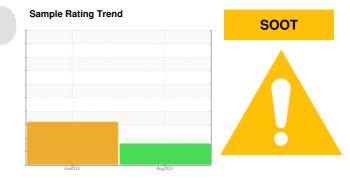


## **PROBLEM SUMMARY**

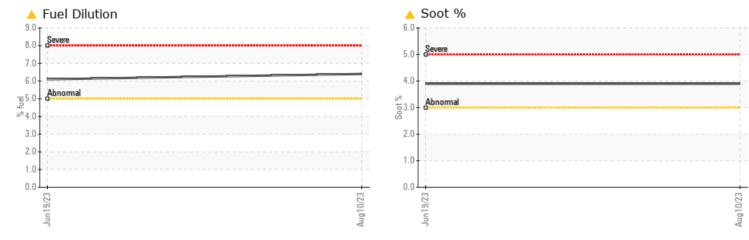


# **FREIGHTLINER 83**

Diesel Engine

### PETRO CANADA DURON SHP 15W40 (13 LTR)

### COMPONENT CONDITION SUMMARY



### RECOMMENDATION

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

PROBLEMAT	IC TES	T RESULT	S			
Sample Status				ABNORMAL	ABNORMAL	
Fuel	%	ASTM D3524	>5	<b>6.4</b>	<b>6</b> .1	
Soot %	%	*ASTM D7844	>3	<b>A</b> 3.9	<b>3</b> .9	

Customer Id: ATRPIN Sample No.: PCA0102641 Lab Number: 05924119 Test Package: FLEET



To manage this report scan the QR code

To discuss the diagnosis or test data: Wes Davis +1 905-569-8600 x223 wesd@wearcheck.ca

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

RECOMMENDED	RECOMMENDED ACTIONS				
Action	Status	Date	Done By	Description	
Resample			?	We recommend an early resample to monitor this condition.	

### HISTORICAL DIAGNOSIS

### 19 Jun 2023 Diag: Jonathan Hester

### DEGRADATION



We advise that you check the fuel injection system. 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.All component wear rates are normal. There is a moderate amount of fuel present in the oil. There is an abnormal amount of solids and carbon present in the oil. The oil viscosity is higher than normal. The BN level is low.





### **OIL ANALYSIS REPORT**

Sample Rating Trend

SOOT

## **FREIGHTLINER 83**

**Diesel Engine** 

#### Fluid PETRO CANADA DURON SHP 15W40 (13 LTR)

### DIAGNOSIS

### 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. Light concentration of carbon/soot present in the oil. Tests confirm the presence of fuel in the oil.

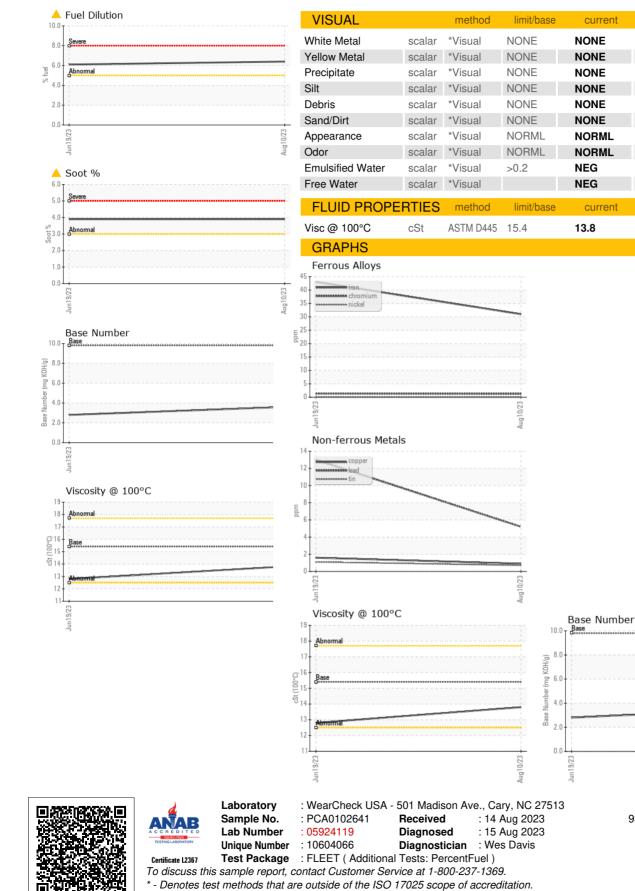
#### Fluid Condition

The BN result indicates that there is suitable alkalinity remaining in the oil. The oil is no longer serviceable due to the presence of contaminants.

