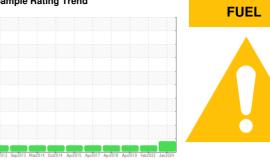


OIL ANALYSIS REPORT

Sample Rating Trend



KME 300907

Component

Front Diesel Engine

SAFETY-KLEEN PERFORMANCE PLUS XHD-7 15W40 (34 LTR)

DIAGNOSIS

Recommendation

The oil change at the time of sampling has been noted. Resample at the next service interval to monitor. No other corrective action is recommended at this time.

Wear

Metal levels are typical for a new component breaking in.

Contamination

Light fuel dilution occurring. No other contaminants were detected in the oil.

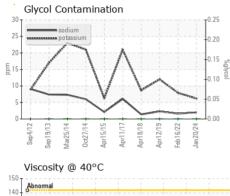
Fluid Condition

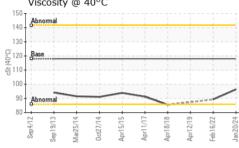
The condition of the oil is acceptable for the time in service.

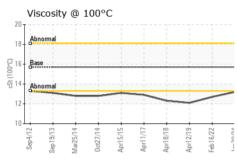
Sample Number Client Info PC0078187 PC0054304 WC0310352 Sample Date Client Info 20 Jan 2024 16 Feb 2022 12 Apr 2019 Machine Age kms Client Info 0 0 0 0 0 0 0 0 0	1D-7 15W40 (34 LIR) Sep2012 Sep2013 Mar2014 Oct2014 Apr2015 Apr2017 Apr2018 Apr2019 Feb2022 Jan2024								
Client Info	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2		
Client Info Qu Jan 2024 16 Feb 2022 12 Apr 2019 Machine Age kms Client Info Qu Qu 38144 32365 Qu Age kms Client Info Qu Qu Qu Qu Qu Qu Qu Q	Sample Number		Client Info		PC0078187	PC0054304	WC0310352		
Machine Age	Sample Date		Client Info		20 Jan 2024	16 Feb 2022	12 Apr 2019		
Contained Client Info Changed Changed Normal	Machine Age	kms	Client Info		42031	38144			
MARGINAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history2 Mater WC Method >0.2 NEG NEg	Oil Age	kms	Client Info		0	0	0		
Water	Oil Changed		Client Info		Changed	Changed	Changed		
Water WC Method >0.2 NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM DS185(m) >85 17 27 25 Chromium ppm ASTM DS185(m) >5 2 2 2 2 Nickel ppm ASTM DS185(m) >5 <1 1 <1 <1 Titanium ppm ASTM DS185(m) >2 0 0 0 0 Aluminum ppm ASTM DS185(m) >2 0 <1 0 Aluminum ppm ASTM DS185(m) >2 0 <1 0 Aluminum ppm ASTM DS185(m) >25 2 4 6 Copper ppm ASTM DS185(m) >5 2 4 5 Actional ppm ASTM DS185(m) 0 0 0 0 Capplitium ppm ASTM DS185(m)	Sample Status				MARGINAL	NORMAL	NORMAL		
WEAR METALS	CONTAMINAT	ION	method	limit/base	current	history1	history2		
Description	Water		WC Method	>0.2	NEG	NEG	NEG		
Chromium ppm ASTM D5185(m) >5 2 2 2 2 Nickel ppm ASTM D5185(m) >5 <1 1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1	WEAR METAL	.S	method	limit/base	current	history1	history2		
Nickel	Iron	ppm	ASTM D5185(m)	>85	17	27	25		
Silver	Chromium	ppm	ASTM D5185(m)	>5	2	2	2		
Silver	Nickel	ppm	ASTM D5185(m)	>5	<1	1	<1		
Aluminum	Titanium	ppm	ASTM D5185(m)	>2	0	0	0		
