

# FIVE WAYS TO ENSURE REPEATABLE OIL TEST RESULTS (EVERY TIME)

**Megger**



Breakdown voltage testing only works when the results are reliable. If one test says the oil's fine and the next flags a problem – and nothing's changed – it throws everything into question. Maintenance decisions, compliance reports, and asset health data all depend on one thing: repeatability.

Getting consistent results isn't hard, but it does require attention to detail. Most issues don't come from the test set itself – they come from what happens around it. The way you handle the oil, prepare the vessel, or even control the environment can have a bigger impact than many realise.

## Why Repeatability Slips – and Why It Matters

According to IEC 60156 and ASTM D1816, breakdown testing must be repeatable under defined conditions. But even with the best kit, results can drift if the basics aren't locked down.

We've seen labs and field teams lose time – and trust – over something as small as a fibre in the oil or a slight shift in the electrode gap. If those errors creep into your data, you won't know whether the oil's degrading or the test is just off. That's when troubleshooting becomes guesswork.

### Five Ways to Lock In Repeatable Results

Here's what the best teams do every time – in labs, in vans, and in substations:

#### 1. Handle Samples Like They Matter

Proper oil sample handling is one of the most common sources of variation in test results – and one of the easiest to overlook. Glass bottles are best here: they're clean, dry, and chemically stable. Plastic containers can sometimes react with the oil, especially over time. Once sampled, it's worth keeping oil sealed, clearly labelled, and away from direct sunlight or damp conditions. And even during prep, try not to leave the sample exposed for too long – airborne moisture or dust can creep in fast and throw off your results.



## 2. Check the Electrode Gap

Even small changes in electrode spacing — as little as 0.1 mm — can shift breakdown voltage by 5–10%, which makes it harder to trust the results. It's a detail that's easy to miss during a busy day. But taking a few seconds to check the gap with the built-in gauge or a certified tool can save a lot of time later on, especially if results come into question.



## 3. Get the Vessel Truly Clean

The cleanliness of the test vessel is one of the most important — and most underestimated — factors in repeatability. A vessel might look clean, but residues or microscopic moisture can remain. Instead of wiping it out, which can leave fibres or static, it's best to use a proper solvent, rinse thoroughly, and let it dry in a clean, dust-free space. Tools like the Voltage check unit VCM100D can help confirm the vessel is ready — giving you confidence before you run the next test.

## 4. Control Your Test Environment

Environmental factors often go unnoticed — but they can have a real impact on test consistency. Even things like fluorescent lighting, open doors, or airflow from HVAC systems can affect temperature stability and introduce airborne contaminants. In lab settings, keeping the space within 20–30°C and below 60% humidity is ideal. Out in the field, conditions can be harder to control, so it's even more important to be aware of sudden changes in temperature or moisture that could affect results.



## 5. Confirm the Vessel Is Ready to Test

Even when a vessel looks clean, it may still hold trace moisture or residue that can affect your results. That's why it's important to have a repeatable process for checking vessel condition before every test — especially in high-throughput labs or field environments where time is tight.

Some teams use dedicated drying cabinets or solvent rinse-and-dry workflows to ensure the vessel is fully prepared. Whatever your setup, this final check can make the difference between reliable data and a false reading.

### What It Costs You If You Get It Wrong

Inconsistent results don't just slow you down — they chip away at trust. When the data doesn't line up, engineers start second-guessing the results<sup>1</sup>, testing more often than needed, and in some cases, replacing equipment that's still fit for service.

A study in Applied Energy<sup>2</sup> shows that poor data quality drives up asset management costs — not just for large operators, but across the board. Bad data leads to bad decisions. It can hide real issues, trigger false alarms, or make trend analysis useless.

If your strategy depends on condition-based insights, unreliable results aren't just a nuisance — they're a liability.

### How OTS Helps You Get It Right

Megger's OTS series is built to support reliable, repeatable testing<sup>3</sup> — every time. Features like automatic electrode alignment, enclosed test chambers, and pre-loaded test sequences help reduce variability and keep things consistent. You'll also get reminders to clean and prep between tests, so nothing gets missed under pressure.

And with built-in compatibility with the Voltage check unit VCM100D, you can check the vessel before the test even begins. It's all designed to give you confidence in your results — without adding more steps to your day.

#### References

- [1] <https://www.megger.com/en/et-online/december-2014/q-and-a-on-high-voltage-transformers>
- [2] [https://www.sciencedirect.com/science/article/pii/S0306261920314896?utm\\_source=chatgpt.com](https://www.sciencedirect.com/science/article/pii/S0306261920314896?utm_source=chatgpt.com)
- [3] <https://www.megger.com/en/products/ots-pb-and-ots-af-series-insulating-oil-test-sets>