SAMPLE INFORMATION     method     imit/base     current     history1     history1       Sample Number     Client Info     10 Aug 2023     19 Jun 2023        Sample Date     Client Info     442736     418909        Oil Age     mis     Client Info     248645     27622        Oil Changed     Client Info     28645     27622        Oil Changed     Client Info     28645     27622        CONTAMINATION     method     Imit/base     current     history1     history2       Glycol     WC Method     Imit/base     current     history1     history2       Korkel     ppm     ASTM 051555     5     1     1        Nicol     ppm	SAMPLE INFORMATION     method     imil/base     current     history1     history2       Sample Number     Client Info     10 Aug 2023     19 Jun 2023        Sample Date     Client Info     442736     418909        Oil Age     mis     Client Info     442736     418909        Oil Age     mis     Client Info     442736     418909        Oil Age     Client Info     442736     418909        Sample Status     Client Info     Changed     Changed        CONTAMINATION     method     limi/base     current     history1     history2       Glycol     WC Method     limi/base     current     history1     history2       CONTAMINATION     method     limi/base     current     history1     history2       Glycol     WC Method     So     31     43        CONTAMINATION     ppm     ASTM 05165     55     1     1        Kromium     ppm     ASTM 05165 </th <th></th> <th></th> <th></th> <th>Jun<sup>2</sup>023</th> <th>Aug2023</th> <th></th> <th></th>				Jun <sup>2</sup> 023	Aug2023		
Sample Number     Client Info     PCA0102641     PCA0100704        Sample Date     Client Info     10 Aug 2023     19 Jun 2023        Machine Age     mis     Client Info     442736     418909        Oil Age     mis     Client Info     28645     27622        Oil Changed     Client Info     28645     27622        CONTAMINATION     method     limi/base     current     history1     history2       Glycol     WC Method     limi/base     current     history1     history2       Nickel     ppm     ASTM 05185     >80     31     43        Nickel     ppm     ASTM 05185     >2     0     0        Itanium     ppm     ASTM 05185     >30     <1     -1        Lead     ppm     ASTM 05185     >30     <1         Vanadium     ppm     ASTM 05185     >10     0         Vanadium	Sample Number     Client Info     PCA0102541     PCA0100704        Sample Date     Client Info     10 Aug 2023     19 Jun 2023        Machine Age     mis     Client Info     442736     418909        Oil Age     mis     Client Info     28645     27622        Oil Changed     Client Info     ABNORMAL     ABNORMAL        Sample Status     method     limil/base     current     history1     history2       Glycol     WC Method     limil/base     current     history1     history2       Kromium     ppm     ASTM 05185     >80     31     43        Nickel     ppm     ASTM 05185     >2     0     0        Nickel     ppm     ASTM 05185     >30     <-1         Lead     ppm     ASTM 05185     >30     <-1         Augentim     ppm     ASTM 05185     >5     <1         Lead </th <th></th> <th></th> <th>method</th> <th></th> <th></th> <th>history1</th> <th>history2</th>			method			history1	history2
Sample Date     Client Info     10 Aug 2023     19 Jun 2023        Wachine Age     mis     Client Info     442736     418909        Dil Age     mis     Client Info     28645     27622        Sample Status     Client Info     Changed     Changed        CONTAMINATION     method     limit/base     current     history1     history2       CONTAMINATION     method     limit/base     current     history1     history2       Clorninm     ppm     ASTM 05165     >80     31     43        VEAR METALS     method     limit/base     current     history1     history2       Vickel     ppm     ASTM 05165     >2     0     0	Sample Date     Client Info     10 Aug 2023     19 Jun 2023        Wachine Age     mis     Client Info     442736     418909        Dil Age     mis     Client Info     28645     27622        Sample Status     Client Info     Changed     Changed        CONTAMINATION     method     limi/base     current     history1     history2       Glycol     WC Method     limi/base     current     history1     history2       VEAR METALS     method     limi/base     current     history1     history2       Vickel     ppm     ASTM D51655     s2     0     0        Vickel     ppm     ASTM D51655     s30     c1     c1        Read     ppm     ASTM D51655     s30     c1     c1        Auminum     ppm     ASTM D51655     s30     c1     c1        Auminum     ppm     ASTM D51655     s30     c1     c1							
Adachine Age     mis     Client Info     442736     418909        Dil Age     mis     Client Info     28645     27622        Dil Ghanged     Client Info     EabNORMAL     ABNORMAL        ABNORMAL      ABNORMAL        CONTAMINATION     method     limit/base     current     history1     history2       Blycol     WC Method     imit/base     current     history1     history2       Stinu D5185m     >5     1     1        VEAR METAL     ppm     ASTM D5185m     >5     1     1        Stinu     ppm     ASTM D5185m     >5     1     1        Stinu     ppm     ASTM D5185m     >30     0     0        Numinum     ppm     ASTM D5185m     >30     5     13        Araadium     ppm     ASTM D5185m     >5     <1	Adachine Age     mis     Client Info     442736     418909        Dil Age     mis     Client Info     28645     27622        Dil Ghanged     Client Info     EabNORMAL     ABNORMAL        ABNORMAL      ABNORMAL        CONTAMINATION     method     limit/base     current     history1     history2       Blycol     WC Method     imit/base     current     history1     history2       Stinu D5185m     >5     1     1        VEAR METAL     ppm     ASTM D5185m     >5     1     1        Stinu     ppm     ASTM D5185m     >5     1     1        Stinu     ppm     ASTM D5185m     >30     0     0        Numinum     ppm     ASTM D5185m     >30     5     13        Araadium     ppm     ASTM D5185m     >5     <1							
