

18419 EUCLID AVENUE
CLEVELAND, OH 44112-1016
(800) 726-5400, FAX (216) 383-9633

CUSTOMER NO.: 18421
UNIT NO.: 5026
DESCRIPTION: DIESEL ENGINE
END USER: LOCOMOTIVE MANAGER
MONTREAL MAINE & ATLANTIC RR
DERBY, ME 04463

MAKE: GE
MODEL
OIL BRAND: EXXON
OIL TYPE: DIOL 17RD 2000
SERIAL NO.:
FUEL TYPE: DIESEL

NO. COPIES 2

SAMPLE DATA

LAB#	SAMPLE DATE	TIME ON OIL
	RECEIPT DATE	TIME ON UNIT
113599	05/31/2007	10000
ABNORMAL	06/14/2007	500000
76657	03/21/2007	10000
ABNORMAL	04/23/2007	500000
10618	12/21/2006	10000
NORMAL	07/15/2007	500000
219571	09/19/2006	10000
NORMAL	10/14/2006	500000

SPECTROCHEMICAL ANALYSIS (ppm)

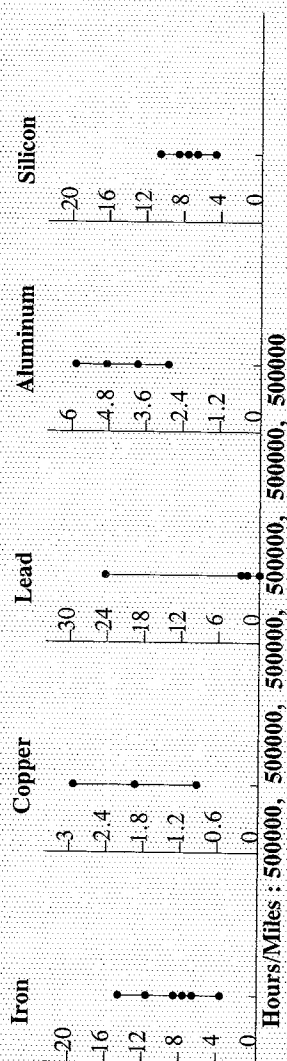
IRON	CHROMIUM	LEAD	COPPER	TIN	ALUMINUM	NICKEL	SILVER	SILICON	BORON	SODIUM	MAGNESIUM	CALCIUM	BARIUM	PHOSPHORUS	ZINC	MOLYBDENUM	TITANIUM	VANADIUM	POTASSIUM	FUEL (%VOL)	VIS @ 40 C	VIS @ 100 C	CSR	WATER (%VOL)	SOOT/SOLIDS (%WT)	COOLANT
4	0	0	1	0	4	0	0	5	2	6	23	5474	0	8	11	115	0	0	0	<1	N/A	14.84	0	0.7	N/A	
7	0	2	3	0	6	0	0	7	2	7	32	5721	0	0	17	134	0	0	0	<1	N/A	14.82	0	1.0	N/A	
8	0	0	3	0	5	0	0	8	2	12	32	5440	0	6	4	123	0	0	0	<1	N/A	15.31	0	0.9	N/A	
9	0	3	3	0	5	0	0	9	2	11	38	4867	0	7	9	171	0	0	0	<1	N/A	16.41	0	1.2	N/A	

PHYSICAL PROPERTIES

ADDITIONAL TESTS

LAB#	TBN
113599	11.75
76657	10.33
10618	10.96
219571	9.51

GRAPHICAL ANALYSIS



LAB# ANALYSIS RECOMMENDATIONS

NOTE: ZINC LEVEL APPEARS TO BE HIGH. RECOMMEND RESAMPLING IN 30 DAYS! ***RESULTS REPORTED BY FAX***
113599

NOTE: ZINC LEVEL APPEARS TO BE HIGH. RECOMMEND RESAMPLING IN 30 DAYS! ***RESULTS REPORTED BY FAX***
76657

RESULTS OF TEST PERFORMED INDICATE NO CORRECTIVE ACTION REQUIRED.
10618

RESULTS OF TEST PERFORMED INDICATE NO CORRECTIVE ACTION REQUIRED.
219571

Key
A: Abnormal C: Critical

LOCOMOTIVE MANAGER
MONTREAL MAINE & ATLANTIC RR
18 B & A AVE
DERBY, ME 04463

THE FOLLOWING INFORMATION HAS BEEN PROVIDED TO ASSIST IN THE INTERPRETATION OF YOUR OIL ANALYSIS.

WEAR METALS

These metals indicate wear on particular components of an individual unit. The particles of these metals will indicate a wear problem on the microscopic level before the problem can be detected by conventional means. The existence of a wear problem is determined not only by absolute values of metals, but more importantly a relative increase or trend in one or more of these metals.

WEAR METAL SOURCES

- IronCylinders, Gears, Rings, Crankshafts, Liners, Bearings, Housings, Rust.
- ChromiumRoller/Taper Bearing, Rods, Platings.
- LeadBearing Overlays, additive in gear oil and gasoline.
- CopperBushings, Bearings, Thrust-Washers, Friction Plates, Oil Cooler, additive in oil.
- TinBearings, Bushings, Pistons, Platings.
- AluminumPistons, Bearings, Pumps, Blowers, Rotors, Thrust-Washers.
- NickelValves.
- SilverBearings, Bushings, Platings.
- ManganeseTrace elements in liners and rings, additive in gasoline.
- TitaniumTrace element.
- VanadiumTrace element.

CONTAMINANTS

These elements can be an indicator of both internal and external contamination. The source and amount of contamination can be determined by comparison to a previously normal sample or to a new oil reference. Specific tests for some contaminants can supplement the analysis.

CONTAMINANT SOURCES

- SiliconElement used to determine the level of airborne dirt and abrasives in the oil (sometimes used as an anti-foam agent).
- BoronPresent in most permanent anti-freeze systems and cooling system inhibitors (sometimes used as an additive).
- SodiumPresent in most permanent anti-freeze systems and cooling system inhibitors (sometimes used as an additive).
- PotassiumPresent in most permanent anti-freeze systems and cooling system inhibitors (sometimes used as an additive in gear oil).

WATER AND SEDIMENT

Reports percent water and percent insolubles (ASTM D-91).

GLYCOL

A specific test for the presence of Glycol (Anti-Freeze) in an oil (ASTM D-2982).

ADDITIVES

These elements are blended into the oil in different forms and quantities by the manufacturer. The additive package in an oil will vary depending on the type of oil.

ADDITIVE FUNCTIONS

- MagnesiumDispersant/Detergent additive.
- CalciumDispersant/Detergent additive.
- BariumDispersant/Detergent additive.
- PhosphorusAnti-Wear additive.
- ZincAnti-Wear additive.
- MolybdenumAnti-Wear additive.

FUEL DILUTION

Undesired fuel in the oil may signal fuel system leaks or incomplete combustion.

FUEL SOOT

A percent of incomplete combustion, blow-by. High levels may indicate engine problems or overextended drain intervals.

VISCOSITY

The kinematic viscosity (ASTM D-445) determined at 40° C and/or 100° C is a measure of the flow rate of an oil in relation to time. This data is used to assign an SAE grade to an oil.

ENGINE OIL VISCOSITY CLASSIFICATION CHART

SAE GRADE	MIN-CST-100° C	MAX-CST
10W	4.10	
20	5.60	9.29
30	9.30	12.49
40	12.50	16.29
50	16.30	21.89

Spectrochemical Analysis

Determines component wear, airborne dirt, cooling system contamination, and oil additive concentrations. Information is reported in parts per million (PPM).

Physical Properties

Changes in the physical qualities of the lubricant are determined and evaluated. These changes and the presence of contaminants affecting the properties of lubricants have a direct bearing on its serviceability.

Graphical Analysis

This key section gives the customer an "at a look" glance at their unit's wear trend for the last six sample histories. For industrial applications, this section will contain detailed particle count data.

