

## **OIL ANALYSIS REPORT**

#### Sample Rating Trend



1908 Component

Machine Id

#### Diesel Engine Fluid DIESEL ENGINE OIL SAE 5W30 (--- QTS)

#### DIAGNOSIS

#### Recommendation

Resample at the next service interval to monitor.

#### Wear

All component wear rates are normal.

#### Contamination

There is no indication of any contamination in the oil.

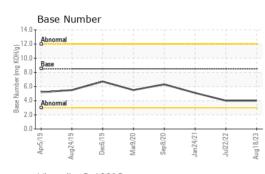
### Fluid Condition

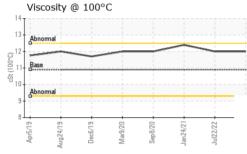
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

Sample Date     Client Info     18 Aug 2023     22 Jul 2022     24 Jan 2021       Machine Age     mis     Client Info     559317     453354     303814       Oil Age     mis     Client Info     Changed     Changed     Changed       Sample Status     Client Info     Changed     NORMAL     NORMAL     NORMAL       CONTAMINATION     method     imit/base     current     history1     history2       Fuel     WC Method     >5     <1.0     <1.0     <1.0       Glycol     WC Method     >5     <1.0     <1.0     <1.0       Glycol     WC Method     NEG     NEG     NEG     NEG       Vical     MSTM D5185m     >100     50     42     26       Chromium     ppm     ASTM D5185m     >20     <1     <1     <1       Nickel     ppm     ASTM D5185m     >20     8     9     6       Biver     ppm     ASTM D5185m     >30     0     <1     2       Nickel     ppm <th></th> <th>IATION</th> <th>method</th> <th></th> <th></th> <th></th> <th>history2</th>		IATION	method				history2
Sample Date     Client Info     18 Aug 2023     22 Jul 2022     24 Jan 2021       Machine Age     mis     Client Info     559317     453354     303814       Oil Age     mis     Client Info     50000     100000     Changed       Sample Status     Client Info     Changed     NORMAL     NORMAL     NORMAL       CONTAMINATION     method     limit/base     current     history1     history2       Fuel     WC Method     >5     <1.0     <1.0     <1.0       Glycol     WC Method     >5     <1.0     <1.0     <1.0       Glycol     WC Method     NEG     NEG     NEG       Vical     MSTM D5185m     >20     <1     <1     <1       Chromium     ppm     ASTM D5185m     >20     <1     <1     <1       Nickel     ppm     ASTM D5185m     >20     <1     <1     <1       Nickel     ppm     ASTM D5185m     >20     <8     9     <6       Barinum     ppm     ASTM	Sample Number		Client Info		WC0814847	WC0686081	WC0509603
Machine Age     mis     Client Info     559317     453354     303814       Oil Age     mis     Client Info     50000     100000     100000       Oil Age     mis     Client Info     S0000     100000     100000       Sample Status      NORMAL     NORMAL     NORMAL     NORMAL       CONTAMINATION     method     Imit/base     current     history1     history2       Fuel     WC Method     >5     <1.0     <1.0     <1.0       Glycol     WC Method     NEG     NEG     NEG       WEAR METALS     method     Imit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >20     <1     <1     <1       Nickel     ppm     ASTM D5185m     >3     0     <1     <1       Silver     ppm     ASTM D5185m     >20     8     9     6       Auminum     ppm     ASTM D5185m     >21     0     0     0       Copper     ppm <th>Sample Date</th> <th></th> <th>Client Info</th> <th></th> <th>18 Aug 2023</th> <th>22 Jul 2022</th> <th>24 Jan 2021</th>	Sample Date		Client Info		18 Aug 2023	22 Jul 2022	24 Jan 2021
Oil Changed Client Info Changed NORMAL Changed NORMAL Changed NORMAL Changed NORMAL Changed NORMAL   CONTAMINATION method limit/base current history1 history2   Fuel WC Method >5 <1.0 <1.0 <1.0   Glycol WC Method >5 <1.0 <1.0 <1.0   WEAR METALS method limit/base current history1 history2   Kron ppm ASTM D5185m >100 50 42 26   Chromium ppm ASTM D5185m >20 <1 <1 <1   Nickel ppm ASTM D5185m >20 <1 <1 <1   Nickel ppm ASTM D5185m >20 8 9 6   Lead ppm ASTM D5185m >20 8 9 6   Lead ppm ASTM D5185m >30 4 4 5   Tin ppm ASTM D5185m >30 4 4 5   Automium ppm ASTM D5185m <1 1 0   Copper ppm ASTM D5185m <1 0 0   Cadmium ppm ASTM D5	Machine Age	mls	Client Info		-	453354	303814
