



CERTIFICATE OF ACCREDITATION

ANSI-ASQ National Accreditation Board

500 Montgomery Street, Suite 625, Alexandria, VA 22314, 877-344-3044

This is to certify that

Link Engineering Company
401 Southfield Road
Dearborn, MI 48120

has been assessed by ANAB
and meets the requirements of international standard

ISO/IEC 17025:2005

while demonstrating technical competence in the field of

TESTING & CALIBRATION

Refer to the accompanying Scope of Accreditation for information regarding the types of calibrations to which this accreditation applies.

ACT-1997
Certificate Number


ANAB Approval

Certificate Valid: 09/22/2016-10/21/2017
Version No. 004 Issued: 09/22/2016



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. 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 January 2009).



ANSI-ASQ National Accreditation Board

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

Link Engineering Company

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TESTING and CALIBRATION

Valid to: October 21, 2017

Certificate Number: ACT-1997

I. Mechanical Testing

Items, Materials or Products Tested	Specific Tests or Properties Measured	Specification, Standard Method or Technique Used	Key Equipment or Technology
Friction Materials and Components for Hydraulic Brakes	Friction Effectiveness/ Performance/Wear	SAE J2522, SAE J2784, SAE J2684, ISO 26867, JASO C406, JASO C407, ATPD-5324-A, ECE R90-02, SAE 2690, ECE R13, ECE R13H, ISO 11157	Performance Dynamometer
Friction Materials and Components for Hydraulic Brakes	Noise	SAE J2521, SAE J2636, SAE J294, ATPD-5324-A, USCT, AK Noise	NVH Dynamometer
Friction Materials and Components for Hydraulic Brakes	Wear	JASO C427, SAE J2707, SAE J3006, ATPD-5324-A, USCT	Performance Dynamometer
Friction Materials and Components for Hydraulic Brakes	Structural Performance	JASO C441, JASO C448, SAE J1713, SAE J2928, ECE R90-2, SAE J1404, ATPD-5324-A	Performance Dynamometer
Friction Materials and Components for Air Brakes	Friction Effectiveness/ Performance/Wear/ Structural	RP 628, TP-121D, SAE J2115, JASO C407, ISO 26865, ISO 26866, ATPD-5324-A	Commercial Vehicle Dynamometer
Hydraulic Brake Systems	Performance	JIS D 2603, SAE 1603	Hydraulic Brake Bench Test
Hub-Bearing Assemblies and Wheels	Impact	SAE J175, SAE J2530, SAE J3010, ISO 7141	Drop Tester



Items, Materials or Products Tested	Specific Tests or Properties Measured	Specification, Standard Method or Technique Used	Key Equipment or Technology
Hub-Bearing Assemblies and Wheels	Cornering Fatigue	SAE J328, SAE J1095, SAE J2530, ISO 3006, ISO 3894	Cornering Fatigue Test
Hub-Bearing Assemblies and Wheels	Radial Fatigue	SAE J328, SAE J2530, SAE J3010, ISO3006, ISO 3894	Radial Fatigue Test
Hub-Bearing Assemblies and Wheels	Biaxial Fatigue	SAE J2562	Biaxial Test
Master Cylinder Assemblies	Performance and Durability	SAE J1153	Caliper Bench/ Dynamometer
Hydraulic Wheel Cylinders for Automotive Drum Brakes	Performance	SAE J101	Caliper Bench/ Dynamometer
Wheel Nut Seat System	Performance	SAE J2316	Mechanical Test
Friction and Composite Materials	Friction Material	SAE J661, VESC-V3, NTC 5388	Chase Test System
Friction and Composite Materials	Compressibility	SAE J2468, ISO 6310, JIS D4413, ABNT NBR 9301, ECE R90-02, GMW 15334, NTC 2406, NTC 5390 SAE J3907-2	Compressibility, Oven Test System
Friction and Composite Materials	Swell and Growth	SAE J160, ABNT NBR 5505, ISO 6310	Compressibility, Oven Test System
Friction and Composite Materials	Internal Shear, Shear Strength	ISO 6311, ISO 6312, ABNT NBR 5537, NTC 5292, SAE J840, ECE R90-02, NTC 2405	Shear Test Stand
Friction and Composite Materials	Specify Gravity/ Density/ Porosity	SAE J380, ISO 15484	Balance
Friction and Composite Materials	Hardness	ISO 2039	Rockwell Tester

Items, Materials or Products Tested	Specific Tests or Properties Measured	Specification, Standard Method or Technique Used	Key Equipment or Technology
Friction Materials/ Brake Hardware/ Full Vehicle	Full Brake System	ECE-R13, ECE-R13H, ECE-R78-1, ECE R90-02, FMVSS 105, FMVSS 122, FMVSS 135	Vehicle, In-Vehicle Data Acquisition System, Proving Grounds Field Testing
Friction Materials/ Brake Hardware/ Full Vehicle	Performance	Thermal Capacity, High Speed Fade, AMS Fade Test, Vacuum Boosted, Trailer Tow, Death Valley, Link Brake Balance, N.C.A.P., Customer Specification	Vehicle, In-Vehicle Data Acquisition System, Proving Grounds Field Testing
Friction Materials/ Brake Hardware/ Full Vehicle	Durability	Detroit City Traffic, Phoenix City Traffic, Detroit Suburban Traffic, Phoenix Suburban Traffic, Huron Detroit Metropolitan Traffic, Customer Specification	Vehicle, In-Vehicle Data Acquisition System, Proving Grounds Field Testing
Friction Materials/ Brake Hardware/ Full Vehicle	Brake Wear	Los Angeles City Traffic, Detroit City Traffic, Phoenix City Traffic, Detroit Suburban Traffic, Phoenix Suburban Traffic, Huron Detroit Metropolitan Traffic, Customer Specification	Vehicle, In-Vehicle Data Acquisition System, Proving Grounds Field Testing
Friction Materials/ Brake Hardware/ Full Vehicle	Noise	Los Angeles City Traffic, Marquette City Traffic, Customer Specification	Vehicle, In-Vehicle Data Acquisition System, Proving Grounds Field Testing
Friction Materials/ Brake Hardware/ Full Vehicle	Thermal Failure	Fluid Boil, Death Valley	Vehicle, In-Vehicle Data Acquisition System, Proving Grounds Field Testing
Friction Materials/ Brake Hardware/ Full Vehicle	Customer Specification	Stopping Distance, Brake Line Pressure, Pedal Force, Pedal Travel, Deceleration, Brake Pad Temperature, Rotor Temperature	Vehicle, In-Vehicle Data Acquisition System, Proving Grounds Field Testing

Items, Materials or Products Tested	Specific Tests or Properties Measured	Specification, Standard Method or Technique Used	Key Equipment or Technology Used
Full Vehicle	Fuel Economy, Coast-down, Fuel Consumption	SAE J1321, SAE J2263	Vehicle, In-Vehicle Data Acquisition System, Proving Grounds Field Testing
Full Vehicle	NVH Vehicle Testing, Interior/Exterior Noise Studies, Pass by Noise	SAE J986	Vehicle, In-Vehicle Data Acquisition System, Proving Grounds Field Testing
Full Vehicle	Thermal HVAC, Cooling Systems, Cold Chamber, Performance, Durability	Customer Specification	Vehicle, In-Vehicle Data Acquisition System, Proving Grounds Field Testing
Full Vehicle	Wheel and Tire, Tire Blow-out, Structural Integrity	FMVSS 110	Vehicle, In-Vehicle Data Acquisition System, Proving Grounds Field Testing
Full Vehicle	Stability Control System	FMVSS 126	Vehicle, In-Vehicle Data Acquisition System, Proving Grounds Field Testing

II. Chemical Testing

Items, Materials or Products Tested	Specific Tests or Properties Measured	Specification, Standard Method or Technique Used	Key Equipment or Technology Used
Friction and Raw Materials	Composition	SAE J2975:2011, SAE J2975:2013, SAE J2975:2015, EPA 3051A, 6010C, 3060A,7196A, EPA/600/R-93/116	ICP-AES, Microwave, PLM Microscope, UV-Vis Spectrometer

III. Mechanical Calibration

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty(\pm)]	Reference Standard or Equipment	Methods
Pressure Sensors	(345 to 27 407) kPa	$(0.15 + 0.0006P)$ kPa	Ashcroft Deadweight Test Bench	C-5.5-L3-079
Force Sensors	(89 to 2 224) N	$(1.93 + 0.0013N)$ N	Interface Gold Standard 1610AJH Calibration Load Cell	C-5.5-L3-080

IV. Dimensional Calibration

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty(\pm)]	Reference Standard or Equipment	Methods
Non-Contact Displacement Probes	(0.125 to 25.4) mm	0.002 mm	1338 Boeckeler Micrometer	C-5.5-L3-082
Distance Sensors	(0.254 to 508) mm	$(0.06 + 0.0033L)$ mm	Mitutoyo Digital Height Gage	C-5.5-L3-006
Decelerometers	(-1 to 1) g	$(0.0008 + 0.0031A)$ g	Digital Protractor Angle Gage	C-5.5-L3-083

Notes:

1. Calibration and Measurement Capabilities (CMC) (Expanded Uncertainties) are based on approximately a 95% confidence interval, using a coverage of $k=2$.
2. This laboratory's capabilities include in-laboratory and on-site calibrations performed at customer-designated locations. Since on-site conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected on-site than what is reported on the accredited scope.
3. Parameters identified with an asterisk (*) are available for on-site testing or calibration.
4. The term P represents Pressure in units appropriate to the uncertainty statement.
5. The term F represents Force in units appropriate to the uncertainty statement.
6. The term L represents Length in units appropriate to the uncertainty statement.
7. The term A represents Acceleration\Deceleration in units appropriate to the uncertainty statement.
8. This scope is part of and must be included with the Certificate of Accreditation No. ACT-1997



 Vice President