

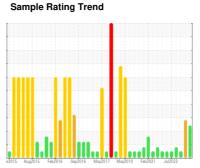
OIL ANALYSIS REPORT



KEMP QUARRIES / RIVER VALLEY ARKOMA **WL062**

Component **Diesel Engine**

MOBIL DELVAC 1300 SUPER15W40 (--- GAL)





DIAGNOSIS

Recommendation

We advise that you check the fuel injection system. The oil change at the time of sampling has been noted. We recommend an early resample to monitor this condition.

Wear

All component wear rates are normal.

Contamination

There is a high amount of fuel present in the oil. Tests confirm the presence of fuel in the oil.

▲ Fluid Condition

The BN result indicates that there is suitable alkalinity remaining in the oil. Fuel is present in the oil and is lowering the viscosity. The oil is no longer serviceable due to the presence of contaminants.

SAMPLE INFORMATION method limit/base current history1 history2 Sample Number Client Info PCA0084031 PCA0084233 PCA0070342 Sample Date Client Info 23 Oct 2023 04 Aug 2023 21 Apr 2023 Machine Age hrs Client Info 25859 25405 24885 Oil Changed Client Info 47177 1500 48315 Oil Changed Client Info Changed Changed Changed Sample Status NEG NEG NEG NEG Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM 05185m >100 61 100 40 WEAR METALS method limit/base current history1 history2 Iron ppm ASTM 05185m >20 <1 2 0 Glycol ppm ASTM 05185m >20	SUPER15W40 (- GAL)	r2015 Aug20	15 Feb2016 Sep2016	May2017 May2019 Feb2021 .	Jul2022	
Sample Date Client Info 23 Oct 2023 04 Aug 2023 21 Apr 2023 Machine Age hrs Client Info 25859 25405 24885 Oil Age hrs Client Info 47177 1500 48315 Oil Changed Client Info Changed NCRMAL CONTAMINATION method limit/base current history1 history2 Iron ppm ASTM DS185m >100 61 100 40 WEAR METALS method limit/base current history1 history2 Iron ppm ASTM DS185m >20 <1 2 0 Nickel ppm ASTM DS185m >22 0 <1 0 Nickel ppm ASTM DS185m >22 0 <1 0 Aluminum ppm ASTM DS185m >22 0 <1 <th>SAMPLE INFOR</th> <th>MATION</th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Sample Date Client Info 23 Oct 2023 04 Aug 2023 21 Apr 2023 Machine Age hrs Client Info 25859 25405 24885 Oil Age hrs Client Info 47177 1500 48315 Oil Changed Client Info Changed NCRMAL CONTAMINATION method limit/base current history1 history2 Iron ppm ASTM DS185m >100 61 100 40 WEAR METALS method limit/base current history1 history2 Iron ppm ASTM DS185m >20 <1	Sample Number		Client Info		PCA0084031	PCA0084233	PCA0070342
Machine Age hrs Client Info 25859 25405 24885 Oil Age hrs Client Info 47177 1500 48315 Oil Changed Changed Changed Changed Changed Changed Sample Status SEVERE SEVERE NCPMAL CONTAMINATION method Imitibase current history1 history2 WEAR METALS method Imitibase current history1 history2 Iron ppm ASTM D5186m >100 61 100 40 Chromium ppm ASTM D5186m >20 <1			Client Info		23 Oct 2023	04 Aug 2023	21 Apr 2023
Dil Age	•	hrs	Client Info			25405	
Contact Client Info	Oil Age	hrs	Client Info		47177	1500	48315
Sever Sever Sever Sever Normal	-		Client Info		Changed	Changed	Changed
CONTAMINATION method limit/base current history1 history2							_
WEAR METALS	•	ION	method	limit/base	current	history1	history2
Pron						•	
Chromium ppm ASTM D5185m >20 <1 2 0 Nickel ppm ASTM D5185m >2 <1	WEAR METAL	S	method	limit/base	current	history1	history2
Chromium	ron	nnm	ASTM D5185m	>100	61	100	40
Nickel	-						
Description							
Silver							
Aluminum							
Lead ppm ASTM D5185m >40 3 10 0 Copper ppm ASTM D5185m >330 6 9 38 Tin ppm ASTM D5185m >15 <1 2 0 Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 <1 0 Barium ppm ASTM D5185m 0 0 <1 0 Molybdenum ppm ASTM D5185m 0 55 31 60 Magnesium ppm ASTM D5185m 0 41 437 955 Calcium ppm ASTM D5185m 933 499 1081 Phosphorus ppm ASTM D5185m 1104 583 1254							
Copper ppm ASTM D5185m >330 6 9 38 Tin ppm ASTM D5185m >15 <1							
Tin							
Vanadium ppm ASTM D5185m 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 <1 0 Barium ppm ASTM D5185m 0 0 <1 0 Molybdenum ppm ASTM D5185m 0 55 31 60 Manganese ppm ASTM D5185m 0 <1 <1 Magnesium ppm ASTM D5185m 0 841 437 955 Calcium ppm ASTM D5185m 933 499 1081 Phosphorus ppm ASTM D5185m 933 499 1081 Zinc ppm ASTM D5185m 2941 1414 3184 CONTAMINANTS method limit/base current history1 history2 Silicon <td></td> <td></td> <td></td> <td></td> <th></th> <td></td> <td></td>							
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 <1				>15			
ADDITIVES							
Boron		ррпі	NI IOOI CU IVI CA		U	U	
Barium ppm ASTM D5185m 0 0 <1	ADDITIVES		method	limit/base		· ·	history2
Molybdenum ppm ASTM D5185m 0 55 31 60 Manganese ppm ASTM D5185m 0 <1 <1 Magnesium ppm ASTM D5185m 0 841 437 955 Calcium ppm ASTM D5185m 933 499 1081 Phosphorus ppm ASTM D5185m 849 466 998 Zinc ppm ASTM D5185m 1104 583 1254 Sulfur ppm ASTM D5185m 2941 1414 3184 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 7 6 3 Sodium ppm ASTM D5185m >0 2 1 Potassium ppm ASTM D5185m >20 2 <1	Boron						
Manganese ppm ASTM D5185m 0 <1 <1 Magnesium ppm ASTM D5185m 0 841 437 955 Calcium ppm ASTM D5185m 933 499 1081 Phosphorus ppm ASTM D5185m 849 466 998 Zinc ppm ASTM D5185m 1104 583 1254 Sulfur ppm ASTM D5185m 2941 1414 3184 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 7 6 3 Sodium ppm ASTM D5185m >20 2 -1 0 Potassium ppm ASTM D5185m >20 2 -1 0 Fuel % ASTM D5185m >20 2 -1 0 Fuel % ASTM D5185m >20 2 -1 0 Fuel							
Magnesium ppm ASTM D5185m 0 841 437 955 Calcium ppm ASTM D5185m 933 499 1081 Phosphorus ppm ASTM D5185m 849 466 998 Zinc ppm ASTM D5185m 1104 583 1254 Sulfur ppm ASTM D5185m 2941 1414 3184 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 7 6 3 Sodium ppm ASTM D5185m >20 2 -1 0 Potassium ppm ASTM D5185m >20 2 -1 0 Fuel % ASTM D3524 >5 9.7 51.5 <1.0	Barium	ppm	ASTM D5185m	0	0	<1	0
Calcium ppm ASTM D5185m 933 499 1081 Phosphorus ppm ASTM D5185m 849 466 998 Zinc ppm ASTM D5185m 1104 583 1254 Sulfur ppm ASTM D5185m 2941 1414 3184 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 7 6 3 Sodium ppm ASTM D5185m >20 2 1 0 Potassium ppm ASTM D5185m >20 2 -1 0 Fuel % ASTM D5185m >20 2 -1 0 Soot % <td>Barium Molybdenum</td> <td>ppm ppm</td> <td>ASTM D5185m ASTM D5185m</td> <td>0</td> <th>0 55</th> <td><1 31</td> <td>0 60</td>	Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m	0	0 55	<1 31	0 60
Phosphorus ppm ASTM D5185m 849 466 998 Zinc ppm ASTM D5185m 1104 583 1254 Sulfur ppm ASTM D5185m 2941 1414 3184 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 7 6 3 Sodium ppm ASTM D5185m >20 2 1 0 Potassium ppm ASTM D5185m >20 2 1 0 Fuel % ASTM D5185m >20 2 <1	Barium Molybdenum Manganese	ppm ppm	ASTM D5185m ASTM D5185m	0	0 55 0	<1 31	0 60 <1
Zinc ppm ASTM D5185m 1104 583 1254 Sulfur ppm ASTM D5185m 2941 1414 3184 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 7 6 3 Sodium ppm ASTM D5185m 0 2 1 Potassium ppm ASTM D5185m >20 2 <1	Barium Molybdenum Manganese Magnesium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0	0 55 0 841	<1 31 <1 437	0 60 <1 955
Sulfur ppm ASTM D5185m 2941 1414 3184 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 7 6 3 Sodium ppm ASTM D5185m 0 2 1 Potassium ppm ASTM D5185m >20 2 <1	Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0	0 55 0 841 933	<1 31 <1 437	0 60 <1 955
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 7 6 3 Sodium ppm ASTM D5185m 0 2 1 Potassium ppm ASTM D5185m >20 2 <1	Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0	0 55 0 841 933 849	<1 31 <1 437 499 466	0 60 <1 955 1081 998
Silicon ppm ASTM D5185m >25 7 6 3 Sodium ppm ASTM D5185m 0 2 1 Potassium ppm ASTM D5185m >20 2 <1 0 Fuel % ASTM D3524 >5 ● 9.7 ● 51.5 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 2.1 1 0.9 Nitration Abs/cm *ASTM D7624 >20 7.6 7.5 6.8 Sulfation Abs/.1mm *ASTM D7415 >30 20.6 15.6 18.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 12.9 9.3 13.7	Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0	0 55 0 841 933 849	<1 31 <1 437 499 466	0 60 <1 955 1081 998
Sodium ppm ASTM D5185m 0 2 1 Potassium ppm ASTM D5185m >20 2 <1	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	0	0 55 0 841 933 849 1104	<1 31 <1 437 499 466 583	0 60 <1 955 1081 998 1254
Potassium ppm ASTM D5185m >20 2 <1 0 Fuel % ASTM D3524 >5 ● 9.7 ● 51.5 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 2.1 1 0.9 Nitration Abs/cm *ASTM D7624 >20 7.6 7.5 6.8 Sulfation Abs/.1mm *ASTM D7415 >30 20.6 15.6 18.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 12.9 9.3 13.7	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0	0 55 0 841 933 849 1104 2941	<1 31 <1 437 499 466 583 1414	0 60 <1 955 1081 998 1254 3184
Fuel % ASTM D3524 >5 9.7 51.5 <1.0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 2.1 1 0.9 Nitration Abs/cm *ASTM D7624 >20 7.6 7.5 6.8 Sulfation Abs/.1mm *ASTM D7415 >30 20.6 15.6 18.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 12.9 9.3 13.7	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 0	0 55 0 841 933 849 1104 2941	<1 31 <1 437 499 466 583 1414 history1	0 60 <1 955 1081 998 1254 3184 history2
INFRA-RED	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	0 0 0	0 55 0 841 933 849 1104 2941 current	<1 31 <1 437 499 466 583 1414 history1	0 60 <1 955 1081 998 1254 3184 history2
Soot % % *ASTM D7844 >3 2.1 1 0.9 Nitration Abs/cm *ASTM D7624 >20 7.6 7.5 6.8 Sulfation Abs/.1mm *ASTM D7415 >30 20.6 15.6 18.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 12.9 9.3 13.7	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	0 0 0 0 limit/base >25	0 55 0 841 933 849 1104 2941 current 7	<1 31 <1 437 499 466 583 1414 history1 6 2 <1	0 60 <1 955 1081 998 1254 3184 history2