Dil Age     mis     Client Info     28645     27622        Sample Status     Client Info     Changed     Changed        Sample Status     M     Method     limit/base     current     history1     history2       CONTAMINATION     method     limit/base     current     history1     history2       Silver     ppm     ASTM D5185m     >80     31     43        VEAR METALS     method     limit/base     current     history1     history2       Silver     ppm     ASTM D5185m     >5     1     1        Vickel     ppm     ASTM D5185m     >2     0     0        Numinum     ppm     ASTM D5185m     >30     <1	Dil Age     mis     Client Info     28645     27622        Sample Status     Client Info     Changed     Changed        Sample Status     M     Method     limit/base     current     history1     history2       CONTAMINATION     method     limit/base     current     history1     history2       Silver     ppm     ASTM D5185m     >80     31     43        VEAR METALS     method     limit/base     current     history1     history2       Silver     ppm     ASTM D5185m     >5     1     1        Vickel     ppm     ASTM D5185m     >2     0     0        Numinum     ppm     ASTM D5185m     >30     <1	•	mla			-		
Changed ample Status     Client Info     Changed ABNORMAL ABNORMAL     Changed ABNORMAL ABNORMAL ABNORMAL ABNORMAL ABNORMAL ABNORMAL ABNORMAL ABNORMAL CONTAMINATION     wethod     imit/base     current     history1     history2       Grown     ppm     ASTM D5185m     >80     31     43        WEAR METALS     method     limit/base     current     history1     history2       ron     ppm     ASTM D5185m     >80     31     43        lickel     ppm     ASTM D5185m     >20     0     0        Silver     ppm     ASTM D5185m     >30     <1	Changed ample Status     Client Info     Changed ABNORMAL ABNORMAL     Changed ABNORMAL ABNORMAL ABNORMAL ABNORMAL ABNORMAL ABNORMAL ABNORMAL ABNORMAL CONTAMINATION     wethod     imit/base     current     history1     history2       Grown     ppm     ASTM D5185m     >80     31     43        WEAR METALS     method     limit/base     current     history1     history2       ron     ppm     ASTM D5185m     >80     31     43        lickel     ppm     ASTM D5185m     >20     0     0        Silver     ppm     ASTM D5185m     >30     <1	v						
Sample Status     Imit/base     CUNTAMINATION     method     Imit/base     current     history1     history2       Glycol     WC Method     Imit/base     current     history1     history2       Glycol     WC Method     Imit/base     current     history1     history2       Chromium     ppm     ASTM D5185m     >5     1     1        Vickel     ppm     ASTM D5185m     >5     1     1        Silver     ppm     ASTM D5185m     >3     0     0        Silver     ppm     ASTM D5185m     >30     <1	Sample Status     Imit/base     CUNTAMINATION     method     Imit/base     current     history1     history2       Glycol     WC Method     Imit/base     current     history1     history2       Glycol     WC Method     Imit/base     current     history1     history2       Chromium     ppm     ASTM D5185m     >5     1     1        Vickel     ppm     ASTM D5185m     >5     1     1        Silver     ppm     ASTM D5185m     >3     0     0        Silver     ppm     ASTM D5185m     >30     <1	0	11115					
CONTAMINATION     method     limit/base     current     history1     history2       Glycol     WC Method     NEG     NEG        WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >50     1     1        Chromium     ppm     ASTM D5185m     >50     1     1        Nickel     ppm     ASTM D5185m     >5     1     1        Nickel     ppm     ASTM D5185m     >30     0     0        Silver     ppm     ASTM D5185m     >30     <1	CONTAMINATION     method     limit/base     current     history1     history2       Glycol     WC Method     NEG     NEG        WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >50     1     1        Chromium     ppm     ASTM D5185m     >50     1     1        Nickel     ppm     ASTM D5185m     >5     1     1        Nickel     ppm     ASTM D5185m     >30     0     0        Silver     ppm     ASTM D5185m     >30     <1	Ũ		Cilent Inio		•	U	
Glycol     WC Method     NEG     NEG	Glycol     WC Method     NEG     NEG			method	limit/base	-		
