

Technical Document - Iron Ore



The world is built on steel. From vehicles, construction of commercial buildings and homes, power generation, agriculture, and national defense.



Steel is an important material used in widespread applications across many industries. Iron-ore mining methods vary by the type of ore being mined. These in turn are dependent on the mineralogy and geology of the ore deposits.

In recent years it has undergone some volatility, with demand closely linked to global economic conditions, in particular Chinese consumption. The industry has seen higher cost producers exit the market and there is continuing pressure on production efficiency with increasing environmental regulations. Demand for higher-grade ore deposits is however, likely to continue.

PROPERTIES AND USES

Iron ores are rocks and minerals from which metallic iron can be economically extracted. They are rich in iron oxides, such as magnetite, hematite, goethite limonite, or siderite. Iron ores are key starting materials for the production of steel.

**Iron Ore is
essential for
modern life.**





DEPOSIT TYPES AND RECOMMENDED ANALYSES

To convert Iron Ore to metallic iron, it must be smelted in the presence of carbon to remove oxygen.

The inclusion of trace elements can have significant effects on the characteristics of a batch of iron or the operation of a smelter. The choice of ore, fuel, and flux determines how the slag behaves during the smelting process. Ideally, Iron Ore contains only iron and oxygen, however, this is rarely the case. Iron ore typically contains a host of penalty elements unwanted in modern steel making.

MSALABS offers a number of testing options for Iron Ore samples.



FUSION/XRF

A prepared sample is weighed and fused with Lithium Metaborate/Tetraborate flux in a platinum crucible. The fused sample is then poured into a platinum mold to create a homogeneous glass disk which is analyzed by X-Ray Fluorescence (XRF). The quantified multi-element concentrations are reported as per the table below. Note that this method is not suitable for samples containing high sulphur ($S > 5\%$).

Method Name: WRX-610		
Elements	LDL (%)	UDL (%)
Al ₂ O ₃	0.01	100
As	0.01	2
Ba	0.1	10
CaO	0.01	40
Cl	0.01	6
Co	0.01	5
Cr ₂ O ₃	0.01	10
Cu	0.01	2
Fe	0.01	75
K ₂ O	0.01	7
MgO	0.01	40
Mn	0.01	25
Na ₂ O	0.01	10
Ni	0.01	10
P	0.01	10
Pb	0.01	2
S	0.01	5
SiO ₂	0.01	100
Sn	0.01	2
Sr	0.01	2
TiO ₂	0.01	50
V	0.01	5
Zn	0.01	2
Zr	0.01	1
LOI	0.01	100

ALTERNATIVE METHODS AVAILABLE

Iron II/III speciation

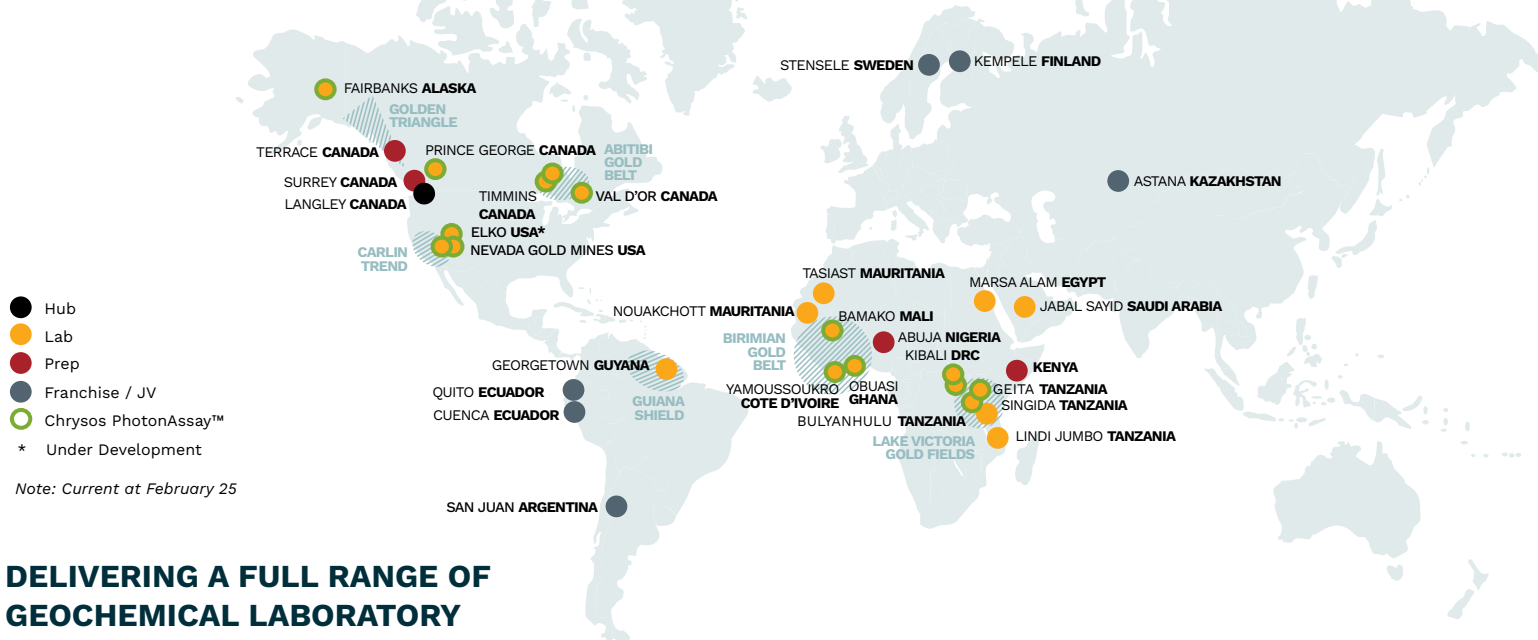
- STI-8Fe
Total Fe by Titration (0.01 – 100)%
- STI-8FeO
Ferrous Iron by Titration (0.01 – 100)%

Total Sulphur

- SPM-210
Total Sulphur by Leco

Satmagan Testing

- SAT-MAG
Determination of Magnetite Content of Iron Ore samples.



DELIVERING A FULL RANGE OF GEOCHEMICAL LABORATORY SERVICES GLOBALLY

EXTENSIVE RANGE OF SERVICES

- PhotonAssay™ Analysis (Gold, Silver and Copper*)
- Sample preparation, storage and disposal
- Precious metals by Fire Assay
- Multi-element packages - Basic, Trace, Ultra-trace
- Fusion, ICP-OES and ICP-MS
- XRF
- Specialty Assay
- Biogeochemistry and Hydrogeochemistry
- Metallurgical Samples Analysis and Services
- Mineralogical Services

* Copper assay only available in select locations and is not currently available in Canada

STRINGENT QUALITY STANDARDS

Our company maintains the highest quality standards and follows the guidelines of ISO17025 accreditation and ISO9001, ISO14001 and ISO45001 certification. Certificates are available for download from our website.

Additionally, we participate in CDN Labs, Geostats, PTP-MAL, and Rockslabs Proficiency Testing Schemes (PTS), among others.

EXPERTISE IN SITE-BASED LABORATORY MANAGEMENT

We have extensive laboratory design, construction and management experience in a range of countries.

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Our laboratories are managed by experienced, highly qualified staff, who undertake regular training.

BROAD RANGE OF COMMODITIES

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- Silver
- Platinum Group Metals
- Copper
- Rare Earth Elements
- Cobalt
- Lithium
- Lead
- Zinc

TIER 1 CLIENTS



EVERY SAMPLE **SAFELY** MEASURED
EVERY RESULT **RELIABLY** DELIVERED

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