



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

Dirats Laboratories
41 Airport Road
Westfield, MA 01085

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 be 'J. Stine', is positioned above a horizontal line.

Jason Stine, Vice President

Expiry Date: 17 May 2025

Certificate Number: AT-1546



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

Dirats Laboratories

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TESTING

Valid to: **May 17, 2025**

Certificate Number: **AT-1546**

Chemical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Chemical Analysis	ICP-OES	Metal Alloys/Powders/Liquids	PE Optima 7300 & Spectro Arcos Inductive Coupled Plasma Spectrometer
Carbon / Sulfur Analysis	Combustion ASTM E1019, E1941	Ni, Co, Cu, Ti and Steel Alloys	Leco CS844es
Nitrogen / Oxygen Analysis	Inert Gas Fusion ASTM E1019	Ni, Co, Ti and Steel Alloys	Leco ONH836
Hydrogen Analysis	Inert Gas Fusion ASTM E1447	Ni, Co, Ti and Steel Alloys	Leco ONH836
Phase Analysis	X-Ray Diffraction	Metals and Ceramics	Panalytical X'pert Pro and Empyrean X-Ray Diffractometer
Retained Austenite	X-Ray Diffraction ASTM E975	Steel Alloys	Panalytical X'pert Pro and Empyrean X-Ray Diffractometer
Semi-Quantitative Analysis	XRF-ED Analysis	Metal Alloys	Thermo Scientific Niton XL 3t
Chemical Analysis	XRF-WD Analysis	Ni, Co, Ti, Al, Cu and Steel Alloys	Thermo PerformX Sequential X-Ray Spectrometer
Chemical Analysis	ICP-MS	Ni, Cu and Steel Alloys	Nexion ICP-MS
Differential Scanning Calorimeter	ASTM E794	Metal Alloys	Mettler Toledo Thermal Analyzer TGA/DSC 1 Star System
Electrical Conductivity using Electromagnetic Method	ASTM E1004	Al and Cu Alloys	PCE-COM20 Conductivity Meter
Magnetic Permeability	ASTM A342	Feebly Magnetic Materials	Severn Engineering Co. Permeability Indicator #3404

Chemical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Coating Weight Determination	ASTM A90, A428, B137 and B767	Platings and Coatings	Analytical Balance
Determination of Flow Rate Of Metal Powders	ASTM B213	Powders	Hall Flowmeter funnel and Analytical Balance
Wet and Dry Particle Size Distribution	ASTM B214	Powders	Ro-Tap Sieve Shaker
Density	ASTM B311	Powders	Analytical Balance
Light Scattering Particle Size Distribution	ASTM B822	Powders	Microtrac S3500 Particle Size Analyzer
Loss on Ignition, Organic Content and Acid Insolubles	Gravimetric Determination	Powders and Solids	Analytical Balance Analytical Furnace
Loss on Ignition, Organic Content and Acid Insolubles	Gravimetric Determination, ASTM D7348	Powders and Solids	Leco TGA801 Thermogravimetric Analyzer
Apparent Density Determination	ASTM B212	Free Flowing Metal Powders	Hall Flowmeter funnel and Analytical Balance
Apparent Density Determination	ASTM B417	Non-Free Flowing Metal Powders	Carney Flowmeter funnel and Analytical Balance
Bulk Density	ASTM C838	Carbon / Graphite Shapes	Analytical Balance
Chloride and Fluoride Ion	ASTM D512	Water	Orion Dual Star Ion Analyzer
Chemical Analysis	Spark OES Analysis	Metal Alloys	ARL 4460 Optical Emission Spectrometer

Mechanical – Metallurgical Exam / Environmental Testing

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Microetching	ASTM E407	Metals	Olympus GX71 or GX53 Metallurgical Microscope 25x – 1000x magnification
Macroetching	ASTM A561, A604, E340, and E381	Metals	Zeiss Metallurgical Microscope 25x – 1000x magnification
Grain Size	ASTM E112 and E930	Metals	Olympus GX71 or GX53 Metallurgical Microscope 25x – 1000x magnification



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Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Photomicrography	ASTM E883	Metallics, Composites and Ceramics	Olympus GX71 or GX53 Metallurgical Microscope 25x – 1000x magnification
Depth of Decarburization	ASTM E1077	Metals	Olympus GX71, GX53, and Zeiss Metallurgical Microscope 25x – 1000x magnification
Case Depth/Carburization	ASTM E384	Metals	Olympus GX71 or GX53 Metallurgical Microscope 25x – 1000x magnification
Inclusion Content	ASTM E45, E1245	Metals	Olympus GX71 or GX53 Metallurgical Microscope 25x – 1000x magnification
Intergranular Attack	ASTM A262	Metals	Olympus GX71 or GX53 Metallurgical Microscope 25x – 1000x magnification
Alpha Case	GE P3TF19	Titanium Alloys	Olympus GX71 or GX53 Metallurgical Microscope 25x – 1000x magnification
Grain Size	Acetate Replica of Etched Structure	Metals	Olympus GX71 or GX53 Metallurgical Microscope 25x – 1000x magnification/tape
Thickness by Cross Section	ASTM B487	Coatings and Platings	Olympus GX71 or GX53 Metallurgical Microscope 25x – 1000x magnification
Microhardness of Coatings	ASTM B578	Coatings and Platings	10 – 1000g load Instron Tukon 2100B / Duramin-40 Automatic Micro/Macro Hardness Tester Microindentation
Adhesion	ASTM B571	Coatings and Platings	Bend, Grinding Wheel, Sharp Instrument, Impact
Wet Tape Adhesion	FED-STD-141 Method 6301	Coatings and Platings	3M Tape
Preparation of Specimens	ASTM E3	Metallics, Composites and Ceramics	Olympus GX71 or GX53 Metallurgical Microscope 25x – 1000x magnification