Lead ppm ASTM D5185(m) >25 2 4 6 Copper ppm ASTM D5185(m) >350 14 26 41 Tin ppm ASTM D5185(m) >5 2 4 5 Antimony ppm ASTM D5185(m) 0 0 0 0 Vanadium ppm ASTM D5185(m) 0 0 0 0 Beryllium ppm ASTM D5185(m) 0 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 0 0 0 ADDITIVES method limit/base current history1 history2 Barium ppm ASTM D5185(m) 0 0 0 0 Magnesium ppm ASTM D5185(m) 944 958 7	Silver	ppm	ASTM D5185(m)	>2	0	<1	0		
Copper ppm ASTM D5185(m) >350 14 26 41 Tin ppm ASTM D5185(m) >5 2 4 5 Antimony ppm ASTM D5185(m) 0 0 0 Vanadium ppm ASTM D5185(m) 0 0 0 Beryllium ppm ASTM D5185(m) 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 0 0 0 Barium ppm ASTM D5185(m) 0 0 0 0 Molybdenum ppm ASTM D5185(m) 59 57 51 51 Magnesium ppm ASTM D5185(m) 944 958 793 52 Calcium ppm ASTM D5185(m) 1018 981 1025 Phosphorus	Aluminum	ppm	ASTM D5185(m)	>40	14	18	19		
Tin ppm ASTM D5185(m) >5 2 4 5 Antimony ppm ASTM D5185(m) 0 0 0 0 Vanadium ppm ASTM D5185(m) 0 0 0 0 Beryllium ppm ASTM D5185(m) 0 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 0 0 0 Molybdenum ppm ASTM D5185(m) 59 57 51 Manganese ppm ASTM D5185(m) 59 57 51 Manganese ppm ASTM D5185(m) 944 958 793 Calcium ppm ASTM D5185(m) 1018 981 1025 Phosphorus ppm ASTM D5185(m) 1021 1021 924 Zinc ppm ASTM D5185(m) 1186 1166 1113 Sulfur ppm ASTM D5185(m) 2759 2556 2635 Lithium ppm ASTM D5185(m) 2759 2556 2635 Lithium ppm ASTM D5185(m) 2759 2556 2635 Soliton ppm ASTM D5185(m) 20 6 8 12 Potassium ppm ASTM D5185(m) 20 6 8 12 Fuel % ASTM D5185(m) >20 6 8 12 Fuel % ASTM D5185(m) >20 6 8 12 Fuel % ASTM D7922* 0.0 0.0 0.0 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >3 0.1 0.1 0.1 Nitration Abs/cm ASTM D7824* >20 7.0 7.8 8.0	Lead	ppm	ASTM D5185(m)	>25	2	4	6		
Antimony ppm ASTM D5185(m) 0	Copper	ppm	ASTM D5185(m)	>350	14	26	41		
Vanadium ppm ASTM D5185(m) 0 0 0 Beryllium ppm ASTM D5185(m) 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 0 0 0 Barium ppm ASTM D5185(m) 0 0 0 0 Molybdenum ppm ASTM D5185(m) 59 57 51 Manganese ppm ASTM D5185(m) 0 <1 <1 Magnesium ppm ASTM D5185(m) 944 958 793 Calcium ppm ASTM D5185(m) 1018 981 1025 Phosphorus ppm ASTM D5185(m) 1021 1021 924 Zinc ppm ASTM D5185(m) 2759 2556 2635 Lithium ppm ASTM D5185(m) >40 </td <td>Tin</td> <td>ppm</td> <td>ASTM D5185(m)</td> <td>>5</td> <th>2</th> <td>4</td> <td>5</td>	Tin	ppm	ASTM D5185(m)	>5	2	4	5		
Beryllium	Antimony	ppm	ASTM D5185(m)		0	0	0		
Cadmium ppm ASTM D5185(m) 0 0 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) <1 2 5 Barium ppm ASTM D5185(m) 0 0 0 Molybdenum ppm ASTM D5185(m) 59 57 51 Manganese ppm ASTM D5185(m) 0 <1 <1 Magnesium ppm ASTM D5185(m) 944 958 793 Calcium ppm ASTM D5185(m) 1018 981 1025 Phosphorus ppm ASTM D5185(m) 1021 1021 924 Zinc ppm ASTM D5185(m) 2759 2556 2635 Lithium ppm ASTM D5185(m) 21 0 0 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >40 <t< td=""><td>Vanadium</td><td>ppm</td><td>ASTM D5185(m)</td><td></td><th>0</th><td>0</td><td>0</td></t<>	Vanadium	ppm	ASTM D5185(m)		0	0	0		
