

METHOD OF ANALYSIS: EFFLUENT

Materials/ Products Tested	Method ID	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Environmental Monitoring Palm Oil Mill and Rubber Factory Effluent	1a	Biochemical Oxygen	DOE Method, 4 th Edition 2019, REF
	1b	Demand (BOD ₅)	DOE Method, 4 th Edition 2019, ALT
	2	Chemical Oxygen Demand (COD)	DOE Method, 4 th Edition 2019, ALT
	3	Ammoniacal Nitrogen (AN)	In-house Method, Based on DOE Method, 4 th Edition 2019, REF
	4	Total Kjeldahl Nitrogen (TKN)	DOE Method, 4 th Edition 2019, ALT
	5	Suspended Solids (SS)	DOE Method, 4 th Edition 2019, REF
	6	Total Solids	APHA Method 2540 B, 19 th Edition 1995
	7	pH	APHA Method 4500-H ⁺ B, 22 nd Edition 2012
	8	Oil & Grease (O & G)	DOE Method, 4 th Edition 2019, REF
	9	*Volatile Acids	APHA Method 5560 C, 22 nd Edition 2012 – Organic And Volatile Acids
	10	Alkalinity	APHA Method 2320 B, 22 nd Edition 2012 – Titration Method
	11	*Volatile Suspended Solids	APHA Method 2540, E 22 nd Edition 2012 - Fixed and Volatile Solids Ignited at 550°C
	12	*Dissolved Oxygen	APHA Method 4500-O G, 22 nd Edition 2012 – Membrane Electrode Method

Remarks: * Not SAMM accredited

METHOD OF ANALYSIS: WATER

Materials/ Products Tested	Method ID	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	13	*Total Coliform	APHA Method 9221 B, 23 rd Edition 2017
	14	*E-Coli	APHA Method 9221 F, 23 rd Edition 2017
	15	pH at 25°C	APHA Method 4500-H ⁺ B, 23 rd Edition 2017
	16	Biochemical Oxygen Demand (BOD ₅)	In-house Method, Based on APHA Method 5210 B, 23 rd Edition 2017
	17	Dissolved Oxygen	APHA Method 4500-O H, 23 rd Edition 2017
	18	Chemical Oxygen Demand	In-house Method, Based on APHA Method 5220 B, 23 rd Edition 2017
	19	Ammoniacal Nitrogen	APHA Method 4500-NH ₃ C, 23 rd Edition 2017
	20	Nitrate Nitrogen	APHA Method 4500-NO ₃ ⁻ B, 23 rd Edition 2017
	21	Chloride	APHA Method 4500-Cl ⁻ B, 23 rd Edition 2017
	22	Phosphorous	APHA Method 4500-P C, 23 rd Edition 2017
	23	Total Solids	APHA Method 2540 B, 23 rd Edition 2017
	24	Total Suspended Solids	APHA Method 2540 D, 23 rd Edition 2017
	25	Total Dissolved Solids	In-house Method, Based on APHA Method 2540 C, 23 rd Edition 2017
	26	Conductivity	APHA Method 2510 B, 23 rd Edition 2017
	27	Hardness	APHA Method 2340 B, 23 rd Edition 2017

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METHOD OF ANALYSIS: WATER (Continue)

Materials/ Products Tested	Method ID	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	28	Potassium	APHA Method 3120B, 3030E, 23 rd Edition 2017 Method: ICP
	29	Magnesium	
	30	Calcium	
	31	Zinc	
	32	Manganese	
	33	Iron	
	34	Copper	
	35	Aluminium	
	36	Sodium	
	37	Cadmium	
	38	Plumbum	
	39	Chromium	
	40	Selenium	
	41	Silver	
	42	*Sulphate	APHA Method 4500-SO ₄ ²⁻ , 23 rd Edition 2017
	43	Turbidity	In-house Method, Water & Environmental Analysis According to US EPA Regulations, 1995

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METHOD OF ANALYSIS: PALM OIL

Materials/ Products Tested	Method ID	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
<u>Foods</u> Palm Oil & Palm Oil Products	45	Moisture & Volatile Matter	MPOB Test Method p2.1:2004
	46	Insoluble Impurities	MPOB Test Method p2.2:2004
	47	Acidity	MPOB Test Method p2.5:2004
	48	Iodine Value	MPOB Test Method p3.2:2004
	49	Peroxide Value	PORIM Test Method p2.3:2004
	50	DOBI	MPOB Test Method p2.9:2004
	51	*Copper	MPOB Test Method p2.10:2004
	52	*Ferum	MPOB Test Method p2.10:2004
	53	*Phosphorous	MPOB Test Method p2.10:2004
	54	*Discriminant Function	MPOB Test Method p2.14:2004
	55	*Specific Extinction	MPOB Test Method p2.14:2004
	56	Carotene	MPOB Test Method p2.6:2004
	57	*Physical Analysis	Palm Oil Factory Process Handbook, Laboratory And Milling Control
	133	*Total Chloride	Operational Manual (Horizontal Furnace) For Coulometer Model MCD- 210
	144	*Mineral Oil Hydrocarbons	In-house Method, Based on ISO20122 and DGF Standard Methods

