

# **OIL ANALYSIS REPORT**

EMD 203 Component

**Diesel Engine** 

NOT GIVEN (--- GAL)

### **DIAGNOSIS**

### Recommendation

No corrective action is recommended at this time. Resample at the next service interval to monitor.

All component wear rates are normal.

### Contamination

Elemental level of sodium (Na) and/or boron (B) indicates a possible cooling water leak.

### ▲ Fluid Condition

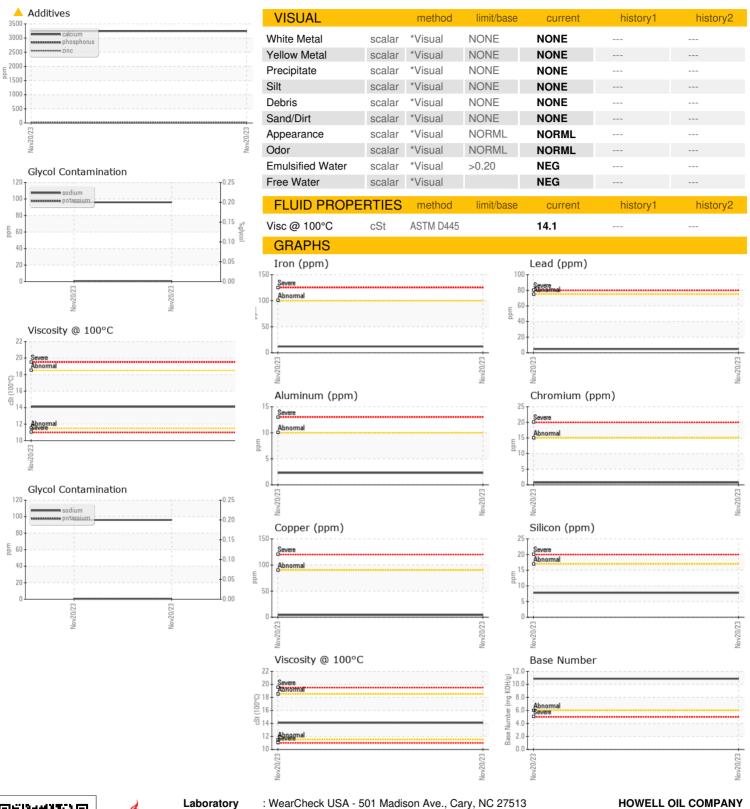
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

