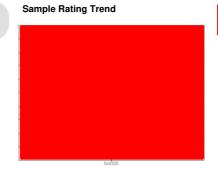


# **PROBLEM SUMMARY**

# **CHAUDIERE GS5** GE PROLEC GS5-T3 (S/N M16E15908)

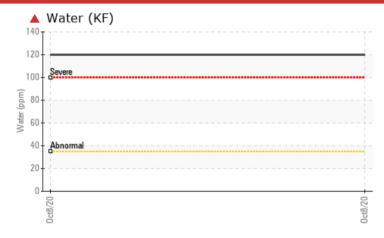
**Transformer Oil** 

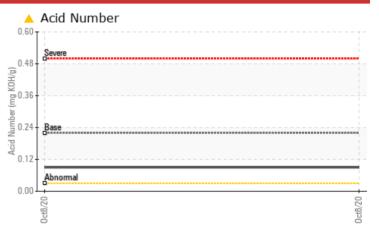
**ENVIROTEMP FR3 FLUID (1808 GAL)** 





## **COMPONENT CONDITION SUMMARY**





### RECOMMENDATION

The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather. We recommend an early resample to monitor this

PROBLEMATIC TEST RESULTS							
Sample Status				SEVERE			
Water	%	ASTM D6304*	>0.0035	▲ 0.012			
ppm Water	ppm	ASTM D6304*	>35	<b>120</b>			
DGA - CO2	ppm	ASTM D3612(e)*		<b>A</b> 8935			
DGA - Ethane	ppm	ASTM D3612(e)*		<b>1122</b>			
DGA - Total Combustible Gas	ppm	ASTM D3612(e)*		<b>1264</b>			
Acid Number (AN)	mg KOH/g	ASTM D974*	0.22	<b>△</b> 0.09			
Interfacial Tension	mN/m	ASTM D971(e)*		<b>1.48</b>			

Customer Id: ENE271OTT **Sample No.:** PP0424147 Lab Number: 02388780 Test Package: TRF 3



To manage this report scan the QR code

To discuss the diagnosis or test data: Bill Quesnel CLS, OMA II, MLA-III, LLA-I+1 (289)291-4641 x4641

Bill.Quesnel@wearcheck.com

To change component or sample information: Gloria Gonzalez +1 (289)291-4643 x4643 gloria.gonzalez@wearcheck.com

RECOMMENDED ACTIONS						
Action	Status	Date	Done By	Description		
Resample			?	We recommend an early resample to monitor this condition.		
Check Breathers			?	The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather.		

# HISTORICAL DIAGNOSIS

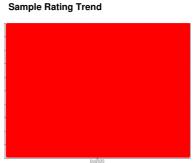


# **OIL ANALYSIS REPORT**

# CHAUDIERE GS5 GE PROLEC GS5-T3 (S/N M16E15908)

**Transformer Oil** 

**ENVIROTEMP FR3 FLUID (1808 GAL)** 





$\mathbf{T}$	ΙД	GI	Nια	าร	I١٩
$\boldsymbol{\nu}$	ᇄ	u	V	$\mathcal{I}$	ľ

### Recommendation

The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather. We recommend an early resample to monitor this condition.

### Contamination

There is a moderate concentration of water present in the transformer oil. Ethane exceeds normal limits (232 µL/L). Levels are elevated. Carbon Dioxide exceeds normal limits (5000 µL/L). (Furans) DP: >1003, Age: <1.0, 2FurylAldehyde: < 10, 5-HydroxyMethylFuralde: < 10, 2ActeylFuran: < 10, 5-Methyl-2-Furaldehyde: 71, 2-FurylAlchohol: < 10.

### Fluid Condition

Interfacial tension results are low. The condition of the transformer oil is acceptable for the time in service.

Sample Number					Oct2020		
Sample Date   Client Info   08 Oct 2020	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age   hrs	Sample Number		Client Info		PP0424147		
Oil Age         hrs         Client Info         N/A             Oil Changed         Client Info         N/A             Sample Status         SEVERE             CONTAMINANTS         method         limit/base         current         history1         history2           FUID CLEANLINESS         method         limit/base         current         history1         history2           FRUID CLEANLINESS         method         limit/base         current         history1         history2           Particles >4µm         ASTM D7647         >5000         372             Particles >6µm         ASTM D7647         >160         7             Particles >38µm         ASTM D7647         >10         0             Particles >38µm         ASTM D7647         >3         0             Particles >38µm         ASTM D7647         >3 <td< td=""><td>Sample Date</td><td></td><td>Client Info</td><td></td><td>08 Oct 2020</td><td></td><td></td></td<>	Sample Date		Client Info		08 Oct 2020		
COIL Changed Sample Status	Machine Age	hrs	Client Info		0		
CONTAMINANTS         method         limit/base         current         history1         history2           Water         %         ASTM D6304*         >0.0035         ▲ 0.012             ppm Water         ppm         ASTM D6304*         >35         ▲ 120             FLUID CLEANLINESS         method         limit/base         current         history1         history2           Particles >4μm         ASTM D7647         >1300         69             Particles >6μm         ASTM D7647         >160         7             Particles >14μm         ASTM D7647         >160         7             Particles >38μm         ASTM D7647         >40         3             Particles >71μm         ASTM D7647         >3         0             Particles >71μm         ASTM D7647         >3         0             Particles >71μm         ASTM D7647         >3         0             Oil Cleanliness         ISO 4406 (c)         >19/17/14         16/13/10 <t< td=""><td>Oil Age</td><td>hrs</td><td>Client Info</td><td></td><td>0</td><td></td><td></td></t<>	Oil Age	hrs	Client Info		0		
CONTAMINANTS   method   limit/base   current   history1   history2   water   %   ASTM D6304*   >0.0035	Oil Changed		Client Info		N/A		
Water         %         ASTM D6304*         >0.0035         ▲ 0.012             ppm Water         ppm         ASTM D6304*         >35         ▲ 120             FLUID CLEANLINESS         method         limit/base         current         history1         history2           Particles >4μm         ASTM D7647         >5000         372             Particles >14μm         ASTM D7647         >1300         69             Particles >21μm         ASTM D7647         >160         7             Particles >38μm         ASTM D7647         >3         0             Particles >71μm         ASTM D7647         >3         0             Particles >71μm         ASTM D7647         >3         0             Oil Cleanliness         ISO 4406 (c)         >19/17/14         16/13/10             DISSOLVED GAS ANALYSIS (DGA)         method         limit/base         current         history1         history2           DGA - N2         ppm         ASTM D8612(e)*         57	Sample Status				SEVERE		
Particles   Pa	CONTAMINANTS		method	limit/base	current	history1	history2
Particles > 4μm	Water	%	ASTM D6304*	>0.0035	<b>▲</b> 0.012		
Particles >4µm	ppm Water	ppm	ASTM D6304*	>35	<b>120</b>		
Particles >6µm	FLUID CLEANLIN	ESS	method	limit/base	current	history1	history2
Particles >14µm	Particles >4µm		ASTM D7647	>5000	372		
Particles >21µm	Particles >6µm		ASTM D7647	>1300	69		
Particles >38µm	Particles >14µm		ASTM D7647	>160	7		
Particles > 71 μm	Particles >21µm		ASTM D7647	>40	3		
Dissolved Gas Analysis (DGA)   method   limit/base   current   history1   history2	Particles >38µm		ASTM D7647	>10	0		
DISSOLVED GAS ANALYSIS (DGA) method limit/base current history1 history2  DGA - H2 ppm ASTM D3612(e)* 57  DGA - O2 ppm ASTM D3612(e)* 55821  DGA - N2 ppm ASTM D3612(e)* 70  DGA - CO ppm ASTM D3612(e)* 8935  DGA - CO2 ppm ASTM D3612(e)* 8  DGA - Methane ppm ASTM D3612(e)* 8  DGA - Acetylene ppm ASTM D3612(e)* 7  DGA - Ethylene ppm ASTM D3612(e)* 7  DGA - Ethylene ppm ASTM D3612(e)* 7  DGA - Total Gas Content % ASTM D3612(e)* 66297  DGA - Total Combustible Gas ppm ASTM D3612(e)* 1264  FLUID DEGRADATION method limit/base current history1 history2  Acid Number (AN) mg KOHg ASTM D974* 0.22  0.09  VISUAL method limit/base current history1 history2  White Metal scalar Visual* NONE NONE  Precipitate scalar Visual* NONE NONE  Silt scalar Visual* NONE NONE  Poebris scalar Visual* NONE NONE  Sand/Dirt scalar Visual* NONE NONE  Appearance scalar Visual* NONE NONE	Particles >71µm		ASTM D7647	>3	0		
