

# Machine Id MTU STBD GEARBOX

## Starboard Gearbox

SAE 15W40 (--- LTR)

### 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**

Viscosity of sample indicates oil is within SAE 30 range, advise investigate. The condition of the oil is acceptable for the time in service.

TestUOMMethodLimit/ACurrentHistory1History2Sample NumberCClient InfoVA0019258							
Sample DateClient Info23 Des 2023 Filter AgeImage: Solution of the solution of	Test	UOM	Method	Limit/Abn	Current	History1	History2
Machine AgehrsClient Info600Oil AgehrsClient Info150Filter AgehrsClient InfoNot ChangOil ChangedClient InfoNot ChangFilter ChangedClient InfoNot ChangSample StatusClient InfoNot ChangIronppmASTMD5186//>2008ChromiumppmASTMD5186//>100NickelppmASTMD5186//>1061SilverppmASTMD5186//>501AluminumppmASTMD5186//>501AluminumppmASTMD5186//>10<1AluminumppmASTMD5186//>10<1AluminumppmASTMD5186//>10<1VandimppmASTMD5186//>10<1SilconppmASTMD5186//>10<1Valdervisual*NONENONESilconppmASTMD5186//>503SilconppmASTMD5186//>20NONESilconppmASTMD5186//>20NONE	Sample Number		Client Info		WA0019256		
Oil Age Filter AgehrsClient InfoIs0150Filter Age Oil ChangedClient InfoNot ChangFilter ChangedImageClient InfoNot ChangSample StatusClient InfoNot ChangIronppmASTM0518/m-2008ChromiumppmASTM0518/m-2008NickelppmASTM0518/m-100NickelppmASTM0518/m-101SilverppmASTM0518/m-101AluminumppmASTM0518/m-501AluminumppmASTM0518/m-501CopperppmASTM0518/m-501VandamppmASTM0518/m-501VandamppmASTM0518/m-501ValuescalaVisual*NONE1ValuescalaVisual*NONE1SiliconppmASTM0518/m-501SiliconppmASTM0518/m-501SiliconppmASTM0518/m-501SiliconppmASTM0518/m-501	Sample Date		Client Info		23 Dec 2023		
Filter Age OII ChangedIC Client InfoIS0Filter ChangedClient InfoNot ChangFilter ChangedClient InfoNot ChangSample StatusSamole StatusASTM DSI8(m) >2008IronppmASTM DSI8(m) >2008NickelppmASTM DSI8(m) >2008NickelppmASTM DSI8(m) >10NickelppmASTM DSI8(m) >10SilverppmASTM DSI8(m) >501AluminumppmASTM DSI8(m) >502AlumatinumppmASTM DSI8(m) >503YanadiumppmASTM DSI8(m) >503YanadiumppmASTM DSI8(m) >503Yalow MetalscalarYisual*NONEYalow MetalscalarYisual*NONEYalow MetalscalarYisual*NONEYalow MetalscalarYisual*NONEYalow MetalscalarYisual*NONEYalow MetalscalarYisual*NONEYalow MetalscalarYisual*NONEYalow MetalscalarYisual*NONE <th>Machine Age</th> <th>hrs</th> <th>Client Info</th> <th></th> <th>600</th> <th></th> <th></th>	Machine Age	hrs	Client Info		600		
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Filter ChangedClient InfoNot ChangdSample StatusASTM D1850>-20088IronpmASTM D1850>100ChromiumpmASTM D1850>100NickelpmASTM D1850>1011TitaniumpmASTM D1850>1011SilverpmASTM D1850>1011AluminumpmASTM D1850>2031LeadpmASTM D1850>2031CopperpmASTM D1850>2031VanadiumpmASTM D1850>10Vinte MetalscalarVisual*NONENONESiliconpmASTM D1850>503SiliconpmASTM D1850>2088SiliconppmASTM D1850>2088SiliconppmASTM D1850>2088SiliconppmASTM D1850>2088SiliconppmASTM D1850>2088SiliconppmASTM D1850>2088SiliconscalarVisual*NONENONESoliconscalarVisual*NORNORE <td< th=""><th>Filter Age</th><th>hrs</th><th>Client Info</th><th></th><th>150</th><th></th><th></th></td<>	Filter Age	hrs	Client Info		150		
Sample StatusABNORMALIronppmASTM D1850>-2008ChromiumppmASTM D1850>100NickelppmASTM D1850>10C1TitaniumppmASTM D1850>10C1SilverppmASTM D1850I0AluminumppmASTM D1850>205LeadppmASTM D1850>2031CopperppmASTM D1850>2031VanadiumppmASTM D1850>10C1Vinte MetalscalarVisual*NONESiliconppmASTM D1850>10Yellow MetalscalarVisual*NONESiliconppmASTM D1850>208SiliconppmASTM D1850>208SiliconppmASTM D1850>208SiliconppmASTM D1850>208SiliconppmASTM D1850>208SiliconppmASTM D1850>208SiliconscalarVisual*NORENORESiliconscalarVisual*NORENORESodu <th>Oil Changed</th> <th></th> <th>Client Info</th> <th></th> <th>Not Changd</th> <th></th> <th></th>	Oil Changed		Client Info		Not Changd		
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TitaniumppmASTM DS185(m)iiiSilverppmASTM DS185(m)0AluminumppmASTM DS185(m)>255LeadppmASTM DS185(m)>2031CopperppmASTM DS185(m)>2031TinppmASTM DS185(m)>10<1VanadiumppmASTM DS185(m)>10<1VanadiumppmASTM DS185(m)>10<1VanadiumppmASTM DS185(m)>0<1Yellow MetalscalarVisual*NONENONESiliconppmASTM DS185(m)>503SiliconppmASTM DS185(m)>503SiliconppmASTM DS185(m)>208SiliconppmASTM DS185(m)>208SiliconscalarVisual*NONENONESiliconscalarVisual*NONENONESolidurscalarVisual*NONENONESolidurscalarVisual*NORHNORHSolidurscalarVisual*NORHNORHSolidur <td< th=""><th></th><th></th><th>× 7</th><th></th><th>-</th><th></th><th></th></td<>			× 7		-		
SilverppmASTM D5186(m)0AluminumppmASTM D5185(m)>255LeadppmASTM D5185(m)>5002CopperppmASTM D5185(m)>20031TinppmASTM D5185(m)>10<1VanadiumppmASTM D5185(m)>10<1Vellow MetalscalarVisual*NONEMONESiliconppmASTM D5185(m)>5003SiliconppmASTM D5185(m)>5003Vatarvoc Method>.2008SiliconppmASTM D5185(m)>5003SiliconppmASTM D5185(m)>5008SiliconscalarVisual*NONENONESilitscalarVisual*NONENONESolitscalarVisual*NONENONEAppearancescalarVisual*NORMNORMLSodiumppmASTM D5185(m)>573SodiumppmASTM D5185(m)>573ManganeseppmASTM D5185(m)So3MolybdenumppmASTM D5185(m)0ManganeseppmAST			( )	>10			
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Copper         ppm         ASTM D5185(m)         >200         31            Tin         ppm         ASTM D5185(m)         >10         <1            Vanadium         ppm         ASTM D5185(m)         >10         <1            White Metal         scalar         Visual*         NONE         NONE            Yellow Metal         scalar         Visual*         NONE             Silicon         ppm         ASTM D5185(m)         >50         3             Silicon         ppm         ASTM D5185(m)         >50         3             Silicon         ppm         ASTM D5185(m)         >20         8             Silicon         ppm         ASTM D5185(m)         >20         8             Silicon         scalar         Visual*         NONE         NONE             Silit         scalar         Visual*         NORM         NORM             Sand/Dirt         scalar         Visual*         NORM         NORM <td< th=""><th>Aluminum</th><th>ppm</th><th>ASTM D5185(m)</th><th>&gt;25</th><th>5</th><th></th><th></th></td<>	Aluminum	ppm	ASTM D5185(m)	>25	5		
TinppmASTM D5185(m)>10<1		ppm	( )	>50	_		
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White Metal Yellow MetalscalarVisual*NONENONEYellow MetalscalarVisual*NONENONESiliconppmASTM D5185(m)>503PotassiumppmASTM D5185(m)>208WaterWC Method>0.2NEGSilitscalarVisual*NONENONESiltscalarVisual*NONEINONESand/DirtscalarVisual*NONEINOREAppearancescalarVisual*NOREINORMLOdorscalarVisual*NOREINORMLSodiumppmASTM D5185(m)>573SodiumppmASTM D5185(m)>573SodiumppmASTM D5185(m)>573BariumppmASTM D5185(m)>573MolybdenumppmASTM D5185(m)>573ManganeseppmASTM D5185(m)>573ManganeseppmASTM D5185(m)ManganesimppmASTM D5185(m)1059ManganesimppmASTM D5185(m) <th>Tin</th> <th>ppm</th> <th>ASTM D5185(m)</th> <th>&gt;10</th> <th></th> <th></th> <th></th>	Tin	ppm	ASTM D5185(m)	>10			
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PotassiumppmASTM D5185(m)>208WaterWC Method>0.2NEGSiltscalarVisual*NONENONEDebrisscalarVisual*NONENONESand/DirtscalarVisual*NONENONEAppearancescalarVisual*NORMLNORMLOdorscalarVisual*NORMLNORMLCodorscalarVisual*NORMLSodiumppmASTM D5185(m)>573BoronppmASTM D5185(m)>573MolybdenumppmASTM D5185(m)ManganeseppmASTM D5185(m)MagnesiumppmASTM D5185(m)PhosphorusppmASTM D5185(m)PhosphorusppmASTM D5185(m)SulfurppmASTM D5185(m)SulfurppmASTM D5185(m)	Yellow Metal	scalar	Visual*	NONE	NONE		
