

OIL ANALYSIS REPORT

Sample Rating Trend

NORMAL

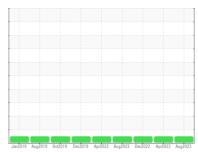


KEMP QUARRIES / RIVER VALLEY ARKOMA Machine Id OHT102

Component

Diesel Engine

MOBIL DELVAC 1300 SUPER15W40 (--- 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

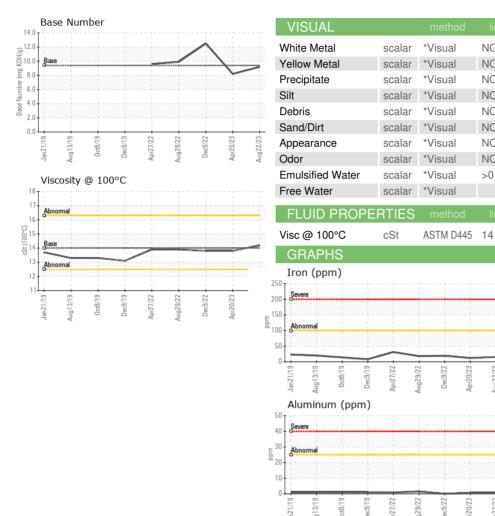
Fluid Condition

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

Client Info 22 Aug 2023 20 Apr 2023 09 Dec 2022	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 29115 28531 27903 27	Sample Number		Client Info		PCA0083933	PCA0070335	PCA0070465
Oil Changed	Sample Date		Client Info		22 Aug 2023	20 Apr 2023	09 Dec 2022
Cilient Info Changed Changed NORMAL NORMAL NORMAL	Machine Age	hrs	Client Info		29115	28531	27903
CONTAMINATION	Oil Age	hrs	Client Info		29115	28531	27903
CONTAMINATION method limit/base current history1 history2 Fuel WC Method >5 <1.0 <1.0 <1.0 Glycol WC Method NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >100 15 12 19 Chromium ppm ASTM D5185m >20 <1 0 <1 Nickel ppm ASTM D5185m >2 <1 0 <1 Silver ppm ASTM D5185m >2 <1 0 <1 Silver ppm ASTM D5185m >25 <1 <1 0 Aluminum ppm ASTM D5185m >20 0 <1 <1 Lead ppm ASTM D5185m >330 10 4 10 Tin ppm ASTM D5185m 0 2 8 23 B	Oil Changed		Client Info		Changed	Changed	Changed
Fuel	Sample Status				NORMAL	NORMAL	NORMAL
WEAR METALS method Imit/base current history1 history2 Iron ppm ASTM D5185m >100 15 12 19 Chromium ppm ASTM D5185m >20 <1 0 <1 Nickel ppm ASTM D5185m >2 <1 0 <1 Silver ppm ASTM D5185m >2 <1 0 <1 Silver ppm ASTM D5185m >2 <1 0 <1 Silver ppm ASTM D5185m >2 <1 0 <1 Aluminum ppm ASTM D5185m >25 <1 <1 0 Aluminum ppm ASTM D5185m >40 2 0 3 Copper ppm ASTM D5185m >40 2 0 3 Capper ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0	CONTAMINAT	ION	method	limit/base	current	history1	history2
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >100 15 12 19 Chromium ppm ASTM D5185m >20 <1 0 <1 Nickel ppm ASTM D5185m >2 <1 0 <1 Titanium ppm ASTM D5185m >2 <1 0 <1 Alluminum ppm ASTM D5185m >2 <1 <1 0 Alluminum ppm ASTM D5185m >2 <1 <1 0 Alluminum ppm ASTM D5185m >40 2 0 3 Copper ppm ASTM D5185m >40 2 0 3 Copper ppm ASTM D5185m >15 <1 0 <1 Vanadium ppm ASTM D5185m 0 0 0 <1 Vanadium ppm ASTM D5185m 0 2 <	Fuel		WC Method	>5	<1.0	<1.0	<1.0
Part	Glycol		WC Method		NEG	NEG	NEG
Chromium	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>100	15	12	19
Silver	Chromium	ppm	ASTM D5185m	>20	<1	0	<1
Silver	Nickel	ppm	ASTM D5185m	>2	<1	0	<1
Aluminum	Titanium	ppm	ASTM D5185m	>2	<1	0	<1
Lead	Silver	ppm	ASTM D5185m	>2	0	0	<1
Copper ppm ASTM D5185m >330 10 4 10 Tin ppm ASTM D5185m >15 <1 0 <1 Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 <1 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 2 8 23 Barium ppm ASTM D5185m 0 2 0 <1 Molybdenum ppm ASTM D5185m 0 64 60 57 Manganese ppm ASTM D5185m <1 <1 <1 <1 Magnesium ppm ASTM D5185m 0 955 968 904 Calcium ppm ASTM D5185m 1058 1013 1025 Zinc ppm ASTM D5185m 1229 1273 1241<	Aluminum	ppm	ASTM D5185m	>25	<1	<1	0
Tin	Lead	ppm	ASTM D5185m	>40	2	0	3
Vanadium ppm ASTM D5185m 0 0 0 Cadmium ppm ASTM D5185m 0 0 <1	Copper	ppm	ASTM D5185m	>330	10	4	10
Cadmium ppm ASTM D5185m 0 0 <1	Tin	ppm	ASTM D5185m	>15	<1	0	<1
ADDITIVES	Vanadium	ppm	ASTM D5185m		0	0	0
Boron	Cadmium	ppm	ASTM D5185m		0	0	<1
Barium ppm ASTM D5185m 0 2 0 <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 0 64 60 57 Manganese ppm ASTM D5185m <1	Paran		ACTM DE10Em	0	2	8	23
Manganese ppm ASTM D5185m <1	DOIOII	ppm	ASTIVI DOTOSITI	0		-	
Magnesium ppm ASTM D5185m 0 955 968 904 Calcium ppm ASTM D5185m 1114 1125 1100 Phosphorus ppm ASTM D5185m 1058 1013 1025 Zinc ppm ASTM D5185m 1229 1273 1241 Sulfur ppm ASTM D5185m 3314 3410 3603 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 4 5 Sodium ppm ASTM D5185m 8 13 43 Potassium ppm ASTM D5185m >20 <1 0 0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.8 0.5 0.4 Nitration Abs/.1mm *ASTM D7415 >30 18.6 16.6 18.4	Barium	• • • • • • • • • • • • • • • • • • • •					
Calcium ppm ASTM D5185m 1114 1125 1100 Phosphorus ppm ASTM D5185m 1058 1013 1025 Zinc ppm ASTM D5185m 1229 1273 1241 Sulfur ppm ASTM D5185m 3314 3410 3603 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 4 5 Sodium ppm ASTM D5185m 8 13 43 Potassium ppm ASTM D5185m >20 <1 0 0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.8 0.5 0.4 Nitration Abs/.1mm *ASTM D7624 >20 5.9 5.6 6.3 Sulfation Abs/.1mm *ASTM D7415 >30 18.6 16.6 18.4 <t< th=""><th></th><th>ppm</th><th>ASTM D5185m</th><th>0</th><th>2</th><th>0</th><th><1</th></t<>		ppm	ASTM D5185m	0	2	0	<1
Phosphorus ppm ASTM D5185m 1058 1013 1025 Zinc ppm ASTM D5185m 1229 1273 1241 Sulfur ppm ASTM D5185m 3314 3410 3603 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 4 5 Sodium ppm ASTM D5185m 8 13 43 Potassium ppm ASTM D5185m >20 <1 0 0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.8 0.5 0.4 Nitration Abs/cm *ASTM D7624 >20 5.9 5.6 6.3 Sulfation Abs/.1mm *ASTM D7415 >30 18.6 16.6 18.4 FLUID DEGRADATION method limit/base current history1 <th>Barium</th> <th>ppm</th> <th>ASTM D5185m ASTM D5185m</th> <th>0</th> <th>2 64</th> <th>0</th> <th><1 57</th>	Barium	ppm	ASTM D5185m ASTM D5185m	0	2 64	0	<1 57
Zinc ppm ASTM D5185m 1229 1273 1241 Sulfur ppm ASTM D5185m 3314 3410 3603 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 4 5 Sodium ppm ASTM D5185m 8 13 43 Potassium ppm ASTM D5185m >20 <1	Barium Molybdenum	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	0	2 64 <1	0 60 <1	<1 57 <1
Sulfur ppm ASTM D5185m 3314 3410 3603 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 4 5 Sodium ppm ASTM D5185m 8 13 43 Potassium ppm ASTM D5185m >20 <1 0 0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.8 0.5 0.4 Nitration Abs/cm *ASTM D7624 >20 5.9 5.6 6.3 Sulfation Abs/.1mm *ASTM D7415 >30 18.6 16.6 18.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.0 12.7 14.3	Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0	2 64 <1 955	0 60 <1 968	<1 57 <1 904
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 3 4 5 Sodium ppm ASTM D5185m 8 13 43 Potassium ppm ASTM D5185m >20 <1 0 0 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 >3 0.8 0.5 0.4 Nitration Abs/cm *ASTM D7624 >20 5.9 5.6 6.3 Sulfation Abs/.1mm *ASTM D7415 >30 18.6 16.6 18.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.0 12.7 14.3	Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0	2 64 <1 955 1114	0 60 <1 968 1125	<1 57 <1 904 1100
Silicon ppm ASTM D5185m >25 3 4 5 Sodium ppm ASTM D5185m 8 13 43 Potassium ppm ASTM D5185m >20 <1	Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0	2 64 <1 955 1114 1058	0 60 <1 968 1125 1013	<1 57 <1 904 1100 1025
Sodium ppm ASTM D5185m 8 13 43 Potassium ppm ASTM D5185m >20 <1	Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0	2 64 <1 955 1114 1058 1229	0 60 <1 968 1125 1013 1273	<1 57 <1 904 1100 1025 1241
