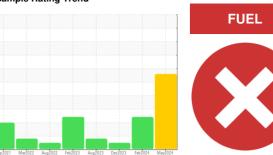


# **PROBLEM SUMMARY**

# Sample Rating Trend

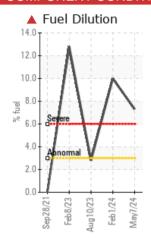


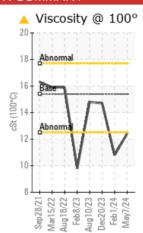


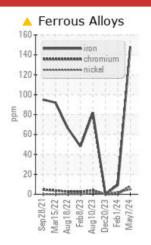
Machine Id
569M
Component
Diesel Engine
Fluid

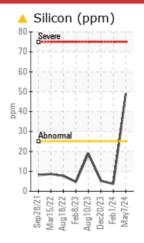
PETRO CANADA DURON SHP 15W40 (--- GAL)

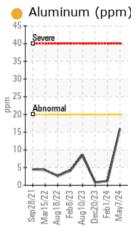
# **COMPONENT CONDITION SUMMARY**











# RECOMMENDATION

We advise that you check the air filter, air induction system, and any areas where dirt may enter the component. We advise that you check the fuel injection system. We recommend that you drain the oil and perform a filter service on this component if not already done. We recommend an early resample to monitor this condition.

PROBLEMATION	C TEST	RESULT	S			
Sample Status				SEVERE	SEVERE	NORMAL
Iron	ppm	ASTM D5185m	>90	<u> </u>	9	0
Silicon	ppm	ASTM D5185m	>25	<b>49</b>	4	5
Fuel	%	ASTM D3524	>3.0	<b>7.3</b>	<b>1</b> 0.0	<1.0
Visc @ 100°C	cSt	ASTM D445	15.4	<b>12.4</b>	▲ 10.8	14.7

Customer Id: GFL415 Sample No.: GFL0117568 Lab Number: 06175203 Test Package: FLEET



To manage this report scan the QR code

To discuss the diagnosis or test data:

Don Baldridge +1 don.b505@comcast.net

To change component or sample information: Customer Service +1 1-800-237-1369 customerservice@wearcheck.com

RECOMMENDE	O ACTIONS			
Action	Status	Date	Done By	Description
Change Fluid			?	We recommend that you drain the oil and perform a filter service on this component if not already done.
Change Filter			?	We recommend that you drain the oil and perform a filter service on this component if not already done.
Resample			?	We recommend an early resample to monitor this condition.
Check Dirt Access			?	We advise that you check the air filter, air induction system, and any areas where dirt may enter the component.
Check Fuel/injector System			?	We advise that you check the fuel injection system.

# HISTORICAL DIAGNOSIS

FUEL

# 01 Feb 2024 Diag: Jonathan Hester

X

We advise that you check the fuel injection system. Oil and filter change at the time of sampling has been noted. We recommend an early resample to monitor this condition. All component wear rates are normal. There is a high amount of fuel present in the oil. Fuel is present in the oil and is lowering the viscosity. The BN result indicates that there is suitable alkalinity remaining in the oil.



NORMAL

# 20 Dec 2023 Diag: Wes Davis



Resample at the next service interval to monitor. All component wear rates are normal. There is no indication of any contamination in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.



CHEL

# 10 Aug 2023 Diag: Doug Bogart



No corrective action is recommended at this time. Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor. All component wear rates are normal. Light fuel dilution occurring. No other contaminants were detected in the oil. The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.



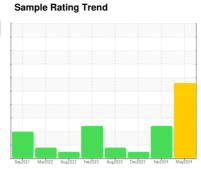


# **OIL ANALYSIS REPORT**



Machine Id 569M **Diesel Engine** 

PETRO CANADA DURON SHP 15W40 (--- GAL)





# **DIAGNOSIS**

#### Recommendation

We advise that you check the air filter, air induction system, and any areas where dirt may enter the component. We advise that you check the fuel injection system. We recommend that you drain the oil and perform a filter service on this component if not already done. We recommend an early resample to monitor this condition.

Cylinder, crank, or cam shaft wear is indicated.

# Contamination

Elemental levels of silicon (Si) and aluminum (Al) indicate alumina-silicate (coarse dirt) ingress. There is a high amount of fuel present in the oil.

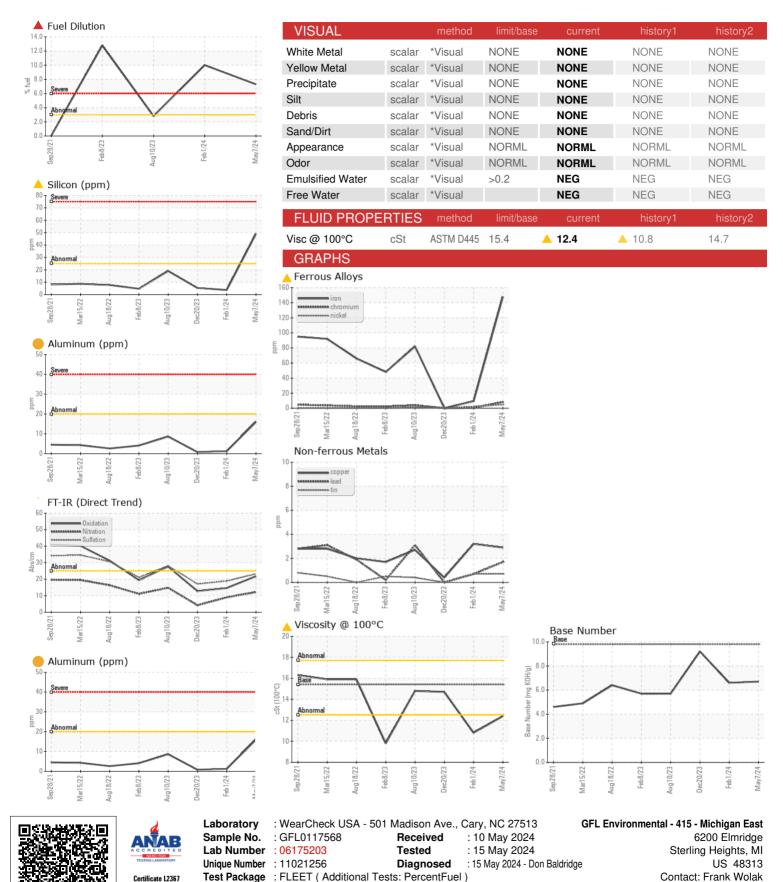
# Fluid Condition

Fuel is present in the oil and is lowering the viscosity. The oil is no longer serviceable due to the presence of contaminants.

SAMPLE INFORMATION         method         limitbase         current         history1         history2           Sample Number         Client Info         GFL0117568         GFL0108790							
Client Info	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Machine Age         hrs         Client Info         7714         7351         7284           Oil Age         hrs         Client Info         7351         7284         7200           Oil Age         hrs         Client Info         Not Changed         Not Changed <td< td=""><td>Sample Number</td><td></td><td>Client Info</td><td></td><th>GFL0117568</th><td>GFL0108790</td><td>GFL0105873</td></td<>	Sample Number		Client Info		GFL0117568	GFL0108790	GFL0105873
Dil Age	Sample Date		Client Info		07 May 2024	01 Feb 2024	20 Dec 2023
Coli   Changed   Changed   Changed   SEVERE   SEVERE   SEVERE   NORMAL	Machine Age	hrs	Client Info		7714	7351	7284
Severe   Severe   Severe   Severe   Normal	Oil Age	hrs	Client Info		7351	7284	7200
Water	Oil Changed		Client Info		Not Changd	Changed	Not Changd
Water         WC Method         >0.2         NEG         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >90         ▲ 148         9         0           Chromium         ppm         ASTM D5185m         >20         8         <1	Sample Status				SEVERE	SEVERE	NORMAL
WEAR METALS	CONTAMINAT	ION	method	limit/base	current	history1	history2
WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >90         ▲ 148         9         0           Chromium         ppm         ASTM D5185m         >20         8         <1	Water		WC Method	>0.2	NEG	NEG	NEG
Description   Description	Glycol		WC Method		NEG	NEG	NEG
Chromium         ppm         ASTM D5185m         >20         8         <1         0           Nickel         ppm         ASTM D5185m         >2         5         2         <1           Titianium         ppm         ASTM D5185m         >2         <1         0         0           Siliver         ppm         ASTM D5185m         >2         0         0         0           Aluminum         ppm         ASTM D5185m         >2         0         16         1         <1           Lead         ppm         ASTM D5185m         >40         2         <1         0           Copper         ppm         ASTM D5185m         >40         2         <1         0           Vanadium         ppm         ASTM D5185m         0         <1         0         <1         0           Vanadium         ppm         ASTM D5185m         0         <1         0         <1         0           Cadmium         ppm         ASTM D5185m         0         <1         0         4         4           Boron         ppm         ASTM D5185m         0         <1         0         4         4           Barium         ppm	WEAR METAL	S	method	limit/base	current	history1	history2
Chromium         ppm         ASTM D5185m         >20         8         <1         0           Nickel         ppm         ASTM D5185m         >2         5         2         <1           Tittanium         ppm         ASTM D5185m         >2         <1         0         0           Siliver         ppm         ASTM D5185m         >2         0         0         0           Aluminum         ppm         ASTM D5185m         >20         16         1         <1         <1           Lead         ppm         ASTM D5185m         >20         16         1         <1         <1           Lead         ppm         ASTM D5185m         >20         16         1         <1         <1           Lead         ppm         ASTM D5185m         >20         2         <1         0            Copper         ppm         ASTM D5185m         0         2         <1         <1         0            Vanadium         ppm         ASTM D5185m         0         <1         0         <0            Cadmium         ppm         ASTM D5185m         0         <1         0         <0	Iron	ppm	ASTM D5185m	>90	<u> </u>	9	0
Nicke	Chromium		ASTM D5185m	>20	8	<1	0
Description	Nickel			>2		2	<1
Silver							
Aluminum							
Lead         ppm         ASTM D5185m         >40         2         <1         0           Copper         ppm         ASTM D5185m         >330         3         <1           Tin         ppm         ASTM D5185m         >15         <1         <1         0           Vanadium         ppm         ASTM D5185m         0         <1         0         <0           Cadmium         ppm         ASTM D5185m         0         <1         0         4           Barium         ppm         ASTM D5185m         0         <1         0         4           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         0         0         0           Magnesium         ppm         ASTM D5185m         0         2         <1         <1           Magnesium         ppm         ASTM D5185m         1070         1048         875         1040           Phosphorus         ppm         ASTM D5185m         1270         1134         1027         1294           Zinc         ppm         ASTM D5185m         220         1134         1027	Aluminum						<1
Copper         ppm         ASTM D5185m         >330         3         <1           Tin         ppm         ASTM D5185m         >15         <1	Lead			>40		<1	0
Trin				>330			<1
Vanadium         ppm         ASTM D5185m         0         <1         0           Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         <1         0         4           Barium         ppm         ASTM D5185m         0         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         2         <1         <1           Manganese         ppm         ASTM D5185m         0         2         <1         <1           Magnesium         ppm         ASTM D5185m         1010         890         804         951           Calcium         ppm         ASTM D5185m         1070         1048         875         1040           Phosphorus         ppm         ASTM D5185m         1270         1134         1027         1294           Sulfur         ppm         ASTM D5185m         2060         3086         2207         3257           CONTAMINANTS         method         limit/base         current         hi					<1	<1	
Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         <1							
Boron					-		
Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         60         55         45         59           Manganese         ppm         ASTM D5185m         0         2         <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         60         55         45         59           Manganese         ppm         ASTM D5185m         0         2         <1	Boron	ppm	ASTM D5185m	0	<1	0	4
Manganese         ppm         ASTM D5185m         0         2         <1         <1           Magnesium         ppm         ASTM D5185m         1010         890         804         951           Calcium         ppm         ASTM D5185m         1070         1048         875         1040           Phosphorus         ppm         ASTM D5185m         1150         961         875         1122           Zinc         ppm         ASTM D5185m         1270         1134         1027         1294           Sulfur         ppm         ASTM D5185m         2060         3086         2207         3257           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         49         4         5           Sodium         ppm         ASTM D5185m         >20         4         2         <1           Fuel         %         ASTM D5185m         >20         4         2         <1           Fuel         %         ASTM D5185m         >20         4         2         <1           Fuel         %         ASTM D5185m         >20	Barium	ppm	ASTM D5185m	0	0	0	0
Magnesium         ppm         ASTM D5185m         1010         890         804         951           Calcium         ppm         ASTM D5185m         1070         1048         875         1040           Phosphorus         ppm         ASTM D5185m         1150         961         875         1122           Zinc         ppm         ASTM D5185m         1270         1134         1027         1294           Sulfur         ppm         ASTM D5185m         2060         3086         2207         3257           CONTAMINANTS         method         limit/base         current         history1         history2           Solicon         ppm         ASTM D5185m         >25         49         4         5           Solium         ppm         ASTM D5185m         >20         4         2         <1	Molybdenum	ppm	ASTM D5185m	60	55	45	59
Calcium         ppm         ASTM D5185m         1070         1048         875         1040           Phosphorus         ppm         ASTM D5185m         1150         961         875         1122           Zinc         ppm         ASTM D5185m         1270         1134         1027         1294           Sulfur         ppm         ASTM D5185m         2060         3086         2207         3257           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         49         4         5           Sodium         ppm         ASTM D5185m         >20         4         2         <1	Manganese	mag	ASTM D5185m	0	2	<1	<1
Phosphorus         ppm         ASTM D5185m         1150         961         875         1122           Zinc         ppm         ASTM D5185m         1270         1134         1027         1294           Sulfur         ppm         ASTM D5185m         2060         3086         2207         3257           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         49         4         5           Sodium         ppm         ASTM D5185m         >20         4         2         <1							
Zinc         ppm         ASTM D5185m         1270         1134         1027         1294           Sulfur         ppm         ASTM D5185m         2060         3086         2207         3257           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         49         4         5           Sodium         ppm         ASTM D5185m         >20         4         2         <1	Magnesium			1010	890		951
Sulfur         ppm         ASTM D5185m         2060         3086         2207         3257           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         49         4         5           Sodium         ppm         ASTM D5185m         10         2         2           Potassium         ppm         ASTM D5185m         >20         4         2         <1		ppm	ASTM D5185m			804	
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         ▲ 49         4         5           Sodium         ppm         ASTM D5185m         10         2         2           Potassium         ppm         ASTM D5185m         >20         4         2         <1	Calcium	ppm	ASTM D5185m ASTM D5185m	1070	1048	804 875	1040
Silicon       ppm       ASTM D5185m       >25       ▲ 49       4       5         Sodium       ppm       ASTM D5185m       10       2       2         Potassium       ppm       ASTM D5185m       >20       4       2       <1         Fuel       %       ASTM D3524       >3.0       ▲ 7.3       ▲ 10.0       <1.0         INFRA-RED       method       limit/base       current       history1       history2         Soot %       %       *ASTM D7844       >6       1.1       0.6       0         Nitration       Abs/cm       *ASTM D7624       >20       12.2       9.0       4.2         Sulfation       Abs/.1mm       *ASTM D7415       >30       23.2       18.9       17.1         FLUID DEGRADATION method       limit/base       current       history1       history2         Oxidation       Abs/.1mm       *ASTM D7414       >25       21.8       14.6       12.8	Calcium Phosphorus	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	1070 1150	1048 961	804 875 875	1040 1122
Sodium         ppm         ASTM D5185m         10         2         2           Potassium         ppm         ASTM D5185m         >20         4         2         <1	Calcium Phosphorus Zinc	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	1070 1150 1270	1048 961 1134	804 875 875 1027	1040 1122 1294
Potassium         ppm         ASTM D5185m         >20         4         2         <1           Fuel         %         ASTM D3524         >3.0         ▲ 7.3         ▲ 10.0         <1.0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >6         1.1         0.6         0           Nitration         Abs/cm         *ASTM D7624         >20         12.2         9.0         4.2           Sulfation         Abs/.1mm         *ASTM D7415         >30         23.2         18.9         17.1           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         21.8         14.6         12.8	Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	1070 1150 1270 2060	1048 961 1134 3086	804 875 875 1027 2207	1040 1122 1294 3257
Fuel % ASTM D3524 >3.0	Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method	1070 1150 1270 2060 limit/base	1048 961 1134 3086	804 875 875 1027 2207 history1	1040 1122 1294 3257 history2
INFRA-RED	Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m	1070 1150 1270 2060 limit/base	1048 961 1134 3086 current	804 875 875 1027 2207 history1	1040 1122 1294 3257 history2
Soot %         %         *ASTM D7844 >6         1.1         0.6         0           Nitration         Abs/cm         *ASTM D7624 >20         12.2         9.0         4.2           Sulfation         Abs/.1mm         *ASTM D7415 >30         23.2         18.9         17.1           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414 >25         21.8         14.6         12.8	Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m  method  ASTM D5185m ASTM D5185m  ASTM D5185m	1070 1150 1270 2060 limit/base >25	1048 961 1134 3086 current 49	804 875 875 1027 2207 history1 4	1040 1122 1294 3257 history2 5
Nitration         Abs/cm         *ASTM D7624         >20         12.2         9.0         4.2           Sulfation         Abs/.1mm         *ASTM D7615         >30         23.2         18.9         17.1           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         21.8         14.6         12.8	Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m  Method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	1070 1150 1270 2060 limit/base >25	1048 961 1134 3086 current 49 10	804 875 875 1027 2207 history1 4 2	1040 1122 1294 3257 history2 5 2 <1
Sulfation         Abs/.1mm         *ASTM D7415         >30         23.2         18.9         17.1           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         21.8         14.6         12.8	Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m  Method ASTM D5185m	1070 1150 1270 2060 limit/base >25 >20 >3.0	1048 961 1134 3086 current ▲ 49 10 4 ▲ 7.3	804 875 875 1027 2207 history1 4 2 2 ▲ 10.0	1040 1122 1294 3257 history2 5 2 <1 <1.0
Sulfation         Abs/.1mm         *ASTM D7415         >30         23.2         18.9         17.1           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         21.8         14.6         12.8	Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED	ppm ppm ppm ppm ppm ppm lTS ppm ppm ppm	ASTM D5185m ASTM D3524	1070 1150 1270 2060 limit/base >25 >20 >3.0	1048 961 1134 3086  current  49 10 4  7.3  current	804 875 875 1027 2207 history1 4 2 2 ▲ 10.0	1040 1122 1294 3257 history2 5 2 <1 <1.0
Oxidation	Calcium Phosphorus Zinc Sulfur  CONTAMINAN Silicon Sodium Potassium Fuel  INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D3524	1070 1150 1270 2060 limit/base >25 >20 >3.0 limit/base >6	1048 961 1134 3086  current  ▲ 49 10 4  ▲ 7.3  current  1.1	804 875 875 1027 2207 history1 4 2 2 ▲ 10.0 history1 0.6	1040 1122 1294 3257 history2 5 2 <1 <1.0 history2
	Calcium Phosphorus Zinc Sulfur  CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration	ppm	ASTM D5185m ASTM D7844 *ASTM D7624	1070 1150 1270 2060 limit/base >25 >20 >3.0 limit/base >6 >20	1048 961 1134 3086  current  ▲ 49 10 4  ▲ 7.3  current  1.1 12.2	804 875 875 1027 2207 history1 4 2 2 ▲ 10.0 history1 0.6 9.0	1040 1122 1294 3257 history2 5 2 <1 <1.0 history2 0 4.2
	Calcium Phosphorus Zinc Sulfur  CONTAMINAN Silicon Sodium Potassium Fuel  INFRA-RED Soot % Nitration Sulfation	ppm	ASTM D5185m ASTM D3524  method  *ASTM D7844  *ASTM D7624  *ASTM D76145	1070 1150 1270 2060 limit/base >25 >20 >3.0 limit/base >6 >20 >30	1048 961 1134 3086  current  ▲ 49 10 4 ▲ 7.3  current  1.1 12.2 23.2	804 875 875 1027 2207 history1 4 2 2 ▲ 10.0 history1 0.6 9.0 18.9	1040 1122 1294 3257 history2 5 2 <1 <1.0 history2 0 4.2 17.1
	Calcium Phosphorus Zinc Sulfur  CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration Sulfation FLUID DEGRA	ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m  Method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D7824  *ASTM D7844  *ASTM D7624 *ASTM D7415  method	1070 1150 1270 2060 limit/base >25 >20 >3.0 limit/base >6 >20 >30 limit/base	1048 961 1134 3086  current  ▲ 49 10 4  ▲ 7.3  current  1.1 12.2 23.2  current	804 875 875 1027 2207 history1 4 2 2 ▲ 10.0 history1 0.6 9.0 18.9 history1	1040 1122 1294 3257 history2 5 2 <1 <1.0 history2 0 4.2 17.1 history2



# **OIL ANALYSIS REPORT**



To discuss this sample report, contact Customer Service at 1-800-237-1369.

 $^st$  - Denotes test methods that are outside of the ISO 17025 scope of accreditation.

Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

fwolak@gflenv.com

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