



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

TENSILE TESTING METALLURGICAL LABORATORY

4520 Willow Parkway
Cleveland, OH 44125

James E Rauckhorst Phone: 216 641 3290

CHEMICAL

Valid To: May 31, 2011

Certificate Number: 0161.01

In recognition of the successful completion of the A2LA evaluation process, 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, eye bolts, weldments and tubular products²:

<u>Test</u>	<u>Test Methods</u>
<u>Spectroscopy</u>	
Optical Emission Spectrochemical Analysis - Argon Path (OES)	TTML C-01; ASTM E415 ¹ , E1086 ¹ , E1251 ¹ , E1999 ¹
<u>Combustion</u>	
LECO Carbon and Sulfur Analyzer	ASTM E1019 ¹
LECO Oxygen, Nitrogen, and Hydrogen Analyzer	ASTM E1019 ¹ , E1447 ¹

*Also using industry and customer driven specifications specifically related to the testing above.

¹This accreditation also includes an evaluation of the GE S400 requirements for the tests listed above using the GE AC1.1 checklist.

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



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TENSILE TESTING METALLURGICAL LABORATORY

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Cleveland, OH 44125
James E Rauckhorst Phone: 216 641 3290

MECHANICAL

Valid To: May 31, 2011

Certificate Number: 0161.02

In recognition of the successful completion of the A2LA evaluation process, 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, eye bolts, weldments and tubular products³:

<u>Test</u>	<u>Test Methods</u>
<i>Mechanical:</i>	
Tensile ¹ : Room Temperature (up to 400K for Ultimate Tension, Yield, Modulus)	ASTM A370, B557, E8; NASM-1312-8; EN 10002; JIS Z2201, Z2241; DIN 50125
R Value	ASTM E517
N Value	ASTM E646
Tensile: Elevated Temperature (up to 1600°F)	ASTM E21; NASM-1312-18
Hardness:	
Brinell ¹	ASTM E10
Rockwell/Superficial Rockwell ¹ (HRA, HRBw, HRC, HRD, HREw, HRFw, HRGw, HRHw, HRKw, HR15Tw, HR30Tw, HR45Tw, HR15N, HR30N, HR45N)	ASTM E18
Vickers	ASTM E92
Microhardness ¹ (Knoop, Vickers)	ASTM E384
Compression	ASTM E9
Jominy Hardenability	ASTM A255; SAE J406
Stress Rupture	ASTM E139, E292
Charpy Impact	ASTM A370, E23; ISO 083
Fracture Toughness	ASTM E399
Bend Test	ASTM A370, B571, E190, E290
Ball Punch Deformation (Olsen)	ASTM E643

Test

Test Methods

Fastener:

Proof (Internal & External Threads)

ASTM A370, F606; SAE J429, J995

Axial Tensile

ASTM F606

Wedge Tensile

ASTM F606

Shear

ASTM F606; NASM 1312-13, NASM 1312-20

Torque Testing

ASTM F738, F880, F912

Rotational Capacity

ASTM A325; AASHTO M164

Hydrogen Embrittlement/Debrittlement

ASTM F519, F606; NASM 1312-5

Verification (Stress Durability)

SAE J419; USCAR-5, USCAR-7

Ductility

SAE J78, J81

Turnbuckle Test

ASTM F1147

Discontinuities

ASTM F788, F812; SAE J122, J123

Metallographic Evaluation¹:

Case Depth

SAE J423

Metallographic Specimen Preparation

ASTM E3

Grain Size

ASTM E112, E930

Banding/Orientation of Microstructures

ASTM E1268; ASM Handbook

Depth of Decarburization

ASTM A574, E1077; SAE J121, SAE ARP 1820

Macro/Micro Etch

ASTM A604, E340, E381, E407

Inclusion Rating

ASTM E45 (Method A & D)

Photomicrography

ASTM E883

Graphite in Castings

GM 9095P; ASTM A247

Ferrite Rating

AMS 2315

Alpha Case

TTML LI-019

Plating Thickness

ASTM B487

Material Property Analysis:

Coating Evaluation

GM 4350

Coating Weight

ASTM A90, A309; NASM 1312-12

Surface Roughness

ASME B46.1

Conductivity

ASTM E1004

Corrosion:

Corrosion Test

ASTM A923 (Method A & C)

Intergranular Corrosion


ASTM A262 (Practice A & E)

Salt Spray

ASTM B117

Humidity

ASTM D2247



Test

Test Methods

Other:

Failure Analysis (using the listed test technologies)

TTML LI-011

Heat Treat²

SAE-AMS-H6875, AMS 2750

Weld Evaluation

ASME Section IX, AWS D1.1, D1.5

*Also using industry and customer driven specifications specifically related to the testing above.

¹This accreditation also includes an evaluation of the GE S400 requirements for the tests listed above using the GE AC1.1 checklist.

²Heat Treatment Performed Only on Samples Prior to Testing.

³On the following materials: Aluminum, Carbon and Alloy Steel, Copper Alloys (Brass, Bronze), Titanium, Cobalt, Superalloys, Tool Steels, Nickel Alloys and Stainless Steels.