

# TESTING SERVICES

*Lubricant Oils, Fluids, Greases & More*

## INDEPENDENT LABORATORY TESTING

The Institute of Materials (IOM) inspects each material purchased, then assigns it a blind-code sample ID to eliminate any brand perception biases.

Samples are sent to pre-selected independent laboratories that specialize in lubricant testing and are:

- Recognized leaders in the industry
- ISO 9001 Quality Management System Certified
- ISO/IEC 17025:2017 Accredited
- Participants in the ASTM Proficiency Testing Program for engine oils

The testing services listed are representative of more than 150 ASTM methods available. The original IOM Test Matrix of analytical and bench testing is indicated by ✓ .

### VISCOSITY

	Method	Test Description
✓	ASTM D445	Kinematic Viscosity
	ASTM D445	Kinematic Viscosity, Low Temperature Below 0°C
✓	ASTM D2270	Viscosity Index (D445 at 40°C & 100°C)
	ASTM D2983	Brookfield Viscosity, (+20°C to -60°C)
✓	ASTM D4683 & D6616	High Temperature High Shear Viscosity
✓	ASTM D4684	Mini-Rotary Viscometer Viscosity (MRV TP-1)
	ASTM D5133	Scanning Brookfield / Gelation Index
✓	ASTM D5133 Modified	Scanning Brookfield Technique, Extended Temperature
✓	ASTM D5293 & Modified	Cold Cranking Simulator (CCS), Single Temperature & Scan
✓	ASTM D6278 & D7109	Kurt Orbahn Shear Stability
	CEC L-45-99 Modified	KRL Shear (Tapered Roller Bearing Test) 4, 8 & 20 Hours
✓	SAVLAB FEI	Fuel Efficiency Index (FEI)
✓	SAVLAB TBR	High Temperature, Low Shear Viscosity
✓	SAVLAB VLP	Viscosity Loss Profile

### PHYSICAL PROPERTIES

	Method	Test Description
	ASTM D92	Flash Point and Fire Point, Cleveland Open Cup
	ASTM D93	Flash Point, Pensky-Martins Closed Cup
	ASTM D97	Pour Point
	ASTM D130	Copper Strip Corrosion
✓	ASTM D892 & D6082	Foaming, Sequence I - IV
	ASTM D1298	Density / API Gravity, Hydrometer
	ASTM D1331	Surface Tension
	ASTM D1401	Emulsion Characteristics / Water Separability
	ASTM D2879	Vapor Pressure by Isotenoscope, Multiple Temperatures
	ASTM D3427	Air Release
✓	ASTM D5800	Noack Volatility
	ASTM D6304	Water by Karl Fischer
✓	ASTM D6417	Simulated Distillation by Gas Chromatography
	ASTM D6793	Bulk Modulus
	ASTM D6922	Homogeneity & Miscibility
	ASTM E1269	Specific Heat
	SAVLAB LPYC	Density, Pycnometer
	SAVLAB TGA	TGA Thermal Scan or Isotherm

### OXIDATION

	Method	Test Description
	ASTM D942	Oxidation Stability (Grease) 100 Hours
	ASTM D943	Oxidation Characteristics
	ASTM D2272	Rotating Pressure Vessel Oxidation Test (RPVOT)
	ASTM D4742 & D7098	Thin Film Oxidation Uptake Test (TFOUT) - Catalyst A & B
✓	ASTM D6335	Thermo-oxidation Engine Oil Simulation Test (TEOST 33C)
	ASTM D6594	High Temperature Corrosion Bench Test, 135°C
✓	ASTM D7097	Thermo-oxidation Engine Oil Simulation Test (TEOST MHT-4)
	SAVLAB EV-CDT	Conductive Deposit Test
	SAVLAB EV-WCT	Wire Corrosion Test
	SAVLAB TURBO	Thermo-oxidation Engine Oil Simulation Test (TURBO)



(continued from page 1)

**DATA INTEGRITY**

Custom designed computer applications and data review processes have been developed by IOM to ensure the highest quality of data and services are provided.

IOM is ISO 9001:2015 Quality Management System Certified by ABS Quality Evaluations, Inc.