WEAR METALS     method     limit/base     current     history1     history2       krom     ppm     ASTM D5185m     >80     31     43        Chromium     ppm     ASTM D5185m     >2     0     0        Nickel     ppm     ASTM D5185m     >2     0     0        Titanium     ppm     ASTM D5185m     >3     0     0        Silver     ppm     ASTM D5185m     >30     5     13        Copper     ppm     ASTM D5185m     >5     <1	WEAR METALS     method     limit/base     current     history1     history2       krom     ppm     ASTM D5185m     >80     31     43        Chromium     ppm     ASTM D5185m     >2     0     0        Nickel     ppm     ASTM D5185m     >2     0     0        Titanium     ppm     ASTM D5185m     >3     0     0        Aluminum     ppm     ASTM D5185m     >30     5     13        Copper     ppm     ASTM D5185m     >150     <1				IIIII Dase			
ppm     ASTM D5185m     >80     31     43        Chromium     ppm     ASTM D5185m     >5     1     1        Nickel     ppm     ASTM D5185m     >2     0     0        Titanium     ppm     ASTM D5185m     >3     0     0        Silver     ppm     ASTM D5185m     >30     <1	ppm     ASTM D5185m     >80     31     43        Chromium     ppm     ASTM D5185m     >5     1     1        Nickel     ppm     ASTM D5185m     >2     0     0        Titanium     ppm     ASTM D5185m     >3     0     0        Silver     ppm     ASTM D5185m     >30     41     -1        Aluminum     ppm     ASTM D5185m     >30     5     13        Lead     ppm     ASTM D5185m     >5     <1		S		limit/base			historv2
prim     ASTM D5185m     >5     1     1        Vickel     ppm     ASTM D5185m     >2     0     0        Silver     ppm     ASTM D5185m     >3     0     0        Silver     ppm     ASTM D5185m     >30     <1	ppm     ASTM D5185m     >5     1     1        Vickel     ppm     ASTM D5185m     >2     0     0        Silver     ppm     ASTM D5185m     >3     0     0        Silver     ppm     ASTM D5185m     >30     <1							<b>,</b>
vickel     ppm     ASTM D5185m     >2     0     0        Fitanium     ppm     ASTM D5185m     >3     0     0        Silver     ppm     ASTM D5185m     >30     <1	vickel     ppm     ASTM D5185m     >2     0     0        Fitanium     ppm     ASTM D5185m     >3     0     0        Silver     ppm     ASTM D5185m     >30     <1	-				-		
Titanium     ppm     ASTM D5185m     >3     0	Titanium     ppm     ASTM D5185m     >3     0							
Silver     ppm     ASTM D5185m     >3     0     0        Aluminum     ppm     ASTM D5185m     >30     <1     <1        Lead     ppm     ASTM D5185m     >30     5     13        Copper     ppm     ASTM D5185m     >150     <1     2        Vanadium     ppm     ASTM D5185m     >5     <1     1        Vanadium     ppm     ASTM D5185m     >5     <1     1        Addium     ppm     ASTM D5185m     O     0     0        ADDITIVES     method     limit/base     current     history1     history2       Barium     pm     ASTM D5185m     0     20     0        Magnesium     pm     ASTM D5185m     0     <10     843     135        Magnesium     pm     ASTM D5185m     100     1140     2037        Calcium     pm     ASTM D5185m	Silver     ppm     ASTM D5185m     >3     0     0        Aluminum     ppm     ASTM D5185m     >30     <1     <1        Lead     ppm     ASTM D5185m     >30     5     13        Copper     ppm     ASTM D5185m     >150     <1     2        Vanadium     ppm     ASTM D5185m     >5     <1     1        Vanadium     ppm     ASTM D5185m     >5     <1     1        Addium     ppm     ASTM D5185m     O     0     0        ADDITIVES     method     limit/base     current     history1     history2       Barium     pm     ASTM D5185m     0     20     0        Magnesium     pm     ASTM D5185m     0     <10     843     135        Magnesium     pm     ASTM D5185m     100     1140     2037        Calcium     pm     ASTM D5185m				>2	-		
Attminum     ppm     ATTM D5185m     >30     <1     <1        Lead     ppm     ASTM D5185m     >30     5     13        Copper     ppm     ASTM D5185m     >150     <1	Attminum     ppm     ATTM D5185m     >30     <1     <1        Lead     ppm     ASTM D5185m     >30     5     13        Copper     ppm     ASTM D5185m     >150     <1				0	-		
Lead     ppm     ASTM D5185m     >30     5     13        Copper     ppm     ASTM D5185m     >150     <1	Lead     ppm     ASTM D5185m     >30     5     13        Copper     ppm     ASTM D5185m     >150     <1					-		
Copper     ppm     ASTM D5185m     >150     <1     2        Tin     ppm     ASTM D5185m     >5     <1	Copper     ppm     ASTM D5185m     >150     <1     2        Tin     ppm     ASTM D5185m     >5     <1							
Tin     ppm     ASTM D5185m     >5     <1     1        Vanadium     ppm     ASTM D5185m     0     0        Cadmium     ppm     ASTM D5185m     0     0        ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     0     2     19        Molybdenum     ppm     ASTM D5185m     0     0     0        Maganese     ppm     ASTM D5185m     0     <1	Tin     ppm     ASTM D5185m     >5     <1     1        Vanadium     ppm     ASTM D5185m     0     0        Cadmium     ppm     ASTM D5185m     0     0        ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     0     2     19        Molybdenum     ppm     ASTM D5185m     0     0     0        Maganese     ppm     ASTM D5185m     0     <1		ppm			-		
Vanadium     ppm     ASTM D5185m     0     0        Cadmium     ppm     ASTM D5185m     0     0        ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     0     2     19        Barium     ppm     ASTM D5185m     0     0     0        Malganese     ppm     ASTM D5185m     60     51     20        Manganese     ppm     ASTM D5185m     0     <1	Vanadium     ppm     ASTM D5185m     0     0        Cadmium     ppm     ASTM D5185m     0     0        ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     0     2     19        Barium     ppm     ASTM D5185m     0     0     0        Malganese     ppm     ASTM D5185m     60     51     20        Manganese     ppm     ASTM D5185m     0     <1		ppm		>150			
Cadmium     ppm     ASTM D5185m     0     0        ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     0     2     19        Barium     ppm     ASTM D5185m     0     0     0     0        Maganesium     ppm     ASTM D5185m     0     <1     <1        Magnesium     ppm     ASTM D5185m     0     <1     <1        Magnesium     ppm     ASTM D5185m     0     <1     <1     <1        Magnesium     ppm     ASTM D5185m     1010     843     135        Calcium     ppm     ASTM D5185m     1070     1140     2037        Sulfur     ppm     ASTM D5185m     1270     1115     1036        Sulfur     ppm     ASTM D5185m     2060     3254     3272        Soliton     ppm     ASTM D5185m	Cadmium     ppm     ASTM D5185m     0     0        ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     0     2     19        Barium     ppm     ASTM D5185m     0     0     0     0        Maganesium     ppm     ASTM D5185m     0     <1     <1        Magnesium     ppm     ASTM D5185m     0     <1     <1        Magnesium     ppm     ASTM D5185m     0     <1     <1     <1        Magnesium     ppm     ASTM D5185m     1010     843     135        Calcium     ppm     ASTM D5185m     1070     1140     2037        Sulfur     ppm     ASTM D5185m     1270     1115     1036        Sulfur     ppm     ASTM D5185m     2060     3254     3272        Soliton     ppm     ASTM D5185m		ppm		>5			
ADDITIVESmethodlimit/basecurrenthistory1history2BoronppmASTM D5185m0219BariumppmASTM D5185m000MolybdenumppmASTM D5185m605120MaganeseppmASTM D5185m0<1	ADDITIVESmethodlimit/basecurrenthistory1history2BoronppmASTM D5185m0219BariumppmASTM D5185m000MolybdenumppmASTM D5185m605120MaganeseppmASTM D5185m0<1	Vanadium	ppm	ASTM D5185m		0		
Boron     ppm     ASTM D5185m     0     2     19        Barium     ppm     ASTM D5185m     0     0     0     0        Molybdenum     ppm     ASTM D5185m     60     51     20        Manganese     ppm     ASTM D5185m     0     <1	Boron     ppm     ASTM D5185m     0     2     19        Barium     ppm     ASTM D5185m     0     0     0     0        Molybdenum     ppm     ASTM D5185m     60     51     20        Manganese     ppm     ASTM D5185m     0     <1	Cadmium	ppm	ASTM D5185m		0	0	
Barium     ppm     ASTM D5185m     0     0     0        Molybdenum     ppm     ASTM D5185m     60     51     20        Manganese     ppm     ASTM D5185m     0     <1     <1        Manganesium     ppm     ASTM D5185m     1010     843     135        Calcium     ppm     ASTM D5185m     1010     843     135        Calcium     ppm     ASTM D5185m     1070     1140     2037        Phosphorus     ppm     ASTM D5185m     1070     1115     1036        Sulfur     ppm     ASTM D5185m     1270     1115     1036        Sulfur     ppm     ASTM D5185m     2060     3254     3272        Soldium     ppm     ASTM D5185m     >20     4     5        Soldium     ppm     ASTM D5185m     >20     2     2   Fuel     %     ASTM D5185m	Barium     ppm     ASTM D5185m     0     0     0        Molybdenum     ppm     ASTM D5185m     60     51     20        Manganese     ppm     ASTM D5185m     0     <1     <1        Manganesium     ppm     ASTM D5185m     1010     843     135        Calcium     ppm     ASTM D5185m     1010     843     135        Calcium     ppm     ASTM D5185m     1070     1140     2037        Phosphorus     ppm     ASTM D5185m     1070     1115     1036        Sulfur     ppm     ASTM D5185m     1270     1115     1036        Sulfur     ppm     ASTM D5185m     2060     3254     3272        Soldium     ppm     ASTM D5185m     >20     4     5        Soldium     ppm     ASTM D5185m     >20     2     2   Fuel     %     ASTM D5185m	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum     ppm     ASTM D5185m     60     51     20        Manganese     ppm     ASTM D5185m     0     <1	Molybdenum     ppm     ASTM D5185m     60     51     20        Manganese     ppm     ASTM D5185m     0     <1	Boron	ppm	ASTM D5185m	0	2	19	
Manganese   ppm   ASTM D5185m   0   <1   <1      Magnesium   ppm   ASTM D5185m   1010   843   135      Calcium   ppm   ASTM D5185m   1010   843   135      Calcium   ppm   ASTM D5185m   1070   1140   2037      Phosphorus   ppm   ASTM D5185m   1070   1140   2037      Phosphorus   ppm   ASTM D5185m   1070   1140   2037      Zinc   ppm   ASTM D5185m   1270   1115   1036      Sulfur   ppm   ASTM D5185m   2060   3254   3272      CONTAMINANTS   method   limit/base   current   history1   history2     Solicon   ppm   ASTM D5185m   >20   2   2      Solicon   ppm   ASTM D5185m   >20   2   2      Solicon   ppm   ASTM D5185m   >20   2   2      INFRA-RED   m	Manganese   ppm   ASTM D5185m   0   <1   <1      Magnesium   ppm   ASTM D5185m   1010   843   135      Calcium   ppm   ASTM D5185m   1010   843   135      Calcium   ppm   ASTM D5185m   1070   1140   2037      Phosphorus   ppm   ASTM D5185m   1070   1140   2037      Phosphorus   ppm   ASTM D5185m   1070   1140   2037      Zinc   ppm   ASTM D5185m   1270   1115   1036      Sulfur   ppm   ASTM D5185m   2060   3254   3272      CONTAMINANTS   method   limit/base   current   history1   history2     Solicon   ppm   ASTM D5185m   >20   2   2      Solicon   ppm   ASTM D5185m   >20   2   2      Solicon   ppm   ASTM D5185m   >20   2   2      INFRA-RED   m							
Magnesium     ppm     ASTM D5185m     1010     843     135        Calcium     ppm     ASTM D5185m     1070     1140     2037        Phosphorus     ppm     ASTM D5185m     1150     918     804        Zinc     ppm     ASTM D5185m     1270     1115     1036        Sulfur     ppm     ASTM D5185m     2060     3254     3272        CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >20     4     5        Sodium     ppm     ASTM D5185m     >20     2     2        Sodium     ppm     ASTM D5185m     >20     2     2        Fuel     ASTM D5185m     >20     2     2         Sodium     ppm     ASTM D5185m     >20     2     2        Fuel     %     ASTM D5185m     >20	Magnesium     ppm     ASTM D5185m     1010     843     135        Calcium     ppm     ASTM D5185m     1070     1140     2037        Phosphorus     ppm     ASTM D5185m     1150     918     804        Zinc     ppm     ASTM D5185m     1270     1115     1036        Sulfur     ppm     ASTM D5185m     2060     3254     3272        CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >20     4     5        Sodium     ppm     ASTM D5185m     >20     2     2        Sodium     ppm     ASTM D5185m     >20     2     2        Fuel     ASTM D5185m     >20     2     2         Sodium     ppm     ASTM D5185m     >20     2     2        Fuel     %     ASTM D5185m     >20	Barium		ASTM D5185m	0	0	0	
Calcium     ppm     ASTM D5185m     1070     1140     2037        Phosphorus     ppm     ASTM D5185m     1150     918     804        Zinc     ppm     ASTM D5185m     1270     1115     1036        Sulfur     ppm     ASTM D5185m     2060 <b>3254</b> 3272        CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >20     4     5        Sodium     ppm     ASTM D5185m     >20     4     5        Sodium     ppm     ASTM D5185m     >20     2         Sodium     ppm     ASTM D5185m     >20     2         Fuel     %     ASTM D5185m     >20     2     2        Fuel     %     ASTM D5185m     >20     2     2        Fuel     %     ASTM D584     >3	Calcium     ppm     ASTM D5185m     1070     1140     2037        Phosphorus     ppm     ASTM D5185m     1150     918     804        Zinc     ppm     ASTM D5185m     1270     1115     1036        Sulfur     ppm     ASTM D5185m     2060 <b>3254</b> 3272        CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >20     4     5        Sodium     ppm     ASTM D5185m     >20     4     5        Sodium     ppm     ASTM D5185m     >20     2         Sodium     ppm     ASTM D5185m     >20     2         Fuel     %     ASTM D5185m     >20     2     2        Fuel     %     ASTM D5185m     >20     2     2        Fuel     %     ASTM D584     >3		ppm			-		
Phosphorus     ppm     ASTM D5185m     1150     918     804        Zinc     ppm     ASTM D5185m     1270     1115     1036        Sulfur     ppm     ASTM D5185m     2060     3254     3272        CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >20     4     5        Sodium     ppm     ASTM D5185m     >20     4     5        Sodium     ppm     ASTM D5185m     >20     4     5        Sodium     ppm     ASTM D5185m     >20     2     2        Potassium     ppm     ASTM D5185m     >20     2     2        Fuel     %     ASTM D5185m     >20     2     2        INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >3	Phosphorus     ppm     ASTM D5185m     1150     918     804        Zinc     ppm     ASTM D5185m     1270     1115     1036        Sulfur     ppm     ASTM D5185m     2060     3254     3272        CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >20     4     5        Sodium     ppm     ASTM D5185m     >20     4     5        Sodium     ppm     ASTM D5185m     >20     4     5        Sodium     ppm     ASTM D5185m     >20     2     2        Potassium     ppm     ASTM D5185m     >20     2     2        Fuel     %     ASTM D5185m     >20     2     2        INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >3	Volybdenum	ppm ppm	ASTM D5185m	60	51	20	
ZincppmASTM D5185m127011151036SulfurppmASTM D5185m206032543272CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>2045SodiumppmASTM D5185m>2045PotassiumppmASTM D5185m>2022Fuel%ASTM D5185m>2022INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>33.93.9SulfationAbs/.1mm*ASTM D7624>2010.511.4FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2519.017.7	ZincppmASTM D5185m127011151036SulfurppmASTM D5185m206032543272CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>2045SodiumppmASTM D5185m>2045PotassiumppmASTM D5185m>2022Fuel%ASTM D5185m>2022INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>33.93.9SulfationAbs/.1mm*ASTM D7624>2010.511.4FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2519.017.7	Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m	60 0	51 <1	20 <1	
ZincppmASTM D5185m127011151036SulfurppmASTM D5185m206032543272CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>2045SodiumppmASTM D5185m>2022PotassiumppmASTM D5185m>2022Fuel%ASTM D5185m>2022INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>33.93.9NitrationAbs/cm*ASTM D7624>2010.511.4SulfationAbs/.1mm*ASTM D7415>3027.430.1CxidationAbs/.1mm*ASTM D7414>2519.017.7	ZincppmASTM D5185m127011151036SulfurppmASTM D5185m206032543272CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>2045SodiumppmASTM D5185m>2022PotassiumppmASTM D5185m>2022Fuel%ASTM D5185m>2022INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>33.93.9NitrationAbs/cm*ASTM D7624>2010.511.4SulfationAbs/.1mm*ASTM D7415>3027.430.1CxidationAbs/.1mm*ASTM D7414>2519.017.7	Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	60 0 1010	51 <1 843	20 <1 135	
SulfurppmASTM D5185m206032543272CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>2045SodiumppmASTM D5185m>2022PotassiumppmASTM D5185m>2022Fuel%ASTM D5185m>2022Fuel%ASTM D5185m>2022INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>33.93.9NitrationAbs/cm*ASTM D7624>2010.511.4SulfationAbs/lm*ASTM D7624>3027.430.1FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/lm*ASTM D7414>2519.017.7	SulfurppmASTM D5185m206032543272CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>2045SodiumppmASTM D5185m>2022PotassiumppmASTM D5185m>2022Fuel%ASTM D5185m>2022Fuel%ASTM D5185m>2022INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>33.93.9NitrationAbs/cm*ASTM D7624>2010.511.4SulfationAbs/lm*ASTM D7624>3027.430.1FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/lm*ASTM D7414>2519.017.7	Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	60 0 1010 1070	51 <1 843 1140	20 <1 135 2037	
Silicon   ppm   ASTM D5185m   >20   4   5      Sodium   ppm   ASTM D5185m   >20   3   2      Potassium   ppm   ASTM D5185m   >20   2   2      Fuel   %   ASTM D5324   >5   ▲ 6.4   ▲ 6.1      INFRA-RED   method   limit/base   current   history1   history2     Soot %   %   *ASTM D7844   >3   ▲ 3.9   ▲ 3.9      Nitration   Abs/cm   *ASTM D7624   >20   10.5   11.4      FLUID DEGRADATION   method   limit/base   current   history1   history2     Oxidation   Abs/.1mm   *ASTM D7414   >25   19.0   17.7	Silicon   ppm   ASTM D5185m   >20   4   5      Sodium   ppm   ASTM D5185m   >20   3   2      Potassium   ppm   ASTM D5185m   >20   2   2      Fuel   %   ASTM D5324   >5   ▲ 6.4   ▲ 6.1      INFRA-RED   method   limit/base   current   history1   history2     Soot %   %   *ASTM D7844   >3   ▲ 3.9   ▲ 3.9      Nitration   Abs/cm   *ASTM D7624   >20   10.5   11.4      FLUID DEGRADATION   method   limit/base   current   history1   history2     Oxidation   Abs/.1mm   *ASTM D7414   >25   19.0   17.7	Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	60 0 1010 1070 1150	51 <1 843 1140 918	20 <1 135 2037 804	
Sodium     ppm     ASTM D5185m     3     2        Potassium     ppm     ASTM D5185m     >20     2     2        Fuel     %     ASTM D3524     >5     ▲ 6.4     ▲ 6.1        INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >3     ▲ 3.9     ▲ 3.9        Nitration     Abs/cm     *ASTM D7624     >20     10.5     11.4        Sulfation     Abs/.1mm     *ASTM D7615     >30     27.4     30.1        FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     19.0     17.7	Sodium     ppm     ASTM D5185m     3     2        Potassium     ppm     ASTM D5185m     >20     2     2        Fuel     %     ASTM D3524     >5     ▲ 6.4     ▲ 6.1        INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >3     ▲ 3.9     ▲ 3.9        Nitration     Abs/cm     *ASTM D7624     >20     10.5     11.4        Sulfation     Abs/.1mm     *ASTM D7615     >30     27.4     30.1        FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     19.0     17.7	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	60 0 1010 1070 1150 1270	51 <1 843 1140 918 1115	20 <1 135 2037 804 1036	
PotassiumppmASTM D5185m>2022Fuel%ASTM D3524>56.46.1INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>33.93.9NitrationAbs/cm*ASTM D7624>2010.511.4SulfationAbs/.1mm*ASTM D7415>3027.430.1FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2519.017.7	PotassiumppmASTM D5185m>2022Fuel%ASTM D3524>56.46.1INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>33.93.9NitrationAbs/cm*ASTM D7624>2010.511.4SulfationAbs/.1mm*ASTM D7415>3027.430.1FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2519.017.7	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	60 0 1010 1070 1150 1270 2060	51 <1 843 1140 918 1115 3254	20 <1 135 2037 804 1036 3272	   
PotassiumppmASTM D5185m>2022Fuel%ASTM D3524>56.46.1INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>33.93.9NitrationAbs/cm*ASTM D7624>2010.511.4SulfationAbs/.1mm*ASTM D7415>3027.430.1FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2519.017.7	PotassiumppmASTM D5185m>2022Fuel%ASTM D3524>56.46.1INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>33.93.9NitrationAbs/cm*ASTM D7624>2010.511.4SulfationAbs/.1mm*ASTM D7415>3027.430.1FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2519.017.7	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	60 0 1010 1070 1150 1270 2060 limit/base	51 <1 843 1140 918 1115 3254 current	20 <1 135 2037 804 1036 3272 history1	    history2
Fuel   %   ASTM D3524   >5   ▲ 6.4   ▲ 6.1      INFRA-RED   method   limit/base   current   history1   history2     Soot %   %   *ASTM D7844   >3   ▲ 3.9   ▲ 3.9      Nitration   Abs/cm   *ASTM D7624   >20   10.5   11.4      Sulfation   Abs/.1mm   *ASTM D7415   >30   27.4   30.1      FLUID DEGRADATION   method   limit/base   current   history1   history2     Oxidation   Abs/.1mm   *ASTM D7414   >25   19.0   17.7	Fuel   %   ASTM D3524   >5   ▲ 6.4   ▲ 6.1      INFRA-RED   method   limit/base   current   history1   history2     Soot %   %   *ASTM D7844   >3   ▲ 3.9   ▲ 3.9      Nitration   Abs/cm   *ASTM D7624   >20   10.5   11.4      Sulfation   Abs/.1mm   *ASTM D7415   >30   27.4   30.1      FLUID DEGRADATION   method   limit/base   current   history1   history2     Oxidation   Abs/.1mm   *ASTM D7414   >25   19.0   17.7	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m Method ASTM D5185m	60 0 1010 1070 1150 1270 2060 limit/base	51 <1 843 1140 918 1115 3254 current 4	20 <1 135 2037 804 1036 3272 history1 5	    history2 
Soot %     %     *ASTM D7844     >3     3.9     3.9        Nitration     Abs/cm     *ASTM D7624     >20     10.5     11.4        Sulfation     Abs/.1mm     *ASTM D7415     >30     27.4     30.1        FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     19.0     17.7	Soot %     %     *ASTM D7844     >3     3.9     3.9        Nitration     Abs/cm     *ASTM D7624     >20     10.5     11.4        Sulfation     Abs/.1mm     *ASTM D7415     >30     27.4     30.1        FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     19.0     17.7	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	60 0 1010 1070 1150 1270 2060 limit/base >20	51 <1 843 1140 918 1115 3254 current 4 3	20 <1 135 2037 804 1036 3272 history1 5 2	    history2 
Nitration     Abs/cm     *ASTM D7624     >20     10.5     11.4        Sulfation     Abs/.1mm     *ASTM D7415     >30     27.4     30.1        FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     19.0     17.7	Nitration     Abs/cm     *ASTM D7624     >20     10.5     11.4        Sulfation     Abs/.1mm     *ASTM D7415     >30     27.4     30.1        FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     19.0     17.7	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	60 0 1010 1070 1150 1270 2060 limit/base >20	51 <1 843 1140 918 1115 3254 current 4 3 2	20 <1 135 2037 804 1036 3272 history1 5 2 2 2	    history2  
Nitration     Abs/cm     *ASTM D7624     >20     10.5     11.4        Sulfation     Abs/.1mm     *ASTM D7615     >30     27.4     30.1        FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     19.0     17.7	Nitration     Abs/cm     *ASTM D7624     >20     10.5     11.4        Sulfation     Abs/.1mm     *ASTM D7615     >30     27.4     30.1        FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     19.0     17.7	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Silicon Sodium Potassium Fuel	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	60 0 1010 1070 1150 1270 2060 limit/base >20 >20 >20	51 <1 843 1140 918 1115 3254 current 4 3 2 ▲ 6.4	20 <1 135 2037 804 1036 3272 history1 5 2 2 2 2 6.1	    history2   
Sulfation     Abs/.1mm     *ASTM D7415     >30     27.4     30.1        FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     19.0     17.7	Sulfation     Abs/.1mm     *ASTM D7415     >30     27.4     30.1        FLUID DEGRADATION     method     limit/base     current     history1     history2       Oxidation     Abs/.1mm     *ASTM D7414     >25     19.0     17.7	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED	ppm ppm ppm ppm ppm ppm ppm <b>TS</b> ppm ppm ppm	ASTM D5185m ASTM D5185m	60 0 1010 1070 1150 1270 2060 <b>limit/base</b> >20 >20 >20 >5	51 <1 843 1140 918 1115 3254 current 4 3 2 2 ▲ 6.4 current	20 <1 135 2037 804 1036 3272 history1 5 2 2 2 4 6.1 history1	    history2     history2
Dxidation     Abs/.1mm     *ASTM D7414     >25     19.0     17.7	Dxidation     Abs/.1mm     *ASTM D7414     >25     19.0     17.7	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm <b>TS</b> ppm ppm ppm %	ASTM D5185m ASTM D3524	60 0 1010 1070 1150 1270 2060 limit/base >20 >20 >20 >5 limit/base >3	51 <1 843 1140 918 1115 3254 current 4 3 2 ▲ 6.4 current ▲ 3.9	20 <1 135 2037 804 1036 3272 history1 5 2 2 2 2 ▲ 6.1 history1 4 ▲ 3.9	    history2     history2
		Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D3524 *ASTM D7844	60 0 1010 1070 1150 1270 2060 <b>limit/base</b> >20 >20 >20 >5 <b>limit/base</b> >3 >20	51 <1 843 1140 918 1115 3254 current 4 3 2 ▲ 6.4 current ▲ 3.9 10.5	20 <1 135 2037 804 1036 3272 history1 5 2 2 2 2 ▲ 6.1 history1 4 3.9 11.4	     history2    history2  history2
		Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm %	ASTM D5185m ASTM D51854 ASTM D5844 *ASTM D7844 *ASTM D7844	60 0 1010 1070 1150 1270 2060 <b>Iimit/base</b> >20 >20 >5 <b>Iimit/base</b> >3 >20 >3 >20	51 <1 843 1140 918 1115 3254 current 4 3 2 ▲ 6.4 current ▲ 3.9 10.5 27.4	20 <1 135 2037 804 1036 3272 history1 5 2 2 2 ▲ 6.1 history1 ▲ 3.9 11.4 30.1	    history2    history2  history2
	Base Number (BN) mg KOH/g ASTM D2896 9.8 <b>3.6</b> 🔶 2.8	Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration Sulfation FLUID DEGRAE	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D3524 *ASTM D7844 *ASTM D7844 *ASTM D7415	60 0 1010 1070 1150 2060 2060 >20 >20 >20 >5 Iimit/base >3 >20 >30 >30	51 <1 843 1140 918 1115 3254 current 4 3 2 ▲ 6.4 current ▲ 3.9 10.5 27.4 current	20 <1 135 2037 804 1036 3272 history1 5 2 2 2 6.1 history1 ▲ 3.9 11.4 30.1 history1	    history2   history2  history2



## **OIL ANALYSIS REPORT**



A Truck Repair 9349 China Grove Church Road Pineville, NC US 28134 Contact: Vlad Melnichuk shop@migway.com T: (980)255-3200 Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012) F:

history1

NONE

NONE

NONE

NONE

NONE

NONE

NORML

NORML

history

NEG

NEG

12.8

history2

history2

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