

TanEV WCT

Wire Corrosion Test

SAE J3200 | ASTM Method Under Development

Principle

Wire Corrosion Test: A wired test board assembly, that has two separate sections, an upper and a lower, is utilized as the core of this test. This assembly is placed into a lubricant heated to the test temperature, typically 130°C, with the lower winding circuit immersed in the test oil and the upper in vapor of the test cell. Once heated and stable, the wires are powered and the change in conductance is monitored for 72 hours or until failure of the wire occurs. The sample temperature and change in conductance of the circuit within both the liquid and vapor are recorded throughout the duration of the test. Conductance changes are converted to resistance values and are then used to determine the change in diameter of the test wire due to corrosion. Changes in the wire diameter are monitored as a rate of change. This change is directly proportional to the amount of corrosion occurring to the surface of the wire.



History

Corrosion testing has been shown necessary in both ICE, HEV, and EV technologies. The degradation of metal surfaces through corrosion is a destructive process wherein the metal is electrochemically oxidized through interaction with its environment. Copper corrodes when exposed to a variety of aggressive agents including acids, salts, phosphates, and Sulphur compounds. When the environment is a formulated hydrocarbon solution, such as fuels and lubricants, the main concern is corrosion by Sulphur compounds.

The wire corrosion test (WCT) technique was developed specifically for the electric vehicle industry. With fluid materials in contact with various metal products, especially copper, this type of testing has become critical as these destructive conditions have been problematic globally. This test was designed not to look at the level of corrosion that occurs such as the ASTM D130 copper corrosion test, but was developed to analyze the rate of corrosion at a given temperature. This analysis is intrinsic for the industry with motors, motor windings, electrical connectors, electrical components, and circuitry all potentially exposed in the EV application.

Innovation

Continued advancement of the original liquid bath version of the wire corrosion test has resulted in the small, non-liquid, TanEV WCT 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

- 80-180°C for ~72 Hour Test
- Low-Voltage Applied to Test Board
- Tests Liquid & Vapor Phase Wire Corrosion
- Modular Test Units with 4-Port Docking Station
- Independently Controlled Test Units with IOS Data Collection
- Small, Non-Liquid Benchtop Footprint

Test Board Assembly, WCT



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Instrument & Parts

Wire Corrosion Test:

- 800100: TanEV WCT (Wire Corrosion Test)
- 800150: Test Board Assembly - WCT
- 600155: Sample Bath Cartridge
- 600160: Adaptor Module with PT100



Instrument Specifications

Dimensions	<u>Single (w) Unit:</u> 6.8(l) x 16.3(l) x 22(h) cm (2.68 x 6.42 x 8.62 in) <u>Docking Station</u> 17.1(w) x 32(w) x 4.4(h) cm (6.72 x 12.6 x 1.73 in) <u>Four Place Unit with Docking Station:</u> 30(w) x 32(l) x 22(h) cm (12 x 12.6 x 8.62 in)
Weight	<u>Single Unit:</u> ~1.7 kg (3.8 lbs.) <u>Docking Station:</u> ~1.5 kg (3.4 lbs.) <u>Four Place Unit with Docking Station:</u> ~8.4 kg (18.6 lbs.)
Power Requirements	100-240 VAC, 50/60 Hz, max. 600 W
Heating Medium	Non-liquid heating system - no hot oil bath
Testing Capacity	Four-position Designed for multi-unit alignment with a docking station, each independent (4 baths)
Temperature	Temperature: 80-180°C
Output	Continuous temperature output
Safety	High Temperature Cut-out

The TanEV WCT 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 HTS Viscometer

- ASTM D4683, D6616, CEC L-36, IP370
- High-Temperature, High-Shear (HTS)
- 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



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