SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

ENGEL METALLURGICAL LTD.
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MECHANICAL

Valid To: June 30, 2025 Certificate Number: 2065.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following tests on metals and alloys (ferrous and non-ferrous), castings, forgings, coatings, plastics, polymers, and rubber for the purpose of providing materials testing, failure analysis, and product evaluations:

Test:	Test Method(s):
Bend Test	ASME Sec. IX (QW-160); ASTM A370, E190, E290; AWS D1.1/D1.1M (Sec. 6.10.3), D1.2/D1.2M (Sec. 3.8, 3.10); CSA W47.1 (Sec. 9.10.2, 11.6.3)
Hardness	
Brinell (10/3000, 10/1500, 10/500, 5/750, 2.5/62.5, 1/30)	ASTM A370, E10
Vickers (up to 50 kg)	ASTM E92, E384
Microindentation (Knoop, Vickers) (up to 1000 g)	ASTM E92, E384
Rockwell (A, B, C)	ASTM A370, E18, F606/F606M
Superficial Rockwell (15N, 30N, 15T, 30T)	ASTM A370, E18, F606/F606M
Metallographic Evaluation	
Preparation	ASTM E3
Case Depth	SAE J423
Coating Thickness (Microscope)	ASTM B487, B748, C664
Depth of Decarburization	ASTM E1077, F2328, F2328M; SAE J121 (Cancelled 2013)[1], J121M (Cancelled 2013)[1], J419
Grain Size (Comparison, Intercept)	ASTM E112, E930, E1181
Intergranular Attack	ASTM A262 (Practice A)
Macroetch	ASTM E340; ASME Sec. IX (Sec. QW-183, QW-184); AWS D1.1/D1.1M (Sec. 46.10.4, 6.23.2); CSA W47.1 (Sec. 9.10.3, 11.6.4); MIL-STD-248D (Cancelled 1997)[1] (Sec. 4.5.2.6, 5.4.2.3)
Microetch	ASTM E407

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Test:	Test Method(s):
Metallographic Evaluation *(cont'd)*	
Microstructure	ASTM A247; EM-S-05.04.21; Metals Handbook 9th Ed. Vol. 9, ASM Handbook 9
Photomicrography	ASTM E883
SEM – EDS	ASTM E1508; EM-S-05.04.16
Tensile (120,000 lbs Maximum)	ASME Sec. IX (QW-150); ASTM A370, B557, E8/E8M, F606/F606M (Sec. 3.6), A536; AWS D1.1/D1.1M (Sec. 6.10.3), D1.2/D1.2M (Sec. 3.7); CSA W47.1 (Sec. 11.7)
Visual Examination	ASME Sec. IX (Sec. QW-194); ASM Handbook 11, 12 (Pages 91-165); AWS D1.1/D1.1M (Sec. 6.10.1, 6.17, 6.23, 6.24), AWS D1.2/D1.2M (Sec. 3.6); CSA W47.1 (Sec. 11.6.1, 11.9.5)
Weld Evaluation	ASME (Sec. IX); AWS D1.1/D1.1M, D1.2/D1.2M; MIL-STD-248D (Cancelled 1997)[1]; CSA W47.1
Failure Analysis (Using Methods Listed Above)	ASM Handbook 11; ASTM E620, E678, E860, E1188, E1492, E2332 (Withdrawn 2004)[1]; EM-S-05-04.18

Dimensional Testing[2]:

Parameter	Range	CMC[3] (±)	Technique / Method
Linear (1D)	Up to 6 in (6 to 12) in	0.0003 in 0.0010 in	Micrometers / EM-S-05-04-19
	Up to 6 in Up to 12 in	0.001 in 0.002 in	Digital calipers / EM-S-05-04-19
	Up to 8 in	0.002 in	Height gage / EM-S-05-04-19

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

[3] Calibration and Measurement Capability (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. Calibration and Measurement Capabilities 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.

Accredited Laboratory

A2LA has accredited

ENGEL METALLURGICAL LTD.

Sauk Rapids, MN

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 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 11th day of May 2023.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2065.01
Valid to June 30, 2025

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