



SCOPE OF ACCREDITATION TO ISO 17034:2016

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REFERENCE MATERIAL PRODUCER

Valid To: May 31, 2020

Certificate Number: 3285.02

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this Reference Material Producer for the production of certified reference materials of the following categories:

Certified Reference Material Category / Description ^{1,2}	Property Value(s) / Property Identity / Range	Characterization Measurement Technique / Method / Procedure
<p>CATEGORY A: CHEMICAL COMPOSITION</p> <p><u>A1: Metals</u></p> <p><u>A1.1: Ferrous Metals:</u> (Solids, Chips, Powders)</p> <p> Steels</p> <p> Carbon Steels</p> <p> Low Alloy Steels</p> <p> High Alloy Steels</p> <p> Cast Steels</p> <p> Specialty Steels</p> <p> Irons</p> <p> White Irons</p> <p> Cast Irons</p> <p> Ductile Irons</p> <p> Gray Iron</p> <p> Nodular Iron</p>	<p>Elemental Composition for:</p> <p>Carbon Range: (0.0002 to 7.00) % Uncertainty: (0.0001 to 0.1) %</p> <p>Sulfur Range: (0.0002 to 0.5) % Uncertainty: (0.0001 to 0.1) %</p> <p>Oxygen Range: (0.0002 to 30) % Uncertainty: (0.0001 to 0.6) %</p> <p>Nitrogen Range: (0.0002 to 0.6) % Uncertainty: (0.0001 to 0.1) %</p> <p>Hydrogen Range: (0.0001 to 0.0020) % Uncertainty: (0.000005 to 0.001) %</p>	<p>Combustion or inert gas fusion using various peer reviewed accepted methods.</p>

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<u>A1.2: Nonferrous Metals:</u> (Solids, Chips, Powders) Aluminum Alloys Copper Base Alloys Cobalt Base Alloys Nickel Base Alloys Titanium Base Alloys Zirconium Base Alloys Carbide Alloys Gold	Elemental Composition for: Carbon Range: (0.0002 to 7.00) % Uncertainty: (0.0001 to 0.1) % Sulfur Range: (0.0002 to 0.001) % Uncertainty: (0.0001 to 0.001) % Oxygen Range: (0.0002 to 54) % Uncertainty: (0.0001 to 1) % Nitrogen Range: (0.0002 to 0.05) % Uncertainty: (0.0001 to 0.01) % Hydrogen Range: (0.0002 to 0.04) % Uncertainty: (0.0001 to 0.01) %	Combustion or inert gas fusion using various peer reviewed accepted methods
<u>A2: Inorganic Reference Materials</u> <u>A2.1 Ores and Minerals:</u>	Elemental Composition for: Carbon Range: (0.1 to 50) % Uncertainty: (0.01 to 1) % Sulfur Range: (0.1 to 50) % Uncertainty: (0.01 to 1) %	Combustion or inert gas fusion using various peer reviewed accepted methods
<u>A2.5 Solid Fuels:</u> Coal and Coke	Elemental Composition for: Carbon Range: (60 to 100) % Uncertainty: (0.001 to 3) % Sulfur Range: (0.1 to 7) % Uncertainty: (0.01 to 0.2) % Nitrogen Range: (0.5 to 3) % Uncertainty: (0.01 to 0.3) % Hydrogen Range: (0.1 to 6) % Uncertainty: (0.05 to 0.5) %	Combustion, Isoperibol Bomb Calorimetry and Thermogravimetric Analysis using various peer reviewed accepted methods



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<u>A2.5 Solid Fuels (cont):</u> Coal and Coke	Ash Range: (0.1 to 15) % Uncertainty: (0.05 to 0.3) %	Combustion, Isoperibol Bomb Calorimetry and Thermogravimetric Analysis using various peer reviewed accepted methods
<u>A3: Organic Reference Materials</u> <u>A3.1: Pure Organic Compounds:</u> Compounds for Elemental Analysis	Elemental Composition for: Carbon Range: (0.01 to 100) % Uncertainty: (0.005 to 0.5) % Sulfur Range: (7 to 35) % Uncertainty: (0.01 to 0.5) % Oxygen Range: (5 to 50) % Uncertainty: (0.01 to 0.5) % Nitrogen Range: (4 to 30) % Uncertainty: (0.02 to 0.3) % Hydrogen Range: (2 to 13) % Uncertainty: (0.01 to 0.2) % Gross Calorific Value Range: (11 000 to 12 000) BTU/lb Uncertainty: (6 to 20) BTU/lb LOI Range: (10 to 32) % Uncertainty: (0.01 to 0.2) %	Combustion, Isoperibol Bomb Calorimetry and Thermogravimetric Analysis using various peer reviewed accepted methods
<u>A3.5: Petroleum Products:</u> Fuels and Lubricants	Elemental Composition for: Carbon Range: (80 to 90) % Uncertainty: (0.1 to 1) % Sulfur Range: (0.01 to 6) % Uncertainty: (0.001 to 0.5) %	Combustion and Isoperibol Bomb Calorimetry using various peer reviewed accepted methods



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<u>A3.5: Petroleum Products (cont):</u> Fuels and Lubricants	Nitrogen Range: (0.01 to 0.5) % Uncertainty: (0.005 to 0.1) % Hydrogen Range: (11 to 14) % Uncertainty: (0.05 to 0.3) % Gross Calorific Value Range: (18 000 to 20 000) BTU/lb Uncertainty: (5 to 200) BTU/lb	Combustion and Isoperibol Bomb Calorimetry using various peer reviewed accepted methods
<u>A4: Environmental Reference Materials</u> <u>A4.1: Soils:</u>	Elemental Composition for: Carbon Range: (0.5 to 40) % Uncertainty: (0.02 to 0.5) % Sulfur Range: (0.01 to 0.5) % Uncertainty: (0.001 to 0.5) % Nitrogen Range: (0.1 to 5) % Uncertainty: (0.01 to 0.1) %	Combustion using various peer reviewed accepted methods
<u>A4: Environmental Reference Materials</u> <u>A4.1: Ashes:</u> Fly Ash From Coal and Coke Incinerator Ash	Elemental Composition for: Carbon Range: (0.5 to 45) % Uncertainty: (0.05 to 0.6) % Sulfur Range: (0.1 to 2) % Uncertainty: (0.005 to 0.03) %	Combustion and Thermogravimetric Analysis using various peer reviewed accepted methods



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<u>A4: Environmental Reference Materials</u> <u>A4.2: Plant Material:</u>	Elemental Composition for: Carbon Range: (40 to 60) % Uncertainty: (0.02 to 0.5) % Sulfur Range: (0.05 to 0.4) % Uncertainty: (0.005 to 0.02) % Nitrogen Range: (1 to 10) % Uncertainty: (0.02 to 0.07) % Hydrogen Range: (3 to 7) % Uncertainty: (0.05 to 0.2) %	Combustion using various peer reviewed accepted methods

¹ Uncertainties for the certified values are available on the reference material producer's issued certificates for certified reference materials.

² This reference material producer is approved to produce Certified Reference Materials (CRM) and Reference Materials (RM) for all items listed on the scope of accreditation. Availability of either a CRM or RM may vary due to production and a customer should ensure they order the product that they require.



Accredited Reference Material Producer

A2LA has accredited

LECO TECHNICAL SERVICES LABORATORY

St. Joseph, MI

This accreditation covers the specific materials listed on the agreed upon Scope of Accreditation.

This producer meets the requirements of ISO 17034:2016 *General Requirements for the Competence of Reference Material Producers*. This accreditation demonstrates technical competence for a defined scope and the operation of a quality management system.

Presented this 5th day of September 2018.



President and CEO
For the Accreditation Council
Certificate Number 3285.02
Valid to May 31, 2020