PotassiumppmASTM D5185(m)>208WaterWC Method>0.2NEGSiltscalarVisual*NONENONEDebrisscalarVisual*NONENONESand/DirtscalarVisual*NONENONEAppearancescalarVisual*NORMLNORMLOdorscalarVisual*NORMLNORMLCodorscalarVisual*NORMLSodiumppmASTM D5185(m)>573BoronppmASTM D5185(m)>573MolybdenumppmASTM D5185(m)ManganeseppmASTM D5185(m)MagnesiumppmASTM D5185(m)PhosphorusppmASTM D5185(m)PhosphorusppmASTM D5185(m)SulfurppmASTM D5185(m)SulfurppmASTM D5185(m)	Silicon	maa	ASTM D5185(m)	>50	3		
WaterWC Method>0.2NEGSiltscalarVisual*NONENONEDebrisscalarVisual*NONENONESand/DirtscalarVisual*NONENONEAppearancescalarVisual*NORMLNORMLOdorscalarVisual*NORMLNORMLEmulsified WatescalarVisual*NORMLNORMLSodiumppmASTM D5185(m)>573BariumppmASTM D5185(m)166MolybdenumppmASTM D5185(m)MagnesiumppmASTM D5185(m)PhosphorusppmASTM D5185(m)PhosphorusppmASTM D5185(m)SilfurppmASTM D5185(m)MagnesiumppmASTM D5185(m)PhosphorusppmASTM D5185(m)SulfurppmASTM D5185(m)SulfurppmASTM D5185(m)SulfurppmASTM D5185(m)SulfurppmASTM D5185(m)SulfurppmASTM D5185(m) <td< th=""><th></th><th></th><th>. ,</th><th></th><th>-</th><th></th><th></th></td<>			. ,		-		
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OdorscalarVisual*NORMLNORRLEmulsified WaterscalarVisual*>0.2NEGSodiumppmASTM D5185(m)>573BoronppmASTM D5185(m)>573BariumppmASTM D5185(m)<166MolybdenumppmASTM D5185(m)<0ManganeseppmASTM D5185(m)<0MagnesiumppmASTM D5185(m)0PhosphorusppmASTM D5185(m)0PhosphorusppmASTM D5185(m)0SulfurppmASTM D5185(m)992SulfurppmASTM D5185(m)1059SulfurppmASTM D5185(m)3473	Sand/Dirt	scalar	Visual*	NONE	NONE		
Emulsified Water       scalar       Visual*       >0.2       NEG          Sodium       ppm       ASTM D5185(m)       >57       3           Boron       ppm       ASTM D5185(m)       >57       3           Boron       ppm       ASTM D5185(m)       >57       3           Barium       ppm       ASTM D5185(m)       166           Molybdenum       ppm       ASTM D5185(m)       0           Manganese       ppm       ASTM D5185(m)       0           Magnesium       ppm       ASTM D5185(m)       0           Phosphorus       ppm       ASTM D5185(m)       0           Phosphorus       ppm       ASTM D5185(m)       2099           Phosphorus       ppm       ASTM D5185(m)       952           Zinc       ppm       ASTM D5185(m)       3473	Appearance	scalar	Visual*	NORML	NORML		
Sodium         ppm         ASTM D5185(m) >57         3            Boron         ppm         ASTM D5185(m)         166            Barium         ppm         ASTM D5185(m)         0            Barium         ppm         ASTM D5185(m)         0            Molybdenum         ppm         ASTM D5185(m)         0            Manganese         ppm         ASTM D5185(m)         0            Magnesium         ppm         ASTM D5185(m)         0            Calcium         ppm         ASTM D5185(m)         994            Phosphorus         ppm         ASTM D5185(m)         2099            Zinc         ppm         ASTM D5185(m)         952            Sulfur         ppm         ASTM D5185(m)         3473	Odor	scalar	Visual*	NORML	NORML		
Boron         ppm         ASTM D5185(m)         166            Barium         ppm         ASTM D5185(m)         0            Molybdenum         ppm         ASTM D5185(m)         0            Manganese         ppm         ASTM D5185(m)         4            Magnesium         ppm         ASTM D5185(m)         0            Calcium         ppm         ASTM D5185(m)         94            Phosphorus         ppm         ASTM D5185(m)         2099            Zinc         ppm         ASTM D5185(m)         952            Sulfur         ppm         ASTM D5185(m)         1059	Emulsified Water	scalar	Visual*	>0.2	NEG		
Boron         ppm         ASTM D5185(m)         166            Barium         ppm         ASTM D5185(m)         0            Molybdenum         ppm         ASTM D5185(m)         0            Manganese         ppm         ASTM D5185(m)         4            Magnesium         ppm         ASTM D5185(m)         0            Calcium         ppm         ASTM D5185(m)         94            Phosphorus         ppm         ASTM D5185(m)         2099            Zinc         ppm         ASTM D5185(m)         952            Sulfur         ppm         ASTM D5185(m)         1059							
Barium         ppm         ASTM D5185(m)         0            Molybdenum         ppm         ASTM D5185(m)         4            Manganese         ppm         ASTM D5185(m)         0            Magnesium         ppm         ASTM D5185(m)         0            Calcium         ppm         ASTM D5185(m)         94            Phosphorus         ppm         ASTM D5185(m)         994            Zinc         ppm         ASTM D5185(m)         9952            Sulfur         ppm         ASTM D5185(m)         1059				>57			
Molybdenum         ppm         ASTM D5185(m)         4            Manganese         ppm         ASTM D5185(m)         0            Magnesium         ppm         ASTM D5185(m)         0            Magnesium         ppm         ASTM D5185(m)         94            Calcium         ppm         ASTM D5185(m)         2099            Phosphorus         ppm         ASTM D5185(m)         952            Zinc         ppm         ASTM D5185(m)         1059            Sulfur         ppm         ASTM D5185(m)         3473							
Manganese         ppm         ASTM D5185(m)         0            Magnesium         ppm         ASTM D5185(m)         94             Calcium         ppm         ASTM D5185(m)         2099             Phosphorus         ppm         ASTM D5185(m)         952             Zinc         ppm         ASTM D5185(m)         1059             Sulfur         ppm         ASTM D5185(m)         3473			( )				
Magnesium         ppm         ASTM D5185(m)         94            Calcium         ppm         ASTM D5185(m)         2099             Phosphorus         ppm         ASTM D5185(m)         952             Zinc         ppm         ASTM D5185(m)         1059             Sulfur         ppm         ASTM D5185(m)         3473							
Calcium         ppm         ASTM D5185(m)         2099            Phosphorus         ppm         ASTM D5185(m)         952            Zinc         ppm         ASTM D5185(m)         1059            Sulfur         ppm         ASTM D5185(m)         3473	-		( )				
Phosphorus         ppm         ASTM D5185(m)         952            Zinc         ppm         ASTM D5185(m)         1059            Sulfur         ppm         ASTM D5185(m)         3473	•	ppm	ASTM D5185(m)				
Zinc         ppm         ASTM D5185(m)         1059            Sulfur         ppm         ASTM D5185(m)         3473	Calcium	ppm	ASTM D5185(m)		2099		
Sulfur         ppm         ASTM D5185(m)         3473	Phosphorus	ppm	ASTM D5185(m)		952		
	Zinc	ppm	ASTM D5185(m)		1059		
Visc @ 40°C cSt ASTM D7279(m) 115	Sulfur	ppm	ASTM D5185(m)		3473		
	Visc @ 40°C	cSt	ASTM D7279(m)	115	<b>7</b> 7.0		

# WEAR NORMAL CONTAMINATION NORMAL FLUID CONDITION ABNORMAL

Contact/Location: Service Manager - CCGSCHED





