



**Official Test Report**

ISO 17025 Chemical Testing Accredited

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Project 14.999

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**Analysis of Transformer Oil**

This report contains results of analysis performed on the transformer oil sample submitted by John Smith on August 25, 2014.

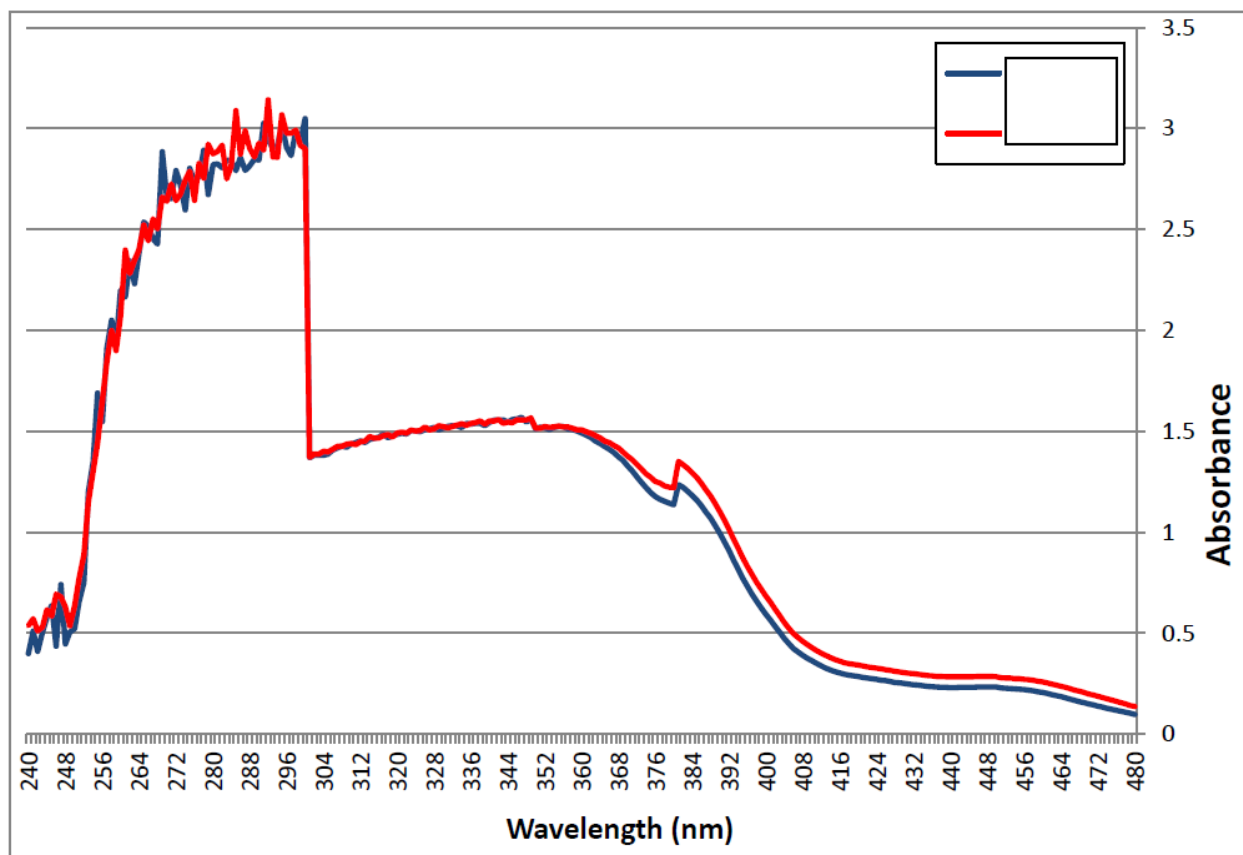
LCM Sample ID	Sample Description	Results
14.999-01	Transformer Oil	<b>Moisture (ASTM E203):</b> 13.7 ± 1 ppm <b>Dielectric Strength (ASTM D877):</b> 20.6 ± 1.1 kV <b>Oxidation Inhibitor (ASTM D2668):</b> ND <b>Color (ASTM D1500):</b> 4 <b>Acid Number (ASTM D974):</b> 0.125 ± 0.001 <b>Furan Content (UV-vis):</b> 3.0 +/- 0.5 ppm

**Comment**

\*ND indicates a non detect

The sample was tested using the ASTM methods stated above. These include Karl-Fisher Titration for moisture, automated dielectric strength tests, FTIR for oxidation inhibitor, and titration with 0.1 M KOH for acid number. The value obtained for dielectric breakdown voltage is lower than the recommended minimum of 35 kV. Oxidation inhibitor was screened for by FTIR and none was detected. Color values indicate that the transformer oil may be undergoing significant oxidation and the acid number values obtained were not within an acceptable range (max of 0.03). No further testing is recommended at this time however dissolved gas analysis is recommended during the next testing cycle.

Tests for furanic compounds resulting from the degradation of the paper insulator were run using UV-Vis spectroscopy. The furan concentration of 3 ppm is moderate, but is within the margin of error when comparing to the 2.5 ppm concentration of the 2012 sample from the same transformer. This suggests that the insulator breakdown has not advanced significantly in the past two years and should not be an immediate concern in the future. The UV-Vis absorption data is shown on the following page.



**Figure 1:** UV-Vis spectra of transformer sample from 2014 (red) and 2012 (blue). Furan content was calculated from the deduced spectral response bandwidth (zero crossing wavelength). The concentration has not changed by much since the last sample.

**The results presented in this report relate only to the samples tested.**

**This report shall not be duplicated, except in full, without written approval from Lab/Cor Materials, LLC.**

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