



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

NSL Analytical Services, Inc.
4450 Cranwood Parkway
Cleveland, OH 44128

Fulfills the requirements of

ISO/IEC 17025:2017

In the field of

TESTING

This certificate is valid only when accompanied by a current scope of accreditation document.
The current scope of accreditation can be verified at www.anab.org.

A handwritten signature in black ink, appearing to read 'R. Douglas Leonard Jr.', is positioned above a solid horizontal line.

R. Douglas Leonard Jr., VP, PILR SBU

Expiry Date: 23 November 2022
Certificate Number: AT-1354



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

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

NSL Analytical Services, Inc.

4450 Cranwood Parkway
Cleveland, OH 44128

Cynthia Hagan 216 438 5208

chagan@nslanalytical.com www.nslanalytical.com

TESTING

Valid to: **November 23, 2022**

Certificate Number: **AT-1354**

Chemical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Elemental Analysis	ASTM E1479 ASTM E2371 ASTM E2594 ICP-003 ICP-004	All Metal Alloys, Ceramics, Chemicals, Plastics	ICP Avio 500 Optima 5300 Optima 7300
Elemental Analysis	ASTM E2823 MS-003 MS-006	All Metal Alloys, Ceramics, Chemicals, Plastics	ICP-MS NexION 2000B NEXION 300/350X ELAN DRcE ELAN DRcEB
Elemental Analysis	ASTM E415 ASTM E1086 ASTM E2994 ASTM E3047 ALY-008 ALY-013	Al, Co, Fe, Ni, Ti Alloys	Spark OES SpectroLab M12 SpectroLab M
Elemental Analysis	ASTM E572 ASTM E1172 ASTM E2465 ALY-010 ALY-010M2	Co, Fe, Ni, Ti Alloys Ceramics	WD-XRF Axios mAX
Elemental Analysis	NSL-4010	Carbides, Nitrides, Ceramics	DC Arc Atom Comp 2000
Se, Te, Cd	ASTM E1184 ASTM E1834 AA-002	Co, Cr, Fe, Mo, Ni Alloys	AA-GF AAnalyst 600

Chemical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
C Analysis	ASTM E1019 ASTM E1941 ALY-005 ALY-011	Most Metal Alloys, Ceramics	Combustion LECO 844 LECO CS444-LS
H Analysis	ASTM E1447 ALY-006	Metal Alloys, excluding Al, Mg	Inert Gas Fusion LECO H836 LECO RH404
N Analysis	ASTM E1019 ASTM E1409 ALY-002 ALY-003 ALY-014	All Metal Alloys, Oxides, Nitrides, Ceramics	Inert Gas Fusion LECO ON 836 LECO TC436 LECO TC436DR
O Analysis	ASTM E1019 ASTM E1409 ALY-002 ALY-003 ALY-014	Most Metal Alloys (excluding Al), Oxides, Carbides, Nitrides, Ceramics	Inert Gas Fusion LECO ON 836 LECO TC436 LECO TC436DR
S Analysis	ASTM E1019 ALY-005 ALY-011	Most Metal Alloys, Ceramics, Graphite	Combustion LECO 844 LECO CS444LS
Cl, F, Br, I, NO ₂ , NO ₃ , SO ₄ , PO ₄	ASTM D4327 ASTM D7359 BS EN 14582:2016 AC-008	Metal Alloys, Ceramics, Chemicals, Plastics	Ion Chromatography ICS 2100 ICS 5000
Br, Cl, F, I, S ²⁻	ASTM C791 ASTM D512 ASTM D808 ASTM D1179 ASTM D7359 BS EN 14582:2016 AC-002	Metal Alloys, Ceramics, Chemicals, Plastics	Ion-Selective Electrode Orion EA 940
Wet Colorimetric P Wet Colorimetric Cr+6	ISO 3613 AC-006M1 AC-012 WC-001M2	All Metal Alloys, Ceramics, Chemicals, Plastics	UV-Vis GENESYS 5 GENESYS 10S
Wet Gravimetric Ni, Si, P, Cu, Ag, Re, S	ASTM E350 (WC defined) WC-001M5 WC-001M7 WC-001M11 WC-001M18 WC-001M23 WC-001M26	Metal Alloys	Wet Chemistry

Chemical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Titration Method for Cr Titration Method for B	WC-001M10 (ASTM E350, WC defined) WC-002 WC-001M1 (ASTM E371) WC-001M3 (ASTM C791 - WC defined); WC-002	Metal Alloys, Chemicals	Titration Metrohm 788 Titrande
Hg Analysis	ASTM D3223 AC-009	Metal Alloys, Ceramics, Chemicals, Plastics	Cold Vapor AA Leeman Hydra II
Lead in Children's Products & Jewelry	CPSC-01 CPSC-CH-E1001-08.3 CPSC-CH-E1002-08.3 CPSC-CH-E1003-09.1	Total Pb per 16CFR Part 1303: Lead Paint Regulation Lead in Non-Metal Children's Products Lead in Children's Metal Products Lead in Children's Metal Jewelry	ICP-MS NexION 2000B NexION 300/350X ELAN DRcE ELAN DRcEB ICP-OES Avio 500 Optima 5300 Optima 7300
Soluble Heavy Metals	CPSC-01 ASTM F 963(Section 4 & Section 8) ASTM F 963-16/-17, 4.3.5.1 ASTM F 963-16/-17, 4.3.5.2 EN 71-3 (section 4 through 10)	Children's Products Sample Preparation and Analysis Surface Coating Materials – Soluble Test For Metals Toy Substrate Materials	ICP-MS NexION 2000B NexION 300/350X ELAN DRcE ELAN DRcEB ICP-OES PE Avio 500 PE Optima 5300 PE Optima 7300 Cold Vapor AA Leeman Hydra II
Phthalates	CPSC-CH-C1001-09.3 CPSC-CH-C1001-09.4 (2018) ORG-003 ORG-003M1 ORG-004 ORG-007	Polymers, Children's Product Analysis	GC GC-MS Clarus 680 SQ 8T GC-MS Clarus 600 GC Varian 4000 GC-MS
Alloy Identification and Qualitative RoHS Screening of Elements	IEC 62321-3-1 ALY-009	Metal Alloys, Ceramics, Plastics	Portable XRF XL3t gun

Chemical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Quantitative RoHS screening for Halogens, Sulfur, Br	IEC 62321-3-2 ASTM D7359 BS EN 14582 :2007 AC-008 AC-001M2 AC-001M6	Metal Alloys, Ceramics, Plastics	Ion Chromatography ICS 5000 ICS 2100
Mercury in polymers, metals and electronics by CV-AAS, ICP-OES	IEC 62321-4	RoHS Testing: Electronics and Consumer Products (All Metals, Alloys, Ceramics, Chemicals, Plastics, Polymers, Coatings)	ICP-OES Avio 500 Optima 7300 PE Optima 5300 Cold Vapor AA Leeman Hydra II
Cd, Cr and Pb in Polymers Cd and Pb in Metals Cd, Cr and Pb in Electronics	IEC 62321-5	RoHS Testing: Electronics and Consumer Products (All Metals, Alloys, Ceramics, Chemicals, Plastics, Polymers, Coatings)	ICP-OES Avio 500 Optima 7300 Optima 5300 ICP-MS NexION 2000B NexION 300/350X ELAN DRcE ELAN DRcEB
PBB and PBDE in Polymers by GC-MS	IEC 62321-6 ORG-008	RoHS Testing: Electronics and Consumer Products (All Metals, Alloys, Ceramics, Chemicals, Plastics, Polymers, Coatings)	GC-MS Clarus 680 SQ 8T Varian 4000
Colorimetric Cr+6 on Surface Coatings	IEC 62321-7-1 AC-006 AC-012	RoHS Testing: Electronics and Consumer Products (All Metals, Alloys, Ceramics, Chemicals, Plastics, Polymers, Coatings)	UV-Vis Genesys 5 Genesys 10S
Colorimetric Cr+6 on Polymers and Electronics	IEC 62321-7-2 AC-006 AC-012	RoHS Testing: Electronics and Consumer Products (All Metals, Alloys, Ceramics, Chemicals, Plastics, Polymers, Coatings)	UV-Vis Genesys 5 Genesys 10S
Phthalates	IEC 62321-8 ORG-007	RoHS Testing: Electronics and Consumer Products (All Metals, Alloys, Ceramics, Chemicals, Plastics, Polymers, Coatings)	GC-MS Clarus 680 SQ 8T Varian 4000

Chemical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Qualitative Analysis, Polymer Identification	ORG-002	Polymers, other Organic Compounds	FTIR Spectrum 1
Formulation Identification and Volatile Matter	ASTM E1131 ASTM E1582 ASTM E1860 ASTM E1868 ASTM E2040 ORG-005 ORG-012	Polymers, other Organic Compounds	TGA TA Q500
Determination of Thermal Characteristics	ASTM E967 ASTM E968 ORG-006	Polymers, other Organic Compounds	DSC TA Q20
pH	ASTM D1293 AC-011 WC-005	Aqueous Solutions, Chemicals, Water	pH/Ion Meter
Conductivity & Resistivity	ASTM D1125 AC-010	Aqueous Solutions, Chemicals, Water	Conductivity Meter
% Ash & Moisture	ASTM C561 ASTM C562 PE-001M1	Carbon, Graphite	Muffle Furnace, Balance
Bulk Density by Physical Measurements	ASTM C559 WC-001M34	Carbon, Graphite	Balance, Calipers
Density by Water Displacement	ASTM B311 WC-001M28	Metals, Ceramics	Balance, Thermometer

Mechanical (Powders)

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Particle Size Distribution by Laser Diffraction	ISO 13320 ASTM B821 ASTM B822 PS-01	Powders	Mastersizer 3000 Particle Size Analyzer
Sieve Analysis	ASTM B214 PC-004	Powders	Rotap Sieves
Flow Rate	ASTM B213 PC-001	Metal Powders	Hall Flow Meter Carney Funnel
Material Flow Parameters	PC-009	Powders	Revolution Powder Rheometer
BET Surface Area By N ₂ or Kr Adsorption	ASTM B922 ASTM C1247 ISO9277 PC-006 PC-007	Powders, Particles	Quadrastorb evoKr/MP FloVac Degasser
Apparent Density	ASTM B212 ASTM B417 ASTM B964 PC-002 PC-003	Free Flowing Metal Powders Non- Free-Flowing Metal Powders	Hall Flowmeter Funnel Carney Funnel
Bulk Density	ASTM D7481 PC-012	Powders	Graduated Cylinder Auto-Tap
Tap Density	ASTM B527 PC-005	Metal Powders	Auto-Tap
Skeletal Volume & Density By Helium or Nitrogen Pycnometry	ASTM B923 ISO12154 MPIF 63 PC-008	Powders Components	Ultrahyc 1200e

Note:

1. This scope is formatted as part of a single document including Certificate of Accreditation No. AT-1354.



R. Douglas Leonard Jr., VP, PILR SBU