TESTOIL
COOLANT ANALYSIS

Overall Condition Marginal

Machine Name: 1612
Machine ID:

COMPREHENSIVE COOLANT ANALYSIS

Component Information		Sample Information		Customer Information
Coolant:	PEA Fleet Charge 50/50	Received:	5/17/2021	Jack Boilerman
Coolant Chemistry:	EG, Nitrite SCA	Report:	5/21/2021	Great Lakes Fleet
Machine MFG:	CUMMINS	Sample No.	6392-17-5	20338 Progress Drive
Machine MOD:		Analyst / Test:	MMM / CLCOMP	Strongsville, OH 44149
Machine Criticality:	Unknown	Sample Source Rating:	Unknown	

PROBLEMS
Different Additives
Wrong Color

COMMENTS
Coolant is a different color than reference new coolant. Coolant should match the color of the original manufacturer/product specifications. Probable causes of color change include improper coolant mixing, glycol deterioration, outside contaminants, and/or precipitation of inhibitors out of coolant. The organic additives present do not correlate with additives present in new reference coolant. This may be due to a different product in use, or a mixture of products in use. Mixing of different coolant products is not recommended, and can result in lack of corrosion protection for metal components and/or formation of deposits.

CUSTOMER NOTES Last fluid change on 5/10/2021

Sample Date	New Fluid	5/14/2021	3/31/2021							
Lab Number	3166042	3203516	3166047							
Hours on Engine		183147	177366							
Hours on Fluid		5781	Unknown							Normal
Condition		Marginal	Marginal							Values
FLUID CONDITION										
Glycol % (R)	49.4	49.8	48.4							50.0
Freezing Point °C (R)	-36	-37	-35							< -30
Boiling Point °C (R)	107	107	107							> 100
pH (G)	10.0	8.2	8.7							7.0 - 11.0
OBSERVATIONS (analyst rating) IWI-520										
Color	Pink	Red	Red							
Visual Clarity	Clear	Clear	Clear							Clear
Visible Foam	None	None	None							None
Visible Oil	None	None	None							None
Fuel Odor	None	None	None							None
Magnetic Particles	None	None	Slight							None
Non-Magnetic Particles	None	None	None							None
CONTAMINATION										
Specific Conductance (N)	1991	2124	2167							< 6600
Total Dissolved Solids (N)	1045	1115	1138							< 3400
Calcium (E)	-	3	14							< 60
Magnesium (E)	-	2	3							< 20
Hardness as $CaCO^3$ (E)	-	30	93							< 250
Chloride (A)	9	9	29							< 75
Fluoride (A)	16	2	16							< 30
Sulfate (A)	10	103	56							< 300
DEGRADATION (mg/L) Ion Chromatography IWI-500										
Glycolate (A)	0	305	129							< 1500
Acetate (A)	0	-	0							
Oxalate (A)	0	12	8							< 50
Formate (A)	0	38	20							< 250

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Condition		Marginal	Marginal							
ADDITIVES (INORGANIC)										
Nitrate (A)	410	652	449							
Molybdenum (E)	2	-	4							
Nitrite (Test Kit) (J)										
Nitrite (A)	1229	1640	1261							
Phosphate (A)	0	50	43							
Phosphorus (E)	12	29	24							
Boron (E)	247	225	243							
Silicon (E)	161	61	66							
Sodium (E)	1501	1277	1488							
Potassium (E)	-	65	55							
SCA Number (U)	1.2	1.6	1.3							
ORGANIC ACID TECHNOLOGY (mg/L) HPLC IWI-510										
2-Ethylhexanoic Acid	0	-	0							
4-tBu-Benzoic Acid	0	27	39							
Adipic Acid	0	-	0							
Benzoic Acid	218	497	537							
Octanoic Acid	0	-	0							
p-Toluic Acid	14	26	39							
Sebacic Acid	593	-	0							
BT	18	31	47							
MBT	246	-	0							
TT	314	310	439							
WEAR (ppm) ICP Spectroscopy IWI-101										
Aluminum (E)	-	-	-							< 5
Copper (E)	-	-	-							< 5
Iron (E)	-	-	-							< 10
Lead (E)	-	-	-							< 5
Silver (E)	-	-	-							< 5
Tin (E)	-	-	-							< 5
Zinc (E)	-	-	-							< 10

Report Key: (-) Below detection limit, (A) mg/L - Ion Chromatography ASTM D5827 Mod, (E) ppm - ICP Spectroscopy IWI-101, (G) pH units IWI-142, (J) mg/L IWI-320, (N) uS/cm IWI-480, (R) Calculated from refractive index IWI-134, (U) Calculated from nitrite and molybdenum, (BT) Benzotriazole, (MBT) Mercaptobenzothiazole, (TT) Tolyltriazole

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REPORT REFERENCE

Fluid Condition	Glycol concentration shows whether the right mix ratio is being employed; when lower than expected there is likely inadequate protection for the cooling system and engine, and when higher than expected there will be a loss of heat transfer. Freeze and boiling points are dependent on glycol % and hint at the expected operating temperature range, and pH is the primary indicator for degradation and/or contamination.
Observations	Color, clarity and foam provide an overview of the physical appearance of the coolant, as any change indicates likely degradation and/or contamination. Odors are checked for signs of contamination due to adverse conditions within the cooling system. Particles can appears for a number of reasons including a poor source of water, corrosion, cavitation or defective electrical grounds.
Contamination	Conductivity increasing indicates contamination originating from the water supply, such as hardness and fluoride, or combustion gases; sudden changes may be the result of overdosing inhibitor or concentrate, or mixing with another coolant. The presence of these contaminants can lead to scale and/or corrosion within the cooling system.
Degradation	Glycolate indicates the primary breakdown of the glycol portion of the coolant which is generally caused by localized overheating or an air leak (i.e., combustion blow-by) within the system. Acetate, oxalate and formate are all signs degradation has progressed to a more severe, secondary stage of degradation.
Additives	The presence and concentration of additives will vary from one coolant to another and should be compared to the new fluid reference; the presence of additives not seen in the new fluid reference indicate likely mixing with another coolant and may void the OEM warranty.
Organic Acid Technology	The presence and concentration of these additives will appear in some Extended Life Coolants (ELC) and should be compared to the new fluid reference.
Wear	Wear metals are most commonly signs of corrosion (driven by low or incorrect additives) or cavitation (driven by air leaks). They may also appear due to grounding faults, localized hot spots or poor water supply.

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