

## **OIL ANALYSIS REPORT**

## Sample Rating Trend

## FUEL





# NEW FLYER 1219

Component

Diesel Engine

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

### **DIAGNOSIS**

#### Recommendation

No corrective action is recommended at this time. Resample at the next service interval to monitor.

#### Waar

All component wear rates are normal.

#### Contamination

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

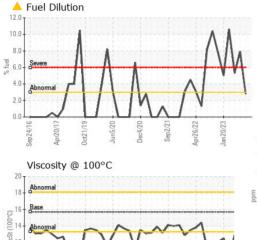
#### **Fluid Condition**

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

Sample Number   Client Info   WC0830196   WC0811407   WC0811535   Sample Date   Client Info   O3 Aug 2023   14 Jun 2023   26 Apr 2023   26	E PLUS XHD-7 15W40	( GAL)	32016 Apr20	17 Oct2019 Jun2020	Dec2020 Sep2021 Apr2022	Jan 2023	
Sample Date	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age   kms	Sample Number		Client Info		WC0830196	WC0811407	WC0811532
Machine Age   kms	Sample Date		Client Info		03 Aug 2023	14 Jun 2023	26 Apr 2023
Dil Changed   Client Info   N/A   MARGINAL   SEVERE   ABNORMAL   Sample Status   Marginal   SEVERE   ABNORMAL   Severe   AB	Machine Age	kms	Client Info		811021	807138	800648
Dil Changed   Client Info   N/A   MARGINAL   SEVERE   ABNORMAL   Sample Status   Marginal   SEVERE   ABNORMAL   Severe   AB	Oil Age	kms	Client Info		0	0	0
MARGINAL   SEVERE   ABNORMAI   CONTAMINATION   method   limit/base   current   history1   history2   history3   history3   method   limit/base   current   history1   history3   history3   method   limit/base   current   history3   history3   method   limit/base   current   history4   history3   method   limit/base   current   history4   history4   method   limit/base   current   history4   history4   history4   history4   method   limit/base   current   history1   history4   history4   method   limit/base   current   history1   history4   history4   method   limit/base   current   history1   history4   method   limit/base   current   history4   method   limit/base   current   history4   method   limit/base   current   history4   history4   history4   method   limit/base   current   history4   history4   history4   method   limit/base   current   history4   history	-		Client Info		N/A	N/A	N/A
WEAR METALS	Sample Status				MARGINAL	SEVERE	ABNORMAL
WEAR METALS	CONTAMINATION	١	method	limit/base	current	history1	history2
Description	Glycol		WC Method		NEG	NEG	NEG
Description	WEAR METALS		method	limit/base	current	history1	history2
ASTM D5185(m)   S4	ron	ppm	ASTM D5185(m)	>75	10	16	8
Description	Chromium	ppm	ASTM D5185(m)	>5	<1	<1	<1
Silver	Nickel	ppm	ASTM D5185(m)	>4	0	0	<1
Silver	Γitanium		ASTM D5185(m)	>2	0	0	<1
Aluminum   ppm   ASTM D5185(m)   >15   1   1   1   1   1   1   1   1   1	Silver		ASTM D5185(m)	>2	<1		0
December   December	Aluminum		ASTM D5185(m)	>15	1	1	1
Description	_ead		, ,				<1
Tin ppm ASTM D5185(m) >4 0 0 0 0 Antimony ppm ASTM D5185(m) 0 0 0 0 Beryllium 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) 1 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 1 0 0 0 0 Molybdenum ppm ASTM D5185(m) 57 53 56 Manganese ppm ASTM D5185(m) 57 53 56 Manganese ppm ASTM D5185(m) 939 847 911 Calcium ppm ASTM D5185(m) 939 847 911 Calcium ppm ASTM D5185(m) 1010 889 1010 Phosphorus ppm ASTM D5185(m) 1046 932 1051 Zinc ppm ASTM D5185(m) 1166 1037 1135 Sulfur ppm ASTM D5185(m) 1166 1037 1135 Sulfur ppm ASTM D5185(m) 2546 2230 2576 Lithium ppm ASTM D5185(m) 2546 2230 2576 Lithium ppm ASTM D5185(m) 2546 2230 2576 Lithium ppm ASTM D5185(m) 2546 2230 2576 Sodium ppm ASTM D5185(m) 20 5 4 2 Eucl % ASTM D5185(m) >25 4 3 2 Sodium ppm ASTM D5185(m) >25 4 3 2 Sodium ppm ASTM D5185(m) 20 5 4 2 Eucl % ASTM D5185(m) >20 5 4 2 Eucl % ASTM D5835(m) >20 5 4 2 Eucl % ASTM D5835(m) >20 5 4 2 Eucl % ASTM D7835 >3.0  22 0 4.2 0.4 0.1 NIFRA-RED method limit/base current history1 history2 Solf Soot % % ASTM D7845 >20 7.5 10.2 6.2 Sulfation Abs/1mm ASTM D7415 >30 22.0 24.2 18.9 FLUID DEGRADATION method limit/base current history1 history2	Copper			>100	<1		<1
Antimony   ppm   ASTM D5185(m)   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)         1         <1         <1         <1           Barium         ppm         ASTM D5185(m)         0         0         0         0           Molybdenum         ppm         ASTM D5185(m)         57         53         56           Manganese         ppm         ASTM D5185(m)         939         847         911           Valeium         ppm         ASTM D5185(m)         939         847         911           Calcium         ppm         ASTM D5185(m)         1046         932         1051           Zinc         ppm         ASTM D5185(m)         1166         1037         1135           Sulfur         ppm         ASTM D5185(m)         2546         2230         2576           Lithium         ppm         ASTM D5185(m)         >25<			. ,				
Decyllium							
Cadmium         ppm         ASTM D5185(m)         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185(m)         1         <1							
Soron	Cadmium						
Barium	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185(m)         57         53         56           Manganese         ppm         ASTM D5185(m)         <1         <1         <1           Magnesium         ppm         ASTM D5185(m)         939         847         911           Calcium         ppm         ASTM D5185(m)         1010         889         1010           Phosphorus         ppm         ASTM D5185(m)         1046         932         1051           Zinc         ppm         ASTM D5185(m)         1166         1037         1135           Sulfur         ppm         ASTM D5185(m)         2546         2230         2576           Lithium         ppm         ASTM D5185(m)         <1         <1         <1         <1           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185(m)         >25         4         3         2           Godium         ppm         ASTM D5185(m)         >20         5         4         2           Fuel         %         ASTM D7593*         >3.0         2.8         7.9         5.3           INFRA-RED         <	Boron	ppm	ASTM D5185(m)		1	<1	<1
Molybdenum         ppm         ASTM D5185(m)         57         53         56           Manganese         ppm         ASTM D5185(m)         <1         <1         <1           Magnesium         ppm         ASTM D5185(m)         939         847         911           Calcium         ppm         ASTM D5185(m)         1010         889         1010           Phosphorus         ppm         ASTM D5185(m)         1046         932         1051           Zinc         ppm         ASTM D5185(m)         1166         1037         1135           Sulfur         ppm         ASTM D5185(m)         2546         2230         2576           Lithium         ppm         ASTM D5185(m)         <1         <1         <1         <1           CONTAMINANTS         method         limit/base         current         history1         history2           Bilicon         ppm         ASTM D5185(m)         >25         4         3         2           Column         ppm         ASTM D5185(m)         >20         5         4         2           Fuel         %         ASTM D7593*         >3.0         2.8         7.9         5.3           INFRA-RED         <	Barium	ppm	ASTM D5185(m)		0	0	0
Manganese         ppm         ASTM D5185(m)         <1         <1         <1           Magnesium         ppm         ASTM D5185(m)         939         847         911           Calcium         ppm         ASTM D5185(m)         1010         889         1010           Phosphorus         ppm         ASTM D5185(m)         1046         932         1051           Zinc         ppm         ASTM D5185(m)         1166         1037         1135           Sulfur         ppm         ASTM D5185(m)         2546         2230         2576           Lithium         ppm         ASTM D5185(m)         <1         <1         <1           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185(m)         >25         4         3         2           Godium         ppm         ASTM D5185(m)         >20         5         4         2           Fuel         %         ASTM D5185(m)         >20         5         4         2           Godium         ppm         ASTM D5185(m)         >20         5         4         2           Fuel         %	Molybdenum		ASTM D5185(m)		57	53	56
Magnesium         ppm         ASTM D5185(m)         939         847         911           Calcium         ppm         ASTM D5185(m)         1010         889         1010           Phosphorus         ppm         ASTM D5185(m)         1046         932         1051           Zinc         ppm         ASTM D5185(m)         1166         1037         1135           Sulfur         ppm         ASTM D5185(m)         2546         2230         2576           Lithium         ppm         ASTM D5185(m)         <1         <1         <1           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185(m)         >25         4         3         2           Godium         ppm         ASTM D5185(m)         >20         5         4         2           Fuel         %         ASTM D7593*         >3.0         2.8         7.9         5.3           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         ASTM D7844*         >6         0.2         0.4         0.1           Nitration <td></td> <td></td> <td>, ,</td> <td></td> <td></td> <td></td> <td></td>			, ,				
Calcium         ppm         ASTM D5185(m)         1010         889         1010           Phosphorus         ppm         ASTM D5185(m)         1046         932         1051           Zinc         ppm         ASTM D5185(m)         1166         1037         1135           Sulfur         ppm         ASTM D5185(m)         2546         2230         2576           Lithium         ppm         ASTM D5185(m)         <1	•					847	
Phosphorus         ppm         ASTM D5185(m)         1046         932         1051           Zinc         ppm         ASTM D5185(m)         1166         1037         1135           Sulfur         ppm         ASTM D5185(m)         2546         2230         2576           Lithium         ppm         ASTM D5185(m)         <1         <1         <1           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185(m)         >25         4         3         2           Sodium         ppm         ASTM D5185(m)         >20         5         4         2           Fuel         %         ASTM D7593*         >3.0         2.8         7.9         5.3           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         ASTM D7624*         >20         7.5         10.2         6.2           Sulfation         Abs/:1mm         ASTM D7415*         >30         22.0         24.2         18.9           FLUID DEGRADATION         method         limit/base         current         history1	-						
Zinc         ppm         ASTM D5185(m)         1166         1037         1135           Sulfur         ppm         ASTM D5185(m)         2546         2230         2576           Lithium         ppm         ASTM D5185(m)         <1         <1         <1           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185(m)         >25         4         3         2           Sodium         ppm         ASTM D5185(m)         >20         5         4         2           Fuel         %         ASTM D7593*         >3.0         2.8         7.9         ▲ 5.3           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         ASTM D7844*         >6         0.2         0.4         0.1           Nitration         Abs/cm         ASTM D7624*         >20         7.5         10.2         6.2           Sulfation         Abs/.1mm         ASTM D7415*         >30         22.0         24.2         18.9           FLUID DEGRADATION         method         limit/base         current			( /				