DGA - H2	Oil Cleanliness		ISO 4406 (c)	>19/17/14	16/13/10		
DGA - O2         ppm         ASTM D3612(e)*         277             DGA - N2         ppm         ASTM D3612(e)*         55821             DGA - CO         ppm         ASTM D3612(e)*         A 8935             DGA - CO2         ppm         ASTM D3612(e)*         8             DGA - Methane         ppm         ASTM D3612(e)*         0             DGA - Acetylene         ppm         ASTM D3612(e)*         7             DGA - Ethylene         ppm         ASTM D3612(e)*         7             DGA - Total Gas Content         %         ASTM D3612(e)*         66297             DGA - Total Combustible Gas         ppm         ASTM D3612(e)*         1264             DGA - Total Combustible Gas         ppm         ASTM D3612(e)*         0.09             DGA - Total Combustible Gas         ppm         ASTM D3612(e)*         0.09             VISUAL         method         limit/base         current         history1         history2	DISSOLVED GAS ANALY	YSIS (DGA)	method	limit/base	current	history1	history2
DGA - N2         ppm         ASTM D3612(e)*         55821             DGA - CO         ppm         ASTM D3612(e)*         70             DGA - CO2         ppm         ASTM D3612(e)*         8935             DGA - Methane         ppm         ASTM D3612(e)*         0             DGA - Methane         ppm         ASTM D3612(e)*         7             DGA - Acetylene         ppm         ASTM D3612(e)*         7             DGA - Ethylene         ppm         ASTM D3612(e)*         66297             DGA - Total Gas Content         %         ASTM D3612(e)*         66297             DGA - Total Combustible Gas         ppm         ASTM D3612(e)*         1264             DGA - Total Combustible Gas         ppm         ASTM D3612(e)*         1264             FLUID DEGRADATION         method         limit/base         current         history1         history2           Acid Number (AN)         mg KOH/g         ASTM D974*         0.22         0.09 <td< td=""><td>DGA - H2</td><td>ppm</td><td>ASTM D3612(e)*</td><td></td><td>57</td><td></td><td></td></td<>	DGA - H2	ppm	ASTM D3612(e)*		57		
DGA - CO         ppm         ASTM D3612(e)*         70             DGA - CO2         ppm         ASTM D3612(e)*         8935             DGA - Methane         ppm         ASTM D3612(e)*         8             DGA - Acetylene         ppm         ASTM D3612(e)*         0             DGA - Ethylene         ppm         ASTM D3612(e)*         7             DGA - Ethane         ppm         ASTM D3612(e)*         66297             DGA - Total Gas Content         %         ASTM D3612(e)*         66297             DGA - Total Combustible Gas         ppm         ASTM D3612(e)*         1264             DGA - Total Combustible Gas         ppm         ASTM D3612(e)*         1264             DGA - Total Combustible Gas         ppm         ASTM D3612(e)*         0.22         0.09             FLUID DEGRADATION         method         limit/base         current         history1         history2           VISUAL         method         limit/base         current         history1 <td>DGA - O2</td> <td>ppm</td> <td>ASTM D3612(e)*</td> <td></td> <td>277</td> <td></td> <td></td>	DGA - O2	ppm	ASTM D3612(e)*		277		
DGA - CO2         ppm         ASTM D3612(e)*         ▲ 8935             DGA - Methane         ppm         ASTM D3612(e)*         0             DGA - Acetylene         ppm         ASTM D3612(e)*         7             DGA - Ethane         ppm         ASTM D3612(e)*         ▲ 1122             DGA - Total Gas Content         %         ASTM D3612(e)*         66297             DGA - Total Combustible Gas         ppm         ASTM D3612(e)*         ▲ 1264             PCA - Total Combustible Gas         ppm         ASTM D3612(e)*         ▲ 1264             DGA - Total Combustible Gas         ppm         ASTM D3612(e)*         ▲ 1264             DGA - Total Combustible Gas         ppm         ASTM D3612(e)*         ▲ 1264             FLUID DEGRADATION         method         limit/base         current         history1         history2           Acid Number (AN)         mg KOH/g         ASTM D974*         0.22         ▲ 0.09             White Metal         scalar         Visual*	DGA - N2	ppm	ASTM D3612(e)*		55821		
DGA - Methane         ppm         ASTM D3612(e)*         8             DGA - Acetylene         ppm         ASTM D3612(e)*         0             DGA - Ethylene         ppm         ASTM D3612(e)*         7             DGA - Ethane         ppm         ASTM D3612(e)*         66297             DGA - Total Gas Content         %         ASTM D3612(e)*         66297             DGA - Total Combustible Gas         ppm         ASTM D3612(e)*         1264             FLUID DEGRADATION         method         limit/base         current         history1         history2           Acid Number (AN)         mg KOH/g         ASTM D974*         0.22         0.09             VISUAL         method         limit/base         current         history1         history2           White Metal         scalar         Visual*         NONE         NONE            Yellow Metal         scalar         Visual*         NONE         NONE            Precipitate         scalar         Visual*         NONE         NONE	DGA - CO	ppm	ASTM D3612(e)*		70		
DGA - Acetylene         ppm         ASTM D3612(e)*         0             DGA - Ethylene         ppm         ASTM D3612(e)*         7             DGA - Ethane         ppm         ASTM D3612(e)*         ▲ 1122             DGA - Total Gas Content         %         ASTM D3612(e)*         66297             DGA - Total Combustible Gas         ppm         ASTM D3612(e)*         ▲ 1264             FLUID DEGRADATION         method         limit/base         current         history1         history2           Acid Number (AN)         mg KOH/g         ASTM D974*         0.22         ▲ 0.09             VISUAL         method         limit/base         current         history1         history2           White Metal         scalar         Visual*         NONE         NONE            Yellow Metal         scalar         Visual*         NONE         NONE            Precipitate         scalar         Visual*         NONE         NONE            Silt         scalar         Visual*         NONE         NONE	DGA - CO2	ppm	. ,		<u>A</u> 8935		
DGA - Ethylene         ppm         ASTM D3612(e)*         7             DGA - Ethane         ppm         ASTM D3612(e)*         ▲ 1122             DGA - Total Gas Content         %         ASTM D3612(e)*         ▲ 66297             DGA - Total Combustible Gas         ppm         ASTM D3612(e)*         ▲ 1264             FLUID DEGRADATION         method         limit/base         current         history1         history2           Acid Number (AN)         mg KOH/g         ASTM D974*         0.22         ▲ 0.09             VISUAL         method         limit/base         current         history1         history2           White Metal         scalar         Visual*         NONE         NONE            Yellow Metal         scalar         Visual*         NONE         NONE            Precipitate         scalar         Visual*         NONE         NONE            Silt         scalar         Visual*         NONE         NONE            Debris         scalar         Visual*         NONE         NONE <td>DGA - Methane</td> <td>ppm</td> <td>( )</td> <td></td> <td>8</td> <td></td> <td></td>	DGA - Methane	ppm	( )		8		
DGA - Ethane         ppm         ASTM D3612(e)*         ▲ 1122             DGA - Total Gas Content         %         ASTM D3612(e)*         66297             DGA - Total Combustible Gas         ppm         ASTM D3612(e)*         ▲ 1264             FLUID DEGRADATION         method         limit/base         current         history1         history2           Acid Number (AN)         mg KOH/g         ASTM D974*         0.22         ▲ 0.09             VISUAL         method         limit/base         current         history1         history2           White Metal         scalar         Visual*         NONE         NONE            Yellow Metal         scalar         Visual*         NONE         NONE            Precipitate         scalar         Visual*         NONE         NONE            Silt         scalar         Visual*         NONE         NONE            Debris         scalar         Visual*         NONE         NONE            Sand/Dirt         scalar         Visual*         NONE         NONE      <	-				-		
DGA - Total Gas Content         %         ASTM D3612(e)*         66297           DGA - Total Combustible Gas         ppm         ASTM D3612(e)*         ▲ 1264	•	ppm	, ,		_		
DGA - Total Combustible Gas         ppm         ASTM D3612(e)*         ▲ 1264             FLUID DEGRADATION         method         limit/base         current         history1         history2           Acid Number (AN)         mg KOH/g         ASTM D974*         0.22         ▲ 0.09             VISUAL         method         limit/base         current         history1         history2           White Metal         scalar         Visual*         NONE         NONE            Yellow Metal         scalar         Visual*         NONE         NONE            Precipitate         scalar         Visual*         NONE         NONE            Silt         scalar         Visual*         NONE         NONE            Debris         scalar         Visual*         NONE         NONE            Sand/Dirt         scalar         Visual*         NONE         NONE            Appearance         scalar         Visual*         NORML         NORML			. ,				