Sample	Rating Trend		GI	YCOL
	No.202	3		
hod	limit/base	current	history1	history

Sample Number         Client Info         PCA0092750					Nov2023		
Client Info	SAMPLE INFORM	IATION	method	limit/base	current	history1	history2
Machine Age         hrs         Client Info         0	Sample Number		Client Info		PCA0092750		
Dil Age	Sample Date		Client Info		20 Nov 2023		
Oil Changed Sample Status         Client Info         N/A   <	Machine Age	hrs	Client Info		0		
CONTAMINATION   method   limit/base   current   history1   history2	Oil Age	hrs	Client Info		0		
ATTENTION   CONTAMINATION   method   limit/base   current   history1   history2	-		Client Info		N/A		
Fuel	-				ATTENTION		
Water	·	NC	method	limit/base	current	history1	history2
WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         12             Chromium         ppm         ASTM D5185m         >15         <1							
WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         12             Chromium         ppm         ASTM D5185m         >5         <1							
Iron					-		
Chromium	WEAR METALS	5	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>100	12		
Titanium	Chromium	ppm	ASTM D5185m	>15	<1		
Silver	Nickel	ppm	ASTM D5185m	>5	<1		
Aluminum         ppm         ASTM D5185m         >10         2             Lead         ppm         ASTM D5185m         >75         5             Copper         ppm         ASTM D5185m         >90         4             Tin         ppm         ASTM D5185m         0             Vanadium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         0             ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0             Barium         ppm         ASTM D5185m         0             Molybdenum         ppm         ASTM D5185m         35             Manganese         ppm         ASTM D5185m         12             Magnesium         ppm         ASTM D5185m         3244             Phosphorus         ppm         ASTM D5185m <t< td=""><td>Titanium</td><td>ppm</td><td>ASTM D5185m</td><td></td><td>0</td><td></td><td></td></t<>	Titanium	ppm	ASTM D5185m		0		
Lead         ppm         ASTM D5185m         >75         5             Copper         ppm         ASTM D5185m         >90         4             Tin         ppm         ASTM D5185m         30         4             Vanadium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         0             ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0             Barium         ppm         ASTM D5185m         0             Molybdenum         ppm         ASTM D5185m         35             Magnesium         ppm         ASTM D5185m         12             Magnesium         ppm         ASTM D5185m         3244             Phosphorus         ppm         ASTM D5185m         0         0             Sulfur         ppm         ASTM D5185m	Silver	ppm	ASTM D5185m	>2	0		
Lead         ppm         ASTM D5185m         >75         5             Copper         ppm         ASTM D5185m         >90         4             Tin         ppm         ASTM D5185m         30         4             Vanadium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         0             ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         49             Barium         ppm         ASTM D5185m         0             Molybdenum         ppm         ASTM D5185m         35              Manganese         ppm         ASTM D5185m         12              Magnesium         ppm         ASTM D5185m         3244              Zinc         ppm         ASTM D5185m         3244	Aluminum	ppm	ASTM D5185m	>10	2		
Copper         ppm         ASTM D5185m         >90         4             Tin         ppm         ASTM D5185m         >30         4             Vanadium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         0             ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         49             Barium         ppm         ASTM D5185m         0             Molybdenum         ppm         ASTM D5185m         35              Manganese         ppm         ASTM D5185m         <1	Lead		ASTM D5185m	>75	5		
Trin	Copper		ASTM D5185m	>90	4		
Vanadium         ppm         ASTM D5185m         0             ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         49             Barium         ppm         ASTM D5185m         0             Molybdenum         ppm         ASTM D5185m         35             Manganese         ppm         ASTM D5185m         12             Magnesium         ppm         ASTM D5185m         12             Calcium         ppm         ASTM D5185m         16             Phosphorus         ppm         ASTM D5185m         4         0             Zinc         ppm         ASTM D5185m         4         0             Sulfur         ppm         ASTM D5185m         >17         8             CONTAMINANTS         method         limit/base         current         history1         history2           Solicon         ppm         ASTM	Tin			>30	4		
Cadmium         ppm         ASTM D5185m         0             ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         49             Barium         ppm         ASTM D5185m         0             Molybdenum         ppm         ASTM D5185m         35             Manganese         ppm         ASTM D5185m         12             Magnesium         ppm         ASTM D5185m         12             Calcium         ppm         ASTM D5185m         3244             Phosphorus         ppm         ASTM D5185m         4         0             Zinc         ppm         ASTM D5185m         2849              Sulfur         ppm         ASTM D5185m         >17         8             CONTAMINANTS         method         limit/base         current         history1         history2           Solicon         ppm <td< td=""><td>Vanadium</td><td></td><td>ASTM D5185m</td><td></td><td>0</td><td></td><td></td></td<>	Vanadium		ASTM D5185m		0		
ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         49             Barium         ppm         ASTM D5185m         0             Molybdenum         ppm         ASTM D5185m         35             Manganese         ppm         ASTM D5185m         <1	Cadmium		ASTM D5185m		0		
Boron	ADDITIVES		mothod	limit/baco	current	history1	hictory?
Barium         ppm         ASTM D5185m         0             Molybdenum         ppm         ASTM D5185m         35             Manganese         ppm         ASTM D5185m         12             Calcium         ppm         ASTM D5185m         3244             Phosphorus         ppm         ASTM D5185m         16             Zinc         ppm         ASTM D5185m         0             Sulfur         ppm         ASTM D5185m         2849             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >17         8             Sodium         ppm         ASTM D5185m         >20         <1             Potassium         ppm         ASTM D5185m         >20         <1             Glycol         %         "ASTM D585m         >20         <1             Rotasium         ppm				IIIIIIIIIIIII			
Molybdenum         ppm         ASTM D5185m         35             Magnesium         ppm         ASTM D5185m         12             Calcium         ppm         ASTM D5185m         3244             Phosphorus         ppm         ASTM D5185m         16             Zinc         ppm         ASTM D5185m         0             Sulfur         ppm         ASTM D5185m         2849             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >17         8             Sodium         ppm         ASTM D5185m         >20         <1							
