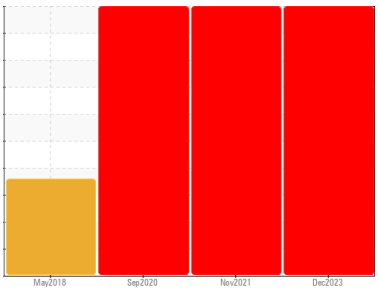
PROBLEM SUMMARY

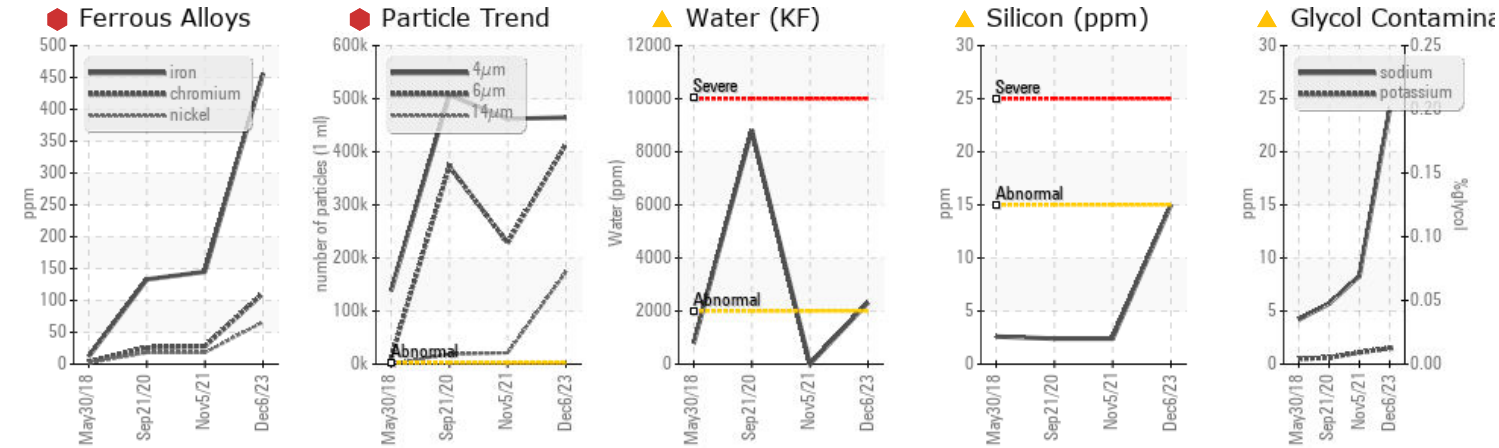
Sample Rating Trend



WEAR

Area
Fwd Machinery Space
Machine Id
Thruster Aft Stbd - Steering Tube Seal (S/N Sample Tag CL-06003-S5)
Component
Steering
Fluid
CASTROL ALPHA SP150 (35 LTR)

COMPONENT CONDITION SUMMARY



RECOMMENDATION

Check seals and/or filters for points of contaminant entry. We advise that you check all areas where contaminants can enter the system. 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 that you drain the fluid from the component if this has not already been done. Confirm the source of the lubricant being utilized for top-up/fill. Resample in 30-45 days to monitor this situation.

PROBLEMATIC TEST RESULTS

Sample Status				**SEVERE**	SEVERE	SEVERE
Iron	ppm	ASTM D5185(m)	>50	**456**	145	133
Chromium	ppm	ASTM D5185(m)	>15	**111**	28	26
Nickel	ppm	ASTM D5185(m)	>5	**66**	18	18
Calcium	ppm	ASTM D5185(m)	4	**93**	2	2
Silicon	ppm	ASTM D5185(m)	>15	**15**	2	2
Sodium	ppm	ASTM D5185(m)		**24**	8	6
Water	%	ASTM D6304*	>0.2	**0.231**	---	0.881
ppm Water	ppm	ASTM D6304*	>2000	**2315**	---	8811.5
Particles >4µm		ASTM D7647	>2500	**464479**	462050	507199
Particles >6µm		ASTM D7647	>640	**413927**	228181	372301
Particles >14µm		ASTM D7647	>80	**173818**	21267	18887
Particles >21µm		ASTM D7647	>20	**45497**	6513	3796
Particles >38µm		ASTM D7647	>4	**393**	193	99
Particles >71µm		ASTM D7647	>3	**10**	5	1
Oil Cleanliness		ISO 4406 (c)	>18/16/13	**26/26/25**	26/25/22	26/26/21
Emulsified Water	scalar	Visual*	>0.2	**.2%**	.5%	.5%

Customer Id: TERHAM
Sample No.: PC
Lab Number: 02601695
Test Package: MAR 2

To manage this report scan the QR code

To discuss the diagnosis or test data:
Kevin Marson +1 (289)291-4644 x4644
Kevin.Marson@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
Change Fluid	---	---	?	We recommend that you drain the fluid from the component if this has not already been done.
Resample	---	---	?	Resample in 30-45 days to monitor this situation.
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.
Check Dirt Access	---	---	?	We advise that you check all areas where contaminants can enter the system.
Check Fluid Source	---	---	?	Confirm the source of the lubricant being utilized for top-up/fill.
Check Seals	---	---	?	Check seals and/or filters for points of contaminant entry.

HISTORICAL DIAGNOSIS

WEAR

05 Nov 2021 Diag: Kevin Marson

Check seals and/or filters for points of contaminant entry. We advise that you check all areas where contaminants can enter the system. 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 that you drain the fluid from the component if this has not already been done. We recommend an early resample to monitor this condition.Iron and nickel ppm levels are severe. Chromium ppm levels are abnormal. Particles >14µm are severely high. Particles >21µm are severely high. Particles >38µm are severely high. Particles >6µm are severely high. Particles >4µm are severely high. There is a moderate concentration of water present in the fluid. Free water present. The AN level is acceptable for this fluid. The fluid is no longer serviceable as a result of the abnormal and/or severe wear.

view report

WEAR

21 Sep 2020 Diag: Kevin Marson

Check seals and/or filters for points of contaminant entry. We advise that you check all areas where contaminants can enter the system. 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 that you drain the fluid from the component if this has not already been done. We recommend an early resample to monitor this condition.Iron and nickel ppm levels are severe. PQ levels are severe. Chromium ppm levels are abnormal. The very high ferrous density (PQ) index indicates that severe wear is occurring. Particles >14µm are severely high. Particles >21µm are severely high. Particles >38µm are severely high. Particles >6µm are severely high. Particles >4µm are severely high. Water Water and ppm water contamination levels are abnormal. There is a moderate concentration of water present in the fluid. The AN level is acceptable for this fluid. The fluid is no longer serviceable as a result of the abnormal and/or severe wear.

view report

ISO

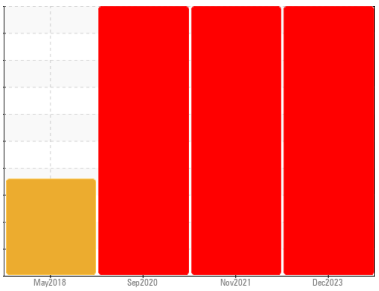
30 May 2018 Diag: Wes Davis

We advise that you check all areas where contaminants can enter the system. We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. 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. Resample in 30-45 days to monitor this situation. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.All component wear rates are normal. Particles >6µm are severely high. Particles >4µm are severely high. Particles >14µm are abnormally high. Particles >21µm are abnormally high. The water content is negligible. The AN level is acceptable for this fluid. The condition of the fluid is suitable for further service.

view report

OIL ANALYSIS REPORT

Sample Rating Trend



WEAR

Area
Fwd Machinery Space
Machine Id
Thruster Aft Stbd - Steering Tube Seal (S/N Sample Tag CL-06003-S5)
Component
Steering
Fluid
CASTROL ALPHA SP150 (35 LTR)

DIAGNOSIS

Recommendation

Check seals and/or filters for points of contaminant entry. We advise that you check all areas where contaminants can enter the system. 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 that you drain the fluid from the component if this has not already been done. Confirm the source of the lubricant being utilized for top-up/fill. Resample in 30-45 days to monitor this situation.

Wear

Chromium, iron and nickel ppm levels are severe.

