

### **OIL ANALYSIS REPORT**

Sample Rating Trend

VISCOSITY

# BUBBLE PERFORATOR

Gearbox Fluid SHELL OMALA 220 (--- GAL)

#### DIAGNOSIS

#### Recommendation

Confirm the source of the lubricant being utilized for top-up/fill. Resample at the next service interval to monitor. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.

#### Wear

All component wear rates are normal.

#### Contamination

There is no indication of any contamination in the oil.

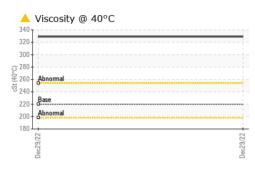
#### Fluid Condition

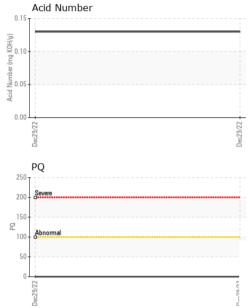
Viscosity of sample indicates oil is within ISO 320 range, advise investigate. This plus the additive levels indicates that this is not the same brand, or type of oil as reported. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

Sample Date         Image of the second					Dec2022			
Sample Date         Client Info         29 Dec 2022             Machine Age         yrs         Client Info         0             Oil Age         yrs         Client Info         0             Sample Status         Client Info         N/A             CONTAMINATION         method         limit/base         current         history1         history2           Water         WC Method         >0.2         NEG             WEAR METALS         method         limit/base         current         history1         history2           PQ         ASTM D5185(m)         >15         0             Iron         ppm         ASTM D5185(m)         >15         1            Nickel         ppm         ASTM D5185(m)         >25         <1             Gopper         ppm         ASTM D5185(m)         >25         0             Antimony         ppm         ASTM D5185(m)         >5         <1             Vanadium         ppm         ASTM D5185(m)	SAMPLE INFORM	IATION	method	limit/base	current	history1	history2	
Machine Age         yrs         Client Info         0             Oil Age         yrs         Client Info         N/A             Sample Status         Image         Lient Info         N/A             CONTAMINATION         method         limitbase         current         history1         history2           Water         WC Method         >.0              WAT         method         limitbase         current         history1         history2           PQ         ASTM D8184'         0              Chromium         ppm         ASTM D5185(m)         >15         <1	Sample Number		Client Info		WC0763603			
Oil Age         yrs         Client Info         0             Oil Changed         Client Info         N/A             Sample Status         Imit/base         ourrent         history1         history2           Water         WC Method         >0.2         NEG             WEAR METALS         method         limit/base         current         history1         history2           PQ         ASTM D8184*         0              Iron         ppm         ASTM D6185(m)         >15         0             Nickel         ppm         ASTM D5185(m)         >15         0             Aluminum         ppm         ASTM D5185(m)         >20         4             Adaminum         ppm         ASTM D5185(m)         >20         4             Adaminum         ppm         ASTM D5185(m)         >20         4             Adaminum         ppm         ASTM D5185(m)         >20              Adaminum	Sample Date		Client Info		29 Dec 2022			
Oil Changed         Client Info         N/A             Sample Status         Imathod         limit/base         current         history1         history2           Water         WC Method         >0.2         NEG             WEAR METALS         method         limit/base         current         history1         history2           PQ         ASTM D8184/         0             Iron         ppm         ASTM D5185(m)         >200         2             Nickel         ppm         ASTM D5185(m)         >15         0             Nickel         ppm         ASTM D5185(m)         >15         0             Silver         ppm         ASTM D5185(m)         >200         4             Copper         ppm         ASTM D5185(m)         >200         4             Adaminum         ppm         ASTM D5185(m)         >200         4             Adaminum         ppm         ASTM D5185(m)         >20         4	Machine Age	yrs	Client Info		0			
Sample Status         method         limit/base         current         history1         history2           Water         WC Method         >0.2         NEG             WEAR METALS         method         limit/base         current         history1         history2           PQ         ASTM D8184'         0              fron         ppm         ASTM D5185(m)         >200         2             Nickel         ppm         ASTM D5185(m)         >15         0             Nickel         ppm         ASTM D5185(m)         >15         <1	Oil Age	yrs	Client Info		0			
CONTAMINATION       method       limit/base       current       history1       history2         Water       WC Method       >0.2       NEG           WEAR METALS       method       limit/base       current       history1       history2         PQ       ASTM D6184/       0            Chromium       ppm       ASTM D6185/m       >15       0           Nickel       ppm       ASTM D5185/m       >15       0           Nickel       ppm       ASTM D5185/m       0            Auminum       ppm       ASTM D5185/m       >200       4           Lead       ppm       ASTM D5185/m       >200       4           Auminum       ppm       ASTM D5185/m       >200       4           Lead       ppm       ASTM D5185/m       >200       4           Auminum       ppm       ASTM D5185/m       >200       4           Copper       ppm       ASTM D5185/m       0	Oil Changed		Client Info					
Water         WC Method         >0.2         NEG             WEAR METALS         method         limit/base         current         history1         history2           PQ         ASTM D8184*         0             Iron         ppm         ASTM D8185m         >200         2             Chromium         ppm         ASTM D5185m         >15         0             Nickel         ppm         ASTM D5185m         >15         <1	Sample Status				ABNORMAL			
WEAR METALS         method         limit/base         current         history1         history2           PQ         ASTM D6184*         0              Iron         ppm         ASTM D6184(m)         200         2             Chromium         ppm         ASTM D5185(m)         >15         0             Nickel         ppm         ASTM D5185(m)         >15         <1             Nickel         ppm         ASTM D5185(m)         >5         <1             Aluminum         ppm         ASTM D5185(m)         >200         4             Lead         ppm         ASTM D5185(m)         >200         4             Copper         ppm         ASTM D5185(m)         >200         4             Matimony         ppm         ASTM D5185(m)         >200              Copper         ppm         ASTM D5185(m)         >200              Cadmium         ppm         ASTM D5185(m)         0	CONTAMINATION	J	method	limit/base	current	history1	history2	
PQ       ASTM D8184*       0           Iron       ppm       ASTM D5185(m)       >200       2           Chromium       ppm       ASTM D5185(m)       >15       0           Nickel       ppm       ASTM D5185(m)       >15       <1	Water		WC Method	>0.2	NEG			
Iron         ppm         ASTM D5185(m)         >200         2             Chromium         ppm         ASTM D5185(m)         >15         0             Nickel         ppm         ASTM D5185(m)         >15         <1             Nickel         ppm         ASTM D5185(m)         0             Silver         ppm         ASTM D5185(m)         >25         <1             Aluminum         ppm         ASTM D5185(m)         >200         4             Lead         ppm         ASTM D5185(m)         >200         4             Copper         ppm         ASTM D5185(m)         >20         4             Matimony         ppm         ASTM D5185(m)         >5         <1             Cadmium         ppm         ASTM D5185(m)         >5         <1             ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185(m)         0	WEAR METALS		method	limit/base	current	history1	history2	
Chromium       ppm       ASTM D5185(m)       >15       0           Nickel       ppm       ASTM D5185(m)       >15       <1	PQ		ASTM D8184*		0			
Nickel         ppm         ASTM D5/85(m)         >15         <1             Titanium         ppm         ASTM D5/85(m)         0             Silver         ppm         ASTM D5/85(m)         >25         <1	Iron	ppm	ASTM D5185(m)	>200	2			
Titanium       ppm       ASTM D5185(m)       0           Silver       ppm       ASTM D5185(m)       >25       <1	Chromium	ppm	ASTM D5185(m)	>15	0			
Silver         ppm         ASTM D5185(m)         0             Aluminum         ppm         ASTM D5185(m)         >25         <1	Nickel	ppm	ASTM D5185(m)	>15	<1			
Aluminum       ppm       ASTM D5185(m)       >25       <1	Titanium	ppm	ASTM D5185(m)		0			
Lead         ppm         ASTM D5185(m)         >100         0             Copper         ppm         ASTM D5185(m)         >200         4             Tin         ppm         ASTM D5185(m)         >25         0             Antimony         ppm         ASTM D5185(m)         >5         <1	Silver	ppm	ASTM D5185(m)		0			
Copper         ppm         ASTM D5185(m)         >200         4             Tin         ppm         ASTM D5185(m)         >25         0             Antimony         ppm         ASTM D5185(m)         >5         <1	Sulfur         ppm         ASTM D51	Aluminum	ppm	ASTM D5185(m)	>25	<1		
Time       ppm       ASTM D5185(m)       >25       0           Antimony       ppm       ASTM D5185(m)       >5       <1           Vanadium       ppm       ASTM D5185(m)       0           Beryllium       ppm       ASTM D5185(m)       0           Cadmium       ppm       ASTM D5185(m)       0           ADDITIVES       method       limit/base       current       history1       history2         Boron       ppm       ASTM D5185(m)       0.0       0           Molybdenum       ppm       ASTM D5185(m)       0.0       0           Magnesium       ppm       ASTM D5185(m)       0       0	Lead	ppm	ASTM D5185(m)	>100	0			
Antimony       ppm       ASTM D5185(m)       >5       <1	Copper	ppm	ASTM D5185(m)	>200	4			
Vanadium         ppm         ASTM D5185(m)         0             Beryllium         ppm         ASTM D5185(m)         0             Cadmium         ppm         ASTM D5185(m)         0             ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185(m)         4.4         <1             Barium         ppm         ASTM D5185(m)         0.0         0             Manganese         ppm         ASTM D5185(m)         0.0         0             Magnesium         ppm         ASTM D5185(m)         0         0             Magnesium         ppm         ASTM D5185(m)         0         0             Calcium         ppm         ASTM D5185(m)         0         0             Magnesium         ppm         ASTM D5185(m)         0         0             Sulfur         ppm         ASTM D5185(m)         7039         T9	Tin	ppm	ASTM D5185(m)	>25	0			
BerylliumppmASTM D5185(m)0CadmiumppmASTM D5185(m)Imit/basecurrenthistory1history2ADDITIVESmethodlimit/basecurrenthistory1history2BoronppmASTM D5185(m)4.4<1	Antimony	ppm	ASTM D5185(m)	>5	<1			
CadmiumppmASTM D5185(m)0ADDITIVESmethodlimit/basecurrenthistory1history2BoronppmASTM D5185(m)4.4<1	Vanadium	ppm	ASTM D5185(m)		0			
ADDITIVESmethodlimit/basecurrenthistory1history2BoronppmASTM D5185(m)4.4<1	Beryllium	ppm	ASTM D5185(m)		0			
Boron       ppm       ASTM D5185(m)       4.4       <1           Barium       ppm       ASTM D5185(m)       0.0       0           Molybdenum       ppm       ASTM D5185(m)       0       0           Manganese       ppm       ASTM D5185(m)       0       0           Magnesium       ppm       ASTM D5185(m)       0       0           Calcium       ppm       ASTM D5185(m)       0       0           Phosphorus       ppm       ASTM D5185(m)       0       0           Zinc       ppm       ASTM D5185(m)       215       163           Sulfur       ppm       ASTM D5185(m)       7039       79           Sulfur       ppm       ASTM D5185(m)       7039       79           CONTAMINANTS       method       limit/base       current       history1       history2         Silicon       ppm       ASTM D5185(m)       >50       3           Potassium       p	Cadmium	ppm	ASTM D5185(m)		0			
BariumppmASTM D5185(m)0.00MolybdenumppmASTM D5185(m)00ManganeseppmASTM D5185(m)00MagnesiumppmASTM D5185(m)00CalciumppmASTM D5185(m)00CalciumppmASTM D5185(m)00PhosphorusppmASTM D5185(m)215163ZincppmASTM D5185(m)0<1SulfurppmASTM D5185(m)703979LithiumppmASTM D5185(m)<1CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185(m)>503PotassiumppmASTM D5185(m)>20<1FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2	ADDITIVES		method	limit/base	current	history1	history2	
MolybdenumppmASTM D5185(m)00ManganeseppmASTM D5185(m)00MagnesiumppmASTM D5185(m)00CalciumppmASTM D5185(m)00PhosphorusppmASTM D5185(m)215163ZincppmASTM D5185(m)0<1	Boron	ppm	ASTM D5185(m)	4.4	<1			
ManganeseppmASTM D5185(m)0MagnesiumppmASTM D5185(m)00CalciumppmASTM D5185(m)00PhosphorusppmASTM D5185(m)215163ZincppmASTM D5185(m)0<1	Barium	ppm	ASTM D5185(m)	0.0	0			
Magnesium       ppm       ASTM D5185(m)       0       0           Calcium       ppm       ASTM D5185(m)       0       0       0           Phosphorus       ppm       ASTM D5185(m)       215       163           Zinc       ppm       ASTM D5185(m)       0       <1	Molybdenum	ppm	ASTM D5185(m)	0	0			
Calcium       ppm       ASTM D5185(m)       0       0           Phosphorus       ppm       ASTM D5185(m)       215       163           Zinc       ppm       ASTM D5185(m)       0       <1	Manganese	ppm	ASTM D5185(m)		0			
Phosphorus         ppm         ASTM D5185(m)         215         163             Zinc         ppm         ASTM D5185(m)         0         <1	Magnesium	ppm	ASTM D5185(m)	0	0			
ZincppmASTM D5185(m)0<1SulfurppmASTM D5185(m)7039 <b>79</b> LithiumppmASTM D5185(m)<1CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185(m)>503SodiumppmASTM D5185(m)>503PotassiumppmASTM D5185(m)>20<1	Calcium	ppm	ASTM D5185(m)	0	0			
SulfurppmASTM D5185(m)7039 <b>79</b> LithiumppmASTM D5185(m) <b>&lt; 1</b> CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185(m)>50 <b>3</b> SodiumppmASTM D5185(m)>20 <b>5</b> PotassiumppmASTM D5185(m)>20 <b>&lt;1</b> FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2	Phosphorus	ppm	ASTM D5185(m)	215	163			
LithiumppmASTM D5185(m)<1CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185(m)>503SodiumppmASTM D5185(m)5PotassiumppmASTM D5185(m)>20<1	Zinc	ppm	ASTM D5185(m)	0	<1			
CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185(m)>503SodiumppmASTM D5185(m)5PotassiumppmASTM D5185(m)>20<1	Sulfur	ppm	ASTM D5185(m)	7039	<b>4</b> 79			
Silicon         ppm         ASTM D5185(m)         >50         3             Sodium         ppm         ASTM D5185(m)         5         5             Potassium         ppm         ASTM D5185(m)         >20         <1	Lithium	ppm	ASTM D5185(m)		<1			
SodiumppmASTM D5185(m)5PotassiumppmASTM D5185(m) >20<1FLUID DEGRADATIONmethodlimit/basecurrenthistory1history2	CONTAMINANTS		method	limit/base	current	history1	history2	
SodiumppmASTM D5185(m)5PotassiumppmASTM D5185(m) >20<1	Silicon	ppm	ASTM D5185(m)	>50	3			
Potassium         ppm         ASTM D5185(m)         >20         <1             FLUID DEGRADATION         method         limit/base         current         history1         history2	Sodium		ASTM D5185(m)		5			
	Potassium		ASTM D5185(m)	>20				
Acid Number (AN) mg KOH/g ASTM D974* 0.13	FLUID DEGRADA	TION	method	limit/base	current	history1	history2	
	Acid Number (AN)	mg KOH/g	ASTM D974*		0.13			



## **OIL ANALYSIS REPORT**





	VISUAL		method	limit/base	current	history1	history2
	White Metal	scalar	Visual*	NONE	NONE		
	Yellow Metal	scalar	Visual*	NONE	VLITE		
1	Precipitate	scalar	Visual*	NONE	NONE		
	Silt	scalar	Visual*	NONE	NONE		
	Debris	scalar	Visual*	NONE	NONE		
	Sand/Dirt	scalar	Visual*	NONE	NONE		
9/22 .	Appearance	scalar	Visual*	NORML	NORML		
Dec29/22	Odor	scalar	Visual*	NORML	NORML		
	Emulsified Water	scalar	Visual*	>0.2	NEG		
	Free Water	scalar	Visual*		NEG		
	FLUID PROPERT		method	limit/base	current	history1	history2
	Visc @ 40°C	cSt	ASTM D7279(m)	220	▲ 329		
	SAMPLE IMAGES		method	limit/base	current	history1	history2
			mothod				motory
Dec29/22 -	Color					no image	no image
	Bottom					no image	no image
	GRAPHS						
	Ferrous Alloys			23	PQ		
	iron				Smuara		
ç	= 6 - mium				0 - Gevele		
C. B. C				18	30		
ć	2			16	50		
	0				10 -		
	Dec29/22			Dec29/22	20		
	Dec				Abnormal		
	Non-ferrous Metals	s		10	JU + Q		
	10 copper 1			8	30		
	8 - Reason lead			6	50		
					10		
	2				20		
	29/22			Dec29/22	1/22		
	Dec29/27			Dec2	Dec29/22		
	🔺 Viscosity @ 40°C				Acid Number		
	350 T						
	300-			KOHV			
	Abnormal Base Base			Acid Number (mg KOH/g) ) 0 mmber (mg KOH/g)	10		
				er o r	05		
	200 - Abnormal			- Nu Nu			
	150				JU		
	Dec29/22			Dec29/22	Dec29/22		
CALA Laboratory	: WearCheck - C8-1175				'L 5H9	Ivex Protect	
Sample No. 17025:2017 Lab Number	: WC0763603	Recei Teste		3 Jan 2023 6 Jan 2023			Britannia Ro ssissauga, C
Accredited Unique Number		Diagr		Jan 2023 - Ke	vin Marson	IVI	CA L4W 5N
	: IND 2 ( Additional Tes					Conta	act: Terry Ea
discuss this sample report	, contact Customer Servi	ce at 1-8	800-268-213			erry.Earle@ivex	
st denoted (*) outside scop	e of accreditation, (m) me	ethod ma	odified, (e) te	sted at exte	rnal lab.		(905)795-88
idity of results and interpre							

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Validity of results and interpretation are based on the sample and information as supplied.