



October 17, 2017

**VIA EMAIL**

Link Engineering Company  
Jim Vilella  
401 Southfield Road  
Dearborn, MI 48120

**Re: Extension for ISO/IEC 17025: 2005 accreditation Certificates #ACT-1997, ACT-1997.01, ACT-1997.02 & AT-1997.03**

Dear Jim:

This letter is to inform you that your accreditation for ISO/IEC 17025: 2005 will expire on 10/21/2017. We have granted you an extension of 45 days from the expiration date on your certificate and scope of accreditation. If you have any questions or concerns regarding this matter, please feel free to give me a call at 414-501-5344.

Regards,

Dominique Hausch  
Senior Client Coordinator  
ANSI-ASQ National Accreditation Board  
Direct line: (414) 501-5346 Main office line: (414) 501-5494  
dhausch@anab.org

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# 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

401 Southfield Road Dearborn, MI 48120  
 Phone: 313-625-4000 [www.linkeng.com](http://www.linkeng.com)  
 Ann Helms [a.helms@linkeng.com](mailto:a.helms@linkeng.com)

### 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                    |



| <b>Items, Materials or Products Tested</b>           | <b>Specific Tests or Properties Measured</b> | <b>Specification, Standard Method or Technique Used</b>  | <b>Key Equipment or Technology</b> |
|--|--|--|------------------------------------|
| 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                    |

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

| <b>Items, Materials or Products Tested</b> | <b>Specific Tests or Properties Measured</b>                         | <b>Specification, Standard Method or Technique Used</b> | <b>Key Equipment or Technology Used</b>                                    |
|--|--|---|--|
| 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

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

### III. Mechanical Calibration

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

### IV. Dimensional Calibration

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

  
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 Vice President