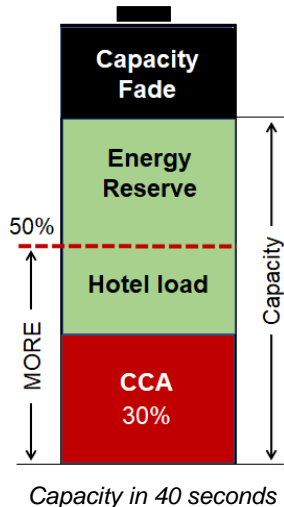




Getting Vehicles Combat Ready

Batteries are improving but lifespans are unknown

The **Spectro CM-24** battery rapid-tester models a battery against a matrix to secure *Minimum Operational Reserve Energy (MORE)* in capacity, the leading health indicator.



Pass/fail levels for starter batteries are commonly set at 40%; higher with hotel load. A PASS gives a grace period to next service; FAIL calls for replacement even if cranking is still strong.

The *Spectro CM-24* comes with a matrix of choice. Other matrices can be downloaded from the Matrix Library with Cloud Analytics, a web app that stores test results and shares data with supervisors.

The test batteries can be QR-coded to store data in the cloud for easy retrieval. The QR code further holds custom matrices with ability to turn the *Spectro CM-24* into an open platform to test all major batteries.



Spectro CM-24 battery rapid-tester



Assuring hotel load and restart by assessing battery capacity

Cause of Battery Failure

Statistics published by Johnson Control reveal that 48% of starter batteries fail by low capacity while only 12% quit by poor CCA. The *Spectro CM-24* reads both values in a 40-seconds non-invasive test.

Matrix Choices

A generic matrix checks starter batteries in consumer auto while custom matrices service large vehicles, machinery and marine vessels. The *Spectro CM-24* also tests deep cycle batteries in lead acid and lithium-based chemistries.

How does Spectro work?

Spectro™ uses a technology called *Multi-Model EIS*. A frequency scan produces a Nyquist plot that is modeled against a matrix to extract battery capacity, CCA and SoC. Accuracy is based on the Matrix Integrity Level (MIL) that can be improved by scanning additional batteries.

Connectivity

The *Spectro CM-24* works with a host in a closed system by displaying test results in numeric and graphic form.

The optional *Cloud Analytics* stores test results in the cloud to track battery health and to share results with fleet supervisors. Cloud Analytics provides predictive battery analysis that simplifies fleet management by fully using each battery with call to replace before failure. Accidental downtimes caused by a weak battery is virtually eliminated.

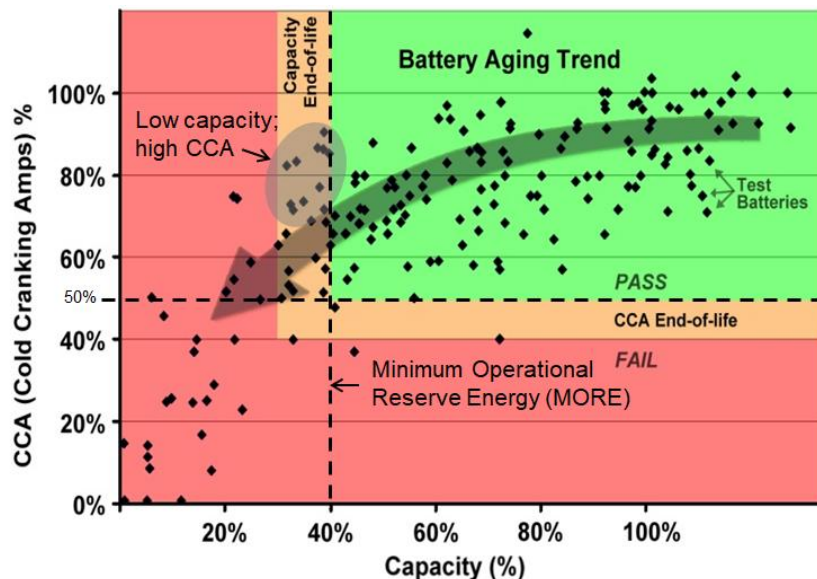


Connectivity leads to cloud analytics

How do Batteries Age?

A German luxury car maker tested capacity and CCA of 175 starter batteries as shown in the graph. This test confirms that capacity is the leading health indicator while CCA alone cannot provide reliable results.

Capacity estimation is of special interest when testing large batteries. Test time is short; the unit stays cool and does not agitate the battery. Another benefit is a state-of-charge test range to 50%.



Specifications

- Uses multi-model electrochemical impedance spectroscopy (EIS) to read capacity, CCA and SoC.
- Test time 40s with a scanning frequency of 2,000Hz to 4Hz. Frequencies to 0.1Hz is available.
- Includes generic matrix to service flooded and AGM starter batteries. Other chemistries on request.
- Capacity pass/fail is 40%; CCA is 50%. Other settings on request. Battery must have 50% SoC.
- Test range: 3–24V; 48V on request; 35–300Ah, CCA 2000A. System is non-invasive and stays cool.
- Internal Li-ion battery provides unit power to perform 250 tests.
- Unit connects to a host by Bluetooth and connection to Cloud Analytics.
- 1 meter (40") test cable connects to DB15; USB-C charges internal battery with AC adapter.
- D: 182mm (7.16"); W: 96mm (3.78"); H: 47mm (1.85"). 430g net (0.94 lb.). Comes in transit case.
- Complies with CSA/UL/CE. RoHS. REACH, RED, WEEE, ISTA 3A, IP52 and FCC Type A.

Scientists predict that battery diagnostics will gravitate to Multi-Model EIS



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