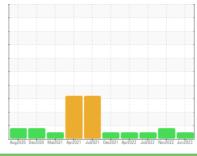


# **COOLANT REPORT**

# Nashville [Nashville] Coolant - Starboard Main Engine

Component Coolant

**CATERPILLAR ELC (--- GAL)** 



Sample Rating Trend



### Recommendation

No corrective action is recommended at this time. The fluid is suitable for further service.

### Corrosion

All metal levels are normal indicating no corrosion in the cooling system.

### **Contaminants**

There is no indication of any contamination in the coolant.

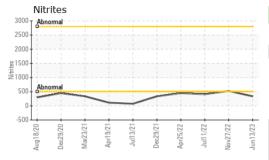
### **Coolant Condition**

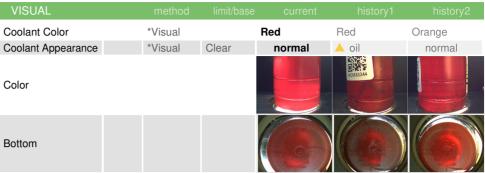
Carboxylate test failed. The glycol level is acceptable. The pH level of this fluid is within the acceptable limits.

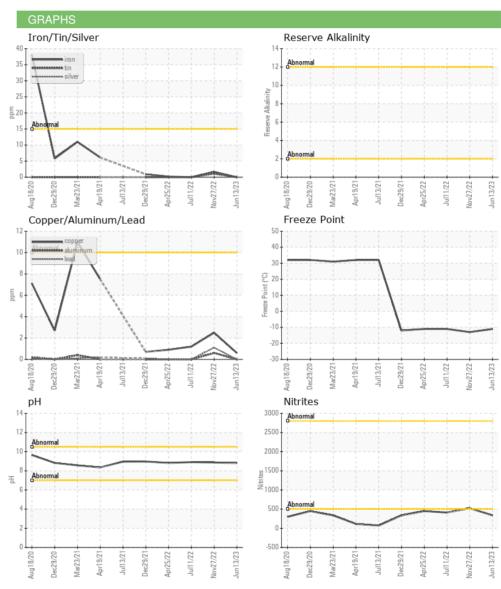
Sample Number	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age         hrs         Client Info         0         50768         47998           Oil Age         hrs         Client Info         0         0         0           Oil Changed         Client Info         N/A         N/A         N/A         N/A           Sample Status         NORMAL         NORMAL         NORMAL         NORMAL         NORMAL           PHYSICAL TEST RESULTS         method         limit/base         current         history1         history2           Specific Gravity         "ASTM D1298         1.054         1	Sample Number		Client Info		WC0683262	WC0683344	RP0016007
Oil Age	Sample Date		Client Info		13 Jun 2023	27 Nov 2022	11 Jul 2022
Oil Changed Sample Status         Client Info Sample Status         N/A NORMAL         N/A ABNORMAL         N/A NORMAL         N/A ABNORMAL         N/A NORMAL         N.D 4         1.054 <th< th=""><th>Machine Age</th><th>hrs</th><th>Client Info</th><th></th><th>0</th><th>50768</th><th>47998</th></th<>	Machine Age	hrs	Client Info		0	50768	47998
Sample Status	Oil Age	hrs	Client Info		0	0	0
PHYSICAL TEST RESULTS   method   limit/base   current   history1   history2	Oil Changed		Client Info		N/A	N/A	N/A
Specific Gravity	Sample Status				NORMAL	ABNORMAL	NORMAL
pH         Scale 0-14         ASTM D1287         8.81         8.87         8.91           Nitrites         ppm         AP-053:2009         336         524         412           Reserve Alkalinity         Scale 0:20         "ASTM D1121              Percentage Glycol         %         ASTM D3321         39.9         40.0         39.4           Freezing Point         °F         ASTM D3321         -11         -13         -11           Total Dissolved Solids         264.0         265.5         287.5         287.5           Carboxylate         Image: Carboxylate organization of the pass of t	PHYSICAL TEST R	RESULTS	method	limit/base	current	history1	history2
Nitrites	Specific Gravity		*ASTM D1298		1.054	1.054	1.054
Reserve Alkalinity   Scale 0-20   "ASTM D1121               Percentage Glycol   %   ASTM D3321   39.9   40.0   39.4     Freezing Point   °F   ASTM D3321   -11   -13   -11     Total Dissolved Solids   264.0   265.5   287.5     Carboxylate                                     CORROSION INHIBITORS   method   limit/base   current   history1   history2     Silicon   ppm   ASTM D6130   0   4   26   18     Phosphorus   ppm   ASTM D6130   0   0   0   0     Boron   ppm   ASTM D6130   0   33   72   48     Molybdenum   ppm   ASTM D6130   950   787   817   812     CORROSION   method   limit/base   current   history1   history2     Iron   ppm   ASTM D6130   >15   0   2   0     Aluminum   ppm   ASTM D6130   >10   0   <1   0     Copper   ppm   ASTM D6130   >10   0   1   0     Copper   ppm   ASTM D6130   >10   0   1   0     Tin   ppm   ASTM D6130   >10   0   <1   0     Zinc   ppm   ASTM D6130   >10   0   <1   0     CONTAMINANTS   method   limit/base   current   history1   history2     Sodium   ppm   ASTM D6130   0   19   11     SCALE POTENTIAL   method   limit/base   current   history1   history2     Calcium   ppm   ASTM D6130   0   19   11     SCALE POTENTIAL   method   limit/base   current   history1   history2     Calcium   ppm   ASTM D6130   0   19   11     SCALE POTENTIAL   method   limit/base   current   history1   history2     Calcium   ppm   ASTM D6130   0   19   11     SCALE POTENTIAL   method   limit/base   current   history1   history2     Calcium   ppm   ASTM D6130   0   19   11     SCALE POTENTIAL   method   limit/base   current   history1   history2     Calcium   ppm   ASTM D6130   0   19   11	pH	Scale 0-14	ASTM D1287		8.81	8.87	8.91
Percentage Glycol   %   ASTM D3321   39.9   40.0   39.4	Nitrites	ppm	AP-053:2009		336	524	412
Freezing Point         °F         ASTM D3321         -11         -13         -11           Total Dissolved Solids         264.0         265.5         287.5           Carboxylate         fail         pass         fail           CORROSION INHIBITORS method limit/base current         limit/base current         history1         history2           Silicon ppm ASTM D6130         0         4         26         18           Phosphorus         ppm ASTM D6130         0         0         0         0           Boron         ppm ASTM D6130         0         33         72         48           Molybdenum         ppm ASTM D6130         950         787         817         812           CORROSION         method         limit/base         current         history1         history2           Iron         ppm ASTM D6130         >15         0         2         0           Aluminum         ppm ASTM D6130         >10         0         <1         0           Copper         ppm ASTM D6130         >10         0         1         0           Lead         ppm ASTM D6130         >10         0         <1         0           Zinc	Reserve Alkalinity	Scale 0-20	*ASTM D1121				
Total Dissolved Solids	Percentage Glycol	%	ASTM D3321		39.9	40.0	39.4
Carboxylate         fail         pass         fail           CORROSION INHIBITORS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D6130         0         4         26         18           Phosphorus         ppm         ASTM D6130         0         0         0         0           Boron         ppm         ASTM D6130         0         33         72         48           Molybdenum         ppm         ASTM D6130         950         787         817         812           CORROSION         method         limit/base         current         history1         history2           Iron         ppm         ASTM D6130         >15         0         2         0           Aluminum         ppm         ASTM D6130         >10         <1         2         1           Lead         ppm         ASTM D6130         >10         <1         2         1           Lead         ppm         ASTM D6130         >10         0         1         0           Zinc         ppm         ASTM D6130         0         <1         0         0           CONTAMINAN	Freezing Point	°F	ASTM D3321		-11	-13	-11
CORROSION INHIBITORS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D6130         0         4         26         18           Phosphorus         ppm         ASTM D6130         0         0         0         0           Boron         ppm         ASTM D6130         0         33         72         48           Molybdenum         ppm         ASTM D6130         950         787         817         812           CORROSION         method         limit/base         current         history1         history2           Iron         ppm         ASTM D6130         >15         0         2         0           Aluminum         ppm         ASTM D6130         >10         0         <1         0           Copper         ppm         ASTM D6130         >10         0         1         0           Lead         ppm         ASTM D6130         >10         0         1         0           Zinc         ppm         ASTM D6130         0         <1         0         0           CONTAMINANTS         method         limit/base         current         history1	Total Dissolved Solids				264.0	265.5	287.5
Silicon	Carboxylate				fail	pass	fail
Phosphorus         ppm         ASTM D6130         0         0         0         0           Boron         ppm         ASTM D6130         0         33         72         48           Molybdenum         ppm         ASTM D6130         950         787         817         812           CORROSION         method         limit/base         current         history1         history2           Iron         ppm         ASTM D6130         >15         0         2         0           Aluminum         ppm         ASTM D6130         >10         0         <1         0           Copper         ppm         ASTM D6130         >10         <1         2         1           Lead         ppm         ASTM D6130         >10         0         1         0           Tin         ppm         ASTM D6130         >10         0         1         0           CONTAMINANTS         method         limit/base         current         history1         history2           Chlorine         ppm         ASTM D6130         5081         5726         2360           Potassium         ppm         ASTM D6130         0         19         11 </th <th>CORROSION INH</th> <th>IBITORS</th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	CORROSION INH	IBITORS	method	limit/base	current	history1	history2
Boron         ppm         ASTM D6130         0         33         72         48           Molybdenum         ppm         ASTM D6130         950         787         817         812           CORROSION         method         limit/base         current         history1         history2           Iron         ppm         ASTM D6130         >15         0         2         0           Aluminum         ppm         ASTM D6130         >10         0         <1	Silicon	ppm	ASTM D6130	0	4	26	18
Molybdenum         ppm         ASTM D6130         950         787         817         812           CORROSION         method         limit/base         current         history1         history2           Iron         ppm         ASTM D6130         >15         0         2         0           Aluminum         ppm         ASTM D6130         >10         0         <1         0           Copper         ppm         ASTM D6130         >10         0         1         0           Lead         ppm         ASTM D6130         >10         0         1         0           Tin         ppm         ASTM D6130         >10         0         1         0           Zinc         ppm         ASTM D6130         0         <1         0           CONTAMINANTS         method         limit/base         current         history1         history2           Chlorine         ppm         ASTM D6130         5081         5726         2360           Potassium         ppm         ASTM D6130         0         19         11           SCALE POTENTIAL         method         limit/base         current         history1         history2           C	Phosphorus	ppm	ASTM D6130	0	0	0	0
CORROSION         method         limit/base         current         history1         history2           Iron         ppm         ASTM D6130         >15         0         2         0           Aluminum         ppm         ASTM D6130         >10         0         <1         0           Copper         ppm         ASTM D6130         >10         <1         2         1           Lead         ppm         ASTM D6130         >10         0         1         0           Tin         ppm         ASTM D6130         >10         0         1         0           Zinc         ppm         ASTM D6130         0         <1         0           CONTAMINANTS         method         limit/base         current         history1         history2           Chlorine         ppm         ASTM D6130         0         46         30           CARRIER SALTS         method         limit/base         current         history1         history2           Sodium         ppm         ASTM D6130         0         19         11           SCALE POTENTIAL         method         limit/base         current         history1         history2 <td< th=""><th>Boron</th><th>ppm</th><th>ASTM D6130</th><th>0</th><th>33</th><th>72</th><th>48</th></td<>	Boron	ppm	ASTM D6130	0	33	72	48
Iron         ppm         ASTM D6130         >15         0         2         0           Aluminum         ppm         ASTM D6130         >10         0         <1	Molybdenum	ppm	ASTM D6130	950	787	817	812
Aluminum         ppm         ASTM D6130         >10         0         <1	CORROSION		method	limit/base	current	history1	history2
Copper         ppm         ASTM D6130         >10         <1         2         1           Lead         ppm         ASTM D6130         >10         0         1         0           Tin         ppm         ASTM D6130         >10         0         1         0           Zinc         ppm         ASTM D6130         0         <1	Iron	ppm	ASTM D6130	>15	0	2	0
Lead         ppm         ASTM D6130         >10         0         1         0           Tin         ppm         ASTM D6130         >10         0         1         0           Zinc         ppm         ASTM D6130         0         <1         0           CONTAMINANTS         method         limit/base         current         history1         history2           Chlorine         ppm         ASTM D6130         0         46         30           CARRIER SALTS         method         limit/base         current         history1         history2           Sodium         ppm         ASTM D6130         5081         5726         2360           Potassium         ppm         ASTM D6130         0         19         11           SCALE POTENTIAL         method         limit/base         current         history1         history2           Calcium         ppm         ASTM D6130         18         14         13	Aluminum	ppm	ASTM D6130	>10	0	<1	0
Tin         ppm         ASTM D6130 billion         >10 billion         0 control         1 control         control <th< th=""><th>Copper</th><th>ppm</th><th>ASTM D6130</th><th>&gt;10</th><th>&lt;1</th><th>2</th><th>1</th></th<>	Copper	ppm	ASTM D6130	>10	<1	2	1
Zinc         ppm         ASTM D6130         0         <1	Lead	ppm	ASTM D6130	>10	0	1	0
CONTAMINANTS         method         limit/base         current         history1         history2           Chlorine         ppm         ASTM D6130         0         46         30           CARRIER SALTS         method         limit/base         current         history1         history2           Sodium         ppm         ASTM D6130         5081         5726         2360           Potassium         ppm         ASTM D6130         0         19         11           SCALE POTENTIAL         method         limit/base         current         history1         history2           Calcium         ppm         ASTM D6130         18         14         13	Tin	ppm	ASTM D6130	>10	0	1	0
Chlorine         ppm         ASTM D6130         0         46         30           CARRIER SALTS         method         limit/base         current         history1         history2           Sodium         ppm         ASTM D6130         5081         5726         2360           Potassium         ppm         ASTM D6130         0         19         11           SCALE POTENTIAL         method         limit/base         current         history1         history2           Calcium         ppm         ASTM D6130         18         14         13	Zinc	ppm	ASTM D6130		0	<1	0
CARRIER SALTS         method         limit/base         current         history1         history2           Sodium         ppm         ASTM D6130         5081         5726         2360           Potassium         ppm         ASTM D6130         0         19         11           SCALE POTENTIAL         method         limit/base         current         history1         history2           Calcium         ppm         ASTM D6130         18         14         13	CONTAMINANTS		method	limit/base	current	history1	history2
Sodium         ppm         ASTM D6130         5081         5726         2360           Potassium         ppm         ASTM D6130         0         19         11           SCALE POTENTIAL         method         limit/base         current         history1         history2           Calcium         ppm         ASTM D6130         18         14         13	Chlorine	ppm	ASTM D6130		0	46	30
Potassium         ppm         ASTM D6130         0         19         11           SCALE POTENTIAL         method         limit/base         current         history1         history2           Calcium         ppm         ASTM D6130         18         14         13	CARRIER SALTS		method	limit/base	current	history1	history2
Potassium         ppm         ASTM D6130         0         19         11           SCALE POTENTIAL         method         limit/base         current         history1         history2           Calcium         ppm         ASTM D6130         18         14         13	Sodium	ppm	ASTM D6130		5081	5726	2360
Calcium         ppm         ASTM D6130         18         14         13	Potassium		ASTM D6130		0	19	11
	SCALE POTENTI	AL	method	limit/base	current	history1	history2
	Calcium	ppm	ASTM D6130		18	14	13
	Magnesium	ppm					



## **COOLANT REPORT**











Certificate L2367

Laboratory Sample No. Lab Number Unique Number

: WC0683262 : 05881237 : 10526340

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

: 22 Jun 2023 : 28 Jun 2023 Diagnostician : Jonathan Hester

Test Package : COOL- ( Additional Tests: COOL, ICP ) 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)

MARATHON PETROLEUM CO.

101 12TH ST CATLETTSBURG, KY US 41169

Contact: CORY GUMBERT

cagumbert@marathonpetroleum.com

T: (606)585-3950 F: x: