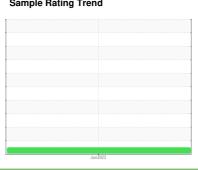


# **OIL ANALYSIS REPORT**

Sample Rating Trend



**NORMAL** 



70-PC-23 (S/N 429)

**Hydraulic System** 

MILITARY MIL-PRF-87257 (--- LTR)

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### Recommendation

Resample at the next service interval to monitor.

All component wear rates are normal.

#### Contamination

There is no indication of any contamination in the oil. The amount and size of particulates present in the system are acceptable.

### **Fluid Condition**

The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

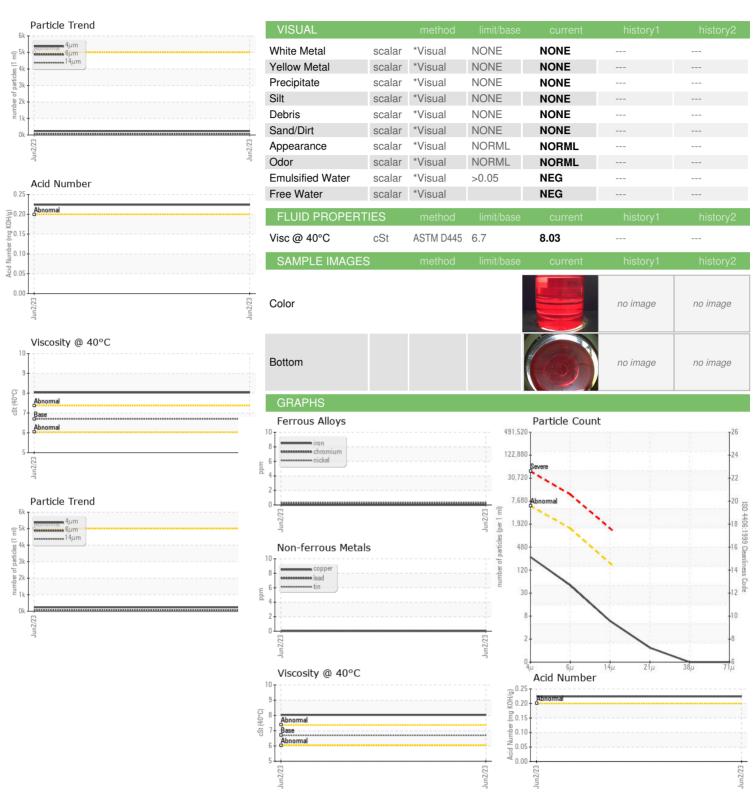
SAMPLE INFORMATION   method   limit/base   current   history1   history2					Jun2023		
Sample Number   Client Info   WC0804048	SAMPLE INFORM	ΙΔΤΙΩΝ	method			history1	history2
Sample Date   Client Info   02 Jun 2023		17 (1101)		mmodasc			
Machine Age Oil Age         hrs Oilent Info         0	·						
Oil Age         hrs         Client Info         N/A             Sample Status         Client Info         N/A             WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >20         0             Chromium         ppm         ASTM D5185m         >20         0             Nickel         ppm         ASTM D5185m         >20         0             Titanium         ppm         ASTM D5185m         0             Aluminum         ppm         ASTM D5185m         0             Aluminum         ppm         ASTM D5185m         20         0             Lead         ppm         ASTM D5185m         >20         0             Copper         ppm         ASTM D5185m         >20         0             Vanadium         ppm         ASTM D5185m         0             Abdition         pp	·	bro					
Oil Changed Sample Status         Client Info         N/A					-		
WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >20         0             Nickel         ppm         ASTM D5185m         >20         <1             Titanium         ppm         ASTM D5185m         0             Silver         ppm         ASTM D5185m         0             Silver         ppm         ASTM D5185m         0             Aluminum         ppm         ASTM D5185m         0             Lead         ppm         ASTM D5185m         >20         0             Copper         ppm         ASTM D5185m         >20         0             Tin         ppm         ASTM D5185m         0         0             Vanadium         ppm         ASTM D5185m         0         0             Boron         ppm         ASTM D5185m         0             Barium         ppm </th <th>-</th> <th>IIIS</th> <th></th> <th></th> <th>-</th> <th></th> <th></th>	-	IIIS			-		
WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >20         0             Nickel         ppm         ASTM D5185m         >20         <1             Nickel         ppm         ASTM D5185m         0             Silver         ppm         ASTM D5185m         0             Aluminum         ppm         ASTM D5185m         >20         0             Lead         ppm         ASTM D5185m         >20         0             Lead         ppm         ASTM D5185m         >20         0             Copper         ppm         ASTM D5185m         0             Tin         ppm         ASTM D5185m         0             Cadium         ppm         ASTM D5185m         0             Boron         ppm         ASTM D5185m         0             Molybdenum         ppm         AST			Client inio				
Iron					NORWAL		
Chromium         ppm         ASTM D5185m         ≥20         0             Nickel         ppm         ASTM D5185m         >20         <1             Titanium         ppm         ASTM D5185m         0             Silver         ppm         ASTM D5185m         0             Aluminum         ppm         ASTM D5185m         >20         0             Lead         ppm         ASTM D5185m         >20         0             Copper         ppm         ASTM D5185m         >20         0             Vanadium         ppm         ASTM D5185m         0              Vanadium         ppm         ASTM D5185m         0              Cadmium         ppm         ASTM D5185m         0              Boron         ppm         ASTM D5185m         0              Malegaese         ppm         ASTM D5185m         0	WEAR METALS		method	limit/base	current	history1	history2
Nickel         ppm         ASTM D5185m         >20         <1             Titanium         ppm         ASTM D5185m         0             Silver         ppm         ASTM D5185m         0             Aluminum         ppm         ASTM D5185m         >20         0             Lead         ppm         ASTM D5185m         >20         0             Copper         ppm         ASTM D5185m         >20         0             Tin         ppm         ASTM D5185m         >20         0             Vanadium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         0             ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0             Barium         ppm         ASTM D5185m         0             Molybdenum         ppm	Iron	ppm	ASTM D5185m	>20	0		
Titanium         ppm         ASTM D5185m         0             Silver         ppm         ASTM D5185m         0             Aluminum         ppm         ASTM D5185m         >20         0             Lead         ppm         ASTM D5185m         >20         0             Copper         ppm         ASTM D5185m         >20         0             Tin         ppm         ASTM D5185m         >20         0             Vanadium         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         0             Barium         ppm         ASTM D5185m         0             Magnesium         ppm         ASTM D5185m	Chromium	ppm	ASTM D5185m	>20	0		
Silver	Nickel	ppm	ASTM D5185m	>20	<1		
Aluminum         ppm         ASTM D5185m         >20         0             Lead         ppm         ASTM D5185m         >20         0             Copper         ppm         ASTM D5185m         >20         0             Tin         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         0             Molybdenum         ppm         ASTM D5185m         0             Manganese         ppm         ASTM D5185m         0             Manganesium         ppm         ASTM D5185m         0             Phosphorus         ppm         ASTM D5185m         0             Phosphorus         ppm         ASTM D5185m         <	Titanium	ppm	ASTM D5185m		0		
Lead         ppm         ASTM D5185m         >20         0             Copper         ppm         ASTM D5185m         >20         0             Tin         ppm         ASTM D5185m         >20         0             Vanadium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         0             ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0             Barium         ppm         ASTM D5185m         0             Molybdenum         ppm         ASTM D5185m         0             Manganese         ppm         ASTM D5185m         0             Magnesium         ppm         ASTM D5185m         0             Phosphorus         ppm         ASTM D5185m         0             Sulfur         ppm         ASTM D5185m         0 <td>Silver</td> <td>ppm</td> <td>ASTM D5185m</td> <td></td> <th>0</th> <td></td> <td></td>	Silver	ppm	ASTM D5185m		0		
Copper         ppm         ASTM D5185m         >20         0             Tin         ppm         ASTM D5185m         >20         0             Vanadium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         0             ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0             Barium         ppm         ASTM D5185m         0             Molybdenum         ppm         ASTM D5185m         0             Magnese         ppm         ASTM D5185m         0             Magnesium         ppm         ASTM D5185m         0             Phosphorus         ppm         ASTM D5185m         0             Sulfur         ppm         ASTM D5185m         0             Sulfur         ppm         ASTM D5185m         0 <td>Aluminum</td> <td>ppm</td> <td>ASTM D5185m</td> <td>&gt;20</td> <th>0</th> <td></td> <td></td>	Aluminum	ppm	ASTM D5185m	>20	0		
Tin	Lead	ppm	ASTM D5185m	>20	0		
Vanadium         ppm         ASTM D5185m         0             Cadmium         ppm         ASTM D5185m         0             ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0             Barium         ppm         ASTM D5185m         0             Molybdenum         ppm         ASTM D5185m         0             Manganese         ppm         ASTM D5185m         0             Magnesium         ppm         ASTM D5185m         0             Phosphorus         ppm         ASTM D5185m         0             Phosphorus         ppm         ASTM D5185m         0             Zinc         ppm         ASTM D5185m         0             Sulfur         ppm         ASTM D5185m         >15         13             Sodium         ppm         ASTM D5185m         >0 <t< td=""><td>Copper</td><td>ppm</td><td>ASTM D5185m</td><td>&gt;20</td><th>0</th><td></td><td></td></t<>	Copper	ppm	ASTM D5185m	>20	0		
Cadmium         ppm         ASTM D5185m         0             Boron         ppm         ASTM D5185m         0             Barium         ppm         ASTM D5185m         0             Molybdenum         ppm         ASTM D5185m         0             Manganese         ppm         ASTM D5185m         0             Magnesium         ppm         ASTM D5185m         0             Calcium         ppm         ASTM D5185m         0             Phosphorus         ppm         ASTM D5185m         0             Zinc         ppm         ASTM D5185m         0             Sulfur         ppm         ASTM D5185m         5         13             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >15         13             Potassium         ppm         ASTM D5185m         >20	Tin	ppm	ASTM D5185m	>20	0		
ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0             Barium         ppm         ASTM D5185m         0             Molybdenum         ppm         ASTM D5185m         0             Manganese         ppm         ASTM D5185m         0             Magnesium         ppm         ASTM D5185m         0             Calcium         ppm         ASTM D5185m         0             Phosphorus         ppm         ASTM D5185m         0             Zinc         ppm         ASTM D5185m         0             Sulfur         ppm         ASTM D5185m         61             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >15         13             Sodium         ppm         ASTM D5185m         >20 <t< td=""><td>Vanadium</td><td>ppm</td><td>ASTM D5185m</td><td></td><th>0</th><td></td><td></td></t<>	Vanadium	ppm	ASTM D5185m		0		
Boron   ppm   ASTM D5185m   0             Barium   ppm   ASTM D5185m   0           Molybdenum   ppm   ASTM D5185m   0           Magnaese   ppm   ASTM D5185m   0           Magnesium   ppm   ASTM D5185m   0           Calcium   ppm   ASTM D5185m   0           Phosphorus   ppm   ASTM D5185m   210           Zinc   ppm   ASTM D5185m   0           Zinc   ppm   ASTM D5185m   0           Sulfur   ppm   ASTM D5185m   0           CONTAMINANTS   method   limit/base   current   history1   history2       Silicon   ppm   ASTM D5185m   > 15   13           Sodium   ppm   ASTM D5185m   > 20   <1           FLUID CLEANLINESS   method   limit/base   current   history1   history2       Particles > 4μm   ASTM D7647   > 5000   233           Particles > 14μm   ASTM D7647   > 160   5           Particles > 21μm   ASTM D7647   > 160   5           Particles > 38μm   ASTM D7647   > 10   0           Particles > 71μm   ASTM D7647   > 3   0           Oil Cleanliness   ISO 4406 (c)   > 19/17/14   15/13/10	Cadmium	ppm	ASTM D5185m		0		
Barium	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum   ppm   ASTM D5185m   0         Manganese   ppm   ASTM D5185m   0         Magnesium   ppm   ASTM D5185m   0         Calcium   ppm   ASTM D5185m   0         Phosphorus   ppm   ASTM D5185m   210       Zinc   ppm   ASTM D5185m   0         Sulfur   ppm   ASTM D5185m   61         CONTAMINANTS   method   limit/base   current   history1   history2     Silicon   ppm   ASTM D5185m   0         Sodium   ppm   ASTM D5185m   0         Potassium   ppm   ASTM D5185m   >20   <1         FLUID CLEANLINESS   method   limit/base   current   history1   history2     Particles >4μm   ASTM D7647   >5000   233         Particles >6μm   ASTM D7647   >160   5         Particles >21μm   ASTM D7647   >40   1         Particles >38μm   ASTM D7647   >3   0         Particles >71μm   ASTM D7647   >3   0         Oil Cleanliness   ISO 4406 (c)   >19/17/14   15/13/10	Boron	ppm	ASTM D5185m		0		
Manganese         ppm         ASTM D5185m         0             Magnesium         ppm         ASTM D5185m         0             Calcium         ppm         ASTM D5185m         0             Phosphorus         ppm         ASTM D5185m         0             Zinc         ppm         ASTM D5185m         0             Sulfur         ppm         ASTM D5185m         61             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >15         13             Sodium         ppm         ASTM D5185m         >0             Potassium         ppm         ASTM D5185m         >20         <1	Barium	ppm	ASTM D5185m		0		
Magnesium         ppm         ASTM D5185m         0             Calcium         ppm         ASTM D5185m         0             Phosphorus         ppm         ASTM D5185m         0             Zinc         ppm         ASTM D5185m         0             Sulfur         ppm         ASTM D5185m         61             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >15         13             Sodium         ppm         ASTM D5185m         >20         <1	Molybdenum	ppm	ASTM D5185m		0		
Calcium         ppm         ASTM D5185m         0             Phosphorus         ppm         ASTM D5185m         210             Zinc         ppm         ASTM D5185m         0             Sulfur         ppm         ASTM D5185m         61             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >15         13             Sodium         ppm         ASTM D5185m         >0              Potassium         ppm         ASTM D5185m         >20         <1	Manganese	ppm	ASTM D5185m		0		
Phosphorus   ppm   ASTM D5185m   210       Sulfur   ppm   ASTM D5185m   0       Sulfur   ppm   ASTM D5185m   61       Sulfur   ppm   ASTM D5185m   515   13       Sodium   ppm   ASTM D5185m   0         Sodium   ppm   ASTM D5185m   > 15   13         Sodium   ppm   ASTM D5185m   > 20   <1             Sulfur   Sul	Magnesium	ppm	ASTM D5185m		0		
Zinc   ppm   ASTM D5185m   0         CONTAMINANTS   method   limit/base   current   history1   history2	Calcium	ppm	ASTM D5185m		0		
Sulfur         ppm         ASTM D5185m         61             CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >15         13             Sodium         ppm         ASTM D5185m         >0             Potassium         ppm         ASTM D5185m         >20         <1	Phosphorus	ppm	ASTM D5185m		210		
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >15         13             Sodium         ppm         ASTM D5185m         0             Potassium         ppm         ASTM D5185m         >20         <1	Zinc	ppm	ASTM D5185m		0		
Silicon         ppm         ASTM D5185m         >15         13             Sodium         ppm         ASTM D5185m         0              Potassium         ppm         ASTM D5185m         >20         <1	Sulfur	ppm	ASTM D5185m		61		
Sodium         ppm         ASTM D5185m         0             Potassium         ppm         ASTM D5185m         >20         <1             FLUID CLEANLINESS         method         limit/base         current         history1         history2           Particles >4μm         ASTM D7647         >5000         233             Particles >6μm         ASTM D7647         >1300         43             Particles >14μm         ASTM D7647         >160         5             Particles >21μm         ASTM D7647         >40         1             Particles >38μm         ASTM D7647         >10         0             Particles >71μm         ASTM D7647         >3         0             Oil Cleanliness         ISO 4406 (c)         >19/17/14         15/13/10	CONTAMINANTS		method	limit/base	current	history1	history2
Sodium         ppm         ASTM D5185m         0             Potassium         ppm         ASTM D5185m         >20         <1	Silicon	ppm	ASTM D5185m	>15	13		
FLUID CLEANLINESS         method         limit/base         current         history1         history2           Particles >4μm         ASTM D7647         >5000         233             Particles >6μm         ASTM D7647         >1300         43             Particles >14μm         ASTM D7647         >160         5             Particles >21μm         ASTM D7647         >40         1             Particles >38μm         ASTM D7647         >10         0             Particles >71μm         ASTM D7647         >3         0             Oil Cleanliness         ISO 4406 (c)         >19/17/14         15/13/10	Sodium	ppm	ASTM D5185m		0		
Particles >4μm       ASTM D7647       >5000       233           Particles >6μm       ASTM D7647       >1300       43           Particles >14μm       ASTM D7647       >160       5           Particles >21μm       ASTM D7647       >40       1           Particles >38μm       ASTM D7647       >10       0           Particles >71μm       ASTM D7647       >3       0           Oil Cleanliness       ISO 4406 (c)       >19/17/14       15/13/10	Potassium	ppm	ASTM D5185m	>20	<1		
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	FLUID CLEANLIN	ESS	method	limit/base	current	history1	history2
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Particles >4µm		ASTM D7647	>5000	233		
$\begin{array}{cccccccccccccccccccccccccccccccccccc$			ASTM D7647	>1300	43		
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Particles >14µm			>160	5		
Particles >38μm       ASTM D7647       >10       0           Particles >71μm       ASTM D7647       >3       0           Oil Cleanliness       ISO 4406 (c)       >19/17/14       15/13/10			ASTM D7647	>40	1		
Particles >71μm       ASTM D7647       >3       0           Oil Cleanliness       ISO 4406 (c)       >19/17/14       15/13/10	•						
Oil Cleanliness ISO 4406 (c) >19/17/14 <b>15/13/10</b>	·						
FLUID DEGRADATION method limit/base current history1 history2	·						
	FLUID DEGRADA	TION	method	limit/base	current	history1	history2

Acid Number (AN) mg KOH/g ASTM D8045

0.224



## **OIL ANALYSIS REPORT**







Laboratory Sample No. Lab Number Unique Number

: 05864810 : 10499275 Test Package : PLANT To discuss this sample report, contact Customer Service at 1-800-237-1369.

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : WC0804048 Received : 05 Jun 2023 Diagnosed : 07 Jun 2023

: Jonathan Hester Diagnostician

SANTA CLARITA, CA US 91355 Contact: REYNARD GOLDMAN

reynard.goldman@woodward.com

T: (661)702-5991

25200 W RYE CANYON RD

\* - 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)

Contact/Location: REYNARD GOLDMAN - WOOSANCA

F:

WOODWARD