

OIL ANALYSIS REPORT

Sample Rating Trend



Machine Id 381-0031-1

Component Gearbox Fluid ESSO SPARTAN EP 220 (--- GAL)

DIAGNOSIS

Recommendation

We advise that you check all areas where contaminants can enter the system. We recommend that you drain the oil from the component if this has not already been done. Confirm the source of the lubricant being utilized for top-up/fill. We recommend an early resample to monitor this condition. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.

Wear

All component wear rates are normal.

Contamination

Lithium (Li) level abnormal at 13ppm., indicates possible grease contamination.

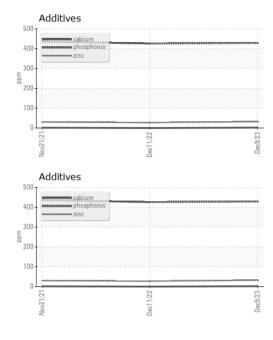
Fluid Condition

Additive levels indicate the addition of a different brand, or type of oil. The oil is no longer serviceable due to the presence of contaminants.

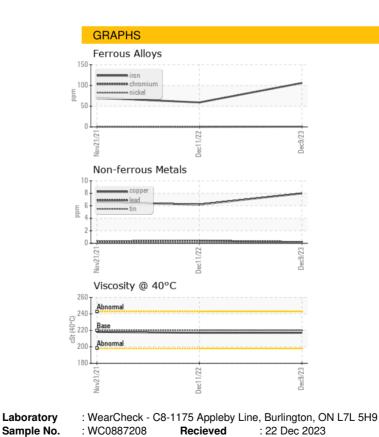
Sample DateClient Info09 Dec 202311 Dec 202221 Nov 2021Machine AgehrsClient Info000Oil AgehrsClient Info000Oil ChangedClient InfoN/AN/AN/ASample StatusImather of the statusMethodImather of the statusABNORMALCONTAMINATIONmethodlimit/basecurrenthistory1history2			No	v2021	Dec2022 Dec20	23	
Sample Date Client Info 09 Dec 2023 11 Dec 2022 21 Nov 2021 Machine Age hrs Client Info 0 0 0 Oil Age hrs Client Info 0 0 0 Oil Changed Client Info N/A N/A N/A N/A Sample Status method limit/base current history1 history2 Water WC Method >0.2 NEG NEG NEG Vetar method limit/base current history1 history2 Iron ppm ASTM DS185(m) >106 59 70 Chromium ppm ASTM DS185(m) >15 0 <1 <1 Nickel ppm ASTM DS185(m) >100 0 <1 <1 Nickel ppm ASTM DS185(m) >200 8 6 7 Aluminum ppm ASTM DS185(m) >200 8 6 7 Venadium ppm	SAMPLE INFORM	ATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 0 0 0 Oil Age hrs Client Info N/A N/A N/A N/A Sample Status Image Client Info N/A N/A N/A 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 Iron ppm ASTM DS185(m) >15 <1	Sample Number		Client Info		WC0887208	WC0646880	WC0646882
Oil Age hrs Client Info 0 0 0 Oil Changed Client Info N/A N/A N/A N/A Sample Status Client Info N/A ABNORMAL NORMAL ABNORMAL CONTAMINATION method limit/base current history1 history2 Water WC Method >0.2 NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5155(m) >200 106 59 70 Chromium ppm ASTM D5155(m) >15 0 <1	Sample Date		Client Info		09 Dec 2023	11 Dec 2022	21 Nov 2021
Oli Changed Client Info N/A N/A N/A N/A N/A Sample Status method limit/base current history1 history2 Water WC Method >0.2 NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185(m) >200 106 59 70 Chromium ppm ASTM D5185(m) >15 <1	Machine Age	hrs	Client Info		0	0	0
Sample Statusmethodimit/basecurrentNORMALABNORMALCONTAMINATIONmethodimit/basecurrenthistory1history2WaterWC Method>0.2NEGNEGNEGWEAR METALSmethodimit/basecurrenthistory1history2IronppmASTM D5185(m)>2001065970ChromiumppmASTM D5185(m)>150<1	Oil Age	hrs	Client Info		0	0	0
CONTAMINATION method limit/base current history1 history2 Water WC Method >0.2 NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185(m) >200 106 59 70 Chromium ppm ASTM D5185(m) >15 <1	Oil Changed		Client Info		N/A	N/A	N/A
Water WC Method >0.2 NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185(m) >200 106 59 70 Chromium ppm ASTM D5185(m) >15 <1	Sample Status				ABNORMAL	NORMAL	ABNORMAL
WEAR METALSmethodlimit/basecurrenthistory1history2IronppmASTM D5185(m)>2001065970ChromiumppmASTM D5185(m)>15<1	CONTAMINATIO	N	method	limit/base	current	history1	history2
Iron ppm ASTM D5185(m) >200 106 59 70 Chromium ppm ASTM D5185(m) >15 <1	Water		WC Method	>0.2	NEG	NEG	NEG
Chromium ppm ASTM D5185(m) >15 <1	WEAR METALS		method	limit/base	current	history1	history2
Nickel ppm ASTM D5185(m) >15 0 <1 <1 Titanium ppm ASTM D5185(m) 0 0 0 0 Silver ppm ASTM D5185(m) 0 0 <1	Iron	ppm	ASTM D5185(m)	>200	106	59	70
Titanium ppm ASTM D5185(m) 0 0 0 0 Silver ppm ASTM D5185(m) >25 <1 0 <1 Aluminum ppm ASTM D5185(m) >25 <1 0 <1 Lead ppm ASTM D5185(m) >100 <1 <1 <1 Copper ppm ASTM D5185(m) >200 8 6 7 Tin ppm ASTM D5185(m) >200 8 6 7 Tin ppm ASTM D5185(m) >200 8 6 7 Vanadium ppm ASTM D5185(m) >5 0 <1 0 Vanadium ppm ASTM D5185(m) >5 0 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 0 0 Boron ppm ASTM D5185(m) .5 <1 2 2 2 Barium ppm ASTM D5185(m) .5 <1 2 2 2 Magnesium ppm <td>Chromium</td> <td>ppm</td> <td>ASTM D5185(m)</td> <td>>15</td> <td><1</td> <td><1</td> <td><1</td>	Chromium	ppm	ASTM D5185(m)	>15	<1	<1	<1
Silver ppm ASTM D5185(m) 0 0 <1 Aluminum ppm ASTM D5185(m) >25 <1 0 <1 Lead ppm ASTM D5185(m) >200 8 6 7 Copper ppm ASTM D5185(m) >200 8 6 7 Tin ppm ASTM D5185(m) >25 0 0 0 Antimony ppm ASTM D5185(m) >5 0 <1 0 Vanadium ppm ASTM D5185(m) >5 0 0 0 0 Beryllium ppm ASTM D5185(m) 0 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 0 0 0 0 Molybdenum ppm ASTM D5185(m) 0 <1 <1 <1 Magnesium ppm ASTM D5185(m) 0 <1 0 2 Colclium ppm ASTM D5185(m) <td>Nickel</td> <td>ppm</td> <td>ASTM D5185(m)</td> <td>>15</td> <td>0</td> <td><1</td> <td><1</td>	Nickel	ppm	ASTM D5185(m)	>15	0	<1	<1
Aluminum ppm ASTM D5185(m) >25 <1 0 <1 Lead ppm ASTM D5185(m) >100 <1	Titanium	ppm	ASTM D5185(m)		0	0	0
Lead ppm ASTM D5185(m) >100 <1	Silver	ppm	ASTM D5185(m)		0	0	<1
Copper ppm ASTM D5185(m) >200 8 6 7 Tin ppm ASTM D5185(m) >25 0 0 0 Antimony ppm ASTM D5185(m) >5 0 <1	Aluminum	ppm	ASTM D5185(m)	>25	<1	0	<1
TinppmASTM D5185(m)>25000AntimonyppmASTM D5185(m)>50<1	Lead	ppm	ASTM D5185(m)	>100	<1	<1	<1
