

NO: SAMM 213

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LABORATORY LOCATION:
(PERMANENT LABORATORY)

CHEMVI LABORATORY SDN. BHD.
NO 22A, JALAN SUNGAI JELUH 32/192,
NOUVELLE KEMUNING INDUSTRIAL PARK
BUKIT RIMAU, SEKSYEN 32,
40460 SHAH ALAM
SELANGOR, MALAYSIA

FIELDS OF TESTING:

CHEMICAL AND MICROBIOLOGICAL

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
Potable and Domestic / Industrial Water, Effluent Surface Water Ground Water Natural Water Mineral Water Drinking Water Portable Water River Water Raw Water	pH Total Suspended Solids BOD ₅ at 20°C COD Cadmium as Cd Chromium as Cr Lead as Pb Copper as Cu Manganese as Mn Nickel as Ni Zinc as Zn Iron as Fe Free-Cl ₂ Oil & Grease Dissolved Oxygen Preliminary Treatment of Samples for Metal Analysis Sulphide Boron Phenol Chromium, Trivalent	APHA 4500 H ⁺ B Electrometric Method APHA 2540 D dried at (103 - 105 °C) APHA 5210 B & 4500-O G APHA 5220 C APHA 3111 B APHA 3111 B APHA 3111 B APHA 3111 B APHA 3111 B APHA 3111 B APHA 3111 B APHA 4500 Cl-F APHA 5520 B APHA 4500 O-G APHA 3030 E APHA 4500 S ² -F APHA 4500 B : C APHA 5530 B&D In House Method, SM059 Based on Spectroquant 14552 (by calculation)

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Potable and Domestic / Industrial Water, Effluent Surface Water Ground Water Natural Water Mineral Water Drinking Water Portable Water River Water Raw Water	Fluoride Formaldehyde Color ADMI Ammonia Nitrogen Chloride Total Dissolved Solid Total Solid Hydrocarbon (Water) Nitrate (NO ₃) Phosphate (PO ₄) Hardness Silica as SiO ₂ Nitrite (NO ₂) Sulfate (SO ₄) Phosphorus Nitrogen Surfactants Anionic Detergents Carbon Dioxide O & G (Mineral Oil) O & G (Emulsified) Polychlorinated Biphenyls (PCBs) (Appendix 1) Organochlorine Pesticides (Appendix 2) Alkalinity Cyanide as CN	APHA 4500F D HACH Method 8110 APHA 2120 F APHA 4500 NH ₃ B & F APHA 4500 Cl- B APHA 2540 C APHA 2540 B APHA 5520 B & F HACH METHOD 8039 HACH METHOD 8048 APHA 2340 B (By Calculation) HACH METHOD 8185 HACH METHOD 8507 HACH METHOD 8051 APHA 4500-P B(5)&C APHA 4500-N (org) (B) HACH Method 8028 HACH Method 8223 APHA 5520 B & F APHA 5520 B USEPA Method 525.2 USEPA Method 525.2 HACH Method 8221 HACH Method 8027

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Surface Water Ground Water Natural Water Mineral Water Drinking Water River Water Raw Water	Chlorinated Acid (Herbicides) 2,4-D (2,4-Dichlorophenoxyacetic acid) 2,4,5-T (2,4,5-Trichlorophenoxyacetic acid) 2,4,5-TP (2,4,5-Trichlorophenoxypropionic acid) Paraquat Diquat	USEPA 555 USEPA 549.2 USEPA 549.2
Potable and Domestic/Industrial Water, Effluent, Surface Water, Ground Water, Natural Water, Mineral Water, Drinking Water, Portable Water, River Water, Raw Water	Tin as Sn Arsenic as As Mercury as Hg	In-house Method SM065 based on APHA 3120B APHA 3120B In-house Method SM066 based on APHA 3120B

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Potable and Domestic / Industrial Water, Effluent Surface Water Ground Water Natural Water Mineral Water Drinking Water Portable Water River Water Raw Water	Chromium Hexavalent as Cr ⁶⁺	APHA 3500 Cr B Colorimetric Method
	Cyanide as CN	OSRMA p.456 Photoelectric Method
	Arsenic as As	APHA 3114 C Continuous Hydride Generation/Atomic Absorption Spectrometric Method
	Tin as Sn	In-House Method: CV/002, (Based on APHA 3114 C Continuous Hydride Generation/Atomic Absorption Spectrometric Method)
	Mercury as Hg	APHA 3112 B Cold-Vapor Atomic Absorption
	Ammonical-Nitrogen (NH ₃ – N)	APHA 4500 NH ₃ B&C
	Preliminary Treatment of Sample	APHA 3030 F
	Aluminum as Al	APHA 3120 B (ICP – OES)
	Boron as B	
	Barium as Ba	
	Cadmium as Ca	
	Chromium as Cr	
	Cobalt as Co	
	Copper as Cu	
	Iron as Fe	
	Lead as Pb	
	Magnesium as Mg	
	Manganese as Mn	
	Nickel as Ni	
	Silver as Ag	
	Strontium as Sr	
	Thallium as Tl	
	Zinc as Zn	

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Marine Water Estuarine Water Coastal Water	TSS	APHA 2540 D
	Colour	APHA 2120 F
	Oil and Grease	APHA 5520 B
	Ammoniacal Nitrogen	APHA 4500- NH ₃ B & F
	Nitrite (NO ₂)	HACH 8507
	Nitrate (NO ₃)	HACH 8192
	Phenol	APHA 5530 B & D
	Arsenic	APHA 3120 B
	Cadmium	APHA 3120 B
	Chromium	APHA 3120 B
	Chromium(Cr 6+)	APHA 3500 Cr B
	Copper	APHA 3120 B
	Lead	APHA 3120 B
	Nickel	APHA 3120 B
	Mercury	In House Method SM064 (modify based on APHA 3120 B
	Zinc	APHA 3120 B
	Phosphate	HACH METHOD 8048
	Total Organic Carbon (TOC)	APHA 5310 B
	Cyanide	OSRMA P.456
	Tributyltin (TBT)	APHA 6710 B
	Polycyclic Aromatic Hydrocarbon (PAHs) (Appendix 3)	APHA 6410 B
	Organic Nitrogen	APHA 4500 N (ORG)
	Cyanide as CN	HACH Method 8027

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Marine Water Estuarine Water Coastal Water	Unionized Ammonia (NH ₃)	In-house Method SMO63 based on Florida Department of Environment Protection Chemistry Laboratory Methods Manual Tallahassee Calculation Method
	Preliminary Treatment of Sample	APHA 3030 F
	Low Level Metals	In-house Method SM065 based on APHA 3125B with High Matrix Introduction (HMI) and Octopole ion guide, ICPMS
	Silver as Ag	
	Aluminum as Al	
	Arsenic as As	
	Barium as Ba	
	Beryllium as Be	
	Cadmium as Cd	
	Copper as Cu	
	Cobalt as Co	
	Chromium as Cr	
	Cesium as Cs	
	Iron as Fe	
	Gallium as Ga	
	Mercury as Hg	
	Lithium as Li	
	Manganese as Mn	
	Nickel as Ni	
	Lead as Pb	
	Rubidium as Rb	
	Selenium as Se	
	Strontium as Sr	
	Titanium as Ti	
	Uranium as U	
	Zinc as Zn	

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Sediment, Sludge, Soil, Solid Samples	Preliminary Treatment of Samples: Acid Digestion	USEPA 3050 B (1996)
	Metal By Acid Digestion:	
	Aluminum as Al	USEPA 3050 B (1996) (ICP – OES)
	Barium as Ba	
	Cadmium as Cd	
	Calcium as Ca	
	Chromium as Cr	
	Cobalt as Co	
	Copper as Cu	
	Iron as Fe	
	Lead as Pb	
	Magnesium as Mg	
	Manganese as Mn	
	Nickel as Ni	
	Silver as Ag	
	Thallium as Tl	
	Zinc as Zn	
Solid Waste, Municipal Solid Waste (MSW), Refuse-Derived Fuel (RDF)	Alkaline digestion and determination of Hexavalent Chromium as Cr ⁶⁺	USEPA 3060 A (1996) & USEPA 7196 A (1992)
	Total Hydrocarbon	APHA 5520 E & F (21 st Edition)
	<u>Proximate Analysis</u>	
	Total Moisture Content	ASTM E 949-96
	Volatile Matter	ASTM E 897-93
	Ash Content	ASTM E 830-96
	Fixed Carbon	In-House Method: CV/001, (Based on ASTM E 949-96, ASTM E 897-93 and ASTM E 830-96)

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Solid Waste, Municipal Solid Waste (MSW), Refuse-Derived Fuel (RDF) (continued)	<u>Ultimate Analysis</u>	
	Preliminary Treatment of Samples for Metal Analysis	ASTM E 926-94 (Practice B-Nitric-Sulphuric-Hydrofluoric Acid Digestion)
	Cadmium as Cd	ASTM E 885-96 (Direct Aspiration)
	Copper as Cu	ASTM E 885-96 (Direct Aspiration)
	Iron as Fe	ASTM E 885-96 (Direct Aspiration)
	Lead as Pb	ASTM E 885-96 (Direct Aspiration)
	Zinc as Zn	ASTM E 885-96 (Direct Aspiration)
	Chromium as Cr	ASTM E 885-96 (Direct Aspiration)
	Manganese as Mn	ASTM E 885-96 (Direct Aspiration)
	Nickel as Ni	ASTM E 885-96 (Direct Aspiration)
	Tin as Sn	ASTM E 885-96 (Direct Aspiration)
	Mercury as Hg	ASTM E 885-96 (Cold Vapour)
Sludge/ Sediment/ Refuse – Derived Fuel (RDF)/ Semi compose Fibre	Standard Test Method for Nitrogen in The Analysis Sample of Refuse-Derived Fuel	ASTM E 778-87 (Reapproved 1996)
	<u>Ultimate Analysis</u>	
	Potassium as K	ASTM E 926-94 (Practice B) Standard Practices For Preparing Refuse-Derived Fuel (RDF)
	Phosphorus as P	ASTM D 5198-92 (Reapproved 2003) Standard Practice for Nitric Acid Digestion of Solid Wastes

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
EU RoHS & EU REACH Compliance	Lead Mercury Cadmium Chromium	In-house Method SM067 based on USEPA 3050B
Paper, Paperboard & Wood Pulp	Hexavalent Chromium	USEPA 3060A & USEPA 7196A
Chemicals	Polybrominated Biphenyls (PBB)	IEC 62321: 2008
Metal Paints	2-Bromobiphenyl 4,4-Dibromooctafluorobiphenyl 3-Bromobiphenyl 4-Bromobiphenyl 2,2-Dibromobiphenyl 2,5-Dibromobiphenyl 2,6-Dibromobiphenyl 4,4-Dibromobiphenyl 2,4-Dibromobiphenyl 2,2,5-Tribromobiphenyl 2,4,5-Tribromobiphenyl 2,3,5-Tribromobiphenyl 2,2,4,5-Tetrabromobiphenyl 2,4,6-Tribromobiphenyl 3,3,5,5-Tetrabromobiphenyl 2,2,4,5,6-Pentabromobiphenyl 2,2,4,5,5-Pentabromobiphenyl	
Papers	Polybrominated diphenyl ether (PBDE)	IEC 62321: 2008
Plastics	2,2,4,4-Tetrabromobiphenyl 2,2,4,4,6-Pentabromobiphenyl 2,2,4,4,5-Pentabromobiphenyl	
Electrical and Electronic product	Bis(2-ethylexyl) phthalate (DEHP) Butyl benzyl phthalate (BBP) Dibutyl phthalate (DBP) Diisobutyl phthalate (DIBP) Dimethyl phthalate (DMP) Diethyl phthalate (DEP) Bis(2-ethoxyethyl) phthalate Dipentyl phthalate (DPP) Di-n-hexyl phthalate (DNHP) Dicylohexyl phthalate (DCHP) Di-n-Octyl phthalate (DNOP) Dinonyl Phthalate (DNP)	USEPA Method 3540C & USEPA Method 8270C

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Materials contained in ship structure or equipment In reference to the Resolution MEPC 269 (68), 2015 Guidelines for the Development of the Inventory of Hazardous Material (IHM) and EU Regulation 1257/2013 on Ship Recycling	Asbestos (Bulk) by PLM (Sampling and Analysis)	NIOSH 9002
	Polychlorinated Biphenyls (PCBs) (Appendix 5) (organic)	USEPA Method 3540C & USEPA Method 8270C
	Polychlorinated Naphthalenes (PCNs) (Appendix 6) (organic)	USEPA Method 3540C & USEPA Method 8270C
	Ozone Depleting Substances (ODS) (Appendix 7) (organic)	USEPA Method 5021A
	1,2,5,6,9,10 – Hexabromocyclodecane [Brominated Flame Retardant (HBCDD)] (organic)	IEC 62321: 2008
	Perfluorooctane Sulfonic Acid (PFOS)	EM 201: 2010
	Polybrominated Biphenyls (PBB) (Appendix 8)	IEC 62321:2008
	Polybrominated Diphenyl Ether (PBDE) (Appendix 9)	IEC 62321:2008
	Short Chain Chlorinated Paraffins (C10-C13) SCCP	USEPA Method 3540C & USEPA Method 8270C (Screening)
	Anti-fouling compound [Tin as percentage (% tin)]	In-house Method SM068 based on USEPA 3050B (ICP OES)
	Cadmium and Cadmium Compounds (as Total Cadmium)	In-house Method SM067 based on USEPA 3050B
	Lead and Lead Compounds (as Total Lead)	In-house Method SM067 based on USEPA 3050B
	Chromium and Chromium Compound (as Total Chromium)	In-house Method SM067 based on USEPA 3050B
	Mercury and Mercury Compound (as Total Mercury)	In-house Method SM067 based on USEPA 3050B
	Chromium Hexavalent (Cr ⁶⁺)	USEPA 3060A & USEPA 7196 A

