



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

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MECHANICAL

Valid To: March 31, 2018

Certificate Number: 0255.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory as well as the 2 satellite laboratory locations listed below to perform the following tests on rubber, plastics, textiles, latex, condoms, adhesives, sealers and adhesive tapes:

CONDITIONING

| <u>Test Method</u> | <u>Test</u> |
|---|---|
| ASTM D618 | Conditioning of Plastics for Testing |
| ASTM D832 | Rubber Conditioning for Low Temperature Testing |
| UL2703 (Sections 18.3-18.6 & Figure 8.1) | Conditioning Polymeric Materials for Testing |

ABRASION

| <u>Test Method</u> | <u>Test</u> |
|---|---|
| ASTM C1353 | Abrasion Resistance of Dimension Stone Subjected to Foot Traffic Using a Rotary Platform Abraser |
| ASTM D1630 | Rubber Property – Abrasion Resistance (Footwear Abrader) |
| ASTM D2228 | Rubber Property – Relative Abrasion Resistance by Pico Abrader Method |
| ASTM D3389 | Coated Fabrics Abrasion Resistance (Rotary Platform Abrader) |
| ASTM D4060 | Abrasion Resistance Organic Coatings by the Taber Abraser |
| ASTM D5963 | Rubber Properties – Abrasion Resistance (Rotary Drum Abrader) |
| DIN 53 5162 ² (Withdrawn 2014) | Determination of Abrasion Resistance |
| DIN ISO 4649 | Rubber, Vulcanized or Thermoplastic – Determination of Abrasion Resistance using a Rotating Cylindrical Drum Device |
| Ford FLTM BN 107-01 | Crocking Test – Interior Trim Materials |
| GM9033P-86 ² (Withdrawn 2013) | Test for Determining Color fastness to Crocking (Rubbing) |
| GMW 3274 | Pile Distortion (Crockmeter Method) |
| ISO 20433 | Colour Fastness to Crocking: Textiles and Leather |

| <u>Test Method</u> | <u>Test</u> |
|-----------------------------|---|
| <i>Abrasion (continued)</i> | |
| SAE J861 | Method of Testing Resistance to Crocking of Organic Trim Materials |
| ASTM D3884 | Standard Guide for Abrasion Resistance of Textile Fabrics (Rotary Platform, Double-Head Method) |
| ASTM D4157 | Standard Test Method for Abrasion Resistance of Textile Fabrics (Oscillatory Cylinder Method) |
| ASTM D4966 | Standard Test Method for Abrasion Resistance of Textile Fabrics (Martindale Abrasion Tester Method) |
| Chrysler LP-463PB-54-01 | Crock Mar Resistance |
| DIN EN ISO 105-X12 | Determining Abrasion Resistance of Color Textiles |

ELECTRICAL

| <u>Test Method</u> | <u>Test</u> |
|--------------------|---|
| ASTM D150 | AC Loss Characteristics and Permittivity (Dielectric Constant of Solid Electrical Insulation) |
| ASTM D257 | DC Resistance or Conductance of Insulating Materials |
| ASTM D991 | Volume Resistivity of Electrically Conductive and Antistatic Products |

EXPOSURE TESTING

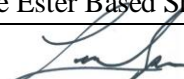
| <u>Test Method</u> | <u>Test</u> |
|--|---|
| <i>Accelerated Aging and Heat Resistance</i> | |
| ASTM D454 | Rubber Deterioration by Heat and Air Pressure |
| ASTM D572 | Rubber – Deterioration by Heat and Oxygen |
| ASTM D573 | Rubber – Deterioration in an Air Oven |
| ASTM D794 ² (Withdrawn 1998) | Determining Permanent Effect of Heat on Plastics |
| ASTM D865 | Rubber – Deterioration by Heating in Air (Test Tube Enclosure) |
| ASTM D1055 (15-16) | Accelerated Aging Tests |
| ASTM D1667 (16-20) | Compression Deflection Test Method |
| ASTM D1667 (21-25) | Compression Set Under Constant Deflection |
| ASTM D3045 | Heat Aging of Plastics Without Load |
| ASTM D3574 (Test J) | Flexible Cellular Materials – Slab, Bonded, and Molded Urethane Foams – Steam Autoclave Aging |
| ASTM D3574 (Test K) | Flexible Cellular Materials – Slab, Bonded, and Molded Urethane Foams – Dry Heat Aging |
| DIN 53 508 | Accelerated Ageing of Rubber |
| ISO 188 | Rubber, vulcanized or thermoplastic – Accelerated Ageing and Heat Resistance Tests |
| JIS K6257 | Rubber, Vulcanized or Thermoplastic – Determination of Heat Ageing Properties |
| SAE J2236 | Determining Continuous Upper Temperature Resistance of Elastomers |

LOW TEMPERATURE

| <u>Test Method</u> | <u>Test</u> |
|--------------------|--|
| ASTM C765 | Low Temperature Flexibility of Preformed Tape Sealants |
| ASTM D746 | Brittleness Temperature of Plastics and Elastomer by Impact |
| ASTM D1329 | Evaluating Rubber Property – Retraction at Lower Temperatures (TR Test) |
| ASTM D2137 | Rubber Property – Brittleness Point of Flexible Polymers and Coated Fabrics |
| ISO 812 | Rubber, Vulcanized or Thermoplastic – Determination of Low – Temperature Brittleness |
| JIS K6261 | Rubber, Vulcanized or Thermoplastic – Determination of Low Temperature Properties |

ULTRAVIOLET FLUORESCENT LAMPS/XENON

| <u>Test Method</u> | <u>Test</u> |
|-------------------------------|--|
| AATCC 186 | Weather Resistance: UV Light and Moisture Exposure |
| ASTM C793 (Except Carbon-Arc) | Effects of Laboratory Accelerated Weathering on Elastomeric Joint Sealants |
| ASTM C1257 | Accelerated Weathering of Solvent-Release-Type Sealants |
| ASTM D750 (Except Caron-Arc) | Rubber Deterioration Using Artificial Weathering Apparatus |
| ASTM D904 (Method A) | Rubber Deterioration Using Artificial Weathering Apparatus |
| ASTM D1148 | Rubber Deterioration-Discoloration from Ultraviolet (UV) or UV/Visible Radiation and Heat Exposure of Light-Colored Surfaces and Xenon-Arc Apparatus |
| ASTM D1670/D1670M | Failure End Point in Accelerated and Outdoor Weathering of Bituminous Materials |
| ASTM D2565 | Xenon-Arc Exposure of Plastics Intended for Outdoor Applications |
| ASTM D3424 (Except Method 2) | Evaluating the Relative Lightfastness and Weatherability of Printed Matter |
| ASTM D4329 | Fluorescent Ultraviolet (UV) Lamp Apparatus Exposure of Plastics |
| ASTM D4587 | Fluorescent UV-Condensation Exposures of Paint and Related Coatings |
| ASTM D4674 (Method IV) | Accelerated Testing for Color Stability of Plastics Exposed to Indoor Office Environments |
| ASTM D4799 | Accelerated Weathering Test Conditions and Procedures for Bituminous Materials (Fluorescent UV, Water Spray, and Condensation Method) |
| ASTM D5208 | Fluorescent Ultraviolet (UV) Exposure of Photodegradable Plastics |
| ASTM D5215 | Instrumental Evaluation of Staining of Vinyl Flooring by Adhesives |
| ASTM D6662 (Section 6.3) | Polyolefin-Based Plastic Lumber Decking Boards |
| ASTM D6754 (Section 8.15) | Ketone Ethylene Ester Based Sheet Roofing |