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Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Humidity	FED-STD-141 Method 6201, MIL-STD-753 Method 101 and MIL-STD-810	Metals, Coatings and Platings	Associated Environmental Systems Model #LH-10 Humidity Chamber
Chemical Passivation Treatments	ASTM A967	Stainless Steel Parts	Auto Technology Salt Fog Corrosion Chamber
Corrosion Susceptibility	ASTM A262 A, E	Metals	Olympus GX71 or GX53 Metallurgical Microscope 25x – 1000x magnification and Struers Lectropol Bench Top Electrolytic Polisher-Etcher, Nikon SMZ-10A Stereoscopic Wide Field
Mercurous Nitrate	ASTM B154	Copper Alloys	Zeiss Discovery V12 Stereoscope and Nikon SMZ-10A Stereoscopic Wide Field Metallurgical Macroscope
Salt Spray	ASTM B117, FED-STD-141 Method 6061	Metals, Coatings and Platings	Auto Technology Salt Fog Corrosion Chamber
Axial Fatigue	ASTM E606, E466	Metals	Instron and MTS servo-hydraulic testing machines
Fracture Toughness	ASTM E399	Metals	Instron and MTS servo-hydraulic testing machines
Crack Growth DADN, Compliance, PD	ASTM E647	Metals	Instron and MTS servo-hydraulic testing machines
Abrasion	ASTM D4060	Coatings	Taber Abraser
Tensile Axial and Wedge	ASTM A370, E8, F606, F606M and MIL-STD-1312-8	Metal fasteners	Tinius Olsen, Instron and MTS servo-hydraulic testing machines and MTS Electromechanical testing machines
Proof	ASTM A370, E8, F606, F606M and MIL-STD-1312-8	Metal fasteners	Tinius Olsen, Instron and MTS servo-hydraulic testing machines and MTS Electromechanical testing machines



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Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Double Shear	ASTM B769	Metal fasteners	Tinius Olsen, Instron and MTS servo-hydraulic testing machines and MTS Electromechanical testing machines
Hardness	NASM 1312 Method 6	Metal fasteners	Scales A, B, C, E, F, G, 15N, 30N, 15T, and 30T Wilson Rockwell Series 2000 Hardness Tester
Stress Rupture	NASM 1312-10	Metal fasteners	Applied Test Systems Series 2330 Stress Rupture Machines with 20:1 Lever arm ratio, 3:1 Lever arm ratio and Applied Test Systems Series 2140 direct loader
Fatigue - Axial	ASTM E466, NASM 1312-11, 111	Metal fasteners	Instron and MTS servo-hydraulic testing machines
Rockwell and Superficial Hardness	ASTM A370, E18	Metals	Scales A, B, C, E, F, G, 15N, 30N, 15T, and 30T Wilson Rockwell Series 2000 Hardness Tester
Brinell Hardness	ASTM A370, E10	Metals	Detroit Testing Model DLC-3100 Brinell Hardness Tester
Microhardness Knoop & Vickers	ASTM E384	Metals	Instron Tukon 2100B / Duramin-40 Automatic Micro/Macro Hardness Tester Microindentation
Tension TS, YS, EL, RA	ASTM A370, E8, E8M, B557, E345 and EN 2002-1	Metals	Tinius Olsen, Instron and MTS servo-hydraulic testing machines and MTS Electromechanical testing machines
Tensile Elevated Temperature	ASTM E21, EN 2002-2	Metals	Tinius Olsen, Instron and MTS servo-hydraulic testing machines and MTS Electromechanical testing machines



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Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Tensile Low Temperature	Customer Method	Metals	Tinius Olsen, Instron and MTS servo-hydraulic testing machines and MTS Electromechanical testing machines
Double Shear	ASTM B769	Metals	Tinius Olsen, Instron and MTS servo-hydraulic testing machines and MTS Electromechanical testing machines
Bend	ASTM A370	Metals	Bend Tester
Ductility Bend or Flaring	ASTM E190, E290, A370	Metals	Bend Tester, Flare Diameter
Charpy Impact and Izod	ASTM A370, E23	Metals	Tinius Olsen
Creep, Stress Rupture	ASTM E139, E292	Metals	Applied Test Systems Series 2330 Stress Rupture Machines with 20:1 Lever arm ratio or 3:1 Lever arm ratios and Applied Test Systems Series 2140 direct loader
Hydrogen Embrittlement	ASTM F519	Coated Plated Specimens	Type 1a specimen Applied Test Systems Series 2330 Stress Rupture Machines with 20:1 Lever Arm ratio
End Quench Hardenability – Jominy	ASTM A255	Metals	HRC Wilson Rockwell Series 2000 Hardness Tester
Superplastic Testing	ASTM E2448	Sheet Metals	MTS Electromechanical testing machines
Adhesion Strength	ASTM C633	Thermal Spray Coatings	Tinius Olsen, Instron and MTS servo-hydraulic testing machines and MTS Electromechanical testing machines
Metallo evaluations, Weld Geometry and Mechanical Properties	ASME Section IX, AWS D1.1, D1.2, D1.5, D17.1 and NAVSEA S9074-AQ-GIB-010/248, F61	Metals	Various Metallographic and Mechanical Equipment



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Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Stress Corrosion	ASTM G1, G44, G47, G49	Metals	Associated Environmental Systems – Model #LH-10 Humidity Chamber
Pin-Type Bearing	ASTM E238	Metals	MTS Electromechanical testing machines
Compression	ASTM E9	Metals	Instron servo-hydraulic testing machine

Note:

1. This scope is formatted as part of a single document including Certificate of Accreditation No. AT-1546.



Jason Stine, Vice President

