

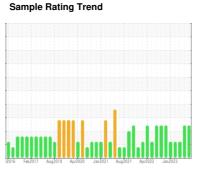
OIL ANALYSIS REPORT



NEW FLYER 0916

Component **Diesel Engine**

SAFETY-KLEEN PERFORMANCE PLUS XHD-7 15W40 (--- GAL)





DIAGNOSIS

Recommendation

We advise that you check the fuel injection system. We recommend that you drain the oil from the component if this has not already been done. We recommend an early resample to monitor this condition.

Wear

Metal levels are typical for a new component breaking in.

Contamination

There is a high amount of fuel present in the oil. Tests confirm the presence of fuel in the oil.

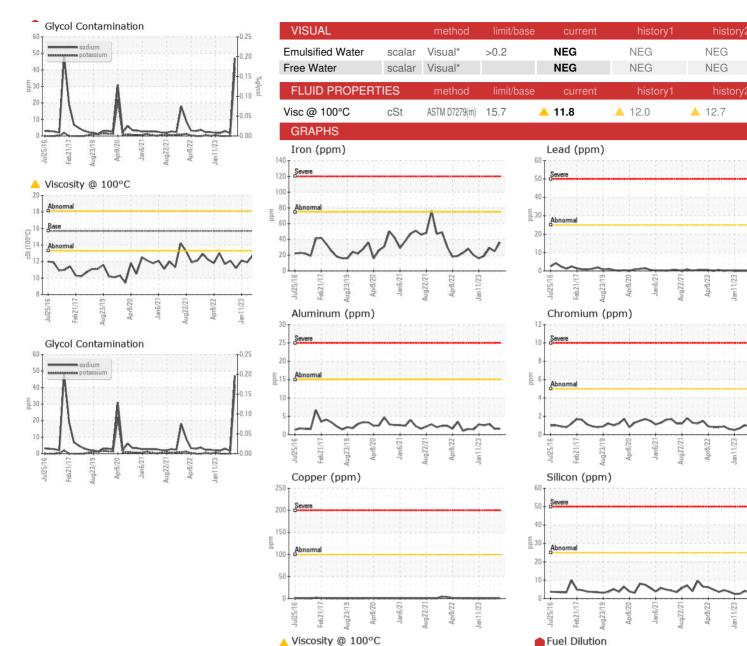
▲ Fluid Condition

Viscosity of sample indicates oil is within SAE 30 range, advise investigate. The oil is no longer serviceable due to the presence of contaminants.

Sample Number Client Info WC0830138 WC0811615 WC0791499 Sample Date Client Info 22 Aug 2023 07 Jul 2023 13 Apr 2023 10 Apr 2023 13 Apr 2023 10	E PLUS AND-7 13W4U	(GAL)	12016 Feb20	117 Aug2019 Apr2020	Jan2021 Aug2021 Apr2022	Jan 2023	
Sample Date Client Info 1922 Aug 2023 07 Jul 2023 13 Apr 2023 13 Apr 2023 13 Apr 2023 13 Apr 2023 10 Apr 2023	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age kms Client Info 109775 108749 107129 Oil Age kms Client Info 0 0 0 0 Oil Changed Client Info N/A N/A N/A N/A Sample Status SEVERE SEVERE ABNORMAL WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185(m) >5 2 <1	Sample Number		Client Info		WC0830138	WC0811615	WC0791499
Machine Age kms Client Info 109775 108749 107129 Oil Age kms Client Info 0 0 0 0 Oil Changed Client Info N/A N/A N/A N/A Sample Status SEVERE SEVERE ABNORMAL WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185(m) >2 2 1 1 Chromium ppm ASTM D5185(m) >5 2 <1 1 Nickel ppm ASTM D5185(m) >4 0 0 <1 Titanium ppm ASTM D5185(m) >2 0 0 <1 Copper ppm ASTM D5185(m) >2 0 <1 0 Copper ppm ASTM D5185(m) >2 0 <1 0 Copper ppm ASTM D5185(m) >4 0 <1 <1 Tin <td></td> <td></td> <td>Client Info</td> <td></td> <th>22 Aug 2023</th> <td>07 Jul 2023</td> <td>13 Apr 2023</td>			Client Info		22 Aug 2023	07 Jul 2023	13 Apr 2023
Cilient Info	•	kms	Client Info		_	108749	
SEVERE SEVERE ABNORMAL	Oil Age	kms	Client Info		0	0	0
SEVERE SEVERE ABNORMAL WEAR METALS method limit/base current history1 history2 history3 history4 history4 history4 history4 history2 history2 history4 history2 history4 history2 history4 history2 history4 history2 history4 history2 history4 history4 history2 history4 history2 history4 history2 history4 history2 history4 history2 history4 history2 history4 history4 history2 history4 history2 history4 history2 history4	•		Client Info			N/A	N/A
Chromium	-				SEVERE	SEVERE	ABNORMAL
Chromium ppm ASTM D5185(m) >5 2 <1 1 Nickel ppm ASTM D5185(m) >4 0 0 <1 Tittanium ppm ASTM D5185(m) >2 0 0 <1 Siliver ppm ASTM D5185(m) >2 0 0 <1 Aluminum ppm ASTM D5185(m) >2 0 0 0 Aluminum ppm ASTM D5185(m) >2 0 <1 <1 Lead ppm ASTM D5185(m) >25 0 <1 0 Copper ppm ASTM D5185(m) >4 0 0 <1 Tin 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) 2 1 <t< td=""><td>WEAR METALS</td><td></td><td>method</td><td>limit/base</td><th>current</th><td>history1</td><td>history2</td></t<>	WEAR METALS		method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185(m)	>75	36	25	29
Silver	Chromium	ppm	ASTM D5185(m)	>5	2	<1	1
Silver	Nickel	ppm	ASTM D5185(m)	>4	0	0	<1
Aluminum ppm ASTM D5185(m) >15 2 2 3 Lead ppm ASTM D5185(m) >25 0 <1 0 Copper ppm ASTM D5185(m) >4 0 0 <1 Antimony ppm ASTM D5185(m) >4 0 0 0 Vanadium 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 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 2 1 8 Barium ppm ASTM D5185(m) 59 54 57 Manganese ppm ASTM D5185(m) 59 54 57 Manganese ppm ASTM D5185(m) 41 <1 <1 Calcium ppm ASTM D5185(m) 936 977 1080 Phosphorus ppm ASTM D5185(m) 936 977 1080 Phosphorus ppm ASTM D5185(m) 886 992 974 Zinc ppm ASTM D5185(m) 2242 2341 2333 Lithium ppm ASTM D5185(m) 2242 2341 2333 Lithium ppm ASTM D5185(m) >25 4 4 4 CONTAMINANTS method limit/base current history1 history2 Fuel % ASTM D5185(m) >20 42 0 0 Fuel % ASTM D5185(m) >20 42 0 0 NEG NEG INFRA-RED method limit/base current history1 history2 Sulfration Abs/am ASTM D7815' >30 28.8 25.3 23.3 FLUID DEGRADATION method limit/base current history1 history2 FLUID DEGRADATION method limit/base current history1 history2 Fuel % ASTM D7824' >60 0.6 0.5 0.8 Nitration Abs/am ASTM D7815' >30 28.8 25.3 23.3 FLUID DEGRADATION method limit/base current history1 history2	Titanium	ppm	ASTM D5185(m)	>2	0	0	<1
Lead ppm ASTM D5185(m) >25 0 <1 0 Copper ppm ASTM D5185(m) >100 <1 <1 <1 Tin ppm ASTM D5185(m) >4 0 0 <1 <1 Antimony ppm ASTM D5185(m) 0 0 0 0 Vanadium ppm ASTM D5185(m) 0 0 0 0 Bervillium ppm ASTM D5185(m) 0 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 0 Boron ppm ASTM D5185(m) 2 1 8 8 Boron ppm ASTM D5185(m) 59 54 57 Manganese ppm ASTM D5185(m) 59 54 57 Magnesium ppm ASTM D5185(m) 936 977 1080 Phosphorus ppm ASTM D5185(m) 936 977 1080	Silver	ppm	ASTM D5185(m)	>2	0	0	0
Copper ppm ASTM D5185(m) >100 <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 <1 <1 <1 <1 <1 <1 <1 <1 <1 </td <td>Aluminum</td> <td>ppm</td> <td>ASTM D5185(m)</td> <td>>15</td> <th>2</th> <td>2</td> <td>3</td>	Aluminum	ppm	ASTM D5185(m)	>15	2	2	3
Copper ppm ASTM D5185(m) >100 <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 <1 <1 <1 <1 <1 <1 <1 <1 <1 </td <td>Lead</td> <td></td> <td>, ,</td> <td></td> <th>0</th> <td><1</td> <td>0</td>	Lead		, ,		0	<1	0
Tin ppm ASTM D5185(m) >4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Copper	ppm	ASTM D5185(m)	>100	<1	<1	<1
Antimony			\ /				
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) 2 1 8 Barium ppm ASTM D5185(m) 0 0 0 Molybdenum ppm ASTM D5185(m) 59 54 57 Manganese ppm ASTM D5185(m) 59 54 57 Magnesium ppm ASTM D5185(m) 869 905 911 Calcium ppm ASTM D5185(m) 936 977 1080 Phosphorus ppm ASTM D5185(m) 936 977 1080 Phosphorus ppm ASTM D5185(m) 2242 2341 2333 Lithium ppm ASTM D5185(m) 2242 2341	Antimony		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) 2 1 8 Barium ppm ASTM D5185(m) 0 0 0 Molybdenum ppm ASTM D5185(m) 59 54 57 Manganese ppm ASTM D5185(m) 41 <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 <t< td=""><td>Vanadium</td><td></td><td>, ,</td><td></td><th>0</th><td>0</td><td>0</td></t<>	Vanadium		, ,		0	0	0
Cadmium ppm ASTM D5185(m) 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 2 1 8 Barium ppm ASTM D5185(m) 0 0 0 Molybdenum ppm ASTM D5185(m) 59 54 57 Manganese ppm ASTM D5185(m) 869 905 911 Calcium ppm ASTM D5185(m) 936 977 1080 Phosphorus ppm ASTM D5185(m) 936 997 1080 Zinc ppm ASTM D5185(m) 936 997 1080 Sulfur ppm ASTM D5185(m) 9242 2341 2333 Lithium ppm ASTM D5185(m) <1 <1 <1 <1 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) <th< td=""><td></td><td></td><td>. ,</td><td></td><th></th><td>0</td><td>0</td></th<>			. ,			0	0
Boron	•		\ /				
Barium ppm ASTM D5185(m) 0 0 0 Molybdenum ppm ASTM D5185(m) 59 54 57 Manganese ppm ASTM D5185(m) 41 <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185(m) 59 54 57 Manganese ppm ASTM D5185(m) <1	Boron	ppm	ASTM D5185(m)		2	1	8
Manganese ppm ASTM D5185(m) <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 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1<	Barium	ppm	ASTM D5185(m)		0	0	0
Magnesium ppm ASTM D5185(m) 869 905 911 Calcium ppm ASTM D5185(m) 936 977 1080 Phosphorus ppm ASTM D5185(m) 886 992 974 Zinc ppm ASTM D5185(m) 1030 1113 1081 Sulfur ppm ASTM D5185(m) 2242 2341 2333 Lithium ppm ASTM D5185(m) <1	Molybdenum	ppm	ASTM D5185(m)		59	54	57
