



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

AADFW, INC.
 1350 Westpark Way
 Euless, TX 76040
 Phone: 817 540 0153
 Billy Brown billy@aadfwinc.com
 Elise Schiltz elise@aadfwinc.com

MECHANICAL

Valid To: January 31, 2019

Certificate Number: 0603.01

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 at the location listed above to perform the following tests on composites, adhesives, metals and metal fasteners:

| <u>Test</u> | <u>Test Method</u> |
|---|---|
| <u>Mechanical Testing</u> | |
| Knoop and Vickers Hardness (HV0.5, HV1, HV5, HV10; HK200, HK500, HK1000) | ASTM E384, E92 |
| Brinell Hardness (500 and 3000 Kg) | ASTM E10, E110 |
| Rockwell Hardness (A, B, C, E, 15N, 30N, 45N, 15T, 30T, 45T) | ASTM E18, F3125 |
| Leeb Portable Hardness | ASTM A956 |
| Fatigue Testing (-300 to +600) °F, (1 to 50) Hz | ASTM E466; NASM 1312-11 |
| Fracture Toughness | ASTM E1304 |
| Bend | ASTM E190; ASME Section IX; AWS D1.1, 17.1; BPS 4311 |
| Magnetic Permeability | ASTM A342 |
| Weld Operator and Weld Procedure Qualification | API 1104; ASME Sect. IX; AWS B2.1/B2.1M, B4.0, D1.1/D1.1M, D1.2/D1.2M, D1.3/D1.3M, D17.1, D17.2/D17.2M |
| Hydrogen Embrittlement (Notch Tension) | ASTM E292, F519; NASM 1312-5, 14 |
| Weld Hardness Profile | NACE MR0175/ ISO 15156, SP0472 RP0472 ¹ (Superseded by SP0472, 2005) |
| Jominy End-Quench | ASTM A255 |
| Tensile Properties | ASTM A370, B557, E8/E8M; ISO 6892-1, 898-1; AWS D1.1, 1.2, 1.3, 1.6, 4.0; ASME Section IX; BPS-4431; ISO 3506-2 |
| Impact Properties (Charpy) (-320 °F to RT) | ASTM A370, E23 |
| Nick Break Testing | API 1104, 1107 ¹ (Superseded by 1104) |
| Fillet Break | AWS B4.0 |

TestTest MethodChemical Properties

| | |
|---|---|
| Carbon/Sulfur Determination | ASTM E1019 |
| Oxygen/Nitrogen/Hydrogen Determination | ASTM E1019, E1409, E1447 |
| Spectroscopy, OES (Al, Fe, Cu, Ti, Mg, Ni base) | ASTM B954, E415, E1086, E1251, E1999; DIN EN 15079 |
| EDS in SEM (Semi-Quantitative) | ASTM E1508 |

Metallographic Evaluation

| | |
|--------------------------------------|---|
| Metallographic Preparation/Microetch | ASTM E3, E407 |
| IGA Preparation | ASTM G110 |
| Grain Size (Comparison) | ASTM E112 |
| Inclusion Rating | ASTM E45 (Method A) |
| Carburization/Decarburization | ASTM E1077; AMS 2759/1-/5; ARP 1820; AMS-H-6875 |
| Microstructure Evaluation | ASTM E1268; AMS 2380, 4911; BAC 5636; NAS 4002, 4003, 4004; ASM Hbk Vol. 9 |
| Graphite in Cast Iron | ASTM A247 |
| Plating/Coating Thickness | ASTM B487, B748 |
| Case Depth | SAE J423 |
| Macroetching | ASTM A604/A604M, E340, E381; AMS 6400 |
| Corrosion Susceptibility | ASTM A262 (Practice A), A923 (Method A), A763 (Practice W) |
| Volume Percent | ASTM E562 |
| IGA, Eutectic Melting, HTO | AMS-H-6088 ¹ (Superseded by SAE AMS 2770-2772), 2772; BPS 4139; BHT LTI-1005; BAC 5602; STP54-101 |
| IGO/IGA | AMS-H-6875; ASTM F2111; BSS 7219 |
| Alpha Case | P3TF19; BATS 2751 |
| Dendrite Arm Spacing | ARP 1947 |
| End Grain Pitting | BSS 7219; ASTM F2111 |

Corrosion

| | |
|--|--|
| Exfoliation Corrosion | ASTM G34 |
| Pitting / Crevice Corrosion Resistance | ASTM G48 |
| Salt Spray | ASTM B117; NASM 1312-1; MIL-STD-1344; ISO 9227 |

Physical Properties / NDT

| | |
|---|---|
| Electrical Conductivity | ASTM E1004 |
| Surface Roughness | ASME B46.1 |
| Coating Weight | ASTM A90/A90M, A428, B137; MIL-A-8625 |
| Coating Adhesion (Bend test) | ASTM B571 |
| Liquid Penetrant Inspection (Water Washable Fluorescent) | ASTM E1417/E1417M; BPS 4089; SS8806; BAPS 172-02; BSS 7039 |
| Magnetic Particle Inspection (Bench Fluorescent) | ASTM E1444; BPS-4075; SS8805 |
| Visual Inspection | EN 970; AWS D1.1, 1.2; BATS 2333; ASME Section XI |
| Nital Etch Inspection | AMS 2649; NDTS 9111; MIL-STD-867; STP 53-701 |



Test

Test Method

Fastener Testing

Fastener Hardness
Stress Durability
Decarburization
Discontinuities

ASTM F606/F606M, F3125, A325, A490; NASM 1312-6
ASTM B839, F606; NASM 1312-5, -14
ASTM F2328; SAE J419, J121¹ (Superseded by F2328)
ASTM F788, F812; SAE J122; NAS 498, 4002, 4003,
4004, 4008

Rotational Capacity
Wedge and Axial Tensile
Axial Proof Load (Internal & External Threads)
Double Shear

ASTM A325, A490, F3125; DOT TEX 452A
ASTM F606/F606M, F3125, A325; NASM 1312-8
ASTM F606/F606M, F3125; SAE J995; NASM 1312-32
NASM 1312-13

Composites and Adhesives Testing

Lap Shear, Single (-150 to +350) °F
Flow, Film Adhesive
Drape, Film Adhesive
Weight, Film Adhesive
T-Peel Strength
Sandwich Beam Flexure (-150 to +350) °F
Climbing Drum Peel

MMM-A-132B; GM 4362A
SS8612; MMM-A-132B
SS8612; MMM-A-132B
SS8612; MMM-A-132B
MMM-A-132B
ASTM C393/C393M; C-M605; GM4309A
ASTM D1781

Other Testing

Failure Analysis
Lab Specimen Heat Treatment
SEM

ASM Handbook 11 (Using Other Test Methods on Scope)
AMS-H-6875; BPS 4017, 4140
OEM Manual

I. Dimensional Testing^{2,4}

| Parameter/Equipment | Range | CMC ³ (±) | Technique/Method |
|---------------------|---------------------|----------------------|---|
| Length – 1D | Up to 1 in | 0.0003 in | Micrometers/MIL-STD-120 (Withdrawn 1996) ¹ |
| 2D | Up to 6 in | 0.001 in | Digital calipers/MIL-STD-120 (Withdrawn 1996) ¹ |
| | X axis: Up to 11 in | 0.0002 in | Optical comparator/MIL-STD-120 (Withdrawn 1996) ¹ |
| | Y axis: Up to 5 in | 0.0002 in | Optical comparator/MIL-STD-120 (Withdrawn 1996) ¹ |
| Angle | Up to 360° | 0.03° | Optical comparator/MIL-STD-120 (Withdrawn 1996) ¹ |
| Radius | Up to 2.25 in | 0.0004 in | Optical comparator/MIL-STD-120 (Withdrawn 1996) ¹ |

¹ This 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.

² This laboratory offers commercial dimensional testing service only.

³ Calibration and Measurement Capability Uncertainty (CMC) is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine measurements of nearly ideal measurement standards or nearly ideal measuring equipment. CMC’s represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of $k = 2$. The actual measurement uncertainty of a specific measurement performed by the laboratory may be greater than the CMC due to the behavior of the customer’s device and to influences from the circumstances of the specific measurement.

⁴ This test is not equivalent to that of a calibration.



Accredited Laboratory

A2LA has accredited

AADFW, INC.

Euless, TX

for technical competence in the field of

Mechanical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets the requirements of R223 – Specific Requirements – GE Aviation S-400 Accreditation program. 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 8 January 2009*).



Presented this 21st day of January 2017.

A handwritten signature in black ink, written over a horizontal line.

President and CEO
For the Accreditation Council
Certificate Number 0603.01
Valid to January 31, 2019

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