

OIL ANALYSIS REPORT

Sample Rating Trend





Diesel Engine

SHELL ROTELLA T4 15W40 (--- GAL)

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 01 Feb 2024 08 Nov 2023 31 Aug 2023 Machine Age mis Client Info 139395 119117 99440 Oil Age mis Client Info 20278 19677 20305 Oil Changed Client Info Changed Changed Changed Changed Sample Status Infit/base current history1 history2 Fuel WC Method >0.0 <1.0 <1.0 <1.0 Water WC Method >0.2 NEG NEG NEG Glycol WC Method NEG NEG NEG NEG Wickel ppm ASTM D5185m >20 <1 <1 0 Tinnium ppm ASTM D5185m >2 0 0 0 Rore ppm ASTM D5185m >2 0 0 1 1 Land ppm ASTM D5185m >2 0 0 0 1 1 1	SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Machine Age mis Client Info 139395 119117 99440 Oil Age mis Client Info 20278 19677 20305 Oil Changed Client Info 20278 19677 20305 Sample Status Imit/base Current NoRMAL NoRMAL CONTAMINATION method Imit/base current History1 history2 Fuel WC Method >3.0 <1.0 <1.0 <1.0 Water WC Method >0.2 NEG NEG NEG Oron ppm ASTM D5185m >20 <1 <1 <1 Nickel ppm ASTM D5185m >20 0 0 0 Nickel ppm ASTM D5185m >20 1 1 1 1 Silver ppm ASTM D5185m >20 0 0 0 1 1 1 Lead ppm ASTM D5185m >20 1 1 1	Sample Number		Client Info		PCA0105523	PCA0089629	PCA0089623
Oil Age mis Client Info 20278 19677 20305 Oil Changed Client Info Changed Shands Shands Changed Changed Shands Shands Changed Changed Shands Shands </th <th>Sample Date</th> <th></th> <th>Client Info</th> <th></th> <th>01 Feb 2024</th> <th>08 Nov 2023</th> <th>31 Aug 2023</th>	Sample Date		Client Info		01 Feb 2024	08 Nov 2023	31 Aug 2023
Oil Changed Client Info Changed NORMAL Changed NORMAL Changed NORMAL Changed NORMAL Changed NORMAL CONTAMINATION method limit/base current History1 History2 Fuel WC Method >0.0 <1.0 <1.0 <1.0 Water WC Method >0.2 NEG NEG NEG Glycol WC Method >0.2 NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >90 10 10 10 Chromium ppm ASTM D5185m >20 <1 <1 0 Nickel ppm ASTM D5185m >20 1 1 1 Lead ppm ASTM D5185m >20 1 1 1 Lead ppm ASTM D5185m >20 1 1 1 Lead ppm ASTM D5185m >20 1 1 1 Copper ppm ASTM D5185m >20 1 1 1 Lead ppm ASTM D5185m 0 0 <1 Vanadium ppm ASTM D5185m	Machine Age	mls	Client Info		139395	119117	99440
Sample Status NORMAL NORMAL NORMAL NORMAL CONTAMINATION method limit/base current history1 history2 Fuel WC Method >3.0 <1.0 <1.0 <1.0 Water WC Method >0.2 NEG NEG NEG Olgool WC Method NEG NEG NEG NEG Wearn ppm ASTM D5185m >0 10 10 10 Chromium ppm ASTM D5185m >20 <1 <1 <1 Nickel ppm ASTM D5185m >20 <1 1 1 Lead ppm ASTM D5185m >20 0 0 0 Aluminum ppm ASTM D5185m >20 1 1 1 Lead ppm ASTM D5185m >20 0 <1 1 Lead ppm ASTM D5185m >30 <1 <1 1 Lead ppm	Oil Age	mls	Client Info		20278	19677	20305
CONTAMINATION method limit/base current history1 history2 Fuel WC Method >3.0 <1.0 <1.0 <1.0 <1.0 Glycol WC Method >0.2 NEG NEG NEG Wear WC Method NEG NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >20 <1 <1 <1 Nickel ppm ASTM D5185m >2 0 0 0 Titanium ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 1 1 1 Lead ppm ASTM D5185m >20 1 1 1 Lead ppm ASTM D5185m 0 0 <1 1 Lead ppm ASTM D5185m 0 0 <1 1	Oil Changed		Client Info		Changed	Changed	Changed
Fuel WC Method >3.0 <1.0	Sample Status				NORMAL	NORMAL	NORMAL
Water WC Method >0.2 NEG NEG NEG NEG Glycol WC Method NEG NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >20 <1 <1 <1 Nickel ppm ASTM D5185m >2 0 <1 0 Silver ppm ASTM D5185m >2 0 <1 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 1 1 1 Lead ppm ASTM D5185m >20 0 0 <1 Copper ppm ASTM D5185m >10 0 <1 1 Lead ppm ASTM D5185m 0 0 0 <1 Cadmium ppm ASTM D5185m 0 0 0 <1	CONTAMINAT	ION	method	limit/base	current	history1	history2
Glycol WC Method NEG NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >90 10 10 10 Chromium ppm ASTM D5185m >20 <1 <1 <1 Nickel ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 1 1 1 Lead ppm ASTM D5185m >20 1 1 1 Vanadium ppm ASTM D5185m 0 0 <1 1 Vanadium ppm ASTM D5185m 0 0 0 <1 Vanadium ppm ASTM D5185m 0 0 0 <1 Vanadium ppm ASTM D5185m 104 97 77 B	Fuel		WC Method	>3.0	<1.0	<1.0	<1.0
