



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

ELEMENT HUNTINGTON BEACH
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Huntington Beach, CA 92649
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MECHANICAL

Valid To: May 31, 2022

Certificate Number: 0093.02

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 types of metals tests:

<u>Test(s):</u>	<u>Test Method(s):</u>
<u>Additive Manufacturing Testing</u>	
Apparent Density	ASTM B212, ASTM B329
Flow Rate	ASTM B213
Gas Pycnometry	ASTM B923
Particle Size Distribution	ASTM B214
Tap Density	ASTM B527
<u>Mechanical Testing (Static)</u>	
Bend Test ¹	ASTM A615/A615M, ASTM E290
Charpy V-Notch Impact ¹	ASTM A370, ASTM E23; BS EN 10045-1; JIS B1051
Compression Strength ¹	ASTM E9
Electrical Conductivity	ASTM E1004; MIL-STD-1537
Elevated Temperature Tensile	ASTM E21
Izod Pendulum Impact Resistance	ASTM D256
Magnetic Permeability Using a Low- μ Permeability Indicator	ASTM A342/A342M; MIL-I-17214
Modulus (Young's, Tangent, Chord)	ASTM E111
Poisson's Ratio	ASTM E132
Pin-Type Bearing ¹	ASTM E238

Test(s):

Test Method(s):

Mechanical Testing (Static) (continued)

Shear Testing of Metals¹

ASTM B769, ASTM B831

Stress Rupture of Metals and Creep Rupture¹

ASTM E139, ASTM E292

Tension

ASTM A370, ASTM B557, ASTM E8

Total Extension at Fracture

ISO 6892

Yield Strength

ASTM A370; ISO 6892

Mechanical Testing (Dynamic)

Crack Propagation / Crack Growth¹

ASTM E647

Conducting Force-Controlled Constant-Amplitude Axial Fatigue Tests of Metallic Materials¹

ASTM E466; BS 3518-1, BS3518-3

Linear-Elastic Plane-Strain Fracture Toughness K_{1C} of Metallic Materials¹

ASTM E399

Residual Life Testing¹

GE C50TF57; GE C50TF12

Strain-Controlled Fatigue Testing¹

ASTM E606/E606M

Metallurgical Testing

Alpha Case

GE P3TF19; GE P3TF32; SOP 60.150²

Decarburization and Case Depth

ASTM B487; ASTM E1077; ASTM F835; ASTM F2328; ASTM G79; ISO 898-1; ISO 898-5; ISO 4507; SAE J78; SAE J121¹; SAE J419; SAE J423

Grain Size

ASTM E112; ASTM E930; ASTM E1181; ISO 643; GE E50TF133

Inclusion Content of Steel

ASTM E45, Parts A & D

Macroscopic Examination by Etching¹

AMS 2380; ASTM A604; ASTM E340; ASTM E381; SAE J123¹; SAE J1061¹

Microscopic Examination by Etching

AMS 2643; ASTM E407

Scanning Electron Microscope (SEM)

SOP 68.00²; SOP 68.10²

Hardness Testing

Brinell Hardness (500 Kg & 3000 Kg)

ASTM A370; ASTM E10

Jominy

ASTM A255

Microhardness (10-1000 HV, 10-1000 Knoop)

ASTM E384; MIL-STD-1312-6; NASM 1312-6



Test(s):

Hardness Testing (continued)

Rockwell (A, B, C, E, F, 15N, 30N, 45N, 15T, 30T, 45T)

Vickers (1 to 30) kg

Corrosion Testing

Alternate Immersion Stress Corrosion

Copper Sulfate

Exfoliation Corrosion

Humidity Testing

Intergranular Corrosion Susceptibility

Salt Spray (Fog)

Fastener Testing

Adhesion of Metallic Coatings on Fasteners

Axial Tensile Strength

Coating Thickness of Fasteners –
Microscopical Method

Cone Proof of Internally Threaded Fasteners

Double Shear

Drive

Elevated Temperature Tensile

Free Height/Compression/Flattening

High Cycle Fatigue (HCF)

Test Method(s):

ASTM A370; ASTM E18; ASTM E140;
ASTM F606/F606M; ISO 898-1; ISO 3738-1;
ISO 6508-1; MIL-STD-1312-6; NASM 1312-6;
SAE J1199

ASTM E92

ASTM G38; ASTM G44; ASTM G47; ASTM G49;
FED-STD-151 (Method 823); MIL-STD-1312-9;
NASM 1312-9

ASTM A380; MIL-STD-753 (Method 102)

ASTM G34

AMS-QQ-P-35; ASTM D2247; MIL-STD-753;
MIL-STD-810; MIL-STD-1312-3; NASM 1312-3

ASTM A262, Practices A and E

ASTM B117; ISO 9227; MIL-STD-810;
MIL-STD-1312-1; NASM 1312-1

AMS 2399; MIL-C-83488; ASTM B571;
SAE J207; AMS-QQ-P-416

ASTM A370; ASTM F606/F606M; ISO 898-1;
ISO 6892; JIS B1051; MIL-STD-1312-8;
NASM 1312-8; SAE J82; SAW J429; SAE J1054

ASTM B487; MIL-STD-1312-12; NASM 1312-12

ASTM A962/A962M; ASTM F606/F606M;
ASTM F812/F812M; IFI 533; SAE J122

ASME 18.8.2; ASTM B565; MIL-STD-1312-13;
NASM 1312-13

ASME B18.6.4 3; SAE J81, SAE J933

MIL-STD-1312-18; NAS3350; NASM 1312-18,
NASM 25027

FF-W-84, FF-W-100; ASME B18.21.1

MIL-STD-1312-11; NAM 1312-111;
NASM 1312-11

Test(s):**Test Method(s):****Fastener Testing (continued)**

Hydrogen Embrittlement (Stress Durability)

AMS-QQ-P-416; ASTM F519;
ASTM F606/F606M; SAE J81; MIL-STD-1312-5;
NASM 1312-5

Interlocking Test

FF-W-84

Permanent Set Test of Self-Locking Nuts

NASM 25027

Prevailing Torque

IFI-100/107

Proof Load of Full-Size Externally Threaded Fasteners

ASTM A370; ASTM F606/F606M; ISO 898-1;
JIS B1051; MIL-STD-1312-8; NASM 1312-8;
SAE J429, SAE J1216

Proof Load of Internally Threaded Fasteners

ASTM A370; ASTM F606/F606M; BPS-N-70;
ISO 898-2; ISO 898-6; JIS B1052; JIS B1056;
SAE J995; SAE J1216

Push-Out Test of Floating Plate Nuts, Gang Channel Nuts and Anchor Nuts

NASM 25027

Recess Strength Test in Both Installation and Removal Directions

MIL-STD-1312-25; NASM 1312-25

Reusability Test of Self-Locking Internally Threaded Fasteners

AS7250; AS7251; AS7252; AS7253; BPS-N70;
MIL-STD-1312-31; NAS3350; NASM 1312-31;
NASM 25027

Single Shear

ASTM F606/F606M; MIL-STD-1312-20;
NASM 1312-20

Stress Rupture of Fasteners

MIL-STD-1312-10; NASM 1312-10

Surface Discontinuities of Externally Threaded Fasteners

ASTM A490; ASTM F788/F788M; ISO 6157-1;
ISO 6157-3; SAE J123; SAE J1061

Surface Discontinuities of Internally Threaded Fasteners

ASTM F812/F812M; SAE J122

Tension Testing of Machined Specimen from Externally Threaded Fasteners & Metals

ASTM F606/F606M; ISO 898-1; JIS B1051;
MIL-STD-1312-8; NASM 1312-8; SAE J429

Torque

MIL-DTL-18240

Torque-Out Test

MIL-STD-1312-24, MIL-STD-1312-31;
NASM 1312-24; NASM 1312-31

Torsional Strength Test of Thread Rolling and Self Drilling Tapping Screws

ASME B18.6.4 3; SAE J78; SAE J81; SAE J933

Total Extension at Fracture of Externally Threaded Fasteners

ASTM F606/F606M; ISO 3506; JIS B1054



Test(s):

Test Method(s):

Fastener Testing (continued)

Twist Test of Lock Washers

ASME B18.21.1; FF-W-84

Wedge Tensile Strength of Full-Size Threaded Fasteners

ASTM A370, ASTM F606/F606M; ISO 898-1; ISO 6892; JIS B1051; MIL-STD-1312-8; MIL-STD-1312-18; NASM 1312-8; NASM 1312-18; SAE J82; SAE J429

Wrench Torque Test of Externally Wrenched Nuts of Spline, Hexagon and Double Hexagon Wrenching Configuration

MIL-STD-1312-31; NASM 1312-31; NASM 25027

Yield Strength of Full-Size Threaded Fasteners

ASTM F606/F606M; ISO 898-1; JIS B1051; JIS B1054; MIL-STD-1312-8; NASM 1312-8; SAE J429

Coating Testing

Abrasion Resistance

ASTM D4060

Coating Weight

ASTM A90/A90M; MIL-STD-1312-12; NASM 1312-12

X-ray Method

ASTM B568

Specimen Preparation

Heat Treat¹

SOP 63.00²

Low Stress Grinding and Polishing¹

GE P1TF79

Weld & Braze Testing, Procedure Qualification and Performance Qualification

Bend¹

API 1104; API 5L; API 650; ASTM A488; ASTM E190; AWS B2.1; AWS B4.0; AWS D1.1; AWS D1.2; AWS D1.3; AWS D1.5; AWS D1.6; AWS D1.9; AWS D14.1; AWS D15.1; AWS D17.1; AWS D18.1; ASME BPVC SEC IX; ASME B31.1; ASME B31.3; CGA C-3; ISO 5173; ISO 9606; ISO 15614; JIS-B-8625; NAVSEA S9074-AQ-GIB-010/248

Bend Break¹

AWS B2.1; AWS D1.1; AWS D1.6; AWS D4.0; AWS D17.1; CGA C-3

Fracture Toughness¹

API 1104; ASME BPVC SEC IX; ISO 9606; JIS-B-8625

Hardness

API 5L, API 5CT, API 650; ASME BPVC SEC IX; AWS D15.2; ISO 1514, ISO 9015, ISO 15156; JIS-B-8625; NAVSEA S9074-AQ-GIB-010/248



Test(s):

Test Method(s):

**Weld & Braze Testing, Procedure
Qualification and Performance Qualification**

Impact¹

API 1104; API 5L; API 5CT; API 650; API 620;
ASME BPVC SEC IX; ASME BPVC
SEC III-DIV 1; ASME BPVC SEC VIII-DIV 1;
ASME B31.1; ASME B31.3; ASTM A488;
AWS B4.0; AWS D1.1; AWS D1.5; AWS D14.1;
AWS D15.1; ISO 148-1; ISO 9016; ISO 15614;
JIS-B-8625; NAVSEA S9074-AQ-GIB-010/248

Nick Break¹

API 1104

Post-Weld Heat Treat¹

ASME BPVC SEC II-DIV 1; ASME BPVC SEC
VIII-DIV 1; ASME BPVC SEC IX; ASME B31.1;
ASME B31.3; AWS D1.1; AWS D1.5; JIS-B-8625

Tensile Shear/Lap Shear¹

ASTM B769; AWS B2.2; AWS B4.0; AWS D17.2;
NAVSEA S9074-AQ-GIB-010/248

Tension Test¹

AMS 2680; AMS 2694; API 1104; API 5L;
API 5CT; API 650; ASME BPVC SEC IX;
ASME B31.1; ASME B31.3; ASTM A488;
AWS B2.1; AWS B2.2; AWS B4.0; AWS D1.1;
AWS D1.2; AWS D1.4; AWS D1.5; AWS D1.6;
AWS D1.9; AWS D14.1; AWS D15.1;
AWS D17.1; AWS D18.1; CGA C-3; ISO 4136;
ISO 15614; JIS-B-8625;
NAVSEA S9074-AW-GIB-010/248

Weld Chem Ferrite Number

ASME BPVC SEC III-DIV 1; ASME BPVC
SEC VIII-DIV 1; AWS D1.6

Weld Macro¹

API 1104; API 5L; API 650; ASME BPVC SEC IX;
ASTM A488; ASTM E190; AWS B2.1; AWS B4.0;
AWS D1.1; AWS D1.2; AWS D1.3; AWS D1.5;
AWS D1.6; AWS D1.9; AWS D14.1; AWS D15.1;
AWS D15.2; AWS D17.1; AWS D18.1; GCA C-3;
ISO 15614; ISO 17639; JIS-B-8625;
NAVSEA S9074-AW-GIB-010/248

Weld Peel

AWS D17.2

Welded Pipe/Vessel Flattening Test

API 5L, API 5CT; CGA C-3

Non-Destructive Testing

Magnetic Particle Inspection
(Wet Fluorescent)

ASTM E1444; MIL-STD-1949, MIL-STD-271;
NAVSEA T9074-AS-GIB-010/271

Penetrant (Water Washable Fluorescent)

ASTM E1417; MIL-STD-271, MIL-STD-6866;
NAVSEA T9074-AS-GIB-010/271



Test(s):

Non-Destructive Testing (continued)

Weld Visual

Test Method(s):

AMS 2680; ASME BPVC SEC IX; ASME BPVC SEC III-DIV 1; ASME BPVC SEC VIII-DIV 1; ASME BPVC SEC V; ASME B31.1; ASME B31.3; ISO 15614; ISO 9606; NAVSEA S9074-AQ-GIB-010/248; JIS-B-8625; AWWA D 100; API 1104; API 650; API 620; AWS D17.1; AWS D17.2; AWS B2.1; AWS D1.1; AWS D1.2; AWS D1.4; AWS D1.5; AWS D1.6; AWS D1.9; AWS D14.1; AWS D14.3; AWS D15.1; AWS D18.1

¹ Specimens machined or heat treated at the following address: 15678 Graham Street Huntington Beach, CA 92649

² Laboratory developed method

³ 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.





Accredited Laboratory

A2LA has accredited

ELEMENT HUNTINGTON BEACH

Huntington Beach, CA

for technical competence in the field of

Mechanical 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 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 April 2017*).



Presented this 23rd day of September 2020.

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

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 93.02
Valid to May 31, 2022

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