



CERTIFICATE OF ACCREDITATION

This is to attest that

CIVIL ENGINEERING LABORATORY OF MACAU

AVENIDA WAI LONG NO°185
TAIPA, 999078, MACAU

Testing Laboratory TL-1169

has met the requirements of AC89, *IAS Accreditation Criteria for Testing Laboratories*, and has demonstrated compliance with ISO/IEC Standard 17025:2017, *General requirements for the competence of testing and calibration laboratories*. This organization is accredited to provide the services specified in the scope of accreditation.

Effective Date November 29, 2023



A handwritten signature in black ink, reading 'Raj Nathan'.

President

IAS is an ILAC MRA Signatory

Visit www.iasonline.org for current accreditation information.

SCOPE OF ACCREDITATION

International Accreditation Service, Inc.

3060 Saturn Street, Suite 100, Brea, California 92821, U.S.A. | www.iasonline.org

CIVIL ENGINEERING LABORATORY OF MACAU

www.lecm.org.mo

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Contact Phone +853-63557140

Accredited to ISO/IEC 17025:2017

Effective Date November 29, 2023

Soil and Sediment Test	
BS 1377-3:2018+A1:2021	Methods of Test for Soils for Civil Engineering Purposes Part 3: Chemical and Electro-Chemical Testing Chapter 7.3- Determination of Water-Soluble Sulfate in Soil (WS)
BS 1377-3:2018+A1:2021	Methods of Test for Soils for Civil Engineering Purposes Part 3: Chemical and Electro-Chemical Testing Chapter 9.2- Determination of Water-Soluble Chloride Content
BS 1377-3:2018+A1:2021	Methods of Test for Soils for Civil Engineering Purposes Part 3: Chemical and Electro-Chemical Testing Chapter 12- Determination of the pH Value
GB/T 50123-2019	Standard for Geotechnical Testing Method Chapter 56- Organic Matter Test
HJ 695-2014	Soil- Determination of Organic Carbon- Combustion Oxidation Nondispersive Infrared Absorption Method
HJ 803-2016	Soil and Sediment- Determination of Aqua Regia Extracts of 12 Metal Elements-Inductively Coupled Plasma Mass Spectrometry- Cadmium, Antimony, Chromium, Manganese, Copper, Nickel, Zinc, Arsenic, Lead
Laboratory Development Method, refer to HJ 803-2016	Soil and Sediment- Determination of Aqua Regia Extracts of 12 Metal Elements-Inductively Coupled Plasma Mass Spectrometry- Mercury
Water and Wastewater Test	
APHA 1060 23 rd Edition, 2017	Standard Methods for the Examination of Water and Wastewater, Collection and Preservation of Samples
APHA 2120C 23 rd Edition, 2017	Standard Methods for the Examination of Water and Wastewater, Color (True and Apparent)- Spectrophotometric- Single-Wavelength Method
APHA 2130B 23 rd Edition, 2017	Standard Methods for the Examination of Water and Wastewater, Turbidity- Nephelometric Method
APHA 2510B 23 rd Edition, 2017	Standard Methods for the Examination of Water and Wastewater, Conductivity- Laboratory Method
APHA 2540D 23 rd Edition, 2017	Standard Methods for the Examination of Water and Wastewater, Total Suspended Solids Dried at 103-105°C
APHA 2550B 23 rd Edition, 2017	Standard Methods for the Examination of Water and Wastewater, Temperature- Laboratory and Field Methods

