



Extended Oil Drain Intervals

Engine oil is changed frequently because of contamination within the engine; once the oil becomes contaminated it breaks down losing its viscosity.

Most manufactures of oil filters have the capacity to clean oil to approximately 25 microns. The system that the Winnipeg Division has been using for the last two years is the Kleenoil System.

This system has the capabilities of cleaning oil to one micron, and as long as the cartridge is replaced every 20000kms it allows us to achieve our goal, which was 60000km oil, drain interval.

Our department has run on a 60000km interval for the last two years, with excellent results. I have just recently increased our drain intervals to 80000km.

This is not just a question of extending oil drains, and saving money although it does this very well it's become a question of being

- Environmentally responsible
- Reducing waste while
- Reducing costs
- Less dependant on foreign oil
- Less down time
- 136hrs of extra vehicle utilization
- Reduced labour by 136hrs
- Total cost of the Kleenoil system was \$10,500.00

As the figures show the cost of installing the Kleenoil System, which is a one-time cost, was almost recovered in the first year.

Please keep in mind that the average cost of an oil change in our division is \$200.00 however if you take into consideration the change in our business requirements over the last year, our kilometers traveled would vary.

Below is a table that I have put together to show you just what type of savings that our department has attained over the last two years.

Average kms Traveled in one year 3248959

3248959 km @ 30000 km oil change interval = 108 oil changes	\$21,600.00 in 2001
3248959 km @ 60000 km oil change interval = 54 oil changes	\$10,800.00 in 2002
3248959 km @ 80000 km oil change interval = 40 oil changes	\$8,000.00 in 2003
Total Savings	\$13,600.00



MOBILE OIL ANALYSIS REPORT

CONTAMINATION
OIL CONDITION
WEAR

NORMAL
NORMAL
NORMAL

210B - Diesel Engine

Unit Make : INTERNATIONAL
 Unit Model : 9400
 Comp Make : CUMMINS
 Comp Model : N14

Serial No : 2HSCNAER5YC072397
 Cust. Ref No. : {n/a}
 Stub No. : WC-0128578

Date Rec'd : Dec 24, 2003
 Sample Date : Dec 2, 2003
 Diagnostician : Kevin Marson

RECOMMENDATION

Resample at the next service interval to monitor.

Sample Date	12/05/01	01/24/03	Current	UOM
Time on Unit	280517	483552	638957	kms
Time on Oil	62956	79573	82239	kms
Time on Fltr	62956	20000	82239	kms
Oil Maint.	changed	changed	changed	---
Filter Maint.	changed	changed	changed	---

CONTAMINATION

There is no indication of any contamination in the component.

Sample Date	12/05/01	01/24/03	Current	Abn
Silicon	4.4	4.0	3.6	
Potassium	0.0	0.0	1.4	
Sodium	4.8	0.0	1.1	
Fuel (%)	<2.0	<2.0	<2.0	
Glycol (%)	<0.02	<0.02	<0.02	
Water (%)	<0.1	<0.1	<0.1	
Soot (%)	1.5	0.7	1.4	
Sulfation	71	68	76	
Nitration	64	73	82	

OIL CONDITION

Oil Type: 40 GAL of ESSO XD-3 EXTRA 15W40

The condition of the oil is acceptable for the time in service.

Sample Date	12/05/01	01/24/03	Current	Base
Boron	13	11	2.2	0.0
Barium	0.7	0.5	0.1	0.0
Calcium	2924	3104	3142	3800
Magnesium	49	72	17	0.0
Molybdenum	14	20	1.6	0.0
Sodium	4.8	0.0	1.1	0.0
Phosphorus	1093	1144	1015	1350
Sulfur	3907	4154	3780	
Zinc	1434	1319	1429	1500
Visc@40°C	---	---	---	116
Visc@100°C	14.5	13.9	14.4	15.0
Oxidation	55	63	68	---
TAN	---	---	---	2.5
TBN	5.87	6.90	7.81	12.2

WEAR

All component wear rates are normal.

