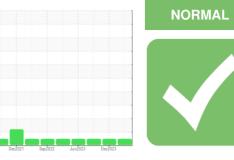


OIL ANALYSIS REPORT

SAMPLE INFORMATION metho

Sample Rating Trend



Area [150782] SGM32KHZP Component

Diesel Engine Fluid RED STAR 15W40 (--- GAL)

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor.

Wear

Metal levels are typical for a new component breaking in.

Contamination

There is no indication of any contamination in the oil.

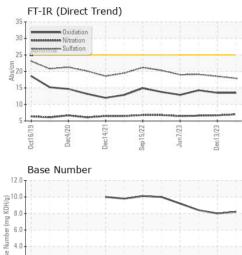
Fluid Condition

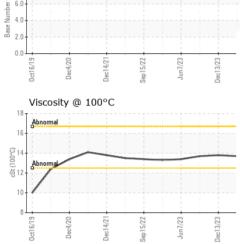
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SAMPLE INFORM		method	limit/base	current	nistory I	nistory2	
Sample Number		Client Info		WC0911428	WC0797335	WC0812671	
Sample Date		Client Info		08 Apr 2024	13 Dec 2023	13 Sep 2023	
Machine Age	hrs	Client Info		167	162	158	
Oil Age	hrs	Client Info		0	0	0	
Oil Changed		Client Info		Changed	N/A	Not Changd	
Sample Status				NORMAL	NORMAL	NORMAL	
	_						
CONTAMINATION	N	method	limit/base	current	history1	history2	
Fuel		WC Method	>5	<1.0	<1.0	<1.0	
Water		WC Method	>0.2	NEG	NEG	NEG	
Glycol		WC Method		NEG	NEG	NEG	
WEAR METALS		mathad	limit/booo	ourropt	bioton/1	history	
WEAR METALS		method	limit/base	current	history1	history2	
Iron	ppm	ASTM D5185m	>100	2	<1	2	
Chromium	ppm	ASTM D5185m	>20	<1	0	0	
Nickel	ppm	ASTM D5185m	>4	<1	0	<1	
Titanium	ppm	ASTM D5185m		31	23	20	
Silver	ppm	ASTM D5185m	>3	0	0	0	
Aluminum	ppm	ASTM D5185m	>20	2	2	3	
Lead	ppm	ASTM D5185m	>40	3	1	3	
Copper	ppm	ASTM D5185m	>330	4	3	4	
Tin	ppm	ASTM D5185m	>15	1	<1	1	
Vanadium	ppm	ASTM D5185m		<1	<1	<1	
Cadmium	ppm	ASTM D5185m		<1	0	0	
ADDITIVES		method	limit/base	current	history1	history2	
	maa		limit/base				
Boron	ppm ppm	ASTM D5185m	limit/base	124	110	121	
Boron Barium	ppm	ASTM D5185m ASTM D5185m	limit/base	124 0	110 0	121 0	
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	124 0 60	110 0 51	121 0 51	
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	124 0 60 <1	110 0 51 <1	121 0 51 0	
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	124 0 60 <1 211	110 0 51 <1 231	121 0 51 0 317	
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	124 0 60 <1 211 2129	110 0 51 <1 231 1878	121 0 51 0 317 1874	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	124 0 60 <1 211 2129 1177	110 0 51 <1 231 1878 931	121 0 51 0 317 1874 1001	
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	124 0 60 <1 211 2129 1177 1242	110 0 51 <1 231 1878 931 1190	121 0 51 0 317 1874 1001 1207	
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		124 0 60 <1 211 2129 1177 1242 4525	110 0 51 <1 231 1878 931 1190 3664	121 0 51 0 317 1874 1001 1207 4046	
Boron 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	limit/base	124 0 60 <1 211 2129 1177 1242	110 0 51 <1 231 1878 931 1190	121 0 51 0 317 1874 1001 1207	
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	limit/base	124 0 60 <1 211 2129 1177 1242 4525	110 0 51 <1 231 1878 931 1190 3664	121 0 51 0 317 1874 1001 1207 4046	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	124 0 60 <1 211 2129 1177 1242 4525 current	110 0 51 <1 231 1878 931 1190 3664 history1	121 0 51 0 317 1874 1001 1207 4046 history2	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m method	limit/base >25	124 0 60 <1 211 2129 1177 1242 4525 current 10	110 0 51 <1 231 1878 931 1190 3664 history1 7	121 0 51 0 317 1874 1001 1207 4046 history2 6	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	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 ASTM D5185m	limit/base >25	124 0 60 <1 211 2129 1177 1242 4525 <u>current</u> 10 25	110 0 51 <1 231 1878 931 1190 3664 history1 7 11	121 0 51 0 317 1874 1001 1207 4046 history2 6 17	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	limit/base >25 >20 limit/base	124 0 60 <1 211 2129 1177 1242 4525 current 10 25 4 x	110 0 51 <1 231 1878 931 1190 3664 history1 7 11 2 history1	121 0 51 0 317 1874 1001 1207 4046 history2 6 17 3	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	limit/base >25 >20 limit/base >3	124 0 60 <1 211 2129 1177 1242 4525 current 10 25 4 current 0.1	110 0 51 <1 231 1878 931 1190 3664 history1 7 11 2 history1 0.1	121 0 51 0 317 1874 1001 1207 4046 history2 6 17 3 history2 0.1	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	limit/base >25 >20 limit/base >3 >20	124 0 60 <1 211 2129 1177 1242 4525 current 10 25 4 current 0.1 7.0	110 0 51 <1 231 1878 931 1190 3664 history1 7 7 11 2 <i>history1</i> 0.1 6.7	121 0 51 0 317 1874 1001 1207 4046 history2 6 17 3 history2 0.1 6.6	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	limit/base >25 >20 limit/base >3 >20 >3 >20	124 0 60 <1 211 2129 1177 1242 4525 current 10 25 4 current 0.1 7.0 17.9	110 0 51 <1 231 1878 931 1190 3664 history1 7 11 2 history1 0.1 6.7 18.5	121 0 51 0 317 1874 1001 1207 4046 history2 6 17 3 history2 0.1 6.6 19.1	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	limit/base >25 >20 limit/base >3 >20	124 0 60 <1 211 2129 1177 1242 4525 current 10 25 4 current 0.1 7.0	110 0 51 <1 231 1878 931 1190 3664 history1 7 7 11 2 <i>history1</i> 0.1 6.7	121 0 51 0 317 1874 1001 1207 4046 history2 6 17 3 history2 0.1 6.6	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7624 *ASTM D7415	limit/base >25 >20 limit/base >3 >20 >3 >20	124 0 60 <1 211 2129 1177 1242 4525 current 10 25 4 current 0.1 7.0 17.9	110 0 51 <1 231 1878 931 1190 3664 history1 7 11 2 history1 0.1 6.7 18.5	121 0 51 0 317 1874 1001 1207 4046 history2 6 17 3 history2 0.1 6.6 19.1	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7624	limit/base >25 >20 limit/base >3 >20 >30 >30	124 0 60 <1 211 2129 1177 1242 4525 <i>current</i> 10 225 4 <i>current</i> 0.1 7.0 17.9 <i>current</i>	110 0 51 <1 231 1878 931 1190 3664 history1 7 11 2 history1 0.1 6.7 18.5 history1	121 0 51 0 317 1874 1001 1207 4046 history2 6 17 3 history2 0.1 6.6 19.1 history2	



OIL ANALYSIS REPORT





	VISUAL		method	limit/bas	se ci	urrent	histor	y1	history2	
	White Metal	scalar	*Visual	NONE	NO	NE	NONE	Ν	IONE	
Yellow Metal		scalar	*Visual	NONE	NONE		NONE	Ν	NONE NONE NONE	
	Precipitate Silt		*Visual	NONE			NONE	Ν		
			*Visual	NONE			NONE	Ν		
	Debris		*Visual	NONE	NONE		NONE	Ν	NONE	
Concernant Concernation of Concernation	Sand/Dirt	scalar	*Visual	NONE	NO	NE	NONE	Ν	IONE	
Jun //23 -	Appearance	scalar	*Visual	NORML	NO	RML	NORMI	_ N	IORML	
Jun7/23 Dec13/23	Odor	scalar	*Visual	NORML	NO	RML	NORMI	_ N	IORML	
	Emulsified Water	scalar	*Visual	>0.2	NEC	G	NEG		IEG	
	Free Water	scalar	*Visual		NEG		NEG		IEG	
	FLUID PROPERT	IES	method	limit/bas	se ci	urrent	histor	y1	history2	
	Visc @ 100°C	cSt	ASTM D445		13.7	7	13.8	1	3.7	
	GRAPHS									
	Iron (ppm)					(ppm)				
	250 Severe				80 Severe					
Jun7/23 Dec13/23	100				-				-	
n e	Abnormal				60 40 Abnom	ıal				
	100 - 4				40 4 4					
	50				20-					
	/19	/22 -	/23 -	/23	04	/20	4/21 -	/23 -	123	
	Oct16/19 Dec4/20 Dec14/21	Sep 15/22	Jun7/23	Dec13/23	0ct16/19	Dec4/20	Dec14/21 Sep15/22	Jun7/23	Dec13/23	
	Aluminum (ppm)	0,				mium (j				
	⁵⁰ T				50 T 3					
	40 - Severe			-	40 - Severe					
	= ³⁰				= ³⁰					
Jun//23 Dec13/23	20 - Abnormal				20 Abnom	al				
Decl	10-				10-					
	0				0					
	Oct16/19 Dec4/20 Dec14/21	Sep 15/22	Jun7/23	Dec13/23	Oct16/19	Dec4/20	Dec14/21 Sep15/22	Jun7/23	Dec13/23	
	0	Sep	٦٢	Dec	_			. nr	Dec	
	Copper (ppm)				Silico ⁸⁰ [Severe	n (ppm)			
	300 -				60 -					
	툡 200-				Abnom	al				
	100				20-					
	0				0					
	0ct16/19 Dec4/20	Sep 15/22	Jun7/23	Dec13/23	0ct16/19	Dec4/20	Dec14/21 Sep15/22	Jun7/23	Dec13/23	
)		ηr	Der				. nr	Dec	
	Viscosity @ 100°C		Base Numb			Numbe	er			
	Abnormal	(b) 10.0- 10.0- W (b) 10.0- 0.0- 10.								
	Q 14			, ma	× 8.0 -					
	(D-001) 312 Abnormal				6.0					
	10			Nas	4.0					
	8				0.0					
	Oct16/19 Dec4/20 Dec14/21	Sep 15/22	Jun7/23	Dec13/23	Oct16/19	Dec4/20	Dec14/21 Sep15/22	Jun7/23	Dec13/23	
	Dec De	Sep	'nſ	Dec	Oct	Ď	Sep Dei	. nr	Dec	
Laboratory	: WearCheck USA - 50	1 Madica		/ NC 9751	3		NATION		ER CORP	
Sample No.	: WC0911428	Rece		5 Apr 2024					EN CONP	
	: 06148442	Teste		6 Apr 2024					EIGH, NC	
Unique Number			nosed : 10	6 Apr 2024		ris			US 27616	
Test Package	: MOB 1 (Additional Te	ests: TBN					Contact: BRANDON RICE			

- Unique Number : 10 Test Package : MOB 1 (Additional Tests: TBN)
- To discuss this sample report, contact Customer Service at 1-800-237-1369.

brandon.rice@natpow.com T: F: (919)790-9714

Report Id: NATRAL [WUSCAR] 06148442 (Generated: 04/16/2024 10:31:10) Rev: 1

Certificate 12367

Contact/Location: BRANDON RICE - NATRAL

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