Potassium ppm ASTM D5185m >20 <1	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	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	0 0 0 limit/base	2 64 <1 955 1114 1058 1229 3314	0 60 <1 968 1125 1013 1273 3410	<1 57 <1 904 1100 1025 1241 3603
INFRA-RED	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	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	0 0 0 limit/base	2 64 <1 955 1114 1058 1229 3314 current	0 60 <1 968 1125 1013 1273 3410 history1	<1 57 <1 904 1100 1025 1241 3603 history2
Soot % % *ASTM D7844 >3 0.8 0.5 0.4 Nitration Abs/cm *ASTM D7624 >20 5.9 5.6 6.3 Sulfation Abs/.1mm *ASTM D7415 >30 18.6 16.6 18.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.0 12.7 14.3	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	0 0 0 limit/base	2 64 <1 955 1114 1058 1229 3314 current	0 60 <1 968 1125 1013 1273 3410 history1	<1 57 <1 904 1100 1025 1241 3603 history2
Nitration Abs/cm *ASTM D7624 >20 5.9 5.6 6.3 Sulfation Abs/.1mm *ASTM D7415 >30 18.6 16.6 18.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.0 12.7 14.3	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	0 0 0 0 limit/base >25	2 64 <1 955 1114 1058 1229 3314 current 3	0 60 <1 968 1125 1013 1273 3410 history1 4	<1 57 <1 904 1100 1025 1241 3603 history2 5 43
Sulfation Abs/.1mm *ASTM D7415 >30 18.6 16.6 18.4 FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.0 12.7 14.3	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m	0 0 0 limit/base >25 >20	2 64 <1 955 1114 1058 1229 3314 current 3 8 <1	0 60 <1 968 1125 1013 1273 3410 history1 4 13	<1 57 <1 904 1100 1025 1241 3603 history2 5 43 0
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 13.0 12.7 14.3	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 0 limit/base >25 >20 limit/base	2 64 <1 955 1114 1058 1229 3314 current 3 8 <1	0 60 <1 968 1125 1013 1273 3410 history1 4 13 0	<1 57 <1 904 1100 1025 1241 3603 history2 5 43 0 history2
Oxidation Abs/.1mm *ASTM D7414 >25 13.0 12.7 14.3	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m method ASTM D5185m	0 0 0 0 limit/base >25 >20 limit/base >3	2 64 <1 955 1114 1058 1229 3314 current 3 8 <1	0 60 <1 968 1125 1013 1273 3410 history1 4 13 0 history1 0.5	<1 57 <1 904 1100 1025 1241 3603 history2 5 43 0 history2 0.4
	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	0 0 0 0 limit/base >25 >20 limit/base >3 >20	2 64 <1 955 1114 1058 1229 3314 current 3 8 <1 current 0.8 5.9	0 60 <1 968 1125 1013 1273 3410 history1 4 13 0 history1 0.5 5.6	<1 57 <1 904 1100 1025 1241 3603 history2 5 43 0 history2 0.4 6.3
	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 ppm ppm	ASTM D5185m Method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D7844 *ASTM D7624 *ASTM D76145	0 0 0 0 	2 64 <1 955 1114 1058 1229 3314 current 3 8 <1 current 0.8 5.9 18.6	0 60 <1 968 1125 1013 1273 3410 history1 4 13 0 history1 0.5 5.6 16.6	<1 57 <1 904 1100 1025 1241 3603 history2 5 43 0 history2 0.4 6.3 18.4
Base Number (BN) mg KOH/g ASTM D2896 9.4 9.2 8.2 12.5	Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINAN Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm	ASTM D5185m Method ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m Method *ASTM D7844 *ASTM D7844 *ASTM D7844 *ASTM D7844 *ASTM D7844	0 0 0 0 	2 64 <1 955 1114 1058 1229 3314 current 3 8 <1 current 0.8 5.9 18.6 current	0 60 <1 968 1125 1013 1273 3410 history1 4 13 0 history1 0.5 5.6 16.6 history1	<1 57 <1 904 1100 1025 1241 3603 history2 5 43 0 history2 0.4 6.3 18.4 history2



OIL ANALYSIS REPORT



VISUAL		method	limit/base	current	history1	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
Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG
	DTIEO		12 24 //		111	1111
FLUID PROPE	RHES	method				history2

14.2

13.8

13.8

GF	RAPI	-IS																
Iro	n (pp	m)							100	Lea	d (pp	om)						
Abn	ere								80 80 60 40	Abno								
Jan21/19	Aug13/19 -	Oct8/19 -	Dec9/19	Apr27/22	Aug29/22 -	Dec9/22 -	Apr20/23 -	Aug22/23	0	Jan21/19	Aug13/19	Oct8/19 -	Dec9/19 -	Apr27/22 +	Aug29/22	Dec9/22	Apr20/23	A72773
Alu	ıminu	m (pį	pm)						50	Chr		m (p	pm)					
Abn	ere								40 830 20	Abno								
Jan21/19	Aug13/19	0ct8/19	Dec9/19	Apr27/22	Aug29/22	Dec9/22	Apr20/23	Aug22/23	0	Jan21/19	Aug13/19	0ct8/19	Dec9/19	Apr27/22	Aug29/22	Dec9/22 -	Apr20/23	A22733
Co	pper	(ppm)						80	Silio	on (opm)						
Sam	eemal-								60 Ed 40 20	Abno								
Jan21/19	Aug13/19	Oct8/19 -	Dec9/19	Apr27/22 -	Aug29/22 -	Dec9/22	Apr20/23	Aug22/23	0	Jan21/19	Aug13/19	0ct8/19 -	Dec9/19	Apr27/22	Aug29/22	Dec9/22 -	Apr20/23	A11972773
Vis	cosity	@ 1	00°C							Bas		mber						
Abn	normal e								Base Number (mg KOH/g) 0.0	Base		1	1			\wedge		
7	normal								Base Number									
Jan21/19	Aug13/19 -	Oct8/19 -	Dec9/19 -	Apr27/22 +	Aug29/22 -	Dec9/22 +	Apr20/23 -	Aug22/23	0.0	Jan21/19	Aug13/19 -	Oct8/19 -	Dec9/19 -	Apr27/22 -	Aug29/22 -	Dec9/22 -	Apr20/23 -	Aug22/23





Certificate L2367

Laboratory Sample No. Lab Number

Unique Number : 10621888

: PCA0083933 : 05936617

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

Diagnosed Diagnostician : Don Baldridge Test Package : MOB 1 (Additional Tests: TBN)

: 29 Aug 2023

: 28 Aug 2023

Kemp Quarries - River Valley - Arkoma 12971 HWY 9a Shawnee, OK

US 74804 Contact:

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

arkomashop@kempquarries.net T:

* - 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)

Report Id: KEMSHA [WUSCAR] 05936617 (Generated: 08/29/2023 19:09:15) Rev: 1

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