

OIL ANALYSIS REPORT

Sample Rating Trend

ISO

BT-FOR-A2 (S/N TANK FT2 AGITATOR)

Component

Gearbox

SHELL OMALA S2 GX 220 (--- GAL)

DIAGNOSIS

Recommendation

Filter oil if possible using B6=75 filter media or better. Resample at next normal interval.

Wear particles are low and acceptable.

Contamination

Particle contamination is elevated. Filtration can help extend machine life.

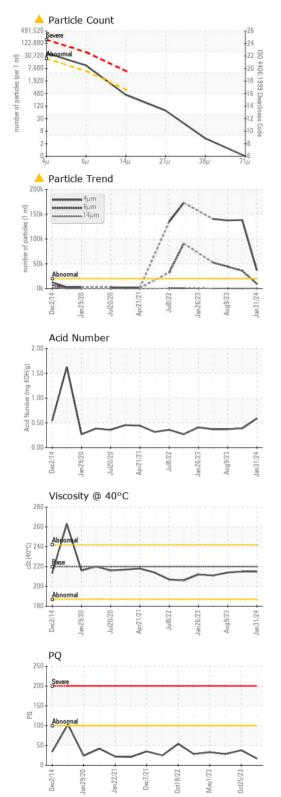
Fluid Condition

Fluid health indicators are acceptable for continued use provided that contamination can be brought