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >90 10 10 10 Chromium ppm ASTM D5185m >20 <1 <1 <1 Nickel ppm ASTM D5185m >2 0 <1 0 Titanium ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >2 0 0 0 Lead ppm ASTM D5185m >20 1 1 1 1 Lead ppm ASTM D5185m >20 0 0 <1 <1 Cadmium ppm ASTM D5185m >330 <1 <1 <1 <1 Cadmium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 <1 1 Boron ppm ASTM D5185m	Water		WC Method	>0.2	NEG	NEG	NEG
Iron ppm ASTM D5185m >90 10 10 10 Chromium ppm ASTM D5185m >20 <1 <1 <1 Nickel ppm ASTM D5185m >2 0 <1 0 Titanium ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >2 0 0 0 Lead ppm ASTM D5185m >2 0 0 <1 1 Lead ppm ASTM D5185m >40 0 <1 <1 <1 Copper ppm ASTM D5185m >10 0 0 0 Cadmium ppm ASTM D5185m 104 97 77 Barium ppm ASTM D5185m 6 13 16 Magnesium ppm ASTM D5185m 6 53 53 <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 METAL	S	method	limit/base	current	history1	history2
Nickel ppm ASTM D5185m >2 0 <1	Iron	ppm	ASTM D5185m	>90	10	10	10
Titanium ppm ASTM D5185m >2 <1	Chromium	ppm	ASTM D5185m	>20	<1	<1	<1
Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >20 1 1 1 Lead ppm ASTM D5185m >40 0 <1 <1 Copper ppm ASTM D5185m >330 <1 <1 <1 Tin ppm ASTM D5185m >15 0 0 <1 Vanadium ppm ASTM D5185m >15 0 0 <1 Cadmium ppm ASTM D5185m 0 0 0 <1 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method imit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 Malganese ppm ASTM D5185m 6 13 16 Maganesium ppm ASTM D5185m 36 56 53 <	Nickel	ppm	ASTM D5185m	>2	0	<1	0
Aluminum ppm ASTM D5185m >20 1 1 1 Lead ppm ASTM D5185m >40 0 <1 <1 Copper ppm ASTM D5185m >330 <1 <1 <1 Tin ppm ASTM D5185m >15 0 0 <1 Vanadium ppm ASTM D5185m >15 0 0 <1 Cadmium ppm ASTM D5185m 0 0 <1 <1 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 104 97 77 Barium ppm ASTM D5185m 0 0 0 <1 Magnaese ppm ASTM D5185m 36 56 53 <2315 Phosphorus ppm ASTM D5185m 3208 2991 4200	Titanium	ppm	ASTM D5185m	>2	<1	<1	<1
Lead ppm ASTM D5185m >40 0 <1	Silver	ppm	ASTM D5185m	>2	0	0	0
Copper ppm ASTM D5185m >330 <1	Aluminum	ppm	ASTM D5185m	>20	1	1	1
Tin ppm ASTM D5185m<>15 0 0 <1	Lead	ppm	ASTM D5185m	>40	0	<1	<1
Vanadium ppm ASTM D5185m 0 0 <1	Copper	ppm	ASTM D5185m	>330	<1	<1	<1
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 104 97 77 Barium ppm ASTM D5185m 0 0 0 Manganese ppm ASTM D5185m 6 13 16 Manganesee ppm ASTM D5185m 6 53 53 Calcium ppm ASTM D5185m 36 56 53 Calcium ppm ASTM D5185m 36 56 53 Calcium ppm ASTM D5185m 36 56 53 Calcium ppm ASTM D5185m 3208 2991 4200 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 9 8 8 INFRA-RED method limit/base current history	Tin	ppm	ASTM D5185m	>15	0	0	<1
ADDITIVESmethodlimit/basecurrenthistory1history2BoronppmASTM D5185m1049777BariumppmASTM D5185m000MolybdenumppmASTM D5185m61316ManganeseppmASTM D5185m65653CalciumppmASTM D5185m365653CalciumppmASTM D5185m196620312315PhosphorusppmASTM D5185m883933983ZincppmASTM D5185m320829914200CONTAMINANTSnethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m>25355SodiumppmASTM D5185m>20988INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7624>208.48.38.4SulfationAbs/rm*ASTM D7645>3021.421.120.4FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/Imm*ASTM D7414>2517.116.716.1	Vanadium	ppm	ASTM D5185m		0	0	<1
Boron ppm ASTM D5185m 104 97 77 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 6 13 16 Manganese ppm ASTM D5185m 0 0 <1 Magnesium ppm ASTM D5185m 36 56 53 Calcium ppm ASTM D5185m 36 56 53 Calcium ppm ASTM D5185m 883 933 983 Zinc ppm ASTM D5185m 883 933 983 Zinc ppm ASTM D5185m 883 933 983 Sulfur ppm ASTM D5185m 3208 2991 4200 CONTAMINANTS method limit/base current history1 history2 Sulfur ppm ASTM D5185m >20 9 8 8 INFRA-RED method limit/base current history1 <	Cadmium	ppm	ASTM D5185m		0	0	0
Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 6 13 16 Manganese ppm ASTM D5185m 0 0 <1 Magnesium ppm ASTM D5185m 36 56 53 Calcium ppm ASTM D5185m 36 56 53 Calcium ppm ASTM D5185m 366 2031 2315 Phosphorus ppm ASTM D5185m 883 933 983 Zinc ppm ASTM D5185m 1052 1110 1277 Sulfur ppm ASTM D5185m 3208 2991 4200 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 9 8 8 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0							
Molybdenum ppm ASTM D5185m 6 13 16 Manganese ppm ASTM D5185m 0 0 <1	ADDITIVES		method	limit/base	current	history1	history2
Manganese ppm ASTM D5185m 0 0 <1	ADDITIVES Boron	ppm		limit/base			
Magnesium ppm ASTM D5185m 36 56 53 Calcium ppm ASTM D5185m 1966 2031 2315 Phosphorus ppm ASTM D5185m 883 933 983 Zinc ppm ASTM D5185m 883 933 983 Zinc ppm ASTM D5185m 1052 1110 1277 Sulfur ppm ASTM D5185m 3208 2991 4200 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 5 5 Sodium ppm ASTM D5185m >20 9 8 8 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.3 0.3 0.3 Nitration Abs/cm< *ASTM D7624 >20 8.4 8.3 8.4 Sulfation Abs/.1mm			ASTM D5185m	limit/base	104	97	77
Calcium ppm ASTM D5185m 1966 2031 2315 Phosphorus ppm ASTM D5185m 883 933 983 Zinc ppm ASTM D5185m 1052 1110 1277 Sulfur ppm ASTM D5185m 3208 2991 4200 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 5 5 Sodium ppm ASTM D5185m >20 9 8 8 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D5185m >20 9 8 8 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.3 0.3 0.3 Nitration Abs/.mm<*ASTM D7415 >30 21.4 21.1 20.4 FL	Boron	ppm	ASTM D5185m ASTM D5185m	limit/base	104 0	97 0	77 0
Phosphorus ppm ASTM D5185m 883 933 983 Zinc ppm ASTM D5185m 1052 1110 1277 Sulfur ppm ASTM D5185m 3208 2991 4200 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 5 5 Sodium ppm ASTM D5185m >20 9 8 8 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D5185m >20 9 8 8 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.3 0.3 0.3 Nitration Abs/cm *ASTM D7624 >20 8.4 8.3 8.4 Sulfation Abs/.tmm *ASTM D7415 >30 21.4 21.1 20	Boron Barium	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	104 0 6	97 0 13	77 0 16 <1
Zinc ppm ASTM D5185m 1052 1110 1277 Sulfur ppm ASTM D5185m 3208 2991 4200 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 5 5 Sodium ppm ASTM D5185m >20 9 8 8 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D5185m >20 9 8 8 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.3 0.3 0.3 Nitration Abs/cm *ASTM D7624 >20 8.4 8.3 8.4 Sulfation Abs/.tmm *ASTM D7415 >30 21.4 21.1 20.4 FLUID DEGRADATION method limit/base current history1<	Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	104 0 6 0 36	97 0 13 0 56	77 0 16 <1 53
Sulfur ppm ASTM D5185m 3208 2991 4200 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 5 5 Sodium ppm ASTM D5185m >20 9 8 8 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D5185m >20 9 8 8 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.3 0.3 0.3 Nitration Abs/cm *ASTM D7624 >20 8.4 8.3 8.4 Sulfation Abs/.1mm *ASTM D7415 >30 21.4 21.1 20.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25	Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	104 0 6 0 36	97 0 13 0 56 2031	77 0 16 <1 53
CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185m<>25355SodiumppmASTM D5185m003PotassiumppmASTM D5185m>20988INFRA-REDmethodlimit/basecurrenthistory1history2Soot %%*ASTM D7844>60.30.30.3NitrationAbs/cm*ASTM D7624>208.48.38.4SulfationAbs/.1mm*ASTM D7415>3021.421.120.4FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2OxidationAbs/.1mm*ASTM D7414>2517.116.716.1	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	104 0 6 0 36 1966 883	97 0 13 0 56 2031 933	77 0 16 <1 53 2315 983
Silicon ppm ASTM D5185m >25 3 5 5 Sodium ppm ASTM D5185m >20 9 8 8 Potassium ppm ASTM D5185m >20 9 8 8 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.3 0.3 0.3 Nitration Abs/cm *ASTM D7624 >20 8.4 8.3 8.4 Sulfation Abs/.tmm *ASTM D7415 >30 21.4 21.1 20.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.tmm *ASTM D7414 >25 17.1 16.7 16.1	Boron 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 ASTM D5185m	limit/base	104 0 6 0 36 1966 883 1052	97 0 13 0 56 2031 933 1110	77 0 16 <1 53 2315 983 1277
Sodium ppm ASTM D5185m 0 0 3 Potassium ppm ASTM D5185m >20 9 8 8 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.3 0.3 0.3 Nitration Abs/cm *ASTM D7624 >20 8.4 8.3 8.4 Sulfation Abs/.1mm *ASTM D7415 >30 21.4 21.1 20.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.1 16.7 16.1	Boron 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 ASTM D5185m	limit/base	104 0 6 0 36 1966 883 1052	97 0 13 0 56 2031 933 1110	77 0 16 <1 53 2315 983 1277
Potassium ppm ASTM D5185m >20 9 8 8 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.3 0.3 0.3 Nitration Abs/cm *ASTM D7624 >20 8.4 8.3 8.4 Sulfation Abs/.1mm *ASTM D7415 >30 21.4 21.1 20.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.1 16.7 16.1	Boron 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 ASTM D5185m ASTM D5185m		104 0 6 0 36 1966 883 1052 3208	97 0 13 0 56 2031 933 1110 2991	77 0 16 <1 53 2315 983 1277 4200
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >6 0.3 0.3 0.3 Nitration Abs/cm *ASTM D7624 >20 8.4 8.3 8.4 Sulfation Abs/.1mm *ASTM D7415 >30 21.4 21.1 20.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.1 16.7 16.1	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN 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 ASTM D5185m	limit/base	104 0 6 0 36 1966 883 1052 3208 current	97 0 13 0 56 2031 933 1110 2991 history1	77 0 16 <1 53 2315 983 1277 4200 history2
Soot % % *ASTM D7844 >6 0.3 0.3 0.3 Nitration Abs/cm *ASTM D7624 >20 8.4 8.3 8.4 Sulfation Abs/.1mm *ASTM D7415 >30 21.4 21.1 20.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.1 16.7 16.1	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m	limit/base >25	104 0 6 0 36 1966 883 1052 3208 current 3 0	97 0 13 0 56 2031 933 1110 2991 history1 5	77 0 16 <1 53 2315 983 1277 4200 history2 5 3
Nitration Abs/cm *ASTM D7624 >20 8.4 8.3 8.4 Sulfation Abs/.1mm *ASTM D7415 >30 21.4 21.1 20.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.1 16.7 16.1	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method ASTM D5185m	limit/base >25	104 0 6 0 36 1966 883 1052 3208 current 3 0	97 0 13 0 56 2031 933 1110 2991 history1 5 0	77 0 16 <1 53 2315 983 1277 4200 history2 5 3
Sulfation Abs/.1mm *ASTM D7415 >30 21.4 21.1 20.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.1 16.7 16.1	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm TS	ASTM D5185m ASTM D5185m	limit/base >25 >20	104 0 6 0 36 1966 883 1052 3208 current 3 0 9	97 0 13 0 56 2031 933 1110 2991 history1 5 0 8 8 history1	77 0 16 <1 53 2315 983 1277 4200 history2 5 3 8 8
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.1 16.7 16.1	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm	ASTM D5185m ASTM D5185m	limit/base >25 >20 limit/base	104 0 6 0 36 1966 883 1052 3208 current 3 0 9	97 0 13 0 56 2031 933 1110 2991 history1 5 0 8 8 history1	77 0 16 <1 53 2315 983 1277 4200 history2 5 3 8 8
Oxidation Abs/.1mm *ASTM D7414 >25 17.1 16.7 16.1	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm	ASTM D5185m ASTM D5185m	limit/base >25 >20 limit/base >6	104 0 6 0 36 1966 883 1052 3208 current 3 0 9 current 0.3	97 0 13 0 56 2031 933 1110 2991 history1 5 0 8 history1 0.3	77 0 16 <1 53 2315 983 1277 4200 history2 5 3 8 8 history2 0.3
	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	limit/base >25 >20 limit/base >6 >20	104 0 6 0 36 1966 883 1052 3208 current 3 0 9 current 0.3 8.4	97 0 13 0 56 2031 933 1110 2991 history1 5 0 8 <u>history1</u> 0.3 8.3	77 0 16 <1 53 2315 983 1277 4200 history2 5 3 8 8 history2 0.3 8.4
Base Number (BN) mg KOH/g ASTM D2896 10.1 6.2 6.2 6.2	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	limit/base >25 >20 limit/base >6 >20 >30	104 0 6 0 36 1966 883 1052 3208 <u>current</u> 3 0 9 <u>current</u> 0.3 8.4 21.4	97 0 13 0 56 2031 933 1110 2991 history1 5 0 8 <u>history1</u> 0.3 8.3 21.1	77 0 16 <1 53 2315 983 1277 4200 history2 5 3 8 8 history2 0.3 8.4 20.4
	Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm TS ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7844 *ASTM D7844	limit/base >25 >20 limit/base >6 >20 >30 limit/base	104 0 6 0 36 1966 883 1052 3208 current 3 0 9 current 0.3 8.4 21.4 current	97 0 13 0 56 2031 933 1110 2991 history1 5 0 8 history1 0.3 8.3 21.1 history1	77 0 16 <1 53 2315 983 1277 4200 history2 5 3 8 history2 0.3 8.4 20.4 history2



12

an5/73

OIL ANALYSIS REPORT

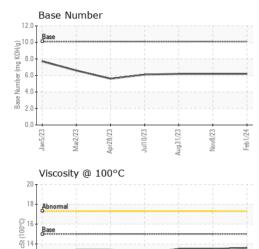
*Visual

scalar

NONE

VISUAL

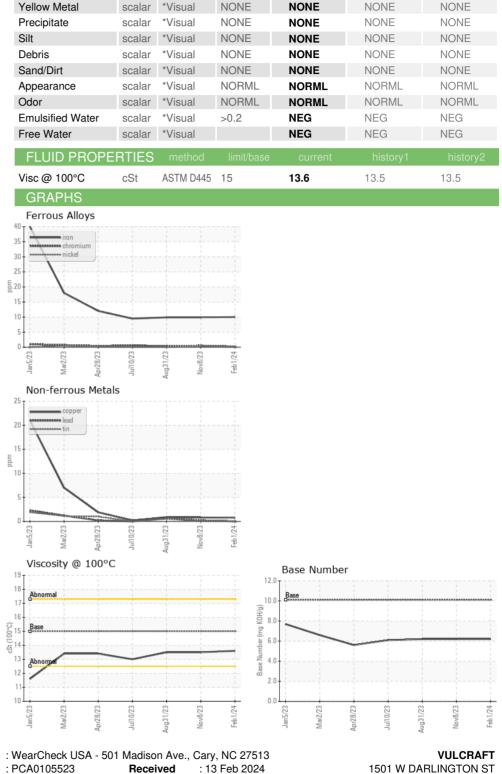
White Metal



Apr28/23

Aug31/23

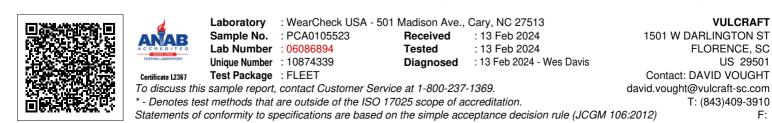
Inv8/73



NONE

NONE

NONE



Contact/Location: DAVID VOUGHT - VULFLO

FLORENCE, SC

T: (843)409-3910

US 29501

F: