



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

HOWMET RESEARCH CENTER
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CHEMICAL

Valid To: March 31, 2027

Certificate Number: 2208.02

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following tests on carbon, clay, ceramics and related products, coatings, contaminants, Ti, Ni, Co, Al, LAS, Stainless, metals and alloys, ores and minerals, surface coatings, petroleum products, plastics and polymers, sand (foundry, glass, and agents), and trace element analysis in dyes and inks, lubricants, rubbers, plastics and related materials:

Test:

Test Method(s) ¹:

Physical Testing – Particle Size

Sieve Analysis of Metal Powders

ASTM B214

Physical Testing – Density

Density of Metal Powders and Compounds
Porosity, Apparent Density, and Bulk Density

ASTM B212
ASTM C830

Physical Testing – Wax / Resin Properties

Ash
Apparent Viscosity

ASTM D482
ASTM D3236

Chemical Analysis – Spectrometric

Spark-AES

a. Carbon and Low Alloy Steels

Al, B, Ca, Co, Cr, Cu, Mn, Mo, Nb, Ni, P, Si, Ti, V, Zr
Al, B, Ca, Co, Cr, Cu, Mg, Mn, Mo, Nb, Ni, P, Si, Ta,
Ti, V, W, Zr

ASTM E415
MCLIII-144

b. Austenitic Stainless Steels

Cr, Cu, Mo, Mn, Ni, P, Si
Al, B, Ca, Co, Cr, Cu, Mg, Mn, Mo, Nb, Ni, P, Si, Ta,
Ti, V, W, Zr

ASTM E1086
MCLIII-144

c. Aluminum Alloys

Ca, Co, Cr, Cu, Fe, Mg, Ni, P, Pb, Sb, Si, Sn, Ti, V,
Zn, Zr
Ca, Co, Cr, Cu, Fe, Mg, Mn, Ni, Pb, Sb, Si, Sn, Ti, V, Zn, Zr

ASTM E1251
MCLIII-144

Test:**Test Method(s) ¹:****Chemical Analysis – Spectrometric (cont)****Spark-AES**

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| d. Nickel Alloys | |
| Al, B, Co, Cr, Cu, Fe, Mg, Mn, Mo, Nb, P, | ASTM E3047 |
| Si, Ta, Ti, W, V, Zr | |
| Al, B, Co, Cr, Cu, Fe, Hf, Mg, Mn, Mo, Nb, P, Re, Si, Ta, | MCLIII-144 |
| Ti, V, W, Zr | |
| e. Cobalt Alloys | MCLIII-144 |
| Al, B, Cr, Cu, Fe, Hf, Mg, Mn, Mo, Nb, Ni, P, Si, Ta, | |
| Ti, V, W, Zr | |

X-Ray Fluorescence (XRF)

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| a. Cast Irons and Low Alloy Steels | |
| Mn, Mo, Ni, Cr, Cu, V | ASTM E322 |
| Al, Co, Cr, Cu, Fe, Mn, Mo, Nb, Ni, P, Si, Ti, V, W, Zr | MCLIII-138 |
| b. Titanium Alloys | |
| Al, Cr, Cu, Fe, Mn, Mo, Nb, Ni, Pd, Ru, Si, Sn, V, Y, Zr | ASTM E539 |
| Al, Cr, Cu, Fe, Mn, Mo, Nb, Ni, Pd, Ru, Sn, Ta, Ti, V, W, Zr | MCLIII-138 |
| c. Low Alloy Steels | |
| Cr, Co, Cu, Mn, Mo, Ni, Nb, P, Si, V | ASTM E1085 |
| Al, Co, Cr, Cu, Fe, Mn, Mo, Nb, Ni, P, Si, Ti, V, W, Zr | MCLIII-138 |
| d. Nickel Alloys | |
| Al, Co, Cr, Cu, Fe, Mn, Mo, Nb, Ni, P, Si, Ti, W | ASTM E2465 |
| Al, Co, Cr, Cu, Fe, Hf, Mn, Mo, Nb, Ni, Re, Ta, Ti, V, W, Zr | MCLIII-138 |
| e. Cobalt Alloys | |
| Al, Co, Cr, Cu, Fe, Hf, Mn, Mo, Nb, Ni, Si, Ta, Ti, V, W, Zr | MCLIII-138 |