Sample Number Client Info PLS0000810 PLS0000779 PLS0000568 Sample Date Client Info 31 Jan 2024 25 Oct 2023 09 Aug 2023 0			Jec2014 Jan	2020 Jul2020 Apr202	1 Jul2022 Jan2023 Aug20	23 Jan2024	
Sample Date Client Info 31 Jan 2024 25 Oct 2023 09 Aug 2023	SAMPLE INFORM	IATION	method	limit/base	current	history1	history2
Machine Age mths Client Info 3 0 0 Oil Age mths Client Info 0 1 0 Oil Changed Client Info N/A Changed N/A Sample Status Description N/A Changed N/A CONTAMINATION method limit/base current history1 history2 Water WC Method >0.2 NEG NEG NEG WEAR METALS method limit/base current history1 history2 PQ ASTM D5185m >0.0 36 65 70 Chromium ppm ASTM D5185m >15 0 0 <1 Nickel ppm ASTM D5185m >15 0 0 0 <1 Nickel ppm ASTM D5185m >25 0 0 0 0 Lead ppm ASTM D5185m >20 0 0 0 Copper ppm	Sample Number		Client Info		PLS0000810	PLS0000779	PLS0000568
Oil Age mths Client Info N/A Changed N/A Changed N/A Changed N/A Sample Status ABNORMAL SEVERE N/A ABNORMAL SEVERE N/A SEVERE N/A ABNORMAL SEVERE N/A SEVERE N/A ABNORMAL SEVERE N/A Changed N/A N/A ABNORMAL SEVERE N/A ABNORMAL SEVERE N/A ABNORMAL SEVERE N/A ABNORMAL SEVERE ABNORMAL ABNORMAL ABNORMAL ABNORMA	Sample Date		Client Info		31 Jan 2024	25 Oct 2023	09 Aug 2023
Oil Changed Client Info N/A ABNORMAL ABNORMAL SEVERE	Machine Age	mths	Client Info		3	0	0
ABNORMAL ABNORMAL SEVERE	Oil Age	mths	Client Info		0	1	0
CONTAMINATION method limit/base current history1 history2 Water WC Method >0.2 NEG NEG NEG WEAR METALS method limit/base current history1 history2 PQ ASTM D8185m 200 36 65 70 Iron ppm ASTM D5185m >200 36 65 70 Chromium ppm ASTM D5185m >200 36 65 70 Chromium ppm ASTM D5185m >15 0 0 <1	Oil Changed		Client Info		N/A	Changed	N/A
Water WC Method >0.2 NEG NEG NEG WEAR METALS method limit/base current history1 history2 PQ ASTM D8184 17 38 28 Iron ppm ASTM D5185m >200 36 65 70 Chromium ppm ASTM D5185m >15 0 0 <1 Nickel ppm ASTM D5185m >15 0 0 0 Silver ppm ASTM D5185m 0 0 0 0 Aluminum ppm ASTM D5185m 225 0 0 0 Aluminum ppm ASTM D5185m >20 0 0 0 Lead ppm ASTM D5185m >20 0 0 0 Copper ppm ASTM D5185m >20 0 0 0 Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium	Sample Status				ABNORMAL	ABNORMAL	SEVERE
WEAR METALS method limit/base current history1 history2 PQ ASTM D8184 17 38 28 Iron ppm ASTM D5185m >200 36 65 70 Chromium ppm ASTM D5185m >15 0 0 <1 <1 Nickel ppm ASTM D5185m 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 2 1 2 1 2 1 2 1 2 1 0 <th>CONTAMINATION</th> <th>J</th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	CONTAMINATION	J	method	limit/base	current	history1	history2
PQ	Water		WC Method	>0.2	NEG	NEG	NEG
	WEAR METALS		method	limit/base	current	history1	history2
Chromium ppm ASTM D5185m >15 0 0 <1 Nickel ppm ASTM D5185m >15 0 0 0 Titanium ppm ASTM D5185m 0 0 0 0 Silver ppm ASTM D5185m 0 0 0 0 Aluminum ppm ASTM D5185m >25 0 0 0 Lead ppm ASTM D5185m >100 0 0 0 Copper ppm ASTM D5185m >200 0 0 0 Vanadium ppm ASTM D5185m >200 0 0 0 Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0.0 <1 <1 <th< td=""><td>PQ</td><td></td><td>ASTM D8184</td><td></td><th>17</th><td>38</td><td>28</td></th<>	PQ		ASTM D8184		17	38	28
Chromium ppm ASTM D5185m >15 0 0 <1 Nickel ppm ASTM D5185m >15 0 0 0 Titanium ppm ASTM D5185m 0 0 0 0 Silver ppm ASTM D5185m 0 0 0 0 Aluminum ppm ASTM D5185m >25 0 0 0 Lead ppm ASTM D5185m >100 0 0 0 Copper ppm ASTM D5185m >200 0 0 0 Vanadium ppm ASTM D5185m >225 <1 0 0 Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0.0 <1 <1 <	Iron	ppm	ASTM D5185m	>200	36	65	70
Nicke ppm ASTM D5185m >15 0 0 0 0	-						
Silver	Nickel		ASTM D5185m	>15	0	0	0
Silver ppm ASTM D5185m 0 0 0 Aluminum ppm ASTM D5185m >25 0 0 0 Lead ppm ASTM D5185m >100 0 0 0 Copper ppm ASTM D5185m >200 0 0 <1	Titanium	ppm	ASTM D5185m		0	<1	<1
Lead	Silver		ASTM D5185m		0	0	0
Copper ppm ASTM D5185m >200 0 0 <1 Tin ppm ASTM D5185m >25 <1	Aluminum	ppm	ASTM D5185m	>25	0	0	0
Tin ppm ASTM D5185m >25 <1 0 0 Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 6.2 0 0 0 Barium ppm ASTM D5185m 0.0 <1 0 <1 Molybdenum ppm ASTM D5185m 0.0 <1 <1 <1 Magnesium ppm ASTM D5185m 0 4 0 2 Calcium ppm ASTM D5185m 0.0 4 0 6 Phosphorus ppm ASTM D5185m 290 299 189 276 Zinc ppm ASTM D5185m 8167 9785 8736 10402 CONTAMINANTS method limit/base current histo	Lead	ppm	ASTM D5185m	>100	0	0	0
Vanadium ppm ASTM D5185m 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 6.2 0 0 0 Barium ppm ASTM D5185m 0.0 <1 0 <1 Molybdenum ppm ASTM D5185m 0 0 <1 <1 Manganese ppm ASTM D5185m 0 4 0 2 Calcium ppm ASTM D5185m 0.0 4 0 2 Calcium ppm ASTM D5185m 290 299 189 276 Zinc ppm ASTM D5185m 3.8 28 22 38 Sulfur ppm ASTM D5185m 8167 9785 8736 10402 CONTAMINANTS method limit/base current history1 history2	Copper	ppm	ASTM D5185m	>200	0	0	<1
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 6.2 0 0 0 Barium ppm ASTM D5185m 0.0 <1	Tin	ppm	ASTM D5185m	>25	<1	0	0
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 6.2 0 0 0 Barium ppm ASTM D5185m 0.0 <1	Vanadium	ppm	ASTM D5185m		0	0	0
Boron ppm ASTM D5185m 6.2 0 0 0 Barium ppm ASTM D5185m 0.0 <1 0 <1 Molybdenum ppm ASTM D5185m 0 0 <1 <1 Manganese ppm ASTM D5185m 0 4 0 2 Magnesium ppm ASTM D5185m 0.0 4 0 2 Calcium ppm ASTM D5185m 0.0 4 0 6 Phosphorus ppm ASTM D5185m 290 299 189 276 Zinc ppm ASTM D5185m 3.8 28 22 38 Sulfur ppm ASTM D5185m 8167 9785 8736 10402 CONTAMINANTS method limit/base current history1 history2 Solium ppm ASTM D5185m >50 2 1 2 Sodium ppm ASTM D5185m >20 0	Cadmium	ppm	ASTM D5185m		0	0	0
Barium ppm ASTM D5185m 0.0 <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 0 0 <1 <1 Manganese ppm ASTM D5185m 0 4 0 2 Calcium ppm ASTM D5185m 0.0 4 0 6 Phosphorus ppm ASTM D5185m 290 299 189 276 Zinc ppm ASTM D5185m 3.8 28 22 38 Sulfur ppm ASTM D5185m 8167 9785 8736 10402 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >50 2 1 2 Sodium ppm ASTM D5185m >20 0 <1 <1 INFRA-RED method limit/base current history1 history2 Soot % *ASTM D7624 0 0 0 Nitration Abs/cm *ASTM D7624 3.0 3.0 2.9 <	Boron	ppm	ASTM D5185m	6.2	0	0	0
Manganese ppm ASTM D5185m <1 <1 <1 Magnesium ppm ASTM D5185m 0 4 0 2 Calcium ppm ASTM D5185m 0.0 4 0 6 Phosphorus ppm ASTM D5185m 290 299 189 276 Zinc ppm ASTM D5185m 3.8 28 22 38 Sulfur ppm ASTM D5185m 8167 9785 8736 10402 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >50 2 1 2 Sodium ppm ASTM D5185m >20 0 <1	Barium	ppm	ASTM D5185m	0.0	<1	0	<1
Magnesium ppm ASTM D5185m 0 4 0 2 Calcium ppm ASTM D5185m 0.0 4 0 6 Phosphorus ppm ASTM D5185m 290 299 189 276 Zinc ppm ASTM D5185m 3.8 28 22 38 Sulfur ppm ASTM D5185m 8167 9785 8736 10402 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >50 2 1 2 Sodium ppm ASTM D5185m >20 0 <1 <1 INFRA-RED method limit/base current history1 history2 Soot % *ASTM D7844 0 0 0 Nitration Abs/cm *ASTM D7624 3.0 3.0 2.9	Molybdenum	ppm	ASTM D5185m	0	0	<1	<1
Calcium ppm ASTM D5185m 0.0 4 0 6 Phosphorus ppm ASTM D5185m 290 299 189 276 Zinc ppm ASTM D5185m 3.8 28 22 38 Sulfur ppm ASTM D5185m 8167 9785 8736 10402 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >50 2 1 2 Sodium ppm ASTM D5185m >20 0 <1	Manganese	ppm	ASTM D5185m		<1	<1	<1
Phosphorus ppm ASTM D5185m 290 299 189 276 Zinc ppm ASTM D5185m 3.8 28 22 38 Sulfur ppm ASTM D5185m 8167 9785 8736 10402 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >50 2 1 2 Sodium ppm ASTM D5185m >50 2 1 2 Potassium ppm ASTM D5185m >20 0 <1	Magnesium	ppm	ASTM D5185m	0	4	0	2
Zinc ppm ASTM D5185m 3.8 28 22 38 Sulfur ppm ASTM D5185m 8167 9785 8736 10402 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >50 2 1 2 Sodium ppm ASTM D5185m 0 2 0 Potassium ppm ASTM D5185m >20 0 <1	Calcium	ppm	ASTM D5185m	0.0	4	0	6
Sulfur ppm ASTM D5185m 8167 9785 8736 10402 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >50 2 1 2 Sodium ppm ASTM D5185m 0 2 0 Potassium ppm ASTM D5185m >20 0 <1	Phosphorus	ppm	ASTM D5185m	290	299	189	276
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >50 2 1 2 Sodium ppm ASTM D5185m 0 2 0 Potassium ppm ASTM D5185m >20 0 <1	Zinc	ppm	ASTM D5185m	3.8	28	22	38
Silicon ppm ASTM D5185m >50 2 1 2 Sodium ppm ASTM D5185m 0 2 0 Potassium ppm ASTM D5185m >20 0 <1 <1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0 Nitration Abs/cm *ASTM D7624 3.0 3.0 2.9	Sulfur	ppm	ASTM D5185m	8167	9785	8736	10402
Sodium ppm ASTM D5185m 0 2 0 Potassium ppm ASTM D5185m >20 0 <1 <1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0 Nitration Abs/cm *ASTM D7624 3.0 3.0 2.9	CONTAMINANTS		method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 0 <1 <1 INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0 Nitration Abs/cm *ASTM D7624 3.0 3.0 2.9	Silicon	ppm	ASTM D5185m	>50	2	1	2
INFRA-RED method limit/base current history1 history2 Soot % % *ASTM D7844 0 0 0 Nitration Abs/cm *ASTM D7624 3.0 3.0 2.9	Sodium	ppm	ASTM D5185m		0	2	0
Soot % % *ASTM D7844 0 0 0 Nitration Abs/cm *ASTM D7624 3.0 3.0 2.9	Potassium	ppm	ASTM D5185m	>20	0	<1	<1
Nitration Abs/cm *ASTM D7624 3.0 3.0 2.9	INFRA-RED		method	limit/base	current	history1	history2
	Soot %	%	*ASTM D7844		0	0	0
Sulfation Abs/.1mm *ASTM D7415 12.1 12.3 12.0	Nitration	Abs/cm	*ASTM D7624		3.0	3.0	2.9
	Sulfation	Abs/.1mm	*ASTM D7415		12.1	12.3	12.0



OIL ANALYSIS REPORT



FLUID CLEANLIN	ESS	method	limit/base	current	history1	history2
Particles >4µm		ASTM D7647	>20000	▲ 36698	<u></u> 138272	<u>▲</u> 137516
Particles >6µm		ASTM D7647	>5000	9348	△ 35742	44240
Particles >14µm		ASTM D7647	>640	362	186	355
Particles >21µm		ASTM D7647	>160	64	17	25
Particles >38µm		ASTM D7647	>40	3	0	1
Particles >71µm		ASTM D7647	>10	0	0	0
Oil Cleanliness		ISO 4406 (c)	>21/19/16	22/20/16	<u>4</u> 24/22/15	2 4/23/16
FLUID DEGRADA	TION	method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	*ASTM D7414		2.8	3.3	3.0
Acid Number (AN)	mg KOH/g	ASTM D8045		0.59	0.39	0.37
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	LIGHT
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.2	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG
FLUID PROPERT	IES	method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D445	220	215	215	214
SAMPLE IMAGES	3	method	limit/base	current	history1	history2
Color						01-70/2 201-
Bottom						





Laboratory Sample No.

Unique Number : 10859703

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : PLS0000810 Lab Number : 06077612

Received : 01 Feb 2024 **Tested** : 02 Feb 2024 Diagnosed

: 09 Feb 2024 - Mike Johnson Test Package: IND 2 (Additional Tests: FT-IR, PQ, PrtCount)

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. **HEXION - BAYTOWN PLANT**

8450 WEST BAY RD BAYTOWN, TX US 77520

Contact: BILL MINER bill.miner@momentive.com

T: F:

Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)