

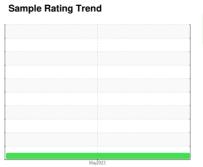
## **OIL ANALYSIS REPORT**



Machine Id CATERPILLAR GM01 - DA LUBRICANT BLUE FLAME HB-5 SAE 40 (S/N LGS00177)
Component

Component New (Unused) Oil

D-A Lubricant Blue Flame HB-8 40W (--- GAL)





## DIAGNOSIS

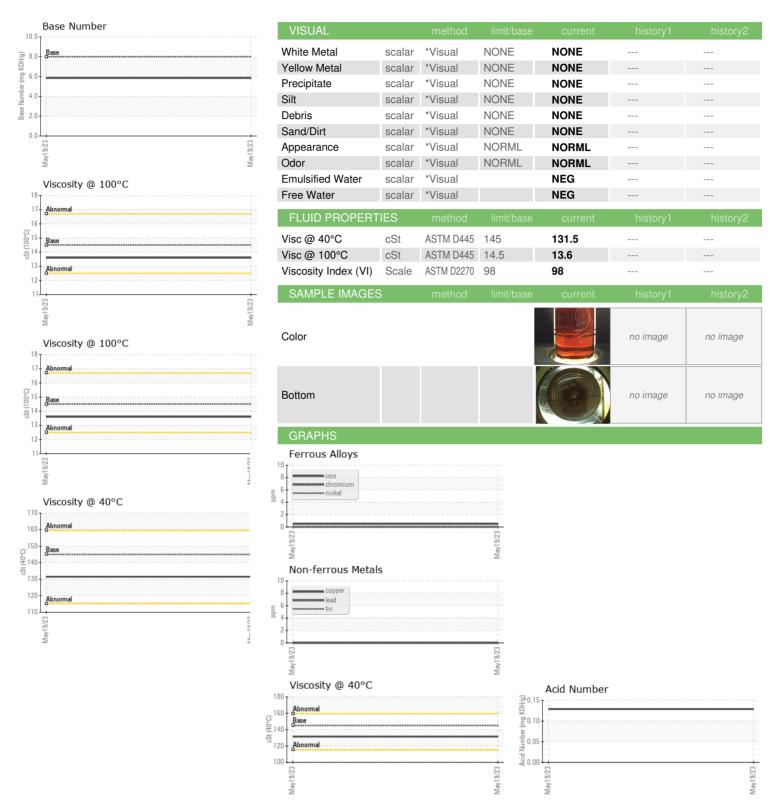
## Recommendation

This is a baseline read-out on the submitted sample.

Water         WC Method         NEG            WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         <1             Chromium         ppm         ASTM D5185m         0             Nickel         ppm         ASTM D5185m         0             Titanium         ppm         ASTM D5185m         0             Aluminum         ppm         ASTM D5185m         0             Aluminum         ppm         ASTM D5185m         0             Lead         ppm         ASTM D5185m         0             Lead         ppm         ASTM D5185m         0             Copper         ppm         ASTM D5185m         0             Tin         ppm         ASTM D5185m         0             Vanadium         ppm         ASTM D5185m         0             Cadmium         ppm	SAMPLE INFORM	/ATION	method	limit/base	current	history1	history2
Sample Date         Client Info         19 May 2023             Machine Age         hrs         Client Info         0             Oil Age         hrs         Client Info         0             Oil Changed         Client Info         N/A             Sample Status         NORMAL             CONTAMINATION         method         Imitibase         current         history1         history2           Water         WC Method         NEG             WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         0             Chromium         ppm	Sample Number		Client Info		WC0760088		
Oil Age         hrs         Client Info         N/A			Client Info		19 May 2023		
Oil Changed Sample Status         Client Info         N/A	Machine Age	hrs	Client Info		0		
Sample Status	Oil Age	hrs	Client Info		0		
CONTAMINATION         method         limit/base         current         history1         history1           Water         WC Method         NEG             WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         0             Chromium         ppm         ASTM D5185m         0             Nickel         ppm         ASTM D5185m         0             Silver         ppm         ASTM D5185m         0             ALuminum         ppm         ASTM D5185m         0             Lead         ppm         ASTM D5185m         0             Copper         ppm         ASTM D5185m         0             Vanadium         ppm         ASTM D5185m         0             Vanadium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         0	Oil Changed		Client Info		N/A		
Water         WC Method         NEG	Sample Status				NORMAL		
WEAR METALS         method         limit/base         current         history1         history1           Iron         ppm         ASTM D5185m         <1             Chromium         ppm         ASTM D5185m         0             Nickel         ppm         ASTM D5185m         0             Titanium         ppm         ASTM D5185m         0             Silver         ppm         ASTM D5185m         0             Aluminum         ppm         ASTM D5185m         0             Lead         ppm         ASTM D5185m         0             Copper         ppm         ASTM D5185m         0             Tin         ppm         ASTM D5185m         0             Vanadium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         0             ADDITIVES         method         limit/base         current         history1         history1     <	CONTAMINATION	V	method	limit/base	current	history1	history2
Iron	Water		WC Method		NEG		
Chromium         ppm         ASTM D5185m         0             Nickel         ppm         ASTM D5185m         0             Titanium         ppm         ASTM D5185m         0             Silver         ppm         ASTM D5185m         0             Aluminum         ppm         ASTM D5185m         0             Lead         ppm         ASTM D5185m         0             Copper         ppm         ASTM D5185m         0             Tin         ppm         ASTM D5185m         0             Vanadium         ppm         ASTM D5185m         0             Vanadium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         0             Boron         ppm         ASTM D5185m         0             Barium         ppm         ASTM D5185m         0             Molybdenum	WEAR METALS		method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m		<1		
Titanium	Chromium	ppm	ASTM D5185m		0		
Silver         ppm         ASTM D5185m         0             Aluminum         ppm         ASTM D5185m         1             Lead         ppm         ASTM D5185m         0             Copper         ppm         ASTM D5185m         0             Tin         ppm         ASTM D5185m         0             Vanadium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         0             ADDITIVES         method         limit/base         current         history1         history1           Boron         ppm         ASTM D5185m         1             Barium         ppm         ASTM D5185m         0             Molybdenum         ppm         ASTM D5185m         0             Magnesium         ppm         ASTM D5185m         7             Magnesium         ppm         ASTM D5185m         1273	Nickel	ppm	ASTM D5185m		0		
Silver         ppm         ASTM D5185m         0             Aluminum         ppm         ASTM D5185m         1             Lead         ppm         ASTM D5185m         0             Copper         ppm         ASTM D5185m         0             Tin         ppm         ASTM D5185m         0             Vanadium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         1             Boron         ppm         ASTM D5185m         0             Barium         ppm         ASTM D5185m         0             Molybdenum         ppm         ASTM D5185m         0             Magnesium         ppm         ASTM D5185m         7             Calcium         ppm         ASTM D5185m         1273             Phosphorus	Titanium	ppm	ASTM D5185m		0		
Lead         ppm         ASTM D5185m         0             Copper         ppm         ASTM D5185m         0             Tin         ppm         ASTM D5185m         0             Vanadium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         1             Boron         ppm         ASTM D5185m         0             Barium         ppm         ASTM D5185m         0             Molybdenum         ppm         ASTM D5185m         0             Magnesium         ppm         ASTM D5185m         7             Magnesium         ppm         ASTM D5185m         1273             Phosphorus         ppm         ASTM D5185m         278             Sulfur         ppm         ASTM D5185m         355             Su	Silver	ppm	ASTM D5185m		0		
Copper         ppm         ASTM D5185m         0             Tin         ppm         ASTM D5185m         0             Vanadium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         1             Boron         ppm         ASTM D5185m         0             Barium         ppm         ASTM D5185m         0             Molybdenum         ppm         ASTM D5185m         1             Magnesium         ppm         ASTM D5185m         7             Magnesium         ppm         ASTM D5185m         1273             Phosphorus         ppm         ASTM D5185m         278             Zinc         ppm         ASTM D5185m         2932             Sulfur         ppm         ASTM D5185m         5             S	Aluminum	ppm	ASTM D5185m		1		
Tin	Lead	ppm	ASTM D5185m		0		
Vanadium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         0             ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         1             Barium         ppm         ASTM D5185m         0             Molybdenum         ppm         ASTM D5185m         1             Manganese         ppm         ASTM D5185m         7             Magnesium         ppm         ASTM D5185m         1273             Calcium         ppm         ASTM D5185m         278             Phosphorus         ppm         ASTM D5185m         355             Zinc         ppm         ASTM D5185m         2932             Sulfur         ppm         ASTM D5185m         5             Sodium         ppm         ASTM D5185m         0 </td <td>Copper</td> <td>ppm</td> <td>ASTM D5185m</td> <td></td> <td>0</td> <td></td> <td></td>	Copper	ppm	ASTM D5185m		0		
Cadmium         ppm         ASTM D5185m         0             ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         1             Barium         ppm         ASTM D5185m         0             Molybdenum         ppm         ASTM D5185m         1             Manganese         ppm         ASTM D5185m         7             Magnesium         ppm         ASTM D5185m         7             Calcium         ppm         ASTM D5185m         278             Phosphorus         ppm         ASTM D5185m         355             Zinc         ppm         ASTM D5185m         2932             Sulfur         ppm         ASTM D5185m         5             CONTAMINANTS         method         limit/base         current         history1         history2           Sodium         ppm         ASTM D5185m         >20         1	Tin	ppm	ASTM D5185m		0		
ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         1             Barium         ppm         ASTM D5185m         0             Molybdenum         ppm         ASTM D5185m         1             Manganese         ppm         ASTM D5185m         7             Magnesium         ppm         ASTM D5185m         1273             Calcium         ppm         ASTM D5185m         278             Phosphorus         ppm         ASTM D5185m         355             Zinc         ppm         ASTM D5185m         2932             Sulfur         ppm         ASTM D5185m         5             Silicon         ppm         ASTM D5185m         5             Sodium         ppm         ASTM D5185m         0             Potassium         ppm         ASTM D5185m         >20         1	Vanadium	ppm	ASTM D5185m		0		
Boron   ppm   ASTM D5185m   1	Cadmium	ppm	ASTM D5185m		0		
Barium         ppm         ASTM D5185m         0             Molybdenum         ppm         ASTM D5185m         1             Manganese         ppm         ASTM D5185m         0             Magnesium         ppm         ASTM D5185m         7             Calcium         ppm         ASTM D5185m         1273             Phosphorus         ppm         ASTM D5185m         278             Zinc         ppm         ASTM D5185m         355             Sulfur         ppm         ASTM D5185m         2932             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         5             Sodium         ppm         ASTM D5185m         0             Potassium         ppm         ASTM D5185m         >20         1             FLUID DEGRADATION         method         limit/base         current	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         1             Manganese         ppm         ASTM D5185m         0             Magnesium         ppm         ASTM D5185m         7             Calcium         ppm         ASTM D5185m         1273             Phosphorus         ppm         ASTM D5185m         278             Zinc         ppm         ASTM D5185m         355             Sulfur         ppm         ASTM D5185m         2932             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         5             Sodium         ppm         ASTM D5185m         0             Potassium         ppm         ASTM D5185m         >20         1             FLUID DEGRADATION         method         limit/base         current         history1         history1           Acid Number (AN)         mg KOH/g         ASTM D8045 <td>Boron</td> <td>ppm</td> <td>ASTM D5185m</td> <td></td> <td>1</td> <td></td> <td></td>	Boron	ppm	ASTM D5185m		1		
Manganese         ppm         ASTM D5185m         0             Magnesium         ppm         ASTM D5185m         7             Calcium         ppm         ASTM D5185m         1273             Phosphorus         ppm         ASTM D5185m         278             Zinc         ppm         ASTM D5185m         355             Sulfur         ppm         ASTM D5185m         2932             CONTAMINANTS         method         limit/base         current         history1         history3           Silicon         ppm         ASTM D5185m         5             Sodium         ppm         ASTM D5185m         0             FLUID DEGRADATION         method         limit/base         current         history1         history1           Acid Number (AN)         mg KOH/g         ASTM D8045         0.129	Barium	ppm	ASTM D5185m		0		
Magnesium         ppm         ASTM D5185m         7             Calcium         ppm         ASTM D5185m         1273             Phosphorus         ppm         ASTM D5185m         278             Zinc         ppm         ASTM D5185m         355             Sulfur         ppm         ASTM D5185m         2932             CONTAMINANTS         method         limit/base         current         history1         history1           Silicon         ppm         ASTM D5185m         5             Sodium         ppm         ASTM D5185m         0             Potassium         ppm         ASTM D5185m         >20         1             FLUID DEGRADATION         method         limit/base         current         history1         history1           Acid Number (AN)         mg KOH/g         ASTM D8045         0.129	Molybdenum	ppm	ASTM D5185m		1		
Calcium         ppm         ASTM D5185m         1273             Phosphorus         ppm         ASTM D5185m         278             Zinc         ppm         ASTM D5185m         355             Sulfur         ppm         ASTM D5185m         2932             CONTAMINANTS         method         limit/base         current         history1         history1           Silicon         ppm         ASTM D5185m         5             Sodium         ppm         ASTM D5185m         0             Potassium         ppm         ASTM D5185m         >20         1             FLUID DEGRADATION         method         limit/base         current         history1         history1           Acid Number (AN)         mg KOH/g         ASTM D8045         0.129	Manganese	ppm	ASTM D5185m		0		
Phosphorus         ppm         ASTM D5185m         278             Zinc         ppm         ASTM D5185m         355             Sulfur         ppm         ASTM D5185m         2932             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         5             Sodium         ppm         ASTM D5185m         0             Potassium         ppm         ASTM D5185m         >20         1             FLUID DEGRADATION         method         limit/base         current         history1         history1           Acid Number (AN)         mg KOH/g         ASTM D8045         0.129	Magnesium	ppm	ASTM D5185m		7		
Zinc         ppm         ASTM D5185m         355             Sulfur         ppm         ASTM D5185m         2932             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         5             Sodium         ppm         ASTM D5185m         0             Potassium         ppm         ASTM D5185m         >20         1             FLUID DEGRADATION         method         limit/base         current         history1         history2           Acid Number (AN)         mg KOH/g         ASTM D8045         0.129	Calcium	ppm	ASTM D5185m		1273		
Sulfur         ppm         ASTM D5185m         2932             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         5             Sodium         ppm         ASTM D5185m         0             Potassium         ppm         ASTM D5185m         >20         1             FLUID DEGRADATION         method         limit/base         current         history1         history2           Acid Number (AN)         mg KOH/g         ASTM D8045         0.129	Phosphorus	ppm	ASTM D5185m		278		
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         5             Sodium         ppm         ASTM D5185m         0             Potassium         ppm         ASTM D5185m         >20         1             FLUID DEGRADATION         method         limit/base         current         history1         history2           Acid Number (AN)         mg KOH/g         ASTM D8045         0.129	Zinc	ppm	ASTM D5185m		355		
Silicon         ppm         ASTM D5185m         5             Sodium         ppm         ASTM D5185m         0             Potassium         ppm         ASTM D5185m         >20         1             FLUID DEGRADATION         method         limit/base         current         history1         history2           Acid Number (AN)         mg KOH/g         ASTM D8045         0.129	Sulfur	ppm	ASTM D5185m		2932		
Sodium         ppm         ASTM D5185m         0             Potassium         ppm         ASTM D5185m         >20         1             FLUID DEGRADATION         method         limit/base         current         history1         history1           Acid Number (AN)         mg KOH/g         ASTM D8045         0.129	CONTAMINANTS	;	method	limit/base	current	history1	history2
Potassium         ppm         ASTM D5185m         >20         1             FLUID DEGRADATION         method         limit/base         current         history1         history2           Acid Number (AN)         mg KOH/g         ASTM D8045         0.129	Silicon	ppm	ASTM D5185m		5		
FLUID DEGRADATION method limit/base current history1 history:  Acid Number (AN) mg KOH/g ASTM D8045 0.129	Sodium	ppm	ASTM D5185m		0		
Acid Number (AN) mg KOH/g ASTM D8045 0.129	Potassium	ppm	ASTM D5185m	>20	1		
	FLUID DEGRADA	ATION	method	limit/base	current	history1	history2
Base Number (BN)   mg KOH/g   ASTM D2896   8   5.85	Acid Number (AN)	mg KOH/g	ASTM D8045		0.129		
	Base Number (BN)	mg KOH/g	ASTM D2896	8	5.85		



## **OIL ANALYSIS REPORT**







Certificate 12367

Laboratory Sample No.

: WC0760088 Lab Number : 05854735 Unique Number : 10484090

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received : 23 May 2023 **Tested** : 25 May 2023

Diagnosed : 25 May 2023 - Jonathan Hester

Test Package : MOB 2 ( Additional Tests: FT-IR, ICP-NewOil, KV100, PrtCount, TBN, VI Contact: THOMAS BURTON To discuss this sample report, contact Customer Service at 1-800-237-1369. thomas.burton@cubedistrictenergy.com

 $^st$  - 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)

**ONSLOW** 

US 28540

T:

F:

465 MEADOWVIEW RD

JACKSONVILLE, NC