



# On the Horizon

A World of Lubrication Understanding®



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## Today's Topics:

- **Important Properties and Tests for EV Lubricants & Fluids**
- **Why Custom Testing for EV Lubricants and Fluids is so Prevalent**
- **Multiple Service Levels Available**

## The News in EV Lubricants & Fluids Testing

In the automotive lubricant industry, 2023 has been full of talk about electric vehicle drivetrain fluids. In June of 2023, TotalEnergies published a white paper announcing results from the fleet testing of its recently launched EV fluid [1]. In October, STLE published a white paper summarizing the research presented at the 2<sup>nd</sup> Tribology & Lubrication for E-Mobility Conference in preparation for its November 2023 Conference [2] and published an article summarizing an earlier webinar about electric vehicle drivetrain fluids testing [3].

At the same STLE conference in November, Greg Müller, Savant Group, presented "Conductive Deposits and Wire Corrosion – New Technology for Electric Vehicle Drivetrains" [4]. Greg also serves on the Electric Vehicle Panel for the STLE Conference for E-Mobility, pictured right. This underscores the continued importance of developing specific fluids for EV drivetrains. If you would like a copy of that presentation, [contact us](#).



Electric Vehicle Panel - STLE Conference for E-Mobility

## The Most Important Properties and Tests for EV Lubricants and Fluids

Based on the [SAE J3200 document](#), which is finalized and now available for purchase on the SAE website, experts agree that the most important properties of electric vehicle drivetrain fluids are low viscosity, good gear protection, low foaming tendency, excellent heat transfer, protection against corrosion and conductive deposits, good compatibility with polymeric materials, prevention of electrical discharge, and good oxidation resistance [5]. These properties promote vehicle efficiency, protect critical vehicle components, and ensure the durability of the fluid over time. There are many common tests used to evaluate potential electric vehicle drivetrain fluid formulations for each of these properties. Savant Labs can provide most of the **SAE J3200 tests**, which are listed in the table below. More details are provided on our website:



[Learn More](#)

Properties	Test Designation	
Viscosity (kinematic, Brookfield, and HTHS, etc.)	ASTM D97 ASTM D2983 CEC L-45	ASTM D445 ASTM D4683
Ability to protect gears	ASTM D5182	ISO 14635
Foaming tendency	ASTM D892 ASTM D6082	ASTM D3427
Heat transfer properties	ASTM D2717 ASTM E1269	ASTM D7896
Protection against corrosion and conductive deposits and oxidation	SAVLAB EV-WCT ASTM D130 ASTM D665 CEC L-48	SAVLAB EV-CDT ASTM D864 ASTM D7214
Compatibility with polymeric materials	ASTM D4289 CEC L-112	ASTM D7216 ISO 1817
Electrical conductivity/resistivity	ASTM D877	
Properties	ASTM D4052 ASTM D5185 ASTM D6417	ASTM D4951 ASTM D6304 ASTM D6443
Flammability	ASTM D92	

## Why Custom Testing for EV Lubricants and Fluids is so Prevalent

Even with this extensive list of available tests, there is a demand for EV lubricant and fluid custom tests. The wide variation in EV drivetrain designs is the primary driver of this demand. Different EV designs may have different motor configurations, different gear reductions, and different numbers of fluids with specific roles for each. Some designs require the same fluid to lubricate gears, bearings, and cool electrical components. Other designs use bearings lubricated with traditional greases and separate the lubricants with appropriate seals. Standardized methods cannot possibly apply to every configuration and its resulting lubricant need. Therefore, researchers have modified existing tests or developed new tests that include applying voltages across test components, changing test temperatures, using different materials in the test, and modifying speed and load [2,3]. Changing one or more parameters of the test to better fit the real-world conditions the lubricant will experience, is the best way to be sure a lubricant is suitable for its application.



## EV Lubricants and Fluids Testing at Savant Labs

Fortunately, Savant Labs can run the [standardized tests](#) most important for EV fluids and provides custom tests that explore areas specific to a given application. Savant Labs has expert staff who have adapted and developed many custom tests. They can guide you in developing a custom test that will answer the questions you have about electric vehicle drivetrain fluids in a particular application. [Contact Savant Labs](#) today to learn more about the standardized and custom testing options available.

More details are provided on our website:

[Learn More](#)

[1] TotalEnergies. "TotalEnergies last-generation EV Fluids validated under real-life conditions." 27/06/2023 – NEWS. <https://lubricants.totalenergies.com/news-press-releases/totalenergies-last-generation-ev-fluids-validated-under-real-life-conditions>, accessed Nov. 3, 2023.

**SAVANTLAB.COM**

Testing Services – Electric Vehicle Lubricants and Fluids

**Savant Labs**  
Driving Change  
Electric Vehicle (EV)  
Lubricant and Fluid  
Testing Services

The transportation industry and its fluids and systems are evolving, and Savant Labs is at the forefront of electric vehicle drivetrain fluids testing.

As leaders in lubricant testing and research, Savant Labs can help you prepare for the future as you develop fluids that meet the expanding EV industry requirements.

Method	Test Description
ASTM D97	Flash and Fire Point by Closed Cup Test
ASTM D445	Viscosity @
ASTM D2983	Cooperating Viscosity
ASTM D117	Cloud Point
ASTM D4683	Viscosity at Operating Temperatures
ASTM D5182	Gear Lubrication
ASTM D892	ASTM D892
ASTM D6082	ASTM D6082
ASTM D2717	ASTM D2717
ASTM E1269	ASTM E1269
SAVLAB EV-WCT	SAVLAB EV-WCT
ASTM D130	ASTM D130
ASTM D665	ASTM D665
CEC L-48	CEC L-48
ASTM D4289	ASTM D4289
CEC L-112	CEC L-112
ASTM D877	ASTM D877
ASTM D4052	ASTM D4052
ASTM D5185	ASTM D5185
ASTM D6417	ASTM D6417
ASTM D92	ASTM D92

**Savant Labs**  
4800 Lewisburg Rd  
Midvale, UT 84046  
savantlabs.com  
801.486.2200

[2] Canter, Neil. "Tribology and Lubrication for E-Mobility: Findings from the 2<sup>nd</sup> STLE Conference on Electric Vehicles." STLE, October, 2023.

[3] McGuire, Nancy. "Test methods for evaluation of electric vehicle drivetrain fluids." STLE. TLT Webinar October 2023.

[https://www.stle.org/files/TLTArchives/2023/10\\_October/Webinar.aspx](https://www.stle.org/files/TLTArchives/2023/10_October/Webinar.aspx), accessed Oct. 30, 2023.

[4] Miiller, Greg, "Conductive Deposits and Wire Corrosion – New Technology for Electric Vehicle Drivetrains." STLE Conference, November, 2023. A white paper was written by Greg Miiller, Savant Group, William Vanbergen, Savant Group, David Gillespie, Cargill, Alexei Kurchan, Cargill; Timothy Newcomb, Lubrizol US; and Greg Hunt, Lubrizol UK.

[5] SAE J3200\_202210 "Fluid for Automotive Electrified Drivetrains" Information Report. October 10, 2022.

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## Multiple Service Levels Available

At Savant Labs, we understand the importance of meeting project deadlines. That's why we offer multiple service levels to ensure you stay on schedule. Choose from:

- **Rush** 3-business day,
- **Expedited** 5-business day and
- **Standard** 10-business day options and even
- **24-Hour turnaround** depending on the test method.

Rest assured, our impressive on-time delivery rate and [ISO/IEC 17025:2017 accreditation](#) on many test methods establish our credibility.



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## Attending ASTM D02 Meeting?

We look forward to the upcoming ASTM D02 Meeting in New Orleans, Louisiana. If you plan on attending, stop by our hospitality booth on Tuesday, **December 5th in the Armstrong Ballroom!** Our team will be available to discuss our new lubricant testing for Conductive Deposits and Wire Corrosion for Electric Vehicle Drivetrains.

**ASTM MEETING ATTENDEES**  
PLEASE JOIN OUR HOSPITALITY

**TUESDAY, DECEMBER 5TH, 6 TO 8PM**  
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[SavantLab.com](https://SavantLab.com)

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**Our mailing address is:**

Savant Labs

4800 James Savage Road

Midland, MI USA 48642

Telephone: (989) 496-2301

Email: [savant@savantgroup.com](mailto:savant@savantgroup.com)

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