Sample Status     NORMAL     NORMAL     NORMAL     NORMAL     NORMAL       CONTAMINATION     method     limit/base     current     history1     history2       Fuel     WC Method     >5     <1.0     <1.0     <1.0       Glycol     WC Method     NEG     NEG     NEG       WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >100     50     42     26       Chromium     ppm     ASTM D5185m     >4     0     <1     1       Nickel     ppm     ASTM D5185m     >4     0     <1     2     <1       Silver     ppm     ASTM D5185m     >40     <1     2     <1     Copper       Tin     ppm     ASTM D5185m     >33     0     0     0     0       Adaminum     ppm     ASTM D5185m     >41     0     0     0       Copper     ppm     ASTM D5185m     <1     0     0 </th <th>Oil Age</th> <th>mls</th> <th>Client Info</th> <th></th> <th>50000</th> <th>100000</th> <th>100000</th>	Oil Age	mls	Client Info		50000	100000	100000
CONTAMINATION     method     limit/base     current     history1     history2       Fuel     WC Method     >5     <1.0     <1.0     <1.0       Glycol     WC Method     NEG     NEG     NEG       VecAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >100     50     42     26       Chromium     ppm     ASTM D5185m     >20     <1     <1     <1       Nickel     ppm     ASTM D5185m     >4     0     <1     <1       Silver     ppm     ASTM D5185m     >3     0     0     <1       Aluminum     ppm     ASTM D5185m     >20     8     9     6       Lead     ppm     ASTM D5185m     >30     4     4     5       Tin     ppm     ASTM D5185m     >11     1     0       Antimony     ppm     ASTM D5185m     <1     1     0       Addminum     ppm	Oil Changed		Client Info		Changed	Changed	Changed
Fuel     WC Method     >5     <1.0	Sample Status				NORMAL	NORMAL	NORMAL
Glycol     WC Method     NEG     NEG     NEG     NEG       WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >100     50     42     26       Chromium     ppm     ASTM D5185m     >20     <1     <1     <1       Nickel     ppm     ASTM D5185m     >4     0     <1     <1       Silver     ppm     ASTM D5185m     >20     8     9     6       Lead     ppm     ASTM D5185m     >20     8     9     6       Lead     ppm     ASTM D5185m     >20     8     9     6       Lead     ppm     ASTM D5185m     <1     1     0     0       Antimony     ppm     ASTM D5185m     <-1     0     0     0       Cadmium     pm     ASTM D5185m     <-1     0     0     0       Astm D5185m     100     68     65     64  Mandium     pm	CONTAMINATION	٧	method	limit/base	current	history1	history2
WEAR METALS     method     limit/base     current     history1     history2       Iron     ppm     ASTM D5185m     >100     50     42     26       Chromium     ppm     ASTM D5185m     >20     <1     <1     <1       Nickel     ppm     ASTM D5185m     >20     <1     <1     <1       Silver     ppm     ASTM D5185m     >3     0     0     <1       Badd     ppm     ASTM D5185m     >3     0     0     <1       Copper     ppm     ASTM D5185m     >20     8     9     6       Lead     ppm     ASTM D5185m     >20     8     9     6       Lead     ppm     ASTM D5185m     >330     4     4     5       Copper     ppm     ASTM D5185m     >15     <1     1     0       Cadmium     ppm     ASTM D5185m     <1     0     0     0       Cadmium     ppm     ASTM D5185m     150     1182     1156	Fuel		WC Method	>5	<1.0	<1.0	<1.0
Iron     ppm     ASTM D5185m     >100     50     42     26       Chromium     ppm     ASTM D5185m     >20     <1     <1     <1       Nickel     ppm     ASTM D5185m     >4     0     <1     <1       Nickel     ppm     ASTM D5185m     >3     0     0     <1       Aluminum     ppm     ASTM D5185m     >30     0     <1     2       Aluminum     ppm     ASTM D5185m     >30     4     4     5       Lead     ppm     ASTM D5185m     >40     <1     2     <1       Copper     ppm     ASTM D5185m     >40     <1     0     0       Cadmium     ppm     ASTM D5185m     >15     <1     1     0       Cadmium     ppm     ASTM D5185m     <1     0     0     0       Cadmium     ppm     ASTM D5185m     100     68     65     64       Manganese     ppm     ASTM D5185m     110     0     0 <th>Glycol</th> <th></th> <th>WC Method</th> <th></th> <th>NEG</th> <th>NEG</th> <th>NEG</th>	Glycol		WC Method		NEG	NEG	NEG
Chromium     ppm     ASTM D5185m     >20     <1	WEAR METALS		method	limit/base	current	history1	history2
Nickel     ppm     ASTM D5185m     >4     0     <1	Iron	ppm	ASTM D5185m	>100	50	42	26
