

OIL ANALYSIS REPORT

Area [1846303] Machine Id UNIT3 GEN THRUST BEARING Component

Thrust Bearing

PETRO CANADA TURBOFLO XL46 (5556 LTR)

DIAGNOSIS

Fluid

Recommendation

We recommend that you perform vacuum distillation and/or air drying to attempt to remove any residual water and/or entrained gases from this oil that may be contributing to abnormal foaming and/or poor water separability. We recommend an early resample to monitor this condition.

Wear

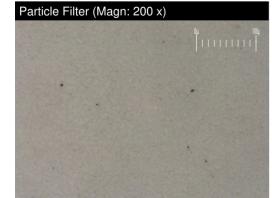
All component wear rates are normal. The ferrography results are normal indicating no abnormal wear in the system.

Contaminants

The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The water content is negligible. The system and fluid cleanliness is acceptable.

Oil Condition

Foaming Tendency (ASTM D892) results are abnormal indicating a tendency for oil foaming. Rust Prevention test (ASTM D665) indicates the oil retains good anti-corrosion properties. The AN level is acceptable for this fluid.

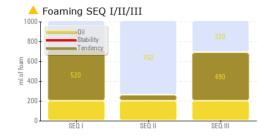


Sample Rating Trend OFF SPEC

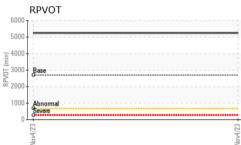
Sample Number Client Info VC0412131 Sample Date I Client Info 0 Machine Age hrs Client Info 0 Oil Age hrs Client Info 0 Oil Changed Ice Client Info N/A Sample Status Ice Client Info N/A WEAR METALS Client Info N/A PQ ASTM D5185(m) >20 0 Iron ppm ASTM D5185(m) >20 0 Nickel ppm ASTM D5185(m) >20 0 Nickel ppm ASTM D5185(m) >20 0 Auminum ppm ASTM D5185(m) >20 0 Auminum ppm ASTM D5185(m) >40 -1 <td< th=""><th>SAMPLE INFORM</th><th>IATION</th><th>method</th><th>limit/base</th><th>current</th><th>history1</th><th>history2</th></td<>	SAMPLE INFORM	IATION	method	limit/base	current	history1	history2
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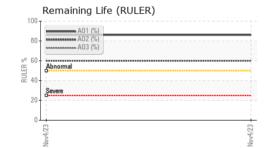


