

## **OIL ANALYSIS REPORT**

Sample Rating Trend

# FREIGHTLINER 79

Diesel Engine Fluid PETRO CANADA DURON SHP 15W40 (13 LT

#### DIAGNOSIS

#### Recommendation

We advise that you check for faulty combustion, plugged air filters, or aftercoolers. Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor. NOTE: High solids (carbon/soot) in the sample have limited the accuracy of Infra-Red data including Total Base Number (TBN) value.

#### Wear

All component wear rates are normal.

### Contamination

There is an abnormal amount of solids and carbon present in the oil.

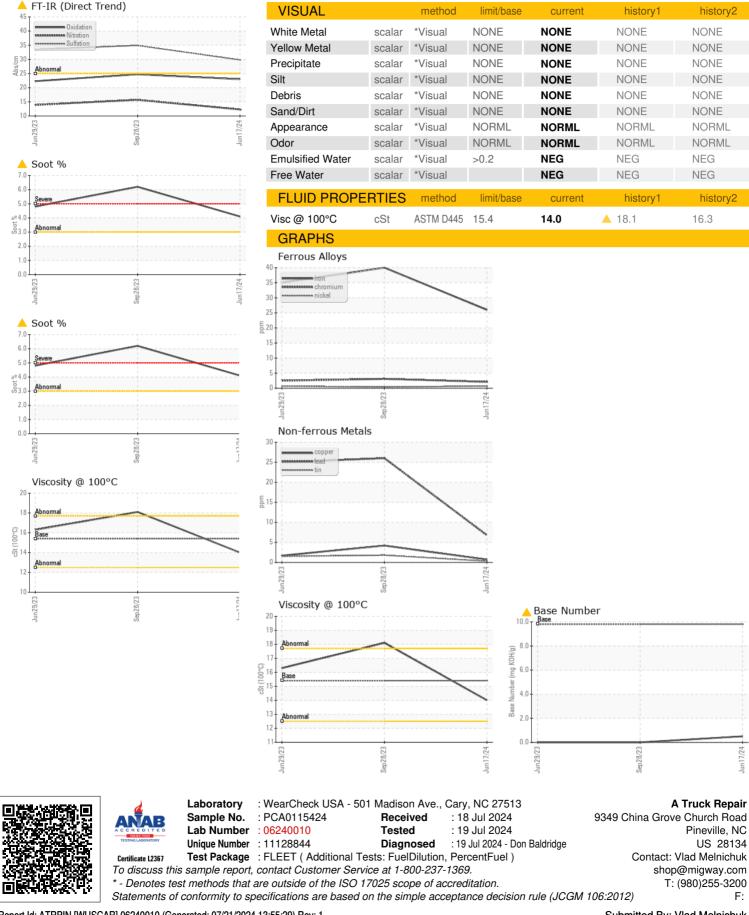
Fluid Condition The BN level is low.

	.TR)		Ju	2023	Sep2023 Jun20	24	
Sample DateClient Info17 Jun 202428 Sep 202329 Jun 2023Machine AgemisClient Info571097456798422347Oil AgemisClient Info250002958729158Oil ChangedClient InfoChangedChangedChangedChangedSample Statusimit/basecurrenthistory1history2WaterWC Method>0.2NEGNEGNEGGlycolWC Method>0.2NEGNEGNEGWEAR METALSmethodlimit/basecurrenthistory1history2IronppmASTM D5185m>50232NickelppmASTM D5185m>50232NickelppmASTM D5185m>5021<1MamiumppmASTM D5185m>5031712LeadppmASTM D5185m>50<142AumaiumppmASTM D5185m>50<122VanadiumppmASTM D5185m>50<122VanadiumppmASTM D5185m>50<122VanadiumppmASTM D5185m0000ASTM D5185m000000Astm D5185m000000Astm D5185m000000Astm D5185m0000<	SAMPLE INFOR		method	limit/base	current	history1	history2
Machine Age     mls     Client Info     571097     456798     422347       Oil Age     mils     Client Info     25000     29587     29158       Oil Changed     Client Info     Changed     Changed     Changed     Changed       Sample Status     n     Neton     Neton     Neton     Neton     Neton       Water     WC Method     >0.2     NEG     NEG     NEG     NEG       Wetar     WC Method     >0.2     NEG     NEG     NEG     NEG       Wetar     WC Method     >0.2     NEG     NEG     NEG     NEG       Wetar     MST MD5185     >80     26     40     35       Chromium     ppm     ASTM D5185     >2     <1	Sample Number		Client Info		PCA0115424	PCA0104953	PCA0100682
Oil AgemisClient Info250002958729158Oil ChangedClient InfoChangedChangedChangedChangedChangedSevereABNORMALSample StatusIImit/basecurrenthistory1history2MerceNEGNEGNEGWaterWC Method>0.2NEGNEGNEGNEGNEGGlycolWC Method>5232NickerWaterppmASTM D5185m>5232IronppmASTM D5185m>5232NickelppmASTM D5185m>3031712SilverppmASTM D5185m>3072625QopperppmASTM D5185m>307262CopperppmASTM D5185m>50<1	Sample Date		Client Info		17 Jun 2024	28 Sep 2023	29 Jun 2023
Oli Changed Sample Status Client Info Changed ABNORMAL Changed SEVERE Changed ABNORMAL   CONTAMINATION method imit/base current history1 history2   Water WC Method >0.2 NEG NEG NEG   Glycol W WC Method NEG NEG NEG NEG   WEAR METALS method imit/base current history1 history2   Iron ppm ASTMD5185m >80 26 40 35   Chromium ppm ASTMD5185m >5 2 3 2   Nickel ppm ASTMD5185m >3 0 <1	Machine Age	mls	Client Info		571097	456798	422347
Sample StatusImage: Mathematic statusABNORMALSEVEREABNORMALCONTAMINATIONmethodimit/basecurrenthistory1history2WaterWC Method>0.2NEGNEGNEGGlycolWC MethodNEGNEGNEGNEGWEAR METALSmethodimit/basecurrenthistory1history1IronppmASTM D5185>80264035ChromiumppmASTM D5185>21<1	Oil Age	mls	Client Info		25000	29587	29158
CONTAMINATION     method     limit/base     current     history1     history2       Water     WC Method     >0.2     NEG     NEG     NEG     NEG       Glycol     W C Method     Imit/base     current     history1     history2       WEAR METALS     method     Imit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >50     2     3     2       Nickel     ppm     ASTM D5185m     >50     2     3     2       Silver     ppm     ASTM D5185m     >30     0     <1	Oil Changed		Client Info		Changed	Changed	Changed
Water     WC Method     >0.2     NEG     NEG     NEG       Glycol     WC Method     Imit/base     current     history1     history2       WEAR METALS     method     Imit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >80     26     40     35       Nickel     ppm     ASTM D5185m     >2     <1	Sample Status				ABNORMAL	SEVERE	ABNORMAL
Glycol     WC Method     NEG     NEG     NEG       WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >50     2     3     2       Nickel     ppm     ASTM D5185m     >2     <1	CONTAMINAT	ION	method	limit/base	current	history1	history2
WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >80     26     40     35       Chromium     ppm     ASTM D5185m     >2     3     2       Nickel     ppm     ASTM D5185m     >2     <1	Water		WC Method	>0.2	NEG	NEG	NEG
Iron     ppm     ASTM D5185m     >80     26     40     35       Chromium     ppm     ASTM D5185m     >5     2     3     2       Nickel     ppm     ASTM D5185m     >2     <1	Glycol		WC Method		NEG	NEG	NEG
Drive     ASTM D5185m     >5     2     3     2       Nickel     ppm     ASTM D5185m     >2     <1     <1     <1       Titanium     ppm     ASTM D5185m     >3     0     <1     0       Silver     ppm     ASTM D5185m     >30     3     17     12       Lead     ppm     ASTM D5185m     >30     7     26     25       Copper     ppm     ASTM D5185m     >5     <1     2     2       Vanadium     ppm     ASTM D5185m     >5     <1     2     2       Vanadium     ppm     ASTM D5185m     <0     0     0     0       Cadmium     ppm     ASTM D5185m     0     0     0     0       Boron     ppm     ASTM D5185m     0     0     0     0       Molybdenum     ppm     ASTM D5185m     1010     718     804     831       Calcium     ppm     ASTM D5185m     1070     902     1007     1025	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel     ppm     ASTM D5185m     >2     <1     <1     <1       Titanium     ppm     ASTM D5185m     >3     0     <1	Iron	ppm	ASTM D5185m	>80	26	40	35
Titanium     ppm     ASTM D5185m     > 0     <1     0       Silver     ppm     ASTM D5185m     >3     0     <1	Chromium	ppm	ASTM D5185m	>5	2	3	2
Silver     pm     ASTM D5185m     >3     0     <1     0       Aluminum     ppm     ASTM D5185m     >30     3     17     12       Lead     ppm     ASTM D5185m     >30     7     26     25       Copper     ppm     ASTM D5185m     >150     <1     4     2       Tin     ppm     ASTM D5185m     >5     <1     2     2       Vanadium     ppm     ASTM D5185m     >5     <1     2     2       Vanadium     ppm     ASTM D5185m     >5     <1     2     2     2       Vanadium     ppm     ASTM D5185m     o     0     0     0     0     0       ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     0     0     <1     <1<     <1       Magnese     ppm     ASTM D5185m     0     2     5     3     3       Calcium     ppm	Nickel	ppm	ASTM D5185m	>2	<1	<1	<1
Aluminum     ppm     ASTM D5185m     >30     3     17     12       Lead     ppm     ASTM D5185m     >30     7     26     25       Copper     ppm     ASTM D5185m     >150     <1	Titanium	ppm	ASTM D5185m		0	<1	0
Lead     ppm     ASTM D5185m     >30     7     26     25       Copper     ppm     ASTM D5185m     >150     <1	Silver	ppm	ASTM D5185m	>3	0	<1	0
Copper     ppm     ASTM D5185m     >150     <1     4     2       Tin     ppm     ASTM D5185m     >5     <1	Aluminum	ppm	ASTM D5185m	>30	3	17	12
Tin     ppm     ASTM D5185m     >5     <1     2     2       Vanadium     ppm     ASTM D5185m     0     0     0     0       Cadmium     ppm     ASTM D5185m     <1	Lead	ppm	ASTM D5185m	>30	7	26	25
Vanadium     ppm     ASTM D5185m     0     0     0     0       Cadmium     ppm     ASTM D5185m     <1	Copper	ppm	ASTM D5185m	>150	<1	4	2
Cadmium     ppm     ASTM D5185m     <1     0     0       ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     0     0     <1     0     0       Barium     ppm     ASTM D5185m     0     0     0     <1     0     0       Barium     ppm     ASTM D5185m     0     0     0     0     0     0       Barium     ppm     ASTM D5185m     0     <1     <1     0     0       Maganese     ppm     ASTM D5185m     010     718     804     831       Calium     ppm     ASTM D5185m     1010     718     804     831       Calium     ppm     ASTM D5185m     1070     902     1007     1025       Phosphorus     ppm     ASTM D5185m     1270     826     1100     1081       Sulfur     ppm     ASTM D5185m     2060     2397     2812     2688       S	Tin	ppm	ASTM D5185m	>5	<1	2	2
ADDITIVESmethodlimit/basecurrenthistory1history2BoronppmASTM D5185m000<1	Vanadium	ppm	ASTM D5185m		0	0	0
Boron     ppm     ASTM D5185m     0     0     <1     0       Barium     ppm     ASTM D5185m     0     0     0     0     0       Molybdenum     ppm     ASTM D5185m     60     52     54     57       Manganese     ppm     ASTM D5185m     0     <1	Cadmium	ppm	ASTM D5185m		<1	0	0
Barium     ppm     ASTM D5185m     0     0     0     0       Molybdenum     ppm     ASTM D5185m     60     52     54     57       Manganese     ppm     ASTM D5185m     0     <1     <1     <1       Magnesium     ppm     ASTM D5185m     1010     718     804     831       Calcium     ppm     ASTM D5185m     1070     902     1007     1025       Phosphorus     ppm     ASTM D5185m     1150     759     823     885       Zinc     ppm     ASTM D5185m     1270     826     1100     1081       Sulfur     ppm     ASTM D5185m     2060     2397     2812     2688       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >20     4     6     4       Sodium     ppm     ASTM D5185m     >20     6     39     26       Fuel     %     ASTM D5185m     >20 </th <th>ADDITIVES</th> <th></th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum     ppm     ASTM D5185m     60     52     54     57       Manganese     ppm     ASTM D5185m     0     <1	Boron	ppm	ASTM D5185m	0	0	<1	0
Manganese     ppm     ASTM D5185m     0     <1     <1     <1       Magnesium     ppm     ASTM D5185m     1010     718     804     831       Calcium     ppm     ASTM D5185m     1070     902     1007     1025       Phosphorus     ppm     ASTM D5185m     1150     759     823     885       Zinc     ppm     ASTM D5185m     1270     826     1100     1081       Sulfur     ppm     ASTM D5185m     2060     2397     2812     2688       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >20     4     6     4       Sodium     ppm     ASTM D5185m     >20     6     39     26       Fuel     %     ASTM D5185m     >20     6     39     26       Fuel     %     ASTM D7844     >3     4.1     6.2     4.8       Nitration     Abs/cm     'ASTM D7624     2	Barium	ppm	ASTM D5185m	0	0	0	0
Magnesium     ppm     ASTM D5185m     1010     718     804     831       Calcium     ppm     ASTM D5185m     1070     902     1007     1025       Phosphorus     ppm     ASTM D5185m     1150     759     823     885       Zinc     ppm     ASTM D5185m     1270     826     1100     1081       Sulfur     ppm     ASTM D5185m     2060     2397     2812     2688       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >20     4     6     4       Sodium     ppm     ASTM D5185m     >20     4     0     0       Potassium     ppm     ASTM D5185m     >20     6     39     26       Fuel     %     ASTM D5185m     >20     6     39     26       Soto %     %     ASTM D7844     >5     <1.0	Molybdenum	ppm	ASTM D5185m	60	52	54	57
Calcium     ppm     ASTM D5185m     1070     902     1007     1025       Phosphorus     ppm     ASTM D5185m     1150     759     823     885       Zinc     ppm     ASTM D5185m     1270     826     1100     1081       Sulfur     ppm     ASTM D5185m     2060     2397     2812     2688       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >20     4     6     4       Sodium     ppm     ASTM D5185m     >20     6     39     26       Fuel     %     ASTM D5185m     >20     6.2     4.8     100       INFRA-RED     method     limit/base     current	Manganese	ppm	ASTM D5185m	0	<1	<1	<1
Phosphorus     ppm     ASTM D5185m     1150     759     823     885       Zinc     ppm     ASTM D5185m     1270     826     1100     1081       Sulfur     ppm     ASTM D5185m     2060     2397     2812     2688       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >20     4     6     4       Sodium     ppm     ASTM D5185m     >20     4     0     0       Potassium     ppm     ASTM D5185m     >20     6     39     26       Fuel     %     ASTM D5185m     >20     6     39     26       Fuel     %     ASTM D5185m     >20     6     39     26       Soot %     %     ASTM D584     >5     <1.0	Magnesium	ppm	ASTM D5185m	1010	718	804	831
Zinc     ppm     ASTM D5185m     1270     826     1100     1081       Sulfur     ppm     ASTM D5185m     2060     2397     2812     2688       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >20     4     6     4       Sodium     ppm     ASTM D5185m     >20     4     0     0       Potassium     ppm     ASTM D5185m     >20     6     39     26       Fuel     %     ASTM D5185m     >20     6     39     26       Fuel     %     ASTM D5185m     >20     6     39     26       Fuel     %     ASTM D5324     >5     <1.0	Calcium	ppm	ASTM D5185m	1070	902	1007	1025
SulfurppmASTM D5185m2060239728122688CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>20464SodiumppmASTM D5185m>2063926PotassiumppmASTM D5185m>2063926Fuel%ASTM D5185m>2063926INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>34.16.24.8NitrationAbs/cm*ASTM D7624>2012.315.713.9SulfationAbs/lim*ASTM D7615>3029.834.933.5FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/lim*ASTM D7414>2523.024.722.3	Phosphorus	ppm	ASTM D5185m	1150	759	823	885
CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>20464SodiumppmASTM D5185m2063926PotassiumppmASTM D5185m>2063926Fuel%ASTM D5185m>2063926Fuel%ASTM D5185m>2063926Soot %%ASTM D5185m>2063926INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>34.16.24.8NitrationAbs/cm*ASTM D7624>2012.315.713.9SulfationAbs/lim*ASTM D7415>3029.834.933.5FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2523.024.722.3	Zinc	ppm	ASTM D5185m	1270	826	1100	1081
Silicon   ppm   ASTM D5185m   >20   4   6   4     Sodium   ppm   ASTM D5185m   >20   6   39   26     Potassium   ppm   ASTM D5185m   >20   6   39   26     Fuel   %   ASTM D5185m   >20   6   39   26     INFRA-RED   method   limit/base   current   history1   history2     Soot %   %   *ASTM D7844   >3   ▲ 4.1   6.2   ▲ 4.8     Nitration   Abs/cm   *ASTM D7624   >20   12.3   15.7   13.9     Sulfation   Abs/lim   *ASTM D7645   >30   29.8   34.9   33.5     FLUID DEGRADATION   method   limit/base   current   history1   history2     Oxidation   Abs/lim   *ASTM D7414   >25   23.0   24.7   22.3	Sulfur	ppm	ASTM D5185m	2060	2397	2812	2688
Sodium     ppm     ASTM D5185m     4     0     0       Potassium     ppm     ASTM D5185m     >20     6     39     26       Fuel     %     ASTM D5324     >5     <1.0	CONTAMINAN	ITS	method	limit/base	current	history1	history2
Potassium     ppm     ASTM D5185m     >20     6     39     26       Fuel     %     ASTM D3524     >5     <1.0     <1.0     <1.0       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >3     ▲ 4.1     ▲ 6.2     ▲ 4.8       Nitration     Abs/cm     *ASTM D7624     >20     12.3     15.7     13.9       Sulfation     Abs/.1mm     *ASTM D7415     >30     29.8     34.9     33.5       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     23.0     24.7     22.3	Silicon	ppm	ASTM D5185m	>20	4	6	4
Fuel     %     ASTM D3524     >5     <1.0     <1.0     <1.0       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >3     4.1     6.2     4.8       Nitration     Abs/cm     *ASTM D7624     >20     12.3     15.7     13.9       Sulfation     Abs/.1mm     *ASTM D7415     >30     29.8     34.9     33.5       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     23.0     24.7     22.3	Sodium	ppm	ASTM D5185m		4	0	0
INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>3▲ 4.1▲ 6.2▲ 4.8NitrationAbs/cm*ASTM D7624>2012.315.713.9SulfationAbs/.1mm*ASTM D715>3029.834.933.5FLUID DEGRADATION methodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D714>2523.024.722.3	Potassium	ppm	ASTM D5185m	>20	6	39	26
Soot %     %     *ASTM D7844     >3     4.1     6.2     4.8       Nitration     Abs/cm     *ASTM D7624     >20     12.3     15.7     13.9       Sulfation     Abs/.1mm     *ASTM D7415     >30     29.8     34.9     33.5       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     23.0     24.7     22.3	Fuel	%	ASTM D3524	>5	<1.0	<1.0	<1.0
Nitration     Abs/cm     *ASTM D7624     >20     12.3     15.7     13.9       Sulfation     Abs/.1mm     *ASTM D7615     >30     29.8     34.9     33.5       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     23.0     24.7     22.3	INFRA-RED		method	limit/base	current	history1	history2
Sulfation     Abs/.1mm     *ASTM D7415     >30     29.8     34.9     33.5       FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     23.0     24.7     22.3	Soot %	%	*ASTM D7844	>3	<b>4</b> .1	<b>6</b> .2	4.8
FLUID DEGRADATION method limit/base current history1 history2   Oxidation Abs/.1mm *ASTM D7414 >25 23.0 24.7 22.3	Nitration	Abs/cm	*ASTM D7624	>20	12.3	15.7	13.9
Oxidation Abs/.1mm *ASTM D7414 >25 23.0 24.7 22.3	Sulfation	Abs/.1mm	*ASTM D7415	>30	29.8	34.9	33.5
	FLUID DEGRA	DATION	method	limit/base	current	history1	history2
Base Number (BN) mg KOH/g ASTM D2896 9.8 ▲ 0.5 ▲ 0.0 ▲ 0.0	Oxidation	Abs/.1mm	*ASTM D7414	>25	23.0	24.7	22.3
	Base Number (BN)	mg KOH/g	ASTM D2896	9.8	<b>A</b> 0.5	▲ 0.0	▲ 0.0

DEGRADATION



## **OIL ANALYSIS REPORT**



Report Id: ATRPIN [WUSCAR] 06240010 (Generated: 07/21/2024 13:55:29) Rev: 1

Submitted By: Vlad Melnichuk

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