Sulfur         ppm         ASTM D5185(m)         2546         2230         2576           Lithium         ppm         ASTM D5185(m)         <1         <1         <1           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185(m)         >25         4         3         2           Sodium         ppm         ASTM D5185(m)         >20         5         4         2           Potassium         ppm         ASTM D5185(m)         >20         5         4         2           Fuel         %         ASTM D7593*         >3.0         2.8         7.9         ▲ 5.3           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         ASTM D7844*         >6         0.2         0.4         0.1           Nitration         Abs/cm         ASTM D7624*         >20         7.5         10.2         6.2           Sulfation         Abs/.1mm         ASTM D7415*         >30         22.0         24.2         18.9           FLUID DEGRADATION         method         limit/base         current<			. ,				
Lithium         ppm         ASTM D5185(m)         <1         <1         <1           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185(m)         >25         4         3         2           Sodium         ppm         ASTM D5185(m)         >20         5         4         2           Fuel         %         ASTM D7593*         >3.0         2.8         7.9         ▲ 5.3           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         ASTM D7844*         >6         0.2         0.4         0.1           Nitration         Abs/cm         ASTM D7624*         >20         7.5         10.2         6.2           Sulfation         Abs/.1mm         ASTM D7415*         >30         22.0         24.2         18.9           FLUID DEGRADATION         method         limit/base         current         history1         history2			1				
Silicon       ppm       ASTM D5185(m)       >25       4       3       2         Sodium       ppm       ASTM D5185(m)       13       10       10         Potassium       ppm       ASTM D5185(m)       >20       5       4       2         Fuel       %       ASTM D7593*       >3.0       2.8       7.9       ▲ 5.3         INFRA-RED       method       limit/base       current       history1       history2         Soot %       %       ASTM D7844*       >6       0.2       0.4       0.1         Nitration       Abs/cm       ASTM D7624*       >20       7.5       10.2       6.2         Sulfation       Abs/.1mm       ASTM D7415*       >30       22.0       24.2       18.9         FLUID DEGRADATION       method       limit/base       current       history1       history2	Lithium		. ,				
Sodium         ppm         ASTM D5185(m)         13         10         10           Potassium         ppm         ASTM D5185(m)         >20         5         4         2           Fuel         %         ASTM D7593*         >3.0         ▲ 2.8         ♠ 7.9         ▲ 5.3           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         ASTM D7844*         >6         0.2         0.4         0.1           Nitration         Abs/cm         ASTM D7624*         >20         7.5         10.2         6.2           Sulfation         Abs/.1mm         ASTM D7415*         >30         22.0         24.2         18.9           FLUID DEGRADATION         method         limit/base         current         history1         history2	CONTAMINANTS		method	limit/base	current	history1	history2
Sodium         ppm         ASTM D5185(m)         13         10         10           Potassium         ppm         ASTM D5185(m)         >20         5         4         2           Fuel         %         ASTM D7593*         >3.0         ▲ 2.8         ♠ 7.9         ▲ 5.3           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         ASTM D7844*         >6         0.2         0.4         0.1           Nitration         Abs/cm         ASTM D7624*         >20         7.5         10.2         6.2           Sulfation         Abs/.1mm         ASTM D7415*         >30         22.0         24.2         18.9           FLUID DEGRADATION         method         limit/base         current         history1         history2	Silicon	ppm	ASTM D5185(m)	>25	4	3	2
Potassium         ppm         ASTM D5185(m)         >20         5         4         2           Fuel         %         ASTM D7593*         >3.0         ▲ 2.8         ♠ 7.9         ▲ 5.3           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         ASTM D7844*         >6         0.2         0.4         0.1           Nitration         Abs/cm         ASTM D7624*         >20         7.5         10.2         6.2           Sulfation         Abs/.1mm         ASTM D7415*         >30         22.0         24.2         18.9           FLUID DEGRADATION         method         limit/base         current         history1         history2	Sodium						
Fuel % ASTM D7593* >3.0 ▲ 2.8 ● 7.9 ▲ 5.3  INFRA-RED method limit/base current history1 history2  Soot % % ASTM D7844* >6 0.2 0.4 0.1  Nitration Abs/cm ASTM D7624* >20 7.5 10.2 6.2  Sulfation Abs/.1mm ASTM D7415* >30 22.0 24.2 18.9  FLUID DEGRADATION method limit/base current history1 history2			. ,	>20			
Soot %         %         ASTM D7844*         >6         0.2         0.4         0.1           Nitration         Abs/cm         ASTM D7624*         >20         7.5         10.2         6.2           Sulfation         Abs/:1mm         ASTM D7415*         >30         22.0         24.2         18.9           FLUID DEGRADATION         method         limit/base         current         history1         history2	Fuel		. ,				
Nitration         Abs/cm         ASTM D7624*         >20         7.5         10.2         6.2           Sulfation         Abs/.1mm         ASTM D7415*         >30         22.0         24.2         18.9           FLUID DEGRADATION         method         limit/base         current         history1         history2	INFRA-RED		method	limit/base	current	history1	history2
Nitration         Abs/cm         ASTM D7624*         >20         7.5         10.2         6.2           Sulfation         Abs/.1mm         ASTM D7415*         >30         22.0         24.2         18.9           FLUID DEGRADATION         method         limit/base         current         history1         history2	Soot %	%	ASTM D7844*	>6	0.2	0.4	0.1
Sulfation Abs/.1mm ASTM D7415* >30 22.0 24.2 18.9  FLUID DEGRADATION method limit/base current history1 history2							
	Sulfation						
<b>Dxidation</b> Abs/.1mm ASTM D7414* >25 <b>17.6</b> 26.1 15.1	FLUID DEGRADA	TION	method	limit/base	current	history1	history2
	Oxidation	Abs/.1mm	ASTM D7414*	>25	17.6		15.1

