



POWER

TRANSFORMER OIL TESTING (TOT)

Transforming Oil Data into
Asset Protection

EXPERIENCE ► INNOVATION ► SUSTAINABILITY



Smarter Oil Testing. Stronger Asset Protection.

For four decades, VPS has been the trusted leader in independent testing and advisory services – helping organisations run cleaner, safer, and more reliably. As industries accelerate toward electrification and net-zero targets, we're here to ensure your assets keep pace.

Our TOT service is engineered to stop transformer failures before they happen. The result: uninterrupted power for networks and customers, reduced environmental risk, and enhanced safety. From renewables and power generation to transmission, distribution, OEMs, Transformer oil testing enables early fault detection and supports evidence-based maintenance decisions, helping to reduce unplanned power outages and improve plant reliability.



Transformer Oil Testing (TOT)

TOT gives you a clear window into the health of your transformer. By analysing the insulating oil, it delivers early warnings of developing issues – allowing you to act before failures occur. It's a proven, cost-saving tool that strengthens any predictive maintenance strategy.

Early detection through fluid analysis helps prevent unplanned outages, boosts reliability, and keeps your network running smoothly

All analyses is performed in accordance with internationally recognised test standards, using advanced laboratory technologies to ensure fast, accurate, and dependable results.

Our specialists advise you on the most appropriate testing package for your transformers, tap changers, reactors, and switchgear, ensuring you maximise the value of your maintenance budget.



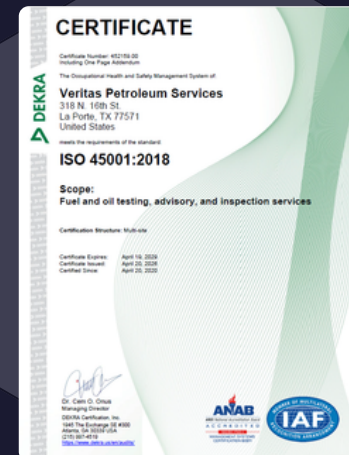
And because your operations can't pause, we provide 24-hour emergency testing support. Contact us anytime on: +44 (0) 758 406 9059.

Certifications & Quality Assurance

VPS Power operates in compliance with internationally recognised standards and holds various certifications, demonstrating our commitment to quality, safety, environment, technical accuracy, and independent verification.

Methods of analysis are validated through the use of certified reference materials and quality control samples and annual inter-laboratory proficiency testing scheme.

VPS are registered members of Achilles UVDB, BSI and the GEL10 technical panel.



TOT Service Overview



TOT Sampling Equipment

Representative, compliant sampling is essential for achieving accurate analytical and diagnostic results. To ensure the highest data quality, we recommend following **IEC 60475 – Method of Sampling Insulating Liquids** as closely as possible. Working to this internationally recognised standard ensures every sample is truly representative, enabling our specialists to deliver world-leading insight and helping keep your assets operating at peak performance.

Our sampling kits include everything required to take, label, package, and safely return samples to our laboratories. Standard kits are available, and we also offer **fully customised configurations** to meet your operational requirements.

Sampling Equipment Options

- **Stainless-steel fittings & nitrile bungs with isolation valve and tubing:** Multiple sizes available for secure connection to transformer drain valves
- **Flanges with stainless-steel fittings, isolation valve and tubing:** Multiple sizes available for secure connection to transformer drain valves
- **Buchholz sampling kits:** Gas tight sampling equipment used to safely extract gas or oil when the Buchholz relay has tripped.
- **Vacuum pumps:** Suitable for connecting to DGPTs on hermetically sealed transformers
- **Switchgear Live Tank Oil Sampling (LTOS) kits:** For safe, controlled live-tank sampling
- **PCB sampling kits:** Designed for compliant PCB screening and analysis
- **CT sampling kits:** For accurate current transformer oil sampling
- **Bushing sampling kits:** For condition assessment of oil-filled bushings

Sample Receptacles (Available in multiples of your choice)

- 500 mL clear or brown glass bottles
- 625 mL aluminium bottles
- 50 mL clear glass syringes

All receptacles are supplied with UV-protective black bags, sample labels (in multiples), and protective packaging to ensure safe return to our laboratory.



TOT Test Methods

ASSESSMENT	TESTS	METHOD
Fluid Assessment	Appearance & Colour	IEC 60422 & ASTM D1500
	Water Content	IEC 60814
	Acidity	IEC 62021
	Breakdown Voltage	IEC 60156
Dissolved Gas Analysis	Hydrogen, Methane, Ethane, Ethylene, Acetylene, Carbon Monoxide, Carbon Dioxide, Oxygen, Nitrogen, Total Dissolved Combustible Gas	IEC 60567
Insulating Paper Assessment	Furans Analysis (FFA) & Estimated Degree of Polymerisation calculation	IEC 61198 & Chendong
Environmental Assessment	Polychlorinated Biphenyls (PCB)	IEC 61619
Others	Dielectric Dissipation Factor (DDF) & Resistivity	IEC 60247
	Interfacial Tension (IFT)	IEC 62961
	Particles (counting and sizing)	IEC 60970
	Oxidation Inhibitor	IEC 60666
	Passivator Content	IEC 60666 Annex B
	Dibenzyl Disulphide	IEC 62697-1
	Corrosive Sulphur	ASTM D1275
	Potentially Corrosive Sulphur	IEC 62535
	Sediment & Sludge	IEC 60422 Annex E

- Our TOT is performed to internationally recognised standards.
- Further test parameters available on request.
- Latest valid version of the international standards listed above will be used unless specified.

Asset Test Suites

ASSESSMENT	TESTS
Basic Transformer Assessment	Fluid Assessment
	Dissolved Gas Analysis
	Insulating Paper Assessment
Transformer Advanced	Basic Transformer Assessment
	Dielectric Dissipation Factor (DDF) & Resistivity
	Interfacial Tension
Tapchanger Assessment	Fluid Assessment
	Dissolved Gas Analysis
	Interfacial Tension
Switchgear Assessment (<16kV/ OCB <72.5kV)	Fluid Assessment
	Dissolved Gas Analysis
	Dissolved Gas Analysis



TOT Testing Overview

In our TOT service, each parameter is analysed to deliver precise diagnostic insight into the condition of the transformer's insulating fluid and overall asset health.

FLUID QUALITY ANALYSIS

Colour and Appearance

Changes in colour, clarity, or the presence of particles, free water, or turbidity can indicate internal deterioration or contamination. A simple visual assessment can reveal early signs of asset stress.

Acidity

As insulating fluid oxidises during service, acidic by-products form. This often darkens the fluid and, if left unmanaged, can lead to corrosion, paper degradation, and sludge formation.

Water Content

Excess moisture weakens the mechanical strength of paper insulation and degrades the fluid. Water ingress may result from poor maintenance or internal ageing. Doubling the water content can halve a transformer's working life.

Dielectric Strength

Insulating fluids must withstand electrical stress. Contaminants such as water, fibres, particles, and polar compounds reduce dielectric strength and increase the risk of failure.

Dielectric Dissipation Factor (DDF)

DDF measures current leakage within the insulating fluid. Higher values reflect increased polar contamination and typically rise as the fluid ages.

Resistivity

Resistivity measures the fluid's ability to resist direct-current flow. Lower readings indicate higher contamination levels and reduced insulating performance.

Interfacial Tension (IFT)

IFT indicates the presence of soluble polar materials and degradation products. Falling IFT values suggest fluid ageing or incompatibility with internal materials such as varnishes or gaskets.

TRANSFORMER HEALTH ANALYSIS

Dissolved Gas Analysis (DGA)

Under electrical or thermal stress, insulating fluids break down and generate gases. The type and concentration of these gases reveal the nature and severity of faults such as thermal overheating, arcing, or partial discharge. VPS applies internationally recognised diagnostic tools – including Roger Ratios, Duval Triangles, and Duval Pentagons – to provide expert interpretation and early-action recommendations.

Insulating Paper Health | Furanic Compounds

Furans are produced as paper insulation degrades. Their concentration helps estimate the remaining useful life of cellulose insulation through correlation with the degree of polymerisation.

Estimated Degree of Polymerisation (DP)

DP reflects the average condition of the paper insulation across the transformer. It is a key indicator of remaining service life for both the insulation and the transformer itself.

ENVIRONMENTAL ASSESSMENT

Polychlorinated Biphenyls (PCB)

PCBs are chlorinated organic compounds once used in insulating fluids but now banned due to environmental and health risks. Classified as Persistent Organic Pollutants under the Stockholm Convention, PCB content must be assessed in all transformers to ensure compliance.

Customer Portal

Dashboard: Summarize sample submissions and report rating statuses.

Reports: Access PDFs and export to Excel effortlessly.

Trends: Visualize current results with interactive line graphs.

Assets: Review existing assets, set sampling frequencies, and activate email notifications.

Scheduler: Track upcoming/overdue sampling and generate electronic labels.

Samplagic: Arrange seamless sample collection and tracking.



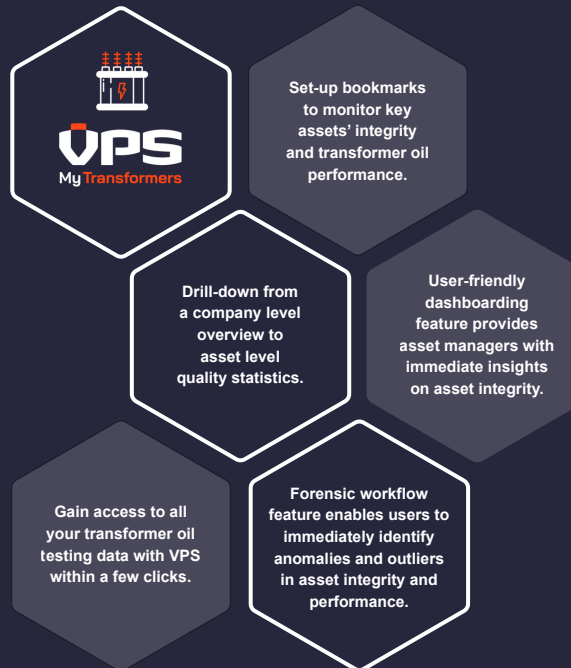
MyTransformer

VPS' latest business intelligence tool, focused on transformer oil condition monitoring and asset integrity.

Dashboard: Custom MyTransformers dashboard.

Assets: Monitor asset and equipment health.

Analytics: Roger ratios and Duval triangle calculations.



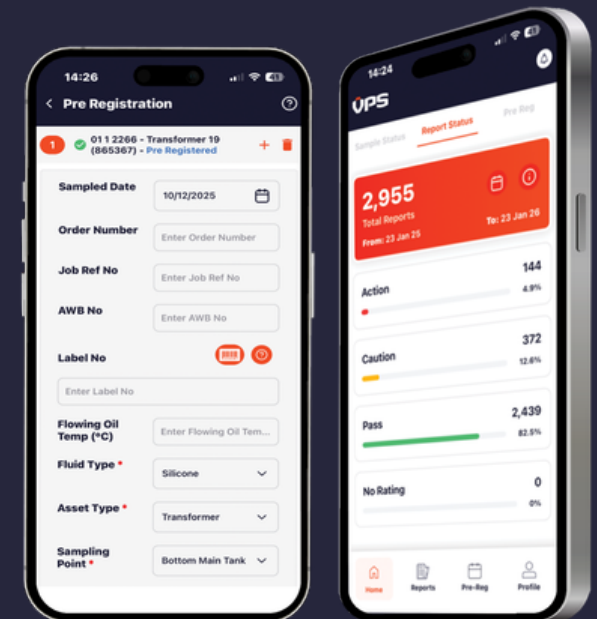
Mobile App

Dashboard: Review sample and report rating status at a glance.

Schedule: View upcoming and overdue assets for sampling.

Results: Access current and historical analysis results.

Labels: Create and register electronic sample labels using QR code technology.



Trainings at VPS Power

Strengthen your team's capability with VPS Power's tailored training solutions, designed to enhance competence, confidence, and compliance across all aspects of transformer oil sampling and interpretation. Each package is built around real-world operational needs and can be delivered on your site, at the VPS Power training facility, or online for maximum flexibility.

What We Offer

IEC 60475 Sampling Training

A practical, standards-aligned programme covering correct sampling techniques, contamination control, equipment handling, and best-practice procedures to ensure reliable, repeatable results.

Technical Report Interpretation Training

A focused session designed to help engineers and asset managers understand laboratory reports, interpret diagnostic indicators, and make informed decisions on asset condition and next steps.

Laboratory Tours

An immersive behind-the-scenes experience showcasing our accredited laboratory, testing processes, analytical equipment, and the rigorous quality controls behind every result.

Independent Witnessed Sampling & Testing

A trusted, impartial service providing witnessed sampling or testing for audits, compliance requirements, and independent verification of transformer oil condition.



Contact

Sample equipment, dispatch, collection and registration enquiries:

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For analysis of emergency samples out of hours please call:

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