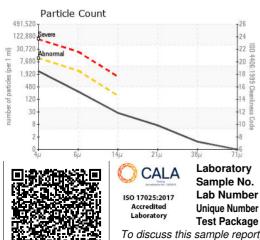
OIL ANALYSIS REPORT









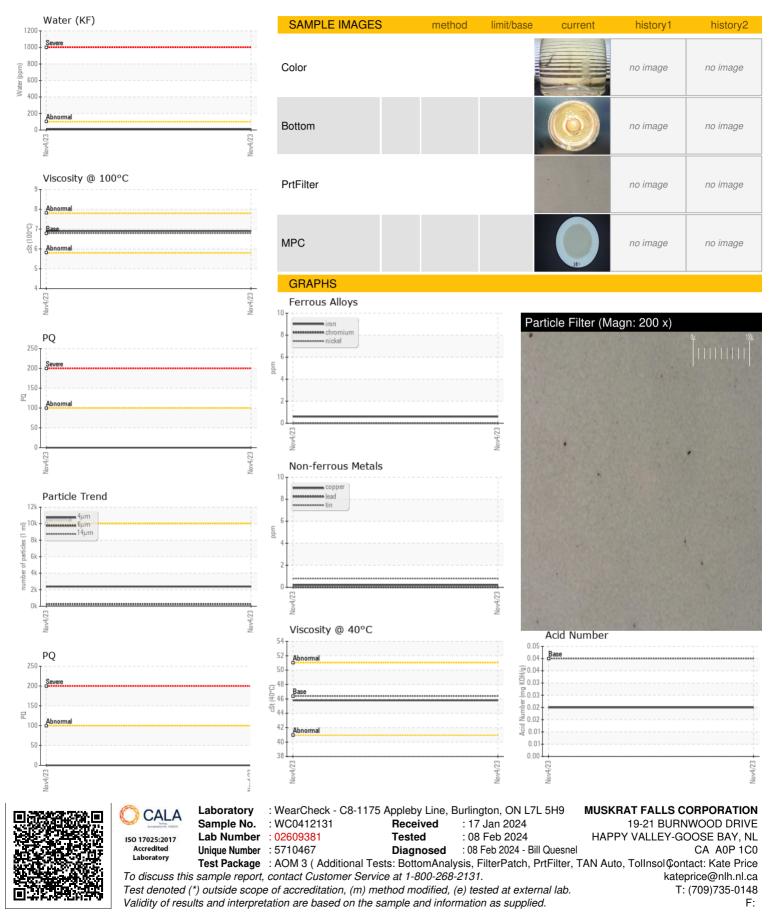


Particles >6µm ASTM D7647 >2500 252 Particles >14µm ASTM D7647 >160 24 Particles >21µm ASTM D7647 >10 1 Particles >38µm ASTM D7647 >10 1 Particles >1µm ASTM D7647 >10 1 Oll Cleanlines ISO 4406 (c) >20/18/14 18/15/12 FLUID DEGRADATION method limit/base current history1 history2 Acid Number (AN) mgR0Hg ASTM D6971* <25 86 Acid Number (AN) mgR0Hg ASTM D6971* <25 60 Acid Number (AN) mgR0Hg ASTM D6971* <25 60 Anti-Oxidant 1 % ASTM D6971* <25 60 VISUAL method limit/base current <td< th=""><th>FLUID CLEANLIN</th><th>IESS</th><th>method</th><th>limit/base</th><th>current</th><th>history1</th><th>history2</th></td<>	FLUID CLEANLIN	IESS	method	limit/base	current	history1	history2
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Oli Cleanliness ISO 4406 (c) >20/18/14 18/15/12 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/1mm ASTM D7414* 1.9 Acid Number (AN) mgK0Hg ASTM D6971* <25	Particles >38µm		ASTM D7647	>10	1		
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Anti-Oxidant 1 % ASTM D6971* <25 86 Anti-Oxidant 2 % ASTM D6971* <25	Oxidation	Abs/.1mm	ASTM D7414*		1.9		
Arti-Oxidant 2 % ASTM D6971' <25 60 MPC Varnish Potential Scale ASTM D7843(m)' >15 13 VISUAL method limit/base current history1 history2 White Metal scalar Visual* NONE NONE Yellow Metal scalar Visual* NONE NONE Precipitate scalar Visual* NONE NONE Solt scalar Visual* NONE NONE Debris scalar Visual* NONE NONE Appearance scalar Visual* NORML NORML Godor scalar Visual* NORML NORML Odor scalar Visual* NORML NORML Godor scalar Visual* NORML	Acid Number (AN)	mg KOH/g	ASTM D974*	0.04	0.02		
MPC Varnish Potential Scale ASTM D7843(m)*<>15 13 VISUAL method limit/base current history1 history2 White Metal scalar Visual* NONE NONE Yellow Metal scalar Visual* NONE NONE Precipitate scalar Visual* NONE NONE Solt scalar Visual* NONE NONE Debris scalar Visual* NONE NONE Sand/Dirt scalar Visual* NONE NONE Appearance scalar Visual* NORML NORML Odor scalar Visual* NORML NORML Free Water scalar Visual* NORML NORML FLUID PROPERTIES method limit/base current history1 history2 Visc @ 40°C CSt ASTM D7279(m) 6.39 45.8 Visc @ 40°C CSt ASTM D2270* 100 <	Anti-Oxidant 1	%	ASTM D6971*	<25	86		
VISUALmethodlimit/basecurrenthistory1history2White MetalscalarVisual*NONENONEYellow MetalscalarVisual*NONENONEPrecipitatescalarVisual*NONENONESiltscalarVisual*NONENONEDebrisscalarVisual*NONENONESand/DirtscalarVisual*NONENONEAppearancescalarVisual*NORMLNORMLOdorscalarVisual*NORMLNORMLFree WaterscalarVisual*NORMLNORMLFluid PROPERTIESmethodlimit/basecurrenthistory1history2Visc @ 40°CcStASTM D7279(m)6.796.9FLUID PROPERTIESmethodlimit/basecurrenthistory1Separabilitydih2demASTM D1279(m)6.796.9Separabilitydih2demASTM D2270'100106ASTM ColorscalarASTM D2270'100106Foam TendencyI/II/IIIASTM D892'06.9Foam TendencyI/II/IIIASTM D892'06.9Foam TendencyI/II/III <t< td=""><td>Anti-Oxidant 2</td><td>%</td><td>ASTM D6971*</td><td><25</td><td>60</td><td></td><td></td></t<>	Anti-Oxidant 2	%	ASTM D6971*	<25	60		