| <u>Test Method</u> | <u>Test</u> |
|---|--|
| <i>Ultraviolet Fluorescent Lamps/Xenon (continued)</i> | |
| ASTM G151 | Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources |
| ASTM G153 | Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials |
| ASTM G154 | Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials |
| Fiat 50471-2000 | Alternating Ultraviolet Radiation/humidity Resistance Test |
| Ford WSB-M3G-102-B/ B2-2007 ² , 3.11 (Withdrawn) | Staining: Low Density Polyvinyl Chloride Foam Pressure Sensitive, Supersoft/Tape, Low Density Polyvinyl Chloride/Nitrile Foam Pressure Sensitive, Ultra Soft |
| GM9125P ² (Withdrawn 2013) | Procedures for Laboratory Accelerated Exposure of Automotive Materials |
| ISO 4892-3 | Methods of Exposure to Laboratory Light Sources – Fluorescent UV Lamps |
| JIS K 7350-3 | Methods of Exposure to Laboratory Light Sources – Part 3: Fluorescent UV Lamps |
| MIL-DTL-85052B (Section 4.4.4.3.1) | General Specification for Clamp, Loop, Cushion: Ultraviolet Exposure |
| Navistar MPAPS GT-31 (Methods A-F) | Accelerated Weathering of Non-Metallic Materials |
| Polaris ENG-TST-10-026, Section 4.5 (2011) | UV Test Procedure |
| SAE J2020 | Accelerated Exposure of Automotive Exterior Materials Using a Fluorescent UV and Condensation Apparatus |
| AATCC 16 (Options 3, 4, & 5) | Colorfastness to Light |
| AATCC 169 (Cycle 1-4) | Weather Resistance of Textiles – Xenon Arc Exposure |
| ASTM C1442 | Conducting Tests on Sealants Using Artificial Weathering Tests |
| ASTM D4459 | Xenon-Arc Exposure of Plastics Intended for Indoor Applications |
| ASTM D4637/D4637M (Sections 8.19 & 8.20) | Weather Resistance of EPDM Sheet Used in Single-Ply Roof Membrane |
| ASTM D4798/D4798M | Accelerated Weathering Test Conditions and Procedures for Bituminous Materials (Xenon-Arc Method) |
| ASTM D5071 | Exposure of Photodegradable Plastics in a Xenon Arc Apparatus |
| ASTM D6695 | Xenon-Arc Exposure of Paint and Related Coatings |
| ASTM D6754/D6754M | Standard Specification for Ketone Ethylene Ester Based Sheet Roofing |
| ASTM D6878/D6878M (Section 7.13) | Weather Resistance of Thermoplastic Polyolefin Based Roofing |
| ASTM D7869 | Xenon Arc Exposure Test with Enhanced Light and Water Exposure for Transportation Coatings |
| ASTM F1515 (Water Cooled Xenon Only) | Measuring Light Stability of Resilient Flooring by Color Change |
| ASTM G26-96 ² (Withdrawn 2000) | Operating Light-Exposure Apparatus (Xenon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials |

| <u>Test Method</u> | <u>Test</u> |
|---|--|
| <i>Ultraviolet Fluorescent Lamps/Xenon (continued)</i> | |
| ASMT G147 | Conditioning and Handling of Nonmetallic Materials for Natural and Artificial Weathering Tests |
| ASTM G155 | Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials |
| Boeing BMS1-57L-2011 (Section 8.10) | Weather Resistance – Silicon Rubber, Extreme Low Temperature Resistant |
| Fiat 50451-2009 (Method A) | Accelerated Aging by Atmospheric Agents |
| Ford FLTM BO 116-01 | Resistance to Interior Weathering |
| ESB-M9P4-A-1978 ² (Withdrawn) | Rubber Parts – Migration Staining Against Paint |
| GM9902P | Noncontact Staining Measurement of Elastomers (Xenon-Arc) |
| GME 60292 | Determination of Colour Fastness and Resistance to Artificial Light |
| GMW 3414 | Artificial Weathering of Automotive Interior Trim Materials |
| GMW 14162 (Methods A, B or D) | Colorfastness to Artificial Weathering |
| GMW 14650, 4.11 | Compatibility |
| GMW 14743, Table 1 | Elastomer for Wiper Blades – Paint Staining |
| Honda HES D2500-10 (Sections 3.12.1b & 3.12.2) | Light Resistance/Weather Resistance – Resin Materials for Vehicles |
| Honda HES D6601-99 | Accelerated Test Method for Light Resistance with Xenon-Arc Lamp |
| Hyundia/Kia MS 210-05 (2006) (Section 4.5) | Fading Resistance Test – Molded Plastic Parts (Interior Use) |
| ISO 105-B02 | Colour Fastness to Artificial light: Xenon Arc Fading Lamp Test |
| ISO 105-B06 (Conditions 3, 4, 5 or 6) | Colour Fastness and ageing to Artificial Light at High Temperatures: Xenon Arc Fading Lamp Test |
| ISO 3865 | Rubber, Vulcanized or Thermoplastic – Methods of Test for Staining in Contact with Organic Material |
| ISO 4892-1 | Methods of Exposure to Laboratory Light Sources – General Guidance |
| ISO 4892-2 | Methods of Exposure to Laboratory Light Sources – Xenon-Arc Lamps |
| ISO 11341-2004 ² (Withdrawn) | Paints and Varnishes – Artificial Weathering and Exposure to Artificial Radiation – Exposure to Filtered Xenon-Arc Radiation |
| ISO 16474-2 | Paints and Varnishes – Methods of Exposure to Laboratory Light Sources – Xenon-arc Lamps |
| ISO 30013 | Rubber and Plastics Hoses – Methods of Exposure to Laboratory Light Sources – Determination of Changes in Colour, Appearance and Other Physical Properties |
| JASO M 305 (Section 5.14) | Weatherstrips for Automobiles – Weatherability Test |
| JASO M 346 | Light-Exposure Test Method by Xenon-Arc Lamp for Automotive Interior Part |
| JASO M351 | Automotive Parts – Accelerated Weathering Testing Method by Xenon-Arc Lamp for Exterior Parts |
| JIS B 7754 | Light-Exposure and Light-and-Water-Exposure Apparatus (Xenon-arc Lamp Type) |

| <u>Test Method</u> | <u>Test</u> |
|---|--|
| <i>Ultraviolet Fluorescent Lamps/Xenon (continued)</i> | |
| JIS D 0205 (Paragraph 2.2.2 & Table 1) | Test Method of Weatherability for Automotive Parts |
| MIL-STD-810G Method 506 (Procedure 11 Only) | Determining the Effects of Solar Radiation on Material |
| Nissan NES M0135 (Except 1-II-1B and 1-II-3 Using Air Cooled Xenon Lamps) | Weatherability and Light Resistance Test Methods for Synthetic Resin Parts |
| PSA Peugeot – Citroen D27-1329-07 | Paint Coatings Rubbers and Plastics Artificial Weathering by Weatherometer |
| Renault D27 1911 D-07 | Rubbers and Plastic, Paint Coatings Artificial Ageing Using a Weatherometer |
| SAE J1885 ² (Withdrawn 2008) | Accelerated Exposure of Automotive Interior Trim Components Using a Controlled Irradiance Water Cooled Xenon-Arc Apparatus |
| SAE J1960 ² (Withdrawn 2008) | Accelerated Exposure of Automotive Exterior Materials Using a Controlled Irradiance Water Cooled Xenon-Arc Apparatus |
| SAE J2027 (Section 5.2.8) | Standard for Protective Covers for Gasoline Fuel Line Tubing, Chemical Resistance (Xenon-Arc) |
| SAE J2412 | Accelerated Exposure of Automotive Interior Trim Components Using a Controlled Irradiance Xenon-Arc Apparatus |
| SAE J2527 | Performance Based Standard for Accelerated Exposure of Automotive Exterior Materials Using a Controlled Irradiance Xenon-Arc Apparatus |
| Suzuki SES N3292-00 Methods WAL-2 & WAN-2 | Test Methods of Weatherability and Light Resistance for Plastic Parts |
| Toyota TSH1585G-10 (Except Test Types IV & V) | Xenon-Arc Lamp Type Methods for Accelerated Weathering Resistance of Paint Film |
| TSL0601G-11 (Methods B & E) | Criteria for Test for Quality of Color Change by Aging |
| TSM0501G-03 (Section 9.20 with Atlas Ci65 or Equivalent) | Accelerated Weather (Light) Resistance Test |
| UL758-07 (Section 17) | Physical Properties of Insulation and Jacket, Sunlight Resistance |
| UL 1581 (Section 1200) | Sunlight Resistance |
| UL 2556-07 (Section 4.2.8.5) | Weather (Sunlight) Resistance |
| VW PV 1303-01 | Exposure Test of Passenger Compartment Components |
| VW PV 3929-08 | Non-Metallic Materials: Weathering in Dry, Hot Climate |
| VW PV 3939-08 | Non-Metallic Materials: Weathering in Moist, Hot Climate |
| Yamaha YGK-8-501 (2008) | Painting – Accelerated Weatherability |
| Yamaha YGK-8-706 (2012) | Xenon Arc Lamp Weathering Test |

