



130 Freedom Lane  
Janesville, WI 53546  
608.756.3838  
Fax 608.756.1262  
<http://www.como.biz>

## TEST REPORT

PROJECT: Spectrographic Analysis of Engine Oils  
CLIENT: COMO Industrial Equipment, Inc.  
PRODUCT: COMO Vehicle Filters

**DESCRIPTION:** A leading independent test facility ran a study of the effect of using COMO Vehicle filters on a representative truck engine. They analyzed the engine oil placed in two similar engines and run under controlled conditions. Both before and after running, oil samples from each engine were subjected to spectrographic analysis. Differences between the new and used oils indicated wear pattern within the engine.

**PROCEDURE:** First, a good quality base oil was selected. It was put into two comparable Cat engines; one with an original equipment filter, the other with a COMO filter added. The OEM equipped engine was run 281 hours, or the equivalent of 14,050 miles at 50 mph. The COMO engine ran for 308 hours, or 15,250 equivalent miles. Here's what was found:

**RESULTS:** Iron in the OEM engine increased 73 parts per million (ppm) over the base oil, while in the COMO engine, it was up only 2 ppm. Copper and lead, indicating bearing wear, were up 15 ppm and 32 ppm in the OEM engine, but only 1 ppm and zero, respectively, using a COMO filter. Chromium, the chief indicator of ring wear was up 6 ppm in the ordinary engine, but showed no measurable increase with the COMO filters. Exact results were as shown.

### KEY ELEMENTS

<u>SAMPLE/DESCRIPTION</u>	Fe	Cr	Cu	Pb	Ni
New Oil	4	3	0	3	0.8
Engine #1/Std. Filter	77	9	15	35	6
Engine #2/COMO Filter	6	3	1	6	0

**SUMMARY:** Analysis of any increase of these key elements in oil indicates that: (a.) Engine parts containing iron (Fe), such as rings, cylinder liners, lifters, and the camshaft, (b.) Piston rings containing nickel (Ni) and chromium (Cr), and (c.) Critical bearing surfaces containing copper (Cu) and lead (Pb), all showed significantly reduced wear. It is logical to conclude from these results that engines run with COMO Vehicle filters will achieve longer life than comparable engines equipped with ordinary filters of the type supplied by engine manufacturers.

# COMO FILTRATION SYSTEMS

## CLEVELAND TECHNICAL CENTER

### SAE MICRON RANGE – PARTICLE COUNT/100 ml

<u>PARTICLE SIZE</u>	<u>SAMPLE #1</u>	<u>SAMPLE #2</u>	<u>SAMPLE #3</u>
5 - 10	891,680	5,428,400	315,080
10 - 25	151,680	587,040	19,600
25 - 50	3,024	7,640	664
50 - 100	432	2,480	416
100 Up	224	840	200
TOTALS	<u>1,047,040</u>	<u>6,026,400</u>	<u>335,960</u>

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#### EXPLANATION OF THIS REPORT:

SAMPLE # 1: This sample is NEW SERIES 3 ENGINE OIL as used in the customer's transmission.

SAMPLE # 2: This sample of the same oil as # 1, after 150 hours in transmission.

SAMPLE # 3: This is the same used oil as in Sample # 2, after ONLY (5) FIVE HOURS OF OPERATION WITH A COMO HYDRAULIC OIL FILTER.

The COMO HYDRAULIC OIL FILTER was installed in addition to the original equipment transmission filter. The oil was then run ONLY (5) FIVE HOURS and another sample was drawn.

SAMPLE # 3 shows a 95% reduction of the contamination level in the used oil after ONLY (5) FIVE HOURS normal operation.

SAMPLE # 3 shows a 65% reduction of the contamination level in BRAND NEW OIL after ONLY (5) FIVE HOURS normal operation after installation of THE COMO HYDRAULIC OIL FILTER.

**COMO Hydraulic Oil Filters On Your Equipment Means:  
Continuous Contamination Control  
Keeps The Dirt In The Oil Filter – Not In The Oil**