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Palm Oil Mill Effluent	BOD ₃	D.O.E Revised Standard Method (1985) for analysis of rubber and palm oil mill effluent, 3 rd Edition Alternative Method
Co-compost	Ash	In-house Method SM094 based on MS 417: Part 2: 1994
	Moisture	In-house Method SM095 based on MS 417: Part 2: 1994 (Method I)
	Phosphorus (P)	In-house Method SM103 (Modified based on MS 417: Part 4: 1994) UV
	Potassium (K)	In-house Method SM107 (Modified based on MS 417: Part 5: 1994) ICP
	Boron (B)	In-house Method SM106 (Modified based on MS 417: Part 7: 2001) UV
	pH	In-house method SM092 based on MS 2457: 2012
	Zinc Iron Manganese Copper	In-house Method SM096 based on USEPA 3050B: SAMPLE PREPARATION & In-house Method SM096 based on USEPA 3050B SAMPLE ANALYSIS BY ICP-OES
	Calcium	In-house Method SM104 based on MS 417: Part 8: 1997/ICP
	Magnesium	In-house Method SM 105 based on MS 417: Part 6: 1994/ICP
Plant/Foliar /Rachis	Zinc Iron Manganese Copper	In-house Method SM096 based on USEPA 3050B: SAMPLE PREPARATION & In-house Method SM096 based on USEPA 3050B SAMPLE ANALYSIS BY ICP-OES
	Ash	In-house Method SM094 based on MS 417: Part 2: 1994
	Moisture	In-house Method SM095 based on MS 417: Part 2: 1994 (Method 1)
	pH	In-house Method SM092 based on MS 2457: 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
Fertilizer	pH	In-house Method SM092 based on MS 2457: 2012
	Moisture	In-house Method SM095 based on MS 417: Part 2: 1994 (Method 1)
	Total Phosphorus (as %P ₂ O ₅)	MS 417: Part 4: 1994/UV
	Water Soluble Phosphorus (as % P ₂ O ₅)	MS 417: Part 4: 1994/UV
	Calcium (as CaO)	In-house Method SM099 (Modified based on MS 417: Part 8: 1997)/ICP
	Total Magnesium (as MgO)	In-house Method SM101 (Modified based on MS 417: Part 6: 1994/ICP
	Total Boron as (B ₂ O ₃)	MS 417: Part 7: 2001 (UV)
	Total Potassium (as K ₂ O)	In-house method SM 100A (Modified based on MS 417: Part 5: 1994)/ICP
Soil	pH	In-house Method SM092 based on MS 2457: 2012
	Conductivity	In-house Method SM093 based on MS 2458: 2012 (Confirmed: 2018)
	Sodium (Na)	Acid Digestion for sediment, sludge and soil (USEPA 3050B)
	Potassium (K)	
	TOC	In-house Method SM125 – Dumas Method using CN Analyser (by calculation)
Co-compost Fertilizer Soil Plant/Foliar /Rachis	Nitrogen (N)	In-house Method SM121 – Dumas Method using CN Analyser
	Carbon / Nitrogen Ratio	In-house method SM123 – Dumas Method using CN Analyser (Calculation)
	Carbon (C)	In-house Method SM122 – Dumas Method Using CN Analyser (by calculation)

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Agricultural Products and Materials		
Foliar, Rachis, Plant	Dry Ashing and Preparation of Sample Extract Solution	MS 677 : Pt. II : 1980
	Nitrogen	MS 677 : Pt. III : 1980
	Phosphorus	In House Method SM085 (Modify based on MS 677: Pt.IV: 1980 (ICP))
	Potassium	In House Method SM085 (Modify based on MS677: Pt.V: 1980 (ICP))
	Magnesium	In House Method SM085 (Modify based on MS677: Pt.VII: 1980 (ICP))
	Calcium	In House Method SM085 (Modify based on MS677: Pt.VI: 1980 (ICP))
	Boron	In House Method SM085 (Modify based on MS417 Part VII: 2001)

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Soil	Volatile Organic Compound (VOC) 1) 1,1-Dichloroethane 2) Chloroprene 3) 2,2-Dichloropropane 4) Bromochloromethane 5) Chloroform 6) 1,1,1-Trichloroethane 7) Carbon Tetrachloride 8) Benzene 9) 1,2-Dichloroethane 10) Trichloroethene 11) 1,2-Dichloropropane 12) Dibromomethane 13) Bromodichloromethane 14) 1,3-Dichloropropene 15) Toluene 16) Trans 1,3-Dichloropropene 17) 1,1,2-Trichloroethane 18) Tetrachloroethene 19) 1,3-Dichloropropane 20) Dibromochloromethane 21) Dibromoethane 22) 1,1,2,2-Tetrachloroethane 23) m-Xylene 24) o-Xylene 25) Bromoform 26) Cumene 27) Bromobenzene 28) 1,2,3-Trichloropropane 29) n-propylbenzene 30) o-chlorotoluene 31) p-chlorotoluene 32) 1,2,4-Trimethylbenzene 33) Cymene 34) 1,3,5-Trimethylbenzene 35) Sec-butylbenzene 36) 1,2-Dichlorobenzene 37) 1,3-Dichlorobenzene 38) n-butylbenzene 39) 1,2,3-Trichlorobenzene 40) Hexachloro-1.3-butadiene 41) 1,2,4-Trichlorobenzene	USEPA 5021A

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Industrial Hygiene	Asbestos and Other Fiber by PCM	NIOSH 7400
Personal and Area Chemical Exposure Monitoring (Sampling and Analysis)	Mercury	NIOSH 6009
In compliance to the OSHA Act 1994 and the USECHH Regulation 2000 (Use & Standards Of Exposure Of Chemical Hazardous To Health Regulations 2000).	Aluminium Antimony Arsenic Barium Beryllium Cadmium Calcium Chromium Cobalt Copper Iron Lead Magnesium Manganese Molybdenum Nickel Tin Zinc	NIOSH 7303
Local Exhaust Ventilation (LEV), Fume hood.	Face Velocity Capture Velocity Static Pressure (SP) Duct Velocity Revolution Per Minute (RPM)	In house method SM 063: Air Velocity Meter using Hot Wire Anemometer Air Velocity Meter using Pitot Tube Laser Tachometer

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Indoor Air Quality (IAQ) Assessment monitoring In compliance to The Indoor Air Quality as per Industry Code of Practice on Indoor Air Quality 2010 (ICOP IAQ 2010), Department Of Occupational Safety And Health, Ministry Of Human Resources, Malaysia, JKKP DP(S) 127/379/4-39.	Total Volatile Organic Compound Carbon Dioxide (CO ₂) Carbon Monoxide(CO) Relative Humidity Air Temperature Air movement Respirable Particulates Ozone Formaldehyde Total bacterial counts (Sampling and Analysis) Total fungal counts (Sampling and Analysis)	In House Method SM 062: VOC monitor using PID sensor Carbon dioxide monitor using non- dispersive infrared sensor Carbon monoxide monitor using electrochemical sensor Air Velocity Meter using hot wire anemometer Digital Dust Monitor using light scattering Ozone monitor using OZL sensor. Formaldemeter using electrochemical formaldehyde sensor In house method SM062 based on NIOSH 0800 (1998) (Tryptic Soy Agar (TSA) In house method SM062 based on NIOSH 0800 (1998) (Malt Extract Agar (MEA)

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Blood	Aluminium (Al) Arsenic (As) Barium (Ba) Cadmium (Cd) Calcium (Ca) Chromium (Cr) Copper (Cu) Iron (Fe) Lead (Pb) Magnesium (Mg) Manganese (Mn) Nickel (Ni) Tin (Sn) Zinc (Zn)	In-house Method SM002 (Metals in Blood) based on NIOSH 8005
Urine	Aluminium (Al) Arsenic (As) Barium (Ba) Cadmium (Cd) Calcium (Ca) Chromium (Cr) Copper (Cu) Iron (Fe) Lead (Pb) Magnesium (Mg) Manganese (Mn) Nickel (Ni) Tin (Sn) Zinc (Zn)	In-house Method SM001 (Metals in Urine) based on NIOSH 8310
Drinking Water Surface Water River Water Ground Water	SVOC PAH TOC	APHA 6410B APHA 6410B APHA 5310B

Signatories:

- | | | |
|----|---|-----------------------------------|
| 1. | Dr. Shanmugam Suberamaniam (All) | IKM No.: M/1095/2640/96/99 |
| 2. | Punitha a/p Perumall | IKM No.: M/2795/5536/2009 |
| 3. | Kalaivani a/p Varadarajan | IKM No.: L/1892/6259/12 (|

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SCOPE OF TESTING: CHEMICAL**SITE: CATEGORY I**

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Effluent/ Water/ River Water/ Surface Water (Site Testing)	pH Temperature Dissolved Oxygen Turbidity	APHA 4500 H ⁺ B APHA 2550 B APHA 4500 O G APHA 2130 B
Noise Measurement/Acoustic	Description and Measurement of Environmental (Factory Boundaries) Noise Level (Intensity and Frequency) – Basic Quantities and Procedures	ISO 1996-1:2003 (E)
Vibration Measurement	Description and Measurement of Vibration Level on Construction and Open Site	BS 5228: Part 2:2009
Chimney/ Stack Air Emission – Flue Gas Sampling	Determination of Concentration and Mass Flow of Particulate Matter Using Isokinetic Method PCDDs and PCDF Dioxin and Furan (Sampling)	MS 1596: 2003 USEPA 23
Effluent/Water/River Water/ Surface Water Groundwater Marine water Estuarine water Coastalwater (Site Testing)	Flow rate Temperature Dissolved Oxygen Salinity Turbidity Conductivity pH	In house method SM 090 Based On Manufacturer Instruction Manual GLOBAL WATER APHA 2550B APHA 4500 O G APHA 2520 A APHA 2130 B APHA 2520 B APHA 4500 H ⁺ B

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Ambient Air (Site Testing)	Sulphur dioxide(SO ₂),	In house method SM 089. Based On Manufacturer Instruction Manual using B-smart sensor
	Ozone (O ₃)	In house method SM 088 Ozone monitor using OZL sensor
	Carbon Monoxide (CO)	In-house Method SM099A based on ToxiRAE Pro User's Guide Carbon Monoxide monitor using non-dispersive infrared sensor
	Carbon Dioxide (CO ₂)	In-house Method SM0099B based on ToxiRAE Pro CO ₂ User's Guide Carbon Dioxide monitor using non-dispersive infrared sensor
	Relative Humidity	In-house Method SM099C based on Velocical Air Velocity Meter using hot wire anemometer
	Total Volatile Organic Compound	In-house Method SM099D based on MiniRAE Lite User's Guide VOC monitor using PID sensor

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Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Ambient Air	Sampling and Analysis of Particulate Matter (PM _{2.5}) in the Atmosphere by using High Volume sampler (Tisch International)	In house method SM 087 based on EPA code of federal regulations. Extension of USEPA 40 Part 50, Appendix J
	Sampling and Analysis of Particulate Matter (PM ₁₀) in the Atmosphere by using High Volume sampler	USEPA 40 Part 50, Appendix J
	Sampling and Analysis of Particulate Matter (PM ₁₀) in the Atmosphere Using PM ₁₀ High Volume Sampler	ISC 501 (11101-01-70T)
	Determination of Suspended Particulate Matter (TSP) in the Atmosphere (High-Volume Method) Using High Volume Sampler (HVS)	USEPA 40 Part 50, Appendix B
	Lead (Pb)	NIOSH 7303
	Cadmium (Cd)	NIOSH 7303
	Calcium (Ca)	NIOSH 7303
	Total Chromium (Cr)	NIOSH 7303
	Copper (Cu)	NIOSH 7303
	Iron (Fe)	NIOSH 7303
	Mercury (Hg)	NIOSH 7303
	Nitrogen Dioxide (NO ₂)	APHA ISC 408 (42602-03-73T)

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SCOPE OF TESTING: CHEMICAL**SITE: CATEGORY I**

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Air Emission - Flue Gas Monitoring	Nitrogen Oxide (NO _x)	In-house Method SM100 based on B-smart sensor operation manual
Dust/Particulate Emission	Determination of Particulate Emissions from Stationary Sources	USEPA Method - 5 (Isokinetic Stack Monitoring)
H ₂ SO ₄ , SO ₂	Determination of Sulfuric Acid Mist and Sulfur Dioxide Emissions from Stationary Sources	USEPA Method - 8 (Isokinetic Stack Monitoring)
Cu, Zn, As, Sb, Pb, Cd, Hg	Determination of Metals Emissions from Stationary Sources	USEPA Method - 29 (Isokinetic Stack Monitoring)
Air Emission	Dark Smoke	BS 2742:2009 (Ringelmann Smoke Chart)

Note:

1. USEPA: United State Environmental Protection Agency, 2000 (5th Edition)
2. APHA: American Public Health Association, 2005 (21st Edition)
3. OSRMA: Official, Standardised & Recommended Methods of Analysis, 1973 (2nd Edition)
4. ISO : International Organization for Standardization
5. ASTM : American Society for Testing and Materials
6. BS : British & International Standards
7. ISC : Intersociety Committee Methods of Air Sampling and Analysis, 3rd ed., 1989
8. NIOSH - National Institute of Occupational Safety and Health.

Signatories:

- | | | |
|----|---|---|
| 1. | Dr. Shanmugam Suberamaniam (All) | IKM No.: M/1095/2640/96/99 (All) |
| 2. | Punitha a/p Perumall | IKM No.: M/2795/5536/2009 (Water/Effluent, Materials Contained in Ship Structure of Equipment, Compost, Plant, Fertilizer and Soil Only) |
| 3. | Kalaivani a/p Varadarajan | IKM No.: L/1892/6259/12 (Stack Monitoring, Dark Smoke, ROHS and Organic only) |
| 4. | Megala a/p Muniandy | Air, Noise, Vibration. Water (WQ1) (Under supervision) |
| 5. | Sharmila a/p Rajahenderan | Air, Noise, Vibration. Water (WQ1) (Under supervision) |
| 6. | Asrifa binti Saari | Air, Noise, Vibration. Water (WQ1) (Under supervision) |
| 7. | Jivitha a/p Veralingam | IKM No.: L/1893/6260/12 (Air, Noise, Vibration. Water) (WQ1) (Under supervision) |
| 8. | Kayathri a/p Karunanithi | Asbestos testing (under supervision) |

SCOPE OF TESTING: MICROBIOLOGY

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Water Waste Water Potable Water Drinking Water Industrial Water River Water	Heterotrophic Plate Count/ Total Plate Count Total Coliform Count Total Faecal Coliform Count <i>E.coli</i> count <i>Legionella spp</i>	APHA 9215 B (2022) (23 rd Edition) (Pour Plate) APHA 9222 B (2022) (23 rd Edition) (Membrane Filtration Technique) APHA 9222 D (2022) (23 rd Edition) (Membrane Filtration Technique) APHA 9222 I (2022) (23 rd Edition) (Membrane Filtration Technique) USEPA 1603 (2014) (Membrane filtration Technique modified M-TEC agar APHA 9260J (2022) (23 rd Edition) (Detection)
Marine Water Estuarine Water Coastal Water	Total Coliform Count Total Faecal Coliform Count <i>E.coli</i> count <i>Enterococci spp</i>	APHA 9222 B (2022) (23 rd Edition) (Membrane Filtration Technique) APHA 9222 D (2022) (23 rd Edition) (Membrane Filtration Technique) APHA 9222 I (2022) (23 rd Edition) (Membrane Filtration Technique) USEPA 1603 (2014) (Membrane filtration Technique modified M-TEC agar APHA 9230 C (2022) (23 rd Edition) (Membrane Filtration Technique)

SCOPE OF TESTING: MICROBIOLOGY

Materials/ Products Tested	Type of Test/ Properties Measured/ Range of Measurement	Standard Test Methods/ Equipment/Techniques
Clean Room Assessment	Total bacterial counts (Sampling and Analysis)	In house method (SM062) based on NIOSH 0800 (1998) (Tryptic Soy Agar (TSA))
	Total fungal counts (Sampling and Analysis)	In house method (SM062) based on NIOSH 0800 (1998) (Malt Extract Agar (MEA))
Pharmaceutical Item/Traditional Medicines/Toiletries	Total Aerobic Microbial Count Total Yeast and Mold Count Bile Tolerant Gram Negative Bacteria <i>Escherichia coli</i> <i>Staphylococcus aureus</i> <i>Pseudomonas aeruginosa</i> <i>Salmonella spp</i>	BP (Harmonised Method) 2022 (Appendix XVI BV 543-551)

Signatories:

1. **Thamayanthi a/p Rajendran (Microbiology, Biology)**
2. **Megala a/p Muniandy (Microbiology, Biology)**
3. **Satish Raj a/l Krishnan**
4. **Vanitha a/p Ganison**

MJMM 1096 (Microbiology)**MJMM 1095 (Microbiology)****Notes:**

- | | |
|-----------|--|
| 1. APHA | American Public Health Association |
| 2. BP | British Pharmacopoeia |
| 3. USE PA | United States Environmental Protection Agency |
| 4. NIOSH | National Institute of Occupational Safety and Health |

