Global Analyser Solutions

PCB in transformer oil

Polychlorinated biphenyls (PCBs) are hazardous contaminants found in transformer oils, requiring stringent monitoring due to their environmental and health risks. ASTM D4059 detects and quantifies PCBs in insulating liquids using GC-ECD (Electron Capture Detector) and ensures precise, reliable, and regulatory analysis.

Procedure

A representative oil sample is diluted with a suitable solvent, typically hexane or iso-octane. An optional clean-up step using a silica gel or Florisil column is performed to remove interfering compounds. The prepared sample is then injected into the GC-ECD system, where PCB compounds are separated and detected, ensuring accurate quantification as per ASTM D4059 guidelines. Quantification is achieved by comparing the sample chromatogram with a known quantity of one or more standard Aroclors under identical analytical conditions.

Instrument Configuration

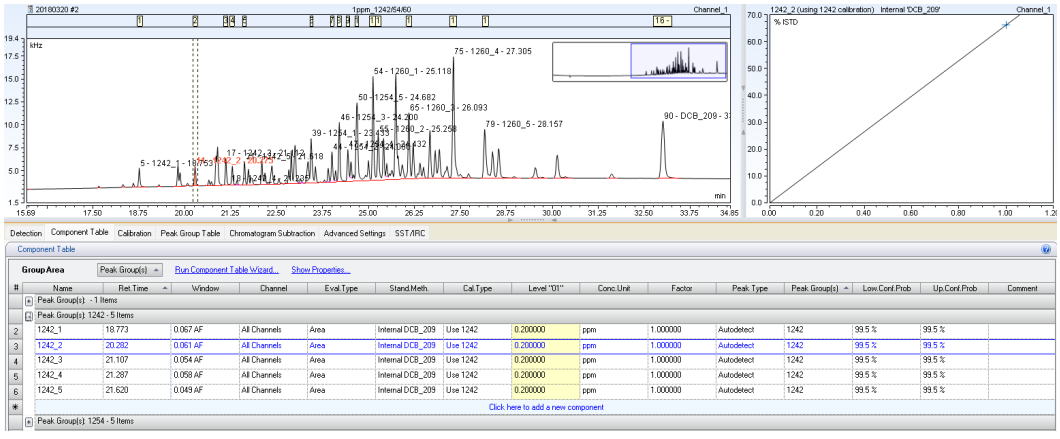
- ThermoGC 1600 with Split/Splitless injector and Electron Capture Detector
- Restek Rtx-PCB separation column
- Chromeleon CDS data system
- Triplus RSH or AS 1610 autosampler optional
- Automated sample preparation optional

Results

Figure 1 shows a typical chromatogram and workflow of the PCB analysis. Chromeleon CDS provides enhanced grouping of peaks and reports individual components and total group amount. PCB analysis requires a grouped peak function within the CDS software; this is done easily using the grouped table functions (see the tabs for Aroclor 1016, 1242, 1254 and 1260.
Using the built-in Skew Graphs tool from Chromeleon it is extremely easy to monitor the accuracy of the system in graph format, for example for checking the internal standard repeatability.

Key benefits

- High sensitivity & specificity – ECD detects trace levels with minimal interference.
- Regulatory compliance – Meets ASTM, EPA and international environmental standards.
- Reliable & reproducible Results – Ensures accurate quantification across multiple samples.
- Cost-effective monitoring – Enables proactive maintenance and regulatory compliance for transformer oil management.



Second channel option:

ASTM D4768-11(2019) Analysis of 2,6-Ditertiary-Butyl Para-Cresol and 2,6-Diter-tiary-Butyl Phenol in Insulating Liquids by Gas Chromatography.

Figure 1
Chromeleon CDS workflow with chromatogram, calibration curve and grouped tab function.

Ordering information	ES22X - ABCDE ES23X - ABCDE ES22X + second channel			
code X	0	1	2	3
GC model, power	1600, 230V	1610, 230V	1600, 115V	1610, 115V

For the selection of options (e.g. Pressure and moisture sensors, GC oven cryo valves, Power plug type and more) , see the options table.

About GAS

Global Analyser Solutions provides GC & GC-MS solutions for Energy, Refinery, Chemical and Environmental markets. Our analysers address a broad spectrum of measuring requirements with high precision and reliability. Please reach out for more information on our website. www.gassite.com