SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

VALE MANITOBA OPERATIONS ANALYTICAL SERVICES
Box 5000
Thompson, Manitoba R8N 1P3
CANADA
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CHEMICAL

Valid To: November 30, 2019 Certificate Number: 2606.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following tests on electroplated nickel and associated refining intermediates:

Test/ Test Technology:	Test Method:
Analysis of Nickel Residue (ENR) for Co, Cu, and Ni, by Electro-Deposition Using Caustic Bromine Separation	ML-005
Analysis of Residues, Monthly Samples and Shipments for Co, Cu, Fe, and Ni, by AAS	ML-008
Analysis of Monthly Samples and Shipments for Pb by AAS	ML-013
Analysis of Monthly Nickel Product for Co, Cu and Zn by AAS and As, Cr, Fe, Pb, and Se by ICP	ML-014
Calculation of Ni Content of Monthly Final Product	ML-016
Analysis of Plant and Effluent Liquid Samples for Acidity, Alkalinity and Chlorides by Titrino Titration	EL-007
Sodium Peroxide Fusions	SL-001
Analysis of Solid and Liquid Process Samples by ICP After Sodium Peroxide Fusion	SL-002
Analysis of Ground and Leached Matte Samples for Ni by Electrolytic Deposition	SL-003
Analysis of Solid Process Samples for Water-Soluble Ni by AAS and Cl^- by Titrino Titration	SL-004
Analysis of Solid Samples for Low Sulfur by Leco Analyser #1 (CS-400SH)	SL-006L

Test/ Test Technology:	**Test Method:**
Analysis of Refinery Process Solutions for Co, Cu, Fe, Ni, and Pb by AAS, ICP, and UV	TL-003
Analysis of Refinery Process Solutions for Carbonate and Bicarbonate by Hydrochloric Acid Titration	TL-004
Analysis of Refinery Process Solutions for Ca, Na, and SO_4^{2-} by ICP and Cl^- by Titration in Purified Electrolyte Samples	TL-006
Analysis of Refinery Nickel Samples for As, Co, Cu, Fe, Pb by ICP and Zn by AAS	TL-007
Analysis of Refinery Process Solutions for As, B, Co, Cu, Fe, and Pb by ICP	TL-013
Analysis of Refinery Liquids for Ni by UV-Visible Spectrophotometry	TL-014
Analysis of Refinery Sewer Samples for pH	TL-018
Analysis of Refinery Process Solutions for pH	TL-019

Accredited Laboratory

A2LA has accredited

VALE MANITOBA OPERATIONS ANALYTICAL SERVICES

Thompson, Manitoba, Canada

for technical competence in the field of

WITHDRAWN

Chemical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

Presented this 29th day of November 2017.

President and CEO
For the Accreditation Council
Certificate Number 2606.01
Valid to November 30, 2019

For the tests to which this accreditation applies, please refer to the laboratory's Chemical Scope of Accreditation.