Titanium     ppm     ASTM D5185m     <1	Chromium	ppm	ASTM D5185m	>20	<1	<1	<1
Silver     ppm     ASTM D5185m     >3     0     0     <1	Nickel	ppm	ASTM D5185m	>4	0	<1	<1
Aluminum     ppm     ASTM D5185m     >20     8     9     6       Lead     ppm     ASTM D5185m     >40     <1     2     <1       Copper     ppm     ASTM D5185m     >330     4     4     5       Tin     ppm     ASTM D5185m     >15     <1     1     0       Antimony     ppm     ASTM D5185m     <1     0     0     0       Vanadium     ppm     ASTM D5185m     <1     0     0     0       Cadmium     ppm     ASTM D5185m     <1     0     0     0       ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     10     0     0     0       Magnesium     ppm     ASTM D5185m     100     68     65     64       Magnesium     ppm     ASTM D5185m     100     6     1182     1156     1191       Calcium     ppm     ASTM D5185m     1300     134	Titanium	ppm	ASTM D5185m		<1	2	<1
Lead     ppm     ASTM D5185m     >40     <1	Silver	ppm	ASTM D5185m	>3	0	0	<1
Copper     ppm     ASTM D5185m     >330     4     4     5       Tin     ppm     ASTM D5185m     >15     <1     1     0       Antimony     ppm     ASTM D5185m       2       Vanadium     ppm     ASTM D5185m     <1     0     0       Cadmium     ppm     ASTM D5185m     <1     0     0       ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     10     0     0     0       Magnese     ppm     ASTM D5185m     100     68     65     64       Magnese     ppm     ASTM D5185m     1182     1156     1191       Calcium     ppm     ASTM D5185m     450     1182     1356     1191       Calcium     ppm     ASTM D5185m     1350     1342     1335     1266       Sulfur     ppm     ASTM D5185m     250     3597     3720     2598 <td< th=""><th>Aluminum</th><th>ppm</th><th>ASTM D5185m</th><th>&gt;20</th><th>8</th><th>9</th><th>6</th></td<>	Aluminum	ppm	ASTM D5185m	>20	8	9	6
Tin     ppm     ASTM D5185m     >15     <1	Lead	ppm	ASTM D5185m	>40	<1	2	<1
Antimony     ppm     ASTM D5185m       2       Vanadium     ppm     ASTM D5185m     <1     0     0       Cadmium     ppm     ASTM D5185m     0     0     0       ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     250     8     7     10       Barium     ppm     ASTM D5185m     250     8     7     10       Barium     ppm     ASTM D5185m     10     0     0     0       Molybdenum     ppm     ASTM D5185m     100     68     65     64       Magnesium     ppm     ASTM D5185m     1182     1156     1191       Calcium     ppm     ASTM D5185m     3000     905     976     922       Phosphorus     ppm     ASTM D5185m     150     1114     1038     1066       Sulfur     ppm     ASTM D5185m     150     3597     3720     2598	Copper	ppm	ASTM D5185m	>330	4	4	5
Vanadium     ppm     ASTM D5185m     <1	Tin	ppm	ASTM D5185m	>15	<1	1	0
Cadmium     ppm     ASTM D5185m     0     0     0       ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     250     8     7     10       Barium     ppm     ASTM D5185m     10     0     0     0       Magnesium     ppm     ASTM D5185m     100     68     65     64       Magnesium     ppm     ASTM D5185m     100     68     65     64       Magnesium     ppm     ASTM D5185m     450     1182     1156     1191       Calcium     ppm     ASTM D5185m     3000     905     976     922       Phosphorus     ppm     ASTM D5185m     1350     1342     1335     1266       Sulfur     ppm     ASTM D5185m     1350     1342     1335     1266       Sulfur     ppm     ASTM D5185m     >25     9     8     10       Sodium     ppm     ASTM D5185m     >20     6	Antimony	ppm	ASTM D5185m				2
ADDITIVES     method     limit/base     current     history1     history2       Boron     ppm     ASTM D5185m     250     8     7     10       Barium     ppm     ASTM D5185m     10     0     0     0       Molybdenum     ppm     ASTM D5185m     100     68     65     64       Manganese     ppm     ASTM D5185m     <1     <1     <1     <1       Magnesium     ppm     ASTM D5185m     450     1182     1156     1191       Calcium     ppm     ASTM D5185m     3000     905     976     922       Phosphorus     ppm     ASTM D5185m     1350     1342     1335     1266       Sulfur     ppm     ASTM D5185m     1350     1342     1335     1266       Sulfur     ppm     ASTM D5185m     250     3597     3720     2598       CONTAMINANTS     method     limit/base     current     history1     history2       Sodium     ppm     ASTM D5185m	Vanadium	ppm					
Boron     ppm     ASTM D5185m     250     8     7     10       Barium     ppm     ASTM D5185m     10     0     0     0       Molybdenum     ppm     ASTM D5185m     100     68     65     64       Manganese     ppm     ASTM D5185m     100     68     65     64       Magnesium     ppm     ASTM D5185m     450     1182     1156     1191       Calcium     ppm     ASTM D5185m     450     1182     1356     1191       Calcium     ppm     ASTM D5185m     3000     905     976     922       Phosphorus     ppm     ASTM D5185m     1150     1114     1038     1066       Zinc     ppm     ASTM D5185m     1350     1342     1335     1266       Sulfur     ppm     ASTM D5185m     4250     3597     3720     2598       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m <th>Cadmium</th> <th>ppm</th> <th>ASTM D5185m</th> <th></th> <th>0</th> <th>0</th> <th>0</th>	Cadmium	ppm	ASTM D5185m		0	0	0
Barium     ppm     ASTM D5185m     10     0     0     0       Molybdenum     ppm     ASTM D5185m     100     68     65     64       Manganese     ppm     ASTM D5185m     100     68     65     64       Magnesium     ppm     ASTM D5185m     450     1182     1156     1191       Calcium     ppm     ASTM D5185m     3000     905     976     922       Phosphorus     ppm     ASTM D5185m     1150     1114     1038     1066       Zinc     ppm     ASTM D5185m     1350     1342     1335     1266       Sulfur     ppm     ASTM D5185m     4250     3597     3720     2598       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >25     9     8     10       Sodium     ppm     ASTM D5185m     >20     6     17     18       INFRA-RED     method     limit/base	ADDITIVES		method	limit/base	current	historv1	historv2
Molybdenum     ppm     ASTM D5185m     100     68     65     64       Manganese     ppm     ASTM D5185m     <<1     <1     <1     <1       Magnesium     ppm     ASTM D5185m     450     1182     1156     1191       Calcium     ppm     ASTM D5185m     450     1182     1156     1191       Calcium     ppm     ASTM D5185m     3000     905     976     922       Phosphorus     ppm     ASTM D5185m     1150     1114     1038     1066       Zinc     ppm     ASTM D5185m     1350     1342     1335     1266       Sulfur     ppm     ASTM D5185m     4250     3597     3720     2598       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >20     6     17     18       INFRA-RED     method     limit/base     current     history1     history2  Soot %     %     *ASTM D7844							
Maganese     ppm     ASTM D5185m     <1	Boron	ppm	ASTM D5185m	250	8		
Magnesium     ppm     ASTM D5185m     450     1182     1156     1191       Calcium     ppm     ASTM D5185m     3000     905     976     922       Phosphorus     ppm     ASTM D5185m     1150     1114     1038     1066       Zinc     ppm     ASTM D5185m     1350     1342     1335     1266       Sulfur     ppm     ASTM D5185m     4250     3597     3720     2598       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >25     9     8     10       Sodium     ppm     ASTM D5185m     >25     9     8     10       Sodium     ppm     ASTM D5185m     >20     6     17     18       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >3     1     0.9     0.6       Nitration     Abs/.mm<*ASTM D7624     >20	Boron Barium					7	10
Calcium     ppm     ASTM D5185m     3000     905     976     922       Phosphorus     ppm     ASTM D5185m     1150     1114     1038     1066       Zinc     ppm     ASTM D5185m     1350     1342     1335     1266       Sulfur     ppm     ASTM D5185m     4250     3597     3720     2598       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >25     9     8     10       Sodium     ppm     ASTM D5185m     >25     9     8     10       Sodium     ppm     ASTM D5185m     >25     9     8     10       Sodium     ppm     ASTM D5185m     >20     6     17     18       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >3     1     0.9     0.6       Nitration     Abs/.mm<*ASTM D7624     >20 <td< th=""><th></th><th>ppm</th><th>ASTM D5185m</th><th>10</th><th>0</th><th>7 0</th><th>10 0</th></td<>		ppm	ASTM D5185m	10	0	7 0	10 0
Phosphorus     ppm     ASTM D5185m     1150     1114     1038     1066       Zinc     ppm     ASTM D5185m     1350     1342     1335     1266       Sulfur     ppm     ASTM D5185m     1350     3597     3720     2598       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >25     9     8     10       Sodium     ppm     ASTM D5185m     >25     9     8     10       Sodium     ppm     ASTM D5185m     >25     9     8     10       Sodium     ppm     ASTM D5185m     >20     6     17     18       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >3     1     0.9     0.6       Nitration     Abs/.mm<*ASTM D7624	Barium	ppm ppm	ASTM D5185m ASTM D5185m	10 100	0 68	7 0 65	10 0 64
Zinc     ppm     ASTM D5185m     1350     1342     1335     1266       Sulfur     ppm     ASTM D5185m     4250     3597     3720     2598       CONTAMINANTS     method     limit/base     current     history1     history2       Silicon     ppm     ASTM D5185m     >25     9     8     10       Sodium     ppm     ASTM D5185m     >25     9     8     10       Sodium     ppm     ASTM D5185m     >25     9     8     10       Sodium     ppm     ASTM D5185m     >20     6     17     18       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >3     1     0.9     0.6       Nitration     Abs/cm     *ASTM D7624     >20     14.2     15.2     12.5       Sulfation     Abs/.tmm     *ASTM D7415     >30     28.7     31.3     27.1       FLUID DEGRADATION     method     limit/base	Barium Molybdenum	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	10 100 450	0 68 <1	7 0 65 <1 1156	10 0 64 <1
SulfurppmASTM D5185m4250359737202598CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>259810SodiumppmASTM D5185m>259810SodiumppmASTM D5185m>2061718INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>310.90.6NitrationAbs/cm*ASTM D7624>2014.215.212.5SulfationAbs/.tmm*ASTM D7415>3028.731.327.1FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2	Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	10 100 450	0 68 <1 1182 905	7 0 65 <1 1156 976	10 0 64 <1 1191 922
CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>259810SodiumppmASTM D5185m755PotassiumppmASTM D5185m>2061718INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>310.90.6NitrationAbs/cm*ASTM D7624>2014.215.212.5SulfationAbs/lmm*ASTM D7415>3028.731.327.1FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2	Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	10 100 450 3000 1150	0 68 <1 1182 905 1114	7 0 65 <1 1156 976 1038	10 0 64 <1 1191 922 1066
Silicon     ppm     ASTM D5185m     >25     9     8     10       Sodium     ppm     ASTM D5185m     7     5     5       Potassium     ppm     ASTM D5185m     >20     6     17     18       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >3     1     0.9     0.6       Nitration     Abs/cm     *ASTM D7624     >20     14.2     15.2     12.5       Sulfation     Abs/.tmm     *ASTM D7415     >30     28.7     31.3     27.1       FLUID DEGRADATION     method     limit/base     current     history1     history2	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	10 100 450 3000 1150 1350	0 68 <1 1182 905 1114 1342	7 0 65 <1 1156 976 1038 1335	10 0 64 <1 1191 922 1066 1266
Sodium     ppm     ASTM D5185m     7     5     5       Potassium     ppm     ASTM D5185m     >20     6     17     18       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >3     1     0.9     0.6       Nitration     Abs/cm     *ASTM D7624     >20     14.2     15.2     12.5       Sulfation     Abs/.tmm     *ASTM D7415     >30     28.7     31.3     27.1       FLUID DEGRADATION     method     limit/base     current     history1     history2	Barium 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	10 100 450 3000 1150 1350	0 68 <1 1182 905 1114 1342	7 0 65 <1 1156 976 1038 1335	10 0 64 <1 1191 922 1066 1266
Potassium     ppm     ASTM D5185m     >20     6     17     18       INFRA-RED     method     limit/base     current     history1     history2       Soot %     %     *ASTM D7844     >3     1     0.9     0.6       Nitration     Abs/cm     *ASTM D7624     >20     14.2     15.2     12.5       Sulfation     Abs/.1mm     *ASTM D7415     >30     28.7     31.3     27.1       FLUID DEGRADATION     method     limit/base     current     history1     history2	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	10 100 450 3000 1150 1350 4250	0 68 <1 1182 905 1114 1342 3597 current	7 0 65 <1 1156 976 1038 1335 3720 history1	10 0 64 <1 1191 922 1066 1266 2598 history2
INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>310.90.6NitrationAbs/cm*ASTM D7624>2014.215.212.5SulfationAbs/.1mm*ASTM D7415>3028.731.327.1FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	10 100 450 3000 1150 1350 4250 <b>limit/base</b>	0 68 <1 1182 905 1114 1342 3597 current 9	7 0 65 <1 1156 976 1038 1335 3720 history1 8	10 0 64 <1 1191 922 1066 1266 2598 history2 10
Soot %     %     *ASTM D7844     >3     1     0.9     0.6       Nitration     Abs/cm     *ASTM D7624     >20     14.2     15.2     12.5       Sulfation     Abs/.1mm     *ASTM D7415     >30     28.7     31.3     27.1       FLUID DEGRADATION     method     limit/base     current     history1     history2	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m	10 100 450 3000 1150 1350 4250 limit/base >25	0 68 <1 1182 905 1114 1342 3597 current 9 7	7 0 65 <1 1156 976 1038 1335 3720 history1 8 5	10 0 64 <1 1191 922 1066 1266 2598 history2 10 5
Nitration     Abs/cm     *ASTM D7624     >20     14.2     15.2     12.5       Sulfation     Abs/.1mm     *ASTM D7415     >30     28.7     31.3     27.1       FLUID DEGRADATION     method     limit/base     current     history1     history2	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b> ASTM D5185m	10 100 450 3000 1150 1350 4250 limit/base >25	0 68 <1 1182 905 1114 1342 3597 current 9 7	7 0 65 <1 1156 976 1038 1335 3720 history1 8 5	10 0 64 <1 1191 922 1066 1266 2598 history2 10 5
Sulfation     Abs/.1mm     *ASTM D7415     >30     28.7     31.3     27.1       FLUID DEGRADATION     method     limit/base     current     history1     history2	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	10 100 450 3000 1150 1350 4250 imit/base >25 >20 imit/base	0 68 <1 1182 905 1114 1342 3597 current 9 7 6 current	7 0 65 <1 1156 976 1038 1335 3720 history1 8 5 17 history1	10 0 64 <1 1191 922 1066 1266 2598 history2 10 5 18 18 history2
FLUID DEGRADATION method limit/base current history1 history2	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot %	ppm	ASTM D5185m ASTM D5185m	10 100 450 3000 1150 1350 4250 <b>limit/base</b> >25 >20 <b>limit/base</b> >3	0 68 <1 1182 905 1114 1342 3597 current 9 7 6 current 1	7 0 65 <1 1156 976 1038 1335 3720 history1 8 5 17 history1 0.9	10 0 64 <1 1191 922 1066 1266 2598 history2 10 5 18 history2 0.6
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	10 100 450 3000 1150 1350 4250 <b>imit/base</b> >25 >20 <b>imit/base</b> >3 >20	0 68 <1 1182 905 1114 1342 3597 <u>current</u> 9 7 6 6 <u>current</u> 1 1	7 0 65 <1 1156 976 1038 1335 3720 history1 8 5 17 8 5 17 history1 0.9 15.2	10 0 64 <1 1191 922 1066 1266 2598 history2 10 5 18 history2 0.6 12.5
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	10 100 450 3000 1150 1350 4250 <b>imit/base</b> >25 >20 <b>imit/base</b> >3 >20	0 68 <1 1182 905 1114 1342 3597 <u>current</u> 9 7 6 6 <u>current</u> 1 1	7 0 65 <1 1156 976 1038 1335 3720 history1 8 5 17 8 5 17 history1 0.9 15.2	10 0 64 <1 1191 922 1066 1266 2598 history2 10 5 18 history2 0.6 12.5
Oxidation     Abs/.1mm     *ASTM D7414     >25     30.4     32.1     27.4	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	10 100 450 3000 1150 1350 4250 imit/base >25 >20 imit/base >3 >20 >30	0 68 <1 1182 905 1114 1342 3597 current 9 7 6 current 1 14.2 28.7	7 0 65 <1 1156 976 1038 1335 3720 history1 8 5 17 history1 0.9 15.2 31.3	10 0 64 <1 1191 922 1066 1266 2598 history2 10 5 18 history2 0.6 12.5 27.1
Base Number (BN)     mg KOH/g     ASTM D2896     8.5     4.0     4.0     5.1	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	10 100 450 3000 1150 1350 4250 imit/base >25 >20 imit/base >3 >20 >30	0 68 <1 1182 905 1114 1342 3597 current 9 7 6 current 1 14.2 28.7	7 0 65 <1 1156 976 1038 1335 3720 history1 8 5 17 history1 0.9 15.2 31.3	10 0 64 <1 1191 922 1066 1266 2598 history2 10 5 18 history2 0.6 12.5 27.1



# **OIL ANALYSIS REPORT**

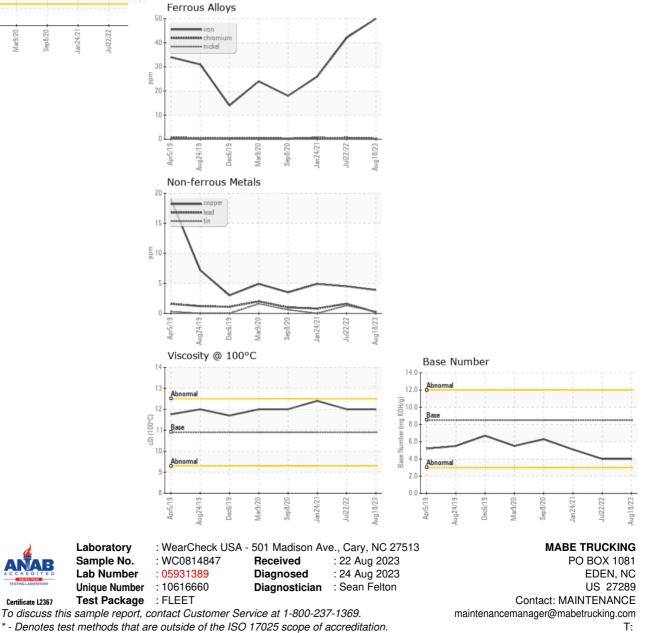




Certificate L2367

Report Id: MABEDE [WUSCAR] 05931389 (Generated: 08/24/2023 12:07:09) Rev: 1

VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG
FLUID PROPERT	IES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	10.9	12.0	12.0	12.4
GRAPHS						



F: (336)635-1791