



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

NSL Metallurgical
4535 Renaissance 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 horizontal line.

R. Douglas Leonard Jr., VP, PILR SBU

Expiry Date: 29 October 2022

Certificate Number: AT-1495



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 Metallurgical
4535 Renaissance Parkway
Cleveland, OH 44128
Cynthia Hagan 216 475 9000
Email: chagan@nslanalytical.com Website: www.nslanalytical.com

TESTING

Valid to: **October 29, 2022**

Certificate Number: **AT-1495**

Mechanical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Room Temperature Tensile	PT-003M1 ASTM A370 ASTM B557 ASTM E8 ISO 6982-1	Metallic Materials	Instron 67 kip MTS 22.5 kip Instron 300LX Instron 5985
Fastener Tensile Testing	PT-003M4 ASTM A370 ASTM E8 ASTM E139 ASTM E292 ASTM E340 ASTM E381 ASTM E384 ASTM F606 NASM 1312-6 NASM 1312-8 NASM 1312 -10 NASM 1312 -18 SAE J429 SAE J995	Metallic Fasteners	MTS 22.5 kip Instron 67kip Instron 300LX Instron 5985
Bend Testing	PT-003M5 ASTM E290	Metallic Materials	Instron 5985



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Mechanical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Charpy Impact	PT-004 PT004M1 ASTM A370 ASTM E23 ISO 148-1	Metallic Materials	MPM 400 ft-lb Wiedemann Baldwin 240 ft-lb
Heat Treat of Specimens	PT-006 AMS2750	Metallic Materials	Cress 1228 Despatch LND1-42-3
Hardness – Brinell	MET-004M1 ASTM E10	Metallic Materials	Detroit DLC-3100
Hardness – Rockwell	MET-004M2 ASTM E18 NASM 1312-6	Metallic Materials	Wilson B523-T LECO LCR500

Metallography

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
SEM Qualitative Elemental Analysis, EDS Profile, Surface Morphology, Imaging	SEM-002 SEM-003	Metal Alloys, Ceramics, Composites, Coatings, Fibers, Polymers, Particles	Hitachi Model SU3500 Thermo Scientific EDS Model 4503A-3UPS-SN
Macroetch	MET-003M9 ASTM E340 ASTM E381 ASTM A604	Metallic Materials Steel bars, billets, blooms, and forgings	n/a
Metallography (Macro exam)	MET-003M9 ASTM E340 ASTM E381 AS7456 AS7458 ASTM A604	Metallic Materials	Leica M125
Metallography – Alpha Case	MET-003M10 ASTM E3 AMS T9046	Titanium Alloys	Nikon Optiphot Leica DMI 5000 M Leica DMi8 A
Decarburization Carburization	MET-003M8 ASTM E3 ASTM E384 ASTM E1077	Ferrous Alloys	Matsuzawa (Micro) MMT-X7B, Matsuzawa Macro Vickers VMT, Leica DMI 5000 M Leica DMi8 A Nikon Optiphot



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Decarburization Carburization	MET-003M8 ASTM F2328	Metallic Fasteners	Matsuzawa(Micro) MMT-X7B, Matsuzawa Macro Vickers VMT Leica DMI 5000 M Leica DMi8 A Nikon Optiphot
Effective Case Depth	MET-003M6 ASTM E384 SAE J423	Metallic Materials	Matsuzawa(Micro) MMT-X7B, Matsuzawa Macro Vickers VMT

Metallography

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Delta Ferrite	MET-003M6 AMS 2315	Metallic Materials	Nikon Optiphot Leica DMI 5000 M Leica DMi8 A
Grain Size	MET-003M1 MET-003M2 MET-003M3 ASTM E112 ASTM E562 ASTM E930	Metallic Materials	Nikon Optiphot Leica DMI 5000 M Leica DMi8 A
Intergranular Attack/Intergranular Oxidation	MET-003M6 PT-003M6 ASTM A262 ASTM E3 AMS 5656	Metallic Materials	Nikon Optiphot Leica DMI 5000 M Leica DMi8 A
Inclusion Rating / Cleanliness	MET-003M5 ASTM E45 SAE J422	Metallic Materials, Ferrous Alloys	Nikon Optiphot Leica DMI 5000 M Leica DMi8 A
Measurement of Metallic and Oxide Coating Thickness by Microscopic Examination of a Cross Section	MET-003M6 ASTM B487	Metallic Materials	Nikon Optiphot Leica DMI 5000 M Leica DMi8 A
Measuring Case Depth	MET-003M6 SAE J423	Ferrous Alloys	Nikon Optiphot Leica DMI 5000 M Leica DMi8 A
Microetching	MET-002M1 ASTM E407	Metallic Materials	n/a
Sample Preparation	MET-002 ASTM E3	Metallic Materials	n/a
Microhardness - Alloy Depletion	MET-003M6 ASTM E1077 ASTM F2328	Metallic Materials	Matsuzawa(Micro) MMT-X7B, Matsuzawa Macro Vickers VMT

Metallography

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Microhardness – Knoop / Vickers	MET-004M3 ASTM E384 NASM 1312-6	Metallic Materials	Matsuzawa(Micro) MMT-X7B, Matsuzawa Macro Vickers VMT

Note:

1. This scope is formatted as part of a single document including Certificate of Accreditation No. AT-1495.



R. Douglas Leonard Jr., VP, PILR SBU

