



CALA Scope of Accreditation

Laboratory Name: African Natural Resources and Mines Limited

Client ID: 1005060

Parent Institution: African Natural Resources and Mines Limited

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Standard: Conforms with requirements of ISO/IEC 17025:2017

Clients Served: All Interested Parties; Internal Clients Only; Other

Revised On: 10/02/2024

Valid To: 03/27/2027

001 - Specific Gravity

Field of Accreditation: Mineral

Matrix: Solids [Concentrates, Ore, Rock, Sand, Soil]

Analytical Method:

Preparation Method:

Lab Method ID(s): SG11/GR

Method Reference	Modified From	Analytical Method	Preparation Method
ASTM D5550-23	No	Yes	No

Parameter

Specific Gravity

002 - Loss on Drying

Field of Accreditation: Mineral

Matrix: Solids [Concentrates, Ore, Rock, Sand, Soil]

Analytical Method:

Preparation Method:

Lab Method ID(s): LOD11/GR

Method Reference	Modified From	Analytical Method	Preparation Method
ASTM D2216-19	No	Yes	No

Parameter

Loss on Drying

003 - Loss On Ignition

Field of Accreditation: Mineral

Matrix: Solids [Concentrates, Ore, Rock, Sand, Soil]

Analytical Method: IGNITION

Preparation Method:

Lab Method ID(s): LOI11/GR

Method Reference	Modified From	Analytical Method	Preparation Method
ISO 11536	No	Yes	No

Parameter

Loss on Ignition (LOI)

004 - Iron Ore

Field of Accreditation: Mineral

Matrix: Solids [Concentrates, Ore, Rock, Sand, Soil]

Analytical Method: X-RAY FLUORESCENCE (XRF)

Preparation Method: PULVERIZATION AND BORATE FUSION

Lab Method ID(s): XRF11

Method Reference	Modified From	Analytical Method	Preparation Method
ISO 9516-1	No	Yes	No

Parameter

Aluminum oxide (Al₂O₃)
 Barium Oxide (BaO)
 Calcium oxide
 Chromium (III) oxide (Cr₂O₃)
 Copper (II) Oxide (CuO)
 Hafnium (IV) Oxide (HfO₂)
 Iron Oxide (Fe₂O₃)
 Lead (II) Oxide (PbO)
 Magnesium oxide
 Manganese (II,III) Oxide (Mn₃O₄)
 Nickel Oxide (NiO)
 Phosphorus
 Phosphorus (V) oxide (P₂O₅)
 Potassium oxide (K₂O)

Parameter

Silicon Dioxide
 Sodium Oxide (Na₂O)
 Strontium Oxide (SrO)
 Sulfur trioxide/Sulfuric acid
 Titanium dioxide
 Total Iron
 Vanadium (V) oxide
 Zinc Oxide (ZnO)
 Zirconium Dioxide (ZrO₂)

005 - Quartz**Field of Accreditation:** Mineral**Matrix:** Solids [Concentrates, Ore, Rock, Sand, Soil]**Analytical Method:** X-RAY FLUORESCENCE (XRF)**Preparation Method:** PULVERIZATION AND BORATE FUSION**Lab Method ID(s):** XRF13

Method Reference	Modified From	Analytical Method	Preparation Method
ISO 12677	No	Yes	No

Parameter

Aluminum oxide (Al₂O₃)
 Barium Oxide (BaO)
 Calcium oxide
 Chromium (III) oxide (Cr₂O₃)
 Copper (II) Oxide (CuO)
 Hafnium (IV) Oxide (HfO₂)
 Iron Oxide (Fe₂O₃)
 Lead (II) Oxide (PbO)
 Magnesium oxide
 Manganese (II,III) Oxide (Mn₃O₄)
 Nickel Oxide (NiO)
 Phosphorus (V) oxide (P₂O₅)
 Potassium oxide (K₂O)
 Silicon Dioxide
 Sodium Oxide (Na₂O)
 Strontium Oxide (SrO)
 Sulfur trioxide/Sulfuric acid
 Titanium dioxide
 Vanadium (V) oxide
 Zinc Oxide (ZnO)
 Zirconium Dioxide (ZrO₂)

006 - Lead Zinc Sulphide**Field of Accreditation:** Mineral**Matrix:** Solids [Concentrates, Ore, Rock, Sand, Soil]**Analytical Method:** X-RAY FLUORESCENCE (XRF)**Preparation Method:** PULVERIZATION AND BORATE FUSION**Lab Method ID(s):** XRF15

Method Reference	Modified From	Analytical Method	Preparation Method
ISO 22863-4	No	Yes	No

Parameter

Aluminum oxide (Al₂O₃)
 Antimony (III) Oxide (Sb₂O₃)
 Arsenic Trioxide (As₂O₃)
 Barium Oxide (BaO)
 Bismuth (III) Oxide (Bi₂O₃)
 Cadmium
 Cadmium Oxide (CdO)
 Calcium oxide
 Chlorine
 Cobalt
 Cobalt (II,III) Oxide (Co₃O₄)
 Copper
 Copper (II) Oxide (CuO)
 Iron Oxide (Fe₂O₃)
 Lead
 Lead (II) Oxide (PbO)
 Magnesium oxide
 Manganese (II) oxide (MnO)
 Manganese Dioxide (MnO₂)
 Molybdenum Trioxide (MoO₃)
 Nickel
 Nickel Oxide (NiO)
 Phosphorus (V) oxide (P₂O₅)

Parameter

Potassium oxide (K₂O)
 Silicon Dioxide
 Sodium Oxide (Na₂O)
 Sulfur trioxide/Sulfuric acid
 Sulphur (Sulfur)
 Tin (IV) Oxide (SnO₂)
 Titanium dioxide (Titanium (IV) oxide)
 Tungsten (VI) Oxide (WO₃)
 Zinc
 Zinc Oxide (ZnO)
 Zirconium Dioxide (ZrO₂)

007 - Limestone and Dolomite

Field of Accreditation: Mineral**Matrix:** Solids [Concentrates, Ore, Rock, Sand, Soil]**Analytical Method:** X-RAY FLUORESCENCE (XRF)**Preparation Method:** PULVERIZATION AND BORATE FUSION**Lab Method ID(s):** XRF16

Method Reference	Modified From	Analytical Method	Preparation Method
ISO 12677	No	Yes	No

Parameter

Aluminum oxide (Al₂O₃)
 Barium Oxide (BaO)
 Calcium oxide
 Chromium (III) oxide (Cr₂O₃)
 Copper (II) Oxide (CuO)
 Hafnium (IV) Oxide (HfO₂)
 Iron Oxide (Fe₂O₃)
 Lead (II) Oxide (PbO)
 Magnesium oxide
 Manganese (II,III) Oxide (Mn₃O₄)
 Nickel Oxide (NiO)
 Phosphorus (V) oxide (P₂O₅)
 Potassium oxide (K₂O)
 Silicon Dioxide
 Sodium Oxide (Na₂O)
 Strontium Oxide (SrO)
 Sulfur trioxide/Sulfuric acid
 Titanium dioxide
 Vanadium (V) oxide
 Zinc Oxide (ZnO)
 Zirconium Dioxide (ZrO₂)

008 - Manganese Ore

Field of Accreditation: Mineral**Matrix:** Solids [Concentrates, Ore, Rock, Sand, Soil]**Analytical Method:** X-RAY FLUORESCENCE (XRF)**Preparation Method:** PULVERIZATION AND BORATE FUSION**Lab Method ID(s):** XRF18

Method Reference	Modified From	Analytical Method	Preparation Method
ISO 12677	No	Yes	No

Parameter

Aluminum oxide (Al₂O₃)
 Barium Oxide (BaO)
 Calcium oxide
 Chromium (III) oxide (Cr₂O₃)
 Copper (II) Oxide (CuO)
 Hafnium (IV) Oxide (HfO₂)
 Iron
 Iron Oxide (Fe₂O₃)
 Lead (II) Oxide (PbO)
 Magnesium oxide
 Manganese
 Manganese (II,III) Oxide (Mn₃O₄)
 Nickel Oxide (NiO)
 Phosphorus
 Phosphorus (V) oxide (P₂O₅)
 Potassium oxide (K₂O)
 Silicon Dioxide
 Sodium Oxide (Na₂O)
 Strontium Oxide (SrO)
 Sulfur trioxide/Sulfuric acid
 Titanium dioxide

Parameter

Vanadium (V) oxide
Zinc Oxide (ZnO)
Zirconium Dioxide (ZrO₂)

009 - Bauxite

Field of Accreditation: Mineral**Matrix:** Solids [Concentrates, Ore, Rock, Sand, Soil]**Analytical Method:** X-RAY FLUORESCENCE (XRF)**Preparation Method:** PULVERIZATION AND BORATE FUSION**Lab Method ID(s):** XRF19

Method Reference	Modified From	Analytical Method	Preparation Method
ISO 12677	No	Yes	No

Parameter

Aluminum oxide (Al₂O₃)
Barium Oxide (BaO)
Calcium oxide
Chromium (III) oxide (Cr₂O₃)
Copper (II) Oxide (CuO)
Hafnium (IV) Oxide (HfO₂)
Iron Oxide (Fe₂O₃)
Lead (II) Oxide (PbO)
Magnesium oxide
Manganese (II,III) Oxide (Mn₃O₄)
Nickel Oxide (NiO)
Phosphorus (V) oxide (P₂O₅)
Potassium oxide (K₂O)
Silicon Dioxide
Sodium Oxide (Na₂O)
Strontium Oxide (SrO)
Sulfur trioxide/Sulfuric acid
Titanium dioxide
Vanadium (V) oxide
Zinc Oxide (ZnO)
Zirconium Dioxide (ZrO₂)

010 - Phosphate and Potash

Field of Accreditation: Mineral**Matrix:** Solids [Concentrates, Ore, Rock, Sand, Soil]**Analytical Method:** X-RAY FLUORESCENCE (XRF)**Preparation Method:** PULVERIZATION AND BORATE FUSION**Lab Method ID(s):** XRF20

Method Reference	Modified From	Analytical Method	Preparation Method
ISO 12677	No	Yes	No

Parameter

Aluminum oxide (Al₂O₃)
Barium Oxide (BaO)
Calcium oxide
Chromium (III) oxide (Cr₂O₃)
Copper (II) Oxide (CuO)
Hafnium (IV) Oxide (HfO₂)
Iron Oxide (Fe₂O₃)
Lead (II) Oxide (PbO)
Magnesium oxide
Manganese (II,III) Oxide (Mn₃O₄)
Nickel Oxide (NiO)
Phosphorus
Phosphorus (V) oxide (P₂O₅)
Potassium oxide (K₂O)
Silicon Dioxide
Sodium Oxide (Na₂O)
Strontium Oxide (SrO)
Sulfur trioxide/Sulfuric acid
Titanium dioxide
Vanadium (V) oxide
Zinc Oxide (ZnO)
Zirconium Dioxide (ZrO₂)

011 - Ferro-Silica Manganese

Field of Accreditation: Mineral**Matrix:** Solids [Concentrates, Ore, Rock, Sand, Soil]**Analytical Method:** X-RAY FLUORESCENCE (XRF)**Preparation Method:** PULVERIZATION AND BORATE FUSION**Lab Method ID(s):** XRF14

Method Reference	Modified From	Analytical Method	Preparation Method
DIN 51418-2	No	Yes	No

Parameter

Aluminum
 Aluminum oxide (Al₂O₃)
 Calcium
 Calcium oxide
 Chromium
 Chromium (III) oxide (Cr₂O₃)
 Cobalt (II) Oxide (CoO)
 Copper (II) Oxide (CuO)
 Iron
 Iron Oxide (Fe₂O₃)
 Manganese
 Manganese (II,III) Oxide (Mn₃O₄)
 Molybdenum Trioxide (MoO₃)
 Nickel
 Nickel Oxide (NiO)
 Phosphorus
 Phosphorus (V) oxide (P₂O₅)
 Silica
 Silicon Dioxide
 Sulfur trioxide/Sulfuric acid
 Sulphur (Sulfur)
 Titanium dioxide
 Vanadium (V) oxide
 Zinc Oxide (ZnO)

012 - Rare Earth and Whole Rock Extended**Field of Accreditation:** Mineral**Matrix:** Solids [Concentrates, Ore, Rock, Sand, Soil]**Analytical Method:** X-RAY FLUORESCENCE (XRF)**Preparation Method:** PULVERIZATION AND BORATE FUSION**Lab Method ID(s):** XRF17

Method Reference	Modified From	Analytical Method	Preparation Method
ISO 12677	No	Yes	No

Parameter

Aluminum
 Aluminum oxide (Al₂O₃)
 Arsenic Trioxide (As₂O₃)
 Barium Oxide (BaO)
 Calcium
 Calcium oxide
 Ceric Oxide (CeO₂)
 Chromium (III) oxide (Cr₂O₃)
 Copper (II) Oxide (CuO)
 Hafnium (IV) Oxide (HfO₂)
 Iron
 Iron Oxide (Fe₂O₃)
 Lanthanum (III) Oxide (La₂O₃)
 Lead (II) Oxide (PbO)
 Magnesium oxide
 Manganese
 Manganese (II,III) Oxide (Mn₃O₄)
 Neodymium (III) Oxide (Nd₂O₃)
 Nickel Oxide (NiO)
 Niobium
 Niobium Pentoxide (Nb₂O₅)
 Phosphorus
 Phosphorus (V) oxide (P₂O₅)
 Potassium
 Potassium oxide (K₂O)
 Silica
 Silicon Dioxide
 Sodium
 Sodium Oxide (Na₂O)
 Strontium Oxide (SrO)
 Sulfur trioxide/Sulfuric acid
 Sulphur (Sulfur)
 Tantalum
 Tantalum Pentoxide (Ta₂O₅)
 Thorium
 Thorium Dioxide (ThO₂)
 Tin

ParameterTin (IV) Oxide (SnO₂)

Titanium

Titanium dioxide

Triuranium octoxide

Tungsten (VI) Oxide (WO₃)

Uranium

Vanadium (V) oxide

Yttrium Oxide (Y₂O₃)

Zinc Oxide (ZnO)

Zirconium Dioxide (ZrO₂)

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

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