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APHA 3030E 23 rd Edition, 2017	Standard Methods for the Examination of Water and Wastewater, Nitric Acid Digestion Part 2: Digestion for Trace-Level (≤ 0.1 mg/L) Concentrations for ICP and ICP-MS
APHA 3125 23 rd Edition, 2017	Standard Methods for the Examination of Water and Wastewater, Metals by Inductively Coupled Plasma-Mass Spectrometry- Lead, Iron, Nickel, Cadmium, Copper, Arsenic, Chromium, Antimony, Zinc, Manganese, Selenium, Aluminum
APHA 4500-Cl G 23 rd Edition, 2017	Standard Methods for the Examination of Water and Wastewater, Free Residual Chlorine- DPD Colorimetric Method
APHA 4500-H ⁺ B 23 rd Edition, 2017	Standard Methods for the Examination of Water and Wastewater, pH- Electrometric Method
APHA 4500-O H 23 rd Edition, 2017	Standard Methods for the Examination of Water and Wastewater, Dissolved Oxygen- Optical-Probe Method
APHA 5310B 23 rd Edition, 2017	Standard Methods for the Examination of Water and Wastewater, Total Organic Carbon- High Temperature Combustion Method
APHA 5520B 23 rd Edition, 2017	Standard Methods for the Examination of Water and Wastewater, Oil and Grease- Liquid-Liquid, Partition- Gravimetric Method
APHA 9215E 23 rd Edition, 2017	Standard Methods for the Examination of Water and Wastewater, Heterotrophic Plate Count- Enzyme Substrate Method
APHA 9223B 23 rd Edition, 2017	Standard Methods for the Examination of Water and Wastewater, Total Coliform Count and Escherichia Coli- Enzyme Substrate Test
GB/T 5750.4-2006	Standard Examination Methods for Drinking Water - Organoleptic and Physical Parameters Chapter 3- Odor and Taste Chapter 4- Visible Substances to the Naked Eye
HACH Method 8000	Method 8000, USEPA Reactor Digestion Method- Chemical Oxygen Demand
HACH Method 8023	Method 8023, USEPA 1,5- Diphenylcarbohydrazide Method- Hexavalent Chromium
HACH Method 8038	Method 8038, USEPA Nessler Method- Ammonia
HACH Method 8039	Method 8039, Cadmium Reduction Method- Nitrate
HACH Method 8051	Method 8051, USEPA SulfaVer 4 Method- Sulfate
HACH Method 8131	Method 8131, USEPA Methylene Blue Method- Sulfide
HACH Method 10021	Method 10021, Titanium Trichloride Reduction Method- Total Inorganic Nitrogen
HACH Method 10023 HACH Method 10031	Method 10023 & 10031, Salicylate Method- Ammonia
HACH Method 10072	Method 10072, Persulfate Digestion Method-Total Nitrogen
HACH Method 10209 HACH Method 10210	Method 10209 & 10210, Ascorbic Acid Method- Reactive (Orthophosphate) and Total Phosphorus
HACH Method TNT 874	Method TNT 874, Anionic Surfactants
HJ 501-2009	Water Quality- Determination of Total Organic Carbon- Combustion Oxidation Nondispersive Infrared Absorption Method

