Issue date: 18 August 2023
Valid Until: 01 July 2028

NO: SAMM 111

LABORATORY LOCATION/ CENTRAL OFFICE:	Spectrum Laboratories (Penang) Sdn Bhd 1904 Tingkat 1, Jln. Bukit Minyak Taman Sri Mangga 14000 Bukit Mertajam, Pulau Pinang. , 14000, PULAU PINANG MALAYSIA
ACCREDITED SINCE :	24 MARCH 2025
FIELD(S) OF TESTING:	CHEMICAL MICROBIOLOGICAL
SITE:	
1 . SITE LABORATORY(HQ) :	CATEGORY I
FIELD(S) OF TESTING :	CHEMICAL

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).

CENTRAL LOCATION:	Spectrum Laboratories (Penang) Sdn Bhd 1904 Tingkat 1, Jln. Bukit Minyak Taman Sri Mangga 14000 Bukit Mertajam, Pulau Pinang. , 14000, Pulau Pinang
FIELD(S) OF TESTING :	CHEMICAL, MICROBIOLOGICAL

SCOPE OF TESTING : CHEMICAL

Material / Product Tested	**Type Of Test / Properties Measured / Range Of Measurement**	**Standard Test Methods / Equipment / Techniques**
Environmental Monitoring - Effluent / Water	Arsenic as As	ASTM D2972-88 A
	Biochemical Oxygen Demand (BOD)	APHA 5210B /4500 O-G
	Boron as B	APHA 4500-B,C
	Chromium, Hexavalent	APHA 3500 Cr-B
	Chromium, Trivalent	In-house method No. 5 based on APHA 3500 Cr-B
	Chemical Oxygen Demand	APHA 5220 C
	Cyanide as CN	OSRMA P.456
	Free Chlorine	APHA 4500-CI F
	Oil & Grease	APHA 5520 B
	pH	APHA 4500-H+ B
	Nitrite as N / as NO_2	APHA 4500-NO2 B
	Total Hardness as $CaCO_3$	APHA 2340 C
	Phosphorus as P and Phosphate as PO_4	APHA 4500-P,B & APHA 4500-P,C

Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques
	Sulphate as SO4	APHA 4500 SO4 E
	Phenol	APHA 5530-B,C
	Sulphide as S2-	APHA 4500 - S2- F
	Aluminium as Al	APHA 3500 Al-B
	Ammonia as NH3	APHA 4500 NH3 - B,C
	Preliminary Treatment of Samples : Nitric Acid – Hydrochloric Acid Digestion	APHA 3030-F
	Chloride as Cl	APHA 4500-Cl C
	Fluoride as F	APHA 4500-F D
	Molybdate Reactive Silica as SiO2	APHA 4500 SiO2 D
	Dissolved Oxygen	APHA 4500 O-G
	Total Organic Carbon (TOC)	APHA 5310-C Persulfate-Ultraviolet or Heated-Persulfate Oxidation Method
	Anionic Surfactant as MBAS	APHA 5540 C
	Total Alkalinity P- Alkalinity m- Alkalinity	OSRMA p.334 - 336
	Bicarbonate Alkalinity Carbonate Alkalinity Hydroxide Alkalinity Free Carbon Dioxide Total Carbon Dioxide	APHA 4500 CO2 D

Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques
	Metals by Inductively Coupled Plasma (ICP) Method: Aluminium as Al Antimony as Sb Arsenic as As Barium as Ba Beryllium as Be Boron as B Cadmium as Cd Calcium as Ca Chromium as Cr, Total Cobalt as Co Copper as Cu Iron as Fe Lead as Pb Lithium as Li Magnesium as Mg Manganese as Mn Molybdenum as Mo Nickel as Ni Potassium as K Selenium as Se Silver as Ag Silicon as Si Silica as SiO2 Sodium as Na Strontium as Sr Thallium as Tl Vanadium as V Zinc as Zn	APHA 3120 B
	Tin Bismuth as Bi Gallium as Ga Indium as In Phosphorus as P (or PO4)	In-house method No. 4 based on APHA 3120 B
	Mercury	In-house method No. 3 based on APHA 3120 B
	Total Acidity p- Acidity m- Acidity	APHA 2310 B

Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques
	Nitrate as N / as NO3	APHA 4500 NO3 B
	Nitrate as N / as NO3	APHA 419 D (14th)
	Turbidity	APHA 2130 B
	Hardness by calculation	APHA 2340 B
	Total Kjeldahl Nitrogen	APHA 4500 Norg A
	Organic Nitrogen	APHA 4500 Norg B
	Total Nitrogen	In-house method No. 7 (based on APHA 4500 Norg B, APHA 4500 NO2B, APHA 4500 NH3 B C, APHA 419D 14th)
	Formaldehyde	HACH SPECTROPHOTOMETER Method 8110
	Formaldehyde	OSRMA p.458
	Color (ADMI)	APHA 2120 F
	Barium	HACH SPECTROPHOTOMETER Method 8014
	Total Chromium	HACH SPECTROPHOTOMETER Method 8024
	Chromium, Hexavalent	HACH SPECTROPHOTOMETER Method 8023
	Chromium, Trivalent	In-house method No. 6 based on HACH SPECTROPHOTOMETER
	Cyanide	Method 8024 / Method 8023
	Tin	APHA 4500 – CN- C and F APHA 3111B/ Direct Air-Acetylene Flame Method

Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques
	Calcium as Ca Chromium, Total Cadmium as Cd Copper as Cu Iron as Fe Lead as Pb Magnesium as Mg Manganese as Mn Nickel as Ni Potassium as K Sodium as Na Zinc as Zn Silver as Ag Strontium as Sr	APHA 3111-B
	Arsenic Mercury Tin Selenium as Se Preliminary Treatment of Samples : Digestion for Metals Preliminary treatment of Samples: Nitric Acid Digestion	APHA 3114 C-Continuous Hydride Generation- AAS Method APHA 3112 B-Cold-Vapor Atomic Absorption Spectrometric In-house method No. 1 based on APHA 3114-C- Continuous Hydride Generation- AAS Method APHA 3114-C APHA 3030-D APHA 3030-E
	Suspended Solids Total Dissolved Solid Dried at 180°C Total Solid Mixed Liquor Suspended solids (MLSS) Mixed Liquor Volatile Suspended Solids (MLVSS)	APHA 2540-D APHA 2540 C APHA 2540 B In-house method No. 8 based on APHA 2540 D In-house method No. 9 based on APHA 2540 E

Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques
Environmental Monitoring - Sewage	Biochemical Oxygen Demand (BOD) Chemical Oxygen Demand (COD) Oil & Grease Phosphorus as P Phosphate as PO4 Suspended Solids Ammonia as NH3 Nitrate as N as NO3 Total Nitrogen pH	APHA 5210 B/ 4500 O-G APHA 5220 C APHA 5520 B APHA 4500-P, B APHA 4500-P, C APHA 2540-D APHA 4500 NH3 - B, C APHA 419D (14th) In-house method No. 7 based on [APHA 4500 Norg A, APHA 4500 Norg B, APHA 4500 NO2B, APHA 4500 NH3 B, C, APHA 419 D (14th)] by calculation APHA 4500-H+ B
Environmental Monitoring - Water / Effluent / Sewage	Phosphorus as P (or PO4) Nitrate as N (or NO3) Nitrite as N (or NO2) Cyanide Ammoniacal Nitrogen Fluoride Phenol Color COD	APHA 4500 P, B, F APHA 4500 NO3 F APHA 4500 NO3 D APHA 4500 NO3 F APHA 4500 CN E APHA 4500 NH3 G APHA 4500 NH3 D APHA 4500 F C USEPA 420.4 Rev 1.0 APHA 2120 C APHA 5220 D
Environmental Monitoring - Rubber / Palm Oil Mill Effluent	Biochemical Oxygen Demand Chemical Oxygen Demand Suspended Solids Oil & Grease Ammoniacal Nitrogen Total Nitrogen	DOE Malaysia Alternative Method DOE Malaysia Reference Method DOE Malaysia Alternative Method DOE Malaysia Reference Method DOE Malaysia Reference Method DOE Malaysia Reference Method

Issue date: 18 August 2023
Valid Until: 01 July 2028

NO: SAMM 111

Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques
Environmental Monitoring - Sediments, Sludges, Soil & Solid Waste	Cadmium as Cd Chromium as Cr Copper as Cu Iron as Fe Manganese as Mn Nickel as Ni Lead as Pb Zinc as Zn Calcium as Ca Magnesium as Mg Potassium as K Sodium as Na	APHA 3111-B
	Moisture content Solid content Organic content Inorganic content Acid Digestion of Sediments, Sludges & Soils pH	OSRMA p.472 (By calculation) OSRMA p.472 OSRMA p.472 OSRMA p.472 (By calculation) EPA 3050 B EPA 9045 D

SCOPE OF TESTING : MICROBIOLOGICAL

Material / Product Tested	**Type Of Test / Properties Measured / Range Of Measurement**	**Standard Test Methods / Equipment / Techniques**
Effluent / Water	Heterotrophic Plate Count / Total Plate Count - Pour Plate Method Heterotrophic Plate Count / Total Plate Count - Spread Plate Method Heterotrophic Plate Count / Total Plate Count - Membrane Filtration Method Total Coliform (MPN) Method Fecal Coliform (MPN) Method E. coli (MPN) Method Total Coliform (Membrane Filtration) E. coli (Membrane Filtration) Fecal Coliform (Membrane Filtration) E. coli (MPN) Method Enterococci	APHA 9215 B APHA 9215 C APHA 9215 D APHA 9221 B APHA 9221 E In-house method-Microb-No. 3 (based on APHA 9221 E) In-house method-Microb-No. 1 (based on APHA 9222 B) In-house method-Microb-No. 2 (based on APHA 9222 G) APHA 9222 D APHA 9221 F APHA 9230 C
Food	Aerobic Plate Count / Total Plate Count (Spread Plate and Pour Plate Method) Yeast and Mold - Spread Plate Method Coliform (MPN) Method Fecal Coliform (MPN) Method E. coli (MPN) Method Staphylococcus aureus	FDA-BAM Chapter 3 FDA-BAM Chapter 18 FDA-BAM Chapter 4 FDA-BAM Chapter 4 FDA-BAM Chapter 4 FDA-BAM Chapter 12

Issue date: 18 August 2023
Valid Until: 01 July 2028

NO: SAMM 111

SITE LOCATION (HQ)	1. CATEGORY I
FIELD(S) OF TESTING :	CHEMICAL

SCOPE OF TESTING : CHEMICAL

Material / Product Tested	**Type Of Test / Properties Measured / Range Of Measurement**	**Standard Test Methods / Equipment / Techniques**
Environmental Monitoring - Ambient	Ambient Air- Determination of Total Suspended Particulates (TSP) Ambient Air – Determination of Particulate Matter (10 µm) (PM10) Ambient Air- Determination of Particulate Matter (2.5 µm) (PM2.5) Ambient Air- Determination of Particulate Lead (Pb) Nitrogen Dioxide (NO2) in the Atmosphere Sulphur Dioxide (SO2) in the Atmosphere Suspended Particulate Matter – PM10	AS 2724.3 In-house Method-Air-No. 6 (based on USEPA 40 CFR Part 50 Appendix J) In-house Method-Air-No. 5 (based on USEPA 40 CFR Part 50 Appendix L) AS 2800 - 1985 ISC 408 ISC 704A AS 3580.9.6 - 2015

Environmental Monitoring - Stack / Flue Gas	Determination of Particulate Emissions from stationary sources Determination of Sulfur Dioxide emissions from stationary sources Determination of Nitrogen Oxide emissions from stationary sources Determination of Sulfuric Acid mist and Sulfur Dioxide emissions from stationary sources Determination of metals emissions from stationary sources Determination of Hydrogen Halide and Halogen Emissions from stationary sources Determination of concentration & mass flow of particulate matter in flue gas for stationary source emissions Determination of Carbon monoxide Determination of Carbon dioxide Determination of Oxygen Determination of Nitrogen dioxide	EPA 40 CFR 60, App. A, Method 5. EPA 40 CFR 60, App. A, Method 6. EPA 40 CFR 60, App. A, Method 7. EPA 40 CFR 60, App. A, Method 8. EPA 40 CFR 60, App. A Method 29 In House Method No. 2 based on EPA 40 CFR 60, App. A, Method 26A MS 1596 : 2003 In-house method Air No. 5 based on manufacturer's Measurement Procedures In-house method Air No. 6 based on manufacturer's Measurement Procedures In-house method Air No. 7 based on manufacturer's Measurement Procedures In-house method Air No. 8 based on manufacturer's Measurement Procedures
	Determination of Nitrogen oxide Determination of Sulfur dioxide	In-house method Air No. 9 based on manufacturer's Measurement Procedures In-house method Air No. 10 based on manufacturer's Measurement Procedures
Environmental Monitoring - Smoke	Determination of dark smoke emissions from chimney using Ringelmann Smoke Chart	BS2742:2009
Environmental Monitoring - Effluent / Water	pH Temperature Dissolved Oxygen Conductivity Turbidity	APHA 4500 H+ B APHA 2550 B APHA 4500 O G APHA 2510 B APHA 2130 B
Environmental Monitoring - Sewage	pH Temperature	APHA 4500 H+ B APHA 2500 B
Environmental Monitoring - Noise Measurement	Acoustics- Description and Measurement of Environmental Noise	ISO 1996/1

Issue date: 18 August 2023
Valid Until: 01 July 2028

NO: SAMM 111

Environmental Monitoring - Air	Measurement of Methane, Carbon Dioxide, Oxygen, Nitrogen, Hydrogen Sulphide, & Carbon Monoxide using Portable Gas Analyser	In-house method-Air-No.4 (based on Manufacturer's Measurement Procedures)
Environmental Monitoring - Ground Vibration	Measurement of Ground Vibration using Vibrometer	In-house method-Vibration-No. 1 based on Manufacturer's Measurement Procedures (Instantel Minimate PlusTM Vibration)
Industrial Hygiene	Lead by Flame AAS Cadmium and Compounds, as Cd Chromium and Compounds, as Cr Copper (dust and fume) Iron Manganese and compounds, as Mn Nickel and Compounds, as Ni Zinc and Compounds, as Zn	NIOSH 7082 NIOSH 7048 NIOSH 7024 NIOSH 7029 In-house method-Air-No.1 (based on NIOSH 7030) In-house method-Air-No.2 (based on NIOSH 7030) In-house method-Air-No.3 (based on NIOSH 7030) NIOSH 7030
- Ambient	Determination of oxidizing substances in the atmosphere Determination of Carbon monoxide (CO) in the atmosphere Determination of wind velocity and direction measurement	ISC 411 ASTM D4599-90 In-house method Air No. 11 based on manufacturer's Measurement Procedures