Antimony ppm ASTM D5185(m) >5 0 <1 0 Vanadium ppm ASTM D5185(m) 0 0 0 0 Beryllium ppm ASTM D5185(m) 0 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) .5 <1	Copper	ppm	ASTM D5185(m)	>200	8	6	7
Vanadium ppm ASTM D5185(m) 0 0 0 Beryllium ppm ASTM D5185(m) 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) .5 <1 2 2 Barium ppm ASTM D5185(m) .5 <1 2 2 Barium ppm ASTM D5185(m) .5 <1 2 2 Barium ppm ASTM D5185(m) 0 0 0 0 0 Molybdenum ppm ASTM D5185(m) 0 <1 <1 <1 <1 <1 Magnesium ppm ASTM D5185(m) 0 <1 0 0 2 Phosphorus ppm ASTM D5185(m) 25.0 429 426 436 Sulfur ppm ASTM D5185(m) <td>Tin</td> <td>ppm</td> <td>ASTM D5185(m)</td> <td>>25</td> <td>0</td> <td>0</td> <td>0</td>	Tin	ppm	ASTM D5185(m)	>25	0	0	0
Beryllium ppm ASTM D5185(m) 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) .5 <1	Antimony	ppm	ASTM D5185(m)	>5	0	<1	0
CadmiumppmASTM D5185(m)000ADDITIVESmethodlimit/basecurrenthistory1history2BoronppmASTM D5185(m).5<1	Vanadium	ppm	ASTM D5185(m)		0	0	0
ADDITIVESmethodlimit/basecurrenthistory1history2BoronppmASTM D5185(m).5<1	Beryllium	ppm	ASTM D5185(m)		0	0	0
Boron ppm ASTM D5185(m) .5 <1 2 2 Barium ppm ASTM D5185(m) 0 0 0 <1 2 2 Barium ppm ASTM D5185(m) 0 0 0 0 0 0 0 Molybdenum ppm ASTM D5185(m) 0 4 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1	Cadmium	ppm	ASTM D5185(m)		0	0	0
Barium ppm ASTM D5185(m) 0 0 <1 Molybdenum ppm ASTM D5185(m) 0 0 0 0 0 Manganese ppm ASTM D5185(m) 0 <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185(m) 0 0 0 0 0 Manganese ppm ASTM D5185(m) 0 <1 <1 <1 Magnesium ppm ASTM D5185(m) 0 <1 0 0 Calcium ppm ASTM D5185(m) 1.7 2 0 2 Phosphorus ppm ASTM D5185(m) 250 429 426 436 Zinc ppm ASTM D5185(m) .3 32 277 30 Sulfur ppm ASTM D5185(m) .3 32 2148 2270 Lithium ppm ASTM D5185(m) .3 32 2148 2270 Silicon ppm ASTM D5185(m) .50 27 26 23 Sodium ppm ASTM D5185(m) >50 27 26 23 Sodium ppm ASTM D5185(m) .50 27 26 23	Boron	ppm	ASTM D5185(m)	.5	<1	2	2
Manganese ppm ASTM D5185(m) <1 <1 <1 Magnesium ppm ASTM D5185(m) 0 <1 0 0 Calcium ppm ASTM D5185(m) 1.7 2 0 2 Phosphorus ppm ASTM D5185(m) 250 429 426 436 Zinc ppm ASTM D5185(m) .3 32 277 30 Sulfur ppm ASTM D5185(m) .3 32 2148 2270 Lithium ppm ASTM D5185(m) .4 13 7 ▲ 13 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >50 27 26 23 Sodium ppm ASTM D5185(m) >50 27 26 23	Barium	ppm	ASTM D5185(m)		0	0	<1
Magnesium ppm ASTM D5185(m) 0 <1 0 0 Calcium ppm ASTM D5185(m) 1.7 2 0 2 Phosphorus ppm ASTM D5185(m) 250 429 426 436 Zinc ppm ASTM D5185(m) .3 32 277 30 Sulfur ppm ASTM D5185(m) .3 32 2148 2270 Lithium ppm ASTM D5185(m) .4 13 7 ▲ 13 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >50 27 26 23 Sodium ppm ASTM D5185(m) >50 1 1 1	Molybdenum	ppm	ASTM D5185(m)	0	0	0	0