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HJ 505-2009	Water Quality- Determination of Biochemical Oxygen Demand after 5 days (BOD ₅) for Dilution and Seeding Method
HJ 1001-2018	Water Quality - Determination of Total Coliforms, Fecal Coliforms and Escherichia Coli - Enzyme Substrate Method
Laboratory Development Method, refer to APHA 3030E 23 rd Edition, 2017	Standard Methods for the Examination of Water and Wastewater, Nitric Acid Digestion Part 2: Digestion for Trace-Level (≤0.1 mg/L) Concentrations for ICP and ICP-MS- Mercury
Laboratory Development Method, refer to APHA 3125 23 rd Edition, 2017	Standard Methods for the Examination of Water and Wastewater, Metals by Inductively Coupled Plasma-Mass Spectrometry- Mercury
Solid Waste Test	
HJ 557-2010	Solid Waste- Extraction Procedure for Leaching Toxicity. Horizontal Vibration Method
HJ 766-2015	Solid Waste- Determination of Metals- Inductively Coupled Plasma Mass Spectrometry (ICP-MS)- Lead, Cadmium, Arsenic, Zinc, Chromium, Copper, Nickel
HJ/T 299-2007	Solid Waste- Extraction Procedure for Leaching Toxicity. Sulphuric Acid and Nitric Acid Method
Laboratory Development Method, refer to HJ 766-2015	Solid Waste- Determination of Metals. Inductively Coupled Plasma Mass Spectrometry (ICP-MS)- Mercury
Air Quality Test	
GB/T 15432-1995	Ambient Air-- Determination of Total Suspended Particulates- Gravimetric Method
GB/T 18204.2-2014	Examination Methods for Public Places- Part 2: Chemical Pollutants Chapter 5.2-Respirable Suspended Particulates (PM ₁₀)-Light Scattering Method Chapter 6- Fine Particulate (PM _{2.5})- Light Scattering Method Chapter 7.2- Formaldehyde- Phenol Reagent Spectrophotometer Method
GB/T 18204.3-2013	Examination methods for public places- Part 3: Airborne microorganism Chapter 3.2 Total Bacteria Count- Impacting Method Chapter 4.2 Total Fungi Count- Impacting Method
GB/T 18204.13-2000	Methods for Determination of Air Temperature in Public Places
GB/T 18204.14-2000	Methods for Determination of Air Humidity in Public Places
GB/T 18204.15-2000	Methods for Determination of Wind Speed in Public Places
Guidance Notes for the Management of Indoor Air Quality in Offices and Public Places	Guidance Notes for the Management of Indoor Air Quality in Offices and Public Places 3.5.7 Respirable Suspended Particulates (PM ₁₀) - Light Scattering Method
Guidance Notes for the Management of Indoor Air Quality in Offices and Public Places	Guidance Notes for the Management of Indoor Air Quality in Offices and Public Places- Nitrogen Dioxide- Electrochemical Method

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Guidance Notes for the Management of Indoor Air Quality in Offices and Public Places	Guidance Notes for the Management of Indoor Air Quality in Offices and Public Places- Total Volatile Organic Compound- PID Method
HJ 618-2011	Determination of Atmospheric Particles PM ₁₀ and PM _{2.5} in Ambient Air by Gravimetric Method
Indoor Air Quality Instructions in General Public Establishments in Macau	Indoor Air Quality Instructions in General Public Establishments in Macau - Ozone- Real-Time Ultraviolet Photometry monitor
Indoor Air Quality Instructions in General Public Establishments in Macau	Indoor Air Quality Instructions in General Public Establishments in Macau - Radon- Electrostatic Method
Indoor Air Quality Instructions in General Public Establishments in Macau	Indoor Air Quality Instructions in General Public Establishments in Macau - Carbon Monoxide and Carbon Dioxide - Non-Dispersive Infrared Analyzers
Noise Test	
Dispatch of the Chief Executive No. 96/2020, Macau SAR Government	Despacho do Chefe do Executivo n.º 96/2020-Aprova a Norma sobre Acústica.
Metal Composition Test	
GB/T 4336-2016	Carbon and Low Alloy Steel- Determination of Multi-Element Contents- Spark Discharge Atomic Emission Spectrometric Method (Routine Method)- Carbon, Silicon, Manganese, Phosphorus, Sulfur
GB/T 11170-2008	Stainless Steel- Determination of Multi-Element Contents- Spark Discharge Atomic Emission Spectrometric Method (Routine Method)- Carbon, Sulfur, Manganese, Phosphorus, Silicon, Chromium, Nickel, Molybdenum
Laboratory Developed Method, refer to GB/T 11170-2008	Stainless Steel- Determination of Multi-Element Contents- Spark Discharge Atomic Emission Spectrometric Method (Routine Method)- Nitrogen
Laboratory developed method, refer to GB/T 16597-2019	Analytical Methods of Metallurgical Products- General Rule for X-ray Fluorescence Spectrometric Methods- Carbon and Low Alloy Steel & Stainless Steel- Manganese, Phosphorus, Silicon, Chromium, Nickel, Molybdenum
Laboratory developed method, refer to GB/T 16597-2019	Analytical Methods of Metallurgical Products- General Rule for X-ray Fluorescence Spectrometric Methods-Lead Content of Welded Joints