Analysis Recommendations

Our data provides specific information about your equipment. In case of imminent danger to a piece of equipment, the customer is alerted to the emergency by phone or fax.

staveley services
Industrial Oils, Lubricants & Analytical Services

1919 BUCK AVENUE
CLEVELAND, OHIO 44112-0001
PHONE 216-362-4400 FAX 216-362-5333

CUSTOMER: 595
EQUIPMENT: 10000
DESCRIPTION: ENGINE OIL
OIL TYPE: 15W-40
SERIAL NO.: 12345
UNIT TYPE: DIESEL

LABORATORY: 595
ANALYST: J. D. SMITH
DATE: 01/15/98
TIME: 10:30 AM

ITEM	UNIT	TEST	RESULT	UNIT	TEST	RESULT	UNIT	TEST	RESULT		
100	PPM	IRON	104	100	PPM	COBALT	10	100	PPM	LEAD	10
101	PPM	CHROMIUM	10	100	PPM	COPPER	10	100	PPM	SILICON	10
102	PPM	MANGANESE	10	100	PPM	NICKEL	10	100	PPM	ANTHRACENE	10
103	PPM	SILICON	10	100	PPM	WATER	10	100	PPM	SEDIMENT	10
104	PPM	SODIUM	10	100	PPM	POTASSIUM	10	100	PPM	GLYCOL	10
105	PPM	BORON	10	100	PPM	SOOT	10	100	PPM	FUEL DILUTION	10
106	PPM	ZINC	10	100	PPM	MAGNESIUM	10	100	PPM	CALCIUM	10
107	PPM	BARIUM	10	100	PPM	PHOSPHORUS	10	100	PPM	ZINC	10
108	PPM	MOLYBDENUM	10	100	PPM	ANTHRACENE	10	100	PPM	SEDIMENT	10
109	PPM	ANTHRACENE	10	100	PPM	SEDIMENT	10	100	PPM	GLYCOL	10
110	PPM	GLYCOL	10	100	PPM	FUEL DILUTION	10	100	PPM	CALCIUM	10
111	PPM	CALCIUM	10	100	PPM	COPPER	10	100	PPM	SILICON	10
112	PPM	SILICON	10	100	PPM	NICKEL	10	100	PPM	ANTHRACENE	10
113	PPM	ANTHRACENE	10	100	PPM	SEDIMENT	10	100	PPM	GLYCOL	10
114	PPM	GLYCOL	10	100	PPM	FUEL DILUTION	10	100	PPM	CALCIUM	10
115	PPM	CALCIUM	10	100	PPM	COPPER	10	100	PPM	SILICON	10
116	PPM	SILICON	10	100	PPM	NICKEL	10	100	PPM	ANTHRACENE	10
117	PPM	ANTHRACENE	10	100	PPM	SEDIMENT	10	100	PPM	GLYCOL	10
118	PPM	GLYCOL	10	100	PPM	FUEL DILUTION	10	100	PPM	CALCIUM	10
119	PPM	CALCIUM	10	100	PPM	COPPER	10	100	PPM	SILICON	10
120	PPM	SILICON	10	100	PPM	NICKEL	10	100	PPM	ANTHRACENE	10
121	PPM	ANTHRACENE	10	100	PPM	SEDIMENT	10	100	PPM	GLYCOL	10
122	PPM	GLYCOL	10	100	PPM	FUEL DILUTION	10	100	PPM	CALCIUM	10
123	PPM	CALCIUM	10	100	PPM	COPPER	10	100	PPM	SILICON	10
124	PPM	SILICON	10	100	PPM	NICKEL	10	100	PPM	ANTHRACENE	10
125	PPM	ANTHRACENE	10	100	PPM	SEDIMENT	10	100	PPM	GLYCOL	10
126	PPM	GLYCOL	10	100	PPM	FUEL DILUTION	10	100	PPM	CALCIUM	10
127	PPM	CALCIUM	10	100	PPM	COPPER	10	100	PPM	SILICON	10
128	PPM	SILICON	10	100	PPM	NICKEL	10	100	PPM	ANTHRACENE	10
129	PPM	ANTHRACENE	10	100	PPM	SEDIMENT	10	100	PPM	GLYCOL	10
130	PPM	GLYCOL	10	100	PPM	FUEL DILUTION	10	100	PPM	CALCIUM	10

Customer Unit Information

This section of the report lists the identification of the unit sampled, equipment manufacturer, model, oil brand and oil type. This information is supplied by the customer.

Sample Data

Indicates data sample was taken/tested, oil and unit hours/mile. Laboratory identification number to track sample history. In addition, the unit condition of each sample is listed.

Additional Test Results

Reporting of additional test results (e.g. TAN, TBN, oxidation and nitration) not part of spectrochemical tests reported in these sections

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AMTOWN, OH 44895

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