ADHESION

| <u>Test Method</u> | <u>Test</u> |
|--------------------|--|
| AFG-01 | Adhesive for Field-Gluing Plywood to Wood Framing |
| ASTM D903 | Peel or Stripping Strength of Adhesive Bonds |
| ASTM D2229 | Standard Test Method for Adhesion Between Steel Tire Cords and Rubber |
| ASTM D3359 | Measuring Adhesion by Tape Test |
| ASTM D3498 | Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems |

CHEMICAL RESISTANCE

| <u>Test Method</u> | <u>Test</u> |
|--|---|
| ASTM D471 | Rubber Property – Effect of Liquids |
| ASTM D543 | Evaluating the Resistance of Plastics to Chemical Reagents |
| ASTM D6284 | Rubber Property – Effect of Aqueous Solutions with Available Chlorine and Chloramine |
| DIN 53 521 ² (Withdrawn 1999) | Determination of the Behavior of Rubber and Elastomers when Exposed to Fluids And Vapours |
| JIS K6258 | Rubber, Vulcanized or Thermoplastic – Determination of the Effect of Liquids |
| ISO 1817 | Rubber, Vulcanized or Thermoplastic – Determination of the Effect of Liquids |
| ASTM F146 | Fluid Resistance of Gasket Material |

COLOR

| <u>Test Method</u> | <u>Test</u> |
|--|--|
| AATCC EP-1 | Greg Scale for Color Change |
| ASTM D1003 | Haze and Luminous Transmittance of Transparent Plastics |
| ASTM D1925-77 ² (Withdrawn 1995) | Yellowness Index of Plastics |
| ASTM D2244 | Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates |
| ASTM E313 | Calculating Yellowness and Whiteness Indices from Instrumentally Measured Color Coordinates |
| ASTM E1164 | Obtaining Spectrometric Data for Object-Color Evaluation |
| ASTM E1331 | Reflectance Factor and Color by Spectrophotometry Using a Hemispherical Geometry |
| ISO 105/A02 | Grey Scale for Assessing Change in Colour |
| ISO 105/A04 | Method for the Instrumental Assessment of the Degree of Staining of Adjacent Fabrics |
| ISO 4582 | Determination of Changes in Colour and Variations in Properties after Exposure to Daylight under Glass, Natural Weathering or Laboratory Light Sources |
| SAE J1545 | Instrumental Color Difference Measurement for Exterior Finishes, Textiles and Colored Trim |

COMPRESSION

| <u>Test Method</u> | <u>Test</u> |
|--|---|
| ASTM D395 | Compression Set |
| ASTM D575 | Rubber Properties in Compression |
| ASTM D623 | Heat Generation and Flexing Fatigue in Compression |
| ASTM D695 | Compressive Properties of Rigid Plastics |
| ASTM D790 | Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials |
| ASTM D945 | Rubber Properties in Compression or Shear (Mechanical Oscillograph) |
| ASTM D1055 (17-19) | Compression Set Under Constant Deflection |
| ASTM D1055 (24-26) | Flexing Test (Suffix H) |
| ASTM D1055 (27-30) | Low-Temperature Test (Compression/Deflection) |
| ASTM D1229 | Compression Set at Low Temperatures |
| ASTM D3574 (Test C) | Compression Force Deflection Test |
| ASTM D3574 (Test D) | Constant Deflection Compression Set |
| ASTM D3575 (Section 9-16) | Flexible Cellular Materials Made from Olefin Polymers – Compression Set Under Constant Deflection |
| ASTM D3575 (Section 17-24) | Flexible Cellular Materials Made from Olefin Polymers – Compression Deflection |
| ASTM F1342 (Procedure A) | Protective Clothing Material Resistance to Puncture |
| ISO 178 | Determination of Flexural Properties |
| ISO 815-1 | Determination of Compression Set – at Ambient or Elevated Temperatures |
| ISO 815-2 | Determination of Compression Set – at Low Temperatures |
| ISO 1653 ² (Withdrawn 1993) | Vulcanized Rubbers - Determination of Compression Set under Constant Deflection at Low Temperatures |
| JIS K6262 | Rubber, Vulcanized or Thermoplastic – Determination of Compression Set at Ambient, Elevated or Low Temperatures |
| ASTM D4014 | Shear Modulus and Related Testing for Elastomeric Bridge Bearings |

CONDOM TEST

| <u>Test Method</u> | <u>Test</u> |
|--------------------|--|
| ASTM D3492 | Rubber Contraceptives (Male Condoms) |
| ASTM D6324 | Male Condoms Made from Polyurethane |
| ARDL 2139 | Lubricant Testing on Condoms |
| BS EN ISO 3704 | Natural Rubber Latex Male Condoms |
| ISO 4074 | Natural Rubber Latex Male Condoms – Requirements and Test Methods |
| WHO 2004 | The Male Latex Condom |
| ASTM D7661 | Determining Compatibility of Personal Lubricants with Natural Rubber Latex Condoms |

CORROSION EVALUATION

| <u>Test Method</u> | <u>Test</u> |
|---------------------------|---|
| ASTM D610 | Evaluating Degree of Rusting on Painted Steel Surfaces |
| ASTM D1654 | Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments |
| SAE J1389 | Corrosion Test for Insulation Materials |

CRACK RESISTANCE

| <u>Test Method</u> | <u>Test</u> |
|---------------------------|--|
| ASTM D813 | Rubber Deterioration – Crack Growth |
| ASTM D1693 | Environmental Stress – Cracking of Ethylene Plastics |

DIMENSIONAL STABILITY

| <u>Test Method</u> | <u>Test</u> |
|--|--|
| ASTM C356 | Linear Shrinkage of Preformed High – Temperature Thermal Insulation Subjected to Soaking Heat |
| ASTM D1204 | Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperatures |
| ASTM D3575 – Suffix S (Sections 35-42) | Flexible Cellular Materials Made from Olefin Polymers – Thermal Stability |
| ASTM D3767 | Rubber Properties – Measurement of Dimensions |

DENSITY

| <u>Test Method</u> | <u>Test</u> |
|---------------------------|---|
| ASTM D792 | Density and Specific Gravity of Plastics by Displacement |
| ASTM D1667, X3 | Suggested Test Method for Density (Suffix W) |
| ASTM D3574 (Test A) | Density Test Urethane Foams |
| ASTM D3575 (Suffix W) | Density – Flexible Cellular Materials Made from Olefin Polymers |

EXTENSION CYCLING FATIGUE/CUT GROWTH

| <u>Test Method</u> | <u>Test</u> |
|---------------------------|--|
| ASTM D430 | Rubber Deterioration – Dynamic Fatigue |
| ASTM D1052 | Measuring Rubber Deterioration – Cut Growth Using Ross Flexing Apparatus |
| ASTM D4482 | Rubber Property – Extension Cycling Fatigue |

FLAMMABILITY

| <u>Test Method</u> | <u>Test</u> |
|---------------------------|--|
| ASTM C1166 | Flame Propagation of Dense and Cellular Elastomeric Gaskets and Accessories |
| ASTM D635 | Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position |
| ASTM D3801 | Measuring the Comparative Burning Characteristics of Solid Plastics in a Vertical Position |

| <u>Test Method</u> | <u>Test</u> |
|---------------------------------|--|
| <i>Flammability (continued)</i> | |
| ASTM D5132 | Horizontal Burning Rate of Polymeric Materials Used in Occupant Compartments of Motor Vehicles |
| FMVSS-302 | Flammability of Interior Materials – Passenger Cars, Multipurpose Passenger Vehicles, Trucks and Buses |
| IEC 60698-11-10 | 50W Horizontal and Vertical Flame Test Methods |
| ISO 3795 | Determination of Burning Behavior of Interior Materials |
| SAE J369 | Flammability of Polymeric Interior Materials – Horizontal Test Method |
| UL94 | Flammability of Plastic Materials for Parts in Devices and Appliances |
| VW TL1010 | Burning Behavior – Materials used in Vehicle Interiors |

FOGGING CHARACTERISTICS

| <u>Test Method</u> | <u>Test</u> |
|--------------------------|---|
| Chrysler CLP-463DB-12-01 | Fogging Resistance of Interior Materials |
| GMW 3235 | Fogging Characteristics of Trim Materials |
| SAE J1756 | Determination of the Fogging Characteristics of Interior Automotive Materials |

FRICITION PROPERTIES

| <u>Test Method</u> | <u>Test</u> |
|--------------------|--|
| ASTM D1894 | Static and Kinetic Coefficients of Friction of Plastic Film and Sheeting |

GLOSS (20°/60°/85°)

| <u>Test Method</u> | <u>Test</u> |
|--|--|
| ASTM C584 | Specular Gloss of Glazed Ceramic Whitewares and Related Products |
| ASTM D523 | Specular Gloss |
| ASTM D1455 | 60° Specular Gloss of Emulsion Floor Polish |
| ASTM D4039 | Reflection Haze of High-Gloss Surfaces |
| FTMS 141C-86 (Methods 6101.1, 6103, & 6104 only) | 60°, 85°, 20° Specular Gloss |
| Ford FLTM BI 010-02 | Measurement of Gloss Change of Flat Enamels after Polishing |
| Ford FLTM BI 110-01 | Measurement of the Gloss of Paint Panels |
| Honda HES D2500-08 (Section 3.10 only) | Gloss Test |

GLOVE TESTING

| <u>Test Method</u> | <u>Test</u> |
|--------------------|--|
| ASTM D120 | Rubber Insulating Gloves |
| ASTM D3577 | Rubber Surgical Gloves |
| ASTM D3578 | Rubber Examination Gloves |
| ASTM D5151 | Detection of Holes in Medical Gloves |
| ASTM D5250 | Poly (Vinyl Chloride) Gloves for Medical Application |
| ASTM D6124 | Residual Powder on Medical Gloves |
| ASTM D6319 | Nitrile Examination Gloves for Medical Application |
| ASTM D6977 | Polychloroprene Examination Gloves for Medical Application |
| ASTM D7198 | Disposable Embalming Gloves for Single-Use Applications |
| ARDL 2140 | Lubricant Testing on Gloves |
| BS EN 455-1 | Medical Gloves for Single Use – Requirements and Testing for Freedom from Holes |
| BS EN 455-2 | Medical Gloves for Single Use – Requirements and Testing for Physical Properties |

HARDNESS

| <u>Test Method</u> | <u>Test</u> |
|--|---|
| ASTM D2583 | Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor |
| ASTM D2240 (Types A, D, M, and OO) | Rubber Property – Durometer Hardness |
| DIN 53 505 ² (Withdrawn 2012) | Shore A and Shore D Hardness Testing of Rubber |
| ISO 868 (Types A and D) | Plastics and Ebonite – Determination of Indentation Hardness by Means of a Durometer (Shore Hardness) |
| JIS K 6253-2 | Rubber, Vulcanized or Thermoplastic – Determination of Hardness (Hardness Between 10 IRHD and 100 IRHD) |
| ASTM D1415 | Rubber Property – International Hardness |
| ISO 48 | Rubber, Vulcanized or Thermoplastic – Determination of Hardness (Hardness between 10 IRHD and 100 IRHD) |
| ASTM D785 (Scale R) | Rockwell Hardness of Plastics and Electrical Insulating Materials |

HDT/VICAT SOFTENING POINT

| <u>Test Method</u> | <u>Test</u> |
|-----------------------|--|
| ASTM D648 | Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position |
| ASTM D1525 (Rate B) | Vicat Softening Temperature of Plastics |
| ISO 75-1 | Determination of Temperature of Deflection under Load – General Test Method |
| ISO 75-2 | Determination of Temperature of Deflection under Load – Plastics and Ebonite |
| ISO 75-3 | Determination of Temperature of Deflection under Load – High-Strength Thermosetting Laminates and Long-Fibre-Reinforced Plastics |
| ISO 306 (Method A120) | Determination of Vicat Softening Temperature |

HOSE TESTING

| <u>Test Method</u> | <u>Test</u> |
|--------------------|---|
| ASTM D380 | Rubber Hose for Automotive Air and Vacuum Brake Systems |
| ASTM D622 | Standard Test Method for Rubber Hoses |

IMPACT

| <u>Test Method</u> | <u>Test</u> |
|--------------------|---|
| ASTM D256 | Determining the Izod Pendulum Impact Resistance of Plastics |
| ASTM D4226 | Impact Resistance of Rigid Poly(Vinyl Chloride) Building Products |
| ASTM D4812 | Unnotched Cantilever Beam Impact Resistance of Plastics |
| ASTM D5420 | Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Hammer (Gardner Impact) |
| ISO 179-1 | Determination of Charpy Impact Properties |
| ISO 180 | Determination of Izod Impact Strength |

INJECTION MOLDING TEST SPECIMENS

| <u>Test Method</u> | <u>Test</u> |
|--------------------|--|
| ASTM D3641 | Injection Molding Test Specimens of Thermoplastics Molding and Extrusion Materials |

MELT FLOW

| <u>Test Method</u> | <u>Test</u> |
|--------------------|--|
| ASTM D1238 | Melt Flow Rates of Thermoplastics by Extrusion Plastometer |
| ASTM D3364 | Flow Rates for Poly (Vinyl Chloride) with Molecular Structure Implications |
| ISO 1133-1 | Determination of the Melt Mass Flow Rate (MFR) and Melt Volume-Flow Rate (MVR) of Thermoplastics |

ODOR TESTING

| <u>Test Method</u> | <u>Test</u> |
|--------------------------------|--|
| Delphi SD2-208 (Section 5.3.2) | Odor Test |
| GMW 3205 | Determining the Resistance to Odor Propagation of Interior Materials |
| GMW 14131 | Compatibility of Interior Trim Materials with Amines |
| SAE J1351 | Hot Odor Test for Insulation Materials |

OZONE TESTING

| <u>Test Method</u> | <u>Test</u> |
|--|--|
| ASTM D518-99 ² (Withdrawn 2008) | Rubber Deterioration – Surface Cracking |
| ASTM D1149 | Rubber Deterioration – Cracking in an Ozone Controlled Environment |
| ASTM D1171 | Rubber Deterioration – Surface Ozone Cracking Outdoors or Chamber (Triangular Specimens) |
| ASTM D3395-99 ² (Withdrawn 2008) | Rubber Deterioration – Dynamic Ozone Cracking in a Chamber |
| DIN 53 509 2 ² (Withdrawn 2011) | Resistance of rubber to ozone cracking |
| ISO 1431-1 | Rubber, Vulcanized or Thermoplastic – Resistance to Ozone Cracking – Static and Dynamic Strain Testing |
| GM4486P ² (Withdrawn 2011) | Test for Ozone Resistance of Elastomer Compounds |

RESILIENCE BY REBOUND

| <u>Test Method</u> | <u>Test</u> |
|----------------------------|---|
| ASTM D2632 | Rubber Property – Resilience by Vertical Rebound |
| ASTM D7121 | Rubber Property – Resilience Using Schob Type Rebound Pendulum |
| DIN 53 512 | Rubber, Vulcanized or Thermoplastic – Determination of Rebound Resilience |
| ISO 4662 (Pendulum Method) | Determining the Rebound Resilience of Rubber using the Schob Pendulum |

STAIN RESISTANCE

| <u>Test Method</u> | <u>Test</u> |
|---|--|
| AATCC Evaluation Procedure 2 | Grey Scale for Staining |
| ASTM D925 | Rubber Property – Staining of Surfaces (Contact, Migration, and Diffusion) |
| GM9240P-88 ² (Withdrawn 2013) | Perspiration Resistance |
| GM9317P | Water Repellancy Test |
| GM9517P-88 ² (Withdrawn 2012) | Resistance to Synthetic Perspiration |
| GM9689-95 ² (Withdrawn 2014) | Asphalt Staining Test |
| GM 9736P-88 ² (Withdrawn 2011) | Sulfide Dioxide Spot Test |
| GMN8170-02 ² (Withdrawn 2014) | Resistance to Blocking |
| GMN10033-04 ² (Withdrawn 2011) | Sunscreen Lotion Resistance of Interior Coatings |
| GMW 14102 | Determination of Water Spotting Test |
| GMW 14069 ² (Withdrawn 2011) | Migrations – Bleeding Resistance and Contact Stain Compatibility of PVC with Other Materials |
| GMW 14141 | Dye Migration |
| GMW 14296 | Perspiration Resistance |
| GMW 14445 | Insect and Insect Repellant Resistance |
| GMW 14864 | Procedure for Determining the Staining of Trim Materials Due to Sulfur Dioxide, SO ₂ , and Hydrogen Sulfide, H ₂ S |
| ISO 105-G02 | Textiles – Tests for Colour Fastness – Colour Fastness to Burnt-Gas Fumes |

| <u>Test Method</u> | <u>Test</u> |
|---------------------------------------|--|
| <i>Stain Resistance (continued)</i> | |
| ISO 3865 | Rubber, Vulcanized or Thermoplastic – Methods for Staining in Contact with Organic Materials |
| ISO 15701 | Leather – Tests for Colour Fastness – Colour Fastness to Migration into Polymeric Material |
| Nissan NES M0142-01 (Section 18 & 19) | Staining/Indirect Staining |
| SAE J322 | Nonmetallic Trim Materials – Test Method for Determining the Staining Resistance to Hydrogen Sulfide Gas |
| SAE J1326 | Test Method for Measuring Wet Color Transfer Characteristics |

STIFFNESS

| <u>Test Method</u> | <u>Test</u> |
|--------------------|--|
| ASTM D1053 | Rubber Property – Stiffening at Low Temperatures: Flexible Polymers and Coated Fabrics (Torsional Stiffness) |
| ASTM D1388 | Stiffness of Fabrics |

TENSILE TESTS

| <u>Test Method</u> | <u>Test</u> |
|---|--|
| ASTM D412 | Vulcanized Rubber and Thermoplastic Elastomers – Tension |
| ASTM D413 | Rubber Property – Adhesion to Flexible Substrate |
| ASTM D429 | Rubber Property – Adhesion to Rigid Substrates |
| ASTM D624 | Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers |
| ASTM D638 | Tensile Properties of Plastics |
| ASTM D882 | Tensile Properties of Thin Plastic Sheeting |
| ASTM D1002 | Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading (Metal-to-Metal) |
| ASTM D1004 | Tear Resistance (Graves Tear) of Plastic Film and Sheeting |
| ASTM D1424 | Tearing Strength of Fabrics by Falling-Pendulum (Elmendorf-Type) Apparatus |
| ASTM D1708 | Tensile Properties of Plastics by Use of Microtensile Specimens |
| ASTM D2261 | Tearing Strength of Fabrics by the Tongue (Single Rip) Procedure |
| ASTM D3163 | Determining Strength of Adhesively Bonded Rigid Plastic Lap-Shear in Shear by Tension Loading |
| ASTM D3574 (Test E) | Flexible Cellular Materials – Slab, Bonded, and Molded Urethane Foams – Tensile Test |
| ASTM D3574 (Test F) | Flexible Cellular Materials – Slab, Bonded, and Molded Urethane Foams – Tear Test |
| ASTM D5734-01 ² (Withdrawn 2008) | Tearing Strength of Nonwoven Fabrics by Falling-Pendulum (Elmendorf) Apparatus |

| <u>Test Method</u> | <u>Test</u> |
|--|--|
| <i>Tensile Test (continued)</i> | |
| ASTM D5735-01 ² (Withdrawn 2009) | Tearing Strength of Nonwoven Fabrics by the Tongue (Single Rip) Procedure |
| ASTM F152 | Tension Testing of Nonmetallic Gasket Materials |
| DIN 53 504 | Determination of Tear Growth Propagation Trouser Test Piece |
| ISO 34-1 | Rubber, vulcanized or thermoplastic – Determination of Tear Strength – Trouser, Angle and Crescent Test Pieces |
| ISO 34-2 | Rubber, Vulcanized or Thermoplastic – Determination of Tear Strength – Small (Delft) Test Pieces |
| ISO 37 | Rubber, Vulcanized or Thermoplastic – Determination of Tensile Stress-Strain Properties |
| ISO 527-1 | Plastics – Determination of Tensile Properties |
| ISO 6383-1 | Film and Sheeting – Determination of Tear Resistance – Trouser Tear Method |
| JIS K 6251 | Rubber, Vulcanized or Thermoplastic – Determination of Tear Strength |
| JIS K6252 | Rubber, Vulcanized or Thermoplastic – Determination of Tensile Stress-Strain Properties |
| DIN 53 507 | Determination of Tensile Strength |
| ASTM D3137 | Standard Test Method for Rubber Property- Hydrolytic Stability |

LOW TEMPERATURE BENDING

| <u>Test Method</u> | <u>Test</u> |
|--------------------|---|
| ASTM D2136 | Coated Fabrics – Low Temperature Bending Test |

VAPOR TRANSMISSION OF VOLATILE LIQUIDS


| <u>Test Method</u> | <u>Test</u> |
|---|--|
| ASTM D814 | Rubber Property – Vapor Transmission of Volatile Liquids |
| GM 214M ² (Withdrawn 2013) Table 2 (3.1.3), Tables 1, 2, 3 and 4 (3.1.2 – 3.1.4) | Engine Intake Manifold and Throttle Body Gaskets |

VOLATILE LOSS

| <u>Test Method</u> | <u>Test</u> |
|--------------------|---|
| ASTM D1203 | Volatile Loss of Plastics Using Activated-Carbon Method |

WATER ABSORPTION

| <u>Test Method</u> | <u>Test</u> |
|---|--|
| ASTM C121 | Water Absorption of Slate |
| ASTM D570 | Water Absorption of Plastics |
| ASTM D3575 – Suffix L (Sections 26-32) | Flexible Cellular Materials Made from Olefin Polymers – Water Absorption |
| ISO 62 | Plastics – Determination of Water Absorption |



¹This accreditation covers testing performed at the main laboratory listed above, and at the satellite laboratories indicated.

AKRON RUBBER DEVELOPMENT LABORATORY, INC.
300 Kenmore Boulevard
Akron, OH 44301

SAMPLE PREPARATION AND MOLDING

| <u>Test Method</u> | <u>Test</u> |
|---|---|
| ASTM D2229 | Standard Test Method for Adhesion Between Steel Tire Cords and Rubber |
| ASTM D3182 | Procedures for Mixing Standard Compounds and Preparing Standard Vulcanized Sheets |
| ASTM D3183 | Rubber – Preparation of Pieces for Test Purposes from Products |
| ASTM D3767 | Standard Practice for Rubber – Measurement of Dimensions |
| ASTM D4703 | Compression Molding Thermoplastic Materials into Test Specimens, Plaques, or Sheets |
| ISO 293 | Compression Moulding of Test Specimens of Thermoplastic Materials |
| UL 2703 (Sections 17.3, 17.4 & 17.1) | Conditioning Polymeric Materials for Testing |

VISCOSITY

| <u>Test Method</u> | <u>Test</u> |
|---------------------------|--|
| ASTM D1646 | Rubber – Viscosity, Stress Relaxation, and Pre – Vulcanization Characteristics (Mooney Viscometer) |

RHEOLOGY

| <u>Test Method</u> | <u>Test</u> |
|---------------------------|---|
| ASTM D2084 | Rubber Property – Vulcanization Using Oscillating Disk Cure Meter |
| ASTM D5289 | Rubber Property – Vulcanization Using Rotorless Cure Meters |

VOLATILE MATTER

| <u>Test Method</u> | <u>Test</u> |
|---------------------------|---|
| ASTM D5668 (Method A) | Rubber from Synthetic Sources – Volatile Matter |



SAMPLE PREPARATION AND MOLDING

| <u>Test Method</u> | <u>Test</u> |
|---------------------------|--|
| ASTM D3183 | Rubber – Preparation of Pieces for Test Purposes from Products |

MISCELLANEOUS

| <u>Test Method</u> | <u>Test</u> |
|---------------------------|---|
| ASTM F36 | Compressibility and Recovery of Gasket Materials |
| ASTM D6147 | Sealability of Gasket Materials |
| ISO 3384-1 | Rubber, Vulcanized or Thermoplastic – Determination of Stress Relaxation in Compression |
| ISO 6056 | Rubber, Vulcanized or Thermoplastic – Determination of Compression Stress Relaxation (Rings) |
| ASTM F1112 | Statics Testing of Tubeless Pneumatic Tires for Rate of Loss of Inflation Pressure |
| ASTM E662 | Optical Smoke Density |
| ISO 23936-1 | Petroleum, Petrochemical and Natural Gas Industries - Non-Metallic Materials in Contact With Media Related to Oil And Gas Production – Thermoplastics |
| ISO 23936-2 | Petroleum, Petrochemical And Natural Gas Industries – Non-Metallic Materials In Contact with Media Related to Oil and Gas Production – Elastomers |
| NACE TM0192 | Evaluating Elastomeric Materials in Carbon Dioxide Decompression Environments |
| NORSOK M-710 | Rapid Gas Decompression Resistance |

CARBON ARC

| <u>Test Method</u> | <u>Test</u> |
|---------------------------|--|
| AATCC 192 | Weather Resistance of Textiles: Sunshine-Arc Lamp Exposure With and Without Wetting |
| ASTM C793 | Effects of Laboratory Accelerated Weathering on Elastomeric Joint Sealants |
| ASTM C1442 | Conducting Tests on Sealants Using Artificial Weathering Apparatus |
| ASTM D750 | Rubber Deterioration Using Artificial Weathering Apparatus |
| ASTM D822 | Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings |
| ASTM D1499 | Filtered Open-Flame Carbon-Arc Exposures of Plastics |
| ASTM D3815 | Accelerated Weathering of Pressure-Sensitive Tapes by Open-Flame Carbon-Arc Exposure Apparatus |

| <u>Test Method</u> | <u>Test</u> |
|---|---|
| <i>Carbon Arc (continued)</i> | |
| ASTM G152 | Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials |
| Ford FLTM BO 101-01 | Resistance to Artificial Weathering |
| Fuji TS420-1-12 (2002) | |
| Honda HES D2500 (3.12.1) | Light Resistance Test |
| Hyundai/KIA MS 260-13, Section 4.8 (2005) | Staining Resistance Test |
| ISO 4892-4 | Methods of Exposure to Laboratory Light Sources: Open-Flame Carbon-Arc Lamps |
| JIS B7753 | Sunshine Carbon Arc Lamp Type Weathering Test Machine and Light Resistance Tester |
| JIS D 0205 | Test Method of Weatherability for Automotive Parts |
| MIL-T-4239A | Accelerated Aging |
| MIL STD 601 (Method 7311) | Resistance to Light |
| Nissan NES M0007 (Methods A and B) | Test Method for Resistance Characteristics to Rubber Part |
| NES M0501 (Methods 4, 5 and 6) | Testing Methods of Staining for Rubber, Vulcanized or Thermoplastic |
| NES M7075, 7.16 | Weather Resistance |
| NES M0135 | Weatherability and Light Resistance Test Methods for Synthetic Resin Parts |
| Suzuki SES N3292-00 | Test Methods of Weatherability and Light Resistance for Plastic Parts |
| Toyota TSM 1100G-07 (Section 8.6) | Weathering Test |
| Toyota TSM 1500G, 5.18 | Staining Test (By Contact) |
| Toyota TSM 1501G, 8.9 | Staining Test |
| Toyota TSM 5728G-05 (Section 5.9.2, Method A) | Accelerated Weatherability |
| TSK 6505G (Section 4.6) | Paint Film Contamination Resistance |
| MIL Std. 601 (Method 7311) | Resistance to Light |
| TSM 5526G | Polycarbonate/Acrylonitrile – X- Styrene Alloy Resin Molding Materials |

ELECTRICAL

| <u>Test Method</u> | <u>Test</u> |
|-----------------------------------|---|
| ASTM D149 | Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulation Materials at Commercial Power Frequencies |
| ASTM D257 | DC Resistance or Conductance of Insulating Materials |
| ASTM D876 (Sections 59, 60, & 62) | Volume Resistivity – Non-rigid Vinyl Chloride Polymer Tubing Used for Electrical Insulation |
| ASTM D991 | Rubber Property – Volume Resistivity of Electrically Conductive and Antistatic Products. |

FEA MODELING AND SUPPORT TESTING

| <u>Test Method</u> | <u>Test</u> |
|---|--|
| ASTM D4014 (Except 8.2.3, 8.2.5 & 8.2.6) | Plain and Steel-Laminated Elastomeric Bearings for Bridges |
| ARDL 8105 | Finite Element Analysis |
| ARDL 8106 | Finite Element Analysis Support Test |
| ARDL 8107 | Life Prediction of Elastomeric Components or Materials |
| ARDL 8111 | Shelf Life Prediction for Rubber Products |

DYNAMIC TESTING

| <u>Test Method</u> | <u>Test</u> |
|---------------------------|--|
| ASTM D4065 | Plastics: Dynamic Mechanical Properties: Determination and Report of Procedures |
| ASTM D5992 | Dynamic Testing of Vulcanized Rubber and Rubber-Like Materials Using Vibratory Methods |
| SAE J1085 | Testing Dynamic Properties of Elastomeric Isolators |

IMPACT

| <u>Test Method</u> | <u>Test</u> |
|---------------------------------|---|
| ASTM D3763 | High Speed Puncture Properties of Plastics Using Load and Displacement Sensors |
| ASTM F1292 | Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment |
| ISO 179-2 | Determination of Charpy Impact Properties – Instrumented Impact Test |
| GM9904P (Inactive) ² | Multi-Axial Impact Test |

SALT SPRAY CORROSION

| <u>Test Method</u> | <u>Test</u> |
|---------------------------|---------------------------------------|
| ASTM B117 | Operating Salt Spray (Fog) Apparatus |
| JIS Z2371 | Methods of Neutral Salt Spray Testing |

²This 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.

The laboratory is accredited for the test methods listed above. The accredited test methods are used in determining compliance with the material specifications listed below; however, the inclusion of these material specifications on this Scope does not confer laboratory accreditation to the material specifications. Inclusion of these material specifications on this Scope also does not confer accreditation for every method embedded within the specification. Only the methods listed above on this Scope are accredited.

ASTM: C923, C1115, C1173, D378, D1056, D1248, D1414, D2000, D6878 / D6878M, E308, D751

DaimlerChrysler: MS-AG-81, MS-AR-20, MS-AR-23, MS-AR-24, MS-AR-26, MS-AR-30, MS-AR-80, MS-DC-16

Ford: ESF-M4D101-A, ESF-M4D423-A, WSK-M4D695-A, WSS-M2D378-B1, WSS-M2D379-B1, WSS-M2D380-B1, WSS-M2D381-B1, WSS-M2D382-B1

GM: GM6086M, GM7001M, GMP.ABS.018R, GMP.E/P.003, GMP.E/P.029, GMP.E/P.071, GMP.TES.012, GMP.EP.001, GMP.PE.002, GMP.PE.003, GMP.PE.004, GMP.PE.005, GMP.PE.006, GMP.PE.007, GMP.PE.009, GMN8423, GMN1110, GMW15473, GMW17408

ISO: 4074-1

JIS: K 6301:1995 (Withdrawn 1996)

Underwriters Laboratory: UL746B (UL 94 Only)



Accredited Laboratory

A2LA has accredited

AKRON RUBBER DEVELOPMENT LABORATORY, INC.

Akron, OH

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 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 29th day of June 2016.

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

President and CEO
For the Accreditation Council
Certificate Number 0255.01
Valid to March 31, 2018
Revised February 21, 2018

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



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

AKRON RUBBER DEVELOPMENT LABORATORY, INC.
2887 Gilchrist Road
Akron, OH 44305
Rick Behne Phone: 330 794 6600

CHEMICAL

Valid To: March 31, 2018

Certificate Number: 0255.02

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following tests on rubber and plastic materials:

SPECTROSCOPY

| <u>Test Method</u> | <u>Test</u> |
|----------------------------------|--|
| ASTM D3677 | Identification by Infrared Spectrophotometry |
| ASTM D5673 (AB) | Elements in Water by Inductively Coupled Plasma-Mass Spectrometry |
| ASTM D7558 | Colorimetric/Spectrophotometric Procedure to Quantify Extractable Chemical Dialkyldithiocarbamate, Thiuram and Mercaptobenzothiazole Accelerators in Natural Rubber Latex and Nitrile Gloves |
| ASTM E1252 | General Techniques for Obtaining Infrared Spectra for Qualitative Analysis |
| ASTM F963 (Sections 8.3, A7.5.3) | Standard Consumer Safety Specification for Toy Safety |
| ARDL 3187 | Calibration of Volumetric Cup Used for ASTM D1513, Pour Density |

CHROMATOGRAPHY

| <u>Test Method</u> | <u>Test</u> |
|---|---|
| ASTM F2466 | Determining Silicone Volatiles in Silicone Rubber for Transportation Applications |
| Daimler Chrysler LP-461J-127 ¹ (Withdrawn) | Silicone Volatiles Determination in Silicone Rubber |
| Ford AV-102-01 | Determination of Percent Silica-Producing Volatiles in Silicone Rubber Adhesives/Sealers Which Cure at Room Temperature |
| GM 9009P ¹ (Withdrawn) | Test for Volatiles in Silicone Rubber |
| ARDL 3138 | Identification of Rubber Chemicals by High Performance Liquid Chromatography |
| ARDL 3174 | Residual Accelerator Analysis |
| ASTM D3156 | Rubber-Chromatographic Analysis of Antidegradants, Antioxidants, Antiozonants and Stabilizers |
| ARDL 3110 | Thin Layer Chromatography (TLC) |
| ARDL 3160 | Gas Chromatograph/Mass Spectrometer and Auto Sampler |

DENSITY

| <u>Test Method</u> | <u>Test</u> |
|------------------------------|--|
| ASTM D297 (Section 16.3.1) | Rubber Products – Chemical Analysis |
| ASTM D1475 | Density of Liquid Coatings, Inks and Related Products |
| ASTM D1817 | Rubber Chemicals – Density |
| ARDL 3103 | Density |
| ISO 1183-1 (Methods A and B) | Methods for Determining the Density of Non-Cellular Plastics |
| ASTM D792 | Density and Specific Gravity of Plastics by Displacement |

GRAVIMETRIC

| <u>Test Method</u> | <u>Test</u> |
|-----------------------------------|--|
| ASTM D297 (Sections 17-29, 41-51) | Rubber Products – Chemical Analysis |
| ASTM D2584 | Ignition Loss of Cured Reinforced Resins |
| ASTM D5630 | Standard Test Method for Ash Content in Plastics |
| ASTM D2369 | Volatile Content of Coatings |

RUBBER AND FOOD CONTACT ASSESSMENT

| <u>Test Method</u> | <u>Test</u> |
|--------------------|--|
| ARDL 3171 | Formula Evaluation and Extractable Testing |
| 21 CFR 177.2600 | Rubber Articles Intended for Repeated Use |

STATE OF CURE

| <u>Test Method</u> | <u>Test</u> |
|--|------------------------|
| ARDL 3135 | Crosslink Density |
| Vanderbilt Latex Handbook (3 rd Edition) p. 110 | Chloroform Coagulation |

MICROSCOPY

| <u>Test Method</u> | <u>Test</u> |
|--------------------|---|
| ARDL 3809 | Light Optical (LOM): Carbon Black/Inorganic Filler Dispersion |
| ASTM D3576 | Light Optical (LOM): Cell Size – Cellular Plastics |
| ARDL 3802 | Light Optical (LOM): Cell Size – Cellular Plastics |
| ARDL 3812 | Light Optical (LOM): Failure Analysis |
| ARDL 3804 | Scanning Electron (SEM/EDX) |
| ARDL 3816 | Scanning Electron (SEM/EDX) |
| ARDL 3815 | Scanning Electron: Microdispersion of Inorganic Fillers |
| ARDL 3813 | Scanning Electron: Elemental Analysis |
| ASTM D3849-95a | Transmission Electron: Primary Aggregate |
| ARDL 3803 | Transmission Electron: Primary Aggregate |
| ARDL 3805 | Transmission Electron: Polymer Morphology |

POLYMER BARRIER PROPERTIES

| <u>Test Method</u> | <u>Test</u> |
|---------------------------------------|--|
| ASTM D1434 (Procedure V) | Determining Gas Permeability Characteristics of Plastic Film and Sheeting |
| ASTM D6978 | Standard Practice for Assessment of Resistance of Medical Gloves to Permeation by Chemotherapy Drugs |
| ASTM F739 | Permeation of Liquids and Gases Through Protective Clothing Materials Under Conditions of Continuous Contact |
| ASTM F1383 | Permeation of Liquids and Gases Through Protective Clothing Materials Under Conditions of Intermittent Contact |
| ISO 6529 | Protective Clothing – Protection Against Chemicals – Determination of Resistance of Protective Clothing Materials to Permeation by Liquids and Gases |
| BS EN 374-3 ¹ (Superseded) | Protective Gloves Against Chemicals and Micro-Organisms – Determination of Resistance to Permeation by Chemicals |
| DIN EN 16523-1 | Determination of Material Resistance to Permeation by Chemicals – Permeation by Liquid Chemical Under Conditions of Continuous Contact |
| ASTM E96/E96M | Water Vapor Transmission of Materials |
| ASTM F903 | Resistance of Materials Used in Protective Clothing to Penetration by Liquids |
| ASTM F1670 | Resistance of Materials Used in Protective Clothing to Penetration by Synthetic Blood |

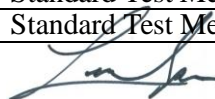
THERMAL

| <u>Test Method</u> | <u>Test</u> |
|-----------------------------|---|
| ASTM D3418 | Transition Temperatures and Enthalpies of Fusion and Crystallization of Polymers by Differential Scanning Calorimetry (DSC) |
| ASTM D3850 | Rapid Thermal Degradation of Solid Electrical Insulating Materials by Thermogravimetric Method (TGA) |
| ASTM D3895 | Oxidative-Induction Time of Polyolefins by Differential Scanning Calorimetry (DSC) |
| ASTM D4419 | Measurement of Transition Temperatures of Petroleum Waxes by Differential Scanning Calorimetry (DSC) |
| ASTM D4565 (Sections 17-18) | Physical and Environmental Performance Properties of Insulations and Jackets for Telecommunications Wire and Cable |
| ASTM D4591 | Determining Temperatures and Heats of Transitions of Fluoropolymers by Differential Scanning Calorimetry (DSC) |
| ASTM D7426 | Assignment of the DSC Procedure for Determining Tg of a Polymer or an Elastomeric Compound |
| ASTM E793 | Enthalpies of Fusion and Crystallization by Differential Scanning Calorimetry (DSC) |
| ASTM E794 | Melting and Crystallization Temperatures by Thermal Analysis |

| <u>Test Method</u> | <u>Test</u> |
|----------------------------|---|
| <i>Thermal (continued)</i> | |
| ASTM E1269 | Determining Specific Heat Capacity by Differential Scanning Calorimetry (DSC) |
| ASTM E1356 | Assignment of the Glass Transition Temperatures by Differential Scanning Calorimetry (DSC) |
| ASTM E2160 | Heat of Reaction of Thermally Reactive Materials by Differential Scanning Calorimetry (DSC) |
| ASTM F2625 | Measurement of Enthalpy of Fusion, Percent Crystallinity, and Melting Point of Ultra-High-Molecular Weight Polyethylene by Means of Differential Scanning Calorimetry |
| ISO 11357-2 | Plastics – Differential Scanning Calorimetry (DSC) – Determination of Glass Transition Temperature and Glass Transition Step Height |
| ISO 11357-3 | Plastics – Differential Scanning Calorimetry (DSC) – Determination of Temperature and Enthalpy of Melting and Crystallization |
| ISO 11357-5 | Plastics – Differential Scanning Calorimetry (DSC) – Determination of Characteristic Reaction – Curve Temperatures and Times, Enthalpy of Reaction and Degree of Conversion |
| ASTM D5992 | Standard Guide for Dynamic Testing of Vulcanized Rubber and Rubber-Like Materials Using Vibratory Methods |
| ASTM E1640 | Assignment of the Glass Transition Temperature by Dynamic Mechanical Analysis |
| ISO 6721-4 | Plastics – Determination of Dynamic Mechanical Properties – Tensile Vibration – Non-Resonance Method |
| ASTM E831 | Linear Thermal Expansion of Solid Materials by Thermomechanical Analysis |
| ISO 11359-1 | Plastics – Thermomechanical Analysis (TMA) – General Principles |
| ISO 11359-2 | Plastics – Thermomechanical Analysis (TMA) – Determination of Coefficient of Linear Thermal Expansion and Glass Transition Temperature |
| ASTM D6370 | Rubber – Compositional Analysis by Thermogravimetry (TGA) |
| ASTM E1131 | Compositional Analysis by Thermogravimetry |
| ASTM E2550 | Thermal Stability by Thermogravimetric |
| ISO 9924-1 | Determination of the Composition of Vulcanizes and Uncured Compounds by Thermogravimetric |
| ISO 9924-2 | Rubber and Rubber Products – Determination of the Composition of Vulcanizates and Uncured Compounds by Thermogravimetry – Acrylonitrile-Butadiene and Halobutyl Rubbers |
| ISO 9924-3 | Determination of the Composition of Vulcanizes and Uncured Compounds by Thermogravimetric |

LEACHING FOR HALIDES AND SULFUR

| <u>Test Method</u> | <u>Test</u> |
|---------------------------|---|
| ASTM D512 | Standard Test Methods for Chloride Ion in Water |
| ASTM D516 | Standard Test Method for Sulfate Ion in Water |
| ASTM D1179 | Standard Test Methods for Fluoride in Water |



| <u>Test Method</u> | <u>Test</u> |
|--|--|
| <i>Leaching for Halides and Sulfur (continued)</i> | |
| ASTM D1246 | Standard Test Method for Bromide in Water |
| MIL-STD 2041D (SH) | Control of Detrimental Materials |
| MIL-STD 2190 (SH) ¹ (Withdrawn) | Non-Metallic Seal Materials |
| ASTM D3566 (Sections 9.1-9.15) | Rubber – Determination of Bromine in the Presence of Chlorine by Oxygen Combustion |

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| <u>Test Method</u> | <u>Test</u> |
|---------------------------------|---|
| ASTM D1510 (Method A) | Iodine Adsorption Number |
| ASTM D2414 (Procedures A and C) | Oil Absorption Number (OAN) |
| ASTM D1506 | Ash Content |
| ASTM D1618 | Transmittance of Toluene Extract |
| ASTM D1508 | Pelleted Fines and Attrition |
| ASTM D1514 | Sieve Residue |
| ASTM D1513 | Pour Density Pelleted |
| ASTM D1512 | pH Value |
| ARDL 3187 | Calibration of Volumetric Cup Used for ASTM D1513, Pour Density |

MICROBIOLOGICAL TESTING

| <u>Test Method</u> | <u>Test</u> |
|---------------------------|--|
| ASTM D5712 | Analysis of Aqueous Extractable Protein in Latex, Natural Rubber and Elastomeric Products Using the Modified Lowry Method |
| ASTM D6499 | Immunological Measurement of Antigenic Protein in Natural Rubber and Its Products |
| ASTM D7427 | Immunological Measurement of Four Principal Allergenic Proteins (Hev b 1, 3, 5 and 6.02) in Natural Rubber and Its Products Derived from Latex |
| BS EN 455-3 (Section 5.1) | Leachable Proteins in Medical Gloves for Single Use |

MOISTURE CONTENT BY KARL FISCHER TITRATION

| <u>Test Method</u> | <u>Test</u> |
|--------------------|--|
| ASTM D4017 | Water in Paints and Paint Materials by Karl Fischer Method |
| ASTM D6869 | Coulometric and Volumetric Determination of Moisture in Plastics Using the Karl Fischer Reaction (the Reaction of Iodine with Water) |
| ISO 15512 | Plastics – Determination of Water Content |

FLASHPOINT

| <u>Test Method</u> | <u>Test</u> |
|--------------------|---|
| ASTM D92 | Flash Points and Fire Points by Cleveland Open Cup Tester |

CONTACT ANGLE DETERMINATION & SURFACE TENSION

| <u>Test Method</u> | <u>Test</u> |
|--|---|
| ASTM D5946 | Corona-Treated Polymer Films Using Water Contact Angle Measurements |
| ASTM D7334 | Surface Wettability of Coatings, Substrates, and Pigments by Advancing Contact Angle Measurement |
| ASTM D7490 | Measurement of the Surface Tension of Solid Coatings, Substrates, and Pigments Using Contact Angle Measurements |
| ISO 15989 | Plastics – Film and Sheeting – Measurement of Water-Contact Angle of Corona-Treated Films |
| ASTM D971 | Interfacial Tension of Oil Against Water by the Ring Method |
| ASTM D1331 (du Noüy Ring Method) | Surface and Interfacial Tension of Solutions of Paints, Solvents, Solutions of Surface-Active Agents, and Related Materials |
| ASTM D1417 (Section 7) ¹ (Historical) | Rubber Lattices – Synthetic |

Note: *The laboratory is accredited for the test methods listed above. The accredited test methods are used in determining compliance with the material and/or safety specifications listed below; however, the inclusion of these material specifications on this Scope does not confer laboratory accreditation to the material specifications. Inclusion of these material specifications on this Scope also does not confer accreditation for every method embedded within the specification. Only the methods listed above on this Scope are accredited.*

ASTM D4626, E682

European Standards: BS EN 71-3

Vanderbilt Latex Handbook (3rd Edition)

EPA Method 24 (see Note 1 below)

Note: For Determination of Volatile Matter Content, Water Content, Density and Weight Solids of Surface Coatings, refer to test methods ASTM D1475, D2369 and D4017 in the accredited portion of this scope listed above.



Accredited Laboratory

A2LA has accredited

AKRON RUBBER DEVELOPMENT LABORATORY, INC.

Akron, OH

for technical competence in the field of

Chemical 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 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 29th day of June 2016.

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

President and CEO
For the Accreditation Council
Certificate Number 0255.02
Valid to March 31, 2018
Revised February 21, 2018

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