Sample Date	12/05/01	01/24/03	Current	Abn
Iron	38	25	28	90
Nickel	0.0	0.0	0.0	2
Chromium	5.0	3.8	3.9	20
Titanium	0.0	0.1	0.2	2
Copper	3.6	8.8	5.2	330
Aluminum	1.6	1.9	1.9	20
Tin	0.0	0.0	0.3	15
Lead	14	12	16	40
Silver	0.1	0.4	0.2	2



MOBILE OIL ANALYSIS REPORT

CONTAMINATION
WEAR
OIL CONDITION

NORMAL
NORMAL
NORMAL

230B - Diesel Engine

Unit Make : INTERNATIONAL
 Unit Model : 9400
 Comp Make : CATERPILLAR
 Comp Model : C12

Serial No : 2HSCNAXR12C041510
 Cust. Ref No. : {n/a}
 Stub No. : WC-0128573

Date Rec'd : Feb 19, 2004
 Sample Date : Jan 7, 2004
 Diagnostician : Barry Goslin

RECOMMENDATION

Resample at the next service interval to monitor.

Sample Date	11/28/02	12/12/02	02/17/03	Current	UOM
Time on Unit	132305	143201	166574	335103	kms
Time on Oil	50088	60984	84357	83120	kms
Time on Fltr	50088	13923	84357	83120	kms
Oil Maint.	not chg	not chg	changed	changed	---
Filter Maint.	not chg	not chg	n/a	changed	---

CONTAMINATION

There is no indication of any contamination in the component.

Sample Date	11/28/02	12/12/02	02/17/03	Current	Abn
Silicon	6.2	6.0	7.0	4.4	
Potassium	0.0	0.0	0.0	0.0	
Sodium	0.0	0.0	0.0	0.0	
Fuel (%)	<2.0	<2.0	<2.0	<2.0	
Glycol	---	---	---	---	
Water (%)	<0.1	<0.1	<0.1	<0.1	
Soot (%)	0.1	0.1	0	0.3	
Sulfation	71	76	44	82	
Nitration	73	82	45	91	

WEAR

All component wear rates are normal.

Sample Date	11/28/02	12/12/02	02/17/03	Current	Abn
Iron	25	26	45	62	100
Nickel	0.0	0.0	0.0	0.0	2
Chromium	1.6	1.7	2.4	3.1	20
Titanium	0.2	0.2	0.1	0.1	2
Copper	31	31	43	74	330
Aluminum	2.8	2.6	3.2	2.3	25
Tin	0.1	0.0	0.0	0.0	15
Lead	0.8	0.9	1.6	0.9	40
Silver	0.7	0.7	0.6	0.6	2

OIL CONDITION

Oil Type: 40 GAL of ESSO XD-3 EXTRA 15W40

The condition of oil is suitable for further service.

Sample Date	11/28/02	12/12/02	02/17/03	Current	Base
Boron	14	12	10	1.2	0.0
Barium	0.2	0.2	0.3	0.1	0.0
Calcium	3102	3038	3418	3553	3800
Magnesium	97	85	85	11	0.0
Molybdenum	32	28	27	0.5	0.0
Sodium	0.0	0.0	0.0	0.0	0.0
Phosphorus	1126	1124	1249	1062	1350
Sulfur	4164	4065	4459	3697	
Zinc	1394	1354	1701	1550	1500
Visc@40°C	---	---	---	---	116
Visc@100°C	14.1	14.1	14.6	14.8	15.4
Oxidation	76	76	34	89	---



MOBILE OIL ANALYSIS REPORT

CONTAMINATION
OIL CONDITION
WEAR

NORMAL
NORMAL
NORMAL

254L - Diesel Engine

Unit Make : KENWORTH

Unit Model : T600

Comp Make : DETROIT

Comp Model : SERIES 60

Serial No : 964552

Cust. Ref No. : {n/a}

Stub No. : WC-576806

Date Rec'd : Feb 3, 2003

Sample Date : Jan 29, 2003

Diagnostician : Barry Goslin

RECOMMENDATION

Resample at the next service interval to monitor.

Sample Date	09/04/02	10/15/02	Current	UOM
Time on Unit	441750	482270	576776	kms
Time on Oil	20000	20000	37701	kms
Time on Fltr	20000	20000	20000	kms
Oil Maint.	changed	not chg	changed	---
Filter Maint.	n/a	not chg	changed	---

CONTAMINATION

There is no indication of any contamination in the component.

Sample Date	09/04/02	10/15/02	Current	Abn
Silicon	3.7	3.7	3.0	
Potassium	0.2	0.0	0.0	
Sodium	0.0	2.4	0.2	
Fuel (%)	<2.0	<2.0	<2.0	
Glycol (%)	<0.02	<0.02	<0.02	
Water (%)	<0.1	<0.1	<0.1	
Soot (%)	0.7	0.4	0.4	
Sulfation	56	62	71	
Nitration	64	64	73	

OIL CONDITION

Oil Type: 38 GAL of ESSO XD-3 EXTRA 15W40

The condition of the oil is acceptable for the time in service.

