



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

TENSILE TESTING METALLURGICAL LABORATORY

4520 Willow Parkway
Cleveland, OH 44125
James Rauckhorst Phone: 216 641 3290

CHEMICAL

Valid To: May 31, 2021

Certificate Number: 0161.01

In recognition of the successful completion of the A2LA evaluation process (including compliance to R223 – Specific Requirements – GE Aviation S-400 Accreditation Program), accreditation is granted to this laboratory to perform the following tests on aerospace, nuclear, automotive parts, bar, forgings, castings, fasteners, medical implants, heat treated parts, eyebolts, weldments, coatings, paint, billets, stampings, rebar, wire, buckles, shackles, hitches, hooks, chains, cargo rings, clevis, turnbuckles, inserts and tubular products¹:

Test

Test Method(s)

Spectroscopy

Optical Emission Spectrochemical Analysis -
Argon Path (OES) (Al, As, B, Bi, C, Cd, Co, Cr,
Cu, Mg, Mn, Mo, Ni, P, Pb, Sb, Sn, Ti, V, W, Zn)

ASTM E415, E1086, E1251, E1999; TTML C-01

Combustion

LECO Carbon and Sulfur Analyzer (C, S)

ASTM E1019; TTML C-04

LECO Oxygen, Nitrogen, and Hydrogen Analyzer
(O, N, H)

ASTM E1019, E1447; TTML C-05

Note: Testing performed on the following materials: Aluminum, Carbon and Alloy Steel, Copper Alloys (Brass, Bronze), Titanium, Cobalt, Superalloys, Tool Steels, Nickel Alloys, Hadfield Manganese and Stainless Steels.

¹This laboratory also meets the requirements of ISO/IEC 17025:2005.



Accredited Laboratory

A2LA has accredited

TENSILE TESTING METALLURGICAL LABORATORY

Cleveland, OH

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 24th day of April 2019.

A blue ink signature of the Vice President of Accreditation Services.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 0161.01
Valid to May 31, 2021

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



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017¹

TENSILE TESTING METALLURGICAL LABORATORY

4520 Willow Parkway
Cleveland, OH 44125
James Rauckhorst Phone: 216 641 3290

MECHANICAL

Valid To: May 31, 2021

Certificate Number: 0161.02

In recognition of the successful completion of the A2LA evaluation process (including compliance to R223 – Specific Requirements – GE Aviation S-400 Accreditation Program), accreditation is granted to this laboratory to perform the following tests on aerospace, nuclear, automotive parts, bar, forgings, castings, fasteners, medical implants, heat treated parts, eyebolts, weldments, coatings, coils, plates, paint, billets, stampings, rebar, wire, buckles, shackles hitches, hooks, chains, cargo rings, clevis, turnbuckles, inserts and tubular products²:

Test:

Test Method(s):

Mechanical:

Ball Punch Deformation (Olsen, Erichsen)

ASTM E643

Bend Test

ASTM A370 (Sec. 15), A489, E190, E290;
ISO 5173, 7438

Charpy Impact (-320, -300 to 212) °F

ASTM A370 (Sec. 20-29), A923 (Method B), E23;
EN 10045-1; ISO 083, 148

Compression

ASTM E9

Flare Test

ASTM A370 (Sec. A2.5.1.4)

Flattening Test

ASTM A370 (Sec. A2.5.1.1)

Fracture Toughness

ASTM E399, ISO 12135

Hardness:

Brinell (500, 1500 & 3000) Kg

ASTM E10; ISO 6506, ISO 898-5 (6.1.2)

Rockwell / Superficial Rockwell (HRA, HRBW,
HRC, HRD, HREW, HRFW, HRGW, HRHW,
HRKW, HR15TW, HR30TW, HR45TW, HR15N,
HR30N, HR45N)

ASTM E18, F606/F606M; NASM 1312-6;
ISO 6508, ISO 898-5 (6.1.3)

Jominy Hardenability

ASTM A255; SAE J406

Microhardness:

Knoop (100, 200, 500) g

ASTM E384, E92, F606/F606M; NASM 1312-6;
ISO 5454

Vickers (300 g, 500 g, 1000 g, 10 Kg)

ASTM E92, E384, F606/F606M; NASM 1312-6;
ISO 6507, ISO 898-5 (6.1.1)

Pencil Hardness

ASTM D3363

Tape Adhesion

ASTM D3359

Test:

