

**SINGAPORE LABORATORY
ACCREDITATION SCHEME**



Schedule

Admaterials Technologies Pte Ltd
58 Sungei Kadut Loop
Singapore 729501

Certificate No. : LA-2013-0546-F
Issue No. : 10
Date : 26 August 2022
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FIELD OF TESTING : Environmental Testing

MATERIALS / PRODUCTS TESTED	TESTS / PROPERTIES	STANDARD METHODS / TECHNIQUES / EQUIPMENT	SIGNATORY
A Water Analysis <ul style="list-style-type: none"> • Potable water • Non-potable water • Sewage, effluents and trade wastes • Water for industrial purposes • Swimming pool water • Ground water • RO water • Sea water • Pond water • Chiller water • Cooling tower water • Water Fountain water • Boiler water • Mineral, Spring Water 	1. Acidity 2. Alkalinity (as CaCO ₃) / Bicarbonate / Carbonate 3. Aluminium (Al) 4. Ammonia (NH ₃) 5. Ammonium 6. Antimony (Sb) 7. Arsenic (As) 8. Barium (Ba) 9. Beryllium (Be) 10. Biochemical Oxygen Demand (BOD) 11. Boron (B) 12. Bromide 13. Cadmium (Cd) 14. Calcium (Ca) 15. Calcium Hardness 16. Chemical Oxygen Demand (COD) 17. Chloride (Cl ⁻) 18. Chlorine (Total Residual) 19. Chlorine (Free)	<p><u>APHA Methods are based on 23rd Edition: 2017</u></p> APHA 2310 B APHA 2320 B APHA 3120 B APHA 3125 B APHA 4500-NH3 F HACH 8038 HACH Doc 022.53.80029 APHA 3120 B APHA 3125 B APHA 3120 B APHA 3125 B APHA 3120 B APHA 3125 B APHA 3120 B APHA 3125 B APHA 3120 B APHA 3125 B APHA 5210 B APHA 3120 B APHA 3125 B APHA 4110 B APHA 3120 B APHA 3125 B APHA 3120 B APHA 3120 B / APHA 2340 B HACH 8000 APHA 4110 B HACH 8167 HACH 8021	DT

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	21. Chromate (CrO ₄ ²⁻)	ADM/ENV/005:2018	
	22. Cobalt (Co)	APHA 3120 B APHA 3125 B	
	23. Colour	HACH 8025	
	24. Conductivity	APHA 2510 B	
	25. Copper (Cu)	APHA 3120 B APHA 3125 B	
	26. Cyanide (CN ⁻)	HACH 8027	
	27. Detergents (Linear alkylate sulphonate as methylene blue active substances)	APHA 5540 C	
	28. Dissolved Oxygen	APHA 4500-O, H	
	29. Fluoride (F ⁻)	APHA 4110 B APHA 4500-F- C	
	30. ffCOD	ADM/ENV/006:2018	
	31. Hardness	APHA 2340 C APHA 3120B / APHA 2340 B	
	32. Iron (Fe)	APHA 3120 B	
	33. Iodide (I ⁻)	ADM/ENV/005: 2018	
	34. Lead (Pb)	APHA 3120 B APHA 3125 B	
	35. Lithium (Li)	APHA 3120 B APHA 3125 B	
	36. Magnesium (Mg)	APHA 3120 B	
	37. Manganese (Mn)	APHA 3120 B APHA 3125 B	
	38. Mercury (Hg)	APHA 3125 B	
	39. Molybdenum (Mo)	APHA 3120 B APHA 3125 B	
	40. Nickel (Ni)	APHA 3120 B APHA 3125 B	
	41. Nitrate (NO ₃ ⁻)	APHA 4110B	
	42. Nitrite (NO ₂ ⁻)	APHA 4110B	
	43. Oil & Grease (Total)	APHA 5520 G	
	44. Oil & Grease (Hydrocarbon)	APHA 5520 F	
	45. Oil & Grease (Non-Hydrocarbon)	APHA 5520 G & APHA 5520 F	
	46. pH	APHA 4500-H ⁺ B	
	47. Phenolic Compounds (as Phenol)	HACH 8047	
	48. Phosphate (PO ₄ ³⁻)	APHA 4110B	
	49. Total Phosphorus, Total Phosphate	HACH 8190	
50. Total Phosphorous	APHA 4500-P B & E		

