

### **OIL ANALYSIS REPORT**

Sample Rating Trend

# NOVA BUS 165

Component Rear Diesel Engine Fluid ESSO XD-3 EXTRA 15W40 (--- GAL)

#### DIAGNOSIS

#### A Recommendation

The oil change at the time of sampling has been noted. We recommend an early resample to monitor this condition.

#### Wear

All component wear rates are normal.

#### Contamination

There is a moderate amount of fuel present in the oil. Test for glycol is negative. Tests confirm the presence of fuel in the oil.

#### Fluid Condition

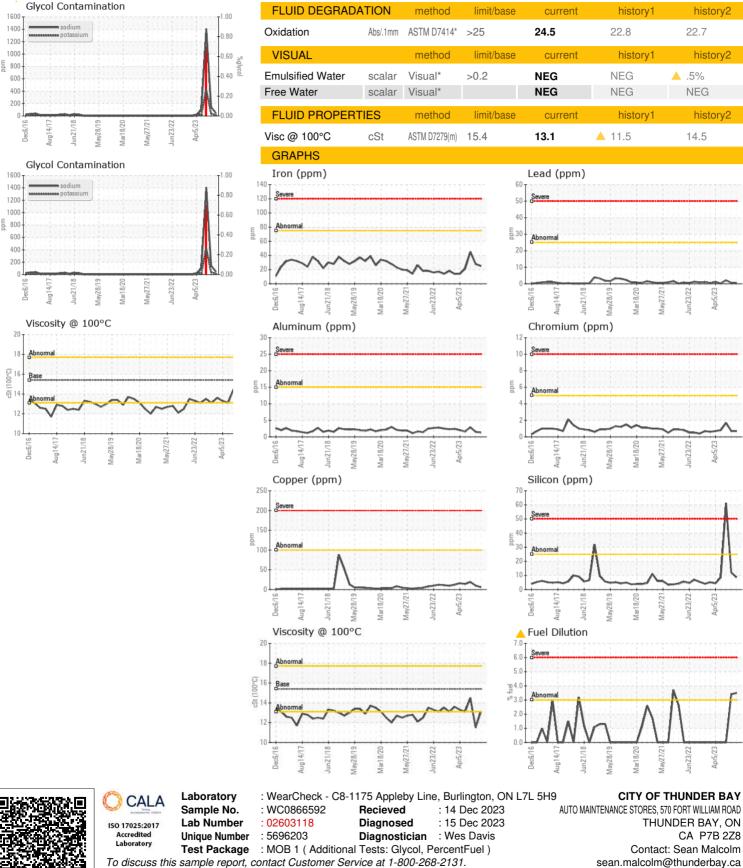
The oil is no longer serviceable due to the presence of contaminants.



