



MS ISO/IEC 17025

Certificate of Accreditation

No: SMM 111

Valid until: 29 July 2011

This is to certify that

**SPECTRUM LABORATORIES (PENANG) SDN BHD
PULAU PINANG
MALAYSIA
(FIELDS OF TESTING: CHEMICAL & MICROBIOLOGY)**

has been granted accreditation in respect of the scope of accreditation described in the SCHEDULE attached, subject to the terms and conditions governing the *Skim Akreditasi Makmal Malaysia (SMM)*, the Laboratory Accreditation Scheme of Malaysia.

Laboratories accredited under SMM meet the requirements of MS ISO/IEC 17025 'General requirements for the competence of testing and calibration laboratories'. This Malaysian Standard is identical with ISO/IEC 17025 published by the International Organization for Standardization (ISO).

"This laboratory is accredited in accordance with recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer joint ISO-ILAC-IAF Communique dated 18 June 2005)"



(FADILAH BAHARIN)

Director-General

Department of Standards Malaysia

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LABORATORY LOCATION:
(PERMANENT LABORATORY)

SPECTRUM LABORATORIES (PENANG) SDN BHD
1904 TINGKAT 1, JALAN BUKIT MINYAK
TAMAN SRI MANGGA, 14000 BUKIT MERTAJAM
SEBERANG PRAI TENGAH
PULAU PINANG, MALAYSIA

The standard used for assessment of this laboratory is MS ISO/IEC 17025:2005

FIELD OF TESTING: CHEMICAL

SCOPE OF ACCREDITATION:

Materials/ Products tested	Type of test/ Properties measured/ Range of measurement	Standard test methods/ Equipment/Techniques
Effluent / Water	Arsenic as As	ASTM D2972-88 A
	Arsenic	APHA 3114 C-Continuous Hydride Generation-AAS Method
	Biochemical Oxygen Demand (BOD)	APHA 5210B /4500 O-G
	Boron as B	APHA 4500-B,C
	Calcium as Ca	APHA 3111-B
	Chromium, Hexavalent	APHA 3500-Cr D
	Chromium, Trivalent	APHA 3500-Cr D
	Chromium, Total	APHA 3111-B
	Cadmium as Cd	APHA 3111-B
	Chemical Oxygen Demand	APHA 5220 C
	Copper as Cu	APHA 3111-B
	Cyanide as CN	OSMRA P.456
	Free Chlorine	APHA 4500-Cl F
	Iron as Fe	APHA 3111-B



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FIELD OF TESTING: CHEMICAL
SCOPE OF ACCREDITATION:

<u>Materials/ Products tested</u>	<u>Type of test/ Properties measured/ Range of measurement</u>	<u>Standard test methods/ Equipment/Techniques</u>
Effluent / Water (continued)	Lead as Pb	APHA 3111-B
	Magnesium as Mg	APHA 3111-B
	Manganese as Mn	APHA 3111-B
	Mercury	APHA 3112 B-Cold-Vapor Atomic Absorption Spectrometric
	Nickel as Ni	APHA 3111-B
	Oil & Grease	APHA 5520 B
	pH	APHA 4500-H ⁺ B
	Nitrite as N / as NO ₂	APHA 4500-NO ₂ 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
	Sulphate as SO ₄	APHA 4500 SO ₄ E
	Selenium as Se	APHA 3114-C
	Phenol	APHA 5530-B,C
	Potassium as K	APHA 3111-B
	Sodium as Na	APHA 3111-B
	Sulphide as S ²⁻	APHA 4500 – S ²⁻ F
	Suspended Solids	APHA 2540-D



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FIELD OF TESTING: CHEMICAL
SCOPE OF ACCREDITATION :

Materials/ Products tested	Type of test/ Properties measured/ Range of measurement	Standard test methods/ Equipment/Techniques
Effluent/ Water (Continued)	Tin	In House Method No. 1 based on APHA 3114-C-Continuous Hydride Generation - AAS Method
	Zinc as Zn	APHA 3111-B
	Aluminium as Al	APHA 3500 Al - D
	Ammonia as NH ₃	APHA 4500 NH ₃ - B,C
	Preliminary Treatment of Samples : Digestion for Metals	APHA 3030-D
	Preliminary treatment of Samples: Nitric Acid Digestion.	APHA 3030-E
	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
	Silver as Ag	APHA 3111-B
	Strontium as Sr	APHA 3111-B
	Molybdate Reactive Silica as SiO ₂	APHA 4500 Si-E
	Total Dissolved Solid Dried at 180°C	APHA 2540 C
	Dissolved Oxygen	APHA 4500 O-G
	Total Organic Carbon (TOC)	APHA 5310-C Persulfate-Ultraviolet or Heated- Persulfate Oxidation Method



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FIELD OF TESTING: CHEMICAL

SCOPE OF ACCREDITATION:

<u>Materials/ Products tested</u>	<u>Type of test/ Properties measured/ Range of measurement</u>	<u>Standard test methods/ Equipment/Techniques</u>
Effluent / Water (Continued)	Anionic Surfactant as MBAS	APHA 5540 C
	Total Alkalinity	OSRMA p.334 - 336
	P- Alkalinity	OSRMA p.334 - 336
	m- Alkalinity	OSRMA p.334 - 336
	Bicarbonate Alkalinity	APHA 4500 CO ₂ D
	Carbonate Alkalinity	APHA 4500 CO ₂ D
	Hydroxide Alkalinity	APHA 4500 CO ₂ D
	Free Carbon Dioxide	APHA 4500 CO ₂ D
	Total Carbon Dioxide	APHA 4500 CO ₂ D
	Total Acidity	APHA 2310 B
	p- Acidity	APHA 2310 B
	m- Acidity	APHA 2310 B
	Total Solid	APHA 2540 B
	Nitrate as N / as NO ₃	APHA 4500 NO ₃ B
	Nitrate as N / as NO ₃	APHA 419 D (14 th)
	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	APHA 4500 N



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FIELD OF TESTING: CHEMICAL

SCOPE OF ACCREDITATION:

<u>Materials/ Products tested</u>	<u>Type of test/ Properties measured/ Range of measurement</u>	<u>Standard test methods/ Equipment/Techniques</u>
Rubber / Palm Oil Mill Effluent	Biochemical Oxygen Demand	DOE Malaysia 1985 Alt Method
	Chemical Oxygen Demand	DOE Malaysia 1985 References Method
	Suspended Solids	DOE Malaysia 1985 Alt Method
	Oil & Grease	DOE Malaysia 1985 References Method
	Ammoniacal Nitrogen	DOE Malaysia 1985 References Method
	Total Nitrogen	DOE Malaysia 1985 References Method
Sediments, Sludges, Soil & Solid Waste	Moisture content	OSRMA p.472 (By calculation)
	Solid content	OSRMA p.472
	Organic content	OSRMA p.472
	Inorganic content	OSRMA p.472 (By calculation)
	Acid Digestion of Sediments, Sludges & Soils	EPA 3050 B
	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	EPA 3050 B (AAS)
	pH	EPA 9045 D



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FIELD OF TESTING: CHEMICAL
SCOPE OF ACCREDITATION:

Materials/ Products tested	Type of test/ Properties measured/ Range of measurement	Standard test methods/ Equipment/Techniques
Air	Ambient Air – Determination of Total Suspended Particulates (TSP)	AS 2724.3
	Ambient Air – Determination of Particulate Lead (Pb)	AS 2800
	Nitrogen Dioxide (NO ₂) in the Atmosphere	ISC 408
	Sulphur Dioxide (SO ₂) in the Atmosphere	ISC 704A
	Suspended Particulate Matter – PM ₁₀	AS 3580.9.6 – 1990
	Lead by Flame AAS	NIOSH 7082
	Cadmium and Compounds, as Cd	NIOSH 7048
	Chromium and Compounds, as Cr	NIOSH 7024
	Copper (dust and fume)	NIOSH 7029
	Iron	In-House Method-Air-No.1 (based on NIOSH 7030)
	Manganese and compounds, as Mn	In-House Method-Air-No.2 (based on NIOSH 7030)
	Nickel and Compounds, as Ni	In-House Method-Air-No.3 (based on NIOSH 7030)
	Zinc and Compounds, as Zn	NIOSH 7030



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FIELD OF TESTING: CHEMICAL

SCOPE OF ACCREDITATION:

<u>Materials/ Products tested</u>	<u>Type of test/ Properties measured/ Range of measurement</u>	<u>Standard test methods/ Equipment/Techniques</u>
Stack / Flue Gas	Determination of Particulate Emissions from stationary sources	EPA 40 CFR 60, App. A, Method 5.
	Determination of Sulfur Dioxide emissions from stationary sources	EPA 40 CFR 60, App. A, Method 6.
	Determination of Nitrogen Oxide emissions from stationary sources	EPA 40 CFR 60, App. A, Method 7.
	Determination of Sulfuric Acid mist and Sulfur Dioxide emissions from stationary sources	EPA 40 CFR 60, App. A, Method 8.
	Determination of metals emissions from stationary sources	EPA 40 CFR 60, App. A Method 29
	Determination of Hydrogen Halide and Halogen Emissions from stationary sources	In House Method No. 2 based on EPA 40 CFR 60, App. A, Method 26A
	Determination of concentration & mass flow of particulate matter in flue gas for stationary source emissions	MS 1596 : 2003



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FIELD OF TESTING: CHEMICAL

SCOPE OF ACCREDITATION: SITE TESTING - CATEGORY 1

<u>Materials/ Products tested</u>	<u>Type of test/ Properties measured/ Range of measurement</u>	<u>Standard test methods/ Equipment/Techniques</u>
Effluent / Water	pH	APHA 4500 H ⁺ B
	Temperature	APHA 2550 B
	Dissolved Oxygen	APHA 4500 O G
	Conductivity	APHA 2510 B
	Turbidity	APHA 2130 B
Noise Measurement	Acoustics – Description and Measurement of Environmental Noise	ISO 1996/1
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 (Gas Data LMSxi)]

Signatories :

- | | | |
|----|----------------------|-------------------------------|
| 1. | Kan King Choy | IKM No. L 1886/88 |
| 2. | Lee Foon Lin | IKM No. A 4086/00/2004 |
| 3. | Ng Choon Yee | IKM No. A 4619/2004 |
| 4. | Ong Chee Mee | IKM No. A 4618/2004 |



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FIELD OF TESTING: MICROBIOLOGY

SCOPE OF ACCREDITATION:

<u>Materials/ Products tested</u>	<u>Type of test/ Properties measured/ Range of measurement</u>	<u>Standard test methods/ Equipment/Techniques</u>
Effluent / Water	Heterotrophic Plate Count / Total Plate Count	APHA 9215 B
	Heterotrophic Plate Count / Total Plate Count	APHA 9215 C
	Heterotrophic Plate Count / Total Plate Count	APHA 9215 D
	Total Coliform	APHA 9221 B
	Fecal Coliform	APHA 9221 E
	<i>E. coli</i>	In house Method-Microb-No. 3
	Total Coliform	In house Method-Microb-No.1
	<i>E. coli</i>	In house Method-Microb-No.2
	Fecal Coliform	APHA 9222 D
	Food	Aerobic Plate Count / Total Plate Count
Yeast and Mold		FDA-BAM Chapter 18
Coliform		FDA-BAM Chapter 4
Fecal Coliform		FDA-BAM Chapter 4
<i>E. coli</i>		FDA-BAM Chapter 4
Staphylococcus aureus		FDA-BAM Chapter 12

Signatories :

- | | | |
|----|-------------------------|----------------------------|
| 1. | Prof. Dr Thong Kwai Lin | I.C No : 560127- 10 - 5818 |
| 2. | Lee Foon Lin | IKM No. A 4086/00/2004 |
| 3. | Ng Choon Yee | IKM No. A 4619/2004 |



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Footnote:

- APHA - Standard Method for the Examination of Water and Wastewater, 19th Edition, 1995 (American Public Health Association)
- OSRMA - Official, Standardised & Recommended Methods of Analysis, 2nd Edition, 1973, Society of Analytical Chemistry
- ASTM - 1993 Annual Book of ASTM Standards, Volume 11.01
- AS - Australia Standard
- ISC - Methods of Air Sampling & Analysis, 3rd Edition, 1990, Inter Society Committee
- ISO - International Organization for Standardization
- EPA 40 CFR 60, App. A - Environmental Protection Agency, Code of Federal Regulations, Title 40, Part 60; Appendix A to Part 60 – Test Methods, 1/7/1998 (Using Graseby-Anderson Universal Stack Sampler)
- FDA-BAM – U.S Food & Drug Administration, Bacteriological Analytical Manual, 2003