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B Environmental Samples (Water, Soil, Sediment Sludge)	1. Toxicity Characteristic Leaching Procedure As, Ag, Ba, Cr, Cd, Cu, Co, Fe, F, Hg, Mn, Ni, Pb, Se, Zn and Phenolic Compounds (as Phenol) 2. Heavy Metals (Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sn, Sr, Tl, V, Zn)	USEPA 1311: 1992 (exclude ZHE: Zero Headspace Extraction) Digestion by USEPA 3051A: 2007 USEPA 3050B: 1996 Analysis by USEPA 6020B:2014 (ICP-MS) USEPA 6010D:2018 (ICP-AES)	

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B Environmental Samples (Water, Soil, Sediment Sludge)	3. Volatile Organic Compounds by GC/MS	USEPA 8260D: 2018 Refer to Appendix 1 for the list of volatile organic compounds	DT
	4. Semi-volatile Organic Compounds by GC/MS	USEPA 8270E: 2018 Refer to Appendix 2 for the list of semi-volatile organic compounds	
	5. Alkaline Digestion for Hexavalent Chromium	USEPA 3060A Rev.1 Dec 1996	
	6. Hexavalent Chromium	USEPA 7196A Rev.1 Jul 1992	
	7. Hexavalent Chromium (in Water)	APHA 3500 Cr-B	
	8. Falling Velocity	ADM/ENV/007:2019	
	9. Compliance Test for Leaching of Granular Waste Materials and Sludge	BS EN 12457-1: 2002 (Extraction)	
	(a) Heavy Metals (Al, Sb, As, Ba, Cd, Cr (total), Co, Cu, Mn, Hg, Mo, Ni, Pb, Ag, Na, Se, Sn, V, Zn)	USEPA 6010D (2018) APHA 3125B	
	(b) Chromium (VI)	APHA 3500Cr-B	
	(c) Bromide (Br), Chloride (Cl), Fluoride (F), Sulphate (SO ₄)	APHA 4110B	
	(d) Ammonia (as N)	APHA 4500-NH ₃ (F)	
	(e) Total Nitrogen (as N)	In-house method ADM/ENV/003:2017	
	(f) Total Phosphorous (as P)	HACH 8190 06/2017 Edition 10 APHA 4500-P B & E	
(g) Total Organic Carbon (TOC)	APHA 5310B		
(h) Chemical Oxygen Demand	HACH 8000 05/2021 Edition 12		
(i) Aromatic substances	USEPA 8260D (2018)		

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C Mixing Water for Concrete	(j) Phenol	HACH 8047 03/2014 Edition 8	DT
	<u>Suitability of Water</u>	BS EN 1008: 2002	
D Non-metallic Products for Use in Contact With Water, and Glass Reinforced Polyester Sectional Water Tanks for PUB Potable Water	1. Oil and Fats		
	2. Detergents		
E Soil	3. Colour		
	4. Suspended Matter		
E Soil	5. Odour		
	6. Acids		
E Soil	7. Humic Matter		
	8. Chloride Content		
E Soil	9. Sulphate Content		
	10. Alkali Content		
E Soil	<u>Effects on Water</u>	SS 375: 2015	
	1. Appearance		
E Soil	2. Extraction of Metals		
	1. pH Value	BS 1377-3: 2018 + A1: 2021 Clause 12	
E Soil	2. Organic Matter	BS 1377-3: 2018 + A1: 2021 Clause 4	
	3. Mass Loss on Ignition	BS 1377-3: 2018 + A1: 2021 Clause 6	
E Soil	4. Water soluble sulphate in soil	BS 1377-3: 2018 + A1: 2021 Clause 7.3	
	5. Water Extract or Groundwater Sulfate (Ion Chromatography Method)	BS 1377-3: 2018 + A1: 2021 Clause 7.4	
E Soil	6. Acid or Water Extract or Groundwater Sulfate (Gravimetric Method)	BS 1377-3: 2018 + A1: 2021 Clause 7.6	
	7. Sulfate in Groundwater	BS 1377-3: 2018 + A1: 2021 Clause 7.8	

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E Soil	8. Acid Soluble Sulfate	BS 1377-3: 2018 + A1: 2021 Clause 7.9	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; width: 100%; height: 100%;"></div> <div style="margin-left: 10px;"> <p>SW</p> <p>MAY</p> <p>DT</p> </div> </div>
	9. Carbonate Content	BS 1377-3: 2018 + A1: 2021 Clause 8.2 BS 1377-3: 2018 + A1: 2021 Clause 8.3 BS 1377-3: 2018 + A1: 2021 Clause 8.4	
	10. Water Soluble Chloride	BS 1377-3: 2018 + A1: 2021 Clause 9.2	
	11. Acid Soluble Chloride	BS 1377-3: 2018 + A1: 2021 Clause 9.3	
	12. Total Dissolved Solid	BS 1377-3: 2018 + A1: 2021 Clause 11	
	13. Total Organic Carbon (TOC)	BS 1377-3: 2018 + A1: 2021 Clause 5	
	14. Heavy Metals (Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sn, Sr, Tl, V and Zn)	Digestion by USEPA 3051A: 2007 USEPA 3050B: 1996 Analysis by USEPA 6020B:2014 (ICP-MS) USEPA 6010D-2018 (ICP-AES)	
	15. Rapid Determination of Carbonate Content of Soils	ASTM D4373-14	
	16. Electrical Resistivity	BS 1377-3: 2018 + A1: 2021 Clause 13	
17. Redox Potential	BS 1377-3: 2018 + A1: 2021 Clause 14	SW	

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Approved Signatories

S/N	Name	Initials
1.	Ms Sherly Wijaya	SW
2.	Ms May Soe Moe	MAY
3.	Ms Doris Tan	DT

Note:

This laboratory is accredited in accordance with the recognised International Standard ISO/IEC 17025. A 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. 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.

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Appendix 1 (Volatile Organic Compound List)

Compound Name		Method Detection Limit (MDL)
Dichlorodifluoromethane	Benzene, bromo-	2 µg/L
Methane, chloro-	Benzene, propyl-	
bromomethane	4-chlorotoluene	
Ethyl Chloride	2-chlorotoluene	
Trichloromonofluoromethane	Benzene, 1,3,5-trimethyl-	
Ethene, 1,1-dichloro-	Benzene, tert-butyl-	
Methylene Chloride	Benzene, 1,2,4-trimethyl-	
Ethene, 1,2-dichloro-, (Z)-	Benzene, 1,3-dichloro-	
Ethane, 1,1-dichloro-	sec-butylbenzene	
Ethene, 1,2-dichloro-, (E)-	Benzene, 1,2-dichloro-	
1 Propane, 2,2-dichloro-	4-isopropyltoluene	
Methane, bromochloro-	Benzene, 1,4-dichloro-	
chloroform	Benzene, butyl-	
Ethane, 1,1,1-trichloro-	Benzene, 1,3,4-trichloro-	
Ethane, 1,2-dichloro-	Naphthalene	
1-Propene, 1,1-dichloro-	Benzene, 1,2,3-trichloro-	
Benzene	hexane	
Propane, 1,2-dichloro-	heptane	
Trichloroethylene	Tetrahydrofuran	
Methane, bromodichloro-	Nonane	
Toluene	Decane	
Ethane, 1,1,2-trichloro-	Octane	
Propane, 1,3-dichloro-	tetrachloromethane	
Methane, dibromochloro-	Methyl tert-butyl-ether	
Ethane, 1,2-dibromo-	furan	
Tetrachloroethylene	Isobutanol	
Benzene, chloro-	DMF (N,N-Dimethylformamide)	
Ethane, 1,1,1,2-tetrachloro-	Turpentine	
Ethylbenzene	Methyl Ethyl Ketone	
p-Xylene,m-xylene	Methyl Isobutyl Ketone	
bromoform	Isopropyl ether	
Styrene	Diethyl ether	
o-Xylene	Dimethyl Sulphide	
Ethane, 1,1,2,2-tetrachloro-	Dimethyl Sulphoxide	
Propane, 1,2,3-trichloro-	Epichlorohydrin	
isopropylbenzene		

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Appendix 2 (Semi-Volatile Organic Compound List)

Method Detection Limit (MDL): 4 µg/L

Compound Name		
N-Nitrosodimethylamine	Naphthalene, 2-chloro-	Carbazole
Pyridine	2-Nitroaniline	Methyl parathion
2-Picoline	Benzene, 1,4-dinitro-	Heptachlor
Ethanamine, N-methyl-N-nitroso-	Dimethyl phthalate	Dibutyl phthalate
Ethanamine, N-ethyl-N-nitroso-	Benzene, 1,3-dinitro-	Parathion
Phenol	Benzene, 2-methyl-1,3-dinitro-	Aldrin
Aniline	Acenaphthylene	Methapyrilene
Bis(2-chloroethyl) ether	Benzene, 1,2-dinitro-	Heptachlor epoxide
Phenol, 2-chloro-	3-Nitroaniline	Fluoranthene
Benzene, 1,3-dichloro-	Acenaphthene	Benzidine
Benzene, 1,4-dichloro-	Phenol, 2,4-dinitro-	trans-Chlordane
Benzyl Alcohol	Phenol, 4-nitro-	Pyrene - D10
Benzene, 1,2-dichloro-	Dibenzofuran	Pyrene
Phenol, 2-methyl-	Benzene, 1-methyl-2,4-dinitro-	cis-Chlordane
Bis(2-chloroisopropyl) ether	1-Naphthalenamine	Endosulfan I
Phenol, 3-methyl- & Phenol, 4-methyl-	Phenol, 2,3,5,6-tetrachloro-	4,4'-DDE
Pyrrolidine, 1-nitroso-	2-Naphthalenamine	Dieldrin
N-nitrosomorpholine	Phenol, 2,3,4,6-tetrachloro-	Benzenamine, N,N-dimethyl-4-(phenylazo)-
1-Propanamine, N-nitroso-N-propyl-	Diethyl Phthalate	Endrin
o-Toluidine	Benzene, 1-chloro-3-phenoxy-	4,4'-DDD
Ethane, hexachloro-	Thionazin	Endosulfan II
Benzene, nitro-	Fluorene	Famphur
Piperidine, 1-nitroso-	5-nitro-o-toluidine	Benzyl butyl phthalate
2-Cyclohexen-1-one, 3,5,5-trimethyl-	4-Nitroaniline	Benzidine, 3,3'-dimethyl-
Phenol, 2-nitro-	Phenol, 2-methyl-4,6-dinitro-	Bis(2-ethylhexyl)adipate
Phenol, 2,4-dimethyl-	Diphenylamine	4,4'-DDT
Methane, bis(2-chloroethoxy)-	Azobenzene	Endosulfan sulfate
O,O,O-Triethyl thiophosphate	Sulfotep	2-acetylaminofluorene
Phenol, 2,4-dichloro-	Phorate	Methoxychlor
Benzene, 1,2,4-trichloro-	Benzene, 1-bromo-4-phenoxy-	Bis(2-ethylhexyl) phthalate
Naphthalene	alpha-BHC	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dichloro-
4-Chloroaniline	Dimethoate	Endrin ketone
1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	Benzene, hexachloro-	Endrin aldehyde
N-nitrosodibutylamine	[1,1'-Biphenyl]-4-amine	Chrysene
1,4-Benzenediamine	beta-BHC	Benz[a]anthracene
Phenol, 4-chloro-3-methyl-	Phenol, pentachloro-	di-n-octyl phthalate
Naphthalene, 1-methyl-	delta-BHC	Benzo[b]fluoranthene
Naphthalene, 2-methyl-	Disulfoton	Benzo[a]pyrene

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1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-	Phenanthrene	Benzo[k]fluoranthene
Phenol, 2,4,6-trichloro-	Anthracene	Indeno[1,2,3-cd]pyrene
Phenol, 2,4,5-trichloro-	Lindane	Dibenz[a,h]anthracene
		Benzo[ghi]perylene