Manganese         ppm         ASTM D5185m         <1             Magnesium         ppm         ASTM D5185m         12             Calcium         ppm         ASTM D5185m         3244             Phosphorus         ppm         ASTM D5185m         16             Zinc         ppm         ASTM D5185m         2849             Sulfur         ppm         ASTM D5185m         2849             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >17         8             Sodium         ppm         ASTM D5185m         >20         <1             Potassium         ppm         ASTM D5185m         >20         <1             Glycol         *ASTM D5185m         >20         <1             Bridge         *ASTM D5185m         >20         <1             Glycol         *ASTM D5185m         >3		ppm					
Magnesium         ppm         ASTM D5185m         12             Calcium         ppm         ASTM D5185m         3244             Phosphorus         ppm         ASTM D5185m         16             Zinc         ppm         ASTM D5185m         0             Sulfur         ppm         ASTM D5185m         2849             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >17         8             Sodium         ppm         ASTM D5185m         >20         <1             Potassium         ppm         ASTM D5185m         >20         <1             Glycol         %         *ASTM D5185m         >20         <1             Glycol         %         *ASTM D5185m         >20         <1             Glycol         %         *ASTM D5185m         >20         <1             Bist							
Calcium         ppm         ASTM D5185m         3244             Phosphorus         ppm         ASTM D5185m         ▲ 16             Zinc         ppm         ASTM D5185m         2849             Sulfur         ppm         ASTM D5185m         2849             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >17         8             Sodium         ppm         ASTM D5185m         >20         <1		ppm					
Phosphorus         ppm         ASTM D5185m         ▲ 16             Zinc         ppm         ASTM D5185m         ▲ 0             Sulfur         ppm         ASTM D5185m         2849             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >17         8             Sodium         ppm         ASTM D5185m         >20         <1             Potassium         ppm         ASTM D5185m         >20         <1             Glycol         %         *ASTM D5185m         >20         <1             Glycol         %         *ASTM D5185m         >20         <1             INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3             Sulfation         Abs/.1mm         *ASTM D7415         >30         15.5	Magnesium	ppm	ASTM D5185m		12		
Zinc         ppm         ASTM D5185m         ▲ 0             Sulfur         ppm         ASTM D5185m         2849             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >17         8             Sodium         ppm         ASTM D5185m         >20         <1	Calcium	ppm	ASTM D5185m		3244		
Sulfur         ppm         ASTM D5185m         2849             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >17         8             Sodium         ppm         ASTM D5185m         >20              Potassium         ppm         ASTM D5185m         >20         <1	Phosphorus	ppm	ASTM D5185m		<u> </u>		
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >17         8             Sodium         ppm         ASTM D5185m         4         96             Potassium         ppm         ASTM D5185m         >20         <1	Zinc	ppm	ASTM D5185m		<u> </u>		
Silicon         ppm         ASTM D5185m         >17         8             Sodium         ppm         ASTM D5185m         ▲ 96             Potassium         ppm         ASTM D5185m         >20         <1             Glycol         %         *ASTM D2982         NEG             INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3             Nitration         Abs/cm         *ASTM D7624         >20         8.7             Sulfation         Abs/.1mm         *ASTM D7415         >30         15.5             FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         8.3	Sulfur	ppm	ASTM D5185m		2849		
Sodium         ppm         ASTM D5185m         ● 96             Potassium         ppm         ASTM D5185m         >20         <1             Glycol         %         *ASTM D2982         NEG             INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3             Nitration         Abs/cm         *ASTM D7624         >20         8.7             Sulfation         Abs/.1mm         *ASTM D7415         >30         15.5             FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         8.3	CONTAMINANT	S	method	limit/base	current	history1	history2
Potassium         ppm         ASTM D5185m         >20         <1             Glycol         %         *ASTM D2982         NEG             INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3             Nitration         Abs/cm         *ASTM D7624         >20         8.7             Sulfation         Abs/.1mm         *ASTM D7415         >30         15.5             FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         8.3	Silicon	ppm	ASTM D5185m	>17	8		
Soot %	Sodium	ppm	ASTM D5185m		<b>4</b> 96		
INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.3             Nitration         Abs/cm         *ASTM D7624         >20         8.7             Sulfation         Abs/.1mm         *ASTM D7415         >30         15.5             FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         8.3	Potassium	ppm	ASTM D5185m	>20	<1		
Soot %         %         *ASTM D7844 >3         0.3             Nitration         Abs/cm         *ASTM D7624 >20         8.7             Sulfation         Abs/.1mm         *ASTM D7415 >30         15.5             FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414 >25         8.3	Glycol	%	*ASTM D2982		NEG		
Nitration         Abs/cm         *ASTM D7624         >20         8.7             Sulfation         Abs/.1mm         *ASTM D7415         >30         15.5             FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         8.3	INFRA-RED		method	limit/base	current	history1	history2
Nitration         Abs/cm         *ASTM D7624         >20         8.7             Sulfation         Abs/.1mm         *ASTM D7415         >30         15.5             FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         8.3	Soot %	%	*ASTM D7844	>3	0.3		
Sulfation         Abs/.1mm         *ASTM D7415         >30         15.5             FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         8.3							
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 8.3							
Oxidation							
						nistory1	nistory2
Base Number (BN) mg KOH/g ASTM D2896 10.87	Out de tiene	Ahe/1mm	*A QTM D7/11/	- 25	0.2		
				>23			



## **OIL ANALYSIS REPORT**







Certificate L2367

Laboratory Sample No. Lab Number **Unique Number** 

: PCA0092750 : 06014177

: 10753321

Received : 21 Nov 2023 Diagnosed

: 24 Nov 2023 Diagnostician : Doug Bogart

Test Package : MOB 2 ( Additional Tests: Glycol ) To discuss this sample report, contact Customer Service at 1-800-237-1369.

\* - Denotes test methods that are outside of the ISO 17025 scope of accreditation. Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012) **HOWELL OIL COMPANY** 

808 NW 12TH ST BELLE GLADE, FL US 33430 Contact: JARED HOWELL

jared@howelloil.com

T: (561)261-9378

Contact/Location: JARED HOWELL - HOWBELFL