Stress Rupture (Up to 1500) °F
w/ Smooth, Notch and Combination Bars
Tensile
Room Temperature (Up to 400K for
Ultimate Tension, Yield, Modulus)

R Value
N Value
Elevated Temperature (Up to 1500) °F

Test Method(s):

ASTM E139, E292; ISO 204; NASM 1312-14

ASTM A370 (Sec. 6-14), A770, B557, E8/E8M;
DIN 50125; EN 10002 (Withdrawn 2001)³, 10164;
JIS Z2201, Z2241; NASM 1312-8; ISO 6892-1
ASTM E517; ISO 10113
ASTM E646; ISO 10275
ASTM E21; NASM 1312-18

Fastener:

Discontinuities

Ductility
Hydrogen Embrittlement / Debrittlement
Verification (Stress Durability)
Prevailing Torque
Proof (Internal & External Threads)

Rotational Capacity (RoCap)

Tensile
Axial Tensile

Wedge Tensile

Screw Thread Insert
Shear / Double Shear

Torque Tension
Torque Testing

Turnbuckle Test

ASTM F788, F812; SAE J122, J123 (Cancelled
2012)³; ISO 6157
SAE J78, J81
ASTM F519, F606/F606M; NASM 1312-5
USCAR-5, USCAR-7
IFI 100/107
ASTM A370 (Annex A3), F606; SAE J429, J995;
ISO 898-2, -6
AASHTO M164 (Withdrawn 2005)³;
ASTM A325 (Sec. 10.2), F3125

ASTM F606/F606M; ISO 898-1;
ICC AC437 (Sec. 4-1-4.3 only)
ASTM F606/F606M; ISO 898-1

MIL-I-45914A
ASTM F606; NASM 1312-13, 1312-20;
ICC AC437 (Sec. 4-1-4.3 only)
ISO 16047
ASTM F738 (Sec. 10.2.4), F880 (Sec. 12.3),
F912 (Sec. 11.2); IFI 101; ISO 898-5 (6.3), -7
ASTM F1145

Metallographic Evaluation:

Alpha Case
Banding / Orientation of Microstructures
Case Depth
Depth of Decarburization / Chord Method

Ferrite Rating
Graphite in Castings / Nodularity
Grain Size (Comparison Method)
Inclusion Rating / Microcleanliness
Metallographic Specimen Preparation
Macro / Micro Etch
Photomicrography
Plating Thickness / Coating Thickness

ASTM E407; TTML LI-019
ASTM E1268; ASM Handbook (Vol. 9)
SAE J423, J121 (Cancelled 2013)³; ISO 18203
ASTM A574, E1077, F2328; SAE J121,
SAE ARP 1820, ISO 898-5 (6.2)
AMS 2315
ASTM A247; GM9095P
ASTM E112, E930
ASTM E45 (Method A & D)
ASTM E3
ASTM A604, E340, E381, E407
ASTM E883
ASTM B487



Test:**Test Method(s):****Material Property Analysis:**

Coating Weight
Conductivity
Surface Roughness / Surface Finish
Adhesion of Metallic Coatings

ASTM A90, A428; NASM 1312-12
ASTM E1004
ASME B46.1
ASTM B571 (Methods 3, 4, 7, 8, 9)

Corrosion:

Corrosion Test
Intergranular Corrosion (IGA)
Salt Spray
Humidity

ASTM A923 (Method A & C)
ASTM A262 (Practice A & E)
ASTM B117; ISO 9227
ASTM D1735; ISO 7253

Other:

Failure Analysis
(using the test technologies listed above)
Heat Treat⁴
Weld Evaluation – PQR, WPS

TTML LI-011; ASM Metals Handbook Vol. 11
SAE-AMS-H6875, AMS 2750
ASME Section IX, AWS D1.1, D1.5

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²Testing performed on the following materials: Aluminum, Carbon and Alloy Steel, Copper Alloys (Brass, Bronze), Titanium, Cobalt, Superalloys, Tool Steels, Nickel Alloys and Stainless Steels.

³This laboratory's scope contains withdrawn or superseded methods. As a clarifier, this indicates that the applicable method itself has been withdrawn or is now considered "historical" and not that the laboratory's accreditation for the method has been withdrawn.

⁴Heat Treatment Performed Only on Samples Prior to Testing. (Heat Treat Capability) including age, anneal, austenitize, bake, heat resistance, normalize, PWHT (Post Weld), stress relieve, quench & temper, 24 hour on nuts.



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Vice President, Accreditation Services
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