Calcium ppm ASTM D5185(m) 1.7 2 0 2 Phosphorus ppm ASTM D5185(m) 250 429 426 436 Zinc ppm ASTM D5185(m) .3 32 27 30 Sulfur ppm ASTM D5185(m) .3 32 2148 2270 Lithium ppm ASTM D5185(m) .4 13 7 .4 13 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >50 27 26 23 Sodium ppm ASTM D5185(m) >50 27 26 23	Manganese	ppm	ASTM D5185(m)		<1	<1	<1
Phosphorus ppm ASTM D5185(m) 250 429 426 436 Zinc ppm ASTM D5185(m) .3 32 27 30 Sulfur ppm ASTM D5185(m) .3 32 2148 2270 Lithium ppm ASTM D5185(m) .4 13 7 .4 13 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >50 27 26 23 Sodium ppm ASTM D5185(m) 1 1 1	Magnesium	ppm	ASTM D5185(m)	0	<1	0	0
Zinc ppm ASTM D5185(m) .3 32 27 30 Sulfur ppm ASTM D5185(m) 2373 2148 2270 Lithium ppm ASTM D5185(m) ▲ 13 7 ▲ 13 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >50 27 26 23 Sodium ppm ASTM D5185(m) 1 1 1	Calcium	ppm	ASTM D5185(m)	1.7	2	0	2
Sulfur ppm ASTM D5185(m) 2373 2148 2270 Lithium ppm ASTM D5185(m) ▲ 13 7 ▲ 13 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >50 27 26 23 Sodium ppm ASTM D5185(m) 1 1 1	Phosphorus	ppm	ASTM D5185(m)	250	429	426	436
LithiumppmASTM D5185(m)13713CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185(m)>50272623SodiumppmASTM D5185(m)111	Zinc	ppm	ASTM D5185(m)	.3	32	27	30
CONTAMINANTSmethodlimit/basecurrenthistory1history2SiliconppmASTM D5185(m)>50272623SodiumppmASTM D5185(m)111	Sulfur	ppm	ASTM D5185(m)		2373	2148	2270
Silicon ppm ASTM D5185(m) >50 27 26 23 Sodium ppm ASTM D5185(m) 1 1 1	Lithium	ppm	ASTM D5185(m)		A 13	7	1 3
Sodium ppm ASTM D5185(m) 1 1 1	CONTAMINANTS		method	limit/base	current	history1	history2
	Silicon	ppm	ASTM D5185(m)	>50	27	26	23
Potassium ppm ASTM D5185(m) >20 <1 0 <1	Sodium	ppm	ASTM D5185(m)		1	1	1
	Potassium	ppm	ASTM D5185(m)	>20	<1	0	<1



OIL ANALYSIS REPORT



VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	Visual*	NONE	VLITE	NONE	VLITE
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	NONE
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		method	limit/base	current	history1	history2
FLUID PROPERT Visc @ 40°C		method ASTM D7279(m)	limit/base 220	current 217		
	T <mark>IES</mark> cSt				history1	history2
Visc @ 40°C	T <mark>IES</mark> cSt	ASTM D7279(m)	220	217	history1 217	history2 ▲ 218



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 Accredited Laboratory
 Unique Number
 : 5698205
 Diagnostician
 : Kevin Marson

 To discuss this sample report, contact Customer Service at 1-800-268-2131.
 parminder.s

 Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab.
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 Validity of results and interpretation are based on the sample and information as supplied.
 Service at 1-800-268-2131.

Diagnosed

: 27 Dec 2023

: 02605120

CALA

ISO 17025:2017

Lab Number

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