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METHOD OF ANALYSIS: FOLIAR

Materials/ Products Tested	Method ID	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
<u>Agriculture Products and Materials</u> Foliar, Leaf and Rachis	58	Nitrogen	In-house Method, Based on LECO TruMac CN Nitrogen in Soil and Plant Tissue Application Notes 203-821-394:2010 Method: Dumas
	59a 59b	Phosphorus	In-house Method, Based on MS 677: Pt.I, II & IV:1980 Method a: UV Method b: ICPOES
	60a 60b	Potassium	In-house Method, Based on MS 677: Pt.I, II & IV:1980 Method a: AAS Method b: ICPOES
	61a 61b	Magnesium	In-house Method, Based on MS 677: Pt.I, II & VII:1980 Method a: AAS Method b: ICPOES
	62a 62b	Calcium	In-house Method, Based on MS 677: Pt.I, II & VII:1980 Method a: AAS Method b: ICPOES
	63a 63b	Boron	In-house Method, 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
	64a 64b	Zinc	In-house Method, Based on MS 677: Pt.I & II:1980 Method a: AAS Method b: ICPOES
	65a 65b	Ferum	
	66a 66b	Copper	
	67a 67b	Manganese	
	68	*Ash	In-House Method
	134	*Chloride	In-House Method
	144	*Sulphur	In-house Method, Based on MS 417: Part4:2020 (Second Revision) Method: ICPOES

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METHOD OF ANALYSIS: COMPOST

Materials/ Products Tested	Method ID	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques	
<u>Agriculture Products and Materials</u> Compost	69	Total Nitrogen	In-house Method, Based on LECO TruMac CN Nitrogen in Soil and Plant Tissue Application Notes 203-821-394:2010 Method: Dumas	
	70a 70b	Total Phosphorus (as P ₂ O ₅)	In-house Method, Based on MS 677: Pt.I, II & IV:1980 Method a: UV Method b: ICPOES	
	71a 71b	Total Potassium (as K ₂ O)	In-house Method, Based on MS 677: Pt.I, II & IV:1980 Method a: AAS Method b: ICPOES	
	72a 72b	Total Magnesium (as MgO)	In-house Method, Based on MS 677: Pt.I, II & VII:1980 Method a: AAS Method b: ICPOES	
	73a 73b	Total Calcium (as CaO)	In-house Method, Based on MS 677: Pt.I, II & VII:1980 Method a: AAS Method b: ICPOES	
	74a 74b	*Total Boron (as B ₂ O ₃)	In-house Method, 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	
	75a 75b	Total Carbon	a. In-house Method, Based on LECO TruMac CN Nitrogen in Soil and Plant Tissue Application Notes 203-821- 394:2010 Method: Dumas	b.* MS417:Part8:1997 (Ammd 2001) Method: Furnace
	76a 76b	Organic Carbon		
	77a 77b	Organic Matter		
	78a 78b	CN ratio		
	79	Moisture	In-House Method, Based on MS 417: Part2:1994	
	135	*pH	MS 2457:2012	

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METHOD OF ANALYSIS: FERTILIZER

Materials/ Products Tested	Method ID	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
<u>Agriculture Products and Materials</u> Fertilizers	80a 80b	Moisture	MS 417: Part2:1994 Method a: Desiccator Method b: Oven
	81	Total Nitrogen	In-house Method, Based on MS 417: Part3:2020 (Second Revision)
	82a 82b	Total Phosphorus as P ₂ O ₅	In-house Method, Based on MS 417: Part4:2020 (Second Revision) Method a: UV Method b: ICPOES
	83a 83b	Total Potassium as K ₂ O	In-house Method, Based on MS 417: Part5:2020 (Second Revision) Method a: AAS Method b: ICPOES
	143a 143b	*Water Soluble Potassium as K ₂ O	In-house Method, Based on MS 417: Part5:2020 (Second Revision) Method a: AAS Method b: ICPOES
	84a 84b	Total Magnesium as MgO	In-house Method, Based on MS 417: Part6:2020 (Second Revision) Method a: AAS Method b: ICPOES
	85a 85b	Total Calcium as CaO	In-house Method, Based on MS 417: Part6:2020 (Second Revision) Method a: AAS Method b: ICPOES
	86a 86b	Total Boron as B ₂ O ₃	In-house Method, Based on MS 417: Part7:2020 (Third Revision) Method a: UV Method b: ICPOES
	86c	Water Soluble Boron as B ₂ O ₃	In-house Method, Based on MS 417: Part7:2020 (Third Revision) Method: Titration
	87	Citric Acid Soluble Phosphorus as P ₂ O ₅	In-house Method, Based on MS 417: Part4:2020 (Second Revision) Method: UV
	88a 88b	Water Soluble Magnesium as MgO	In-house Method, Based on MS 417: Part6:2020 (Second Revision) Method a: AAS Method b: ICPOES

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METHOD OF ANALYSIS: FERTILIZER (Continue)

Materials/ Products Tested	Method ID	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques	
<u>Agriculture Products and Materials</u> Fertilizers	89a 89b	*Water Soluble Phosphorus as P ₂ O ₅	In-house Method, Based on MS 417: Part4:2020 (Second Revision) Method a: UV Method b: ICPOES	
	90	*Sulphur	In-house Method, Based on MS 417: Part4:2020 (Second Revision) Method a: ICPOES	
	91	*pH	MS 2457:2012	
	92a 92b	*Ferum	In-house Method, Based on MS 417: Part5:2020 (Second Revision) Method a: AAS Method b: ICPOES	
	93a 93b	*Manganese		
	94a 94b	*Copper		
	95b 95b	*Zinc		
	96a 96b	*Total Carbon	a. In-house Method, Based on MS 417: Part 3:2020 (Second Revision) Method: Dumas	b. MS417:Part 8:1997 (Ammd 2001) Method: Furnace
	97a 97b	*Organic Matter		
	98a 98a	*Organic Carbon		
	99a 99b	*C/N Ratio		
	125	*Particle Size	MS 417: Part2:1994	
	126	*Hardness	In-House Method	
	127	*Ammoniacal Nitrogen	In-house Method, Based on MS 417: Part 3:1994 (First Revision)	
	128	*Urea Nitrogen	In-house Method, Based on MS 417: Part 3:1994 (First Revision)	
	129	*Nitrate Nitrogen	In-house Method, Based on MS 417: Part 3:1994 (First Revision)	

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METHOD OF ANALYSIS: FERTILIZER (Continue)

Materials/ Products Tested	Method ID	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
<u>Agriculture Products and Materials</u> Fertilizers	130	*Sodium, Na	APHA Method 3030E, 3120B 23 rd Edition 2017
	131	*Conductivity	MS 2458:2012
	132	*Chloride	APHA Method 4500-Cl-B, 23 rd Edition 2017
	139	*Selenium	In-house Method, Based on MS 417: Part 5:2020 (Second Revision) Method: ICPOES
	140	*Plumbum	
	141	*Chromium	
	142	*Cadmium	

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METHOD OF ANALYSIS: SOIL

Materials/ Products Tested	Method ID	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
<u>Agriculture Products and Materials</u> Soils	100	pH	MS 2457:2012
	101	Conductivity	MS 2458:2012
	102	Total Nitrogen	MS ISO 13878:2014
	103	Organic Carbon	In-House Method, Based on MS 10694:2016 and Soil Sampling, Preparation, and Analysis 1996 pg. 225
	104	Total Carbon	MS 10694:2016
	105	Organic Matter	
	106a 106b	Available Phosphorus	In-House Method, Based on Buku Panduan Analisis Tanah & Tumb, Jab Sains Tanah UPM 1988, pg. 23, Method a: UV Method b: ICPOES
	107	Total Phosphorus	MS 678: Part VII:1980 Method: UV
	108	Exchangeable Cation Potassium	MS 678: Part IV:1980 Method: ICPOES
	109	Exchangeable Cation Magnesium	
	110	Exchangeable Cation Calcium	
	111	*Exchangeable Cation Sodium	
	112	Cation Exchangeable Capacity	MS 678:Part V:1980
	113	*Exchangeable Al	Soil Analysis Handbook of Reference Methods.
	114	*Exchangeable H	
	115	*Acid Extractable	

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METHOD OF ANALYSIS: SOIL (Continue)

Materials/ Products Tested	Method ID	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
<u>Agriculture Products and Materials</u> Soils	136	*Ferum	SOP Penentuan Free Iron Oxide (Fe ₂ O ₃). Kaedah Calorimetric-Bacaan Atomic Absorption Spectrometer, <i>Version 1.0, 2013</i> . Makmal Tanah, Jabatan Pertanian.
	137	*Loss of Ignition (LOI)	In-House Method
	138	*Mechanical Analysis	SOP for Mechanical Analysis. Method DOA

Remarks : * Not SAMM accredited

METHOD OF ANALYSIS: LATEX

Materials/ Products Tested	Method ID	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Rubber Field Latex	116	*Dry Rubber Content	MS 466:1987
	117	*TSC	MS 466:1987
	118	*Ammonia	In-house Method
	119	*VFA	
	120	*KOH	
	121	*Coagulant	
	122	*Magnesium	
	123	*Zinc	
	124	*Specific Gravity	

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