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LABORATORY LOCATION:
(PERMANENT LABORATORY)

UTCL LABORATORY
MAHAMURNI PLANTATIONS SDN. BHD
LOT 2135 BATU 23½
JALAN KOTA TINGGI-JOHOR BAHRU
81900 KOTA TINGGI, JOHOR
MALAYSIA

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 fulfilment 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 Palm Oil Mill and Rubber Factory Effluent	Biochemical Oxygen Demand (BOD ₃)	DOE (Msia, 1995) REF
		DOE (Msia, 1995) ALT
	Chemical Oxygen Demand (COD)	DOE (Msia, 1995) ALT
	Suspended Solids (SS)	DOE (Msia, 1995) REF
	Oil & Grease (O & G)	DOE (Msia, 1995) REF
	Ammoniacal Nitrogen (AN)	In-house Method TP-EFF-03 Based on DOE (Msia, 1985) REF
	Total Nitrogen (TN)	DOE (Msia, 1995) ALT
	Total Solids	APHA 2540B, 19 th Edition 1995
	pH	APHA Method 4500-H ⁺ B 22 nd Edition 2012

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
<u>Environmental Monitoring</u> Sewage Water <u>Water</u> Processed Water Surface Water	pH	APHA Method 4500-H ⁺ B 22 nd Edition 2012
	Biochemical Oxygen Demand (BOD ₅)	In-house Method, TP-WAT-03, Based on APHA Method 5210 B 22 nd Edition 2012
	Dissolved Oxygen	APHA Method 4500 O 22 nd Edition 2012
	Chemical Oxygen Demand	In-house Method, TP-WAT-05, Based on APHA Method 5220 B 22 nd Edition 2012
	Ammoniacal Nitrogen	APHA Method 4500-NH ₃ C 22 nd Edition 2012
	Chloride	APHA Method 4500-Cl-B 22 nd Edition 2012
	Nitrate Nitrogen	APHA Method 4500-NO ₃ ⁻ B 22 nd Edition 2012
	Phosphorous	APHA Method 4500-P C 22 nd Edition 2012
	Total Solids	APHA Method 2540 B 22 nd Edition 2012
	Total Suspended Solids	APHA Method 2540 D 22 nd Edition 2012
	Total Dissolved Solids	In-house Method, TP-WAT-12, Based on APHA Method 2540 C 22 nd Edition 2012
	Conductivity	APHA Method 2510 B 22 nd Edition 2012
	Hardness	APHA 2340B 22 nd Edition 2012

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
<u>Environmental Monitoring</u> Sewage Water <u>Water</u> Processed Water Surface Water	Potassium Magnesium Calcium Zinc Manganese Iron Copper Aluminium Sodium	APHA 3030E, 3120B 22 nd Edition 2012
<u>Foods</u> Palm Oil & Palm Oil Products	Moisture & Volatile Matter Impurities Peroxide Value Acidity Iodine Value DOBI	MPOB Test Method p2.1 Part1:2004 MPOB Test Method p2.2:2004 PORIM Test Method p2.3:2004 MPOB Test Method p2.5:2004 MPOB Test Method 3.2:2004 MPOB Test Method p2.9:2004
<u>Agriculture Products and Materials</u> Compost	Total Nitrogen Total Carbon, Total Organic Carbon, Organic Matter and CN Ratio Moisture Phosphorus Potassium Magnesium Calcium	In-house Method, TP-FER-03, Based on LECO TruMac CN Nitrogen in Fertilizer Application Notes 203-821-399:2011 In-house Method, TP-FER-08, Based on LECO TruMac CN Nitrogen in Soil and Plant Tissue Application Notes 203-831-394:2010 In-house Method, TP-FER-02, Based on MS 417:Part2:1994 In-house Method, TP-FOL-02, Based on MS 677:Pt.I & II:1980 / ICP-OES

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
<u>Agriculture Products and Materials</u> Foliar, Leaf and Rachis	Total Nitrogen	In-house Method, TP-FOL-06, Based on LECO TruMac CN Nitrogen in Soil and Plant Tissue Application Notes 203-821-394:2010
	Phosphorus	In-house Method, TP-FOL-02, Based on MS 677:Pt.I, II & IV:1980, Method A: UV Method B: ICPOES
	Potassium	In-house Method, TP-FOL-03, Based on MS 677:Pt.I, II & IV:1980; Method A: AAS Method B, ICPOES
	Magnesium	In-house Method, TP-FOL-03, Based on MS 677: Pt.I, II & VII:1980, Method A: AAS Method B: ICPOES
	Calcium	In-house Method, TP-FOL-03, Based on MS 677: Pt.I, II & VII:1980, Method A: AAS Method B: ICPOES
	Boron	In-house Method, TP-FOL-05, Based on MS 677:Pt.I & II:1980 and Method 9.3 Official Journal of the E.U, 2003, Method A: UV Method B: ICPOES
	Zinc Ferum Copper Manganese	In-house Method, TP-FOL-04, Based on MS 677:Pt.I & II:1980, Method A: AAS Method B: ICP-OES

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
<u>Agriculture Products and Materials</u> Fertilizers and liming materials	Moisture	MS 417: Part2: 1994
	Total Nitrogen	In-house Method, TP-FER-03, Based on LECO TruMac CN Nitrogen in Fertilizer Application Notes 203-821-399:2011
	Total Phosphorus	In-house Method, TP-FER-04, Based on 417:Part 4:1994, Method A: UV Method B: ICPOES
	Total Potassium	In-house Method, TP-FER-05, Based on 417:Part 5:1994, Method A: AAS Method B: ICPOES
	Total Magnesium	In-house Method, TP-FER-06, Based on 417:Part 6:1994 Method A: AAS Method B: ICPOES
	Total Calcium	In-house Method, TP-FER-07, Based on 417:Part 6:1994 Method A: AAS Method B: ICPOES
	Boron	In-house Method, TP-FER-09, Based on 417:Part 5:1994 / ICPOES
	Citric Acid Soluble P ₂ O ₅	In-house Method, TP-FER-16, Based on MS 417: Part 4: 1994 / UV
	Water Soluble MgO	In-house Method, TP-FER-17, Based on MS 417: Part 6:1994, Method A: AAS Method B: ICPOES

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
<u>Agriculture Products and Materials</u>	pH Conductivity	MS 2457:2012
Soils	Total Nitrogen	In-House Method, TP-SOIL-04, Based on LECO TruMac CN Nitrogen in Soil and Plant Tissue Application Notes 203-821-394:2010
	Total Organic Carbon	In-House Method, TP-SOIL-05, Based on LECO TruMac CN Nitrogen in Soil and Plant Tissue Application Notes 203-821-394:2010
	Available Phosphorus	In-House Method, TP-SOIL-06, Based on Buku Panduan Analisis Tanah & Tumb, Jab Sains Tanah UPM 1988 pg. 23, MS 678:Part VIII:1980 / UV
	Total Phosphorus	MS 678:Part VII:1980 / UV
	Exchangeable Cation Potassium Exchangeable Cation Magnesium Exchangeable Cation Calcium	MS 678:Part IV:1980 / ICP-EOS
	Cation Exchangeable Capacity	MS 678:Part V:1980
<u>Rubber</u>		
Field Latex	Dry Rubber Content	MS 466:1987

Signatories:

1. Mohd Kamaruddin bin Jaffar

IKM No.: M/2952/5304/08/2010

2. Nur Syafiqah binti Mohamad Sa'adan

IKM No.: L/2792/8264/18