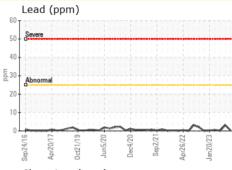


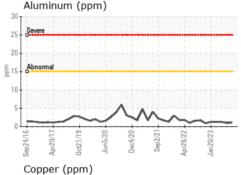
## **OIL ANALYSIS REPORT**

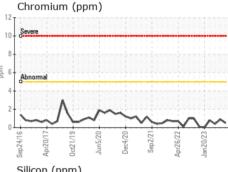


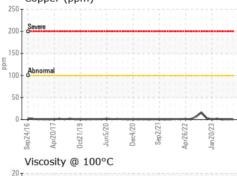
VISUAL		method	limit/base	current	history1	history2
Emulsified Water	scalar	Visual*	>0.2	NEG	NEG	NEG
Free Water	scalar	Visual*		NEG	NEG	NEG
FLUID PROPERT	TIES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D7279(m)	15.7	13.8	<b>△</b> 12.0	<b>△</b> 12.9
GRAPHS						

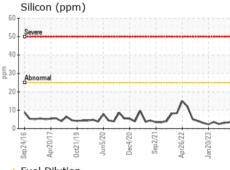
Severe						
Abnormal						
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h	$\Lambda$	~		1	N	L

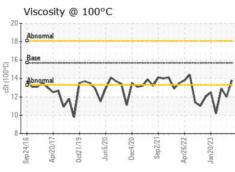


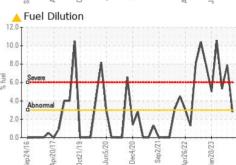














CALA ISO 17025:2017 Accredited Laboratory

Laboratory Sample No. Lab Number **Unique Number** 

: WC0830196 : 02575666 : 5620717

To discuss this sample report, contact Customer Service at 1-800-268-2131.

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

: 14 Aug 2023 Diagnostician : Wes Davis Test Package : MOB 1 ( Additional Tests: PercentFuel )

: 15 Aug 2023

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

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.