Sample Date         Client Info         08 Dec 2023         22 Sep 2023         11 Jul 2023           Machine Age         kms         Client Info         0         0         0           Oll Age         kms         Client Info         8838         9692         9590           Oil Changed         Client Info         ABNORMAL         ABNORMAL         SEVERE           CONTAMINATION         method         Imit/base         current         history1         history2           Water         WC Method         >0.2         NEG         NEG         NEG           Water         WC Method         >0.2         NEG         NEG         NEG           Iron         ppm         ASTM D516500         >75         25         28         45           Chromium         ppm         ASTM D516500         >4         0         0         -1           Nickel         ppm         ASTM D516500         >2         1         2         3           Lead         ppm         ASTM D516500         >25         <1         <1         2           Autimium         ppm         ASTM D516500         >25         <1         <1         2           Clead         ppm	2016 Aug2017 Jun2018 May2019 Mar2020 May2022 Jun2022 Apr2023							
Sample Date         Client Info         08 Dec 2023         22 Sep 2023         11 Jul 2023           Machine Age         kms         Client Info         0         0         0           Oil Age         kms         Client Info         0         0         0           Oil Changed         Client Info         Changed         NEG         NEG           Water         WC Method         >0.2         NEG         NEG         NEG         NEG           Itanium         ppm         ASTM 05(80)         >75         25         28         45           Itanium         ppm         ASTM 05(80)         >20         0         0         1         2           Silver         ppm         ASTM 05(80)         >22         <1	SAMPLE INFORM	IATION	method	limit/base	current	history1	history2	
Machine Age         kms         Client Info         0         0         0         0           Oil Age         kms         Client Info         833         9692         9500           Oil Changed         Client Info         Changed         Changed         Changed           Sample Status         C         ImitVbase         current         history1         Nistory2           Water         WC Method         >0.2         NEG         NEG         NEG           WEAR METALS         method         limitVbase         current         history1         history2           Iron         ppm         ASTM DS185(m)         >75         25         28         45           Chromium         ppm         ASTM DS185(m)         >55         <1	Sample Number		Client Info		WC0866592	WC0816370	WC0816550	
Oil Age     kms     Client Info     8838     9692     9590       Oil Changed     Client Info     Changed     Changed     Changed     Changed       Sample Status     Imit/base     current     history1     history2       Water     WC Method     >0.2     NEG     NEG     NEG       WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTN D518(m)     >75     25     28     45       Chromium     ppm     ASTN D518(m)     >5     <1	Sample Date		Client Info		08 Dec 2023	22 Sep 2023	11 Jul 2023	
Oil Changed Sample Status     Client Info     Changed ABNORMAL     Changed ABNORMAL     Changed ABNORMAL     Changed SEVERE       CONTAMINATION     method     limit/base     current     history1     history2       Water     WC Method     >0.2     NEG     NEG     NEG       WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D518(m)     >75     25     28     45       Chromium     ppm     ASTM D518(m)     >2     0     0     <1	Machine Age	kms	Client Info		0	0	0	
Sample Status         Image of the status         ABNORMAL         ABNORMAL         SEVERE           CONTAMINATION         method         limit/base         current         history1         history2           Water         WC Method         >0.2         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185(m)         >75         25         28         45           Chromium         ppm         ASTM D5185(m)         >5         <1	Oil Age	kms	Client Info		8838	9692	9590	
CONTAMINATION         method         limit/base         current         history1         history2           Water         WC Method         >0.2         NEG         NEG         NEG           Water         ppm         ASTM D5165(m)         >75         25         28         45           Chromium         ppm         ASTM D5165(m)         >56         <1	Oil Changed		Client Info		Changed	Changed	Changed	
Water         WC Method         >0.2         NEG         NEG         NEG           WEAR METALS         method         limil/base         current         history1         history2           Iron         ppm         ASTM D5185(m)         >75         25         28         45           Chromium         ppm         ASTM D5185(m)         >55         <1	Sample Status				ABNORMAL	ABNORMAL	SEVERE	
WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185(m)         >75         25         28         45           Chromium         ppm         ASTM D5185(m)         >55         <1         <1         2           Nickel         ppm         ASTM D5185(m)         >2         0         0         <1           Titanium         ppm         ASTM D5185(m)         >2         0         0         <1           Silver         ppm         ASTM D5185(m)         >2         <1         <1         2         3           Lead         ppm         ASTM D5185(m)         >15         1         2         3           Lead         ppm         ASTM D5185(m)         >2         <1         <1         2           Copper         ppm         ASTM D5185(m)         >2         <1         <1         2           Cadmium         ppm         ASTM D5185(m)         0         0         0         0           Cadmium         ppm         ASTM D5185(m)         6         45         15           Magaese         ppm         ASTM D5185(m)         50         293	CONTAMINATION	N	method	limit/base	current	history1	history2	
Iron         ppm         ASTM D5185(m)         >75         25         28         45           Chromium         ppm         ASTM D5185(m)         >5         <1	Water		WC Method	>0.2	NEG	NEG	NEG	
Chromium         ppm         ASTM D5185(m)         >5         <1         <1         2           Nickel         ppm         ASTM D5185(m)         >4         0         0         <1	WEAR METALS		method	limit/base	current	history1	history2	
Nickel         ppm         ASTM D5185(m)         >4         0         0         <1           Titanium         ppm         ASTM D5185(m)         >2         0         0         <1	Iron	ppm	ASTM D5185(m)	>75	25	28	45	
Titanium         ppm         ASTM D5185(m)         >2         0         0         <1           Silver         ppm         ASTM D5185(m)         >2         <1	Chromium	ppm	ASTM D5185(m)	>5	<1	<1	2	
Silver         ppm         ASTM D5185(m)         >2         <1         <1         <1           Aluminum         ppm         ASTM D5185(m)         >15         1         2         3           Lead         ppm         ASTM D5185(m)         >25         <1	Nickel	ppm	ASTM D5185(m)	>4	0	0	<1	
Aluminum         ppm         ASTM D5185(m)         >15         1         2         3           Lead         ppm         ASTM D5185(m)         >25         <1	Titanium	ppm	ASTM D5185(m)	>2	0	0	<1	
Lead         ppm         ASTM D5185(m)         >25         <1         <1         2           Copper         ppm         ASTM D5185(m)         >100         6         10         19           Tin         ppm         ASTM D5185(m)         >4         0         0         <1	Silver	ppm	ASTM D5185(m)	>2	<1		<1	
Copper         ppm         ASTM D5185(m)         >100         6         10         19           Tin         ppm         ASTM D5185(m)         >4         0         0         <1	Aluminum	ppm	ASTM D5185(m)	>15	1	2	3	
Tin         ppm         ASTM D5185(m)         >4         0         0         <1           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           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185(m)         63         42         49           Barium         ppm         ASTM D5185(m)         6         45         15           Manganese         ppm         ASTM D5185(m)         0         0         1           Magnesium         ppm         ASTM D5185(m)         50         293         206           Calcium         ppm         ASTM D5185(m)         3780         2102         1891         1736           Phosphorus         ppm         ASTM D5185(m)         388         958         925         21667         2802	Lead	ppm	ASTM D5185(m)	>25	<1	<1	2	
Antimony         ppm         ASTM D5185(m)         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           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185(m)         63         42         49           Barium         ppm         ASTM D5185(m)         63         42         49           Barium         ppm         ASTM D5185(m)         61         45         15           Manganese         ppm         ASTM D5185(m)         50         293         206           Calcium         ppm         ASTM D5185(m)         1370         888         958         925           Zinc         ppm         ASTM D5185(m)         1370         888         958         925           Sulfur         ppm         ASTM D5185(m)         3800         2805         2667         2802           Lithium<	Copper	ppm	ASTM D5185(m)	>100	6	10	19	
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)         63         42         49           Barium         ppm         ASTM D5185(m)         63         42         49           Barium         ppm         ASTM D5185(m)         6         45         15           Molybdenum         ppm         ASTM D5185(m)         50         293         206           Calcium         ppm         ASTM D5185(m)         3780         2102         1891         1736           Phosphorus         ppm         ASTM D5185(m)         1370         888         958         925           Zinc         ppm         ASTM D5185(m)         1500         1102         1181         1089           Sulfur         ppm         ASTM D5185(m)         3800         2805         2667         2802           Silicon         ppm </td <td>Tin</td> <td>ppm</td> <td>ASTM D5185(m)</td> <td>&gt;4</td> <th>0</th> <td>0</td> <td>&lt;1</td>	Tin	ppm	ASTM D5185(m)	>4	0	0	<1	
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)         63         42         49           Barium         ppm         ASTM D5185(m)         63         42         49           Barium         ppm         ASTM D5185(m)         63         42         49           Barium         ppm         ASTM D5185(m)         66         45         15           Manganese         ppm         ASTM D5185(m)         50         293         206           Calcium         ppm         ASTM D5185(m)         3780         2102         1891         1736           Phosphorus         ppm         ASTM D5185(m)         1370         888         958         925           Zinc         ppm         ASTM D5185(m)         1370         888         958         925           Sulfur         ppm         ASTM D5185(m)         1300         1102         1181         1089           Sulfur         ppm <td>Antimony</td> <td>ppm</td> <td>ASTM D5185(m)</td> <td></td> <th>0</th> <td>0</td> <td>0</td>	Antimony	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)         633         42         49           Barium         ppm         ASTM D5185(m)         613         42         49           Barium         ppm         ASTM D5185(m)         66         45         15           Molybdenum         ppm         ASTM D5185(m)         50         293         206           Calcium         ppm         ASTM D5185(m)         3780         2102         1891         1736           Phosphorus         ppm         ASTM D5185(m)         1370         888         958         925           Zinc         ppm         ASTM D5185(m)         1500         1102         1181         1089           Sulfur         ppm         ASTM D5185(m)         3800         2805         2667         2802           Lithium         ppm         ASTM D5185(m)         >25         9         12         61           Sodium         ppm         ASTM D5185(m)         >20         13         35         424	Vanadium	ppm	ASTM D5185(m)		0	0	0	
ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185(m)         63         42         49           Barium         ppm         ASTM D5185(m)         6         45         15           Molybdenum         ppm         ASTM D5185(m)         6         45         15           Manganese         ppm         ASTM D5185(m)         50         293         206           Calcium         ppm         ASTM D5185(m)         50         293         206           Calcium         ppm         ASTM D5185(m)         3780         2102         1891         1736           Phosphorus         ppm         ASTM D5185(m)         1370         888         958         925           Zinc         ppm         ASTM D5185(m)         1370         888         958         925           Zinc         ppm         ASTM D5185(m)         3800         2805         2667         2802           Lithium         ppm         ASTM D5185(m)         >25         9         12         61           Sodium         ppm         ASTM D5185(m)         >22         9         12         61 <t< td=""><td>Beryllium</td><td>ppm</td><td>ASTM D5185(m)</td><td></td><th>0</th><td>0</td><td></td></t<>	Beryllium	ppm	ASTM D5185(m)		0	0		
Boron         ppm         ASTM D5185(m)         63         42         49           Barium         ppm         ASTM D5185(m)         <1	Cadmium	ppm	ASTM D5185(m)		0	0	0	
Barium         ppm         ASTM D5185(m)         <1	ADDITIVES		method	limit/base	current	history1	history2	
Molybdenum         ppm         ASTM D5185(m)         6         45         15           Manganese         ppm         ASTM D5185(m)         0         0         1           Magnesium         ppm         ASTM D5185(m)         50         293         206           Calcium         ppm         ASTM D5185(m)         3780         2102         1891         1736           Phosphorus         ppm         ASTM D5185(m)         1370         888         958         925           Zinc         ppm         ASTM D5185(m)         1500         1102         1181         1089           Sulfur         ppm         ASTM D5185(m)         3800         2805         2667         2802           Lithium         ppm         ASTM D5185(m)         >25         9         12         61           Sodium         ppm         ASTM D5185(m)         >25         9         12         61           Sodium         ppm         ASTM D5185(m)         >20         13         35         424           Potassium         ppm         ASTM D5185(m)         >20         13         3.4         <1.0           Glycol         %         ASTM D7593*         >3.0         3.5	Boron	ppm	ASTM D5185(m)		63	42	49	
Manganese         ppm         ASTM D5185(m)         0         0         1           Magnesium         ppm         ASTM D5185(m)         50         293         206           Calcium         ppm         ASTM D5185(m)         3780         2102         1891         1736           Phosphorus         ppm         ASTM D5185(m)         1370         888         958         925           Zinc         ppm         ASTM D5185(m)         1500         1102         1181         1089           Sulfur         ppm         ASTM D5185(m)         1500         1102         1181         1089           Sulfur         ppm         ASTM D5185(m)         3800         2805         2667         2802           Lithium         ppm         ASTM D5185(m)         3800         2805         2667         2802           Silicon         ppm         ASTM D5185(m)         >25         9         12         61           Sodium         ppm         ASTM D5185(m)         >192         44         144         1404           Potassium         ppm         ASTM D5185(m)         >20         13         3.4         4.1.0           Glycol         %         ASTM D7922* <t< td=""><td>Barium</td><td>ppm</td><td>ASTM D5185(m)</td><td></td><th>&lt;1</th><td>&lt;1</td><td>&lt;1</td></t<>	Barium	ppm	ASTM D5185(m)		<1	<1	<1	
Magnesium         ppm         ASTM D5185(m)         50         293         206           Calcium         ppm         ASTM D5185(m)         3780         2102         1891         1736           Phosphorus         ppm         ASTM D5185(m)         1370         888         958         925           Zinc         ppm         ASTM D5185(m)         1500         1102         1181         1089           Sulfur         ppm         ASTM D5185(m)         1500         1102         1181         1089           Sulfur         ppm         ASTM D5185(m)         3800         2805         2667         2802           Lithium         ppm         ASTM D5185(m)         3800         2805         2667         2802           Silicon         ppm         ASTM D5185(m)         3800         2805         2667         2802           Solium         ppm         ASTM D5185(m)         >25         9         12         61           Sodium         ppm         ASTM D5185(m)         >20         13         35         424           Fuel         %         ASTM D593*         >3.0         3.5         3.4         <1.0	Molybdenum	ppm	ASTM D5185(m)		6	45	15	
Calcium         ppm         ASTM D5185(m)         3780         2102         1891         1736           Phosphorus         ppm         ASTM D5185(m)         1370         888         958         925           Zinc         ppm         ASTM D5185(m)         1500         1102         1181         1089           Sulfur         ppm         ASTM D5185(m)         1500         1102         1181         1089           Sulfur         ppm         ASTM D5185(m)         3800         2805         2667         2802           Lithium         ppm         ASTM D5185(m)         3800         2805         2667         2802           Silicon         ppm         ASTM D5185(m)         3800         2805         2667         2802           Sodium         ppm         ASTM D5185(m)         3800         2805         2667         2802           Silicon         ppm         ASTM D5185(m)         >25         9         12         61           Sodium         ppm         ASTM D5185(m)         >192         44         144         404           Potassium         ppm         ASTM D5185(m)         >20         13         3.4         <1.0	Manganese	ppm	ASTM D5185(m)		0	0	1	
Phosphorus         ppm         ASTM D5185(m)         1370         888         958         925           Zinc         ppm         ASTM D5185(m)         1500         1102         1181         1089           Sulfur         ppm         ASTM D5185(m)         3800         2805         2667         2802           Lithium         ppm         ASTM D5185(m)         3800         2805         2667         2802           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185(m)         >25         9         12         61           Sodium         ppm         ASTM D5185(m)         >25         9         12         61           Sodium         ppm         ASTM D5185(m)         >20         13         35         424           Potassium         ppm         ASTM D792*         >3.0         3.5         3.4         <1.0	Magnesium	ppm	ASTM D5185(m)		50	293	206	
Zinc         ppm         ASTM D5185(m)         1500         1102         1181         1089           Sulfur         ppm         ASTM D5185(m)         3800         2805         2667         2802           Lithium         ppm         ASTM D5185(m)         3800         2805         2667         2802           Lithium         ppm         ASTM D5185(m)         <	Calcium	ppm	ASTM D5185(m)	3780	2102	1891	1736	
Sulfur         ppm         ASTM D5185(m)         3800         2805         2667         2802           Lithium         ppm         ASTM D5185(m)         3800         2805         2667         2802           Lithium         ppm         ASTM D5185(m)                   CONTAMINANTS         method         limit/base         current         history1         history2            Silicon         ppm         ASTM D5185(m)         >25         9         12         61           Sodium         ppm         ASTM D5185(m)         >192         44         144         1404           Potassium         ppm         ASTM D5185(m)         >20         13         35         424           Fuel         %         ASTM D7922*         0.0         0.0         0.696           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         ASTM D7844*         >6         1.1         0.9         1.2           Nitration         Abs/cm         ASTM D7624*         >20         10.8         9.5         17.4	Phosphorus	ppm	. /					
Lithium         ppm         ASTM D5185(m)         <1         <1         <1           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185(m)         >25         9         12         61           Sodium         ppm         ASTM D5185(m)         >25         9         12         61           Sodium         ppm         ASTM D5185(m)         >192         44         144         1404           Potassium         ppm         ASTM D5185(m)         >20         13         35         424           Fuel         %         ASTM D7932*         >3.0         3.5         3.4         <1.0           Glycol         %         ASTM D7922*         0.0         0.0         0.696           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         ASTM D7844*         >6         1.1         0.9         1.2           Nitration         Abs/cm         ASTM D7624*         >20         10.8         9.5         17.4	Zinc	ppm						
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185(m)         >25         9         12         61           Sodium         ppm         ASTM D5185(m)         >192         44         144         1404           Potassium         ppm         ASTM D5185(m)         >20         13         35         424           Fuel         %         ASTM D5185(m)         >20         13         3.4         <1.0	Sulfur	ppm	17	3800		2667	2802	
Silicon         ppm         ASTM D5185(m)         >25         9         12         61           Sodium         ppm         ASTM D5185(m)         >192         44         144         1404           Potassium         ppm         ASTM D5185(m)         >20         13         35         424           Fuel         %         ASTM D593*         >3.0         3.5         3.4         <1.0	Lithium	ppm	ASTM D5185(m)		<1	<1	<1	
Sodium         ppm         ASTM D5185(m)         >192         44         144         1404           Potassium         ppm         ASTM D5185(m)         >20         13         35         424           Fuel         %         ASTM D593*         >3.0         3.5         3.4         <1.0           Glycol         %         ASTM D7922*         0.0         0.0         0.696           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         ASTM D7844*         >6         1.1         0.9         1.2           Nitration         Abs/cm         ASTM D7624*         >20         10.8         9.5         17.4	CONTAMINANTS		method	limit/base	current	history1	history2	
Potassium         ppm         ASTM D5185(m)         >20         13         A 35         424           Fuel         %         ASTM D7593*         >3.0         A 3.5         A 3.4         <1.0	Silicon	ppm	ASTM D5185(m)	>25	9	12	61	
Fuel         %         ASTM D7593*         >3.0         A 3.5         A 3.4         <1.0           Glycol         %         ASTM D7922*         0.0         0.0         0.696           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         ASTM D7844*         >6         1.1         0.9         1.2           Nitration         Abs/cm         ASTM D7624*         >20         10.8         9.5         17.4	Sodium	ppm	ASTM D5185(m)	>192	44	144	▲ 1404	
Glycol         %         ASTM D7922*         0.0         0.0         0.696           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         ASTM D7844*         >6         1.1         0.9         1.2           Nitration         Abs/cm         ASTM D7624*         >20         10.8         9.5         17.4	Potassium	ppm	ASTM D5185(m)	>20	13	<b>A</b> 35	424	
INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         ASTM D7844*         >6         1.1         0.9         1.2           Nitration         Abs/cm         ASTM D7624*         >20         10.8         9.5         17.4	Fuel	%	ASTM D7593*	>3.0	<b>A</b> 3.5	<b>3</b> .4	<1.0	
Soot %         %         ASTM D7844*         >6         1.1         0.9         1.2           Nitration         Abs/cm         ASTM D7624*         >20         10.8         9.5         17.4	Glycol	%	ASTM D7922*		0.0	0.0	0.696	
Nitration         Abs/cm         ASTM D7624*         >20         10.8         9.5         17.4	INFRA-RED		method	limit/base	current	history1	history2	
	Soot %	%	ASTM D7844*	>6	1.1	0.9	1.2	
Sulfation         Abs/.1mm         ASTM D7415*         >30         27.0         25.6         29.0	Nitration	Abs/cm	ASTM D7624*	>20	10.8	9.5	17.4	
	Sulfation	Abs/.1mm	ASTM D7415*	>30	27.0	25.6	29.0	



## **OIL ANALYSIS REPORT**



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

Contact/Location: Sean Malcolm - CITTHU

CA P7B 2Z8

T: (807)684-2716

F: (807)344-0237

un73/77

Aav27/2

history2

history2

historv2

or5/73

22.7

.5%

NEG

14.5