501 based on Palintest Comparator
	Total Residual Chlorine (DPD)	In-house Method 0501 based on Palintest Comparator
	Oxygen (Dissolved)	APHA 4500-O G, 2005 APHA 4500-O G, 2017 APHA 4500-O G, 2023
	Temperature	APHA 2550 B, 2005 APHA 2550 B, 2017
• Ambient Air	Total Suspended Particulate Matter	AS/NZS 3580.9.3: 2015
	Deposited Particulate Matter (Total Solid)	AS/NZS 3580.10.1: 2003

Note:
- APHA: American Public Health Association

SCOPE OF TESTING: CHEMICAL

SITE

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Ambient Air	CO_2	In-house Method 6005 based on Sirius gas meter manufacturer manual (In Situ -Direct Measurement)
	O_2	In-house Method 6004 based on Crowcon gas meter manufacturer manual (In Situ - Direct Measurement)
	#PM10	CFR App J to part 50 - Reference method for the determination of particulate matters as PM_{10} in the atmosphere AS NZS 3580.9.6: 2015
	#PM2.5	CFR App L to part 50 - Reference method for the determination of fine particulate matters as $PM_{2.5}$ in the atmosphere AS NZS 3580.9.14: 2013
	SO_2	Method 704 A of air sampling and analysis, 3rd Edition
	NO_2	In-house Method 6022 based on Method 818 of air sampling and analysis, 3rd Edition

SCOPE OF TESTING: CHEMICAL

SITE

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Ambient Air	PM10 PM2.5 O_3 CO H_2S NH_3	In-house Method 6020 based on Instrumentation- Direct Reading Aeroqual 500
	CO H_2S CH_4	In-house Method 6004 based on Crowcon gas meter manufacturer manual
Environmental Monitoring • Industrial Hygiene (Area & Personal Exposure)	Hydrocarbons, BP 36°-216°C (N- Hexane only)	NMAM 1500
	Hydrocarbon, Aromatic (Benzene, Toluene, Ethylbenzene & Xylene)	NMAM 1501
	Mercury	NMAM 6009
	Methanol	NMAM 2000
	Alkaline Dusts (as NaOH)	NMAM 7401
	Total Particulate	NMAM 0500
	Respirable Particulate	NMAM 0600

Note:
- NMAM: NIOSH Manual of Analytical Methods.

SCOPE OF TESTING: CHEMICAL

SITE

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Stationary Air Emission	Particulate Matter	MS 1596:2003
	Particulate Matter	USEPA Method 5
	SO_2 NO NO_2 CO CO_2 O_2 H_2S	In-house Method 0585 based on Testo 350 Flue gas analyser
	Dark Smoke	BS 2742:2009
	Smoke Density	US Bureau of Mines Information Circular 8333 (revision of IC 7718)
Water • Groundwater	LNAPL Thickness Oxidation Reduction Potential	In-house Method 6045 based on Solinst Interface Meter In-house Method 6003 based on APHA 2580
• Groundwater • Marine Water	Appearance Odor	In-house Method 6006 based on Washington Department of Health Publication 331-286 Revised February 2018
Marine Water Estuarine Water River Water Groundwater Lake/Dam/Reservoir Water	Temperature pH DO Salinity Turbidity Chlorophyll a Conductivity Total Dissolved Solids	In-house Method 6050 based on Aqua Troll 600 multiparameter sonde

SCOPE OF TESTING: MECHANICAL

SITE

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Ambient Noise	Measurement of Noise Emission Level	ISO 1996-1:2016 & ISO 1996-2:2017
Vibration	Measurement of vibration level	DOE Guidelines for Environmental Vibration Limits and Control, 3rd Edition

Note:
- ISO-International Organization for Standardization

SCOPE OF TESTING: MICROBIOLOGY

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Microbiological Environmental Sample	Heterotrophic Plate Count	APHA 9215 B, 2005 APHA 9215 B, 2023
• Water and Wastewater	Total Coliform Count	APHA 9221 B, 2005 APHA 9221 B, 2023
	Fecal Coliform Count	APHA 9221 E, 2005
	Thermotolerant (Fecal) Coliform Count	APHA 9221 E, 2023
	Escherichia Coli Count	In-house Method 0601 based on APHA 9221 E, 2023 & AS 4276.6,1995
• Water and Waste Water	*Escherichia Coli* Count	APHA 9221 G, 2023
	Clostridium perfringens	The Microbiology of Drinking Water (2010)-Part 6B
	Sulphite Reducing *Anaerobe*	The Microbiology of Drinking Water (2010)-Part 6A
	Total Coliform by Membrane Filtration	In-house Method 0606 based on APHA 9222 B, 2023
	Escherichia Coli by Membrane Filtration	In-house Method 0610 based on APHA 9222 H, 2023
	Shigella (MF)	APHA 9260 E, 2017
	Total Coliform & E Coli by Dual Chromogen Membrane Filtration	In-house Method 0608 based on APHA 9222 J, 2023
	Thermotolerant Fecal Coliform by Membrane Filtration Method	APHA 9222 D, 2023
• Water and Wastewater (Field Sampling & Testing)	Enzyme Substrate Test: Total Coliform & *Escherichia Coli* Count	APHA 9223 B,2012

SCOPE OF TESTING: MICROBIOLOGY

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Microbiological Environmental Sample • Water	Examination of *Legionella* including *Legionella Pneumophila* *Pseudomonas Aeruginosa* Fecal *Enterococci/Streptococci* Fecal *Enterococci*	AS/NZS 3896: 1998 APHA 9213 E, 2017 APHA 9230 C, 2017 APHA 9230 B, 2023
• Surface • Equipment • Personnel Hand	**Swab Test:** Standard Plate Count Coliform Count *E.coli* Count Coagulase-positive *Staphylococci* *Salmonellae*	 In-house Method 0605:1 Swab Contact Method In-house Method 0605:2 based on AOAC 46.016,1984 In-house Method 0605:3 based on AS 1766.2.3, 1992 In-house Method 0605: 4 based on AS 1766.2.4,1994 In-house Method 0605: 5 based on AS 1766.2.5,1991
• Surface • Equipment • Personnel Hand	Swab Test Aerobic Plate Count, CFU/cm2	In-house Method 0611 based on AOAC 966.23, 2016
• Environmental Surfaces	Detection of Listeria spp on Surface	RapidChek®Listeria species Environmental System
• River water • Marine Water	Thermotolerant (*Fecal*) Coliform by Membrane Filtration	In-house Method 0609 based on APHA 9222G, 2023
• Marine Water • Estuarine Water • Formation Water/Produce Water	Total Coliform & E Coli by Dual Chromogen Membrane Filtration Thermotolerant Fecal Coliform by Membrane Filtration Method	In-house Method 0608 based on APHA 9222 J, 2023 APHA 9222 D, 2023

SCOPE OF TESTING: MICROBIOLOGY

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Microbiological Tests on Foods • Food and Food Products	Standard Plate Count	AS 1766.2.1, 1991
	Coliform Count	AS 1766.2.3, 1992 AOAC 46.016, 1984
	Escherichia Coli Count	AS 1766.2.3, 1992
	Salmonellae	AS 1766.2.5, 1991
	Vibrio Parahaemolyticus (Qualitative Test)	AS 1766.2.9, 1991
	Vibrio Cholerae	In-house Method 0602 based on Ministry of Health Malaysia
	Yeasts and Molds Count	FDA/BAM, 5th Edition In-house Method 0603 based on APHA Compendium Method
	Coagulase-positive *Staphylococci*	AS 1766.2.4, 1994
	Listeria spp. per 25 g sample	RapidChek®Listeria species Food System
• Food and Food Products	*Bacillus cereus*	CCFRA Microbiological Methods Manual, Method 8.1:1995
	Clostridium perfringens	CCFRA Microbiological Methods Manual, Method 12.1:1995
	Listeria monocytogenes	RapidChek Listeria Next Day Food System
	Coliform & E.coli, CFU/g	Rapid E.coli/Coliform Count Plate, AOAC 2018.13, 2018 (Petrifilm Method)
Compost & Organic Fertilizer	E.coli, MPN/g	In-house Method 0612 based on USEPA Method 1680, 2014
	Salmonella, MPN/4g	In-house Method 0613 based on USEPA Method 1682, 2006

Note:
- AS : Australia Standards
- AOAC : Association of Official Analytical Chemists
- FDA/BAM : Food and Drug Administration/Bacteriological Analytical Manual
- APHA : American Public Health Association
- CCFRA - Campden & Chorleywood Food Research Association

APPENDIX A

List of Polycyclic Aromatic Hydrocarbon (PAH)

1. Naphthalene
2. 1-Methylnaphthalene
3. 2-Methylnaphthalene
4. Acenaphthene
5. Acenaphthylene
6. Fluorene
7. Phenanthrene
8. Anthracene
9. Fluoranthene
10. Pyrene
11. Benz(a)anthracene
12. Chrysene
13. Benzo(b)fluoranthene
14. Benzo(k)fluoranthene
15. Benzo(a)pyrene
16. Indeno(1,2,3-c,d)pyrene
17. Dibenz(a,h)anthracene
18. Benzo(g,h,i)perylene

APPENDIX B

List of Volatile organic Compounds

1. Methylene chloride (Dichloromethane)
2. 1,1-Dichloroethane
3. 1,2-Dichloroethylene (trans)
4. Bromochloromethane
5. Chloroform
6. 2,2-Dichloropropane
7. 1,2-Dichloroethane
8. 1,1,1-Trichloroethane
9. Carbon Tetrachloride
10. Benzene
11. Dibromomethane
12. 1,2-Dichloropropane
13. Trichlorothylene
14. Bromodichloromethane
15. 1,1,2-Trichloroethane
16. Toluene
17. 1,3-Dichloropropane
18. Ethyl methacrylate
19. Dibromochloromethane
20. 1,2-Dibromoethane (EDB)
21. Tetrachloroethylene
22. 1,1,1,2-tetrachloroethane
23. Chlorobenzene
24. Ethylbenzene
25. Bromoform
26. Styrene
27. 1,2,3-Trichloropropane
28. Bromobenzene
29. 1,2-Dichlorobenzene
30. 1,2-Dibromo-3-chloropropane
31. 1,2,4-Trichlorobenzene
32. Hexachlorobutadiene
33. 1,2,3-Trichlorobenzene