Sample Date	09/04/02	10/15/02	Current	Base
Boron	9.7	7.2	4.2	148
Barium	0.0	0.4	0.2	0.8
Calcium	2277	3136	3471	1844
Magnesium	342	75	28	468
Molybdenum	0.7	5.7	3.1	104
Sodium	0.0	2.4	0.2	
Phosphorus	1065	1178	1215	940
Sulfur	8871	5037	4392	5448
Zinc	1217	1374	1350	1044
Visc@40°C	---	---	---	118
Visc@100°C	12.2	12.7	13.1	15.0
Oxidation	42	55	72	---
TAN	---	---	---	2.9
TBN	---	8.39	7.33	10.0

WEAR

All component wear rates are normal.

Sample Date	09/04/02	10/15/02	Current	Abn
Iron	34	20	22	120
Nickel	0.0	0.0	0.0	2
Chromium	2.1	2.8	3.1	20
Titanium	0.1	0.0	0.0	2
Copper	1.3	0.8	1.4	30
Aluminum	3.3	1.0	0.9	20
Tin	0.0	0.0	0.0	15
Lead	3.8	0.2	1.4	40
Silver	0.1	0.2	0.2	2



MOBILE OIL ANALYSIS REPORT

CONTAMINATION
OIL CONDITION
WEAR

NORMAL
NORMAL
NORMAL

206B - Diesel Engine

Unit Make : INTERNATIONAL
 Unit Model : 9400
 Comp Make : CUMMINS
 Comp Model : N14

Serial No : 2HSCNAER8YC072345
 Cust. Ref No. : {n/a}
 Stub No. : WC-0128570

Date Rec'd : Mar 15, 2004
 Sample Date : Mar 10, 2004
 Diagnostician : Barry Goslin

RECOMMENDATION

Resample at the next service interval to monitor.

Sample Date	05/14/02	08/09/02	11/28/02	Current	UOM
Time on Unit	404896	453496	497310	723659	kms
Time on Oil	60891	60841	92414	83986	kms
Time on Fltr	60891	60841	92414	83986	kms
Oil Maint.	changed	n/a	changed	changed	---
Filter Maint.	changed	not chg	changed	changed	---

CONTAMINATION

There is no indication of any contamination in the component.

Sample Date	05/14/02	08/09/02	11/28/02	Current	Abn
Silicon	9.5	6.2	6.2	4.4	
Potassium	0.0	0.6	0.0	1.4	
Sodium	0.0	0.0	0.0	1.7	
Fuel (%)	<2.0	<2.0	<2.0	<2.0	
Glycol	---	---	---	---	
Water (%)	<0.1	<0.1	<0.1	<0.1	
Soot (%)	0.8	1.2	1.1	1.6	
Sulfation	35	62	71	79	
Nitration	36	64	73	82	

OIL CONDITION

Oil Type: 40 GAL of Chevron DELO 400 MULTIGRADE 15W40

The condition of oil is suitable for further service.

Sample Date	05/14/02	08/09/02	11/28/02	Current	Base
Boron	67	85	41	1.2	
Barium	0.2	0.0	0.2	0.0	
Calcium	2419	2752	2786	3582	
Magnesium	273	319	270	9.9	
Molybdenum	91	105	90	0.4	
Sodium	0.0	0.0	0.0	1.7	
Phosphorus	1082	1233	1177	1136	1380
Sulfur	4583	5460	4326	4008	
Zinc	1299	1496	1476	1657	1510
Visc@40°C	---	---	---	---	116
Visc@100°C	14.4	14.5	15.0	15.2	15.6
Oxidation	30	55	63	68	---
TAN	---	---	---	---	
TBN	7.03	---	7.07	6.91	11.3

WEAR

All component wear rates are normal.

Sample Date	05/14/02	08/09/02	11/28/02	Current	Abn
Iron	17	15	26	27	90
Nickel	0.0	0.0	0.0	0.0	2
Chromium	4.2	5.0	7.4	2.6	20
Titanium	0.2	0.1	0.1	0.1	2
Copper	3.3	2.0	3.6	3.6	330
Aluminum	4.5	4.4	3.9	2.0	20
Tin	0.2	0.0	0.0	0.2	15
Lead	4.2	3.0	8.9	7.0	40
Silver	0.3	0.5	0.4	0.3	2