Calcium ppm ASTM D5185(m) 936 977 1080 Phosphorus ppm ASTM D5185(m) 886 992 974 Zinc ppm ASTM D5185(m) 1030 1113 1081 Sulfur ppm ASTM D5185(m) 2242 2341 2333 Lithium ppm ASTM D5185(m) <1	Manganese	ppm	ASTM D5185(m)		<1	<1	<1
Phosphorus ppm ASTM D5185(m) 886 992 974 Zinc ppm ASTM D5185(m) 1030 1113 1081 Sulfur ppm ASTM D5185(m) 2242 2341 2333 Lithium ppm ASTM D5185(m) <1 <1 <1 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >25 4 4 4 Sodium ppm ASTM D5185(m) >20 42 0 0 Fuel % ASTM D7593* >3.0 8 6.7 5.2 Glycol % ASTM D7922* 0.0 NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7624* >20 12.5 11.0 11.7 Sulfation Abs/:nm ASTM D7415* >30 28.8 25.3 23.3	Magnesium	ppm	ASTM D5185(m)		869	905	911
Zinc ppm ASTM D5185(m) 1030 1113 1081 Sulfur ppm ASTM D5185(m) 2242 2341 2333 Lithium ppm ASTM D5185(m) <1 <1 <1 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >25 4 4 4 Sodium ppm ASTM D5185(m) >25 4 4 4 Sodium ppm ASTM D5185(m) >20 42 0 0 Fuel % ASTM D7593* >3.0 8 6.7 5.2 Glycol % ASTM D7922* 0.0 NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7624* >20 12.5 11.0 11.7 Sulfation Abs/:nm ASTM D7415* >30 28.8 25.3 23.3	Calcium	ppm	ASTM D5185(m)		936	977	1080
Zinc ppm ASTM D5185(m) 1030 1113 1081 Sulfur ppm ASTM D5185(m) 2242 2341 2333 Lithium ppm ASTM D5185(m) <1 <1 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >25 4 4 4 Sodium ppm ASTM D5185(m) >25 4 4 4 Potassium ppm ASTM D5185(m) >20 42 0 0 Fuel % ASTM D7593* >3.0 8 6.7 5.2 Glycol % ASTM D7922* 0.0 NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7624* >20 12.5 11.0 11.7 Sulfation Abs/.mm ASTM D7415* >30 28.8 25.3 23.3 <t< td=""><td>Phosphorus</td><td>ppm</td><td>ASTM D5185(m)</td><td></td><th>886</th><td>992</td><td>974</td></t<>	Phosphorus	ppm	ASTM D5185(m)		886	992	974
Sulfur ppm ASTM D5185(m) 2242 2341 2333 Lithium ppm ASTM D5185(m) <1 <1 <1 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >25 4 4 4 Sodium ppm ASTM D5185(m) >25 4 4 4 Potassium ppm ASTM D5185(m) >20 42 0 0 Fuel % ASTM D7593* >3.0 8 6.7 △ 5.2 Glycol % ASTM D7922* 0.0 NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >6 0.6 0.5 0.8 Nitration Abs/cm ASTM D7415* >20 12.5 11.0 11.7 Sulfation Abs/Limm ASTM D7415* >30 28.8 <t< td=""><td>Zinc</td><td></td><td>ASTM D5185(m)</td><td></td><th>1030</th><td>1113</td><td>1081</td></t<>	Zinc		ASTM D5185(m)		1030	1113	1081
Lithium ppm ASTM D5185(m) <1 <1 <1 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >25 4 4 4 Sodium ppm ASTM D5185(m) >20 42 0 0 Potassium ppm ASTM D5185(m) >20 42 0 0 Fuel % ASTM D7593* >3.0 8 6.7 ▲ 5.2 Glycol % ASTM D7922* 0.0 NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >6 0.6 0.5 0.8 Nitration Abs/cm ASTM D7415* >20 12.5 11.0 11.7 Sulfation Abs/.1mm ASTM D7415* >30 28.8 25.3 23.3	Sulfur		ASTM D5185(m)		2242		2333
Silicon ppm ASTM D5185(m) >25 4 4 4 Sodium ppm ASTM D5185(m) >20 47 2 3 Potassium ppm ASTM D5185(m) >20 42 0 0 Fuel % ASTM D7993* >3.0 8 6.7 5.2 Glycol % ASTM D7922* 0.0 NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >6 0.6 0.5 0.8 Nitration Abs/cm ASTM D7624* >20 12.5 11.0 11.7 Sulfation Abs/.1mm ASTM D7415* >30 28.8 25.3 23.3 FLUID DEGRADATION method limit/base current history1 history2	Lithium		. ,		<1	<1	