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) <1	Beryllium	ppm	ASTM D5185(m)		0	0	0		
Serion ppm ASTM D5185(m) c1 2 5	Cadmium	ppm	ASTM D5185(m)		0	0	<1		
Barium ppm ASTM D5185(m) 0 0 0 Molybdenum ppm ASTM D5185(m) 59 57 51 Manganese ppm ASTM D5185(m) 0 <1 <1 Magnesium ppm ASTM D5185(m) 944 958 793 Calcium ppm ASTM D5185(m) 1018 981 1025 Phosphorus ppm ASTM D5185(m) 1021 1021 924 Zinc ppm ASTM D5185(m) 2759 2556 2635 Lithium ppm ASTM D5185(m) <1 0 0 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >40 6 7 7 Sodium ppm ASTM D5185(m) >20 6 8 12 Potassium ppm ASTM D5185(m) >20 6 8 12 Fuel % ASTM D7593*	ADDITIVES		method	limit/base	current	history1	history2		
Molybdenum ppm ASTM D5185(m) 59 57 51 Manganese ppm ASTM D5185(m) 0 <1 <1 Magnesium ppm ASTM D5185(m) 944 958 793 Calcium ppm ASTM D5185(m) 1018 981 1025 Phosphorus ppm ASTM D5185(m) 1021 1021 924 Zinc ppm ASTM D5185(m) 1186 1166 1113 Sulfur ppm ASTM D5185(m) 2759 2556 2635 Lithium ppm ASTM D5185(m) <1 0 0 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >40 6 7 7 Sodium ppm ASTM D5185(m) >20 6 8 12 Fuel % ASTM D7593* >5 △ 2.6 <1.0 1.1 Glycol % <td>Boron</td> <td>ppm</td> <td>ASTM D5185(m)</td> <td></td> <th><1</th> <td>2</td> <td>5</td>	Boron	ppm	ASTM D5185(m)		<1	2	5		
Manganese ppm ASTM D5185(m) 0 <1 <1 Magnesium ppm ASTM D5185(m) 944 958 793 Calcium ppm ASTM D5185(m) 1018 981 1025 Phosphorus ppm ASTM D5185(m) 1021 1021 924 Zinc ppm ASTM D5185(m) 1186 1166 1113 Sulfur ppm ASTM D5185(m) 2759 2556 2635 Lithium ppm ASTM D5185(m) <1	Barium	ppm	ASTM D5185(m)		0	0	0		
Magnesium ppm ASTM D5185(m) 944 958 793 Calcium ppm ASTM D5185(m) 1018 981 1025 Phosphorus ppm ASTM D5185(m) 1021 1021 924 Zinc ppm ASTM D5185(m) 1186 1166 1113 Sulfur ppm ASTM D5185(m) 2759 2556 2635 Lithium ppm ASTM D5185(m) <1	Molybdenum	ppm	ASTM D5185(m)		59	57	51		
Calcium ppm ASTM D5185(m) 1018 981 1025 Phosphorus ppm ASTM D5185(m) 1021 1021 924 Zinc ppm ASTM D5185(m) 1186 1166 1113 Sulfur ppm ASTM D5185(m) 2759 2556 2635 Lithium ppm ASTM D5185(m) <1	Manganese	ppm	ASTM D5185(m)		0	<1	<1		
Phosphorus ppm ASTM D5185(m) 1021 1021 924 Zinc ppm ASTM D5185(m) 1186 1166 1113 Sulfur ppm ASTM D5185(m) 2759 2556 2635 Lithium ppm ASTM D5185(m) <1 0 0 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >40 6 7 7 Sodium ppm ASTM D5185(m) 2 2 2 2 Potassium ppm ASTM D5185(m) >20 6 8 12 Fuel % ASTM D7593* >5 2.6 <1.0	Magnesium	ppm	ASTM D5185(m)		944	958	793		
Zinc ppm ASTM D5185(m) 1186 1166 1113 Sulfur ppm ASTM D5185(m) 2759 2556 2635 Lithium ppm ASTM D5185(m) <1 0 0 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >40 6 7 7 Sodium ppm ASTM D5185(m) 2 2 2 2 Potassium ppm ASTM D5185(m) >20 6 8 12 Fuel % ASTM D7893* >5 2.6 <1.0	Calcium	ppm	ASTM D5185(m)		1018	981	1025		
Sulfur ppm ASTM D5185(m) 2759 2556 2635 Lithium ppm ASTM D5185(m) <1 0 0 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >40 6 7 7 Sodium ppm ASTM D5185(m) 2 2 2 2 Potassium ppm ASTM D5185(m) >20 6 8 12 Fuel % ASTM D7593* >5 ▲ 2.6 <1.0	Phosphorus	ppm	ASTM D5185(m)		1021	1021	924		
Lithium ppm ASTM D5185(m) <1 0 0 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >40 6 7 7 Sodium ppm ASTM D5185(m) 2 2 2 2 Potassium ppm ASTM D5185(m) >20 6 8 12 Fuel % ASTM D7593* >5 ▲ 2.6 <1.0	Zinc	ppm	ASTM D5185(m)		1186	1166	1113		
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >40 6 7 7 Sodium ppm ASTM D5185(m) 2 2 2 2 Potassium ppm ASTM D5185(m) >20 6 8 12 Fuel % ASTM D7593* >5 ▲ 2.6 <1.0	Sulfur	ppm	ASTM D5185(m)		2759	2556	2635		
Silicon ppm ASTM D5185(m) >40 6 7 7 Sodium ppm ASTM D5185(m) 2 2 2 2 Potassium ppm ASTM D5185(m) >20 6 8 12 Fuel % ASTM D7593* >5 ▲ 2.6 <1.0 1.1 Glycol % ASTM D7922* 0.0 0.0 0.0 0.0 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >3 0.1 0.1 0.1 Nitration Abs/cm ASTM D7624* >20 7.0 7.8 8.0	Lithium	ppm	ASTM D5185(m)		<1	0	0		
Sodium ppm ASTM D5185(m) 2 2 2 2 Potassium ppm ASTM D5185(m) >20 6 8 12 Fuel % ASTM D7593* >5 ▲ 2.6 <1.0 1.1 Glycol % ASTM D7922* 0.0 0.0 0.0 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >3 0.1 0.1 0.1 Nitration Abs/cm ASTM D7624* >20 7.0 7.8 8.0	CONTAMINAN	ITS	method	limit/base	current	history1	history2		
Potassium ppm ASTM D5185(m) >20 6 8 12 Fuel % ASTM D7593* >5 ▲ 2.6 <1.0 1.1 Glycol % ASTM D7922* 0.0 0.0 0.0 0.0 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >3 0.1 0.1 0.1 Nitration Abs/cm ASTM D7624* >20 7.0 7.8 8.0	Silicon	ppm	ASTM D5185(m)	>40	6		7		
Fuel % ASTM D7593* >5 ▲ 2.6 <1.0 1.1 Glycol % ASTM D7922* 0.0 0.0 0.0 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >3 0.1 0.1 0.1 Nitration Abs/cm ASTM D7624* >20 7.0 7.8 8.0	Sodium	ppm	ASTM D5185(m)		2	2	2		
Glycol % ASTM D7922* 0.0 0.0 0.0 INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >3 0.1 0.1 0.1 Nitration Abs/cm ASTM D7624* >20 7.0 7.8 8.0	Potassium	ppm	ASTM D5185(m)	>20	6	8	12		
INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >3 0.1 0.1 0.1 Nitration Abs/cm ASTM D7624* >20 7.0 7.8 8.0	Fuel	%	ASTM D7593*	>5	2.6	<1.0	1.1		
Soot % % ASTM D7844* >3 0.1 0.1 0.1 Nitration Abs/cm ASTM D7624* >20 7.0 7.8 8.0	Glycol	%	ASTM D7922*		0.0	0.0	0.0		
Nitration Abs/cm ASTM D7624* >20 7.0 7.8 8.0	INFRA-RED		method	limit/base	current	history1	history2		
	Soot %	%	ASTM D7844*	>3	0.1	0.1	0.1		
Sulfation Abs/.1mm ASTM D7415* >30 19.0 20.3 19.0	Nitration	Abs/cm	ASTM D7624*	>20	7.0	7.8	8.0		
	Sulfation	Abs/.1mm	ASTM D7415*	>30	19.0	20.3	19.0		

