Problem Overview

♦ Due to several clutch failures on the Chevrolet ZO6 model the clutch fluid is being inspected for possible clutch dust content.

Date: January 23, 2009

Objective: The Unovis Advanced Process Laboratory has been asked to inspect clutch oil from two suppliers for content of metal filings originating from the clutch.

Overview: The following materials were supplied for analysis;

Sample #1: Prestone DOT 4 used and new fluid
Sample #2: GM Super DOT 4 used (1300 miles) and new fluid
Sample #4: Raw Clutch Dust
The used oils from sample #1 and sample #2 were filtered through glass microfibre filters from Whatman and flushed with lab grade isopropanol in order to extract the solid content from both samples.

**Discussion:** After extraction filter material from samples #1 and #2 were compared to the sample #4 clutch dust by SEM/EDXA.

SEM/EDXA analysis showed that particles consisting of similar elemental constituents were detected in all three samples. In addition the physical appearance and general particle size was identical for all three samples. This suggests strongly that clutch dust is present in both samples #1 and #2.
In the EDXA plots below we see a strong concentration of either copper (Cu) or iron (Fe) as well as some secondary elemental similarities such as sulfur (S) and magnesium (Mg). In some areas we also detect phosphorous (P). These elements are unique to those detected on the filter paper as shown on the previous page. These elements will also be repeated when examining particles in samples #1 and #2.
Sample #1 oil extract 3

Sample #1 oil extract 4

Sample #1 oil extract 5
Sample #2 oil extract 1

Sample #2 oil extract 2

Sample #2 oil extract 3
Conclusions: SEM/EDXA analysis showed that particles consisting of similar elemental constituents were detected in all three samples. In addition the physical appearance and general particle size was identical for all three samples. This suggests strongly that clutch dust is present in both samples #1 and #2.

In the EDXA plots below we see a strong concentration of either copper (Cu) or iron (Fe) as well as some secondary elemental similarities such as sulfur (S) and magnesium (Mg).