

# TanEV CDT™

## Conductive Deposit Test

**ASTM D8544 | SAE J3200**



### Principle

**Conductive Deposit Test:** The CDT instrument is designed to determine the tendency of lubricating fluids to form conductive layer deposits on exposed copper motor windings, connectors, and electrical components at elevated temperatures in an Electrified Vehicle (EV) Drivetrain. A specially modified circuit board (PCB) is lowered into ~20 mL of test fluid at 150°C for ~500 hours while supplied with a 5V DC signal. The resistance, in Ohms supplied to two voltage loops on the PCB, is measured in both the liquid and vapor phases the duration of the test. A failed test occurs when deposits conduct across copper traces on the PCB.

### History

With the rapid increase in EV mobility of all types (EV, BEV, Hybrid, etc.), the need for EV fluids with special performance specifications and characteristics is critical. Initial studies found the ASTM D130 (Copper Strip Test) does not adequately predict fluid performance in electrified drivetrains and is limited to evaluation of copper metal strips only. Failures in EV motors have been shown to relate to growth of the conductive layer deposits that connect the hairpin locations of the motor winding, providing a pathway for current to flow via the deposit. Exposed copper in the motor winding is the result of either a flaw in the manufacturing process or the failure of the coating during operation.

Conductive deposits form from the chemical reaction of the lubricating fluid and copper motor windings and electrical components in very small areas at elevated temperatures. This occurs under electrified conditions both in the fluid and the vapor state causing failures. The CDT test appears to be a good discriminator between passing and failing either vapor and/or liquid phases of field passing and failing fluids.

### Innovation

Continued advancement of the original liquid bath version of the conductive layer deposit test has resulted in the small, non-liquid, TanEV CDT™ with minimal operational setup and teardown steps. It has (4) independent heating/data units per docking station and works with an IOS application for starting/stopping tests and capturing data.

### Features

- 150°C for 500+ Hours with 5V DC Applied to Two Voltage Loops per PCB
- Tests Liquid & Vapor Phase Deposit Formation (~20 mL Sample Size)
- Specially Designed PCBs with Critical Spacing for Drivetrain Simulation
- 4-port Docking Station, Independently Controlled Units
- Small Benchtop Footprint (30 cm x 32 cm)
- Included in SAE J3200 for EV Drivetrain Fluids

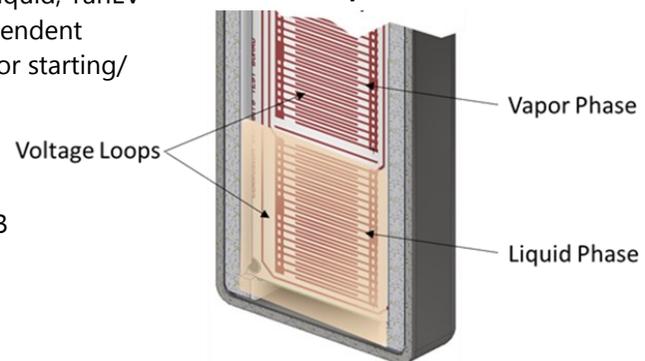
### ASTM D8544

Determination of Conductive Deposits on Electrical and Mechanical Components from Fluids in Liquid and Vapor States within an Electrically Charged System.

**Included in Draft of SAE J3200 EV Classification Guideline**

**US Army MILSPEC/Federal Test Method (FTM) Awaiting Approval**

**Test Cell Cutaway View**



## Instrument & Parts

### Conductive Deposit Test:

- 600100: TanEV CDT™ (Conductive Deposit Test)
- 600150: PCB Test Board Assembly - CDT
- 600155: Sample Bath Cartridge
- 600160: Adapter Module with PT100



## Instrument Specifications

|                           |   |
|---------------------------|---|
| <b>Dimensions</b>         | <u>Single Bath/Head:</u><br>6.8(w) x 16.3(L) x 22(h) cm   (2.68 x 6.42 x 8.62 in)           |
|                           | <u>Docking Station</u><br>17.1(w) x 32(L) x 4.4(h) cm   (6.72 x 12.6 x 1.73 in)             |
|                           | <u>Four Baths with Docking Station:</u><br>30(w) x 32(L) x 22(h) cm   (12 x 12.6 x 8.62 in) |
| <b>Weight</b>             | Single Bath/Head: ~1.7 kg (3.8 lbs.)  |
|                           | Docking Station: ~1.5 kg (3.4 lbs.)   |
|                           | Four Baths with Docking Station: ~8.4 kg (18.6 lbs.)  |
| <b>Power Requirements</b> | 100-240 VAC, 50/60 Hz, max. 600 W   |
| <b>Heating Medium</b>     | Non-liquid heating system - no hot oil bath   |
| <b>Testing Capacity</b>   | Four-position   |
|                           | Designed for multi-unit alignment with a docking station, each independent (4 baths)        |
| <b>Temperature</b>        | Temperature: 150° ± 0.1°C   |
| <b>Output</b>             | Continuous temperature output   |
| <b>Safety</b>             | High Temperature Cut-out  |

The TanEV CDT™ instrument offers independent control of each unit through an IOS application. Users can seamlessly start, stop tests, and capture data remotely, providing a user-friendly and efficient experience for precise experimentation and data analysis.

## Additional TANNAS CO. Precision Laboratory Instruments



### Tannas Foam Air Bath (TFAB)

- ASTM D892, D6082, D1881, D7840, IP146
- Non-liquid bath
- 24°C to 150°C range



### TBS 3000 HTHS Viscometer

- ASTM D4683, D6616, CEC L-36, IP370
- High-Temperature, High-Shear (HTHS)
- 80°C, 100°C, 150°C testing



### Noack S2® Volatility Test

- ASTM D5800, Procedure D, CEC L-40
- Phosphorus Volatility
- Non-Wood's metal heating system