Nitration Abs/cm *ASTM D7624 >20 7.6 7.5 6.8 Sulfation Abs/.1mm *ASTM D7415 >30 20.6 15.6 18.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 12.9 9.3 13.7	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm	ASTM D5185m	0 0 0 0 limit/base >25 >20	0 55 0 841 933 849 1104 2941 current 7 0	<1 31 <1 437 499 466 583 1414 history1 6 2 <1	0 60 <1 955 1081 998 1254 3184 history2 3 1
Sulfation Abs/.1mm *ASTM D7415 >30 20.6 15.6 18.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 12.9 9.3 13.7	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel	ppm	ASTM D5185m	0 0 0 0 	0 55 0 841 933 849 1104 2941 current 7 0 2	<1 31 <1 437 499 466 583 1414 history1 6 2 <1	0 60 <1 955 1081 998 1254 3184 history2 3 1 0 <1.0
Sulfation Abs/.1mm *ASTM D7415 >30 20.6 15.6 18.3 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 12.9 9.3 13.7	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	0 0 0 0 limit/base >25 >20 >5 limit/base	0 55 0 841 933 849 1104 2941 current 7 0 2 9.7 current	<1 31 <1 437 499 466 583 1414 history1 6 2 <1 \$\int 51.5\$ history1	0 60 <1 955 1081 998 1254 3184 history2 3 1 0 <1.0 history2
Oxidation	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0 55 0 841 933 849 1104 2941 current 7 0 2 9.7 current 2.1	<1 31 <1 437 499 466 583 1414 history1 6 2 <1 \$\int 51.5\$ history1 1	0 60 <1 955 1081 998 1254 3184 history2 3 1 0 <1.0 history2
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration	ppm	ASTM D5185m ASTM D7844 *ASTM D7844	0 0 0 0 	0 55 0 841 933 849 1104 2941 current 7 0 2 9.7 current 2.1 7.6	<1 31 <1 437 499 466 583 1414 history1 6 2 <1 51.5 history1 1 7.5	0 60 <1 955 1081 998 1254 3184 history2 3 1 0 <1.0 history2 0.9 6.8
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration Sulfation	ppm	ASTM D5185m ASTM D76185m	0 0 0 0 limit/base >25 >20 >5 limit/base >3 >20 >30	0 55 0 841 933 849 1104 2941 current 7 0 2 9.7 current 2.1 7.6 20.6	<1 31 <1 437 499 466 583 1414 history1 6 2 <1 51.5 history1 1 7.5 15.6	0 60 <1 955 1081 998 1254 3184 history2 3 1 0 <1.0 history2 0.9 6.8 18.3
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium Fuel INFRA-RED Soot % Nitration Sulfation FLUID DEGRAI	ppm	ASTM D5185m Method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D7624 *ASTM D7624 *ASTM D76124 *ASTM D76124 *ASTM D76124	0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0 55 0 841 933 849 1104 2941 current 7 0 2 9.7 current 2.1 7.6 20.6 current	<1 31 <1 437 499 466 583 1414 history1 6 2 <1 51.5 history1 1 7.5 15.6 history1	0 60 <1 955 1081 998 1254 3184 history2 3 1 0 <1.0 history2 0.9 6.8 18.3 history2



OIL ANALYSIS REPORT





Laboratory Sample No. Lab Number

Unique Number

: PCA0084031 : 06002182 : 10735944

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

: 08 Nov 2023 Diagnosed

: 09 Nov 2023 Diagnostician : Wes Davis Test Package : MOB 1 (Additional Tests: PercentFuel, TBN)

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)

Kemp Quarries - River Valley - Arkoma

12971 HWY 9a Shawnee, OK US 74804

Contact:

arkomashop@kempquarries.net

T: F: