



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

AKRON RUBBER DEVELOPMENT
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MECHANICAL

Valid To: January 31, 2020

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)
ASTM F1319	Standard Test Method for determination of Abrasion and Smudge Resistance of Images Produced from Business Copy Products (Crockmeter Method)
DIN 53 516 – 87 ² (Withdrawn in 2014)	Determination of Abrasion Resistance
BS ISO 4649	Rubber, Vulcanized or Thermoplastic – Determination of Abrasion Resistance using a Rotating Cylindrical Drum Device
DIN ISO 4649	Determination of Abrasion resistance using a rotating cylindrical drum device
ISO 4649	Determination of Abrasion resistance using a rotating cylindrical drum device

ABRASION (continued)

<u>Test Method</u>	<u>Test</u>
Ford FLTM BN 107-01	Crocking Test – Interior Trim Materials
GM9033P-86 ² (Withdrawn in 2013)	Test for Determining Color fastness to Crocking (Rubbing)
GMW 3274 – 2011 (Withdrawn in 2016)	Pile Distortion (Crockmeter Method)
ISO 20433	Colour Fastness to Crocking: Textiles and Leather
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)
Chrysler LP-463PB-54-01	Crock Mar Resistance
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
ASTM D876 (Sections 59, 60 and 62)	Volume resistivity-non rigid vinyl fluoride polymer tubing used for electrical insulation

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 – 1993 (Withdrawn 1998)	Determining Permanent Effect of Heat on Plastics
ASTM D865	Rubber – Deterioration by Heating in Air (Test Tube Enclosure)
ASTM D1055 – 2009 (Parts 15-16) (Withdrawn in 2014)	Accelerated Aging Tests
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 Withdrawn	Rubber, Vulcanized or Thermoplastic – Determination of Low Temperature Properties
JIS K6261-1	General Introduction and Guide: Determination of low temperature properties
JIS K6261-2	Low temperature Brittleness
JIS K6261-3	Low temperature stiffness
JIS K6261-4	Low temperature retraction

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	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)

ULTRAVIOLET FLUORESCENT LAMPS/XENON *(continued)*

Test Method	Test
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
ASTM G151	Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources
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 102B/B2 - 3.11 - 2005 (Withdrawn in 2007)	Staining: Low Density Polyvinyl Chloride Foam Pressure Sensitive, Supersoft/Tape, Low Density Polyvinyl Chloride/Nitrile Foam Pressure Sensitive, Ultra Soft
GM 9125-1998 (Withdrawn in 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 (2014)	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

ULTRAVIOLET FLUORESCENT LAMPS/XENON (continued)

Test Method	Test
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 (Withdrawn in 2000)	Operating Light-Exposure Apparatus (Xenon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials
ASTM 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 BMS 1-57L-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
Ford ESB-M9P4-A-1978 ² (Withdrawn)	Rubber Parts – Migration Staining Against Paint
GM9902P-96 Withdrawn	Noncontact Staining Measurement of Elastomers (Xenon-Arc)
GME 60292 – 2000 (Withdrawn in 2016)	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
GMW 17557	Non Contact Staining
Honda HES D2500-10 (Sections 3.12.1b & 3.12.2)	Light Resistance/Weather Resistance – Resin Materials for Vehicles
Honda HES D6601-99A	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
ISO105-B01	Color fastness to Daylight
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

ULTRAVIOLET FLUORESCENT LAMPS/XENON (continued)

Test Method	Test
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)
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) (2008 Only)	Weatherability and Light Resistance Test Methods for Synthetic Resin Parts
PSA Peugeot – Citroen D27-1389-07	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 J1885-2005 (Withdrawn in 2008)	Accelerated Exposure of Automotive Interior Trim Components Using a Controlled Irradiance Water Cooled Xenon-Arc Apparatus
SAE J1960-2004 (Withdrawn in 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 TSL 3610G Rev 9 Sept. 2010 PARA. 7.8.2	Light Resistance
Toyota TSH1585G-10 (Except Test Types IV & V)	Xenon-Arc Lamp Type Methods for Accelerated Weathering Resistance of Paint Film
Toyota TSL0601G-11 (Methods B & E)	Criteria for Test for Quality of Color Change by Aging
Toyota TSM0501G-03 (Section 9.20 with Atlas Ci65 or Equivalent)	Accelerated Weather (Light) Resistance Test
UL758 (Section 17)	Physical Properties of Insulation and Jacket, Sunlight Resistance

ULTRAVIOLET FLUORESCENT LAMPS/XENON (continued)

<u>Test Method</u>	<u>Test</u>
UL 1581 (Section 1200)	Sunlight Resistance
UL 2556 (Section 4.2.8.5)	Weather (Sunlight) Resistance
VW PV 1303-01	Exposure Test of Passenger Compartment Components
VW PV 3929-18	Non-Metallic Materials: Weathering in Dry, Hot Climate
VW PV 3930-17	Non-Metallic Materials: Weathering in Moist, Hot Climate
Yamaha YGK-8-501 (2008)	Painting – Accelerated Weatherability
Yamaha YGK-8-706 (2016)	Xenon Arc Lamp Weathering Test

ADHESION

<u>Test Method</u>	<u>Test</u>
AFG-01 - 1984	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 – 1987 (Withdrawn in 1999)	Determination of the Behavior of Rubber and Elastomers when Exposed to Fluids And Vapours
DIN ISO 1817	Determination of the effect of liquids
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
GMW14334	Chemical Resistance to Fluids
NES M0133 2010	Testing methods of chemical resistance for plastic parts

COLOR

<u>Test Method</u>	<u>Test</u>
AATCC EP-1	Grey Scale for Color Change
ASTM D1003	Haze and Luminous Transmittance of Transparent 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
JIS L0804	Grey scale for assessing change in Color
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 Method A only	Heat Generation and Flexing Fatigue in Compression
ASTM D695	Compressive Properties of Rigid Plastics
ISO 604	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) – 2009 (Withdrawn in 2014)	Compression Set Under Constant Deflection
ASTM D1055 (24-26) – 2009 (Withdrawn in 2014)	Flexing Test (Suffix H)
ASTM D1055 (27-30) – 2009 (Withdrawn in 2014)	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

COMPRESSION (continued)

<u>Test Method</u>	<u>Test</u>
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 - 1975 (Withdrawn in 1993)	Vulcanized Rubbers - Determination of Compression Set under Constant Deflection at Low Temperatures
ISO 3386-1	Determination of stress strain characteristics in compression-Low density materials
DIN EN ISO 3386-1	Determination of stress strain characteristics in compression-Low density materials
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
ASTM D1667 (Parts 16-20)	Compression Deflection Test Method
ASTM D1667 (Parts 21-25)	Compression Set Under Constant Deflection

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 3704 – 1996 (Withdrawn)	Natural Rubber Latex Male Condoms
ISO 4074 Except annex G and section M.3	Natural Rubber Latex Male Condoms – Requirements and Test Methods
BS EN ISO 4074 Except annex G and section M.3	Natural Rubber Latex Male Condoms – Requirements and Test Methods
WHO – Male Latex Condom Test	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 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 D1622/D1622M	Standard Test method for Apparent Density of Rigid Cellular Plastics
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
ASTM D5132	Horizontal Burning Rate of Polymeric Materials Used in Occupant Compartments of Motor Vehicles
USDOT FMVSS-302-03	Flammability of Interior Materials – Passenger Cars, Multipurpose Passenger Vehicles, Trucks and Buses
IEC 60695-11-10	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 TL1010-2008	Burning Behavior – Materials used in Vehicle Interiors

FOGGING CHARACTERISTICS

<u>Test Method</u>	<u>Test</u>
Chrysler LP-463DB-12-01 – 2000 Withdrawn	Fogging Resistance of Interior Materials
GMW 3235	Fogging Characteristics of Trim Materials
SAE J1756	Determination of the Fogging Characteristics of Interior Automotive Materials
ASTM D1735	Standard Practice for Testing Water resistance of Coatings Using Water Fog Apparatus

FRICTION 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
Federal Standard 141D (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 D2500-10 (Section 3.10 only)	Gloss Test
JIS Z 8741	Specular Glossiness
ISO 2813	Gloss values at 20°, 60°, 85°

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 53 505-2000 (Withdrawn in 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)
DIN ISO7619-1	Rubber, Vulcanized or Thermoplastic-Determination of Indentation Hardness
JIS K 6253-2 M and CM only	Rubber, Vulcanized or Thermoplastic – Determination of Hardness (Hardness Between 10 IRHD and 100 IRHD)
ASTM D1415	Rubber Property – International Hardness
ISO 48 M and CM only	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
SAE J1037	Windshield Washer Tubing

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) 2012	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
VDA 270	Determination of odor characteristics of trim materials

OZONE TESTING

<u>Test Method</u>	<u>Test</u>
ASTM D518-99 (Withdrawn in 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 (Withdrawn in 2008)	Rubber Deterioration – Dynamic Ozone Cracking in a Chamber
DIN 53 509-1-1990 (Withdrawn in 2011)	Resistance of rubber to ozone cracking
ISO 1431-1	Rubber, Vulcanized or Thermoplastic – Resistance to Ozone Cracking – Static and Dynamic Strain Testing
Ford BP 101-01	Degradation by ozone
FMVSS 106 TP-106 April 2008 (sections 12.A.13 & 12.B.6	Laboratory test procedure for FMVSS 106 brake hoses
SAE J1401 Section 4.2.9 & 4.2.13	Hydraulic Brake Hose Assemblies for use with nonpetroleum base hydraulic fluids
GM4486P-1995 (Withdrawn in 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
BN 103-01	Resistance of Coated Fabrics and Plastic Film to Migration Staining and Blocking
GM9317P-1996 (Withdrawn 2017)	Water Repellancy Test
GM9517P-88 ² (Withdrawn 2012)	Resistance to Synthetic Perspiration
GM 9689-95P 1995 (Withdrawn in 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 - 2005 (Withdrawn in 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
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 M0142-1991 (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 D1708	Tensile Properties of Plastics by Use of Microtensile Specimens
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 D5734-2001 (Withdrawn in 2008)	Tearing Strength of Nonwoven Fabrics by Falling-Pendulum (Elmendorf) Apparatus
ASTM D5735 - 2001 (Withdrawn in 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 Tensile Strength
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 K6252-1	Rubber, Vulcanized or Thermoplastic- Determination of tear strength Trouser, angle crescent pieces
JIS K6252-2	Rubber, Vulcanized or Thermoplastic- Determination of tear strength Small (delft) test pieces
JIS K6252-2007 (Withdrawn)	Rubber, Vulcanized or Thermoplastic – Determination of Tensile Stress-Strain Properties
DIN 53 507 – 1983 (Withdrawn)	Determination of Tear Growth Propagation Trouser Test Piece
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 – 2003 (Withdrawn in 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
GMW14724	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
SAE J 2665	Measurement of fuel permeability of materials by the cup weight loss methods

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
BS EN ISO 62	Plastics – Determination of Water Absorption
ASTM D1056, sections 43 to 49	Flexible Cellular Materials-Sponge or Expanded Rubber-water absorption,
ISO 6916-1 Annex E	Flexible cellular polymeric materials-Sponge and expanded cellular rubber

¹This accreditation covers testing performed at the main laboratory listed on page 1, and at the satellite laboratories listed below.

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 D3182	Procedures for Mixing Standard Compounds and Preparing Standard Vulcanized Sheets
ASTM D3183	Rubber – Preparation of Pieces for Test Purposes from Products

MISCELLANEOUS

<u>Test Method</u>	<u>Test</u>
ASTM D6147	Determination of Force Decay (Stress Relaxation) in Compression
ASTM E662	Optical Smoke Density
ASTM F36	Compressibility and Recovery of Gasket Materials
ASTM F1112	Statics Testing of Tubeless Pneumatic Tires for Rate of Loss of Inflation Pressure
ISO 3384-1	Determination of Stress Relaxation in Compression
ISO 6056	Determination of Compression Stress Relaxation (rings)

CONVEYOR BELTING, FLAT TYPE

<u>Test Method</u>	<u>Test</u>
ASTM D378 (Section 17)	Breaking Strength and Modulus Testing of Conveyor Belting

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

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 (Except Compression Set, ASTM D395)	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
ISO 4664-1	Rubber, Vulcanized or Thermoplastic-Determination of Dynamic Properties
ASTM D5024	Dynamic Mechanical Properties in Compression
ASTM D5026	Dynamic Mechanical Properties in Tension
ASTM E1640	Standard for Assignment of the Glass Transition Temperature by Dynamic Mechanical Analysis

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
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

HOSE TESTING

<u>Test Method</u>	<u>Test</u>
ASTM D380 (Section 14-17)	Rubber Hose for Automotive Air and Vacuum Brake Systems

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

CARBON ARC (continued)

Test Method	Test
ASTM D3815	Accelerated Weathering of Pressure-Sensitive Tapes by Open-Flame Carbon-Arc Exposure Apparatus
ASTM G152	Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials
Ford FLTM BO 101-01-2001 (Withdrawn)	Resistance to Artificial Weathering
Fuji TS420-1-12 (2002)	Weather Strip Testing
Honda HES D2500 -10 Rev 2 (3.12.2)	Weathering Resistance Test Resistance Test
Hyundai/KIA MS 260-13, Section 4.9 (2014)	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 – 1951 (Withdrawn in 1966)	Accelerated Aging
FED STD 601 Method 7311 – 1955 (Withdrawn)	Resistance to Light
Nissan NES M0007 - 2006 (Methods A and B)	Test Method for Resistance Characteristics to Rubber Part
Nissan NES M0501 (Methods 4, 5 and 6) - 2007	Testing Methods of Staining for Rubber, Vulcanized or Thermoplastic
Nissan NES M7075, 7.16 - 2005	Weather Resistance
Nissan NES M0135 - 2008	Weatherability and Light Resistance Test Methods for Synthetic Resin Parts
Suzuki SES N3292 - 2000	Test Methods of Weatherability and Light Resistance for Plastic Parts
Toyota TSM 1100G-2007 (Section 8.6)	Weathering Test
Toyota TSM 1500G, 5.18 - 2012	Staining Test (By Contact)
Toyota TSM 1501G, 8.9 - 2004	Staining Test
Toyota TSM 5728G-2005 (Section 5.9.2, Method A)	Accelerated Weatherability
Toyota TSK 6505G (Section 4.6) - 2011	Paint Film Contamination Resistance
FED STD 601 Method 7311 – 1955 Withdrawn	Resistance to Light
Toyota TSM 5526G - 2010	Polycarbonate/Acrylonitrile – X- Styrene Alloy Resin Molding Materials
UL 758 Section 17	Sunlight Resistance
UL 2556 Section 4.2.8.5	Weather Resistance

OIL AND GAS

ISO 23936-1	Petroleum, Petrochemical and Natural Gas Industries – Non-Metallic Materials in Contact With Media Related Oil and Gas Production – Thermoplastics
ISO 23936-2	Petroleum, Petrochemical and Natural Gas Industries – Non-Metallic Materials in Contact With Media Related Oil and Gas Production – Elastomers
NACE TM0192	Evaluating Elastomeric Materials in Carbon Dioxide Decompression Environments
NORSOK M-710	Rapid Gas Decompression Resistance

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 Withdrawn, WSS-M2D380-B1 Withdrawn, WSS-M2D381-B1 Withdrawn, WSS-M2D382-B1Withdrawn

GM: GM6086M Withdrawn 2012, GM7001M Withdrawn 2011, GMP.ABS.018R Withdrawn 2012, GMP.E/P.003 Withdrawn 2011, GMP.E/P.029 Withdrawn 2010, GMP.E/P.071 Withdrawn 2011, GMP.TES.012 Withdrawn 2013, GMP.EP.001 Withdrawn 2011, GMP.PE.002 Withdrawn 2011, GMP.PE.003 Withdrawn 2011, GMP.PE.004 Withdrawn 2011, GMP.PE.005 Withdrawn 2011, GMP.PE.006 Withdrawn 2016, GMP.PE.007 Withdrawn 2011, GMP.PE.009 Withdrawn 2011, GMN8423, GMN11106 Withdrawn 2010, GMW15473 Withdrawn 2015, 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 5th day of March 2018.

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

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 0255.01
Valid to January 31, 2020
Revised February 8, 2019

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: January 31, 2020

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

CHROMATOGRAPHY

<u>Test Method</u>	<u>Test</u>
ASTM D4327	Standard Test Method for Anions in Water by Suppressed Ion Chromatography
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

CHROMATOGRAPHY (continued)

<u>Test Method</u>	<u>Test</u>
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 3816	Scanning Electron (SEM/EDX)
ARDL 3815	Scanning Electron: Microdispersion of Inorganic Fillers
ARDL 3813	Scanning Electron: Elemental Analysis
ASTM D3849-95a Historical	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 374-3-2003 (Withdrawn)	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



THERMAL (continued)

Test Method	Test
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
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

CARBON BLACK

<u>Test Method</u>	<u>Test</u>
ASTM D1510 (Method A)	Iodine Adsorption Number
ASTM D2414	Oil Absorption Number (OAN)
ASTM D1506	Ash Content
ASTM D1618	Transmittance of Toluene Extract
ASTM D1619	Carbon Black – Sulfur Content
ASTM D1508	Pelleted Fines and Attrition
ASTM D1509 (Method A)	Carbon Black – Heating Loss
ASTM D1514	Sieve Residue
ASTM D1513	Pour Density Pelleted
ASTM D1512	pH Value
ARL 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)	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) (for Reference Only)

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 5th day of March 2018.

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

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 0255.02
Valid to January 31, 2020
Revised February 26, 2019

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