**APPENDIX 1
POLYCHLORINATED BIPHENYLS (PCBs)**

1. 2-Chlorobiphenyl (2051-60-7)
2. 2,3-Dichlorobiphenyl (16605-91-7)
3. 2,4,5-Trichlorobiphenyl (15862-07-4)
4. 2,2',4,4'-Tetrachlorobiphenyl (2437-79-8)
5. 2,2',3',4,6-Pentachlorobiphenyl (60233-25-2)
6. 2,2',4,4',5,6'-Hexachlorobiphenyl (60145-22-4)
7. 2,2',3,3',4,4',6-Heptachlorobiphenyl (52663-71-5)
8. 2,2',3,3',4,5',6,6'-Octachlorobiphenyl (40186-71-8)

**APPENDIX 2
ORGANOCHLORINE PESTICIDES**

1. 4,4'-DDD (72-54-8)
2. 4,4'-DDE (72-55-9)
3. 4,4'-DDT (50-29-3)
4. Aldrin (309-00-2)
5. alpha-BHC (319-84-6)
6. Beta-BHC (319-85-7)
7. Cis-Chlordane (5103-71-9)
8. Delta-BHC (319-86-8)
9. Dieldrin (60-57-1)
10. Endosulfan I (959-98-8)
11. Endosulfan II (33213-65-9)
12. Endosulfansulfate (1031-07-8)
13. Endrin (72-20-8)
14. Endrin aldehyde (7421-93-4)
15. Endrin ketone (53494-70-5)
16. gamma-BHC (Lindane) (58-89-9)
17. Heptachlor (76-44-8)
18. Heptachlorepoxy (isomer B) (1024-57-3)
19. Methoxychlor (72-43-5)
20. Trans-Chlordane (5103-74-2)

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**APPENDIX 3
POLYAROMATIC HYDROCARBONS (PAHs)**

1. 2,4-Dinitrotoluene (121-14-2)
2. Acenaphthylene(208-96-8)
3. Benzo(a)pyrene(50-32-8)
4. Benzo(b)fluoranthene(205-99-2)
5. Benzo(g,h,i)perylene(191-24-2)
6. Benzo(k)fluoranthene(207-08-9)
7. Benzyl butyl phthalate(85-68-7)
8. Bis(2-ethylhexyl)phthalate (117-84-0)
9. Diethylphthalate(84-66-2)
10. Dimethylphthalate(131-11-3)
11. Di-n-butylphthalate(84-74-2)
12. Fluoranthene(206-44-0)
13. Fluorene(86-73-7)
14. Hexachlorobenzene(118-74-1)
15. Hexachlorocyclopentadiene(77-47-4)
16. Indeno(1,2,3-cd)pyrene (193-39-5)
17. Isophorone (CAS 78-59-1)
18. Phenanthrene(85-01-8)
19. Pyrene(129-00-0)

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APPENDIX 4
SEMIVOLATILE ORGANIC COMPOUNDS (SVOC)

1. 1-Methylnaphthalene (90-120-0)
2. 2-Methylnaphthalene (91-57-6)
3. 1,4-Dichlorobenzene (106-46-7)
4. 2-Chlorophenol (95-57-8)
5. 2-Chloronaphthalene (91-58-7)
6. 2-Methylphenol (95-48-7)
7. 2-Nitroaniline (88-74-4)
8. 2,4-Dichlorophenol (120-83-2)
9. 2,4-Dimethylphenol (105-67-9)
10. 2,4-Dinitrotoluene (121-14-2)
11. 2,4,5-Trichlorophenol (95-95-4)
12. 2,4,6-Trichlorophenol (88-06-2)
13. 2,3,4,6-Tetrachlorophenol (58-90-2)
14. 3-Methylphenol (108-39-4)
15. 4-Bromophenyl phenyl ether (101-55-3)
16. 4-Chloroaniline (106-47-8)
17. 4-Chloro-3-methylphenol (59-50-7)
18. 4,6-Dinitro-2-methylphenol (534-52-1)
19. Acenaphthylene (208-96-8)
20. Aniline (62-53-3)
21. Benzo (a) pyrene (50-32-8)
22. Benzo (b) fluoroanthene (205-99-2)
23. Benzo (g,h,i) perylene (191-24-2)
24. Benzo (k) fluoroanthene (207-08-09)
25. Benzyl alcohol (100-51-6)
26. Benzyl butyl phthalate (85-68-7)
27. Bis (2-chloroethyl) ether (114-44-4)
28. Bis (2-chloroethoxy) methane (111-91-1)
29. Bis (2-chloroisopropyl) ether (108-60-1)
30. Bis (2-ethylhexyl) phthalate (117-81-7)
31. Dibenzofuran (132-64-9)
32. Diethyl phthalate (84-66-2)
33. Dimethyl phthalate (131-11-3)
34. Di-n-butyl phthalate (84-74-2)
35. Diphenylamine (122-39-4)
36. Fluoranthene (206-44-0)
37. Fluorene (86-73-7)
38. Hexachlorobenzene (118-74-1)
39. Hexachlorobutadiene (87 68 3)
40. Hexachlorocyclopentadiene (77 47-4)
41. Hexachloroethane (67-72 1)
42. Indeno (1,2,3 cd) pyrene (207 08 9)
43. Isophorone (78-59-1)
44. Phenanthrene (8S 01-8)
45. Phenol (108 95 2)
46. Pyrene (129-00 0)