White MetalscalarVisual*NONENONEYellow MetalscalarVisual*NONENONEPrecipitatescalarVisual*NONENONESiltscalarVisual*NONENONEDebrisscalarVisual*NONENONESand/DirtscalarVisual*NONENONEAppearancescalarVisual*NORMLNORMLOdorscalarVisual*NORMLNORMLCodorscalarVisual*NORMLNORMLEmulsified WaterscalarVisual*>2NEGFLUID PROPERTIESmethodlimit/basecurrenthistory1history2Visc @ 40°CcStASTM D7279(m)6.796.9Separabilityoilh20/emASTM D12770100106Separabilityoilh20/emASTM D13427*47.00Foam Tendency//1/1/11ASTM D892*00/0/0ASTM ColorscalarASTM D1260*PASSRust PreventionPASSFALASTM D892*00/0/0SeDIMENTmethodlimit/basecurrenthistory1history1history2Rust Prevention </td <td>MPC Varnish Potential</td> <td>Scale</td> <td>ASTM D7843(m)*</td> <td>>15</td> <td>13</td> <td></td> <td></td>	MPC Varnish Potential	Scale	ASTM D7843(m)*	>15	13		
Vellow MetalscalarVisual*NONENONEPrecipitatescalarVisual*NONENONESiltscalarVisual*NONENONEDebrisscalarVisual*NONENONESand/DirtscalarVisual*NONENONEAppearancescalarVisual*NORMLNORMLOdorscalarVisual*NORMLNORMLCodorscalarVisual*NORMLNORMLFree WaterscalarVisual*>2NEGFLUID PROPERTIESmethodlimit/basecurrenthistory1history2Visc @ 40°CcStASTM D2270'100106Separabilityaih2olmASTM D2270'100106Air Release TimeminASTM D327'47.00Foam TendencyI/I/IIIASTM D892'00/0/0Fami StabilityI/I/IIIASTM D892'00/0/0ASTM ColorscalarASTM D1500'0.5<1.0Rust PreventionPASSFALASTM D665'PASSSEDIMENTmethodlimit/basecurrenthistory1history2Pentane Insolubles%ASTM D8	VISUAL		method	limit/base	current	history1	history2
PrecipitatescalarVisual*NONENONESiltscalarVisual*NONENONEDebrisscalarVisual*NONENONESand/DirtscalarVisual*NONENONEAppearancescalarVisual*NORMLNORMLOdorscalarVisual*NORMLNORMLCodorscalarVisual*NORMLNORMLEmulsified WaterscalarVisual*>2NEGFree WaterscalarVisual*-2NEGFullD PROPERTIESmethodlimit/basecurrenthistory1history2Visc @ 40°CcStASTM D279(m)6.796.9Viscosity Index (VI)ScaleASTM D277100106Separabilityoilh20(emASTM D1401*40/40/041/39/0 (20)Air Release TimeminASTM D3427*47.00Foam Tendency//////IIASTM D892*00/0/0ASTM ColorscalarASTM D1500*0.5<1.0	White Metal	scalar	Visual*	NONE	NONE		
SiltscalarVisual*NONENONEDebrisscalarVisual*NONENONESand/DirtscalarVisual*NONENONEAppearancescalarVisual*NORMLNORMLAppearancescalarVisual*NORMLNORMLOdorscalarVisual*NORMLNORMLEmulsified WaterscalarVisual*>2NEGFree WaterscalarVisual*>2NEGFLUID PROPERTIESmethodlimit/basecurrenthistory1history2Visc @ 40°CcStASTM D7279(m)46.3945.8Visc @ 100°CcStASTM D7279(m)6.796.9Viscosity Index (VI)ScaleASTM D2270*100106Separabilityoilh2o/emASTM D1401*40/40/041/39/0 (20)Air Release TimeminASTM D3427*47.00Foam TendencyI/I/IIIASTM D892*00/0/0ASTM ColorscalarASTM D150*0.5<1.0	Yellow Metal	scalar	Visual*	NONE	NONE		
DebrisscalarVisual*NONENONESand/DirtscalarVisual*NONENONEAppearancescalarVisual*NORMLNORMLOdorscalarVisual*NORMLNORMLEmulsified WaterscalarVisual*NORMLNORMLFree WaterscalarVisual*>2NEGFLUID PROPERTIESmethodlimit/basecurrenthistory1history2Visc @ 40°CcStASTM D7279(m)46.3945.8Visc @ 100°CcStASTM D7279(m)6.796.9Separabilityoi/h2o/emASTM D1207100106Air Release TimeminASTM D1401*40/40/041/39/0 (20)Foam TendencyI/I/IIIASTM D892*00/0/0ASTM ColorscalarASTM D1500*0.5<1.0	Precipitate	scalar	Visual*	NONE	NONE		
Sand/DirtscalarVisual*NONENONEAppearancescalarVisual*NORMLNORMLOdorscalarVisual*NORMLNORMLEmulsified WaterscalarVisual*>2NEGFree WaterscalarVisual*>2NEGFLUID PROPERTIESmethodlimit/basecurrenthistory1history2Visc @ 40°CcStASTM D7279(m)6.3945.8Visc @ 100°CcStASTM D7279(m)6.796.9Viscosity Index (VI)ScaleASTM D2270*100106Separabilitydilh2o/emASTM D3427*47.00Foam TendencyI/II/IIIASTM D892*00/0/0ASTM ColorscalarASTM D1500*0.5<1.0	Silt	scalar	Visual*	NONE	NONE		
AppearancescalarVisual*NORMLNORMLOdorscalarVisual*NORMLNORMLEmulsified WaterscalarVisual*>2NEGFree WaterscalarVisual*Imit/basecurrenthistory1history2FLUID PROPERTIESmethodimit/basecurrenthistory1history2Visc @ 40°CcStASTM D7279(m)46.3945.8Visc @ 100°CcStASTM D7279(m)6.796.9Visco@ 100°CcStASTM D2270*100106Separabilityoilh2olenASTM D1401*40/40/041/39/0 (20)Air Release TimeminASTM D3427*47.00Foam TendencyI/II/IIASTM D892*00/0/0ASTM ColorscalarASTM D1500*0.5<1.0	Debris	scalar	Visual*	NONE	NONE		
OdorscalarVisual*NORMLNORMLEmulsified WaterscalarVisual*>2NEGFree WaterscalarVisual*NEGFLUID PROPERTIESmethodlimit/basecurrenthistory1history2Visc @ 40°CcStASTM D7279(m)46.3945.8Visc @ 100°CcStASTM D7279(m)6.796.9Visco@ 100°CcStASTM D2270*100106Viscosity Index (VI)ScaleASTM D1401*40/40/041/39/0 (20)Air Release TimeminASTM D3427*47.00Foam TendencyI/II/IIIASTM D892*00/0/0ASTM ColorscalarASTM D160*0.5<1.0	Sand/Dirt	scalar	Visual*	NONE	NONE		
Emulsified WaterscalarVisual*>2NEGFree WaterscalarVisual*/NEGFLUID PROPERTIESmethodlimit/basecurrenthistory1history2Visc @ 40°CcStASTM D7279(m)46.3945.8Visc @ 100°CcStASTM D7279(m)6.796.9Visc @ 100°CcStASTM D7279(m)6.796.9Viscosity Index (VI)ScaleASTM D2270*100106Separabilityoil/b2/emASTM D1401*40/40/041/39/0 (20)Air Release TimeminASTM D3427*47.00Foam TendencyI/II/IIIASTM D892*00/0/0Foam StabilityI/II/IIIASTM D892*00/0/0ASTM ColorscalarASTM D1500*0.5<1.0Rust PreventionPASS/FAILASTM D2272*27005244SEDIMENTmethodlimit/basecurrenthistory1history2Pentane Insolubles%ASTM D893(m)*0.000SEDIMENTmethodlimit/basecurrenthistory1history2	Appearance	scalar	Visual*	NORML	NORML		
Free WaterscalarVisual*NEGFLUID PROPERTIESmethodlimit/basecurrenthistory1history2Visc @ 40°CcStASTM D7279(m)46.3945.8Visc @ 100°CcStASTM D7279(m)6.796.9Viscosity Index (VI)ScaleASTM D7279(m)6.796.9Separabilityoil/h2o/emASTM D1401*40/40/041/39/0 (20)Air Release TimeminASTM D3427*47.00Foam Tendency//II/IIIASTM D3427*4520/60/490Foam Stability//II/IIIASTM D892*00/0/0ASTM ColorscalarASTM D1500*0.5<1.0	Odor	scalar	Visual*	NORML	NORML		
FLUID PROPERTIESmethodlimit/basecurrenthistory1history2Visc @ 40°CcStASTM D7279(m)46.3945.8Visc @ 100°CcStASTM D7279(m)6.796.9Viscosity Index (VI)ScaleASTM D2270*100106Separabilityoil/h2o/emASTM D1401*40/40/041/39/0 (20)Air Release TimeminASTM D3427*47.00Foam TendencyI/II/IIIASTM D892*00/0/0Foam StabilityI/II/IIIASTM D1500*0.5<1.0		scalar		>2			
Visc @ 40°C cSt ASTM D7279(m) 46.39 45.8 Visc @ 100°C cSt ASTM D7279(m) 6.79 6.9 Viscosity Index (VI) Scale ASTM D7279(m) 6.79 6.9 Separability oil/h2o/en ASTM D2270* 100 106 Separability oil/h2o/en ASTM D1401* 40/40/0 41/39/0 (20) Air Release Time min ASTM D3427* 4 7.00 Foam Tendency I/II/III ASTM D892* 0 0/0/0 Foam Stability I/II/III ASTM D892* 0 0/0/0 Foam Stability I/II/III ASTM D892* 0 0/0/0 ASTM Color scalar ASTM D1500* 0.5 <1.0	Free Water	scalar	Visual*		NEG		
Visc @ 100°C cSt ASTM D7279(m) 6.79 6.9 Viscosity Index (VI) Scale ASTM D2270* 100 106 Separability oil/h2o/em ASTM D1401* 40/40/0 41/39/0 (20) Air Release Time min ASTM D3427* 4 7.00 Foam Tendency I/II/III ASTM D892* 0 ▲ 520/60/490 Foam Stability I/II/III ASTM D892* 0 0/0/0 ASTM Color scalar ASTM D1500* 0.5 <1.0 ASTM Color scalar ASTM D665* PASS Quidation Test (RPVOT) minutes ASTM D2272* 2700 5244 SEDIMENT method limit/base current history1 history2 Pentane Insolubles % ASTM D893(m)* 0.000	FLUID PROPERT	IES	method	limit/base	current	history1	history2
Viscosity Index (VI) Scale ASTM D2270* 100 106 Separability oil/h2o/em ASTM D1401* 40/40/0 41/39/0 (20) Air Release Time min ASTM D3427* 4 7.00 Foam Tendency I/II/II ASTM D892* 0 ▲ 520/60/490 Foam Stability I/II/II ASTM D892* 0 0/0/0 ASTM Color scalar ASTM D1500* 0.5 <1.0	Visc @ 40°C	cSt	ASTM D7279(m)	46.39	45.8		
Separability oil/h2o/em ASTM D1401* 40/40/0 41/39/0 (20) Air Release Time min ASTM D3427* 4 7.00 Foam Tendency I/II/III ASTM D892* 0 ▲ 520/60/490 Foam Stability I/II/III ASTM D892* 0 0/0/0 Foam Stability I/II/III ASTM D892* 0 0/0/0 ASTM Color scalar ASTM D1500* 0.5 <1.0	Visc @ 100°C	cSt	ASTM D7279(m)	6.79	6.9		
Air Release Time min ASTM D3427* 4 7.00 Foam Tendency I/II/III ASTM D892* 0 ▲ 520/60/490 Foam Stability I/II/III ASTM D892* 0 0/0/0 ASTM Color scalar ASTM D1500* 0.5 <1.0	Viscosity Index (VI)	Scale	ASTM D2270*	100	106		
Foam Tendency I/II/III ASTM D892* 0 ► 520/60/490 Foam Stability I/II/III ASTM D892* 0 0/0/0 ASTM Color scalar ASTM D1500* 0.5 <1.0	Separability	oil/h2o/em	ASTM D1401*	40/40/0	41/39/0 (20)		
Foam Stability I/II/III ASTM D892* 0 0/0/0 ASTM Color scalar ASTM D1500* 0.5 <1.0	Air Release Time						
ASTM Color scalar ASTM D1500* 0.5 <1.0 Rust Prevention PASS/FAIL ASTM D665* PASS Oxidation Test (RPVOT) minutes ASTM D2272* 2700 5244 SEDIMENT method limit/base current history1 history2 Pentane Insolubles % ASTM D893(m)* 0.000	,						
Rust Prevention PASS/FAIL ASTM D665* PASS Oxidation Test (RPVOT) minutes ASTM D2272* 2700 5244 SEDIMENT method limit/base current history1 history2 Pentane Insolubles % ASTM D893(m)* 0.000	,	1/11/111					
Oxidation Test (RPVOT) minutes ASTM D2272* 2700 5244 SEDIMENT method limit/base current history1 history2 Pentane Insolubles % ASTM D893(m)* 0.000				0.5			
SEDIMENT method limit/base current history1 history2 Pentane Insolubles % ASTM D893(m)* 0.000	Rust Prevention						
Pentane Insolubles % ASTM D893(m)* 0.000	Oxidation Test (RPVOT)	minutes	ASTM D2272*	2700	5244		
	SEDIMENT		method	limit/base	current	history1	history2
Toluene Insolubles % ASTM D893(m)* 0.001	Pentane Insolubles	%	ASTM D893(m)*		0.000		
	Toluene Insolubles	%	ASTM D893(m)*		0.001		

s.e	🔘 CALA	Laboratory	: WearCheck - (C8-1175 Appleby Line, E	Burlington, ON L7L 5H9	MUSKRAT FALLS CORPORATION
포끝	Accreditation No. 100/019	Sample No.	: WC0412131	Received	: 17 Jan 2024	19-21 BURNWOOD DRIVE
	ISO 17025:2017	Lab Number	: 02609381	Tested	: 08 Feb 2024	HAPPY VALLEY-GOOSE BAY, NL
行なり	Accredited	Unique Number	: 5710467	Diagnosed	: 08 Feb 2024 - Bill Quesne	CA A0P 1C0
2 4	Laboratory	Test Package	: AOM 3 (Addit	ional Tests: BottomAnaly	sis, FilterPatch, PrtFilter,	TAN Auto, TolInsol Contact: Kate Price
	To discuss this	s sample report,	contact Custom	er Service at 1-800-268-	-2131.	kateprice@nlh.nl.ca
	Test denoted (T: (709)735-0148				
	Validity of resu	Its and interpre	tation are based	on the sample and infor	mation as supplied.	F:



OIL ANALYSIS REPORT

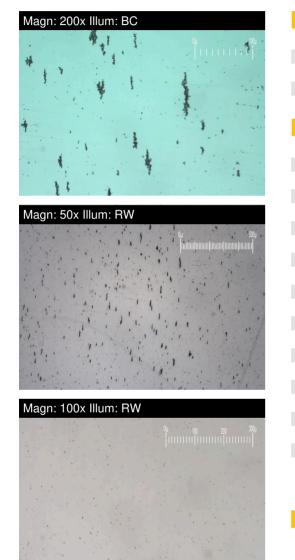


FERROGRAPHY REPORT

Area [1846303] Machine Id UNIT3 GEN THRUST BEARING Component

Thrust Bearing

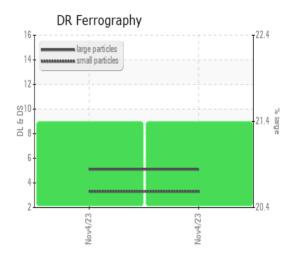
PETRO CANADA TURBOFLO XL46 (5556 LTR)

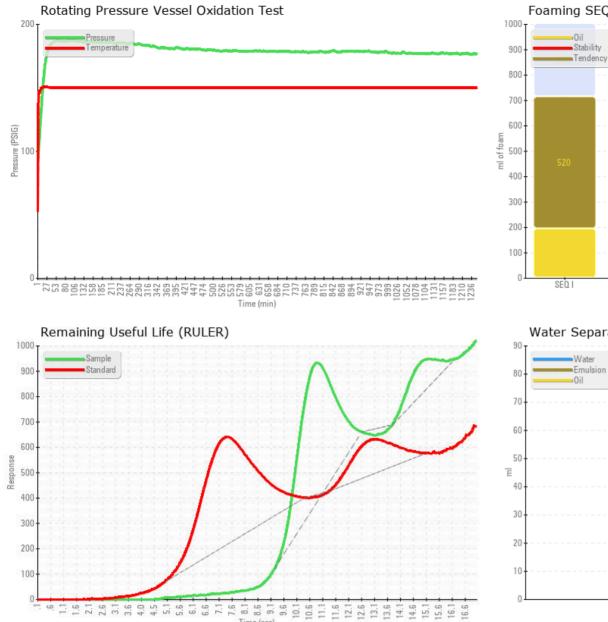


DR-FERROGRAP	ΉY	method	limit/base	current	history1	history2
Large Particles		DR-Ferr*		5.1		
Small Particles		DR-Ferr*		3.3		
Total Particles		DR-Ferr*	>	8.4		
Large Particles Percentage	%	DR-Ferr*		21.4		
Severity Index		DR-Ferr*		9		
FERROGRAPHY		method	limit/base	current	history1	history2
Ferrous Rubbing	Scale 0-10	ASTM D7684*		2		
Ferrous Sliding	Scale 0-10	ASTM D7684*				
Ferrous Cutting	Scale 0-10	ASTM D7684*				
Ferrous Rolling	Scale 0-10	ASTM D7684*		1		
Ferrous Break-in	Scale 0-10	ASTM D7684*				
Ferrous Spheres	Scale 0-10	ASTM D7684*				
Ferrous Black Oxides	Scale 0-10	ASTM D7684*				
Ferrous Red Oxides	Scale 0-10	ASTM D7684*				
Ferrous Corrosive	Scale 0-10	ASTM D7684*		1		
Ferrous Other	Scale 0-10	ASTM D7684*				
Nonferrous Rubbing	Scale 0-10	ASTM D7684*				
Nonferrous Sliding	Scale 0-10	ASTM D7684*				
Nonferrous Cutting	Scale 0-10	ASTM D7684*				
Nonferrous Rolling	Scale 0-10	ASTM D7684*				
Nonferrous Other	Scale 0-10	ASTM D7684*				
Carbonaceous Material	Scale 0-10	ASTM D7684*				
Lubricant Degradation	Scale 0-10	ASTM D7684*				
Sand/Dirt	Scale 0-10	ASTM D7684*				
Fibres	Scale 0-10	ASTM D7684*				
Spheres	Scale 0-10	ASTM D7684*				
Other	Scale 0-10	ASTM D7684*		1		

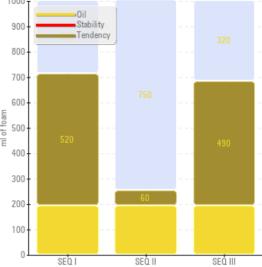
WEAR

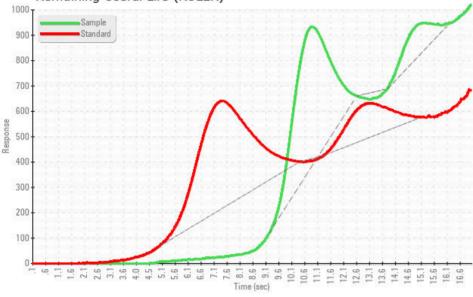
All component wear rates are normal. The ferrography results are normal indicating no abnormal wear in the system.



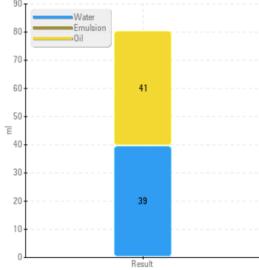


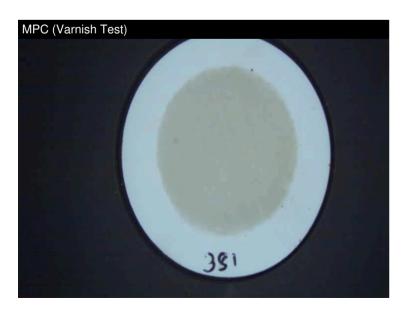
Foaming SEQ I/II/III





Water Separability





Report Id: MUSHAP [WCAMIS] 02609381 (Generated: 02/08/2024 10:12:22) Rev: 1



Contact/Location: Kate Price - MUSHAP Page 5 of 6

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