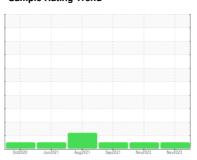


# **OIL ANALYSIS REPORT**

Sample Rating Trend



**NORMAL** 



## Machine Id Rose (S/N 2XR03265)

**Starboard Diesel Engine** 

SHELL ROTELLA T4 15W40 (--- GAL)

#### Recommendation

Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor.

### Wear

All component wear rates are normal.

#### Contamination

Test for glycol is negative. There is no indication of any contamination in the oil.

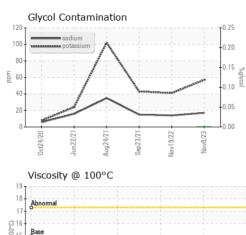
#### **Fluid Condition**

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

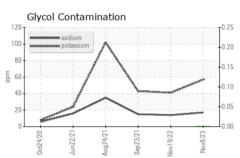
SAMPLE INFORMATION   method   limit/base   current   history1   history2			Oct2020	Jun2021 Aug2021	Sep2021 Nov2022	Nov2023	
Sample Date	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Sample Date	Sample Number		Client Info		WC0881046	WC0762461	WC0626860
Oil Age         hrs         Client Info         100         45         30           Oil Changed         Changed         Changed         Changed         Changed         Changed           Sample Status         NORMAL         NORMAL         NORMAL         NORMAL         NORMAL           CONTAMINATION         method         limit/base         current         history1         history2           Fuel         WC Method         >5         <1.0	Sample Date		Client Info		08 Nov 2023	19 Nov 2022	23 Sep 2021
Oil Changed Sample Status         Client Info         Changed NORMAL         Change And NoRMAL         Changed NoRMANAL         Change And NoRMANAL         Change And NoRMANAL </th <th>Machine Age</th> <th>hrs</th> <th>Client Info</th> <th></th> <th>5380</th> <th>1264</th> <th>1187</th>	Machine Age	hrs	Client Info		5380	1264	1187
Sample Status	Oil Age	hrs	Client Info		100	45	30
CONTAMINATION         method         limit/base         current         history1         history2           Fuel         WC Method         >5         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0         <1.0	Oil Changed		Client Info		Changed	Changed	Changed
Fuel   WC Method   S5						Ü	Ü
Water         WC Method         >0.2         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         14         17         14           Chromium         ppm         ASTM D5185m         >20         <1         1         <1           Nickel         ppm         ASTM D5185m         >4         0         1         <1           Silver         ppm         ASTM D5185m         >4         0         0         <2           Aluminum         ppm         ASTM D5185m         >40         0         0         <1           Lead         ppm         ASTM D5185m         >40         0         0         <1           Tin         ppm         ASTM D5185m         >40         0         0         <1         <1           Antimony         ppm         ASTM D5185m         >40         0         <1         <1         <1           Vanadium         ppm         ASTM D5185m         >13         2         <1         <1         <1           ADDITIVES         method         limit/base <td< th=""><th>CONTAMINATION</th><th>١</th><th>method</th><th>limit/base</th><th>current</th><th>history1</th><th>history2</th></td<>	CONTAMINATION	١	method	limit/base	current	history1	history2
WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >10.0         14         17         14           Chromium         ppm         ASTM D5185m         >20         <1         1         <1           Nickel         ppm         ASTM D5185m         >0         0         <1         <1           Sliver         ppm         ASTM D5185m         >3         0         0         2           Aluminum         ppm         ASTM D5185m         >30         0         0         <1           Lead         ppm         ASTM D5185m         >40         0         0         <1           Lead         ppm         ASTM D5185m         >33.0         4         6         10           Tin         ppm         ASTM D5185m         >15         0         <1         <1           Vanadium         ppm         ASTM D5185m         0         <1         <1         <1           Cadmium         ppm         ASTM D5185m         0         <1         <1         <1           Cadmium         ppm         ASTM D5185m         0         0         <1	Fuel		WC Method	>5	<1.0	<1.0	<1.0
Iron	Water		WC Method	>0.2	NEG	NEG	NEG
Chromium         ppm         ASTM D5185m         >20         <1	WEAR METALS		method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>100	14	17	14
Titanium	Chromium	ppm	ASTM D5185m	>20	<1	1	<1
Stilver	Nickel	ppm	ASTM D5185m	>4	0	1	<1
Silver         ppm         ASTM D5185m         >3         0         0         2           Aluminum         ppm         ASTM D5185m         >20         <1	Titanium		ASTM D5185m		0	0	<1
Aluminum	Silver		ASTM D5185m	>3	0	0	2
Lead         ppm         ASTM D5185m         >40         0         0         <1	Aluminum		ASTM D5185m	>20	<1	1	1
Copper         ppm         ASTM D5185m         >330         4         6         10           Tin         ppm         ASTM D5185m         >15         0         <1         <1           Antimony         ppm         ASTM D5185m           <1           Vanadium         ppm         ASTM D5185m         0         <1         <1           Cadmium         ppm         ASTM D5185m         0         0         <1           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         0         0           Barium         ppm         ASTM D5185m         0         0         0           Molybdenum         ppm         ASTM D5185m         5         13         2           Manganese         ppm         ASTM D5185m         35         12         14           Calcium         ppm         ASTM D5185m         35         12         14           Calcium         ppm         ASTM D5185m         1008         966         1010           Zinc         ppm         ASTM D5185m         17         14         14	Lead	ppm	ASTM D5185m	>40	0	0	<1
Tin	Copper		ASTM D5185m	>330	4	6	10
Antimony         ppm         ASTM D5185m           <1	• •	ppm	ASTM D5185m	>15	0	<1	<1
Vanadium         ppm         ASTM D5185m         0         <1	Antimony		ASTM D5185m				<1
Cadmium         ppm         ASTM D5185m         0         0         <1	-		ASTM D5185m		0	<1	<1
Boron	Cadmium		ASTM D5185m		0	0	<1
Barium         ppm         ASTM D5185m         0         0         0           Molybdenum         ppm         ASTM D5185m         5         13         2           Manganese         ppm         ASTM D5185m         0         <1         <1           Magnesium         ppm         ASTM D5185m         35         12         14           Calcium         ppm         ASTM D5185m         2042         2160         2310           Phosphorus         ppm         ASTM D5185m         1008         966         1010           Zinc         ppm         ASTM D5185m         1198         1143         1181           Sulfur         ppm         ASTM D5185m         3772         3757         3174           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         8         12         2           Sodium         ppm         ASTM D5185m         >20         57         41         43           Glycol         %         *ASTM D5185m         >20         57         41         43           Glycol         %         *ASTM D5185m <t< th=""><th>ADDITIVES</th><th></th><th>method</th><th>limit/base</th><th>current</th><th>history1</th><th>history2</th></t<>	ADDITIVES		method	limit/base	current	history1	history2
Barium         ppm         ASTM D5185m         0         0         0           Molybdenum         ppm         ASTM D5185m         5         13         2           Manganese         ppm         ASTM D5185m         0         <1	Boron	maa	ASTM D5185m		135	120	150
Molybdenum         ppm         ASTM D5185m         5         13         2           Manganese         ppm         ASTM D5185m         0         <1	Barium		ASTM D5185m			0	0
Manganese         ppm         ASTM D5185m         0         <1							
Magnesium         ppm         ASTM D5185m         35         12         14           Calcium         ppm         ASTM D5185m         2042         2160         2310           Phosphorus         ppm         ASTM D5185m         1008         966         1010           Zinc         ppm         ASTM D5185m         1198         1143         1181           Sulfur         ppm         ASTM D5185m         3772         3757         3174           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         8         12         2           Sodium         ppm         ASTM D5185m         17         14         15           Potassium         ppm         ASTM D5185m         >20         57         41         43           Glycol         %         *ASTM D5185m         >20         57         41         43           Reg         INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624         >20         6.3         7.6         7.8           Sulf	•						_
Calcium         ppm         ASTM D5185m         2042         2160         2310           Phosphorus         ppm         ASTM D5185m         1008         966         1010           Zinc         ppm         ASTM D5185m         1198         1143         1181           Sulfur         ppm         ASTM D5185m         3772         3757         3174           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         8         12         2           Sodium         ppm         ASTM D5185m         >20         57         41         43           Potassium         ppm         ASTM D5185m         >20         57         41         43           Glycol         %         *ASTM D2982         0.0         NEG         NEG           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624         >20         6.3         7.6         7.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.6         22.6         22.5	•						14
Phosphorus         ppm         ASTM D5185m         1008         966         1010           Zinc         ppm         ASTM D5185m         1198         1143         1181           Sulfur         ppm         ASTM D5185m         3772         3757         3174           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         8         12         2           Sodium         ppm         ASTM D5185m         >20         57         41         43           Potassium         ppm         ASTM D5185m         >20         57         41         43           Glycol         %         *ASTM D2982         0.0         NEG         NEG           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.2         0.2           Nitration         Abs/cm         *ASTM D7624         >20         6.3         7.6         7.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.6         22.6         22.5						2160	2310
Zinc         ppm         ASTM D5185m         1198         1143         1181           Sulfur         ppm         ASTM D5185m         3772         3757         3174           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         8         12         2           Sodium         ppm         ASTM D5185m         >20         57         41         43           Potassium         ppm         ASTM D5185m         >20         57         41         43           Glycol         %         *ASTM D2982         0.0         NEG         NEG           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624         >3         0.1         0.2         0.2           Nitration         Abs/.1mm         *ASTM D7624         >20         6.3         7.6         7.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.6         22.6         22.5           FLUID DEGRADATION         method         limit/base         current         history1					1008	966	1010
Sulfur         ppm         ASTM D5185m         3772         3757         3174           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         8         12         2           Sodium         ppm         ASTM D5185m         >20         57         41         43           Potassium         ppm         ASTM D5185m         >20         57         41         43           Glycol         %         *ASTM D2982         0.0         NEG         NEG           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.2         0.2           Nitration         Abs/.1mm         *ASTM D7624         >20         6.3         7.6         7.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.6         22.6         22.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25							
Silicon         ppm         ASTM D5185m         >25         8         12         2           Sodium         ppm         ASTM D5185m         17         14         15           Potassium         ppm         ASTM D5185m         >20         57         41         43           Glycol         %         *ASTM D2982         0.0         NEG         NEG           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.2         0.2           Nitration         Abs/cm         *ASTM D7624         >20         6.3         7.6         7.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.6         22.6         22.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.6         17.7         18.6	Sulfur		ASTM D5185m		3772	3757	3174
Sodium         ppm         ASTM D5185m         17         14         15           Potassium         ppm         ASTM D5185m         >20         57         41         43           Glycol         %         *ASTM D2982         0.0         NEG         NEG           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.2         0.2           Nitration         Abs/cm         *ASTM D7624         >20         6.3         7.6         7.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.6         22.6         22.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.6         17.7         18.6	CONTAMINANTS		method	limit/base	current	history1	history2
Sodium         ppm         ASTM D5185m         17         14         15           Potassium         ppm         ASTM D5185m         >20         57         41         43           Glycol         %         *ASTM D2982         0.0         NEG         NEG           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.2         0.2           Nitration         Abs/cm         *ASTM D7624         >20         6.3         7.6         7.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.6         22.6         22.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.6         17.7         18.6	Silicon	ppm	ASTM D5185m	>25	8	12	2
Potassium         ppm         ASTM D5185m         >20         57         41         43           Glycol         %         *ASTM D2982         0.0         NEG         NEG           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.2         0.2           Nitration         Abs/cm         *ASTM D7624         >20         6.3         7.6         7.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.6         22.6         22.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.6         17.7         18.6							
Glycol         %         *ASTM D2982         0.0         NEG         NEG           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.1         0.2         0.2           Nitration         Abs/cm         *ASTM D7624         >20         6.3         7.6         7.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.6         22.6         22.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.6         17.7         18.6				>20			
Soot %         %         *ASTM D7844 >3         0.1         0.2         0.2           Nitration         Abs/cm         *ASTM D7624 >20         6.3         7.6         7.8           Sulfation         Abs/.1mm         *ASTM D7415 >30         20.6         22.6         22.5           FLUID DEGRADATION method limit/base current history1 history2           Oxidation         Abs/.1mm         *ASTM D7414 >25         16.6         17.7         18.6	Glycol				0.0	NEG	NEG
Nitration         Abs/cm         *ASTM D7624         >20         6.3         7.6         7.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.6         22.6         22.5           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.6         17.7         18.6	INFRA-RED		method	limit/base	current	history1	history2
Nitration         Abs/cm         *ASTM D7624         >20         6.3         7.6         7.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.6         22.6         22.5           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.6         17.7         18.6	Soot %	%	*ASTM D7844	>3	0.1	0.2	0.2
Sulfation         Abs/.1mm         *ASTM D7415         >30         20.6         22.6         22.5           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         16.6         17.7         18.6							
Oxidation Abs/.1mm *ASTM D7414 >25 <b>16.6</b> 17.7 18.6							
	FLUID DEGRADA	TION	method	limit/base	current	history1	history2
	Oxidation	Abs/.1mm	*ASTM D7414	>25	16.6	17.7	18.6



## **OIL ANALYSIS REPORT**



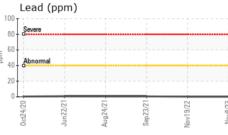
19 T					
18 - Abnorma					
17-					
016 Base					
₹3 14 -					
13 - Abnorma	1				
12					
Oct24/20	22/21	Aug24/21	Sep23/21-	9/22 -	
0ct2	Jun22/	Aug	Sep	Nov19/22	
Glyco	Contam	ination			



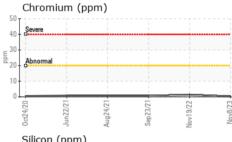
VISUAL		method				history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
<b>Emulsified Water</b>	scalar	*Visual	>0.2	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG
FLUID PROPERT	TIES	method	limit/hasa	current	hietory1	history2

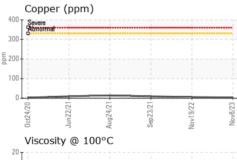
0.5						
Visc @ 100°C	cSt	ASTM D445	15	14.1	14.1	14.6

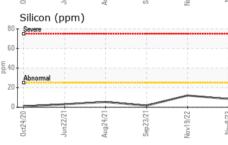
Iron (	ppm)				
Severe					
1		!			
Abnorma	al				
Aprilating		:		:	
120	12/21	121	3/21-	727	/23
0ct24/20	Jun22/	Aug24/	Sep23/	Nov19/2	Nov8/23
	num (p	4		~	

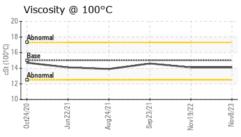


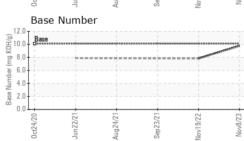
		***************************************		
-			2	
Jun22/2	Aug24/2	Sep23/2	Nov19/2	
	Jun222/21 (ppm)	¬ ∀		_















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

: 10740896

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : WC0881046 : 06007134

Received Diagnosed

: 14 Nov 2023 : 21 Nov 2023

Diagnostician : Doug Bogart

Test Package : MOB 2 ( Additional Tests: Glycol )

\* - Denotes test methods that are outside of the ISO 17025 scope of accreditation.

To discuss this sample report, contact Customer Service at 1-800-237-1369.

**CONTRACTORS SUPPLY** 

17 VIADUCT RD STAMFORD, CT US 06907 Contact: PHIL ZINSER

pzin@optionline.net T: (203)979-2784

Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)