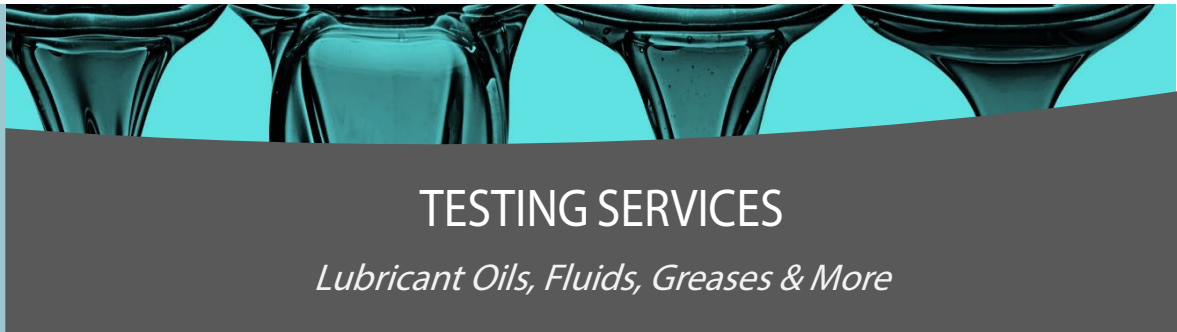
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**P E R F O R M A N C E / S I M U L A T I O N**

	Method	Test Description
	ASTM D217	Cone Penetration, Unworked & 60 Strokes (Grease)
	ASTM D2603 & D5621	Sonic Shear, Oils or Hydraulic Fluids
	ASTM D2783	Four Ball Extreme Pressure
	ASTM D4172	Four Ball Wear
	ASTM D4289	Elastomer Compatibility NBR L and/or CR Grease
	ASTM D5183	Coefficient of Friction by Four Ball
✓	ASTM D6417	Simulated Distillation by Gas Chromatography
	ASTM D6425	Friction and Wear Properties of Extreme Pressure (EP) Using SRV
	ASTM D6795	Engine Oil Filterability (EOFT)
	ASTM D7216	Elastomer Compatibility
✓	ASTM D7563	Emulsion of Water and Simulated Ed85 Fuel
	CEC L-112-16	ACEA Elastomers Compatibility

**S P E C I F I C A T I O N S**

	Method	Test Description
	ASTM D445	Kinematic Viscosity
	ASTM D664	Acid Number
	ASTM D874	Sulfated Ash
	ASTM D892 & D6082	Foaming, Sequence I - IV
✓	ASTM D2270	Viscosity Index (D445 at 40°C & 100°C)
✓	ASTM D2896	Base Number
✓	ASTM D4683	High Temperature High Shear Viscosity
✓	ASTM D4684	Mini-Rotary Viscometer (MRV TP-1) Viscosity
	ASTM D4951	Elemental Analysis by Inductively Coupled Plasma
✓	ASTM D5133	Scanning Brookfield / Gelation Index
	ASTM D5293	Cold Cranking Simulator (CCS)
	ASTM D5762	Nitrogen
✓	ASTM D5800	Noack Volatility
✓	ASTM D6335	Thermo-oxidation Engine Oil Simulation (TEOST 33C)
✓	ASTM D6417	Simulated Distillation by Gas Chromatography
	ASTM D6594	High Temperature Corrosion Bench Test, 135°C
✓	ASTM D6616	High Temperature High Shear Viscosity
	ASTM D6794	Engine Oil Water Tolerance (EOWT)
	ASTM D6795	Engine Oil Filterability (EOFT)
	ASTM D6922	Homogeneity & Miscibility
✓	ASTM D7097	Thermo-oxidation Engine Oil Simulation (MHT)
	ASTM D7216	Elastomer Compatibility

**M O L E C U L A R C H A R A C T E R I Z A T I O N**

	Method	Test Description
	ASTM D2887	Gas Chromatography - Carbon Distribution
✓	ASTM D2896 & D4739	Base Number
✓	ASTM D4951 & D5185	Elemental Analysis by Inductively Coupled Plasma
✓	ASTM D5453	Sulfur
✓	ASTM D5762	Nitrogen
	ASTM D6304	Water by Karl Fischer
✓	SAVLAB PEI	Phosphorus Emission Index
✓	SAVLAB SEI	Sulfur Emission Index
✓	SAVLAB SULFCALC	Sulfated Ash (Calculated)

The original IOM Test Matrix of analytical and bench testing is indicated by ✓.