Sodium ppm ASTM D5185(m) 47 2 3 Potassium ppm ASTM D5185(m) >20 42 0 0 Fuel % ASTM D7593* >3.0 8 6.7 ▲ 5.2 Glycol % ASTM D7922* 0.0 NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >6 0.6 0.5 0.8 Nitration Abs/cm ASTM D7624* >20 12.5 11.0 11.7 Sulfation Abs/.1mm ASTM D7415* >30 28.8 25.3 23.3 FLUID DEGRADATION method limit/base current history1 history2	CONTAMINANTS	;	method	limit/base	current	history1	history2
Sodium ppm ASTM D5185(m) 47 2 3 Potassium ppm ASTM D5185(m) >20 42 0 0 Fuel % ASTM D7593* >3.0 8 6.7 ▲ 5.2 Glycol % ASTM D7922* 0.0 NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >6 0.6 0.5 0.8 Nitration Abs/cm ASTM D7624* >20 12.5 11.0 11.7 Sulfation Abs/.1mm ASTM D7415* >30 28.8 25.3 23.3 FLUID DEGRADATION method limit/base current history1 history2	Silicon	ppm	ASTM D5185(m)	>25	4	4	4
Potassium ppm ASTM D5185(m) >20 42 0 0 Fuel % ASTM D7593* >3.0 8 6.7 ▲ 5.2 Glycol % ASTM D7922* 0.0 NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >6 0.6 0.5 0.8 Nitration Abs/cm ASTM D7624* >20 12.5 11.0 11.7 Sulfation Abs/.1mm ASTM D7415* >30 28.8 25.3 23.3 FLUID DEGRADATION method limit/base current history1 history2	Sodium		ASTM D5185(m)		47	2	3
Fuel % ASTM D7593* >3.0 8 6.7 ▲ 5.2 Glycol % ASTM D7922* 0.0 NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >6 0.6 0.5 0.8 Nitration Abs/cm ASTM D7624* >20 12.5 11.0 11.7 Sulfation Abs/.1mm ASTM D7415* >30 28.8 25.3 23.3 FLUID DEGRADATION method limit/base current history1 history2			. ,	>20			
Glycol % ASTM D7922* 0.0 NEG NEG INFRA-RED method limit/base current history1 history2 Soot % % ASTM D7844* >6 0.6 0.5 0.8 Nitration Abs/cm ASTM D7624* >20 12.5 11.0 11.7 Sulfation Abs/.1mm ASTM D7415* >30 28.8 25.3 23.3 FLUID DEGRADATION method limit/base current history1 history2			. ,			6 .7	△ 5.2
Soot % % ASTM D7844* >6 0.6 0.5 0.8 Nitration Abs/cm ASTM D7624* >20 12.5 11.0 11.7 Sulfation Abs/.1mm ASTM D7415* >30 28.8 25.3 23.3 FLUID DEGRADATION method limit/base current history1 history2	Glycol						
Nitration Abs/cm ASTM D7624* >20 12.5 11.0 11.7 Sulfation Abs/.1mm ASTM D7415* >30 28.8 25.3 23.3 FLUID DEGRADATION method limit/base current history1 history2	INFRA-RED		method	limit/base	current	history1	history2
Nitration Abs/cm ASTM D7624* >20 12.5 11.0 11.7 Sulfation Abs/.1mm ASTM D7415* >30 28.8 25.3 23.3 FLUID DEGRADATION method limit/base current history1 history2	Soot %	%	ASTM D7844*	>6	0.6	0.5	0.8
Sulfation Abs/.1mm ASTM D7415* >30 28.8 25.3 23.3 FLUID DEGRADATION method limit/base current history1 history2							
Oxidation Abs/.1mm ASTM D7414* >25 31.2 26.9 22.3	FLUID DEGRADA	ATION	method	limit/base	current	history1	history2
	Oxidation	Abs/.1mm	ASTM D7414*	>25	31.2	26.9	22.3



OIL ANALYSIS REPORT







Laboratory Sample No. Lab Number

Unique Number

: WC0830138 : 02578958 : 5632018

cSt (100°C)

: WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 Received

Validity of results and interpretation are based on the sample and information as supplied.

: 29 Aug 2023 Diagnosed : 30 Aug 2023

Diagnostician : Kevin Marson

12.0 10.0

0.0

Test Package: MOB 1 (Additional Tests: Glycol, PercentFuel) To discuss this sample report, contact Customer Service at 1-800-268-2131. Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab. CITY OF HAMILTON

2200 UPPER JAMES,, MOUNTAIN TRANSIT STOREROOM MOUNT HOPE, ON CA LOR 1W0 Contact: Jeff Parr

jeff.parr@hamilton.ca T: (905)546-2424

F: (905)679-4502