Inductively Coupled Plasma (ICP-AES)

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| a. Titanium Alloys | |
| Al, B, Co, Cr, Cu, Fe, Mn, Mo, Ni, Nb, Pd, Ru, Si, | |
| Ta, Sn, W, V, Y, Zr | ASTM E2371 |
| Al, B, Co, Cr, Cu, Fe, Hf, Mg, Mn, Mo, Na, Nb, Ni, Re, Si, Ta, | |
| Ti, V, W, Y, Zr | MCLIII-141 |
| b. Nickel Alloys | |
| Al, B, Ca, Co, Cr, Cu, Fe, Mg, Mn, Mo, Nb, Ni, P, Si, | ASTM E2594 |
| Ta, Ti, W, V, Zr | |
| Al, B, Ca, Co, Cr, Cu, Fe, Hf, Mg, Mn, Mo, Na, Nb, Ni, P, Re, | |
| Si, Ta, Ti, V, W, Y, Zr | MCLIII-141 |
| c. Aluminum Alloys | |
| Cr, Co, Cu, Fe, Mg, Mn, Mo, Na, Ni, P, Si, Sr, Zn, V, Zr | ASTM E3061 |
| B, Bi, Ca, Co, Cr, Cu, Fe, Hf, Ga, Mg, Mn, Mo, Na, Nb, Ni, P, | |
| Re, Si, Sn, Sr, Ta, Ti, V, W, Y, Zn, Zr | MCLIII-141 |

Test:**Test Method(s) ¹:****Inductively Coupled Plasma Mass Spectrometer (ICP-MS)****Nickel**

Ag, Bi, Ga, Pb, Sb, Sn, Tl

ASTM E2823

As, Ag, Bi, Cd, Ce, Ga, In, La, Mg, Pb, Pd, Pt, Re, Ru, Sb, Se, Sn, MCLIII-1002

Te, Th, Tl, U, Zn, Mn, Cu, Nb, P, Ti, V, Fe, Zr, Hf, Mo, Ta, W, Y

Cobalt/Iron

As, Ag, Bi, Cd, Ce, Ga, In, La, Mg, Pb, Pd, Pt, Re,

MCL3-1002

Ru, Sb, Se, Sn, Te, Th, Tl, U, Zn, Mn, Cu, Nb, P, Ti, V, Fe, Zr,

Hf, Mo, Ta, W

Glow Discharge Mass Spec (GDMS)

Ag, Al, As, Au, B, Ba, Be, Bi, Br, Ca, Cd, Ce, Cl, Cs, Cu,

MCL III-1006

Dy, Eu, F, Fe, Ga, Gd, Ge, Hf, Hg, Ho, I, Ir, In, K, La, Li,

Lu, Mg, Mn, Mo, Na, Nb, Nd, Os, P, Pb, Pd, Nd, Pr, Pt, Re,

Rh, Ru, S, Sb, Rb, Sc, Se, Si, Sm, Sn, Sr, Ta, Tb, Te, Ti, Tm,

Th, Tl, U, V, W, Y, Yb, Zn, Zr

Chemical Analysis – Combustion / Fusion**Carbon and Sulfur (Leco)**

ASTM E1019, E1941

Oxygen and Nitrogen (Leco)

ASTM E1019, E1409

Hydrogen (Leco)

ASTM E1447

Electron Micro-Probe (EMP)

MCL-III-504

¹ When the date, edition, version, etc. is not identified in the scope of accreditation, laboratories may use the version that immediately precedes the current version for a period of one year from the date of publication of the standard measurement method, per part C., Section 1 of A2LA R101 - *General Requirements- Accreditation of ISO-IEC 17025 Laboratories*.



Accredited Laboratory

A2LA has accredited

HOWMET RESEARCH CENTER

Whitehall, MI

for technical competence in the field of

Chemical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *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 April 2017).



Presented this 28th day of March 2025.

A blue ink signature of Mr. Trace McInturff, written over a horizontal line.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2208.02
Valid to March 31, 2027

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