**APPENDIX 5
POLYCHLORINATED BIPHENYLS (PCBs)**

1. 2-chlorobiphenyl
2. 2,3-Dichlorobiphenyl
3. 2,2',5- Trichlorobiphenyl
4. 2,4',5- Trichlorobiphenyl
5. 2,2'3,5'-Tetrachlorobiphenyl
6. 2,2',5,5'-Tetrachlorobiphenyl
7. 2,3',4,4'-Tetrachlorobiphenyl
8. 2,2',3,4,5'-Pentachlorobiphenyl
9. 2,2',4,5,5'-Pentachlorobiphenyl
10. 2,3,3',4',6-Pentachlorobiphenyl
11. 2,2',3,4,4',5-Hexachlorobiphenyl
12. 2,2',3,4,5,5'-Hexachlorobiphenyl
13. 2,2',3,5,5',6-Hexachlorobiphenyl
14. 2,2',4,4',5,5'-Hexachlorobiphenyl
15. 2,2',3,3',4,4',5-Heptachlorobiphenyl
16. 2,2',3,4,4',5,5'-Heptachlorobiphenyl
17. 2,2',3,4,4',5',6-Heptachlorobiphenyl
18. 2,2',3,4',5,5',6-Heptachlorobiphenyl
19. 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl

**APPENDIX 6
POLYCHLORINATED NAPHTHALENES (PCN)**

1. 1,2,3,4-Tetrachloronapthalene
2. Octachloronapthalene

**APPENDIX 7
OZONE DEPLETING SUBSTANCES (ODS)**

1. 1,1,1 – Trichloroethane
2. 1,1,2 – Trichloroethane
3. 1,1 – Dichloroethane
4. 1,2 – Dichloroethane
5. 1,2 – Dichloropropane
6. 1,3 – Dichloropropene
7. 2,2 – Dichloropropane
8. Bromo chloroethane
9. Carbon tetrachloride
10. Chloroform
11. Hexachlorobutadiene
12. Tetrachloroethene

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(Continued)

13. Trans – 1,3 – dichloropropene
14. Trichloroethene
15. Trichlorofluoromethane (CFC-11)
16. 1,1,2-Trichlorotrifluoroethane (CFC-113)
17. 1,2-Dichlorotetrafluoroethane (CFC-114)

**APPENDIX 8
POLYBROMINATED BIPHENYLS (PBB)**

1. 2-Bromobiphenyl
2. 4,4- Dibromooctafluorobiphenyl
3. 3-Bromobiphenyl
4. 4-Bromobiphenyl
5. 2,2'- Dibromobiphenyl
6. 2,5- Dibromobiphenyl
7. 2,6- Dibromobiphenyl
8. 4,4' – Dibromobiphenyl
9. 2,4- Dibromobiphenyl
10. 2,2',5 –Tribromobiphenyl
11. 2,4,5 –Tribromobiphenyl
12. 2,3,5 – Tribromobiphenyl
13. 2,2',4,5- Tetrabromobiphenyl
14. 2,4,6-Tribromobiphenyl
15. 3,3',5,5' –Tetrabromobiphenyl
16. 2,2',4,5,6-Pentabromobiphenyl
17. 2,2',4,5,5- Pentabromobiphenyl

**APPENDIX 9
POLYBROMINATED DIPHENYL ETHER (PBDE)**

1. 2, 2',4,4' – Tetrabromodiphenyl
2. 2,2',4,4',6 – Pentabromobiphenyl
3. 2,2',4,4',5 – Pentabromobiphenyl

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**APPENDIX 10
SVOC (WATER)**

1. Phenol
2. Bis (2-chloroethyl) ether (111-44-4)
3. 2-chlorophenol
4. 1,4-dichlorobenzene
5. 2-methylphenol
6. Bis-(2-chloroisopropyl)
7. 3-methylphenol
8. Isophorone
9. 2,4-dimethylphenol
10. Bis (2-chloroMethane)
11. 2,4-dichlorophenol
12. 4-chloroaniline
13. Hexachlorobutadiene
14. 4-chloro-3-methylphenol
15. 2,4,6-Trichlorophenol
16. 2,4,5-Trichlorophenol
17. 2-Chloronapthalene
18. Dibenzofuran
19. 2,3,4,6-Tetrachlorophenol
20. Diethylphthalate
21. Diphenylamine
22. 4-Bromophenyl phenyl ether
23. Hexachlorobenzene
24. 36. Di-n-butyl phthalate
25. Benzyl butyl phthalate
26. Bis(2-ethylhexyl) phthalate

**APPENDIX 11
PAH (WATER)**

1. 2-methylnaphtalene
2. 1-methylnaphtalene
3. Acenaphtalene
4. Fluorene
5. Phenanthrene
6. Fluoranthene
7. Pyrene
8. Indeno (1,2,3-cd) pyrene
9. Benzo(k) fluoranthene
10. Benzo(b) fluoranthene
11. Benzo (a) pyrene
12. Benzo (ghi) perylene