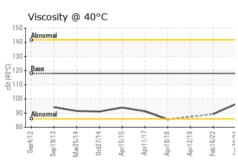


OIL ANALYSIS REPORT



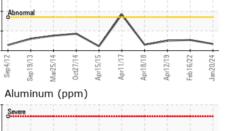


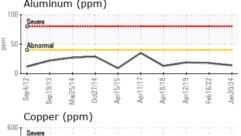


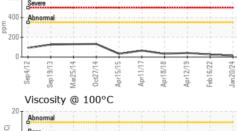


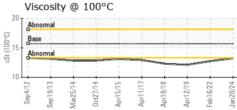
FLUID DEGRAD	OITAC	method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	ASTM D7414*	>25	14.3	14.5	12.6
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	Visual*	NONE	NONE		
Yellow Metal	scalar	Visual*	NONE	VLITE		
Precipitate	scalar	Visual*	NONE	NONE		
Silt	scalar	Visual*	NONE	NONE		
Debris	scalar	Visual*	NONE	NONE		
Sand/Dirt	scalar	Visual*	NONE	NONE		
Appearance	scalar	Visual*	NORML	NORML		
Odor	scalar	Visual*	NORML	NORML	NORML	
Emulsified Water	scalar	Visual*	>0.2	NEG	NEG	NEG
Free Water	scalar	Visual*		NEG	NEG	NEG
FLUID PROPE	RTIES	method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D7279(m)	118	96.4	89.3	
Visc @ 100°C	cSt	ASTM D7279(m)	15.7	13.2	12.7	12.1
Viscosity Index (VI)	Scale	ASTM D2270*	140	135	139	
GRAPHS						

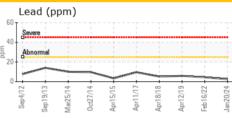
Iron	n (pp	om)							
100 - Abno	ormal		_	_/	^	\			
Sep4/12+	Sep19/13 -	Mar25/14	0ct27/14 -	Apr15/15	Apr11/17 -	Apr18/18	Apr12/19 -	Feb16/22	Jan20/24

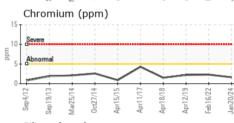


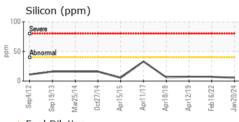


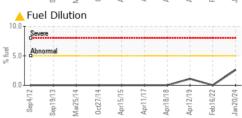














CALA ISO 17025:2017 Accredited

Laboratory

Unique Number : 5724630

Laboratory Sample No.

: WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 : PC0078187 Lab Number : 02615535

Received **Tested** Diagnosed

: 14 Feb 2024 : 15 Feb 2024 : 15 Feb 2024 - Wes Davis

HAMILTON FIRE DEPT MECHANICAL DIV., 177 BAY STREET NORTH

HAMILTON, ON CA L8R 2P8

Test Package : MOB 1 (Additional Tests: FuelDilution, Glycol, KV40, PercentFuel, VI, Visutadt: Jenny-Lynn Pellegrino To discuss this sample report, contact Customer Service at 1-800-268-2131.

jenny-lynn.pellegrino@hamilton.ca T: (905)546-2424

Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab. Validity of results and interpretation are based on the sample and information as supplied.

F: (905)961-9116