FLUID DEGRADATION method limit/base current history1 history2  Acid Number (AN) mg KOH/g ASTM D974* 0.22  0.09  VISUAL method limit/base current history1 history2  White Metal scalar Visual* NONE NONE  Yellow Metal scalar Visual* NONE NONE  Precipitate scalar Visual* NONE NONE  Silt scalar Visual* NONE NONE  Debris scalar Visual* NONE NONE  Debris scalar Visual* NONE NONE  Sand/Dirt scalar Visual* NONE NONE  Appearance scalar Visual* NONE NONE		%	. ,				
VISUAL         method         limit/base         current         history1         history2           White Metal         scalar         Visual*         NONE         NONE             Yellow Metal         scalar         Visual*         NONE         NONE             Precipitate         scalar         Visual*         NONE         NONE             Silt         scalar         Visual*         NONE         NONE             Debris         scalar         Visual*         NONE         NONE             Sand/Dirt         scalar         Visual*         NONE         NONE             Appearance         scalar         Visual*         NORML         NORML		• •	ASTM D3612(e)*		<u> </u>		
VISUAL         method         limit/base         current         history1         history2           White Metal         scalar         Visual*         NONE         NONE             Yellow Metal         scalar         Visual*         NONE         NONE             Precipitate         scalar         Visual*         NONE         NONE             Silt         scalar         Visual*         NONE         NONE             Debris         scalar         Visual*         NONE         NONE             Sand/Dirt         scalar         Visual*         NORML         NORML             Appearance         scalar         Visual*         NORML         NORML	FLUID DEGRADA	TION	method	limit/base	current	history1	history2
White Metal         scalar         Visual*         NONE         NONE             Yellow Metal         scalar         Visual*         NONE         NONE             Precipitate         scalar         Visual*         NONE         NONE             Silt         scalar         Visual*         NONE         NONE             Debris         scalar         Visual*         NONE         NONE             Sand/Dirt         scalar         Visual*         NORML         NORML             Appearance         scalar         Visual*         NORML         NORML	Acid Number (AN)	mg KOH/g	ASTM D974*	0.22	<u> </u>		
Yellow Metal         scalar         Visual*         NONE         NONE             Precipitate         scalar         Visual*         NONE         NONE             Silt         scalar         Visual*         NONE         NONE             Debris         scalar         Visual*         NONE         NONE             Sand/Dirt         scalar         Visual*         NORML         NORML             Appearance         scalar         Visual*         NORML         NORML	VISUAL		method	limit/base	current	history1	history2
Precipitate         scalar         Visual*         NONE         NONE             Silt         scalar         Visual*         NONE         NONE             Debris         scalar         Visual*         NONE         NONE             Sand/Dirt         scalar         Visual*         NONE         NONE             Appearance         scalar         Visual*         NORML         NORML	White Metal						
Silt         scalar         Visual*         NONE         NONE             Debris         scalar         Visual*         NONE         NONE             Sand/Dirt         scalar         Visual*         NONE         NONE             Appearance         scalar         Visual*         NORML         NORML	Yellow Metal	scalar		NONE	NONE		
Debris         scalar         Visual*         NONE         NONE             Sand/Dirt         scalar         Visual*         NONE         NONE             Appearance         scalar         Visual*         NORML         NORML	Precipitate						
Sand/Dirt scalar Visual* NONE NONE Appearance scalar Visual* NORML NORML	Silt						
Appearance scalar Visual* NORML NORML	Debris						
	Sand/Dirt						
Odor scalar Visual* NORML NORML	Appearance						
	Odor	scalar	Visual*	NORML	NORML		



# **OIL ANALYSIS REPORT**





CALA ISO 17025:2017 Accredited Laboratory

Laboratory Sample No.

: WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 : PP0424147 Lab Number : 02388780

Unique Number : 5136237

Received **Tested** Diagnosed

: 20 Nov 2020

: 09 Dec 2020

: 09 Dec 2020 - Bill Quesnel

Test Package: TRF 3 (Additional Tests: PrtCount) To discuss this sample report, contact Customer Service at 1-800-268-2131.

Test denoted (\*) outside scope of accreditation, (m) method modified, (e) tested at external lab. Validity of results and interpretation are based on the sample and information as supplied.

Portage Power - Energy Ottawa

4 Booth Street Ottawa, ON **CA K1R 6K8** 

Contact: Cheryl Gharib info@portagepower.com

T: F: x: