Issue date: 26 October 2022
Valid until: 27 January 2028

NO: SAMM 238

LABORATORY LOCATION:
(PERMANENT LABORATORY)

CHEMSAIN KONSULTANT SDN. BHD.
LOT 7, LORONG SURIA
OFF LORONG BUAH DUKU 1
TAMAN PERINDUSTRIAN SURIA
JALAN KOLOMBONG
88450 KOTA KINABALU, SABAH
MALAYSIA

FIELDS OF TESTING: **CHEMICAL, MICROBIOLOGY**

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
Water • Potable and Domestic • Ground Water • Mineral Water • Processed Water • Formation Water • Surface Water • Swimming Pool/Spa • Boiler Water • Industrial/Cooling Purposes • Reverse Osmosis Water	Colour (Hazen Units)	APHA 2120 B, 2017
	Turbidity	APHA 2130 B, 2017
	Acidity	APHA 2310 B, 2017
	Alkalinity	APHA 2320 B, 2017
	Hardness, EDTA Trimetric	APHA 2340 C, 2017
	Hardness by Calculation	APHA 2340 B, 2017
	Conductivity	APHA 2510 B, 2017
	Total Solids	APHA 2540 B, 2017
	Total Dissolved Solids	APHA 2540 C, 2017
	Total Suspended Solids	APHA 2540 D, 2017
	Temperature	APHA 2550 B, 2017
	Calcium Hardness as CaCO3, EDTA Trimetric	APHA 3500-Ca B, 2017

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SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Water • Potable and Domestic • Ground Water • Mineral Water • Processed Water • Formation Water • Surface Water • Swimming Pool/Spa • Boiler Water • Industrial/Cooling Purposes • Reverse Osmosis Water	Magnesium (by Calculation Method)	APHA 3500-Mg B, 2017
	Boron	APHA 4500-B C, 2017
	Free Carbon Dioxide	APHA 4500-CO_2 C, 2017
	Chloride	APHA 4500-Cl^- B, 2017
	Ammoniacal Nitrogen (as N)	APHA 4500-NH_3 C, 2017
	Ammoniacal Nitrogen (as N)	APHA 4500-NH_3 F, 2017
	Total Nitrogen, Kjeldahl (as N)	APHA 4500-N_{org} B,2017
	Nitrate Nitrate - N	APHA 4500-NO_3^- E, 2017
	Nitrite Nitrite - N	APHA 4500-NO_2^- B, 2017
	Oxygen (Dissolved)	APHA 4500-O C, 2017
	Oxygen (Dissolved)	APHA 4500-O G, 2017
	pH Value	APHA 4500-H^+ B, 2017
	Sulphate	APHA 4500-SO_4^{2-} C, 2017
	Sulphate	APHA 4500- SO_4^{2-} E, 2017
	Sulphide	APHA 4500- S^{2-} D, 2017
	Fluoride	APHA 4500-F^- C, 2017
	Cyanide	APHA 4500-CN^- C & F, 2017

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SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Water • Potable and Domestic • Ground Water • Mineral Water • Processed Water • Formation Water • Surface Water • Swimming Pool/Spa • Boiler Water • Industrial/Cooling Purposes • Reverse Osmosis Water	Chemical Oxygen Demand Biochemical Oxygen Demand 5 days @ 20 °C Oil and Grease Phenol Anionic surfactant as MBAS Free, Combined and Total Residual Chlorine (DPD) Chromium Hexavalent Chromium Trivalent Color, ADMI Formaldehyde Phosphorus	APHA 5220 B, 2017 APHA 5220 C, 2017 APHA 5210 B & 4500-O C, 2017 APHA 5210 B & 4500-O G, 2017 APHA 5520 B, 2017 APHA 5530 C, 2017 APHA 5540 C, 2017 In-House Method 0501 based on Palintest Comparator APHA 3500 – Cr B, 2017 In-House Method 0508 based on APHA 3500 – Cr B, 2017 APHA 2120 F, 2017 In-House Method 0527 based on AOAC 931.08 APHA 4500-P D, 2017
• Formation Water • Produced Water	<u>Metal Analysis by ICP-OES</u> Sodium (Na) Potassium (K) Calcium (Ca) Magnesium (Mg) Barium (Ba) Strontium (Sr) Iron (Fe)	APHA 3120 B 2017

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Water • Formation Water • Produced Water	Organic Acid Analysis by Ion Chromatography Formic Acid (CH_2O_2) Acetic Acid (CH_3COOH) Propionic Acid ($C_3H_6O_2$) Butyric Acid ($C_4H_8O_2$) Valeric Acid ($C_5H_{10}O_2$) Caproic Acid ($C_6H_{12}O_2$)	In-House Method 0543 based on IC Application Work AW CH6-01910-062007
• Potable Water • Ground Water • Mineral Water	Metal Analysis by ICP-OES Sodium (Na) Potassium (K) Calcium (Ca) Magnesium (Mg) Iron (Fe) Lead (Pb) Silver (Ag) Chromium (Cr) Cadmium (Cd) Nickel (Ni) Antimony (Sb) Molybdenum (Mo) Cobalt (Co) Barium (Ba) Strontium (Sr) Silicon (Si) Aluminum (Al) Arsenic (As) Selenium (Se) Copper (Cu) Zinc (Zn) Manganese (Mn)	APHA 3120 B 2017
• Drinking Water • Surface Water • Ground Water • Marine Water	Chlorite (ClO_2^-) Chlorate (ClO_3^-) Bromate (BrO_3^-) Iodide (I^-)	In House Method 6023, based on Metrohm IC Application, Note No. S-170 & APHA 4110 B

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Water • Formation Water • Produced Water • Potable Water	<u>Anion Analysis by Ion Chromatography</u> Chloride (Cl^-) Fluoride (F^-) Nitrate Nitrogen (NO_3-N) Nitrite Nitrogen (NO_2-N) Bromide (Br^-) Sulfate (SO_4^-) Phosphate (PO_4^{3-})	APHA 4110 B 2017
• Formation Water • Sea Water • Saline Water • Surface Water • Ground Water • Mineral Water • Drinking Water • Raw Water • Potable Water	Salinity Ammonia – N	APHA 2520 B, 2017 In-house Method 0554 based on Metrohm Technical Note
• Produced Water • Formation Water • Sea Water	Density	In-house Method 0555 based on ASTM D 4052-11
• Surface Water • Potable Water	Hydrocarbon Boron (B)	APHA 5520 F 2017 APHA 3120 B 2017
• Ground Water • Mineral Water • Drinking Water • Potable Water	Color (color units)	APHA 2120 C 2017

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SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Water • Surface Water • Sea Water • Formation Water	Vanadium (V) Tin (Sn)	APHA 3120 B, 2017 In House Method 0582 Based on APHA 3120 B 2017
• River Water • Marine Water • Potable Water	Uranium (U) Sulphur (S)	In House Method 0582 based on APHA 3120 B, 2017 In House Method 0582 based on APHA 3120 B, 2017
• Surface Water	Free Carbon Dioxide (by calculation)	APHA 4500 CO_2 D, 2017
• Marine Water • Sea Water	Unionised Ammonia (by Calculation)	In House Method 0590 adopted from Unionised Ammonia Calculator V 1.2 by Florida Dept. of Environment Protection
• Potable water • Formation water • Marine water • Sea water	Mercury (Hg)	In House Method 0556 based on UOP938 – 10
• Formation water • Sea water • Saline water	Chemical Oxygen Demand	In House Method 0560 based on APHA 5220 C 2017 & USGS
• Ground Water • Surface Water • River Water	Oil and Grease (Mineral) Oil and Grease (Emulsified Edible)	APHA 5520 F, 2017 APHA 5520 B & F, 2017

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SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Water • River Water	Paraquat Phenol	In House Method 0598 based on 134-A of Manual of Pesticides Residual Analysis, Volume II, DFG APHA 5530 B&D, 2017
• Marine Water • Surface Water	Total Petroleum Hydrocarbon	In House Method 0539 based on TNRCC method 1005, rev 03, 1st June 2001

Signatory(ies):

1. Zaydie Leong @ Dino Osman	**IKM No. M/3133/5377/08/11**
2. Shierly Sulaiman	**IKM No. M/4697/6031/11/17**
3. Nurazwani Ghani	**IKM No. M/4882/6367/12/18**
4. Ho Li Sin	**IKM No. M/5196/7297/16/19**
5. *Sim Hang Thiew	**IKM No. M/0688/1530/83**
6. *Chee Ong Koh	**IKM No. F/0060/0077/71/94**
7. Teo Wei Chin	**IKM No. M/3136/5711/10/11**
8. *Arnie Ann Johnny	**IKM No. M/3121/5857/11**

* This signatory is a non-resident signatory
Signatory No. 7 & 8 only for Total Petroleum Hydrocarbon

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SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring		
• Industrial Effluent • Leachate • Sewage Water	Colour (Hazen Units)	APHA 2120 B, 2005 APHA 2120 B, 2017
	Turbidity	APHA 2130 B, 2005 APHA 2130 B, 2017
	Acidity	APHA 2310 B, 2005 APHA 2310 B, 2017
	Alkalinity	APHA 2320 B, 2005 APHA 2320 B, 2017
	Hardness, EDTA Trimetric	APHA 2340 C, 2005 APHA 2340 C, 2017
	Hardness by Calculation	APHA 2340 B, 2005 APHA 2340 B, 2017
	Conductivity @ 25ºC	APHA 2510 B, 2005 APHA 2510 B, 2017
	Total Solids	APHA 2540 B, 2005 APHA 2540 B, 2017
	Total Dissolved Solids	APHA 2540 C, 2005 APHA 2540 C, 2017
	Total Suspended Solids	APHA 2540 D, 2005 APHA 2540 D, 2017
	Fixed and Volatile Suspended Solids Ignited at 550 °C	APHA 2540 E 2005 APHA 2540 E 2017
	Temperature	APHA 2550 B, 2005 APHA 2550 B, 2017
	Calcium Hardness as $CaCO_3$, EDTA Trimetric	APHA 3500-Ca B, 2005 APHA 3500-Ca B, 2017
	Magnesium (by Calculation Method)	APHA 3500-Mg B, 2005 APHA 3500-Mg B, 2017

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Industrial Effluent • Leachate • Sewage Water	Boron	APHA 4500-B C, 2005 APHA 4500-B C, 2017
	Free Carbon Dioxide	APHA 4500-CO_2 C, 2005 APHA 4500-CO_2 C, 2017
	Chloride	APHA 4500-Cl^- B, 2005 APHA 4500-Cl^- B, 2017
	Ammoniacal Nitrogen (as N)	APHA 4500-NH_3 C, 2005 APHA 4500-NH_3 C, 2017 APHA 4500-NH_3 F, 2005 APHA 4500-NH_3 F, 2017
	Total Nitrogen, Kjeldahl (as N)	APHA 4500-N_{org} B, 2005 APHA 4500-N_{org} B,2017
	Nitrate Nitrate - N	APHA 4500-NO_3^- E, 2005 APHA 4500-NO_3^- E, 2017
	Nitrite Nitrite - N	APHA 4500-NO_2^- B, 2005 APHA 4500-NO_2^-B, 2017
	Oxygen (Dissolved)	APHA 4500-O C, 2005 APHA 4500-O C, 2017 APHA 4500-O G, 2005 APHA 4500-O G, 2017
	pH Value	APHA 4500-H^+ B, 2005 APHA 4500-H^+ B, 2017
	Sulphate	APHA 4500-SO_4^{2-} C, 2005 APHA 4500-SO_4^{2-} C, 2017 APHA 4500- SO_4^{2-} E, 2005 APHA 4500- SO_4^{2-} E, 2017

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Industrial Effluent • Leachate • Sewage Water	Sulphide	APHA 4500- S^{2-} D, 2005 APHA 4500- S^{2-} D, 2017
	Fluoride	APHA 4500-F^- C, 2005 APHA 4500-F^- C, 2017
	Cyanide	APHA 4500-CN^- C & F, 2005 APHA 4500-CN^- C & F, 2017
	Chemical Oxygen Demand	APHA 5220 B, 2005 APHA 5220 B, 2017 APHA 5220 C, 2005 APHA 5220 C, 2017
	Biochemical Oxygen Demand 5 days @ 20 °C	APHA 5210 B & 4500-O C, 2005 APHA 5210 B & 4500-O C, 2017 APHA 5210 B & 4500-O G, 2005 APHA 5210 B & 4500-O G, 2017
	Oil and Grease	APHA 5520 B, 2005 APHA 5520 B, 2017
	Phenol	APHA 5530 C, 2005 APHA 5530 C, 2017
	Anionic surfactant as MBAS	APHA 5540 C, 2005 APHA 5540 C, 2017
	Free, Combined and Total Residual Chlorine (DPD)	In-House Method 0501 based on Palintest Comparator
	Chromium Hexavalent	APHA 3500 – Cr B, 2005 APHA 3500 – Cr B, 2017
	Chromium Trivalent	In-House Method 0508 based on APHA 3500 – Cr B, 2005 In-House Method 0508 based on APHA 3500 – Cr B, 2017
	Color, ADMI	APHA 2120 F, 2005 APHA 2120 F, 2017
	Formaldehyde	In-House Method 0527 based on AOAC 931.08
	Phosphorus	APHA 4500-P D, 2005 APHA 4500-P D, 2017

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Industrial Effluent • Wastewater	Metal Analysis by ICP-OES Sodium (Na) Potassium (K) Calcium (Ca) Magnesium (Mg) Iron (Fe) Lead (Pb) Silver (Ag) Chromium (Cr) Cadmium (Cd) Nickel (Ni) Antimony (Sb) Molybdenum (Mo) Cobalt (Co) Barium (Ba) Strontium (Sr) Silicon (Si) Aluminum (Al) Arsenic (As) Selenium (Se) Copper (Cu) Zinc (Zn) Manganese (Mn)	 APHA 3120 B, 2005 APHA 3120 B, 2017
	Vanadium Tin Uranium Sulphur	APHA 3120 B, 2005 APHA 3120 B, 2017 In House Method 0582 Based on APHA 3120 B, 2005 In House Method 0582 Based on APHA 3120 B, 2017 In House Method 0582 based on APHA 3120 B, 2005 In House Method 0582 based on APHA 3120 B, 2017 In House Method 0582 based on APHA 3120 B, 2005 In House Method 0582 based on APHA 3120 B, 2017

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SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Industrial Effluent • Sewage Water • Wastewater	Hydrocarbon Boron	APHA 5520 F 2005 APHA 5520 F 2017 APHA 3120 B 2005 APHA 3120 B 2017
• Soil	pH Value Acid Soluble Sulphate Content/Total Sulphate Content Acid Soluble Chloride Content Water Soluble Sulphate Content Organic Matters	BS 1377-3:1990:9.5 (Incorporated Amendment No.1) BS 1377-3:1990:5.5 (Incorporated Amendment No.1) BS 1377-3:1990:7.3 (Incorporated Amendment No.1) BS 1377-3:1990:5.5 (Incorporated Amendment No.1) BS 1377-3: 2018: 4.5
• Foam Concentrates	pH value Viscosity @ 20 °C Sedimentation Specific Gravity @ 20°C Foam Expansion and 25% Drainage Time	APHA 4500-H+ B, 2017 IMO MSC 1 Circ. 1312, Clause 3.4.1 with reference to ASTM D445-17 In-House Method 6011 based on IMO MSC.1 Circ.1312 and IMO MSC Circ.670, Clause 3.3 ASTM D4052-18 IMO MSC.1 Circ.1312, Clause 3.7 and 3.8
• Sediment • Sludge • Soil • Solid Waste (solid, semi-solid & liquid) • Fertilizer	Organic Carbon	MS 2469: 2012

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SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
• Industrial Effluent • Pigging Debris	Mercury	In House Method 0556 based on UOP938 – 10

Signatories:

1. Zaydie Leong @ Dino Osman	**IKM No. M/3133/5377/08/11**
2. Shierly Sulaiman	**IKM No. M/4697/6031/11/17**
3. *Sim Hang Thiew	**IKM No. M/0688/1530/83**
4. Teo Wei Chin	**IKM No. M/3136/5711/10/11**
5. *Arnie Ann Johnny	**IKM No. M/3121/5857/11**
6. *Chan Pei Xin	**IKM No. L/2695/7983/19**
7. Nurazwani Ghani	**IKM No. M/4882/6367/12/18**

* This signatory is a non-resident signatory
Signatory No. 6 only for Foam Concentrates

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring		
• Industrial Effluent • Wastewater	Paraquat	In House Method 0598 based on 134-A of Manual of Pesticides Residual Analysis, Volume II, DFG
	Phenol	APHA 5530 B&D, 2005 APHA 5530 B&D, 2017
• Soil • Sediment • Sludge • Solid waste	Aluminum (Al) Antimony (Sb) Arsenic (As) Barium (Ba) Beryllium (Be) Boron (B) Calcium (Ca) Cadmium (Cd) Chromium (Cr) Cobalt (Co) Copper (Cu) Gold (Au) Iron (Fe) Lead (Pb) Lithium (Li) Magnesium (Mg) Manganese (Mn) Molybdenum (Mo) Nickel (Ni) Palladium (Pd) Phosphorus (P) Platinum (Pt) Potassium (K) Selenium (Se) Silver (Ag) Sodium (Na) Strontium (Sr) Sulphur(S) Thalium (Tl) Titanium (Ti) Tin (Sn) Tellurium (Te) Uranium (U) Vanadium (V) Zinc (Zn)	USEPA 200.2, Revision 2.8, 1994 & USEPA 6010 B, Revision 2, December 1996

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Soil • Sediment • Sludge • Solid waste	Hexane Extractable Material	USEPA 9071B, April 1998
	Silica Gel Treated N-Hexane Extractable Materials (SGT-HEM; Non-Polar Materials)	In House Method 0559 based on USEPA 9071B Revision 2 (April 1998) & 1664 Revision A (February 1999)
	Total Petroleum Hydrocarbon	In House Method 0539 based on TNRCC method 1005, rev 03, 1st June 2001
• Soil • Sediment • Sludge	Particle Size Distribution (gravel, sand, silt and clay)	In House Method 0588 based on BS1377 Part 2 1990
• Waste - Solid - Semi Solid - Liquid	Toxicity Characteristic Leaching Procedure (TCLP) - Selenium (Se) - Silver (Ag) - Arsenic (As) - Barium (Ba) - Cadmium (Cd) - Chromium (Cr) - Lead (Pb)	USEPA 1311-1992 (Metals Only)
• Wastewater from Rubber and Palm Oil Mills	Biochemical Oxygen Demand 3 days @ 30°C Chemical Oxygen Demand Suspended Solids Oil and Grease Ammoniacal Nitrogen Total Nitrogen, Kjeldahl	DOE 2019, Alternative Method DOE 2019, Reference Method DOE 2019, Reference Method DOE 2019, Reference Method DOE 2019, Reference Method DOE 2019, Reference Method

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Ambient Air	Hydrogen Bromide (HBr) Nitric Acid (HNO_3) Phosphoric Acid (H_3PO_4) Sulfuric Acid (H_2SO_4) Hydrogen Chloride (HCl)	OSHA Method ID-165SG OSHA Method ID-174SG
• Ambient Air	Antimony (Sb) Beryllium (Be) Cadmium (Cd) Chromium (Cr) Cobalt (Co) Copper (Cu) Iron (Fe) Lead (Pb) Manganese (Mn) Molybdenum (Mo) Nickel (Ni) Vanadium (V) Zinc (Zn)	OSHA Method ID-125G

Signatory(ies):

1. **Zaydie Leong @ Dino Osman** — **IKM No. M/3133/5377/08/11**
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3. **Nurazwani Ghani** — **IKM No. M/4882/6367/12/18**
4. **Ho Li Sin** — **IKM No. M/5196/7297/16/19**
5. ***Sim Hang Thiew** — **IKM No. M/0688/1530/83**
6. ***Chee Ong Koh** — **IKM No. F/0060/0077/71/94**

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Foods • Dairy Products • Edible oil, Fats and Their Products • Fish and Fish Products • Flour and Confectionary • Meat, Poultry and Derived Products • Non-alcoholic Beverages • Nuts, Fruits and Vegetables and Derived Products • Sauces, Herbs, Spices, and Condiments	Moisture	In-house Method 0509 based on Pearson's Chemical Analysis of Food (8th Edition)
	Ash	In-house Method 0510 based on Pearson's Chemical Analysis of Food (8th Edition)
	Carbohydrate (by difference)	In-house Method 0512 based on Methods of Analysis for Nutrition Labeling (AOAC 1993)
	Energy (by calculation)	In-house Method 0513 based on Methods of Analysis for Nutrition Labeling (AOAC 1993)
	Fat	In-house Method 0511 based on Pearson's Chemical Analysis of Food (8th Edition) by Soxhlet Extraction
	Fat	In-house Method 0514 based on Pearson's Chemical Analysis of Food (8th Edition) by Rose Gottlieb
	Protein	In-house Method 0506 based on Pearson's Chemical Analysis of Food (8th Edition)
• Fish and Fish Products	Formaldehyde	In-house Method 0536 based on AOAC 964.21
• Bird Nest	Nitrite & Nitrate	In-house Method 0541 based on MS 2509: 2012 (P) & IC

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3. Nurazwani Ghani	**IKM No. M/4882/6367/12/18**
4. Anis Idayu Bte Zakaria	**MJMM 0152**
5. *Sim Hang Thiew	**IKM No. M/0688/1530/83**

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SCOPE OF TESTING: CHEMICAL

Materials / Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Foods • Fish • Prawn • Soya Sauce • Tomato Sauce • Chili Sauce • Tomyam Paste • Puree • Coffee • Flour	Arsenic (As) Cadmium (Cd) Lead (Pb) Iron (Fe) Tin (Sn) Antimony (Sb) Calcium (Ca) Sodium (Na)	In-House Method 0581 based on AOAC 999.11-2016
	Mercury	In-House Method 0595 based on UOP 938-10
• Non-Alcoholic Beverages • Honey • Sauces • Juices • Cordial • Coffee	Total Sugar/Reducing Sugar/Non-Reducing Sugar	In House Method 6015 based on Pearson's Chemical Analysis of Foods (Lane & Eynon Titration Method), 8th Edition 1981
• Honey	Acidity (Free, Lactone and Total) of Honey	AOAC 962.19,2005
• Vinegar • Chili Sauce • Tomato Sauce • Cordial • Juices • Soya Bean Sauce	Acidity of Fruit Products	In House Method 6013 based on AOAC 920.149 & 942.15, 2016, 20th Edition

Signatory(ies):

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3. Nurazwani Ghani	**IKM No. M/4882/6367/12/18**
4. Anis Idayu Bte Zakaria	**MJMM 0152**
5. *Sim Hang Thiew	**IKM No. M/0688/1530/83**
6. Teo Wei Chin	**IKM No. M/3136/5711/10/11**
7. *Arnie Ann Johnny	**IKM No. M/3121/5857/11**

* This signatory is a non-resident signatory
Signatory No 6 & 7 only for Mercury

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SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Petroleum & Petroleum Products		
• Crude Oil	Density, Specific Gravity and API Gravity	ASTM D 1298 – 17 By Hydrometer Method
	Kinematic Viscosity	ASTM D 445 – 19
	Vapor Pressure	ASTM D 323 – 15a (Procedure A) By Reid Method
	Acid Number	ASTM D 664 – 18e2 (Procedure A) By Potentiometric Titration
	Water & Sediment	ASTM D 4007 – 11 (2016) e1 By Centrifuge Method
	Water	In-house Method 0524 Based on ASTM D 4007 – 11 (2016e1) By Centrifuge Method
	Water	ASTM D 4928 – 12 (2018) By Coulometric Karl Fischer Titration
	Asphaltene	ASTM D 6560 – 17
	Salt	ASTM D 3230 – 17 By Electrometric Method
	Compositional analysis Hydrocarbons (C1 – C12+)	In-house Method 0522 Based on ASTM D 5442 – 17
	Molecular weight in crude oil	In-House Method 0549 (Based on Cryette Operating Manual)
	Sediment	ASTM D 4807-15 By Membrane Filtration
	Water	ASTM D 4377-00 (Reapproved 2011) By Potentiometric Karl Fischer Titration

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Petroleum & Petroleum Products • Crude Oil	Density and Relative Density	ASTM D 5002-19 By Digital Density Analyzer
	Light Hydrocarbon C1 to C6+	IP344/1985 (2010)
	Pour Points	ASTM D 5853 – 17 (Procedure A)
	Water Content	ASTM D 4006-16e1 By Distillation
	Sediment Content	ASTM D 473-17e1 By Extraction
	Wax Content	UOP 46-85
	Nitrogen Content	ASTM 5762-18a
	Ash Content	ASTM D482-13
Petroleum Products • Pressurized Crude Oils • Crude Oil	Shrinkage Factor Analysis	In-House Method 0531 (Based on API MPMS Chapter 20 (Section 1), Chapter 11.1)
	Pressurized Liquid Fluid Property	In-House Method 0542 (Based on Petroleum Fluid Properties Manual) By Flash Vaporization

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SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Petroleum Products • Lubricating Oil • Diesel • Fuel Oil • Spent Lubricating Oil / Spent Hydraulic Oil	Water Content	ASTM D 95-18 By Distillation
	Sediment Content	ASTM D 473-17e1 By Extraction
	Density, Relative Density, and API Gravity of Liquids	ASTM D 4052-18 by Digital Density Meter
	Cloud Point	ASTM D 2500-17a
	Nitrogen Content	ASTM D 5762-18a
	Water Content	ASTM D 6304-20 By Coulometric Karl Fisher Titration
	Ash Content	ASTM D482 -13
	Total Sulfur	ASTM D4294 -16e1
	Particle Count	NAS 1638 / ISO 4406-1999
	Estimation of Net and Gross Heat of Combustion	ASTM D4868 -17
	Flash Point	ASTM D 93 -20 (Procedure B)
	Kinematic Viscosity @ 40°C	ASTM D 445-19
Petroleum Gases • Natural Gas • Produced Gas • Crude Oil (Evolved Gas)	Compositional analysis Hydrocarbons (C1 – C12+), CO_2, N_2	GPA 2286 – 95
	Compositional analysis Hydrocarbons (C1 – C12+), CO_2, N_2	In-House Method 0548 (Based on GPA 2286-95)
	Mercury (Hg)	ASTM D6350-14

SCOPE OF TESTING: CHEMICAL

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Petroleum and Petroleum Products • JET A-1	Density @15°C, kg/m3	ASTM D 4052-18
	Distillation	ASTM D 86-20
	Electrical Conductivity, pS/m	ASTM D 2624-15
	Corrosion: Copper Strip, class	ASTM D 130-19
	Existent Gum, mg/100ml	ASTM D 381- 19
	Colour Saybolt	ASTM D156-15
	Freezing Point	ASTM D 2386-19
	Flash Point ABEL	IP170-14
	Water Separation (MSEP)	ASTM D 3948-20
	Total Sulfur	ASTM D 4294-16ei
• Biodiesel	Mercury (Hg)	UOP 938 – 10
	Ester Content	EN 14103 – 2003
	Density @ 15°C	ASTM D 4052 – 18 (Oscillating U-tube)
	Water Content	EN 12937 – 2002 By Coulometric Karl Fisher Titration.
	Flash Point	ASTM D 93 -20 (Procedure C)
	Total Contamination	EN 12662 – 2014 (Filter under vacuum)
	Acid Value	EN 14104 – 2003
	Methanol content	EN 14110 – 2003 (GC Headspace)
	Cold Filter Plugging Point, CFPP	EN 116 – 1997
	Oxidation Stability	EN 14112 – 2003
	Mono / Di / Triglyceride content Free / Total glycerine	ASTM D 6584 – 17
	Total Sulfur	ASTM D 4294-16ei

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Petroleum & Petroleum Products • Biodiesel Blend	Flash point (Pensky-Martens Closed Cup) FAME Content	ASTM D 93 – 20 (Procedure A) EN 14078-2002 (by FTIR)
• Methanol	Permanganate Time Carbonizable Substances Color by Pt-Co Scale Water Miscibility Water Content Acidity Appearance Purity and Impurities Distillation range at 760mmHg Specific Gravity Total Iron Non-Volatile Matter Odor	ASTM D1363-11 ASTM E346-08e1 ASTM D1209-11 ASTM D1722-17 ASTM E1064-16 ASTM D1613-17 IMPCA 003-98 IMPCA 001-14 ASTM D1078-11 ASTM D4052-18 ASTM E394-15 ASTM D1353-13 ASTM D1296-12

Note:
- IMPCA : International Methanol Producers and consumers Association
- NAS : National Aerospace Standard
- ISO : International Standards Organization

Signatory(ies):

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5. *Sim Hang Thiew **IKM No. M/0688/1530/83**
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* This signatory is a non-resident signatory
Signatory No. 4 only for Lubricating Oil

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SCOPE OF TESTING: CHEMICAL

SITE TESTING: CATEGORY I

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Industrial Effluent • Leachate • Sewage Water	Temperature	APHA 2550 B, 2005 APHA 2550 B, 2017
	pH Value	APHA 4500-H+ B, 2005 APHA 4500-H+ B, 2017
	Oxygen (Dissolved)	APHA 4500-O G, 2005 APHA 4500-O G, 2017
	Free, Combined and Total Residual Chlorine (DPD)	In-House Method 0501 based on Palintest Comparator
• Noise	Noise Monitoring	ISO 1996-1: 2016 ISO 1996-2: 2017
• Ambient Air	Total Suspended Particulate Matter	AS/NZS 3580.9.3 (2015)

Notes:

- APHA : American Public Health Association Standard Method for the Examination of Water and Wastewater
- DOE : Department of Environment
- USEPA : United States Environmental Protection Agency

Signatory(ies):

1. Zaydie Leong @ Dino Osman	**IKM No. M/3133/5377/08/11**
2. Shierly Sulaiman	**IKM No. M/4697/6031/11/17**
3. Nurazwani Ghani	**IKM No. M/4882/6367/12/18**
4. Ho Li Sin	**IKM No. M/5196/7297/16/19**
5. *Sim Hang Thiew	**IKM No. M/0688/1530/83**
6. **Jessica Yvette Malagkas	
7. **Shiella Rose Vitalis	

* This signatory is a non-resident signatory
** Signatory no. 6 & 7 perform only for Noise and Ambient Air

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SCOPE OF TESTING: CHEMICAL

SITE TESTING: CATEGORY I

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring • Ambient Air	PM10	AS/NZS 3580.9.6 2015
• Stationery Air Emission	Particulate Matter	MS 1596:2003 USEPA Method 5
	SO_2 NO_X CO H_2S	In-house method 585 based on Flue Gas Analyser

Signatory(ies):

1. Zaydie Leong @ Dino Osman IKM No. M/3133/5377/08/11
2. Shierly Sulaiman IKM No. M/4697/6031/11/17
3. *Jessica Yvette Malagkas
4. *Shiella Rose Vitalis

*Signatory No. 3 & 4 perform all methods except for In-house method 585 based on Flue Gas Analyser. Both also are under supervision of registered chemist.

SCOPE OF TESTING: CHEMICAL

SITE TESTING: CATEGORY I

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Water • Saline Water • Surface Water • Swimming Pool/Spa • Ground Water • Formation Water	Temperature	APHA 2550 B, 2005 APHA 2550 B, 2017
	pH Value	APHA 4500-H+ B, 2005 APHA 4500-H+ B, 2017
	Oxygen (Dissolved)	APHA 4500-O G, 2005 APHA 4500-O G, 2017
	Free, Combined and Total Residual Chlorine (DPD)	In-House Method 0501 based on Palintest Comparator

Notes:

- APHA : American Public Health Association Standard Method for the Examination of Water and Wastewater
- DOE : Department of Environment
- USEPA : United States Environmental Protection Agency

Signatory(ies):

1. Zaydie Leong @ Dino Osman	**IKM No. M/3133/5377/08/11**
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3. Nurazwani Ghani	**IKM No. M/4882/6367/12/18**
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* This signatory is a non-resident signatory

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SCOPE OF TESTING: MICROBIOLOGY

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Microbiological Foods Sample • Food & Food Products • Animal Feeds	Standard Plate Count	AS 1766.2.1-1991
	Yeasts & Molds Count	FDA / BAM Chapter 17, 5th Edition, 1978
	Coliform Count	AS 1766.2.3-1992 AOAC 991.14, 2005 (Petrifilm Method)
	Escherichia coli Count	AS 1766.2.3-1992 AOAC 991.14, 2005 (Petrifilm Method)
	Coagulase-positive Staphylococci	AS 1766.2.4-1994
	Salmonellae	AS 1766.2.5-1991
	Vibrio parahaemolyticus	AS 1766.2.9-1991
	Vibrio cholerae	In-House Method 0602, Based on Ministry of Health, Malaysia
	Listeria spp.	RapidChek®*Listeria* species, Food System
Microbiological Environmental Sample • Water • Wastewater	Heterotrophic Plate Count	APHA 9215 B, 2005 APHA 9215 B, 2017
	Total Coliform Count	APHA 9221 B, 2005 APHA 9221 B, 2017
	Thermotolerant (Fecal) Coliform Count	APHA 9221 E, 2005 APHA 9221 E, 2017
	Escherichia coli Count	In-House Method 0601 based on AS4276.6, 1995

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SCOPE OF TESTING: MICROBIOLOGY

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Microbiological Environmental Sample • Water • Marine water • Wastewater	Total Coliform by Membrane Filtration	In House Method 0606 based on APHA 9222 B, 2017
	E. coli Count by Membrane Filtration	In House Method 0610 based on APHA 9222 H, 2017
	Fecal Enterococci	APHA 9230 B, 2017
	Fecal Enterococci by Membrane Filtration	APHA 9230 C, 2017
	Thermotolerant (Fecal) Coliform by Membrane Filtration	In House Method 0609 based on APHA 9222G, 2017
	Total Coliform by Dual-Chromogenic Membrane Filtration	In House Method 0608 based on APHA 9222 J, 2017
	E. coli by Dual-Chromogenic Membrane Filtration	In House Method 0608 based on APHA 9222 J, 2017
	Thermo tolerant (Fecal) Coliform by Membrane Filtration	APHA 9222D, 2017
Miscellaneous Materials & Product • Surface • Equipment • Personnel Hand	Swab Test Standard Plate Count	Swab Contact Method (FAO Manual of Food Quality Control 14/12 – 1991)

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Notes:

- AOAC : Association of Official Analytical Chemists
- APHA : American Public Health Association, 21st Edition (2005), Standard Method for the Examination of Water and Wastewater
- AS : Australia Standards
- BAM : Bacteriological Analytical Manual
- FAO : Food and Agriculture Organization
- FDA : Food & Drug Administration

***** All calibration/testing laboratories are expected to have their own documented procedures for the estimation of calculations of measurement uncertainty.

Signatories:

1. ***Goh Chia Mey** **MJMM 0118**
2. **Anis Idayu Bte Zakaria** **MJMM 0152**
3. **Stepfanie Evert Jole** **MJMM 0369**

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