Contamination

There is a high amount of particulates (2 to 100 microns in size) present in the fluid. There is a moderate concentration of water present in the fluid. There is a moderate concentration of dirt present in the fluid. Abnormal water content and sodium(Na) level indicate possible sea water contamination. High amount of ingressed dirt has caused abrasive wear to the component.

Fluid Condition

Additive levels indicate the addition of a different brand, or type of fluid. The AN level is acceptable for this fluid. The fluid is no longer serviceable as a result of the abnormal and/or severe wear.

SAMPLE INFORMATION		method	limit/base	current	history1	history2
Sample Number		Client Info		**PC**	PC0040616	PC0035660
Sample Date		Client Info		**06 Dec 2023**	05 Nov 2021	21 Sep 2020
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
Sample Status				**SEVERE**	SEVERE	SEVERE

WEAR METALS		method	limit/base	current	history1	history2
PQ		ASTM D8184*		**98**	18	135
Iron	ppm	ASTM D5185(m)	>50	**456**	145	133
Chromium	ppm	ASTM D5185(m)	>15	**111**	28	26
Nickel	ppm	ASTM D5185(m)	>5	**66**	18	18
Titanium	ppm	ASTM D5185(m)		**0**	0	0
Silver	ppm	ASTM D5185(m)		**<1**	<1	<1
Aluminum	ppm	ASTM D5185(m)	>5	**<1**	0	0
Lead	ppm	ASTM D5185(m)	>10	**0**	<1	0
Copper	ppm	ASTM D5185(m)	>50	**3**	1	1
Tin	ppm	ASTM D5185(m)	>5	**0**	0	0
Antimony	ppm	ASTM D5185(m)		**<1**	<1	<1
Vanadium	ppm	ASTM D5185(m)		**0**	<1	<1
Beryllium	ppm	ASTM D5185(m)		**0**	0	0
Cadmium	ppm	ASTM D5185(m)		**0**	<1	0

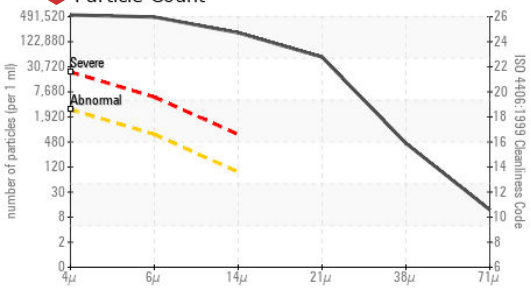
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185(m)		**5**	2	2
Barium	ppm	ASTM D5185(m)	4	**0**	0	0
Molybdenum	ppm	ASTM D5185(m)		**16**	4	3
Manganese	ppm	ASTM D5185(m)		**9**	2	2
Magnesium	ppm	ASTM D5185(m)	4	**7**	2	2
Calcium	ppm	ASTM D5185(m)	4	**93**	2	2
Phosphorus	ppm	ASTM D5185(m)	330	**201**	214	242
Zinc	ppm	ASTM D5185(m)	4	**16**	5	3
Sulfur	ppm	ASTM D5185(m)		**8693**	7886	8159
Lithium	ppm	ASTM D5185(m)		**13**	<1	<1

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185(m)	>15	**15**	2	2
Sodium	ppm	ASTM D5185(m)		**24**	8	6
Potassium	ppm	ASTM D5185(m)	>20	**2**	1	<1
Water	%	ASTM D6304*	>0.2	**0.231**	---	0.881
ppm Water	ppm	ASTM D6304*	>2000	**2315**	---	8811.5

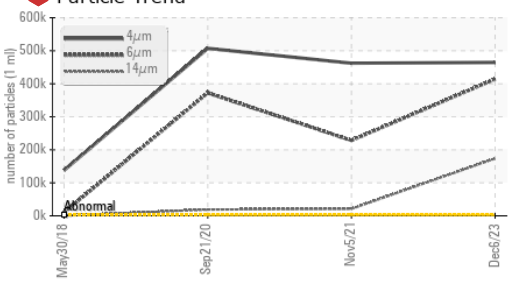
FLUID CLEANLINESS		method	limit/base	current	history1	history2
Particles >4µm		ASTM D7647	>2500	**464479**	462050	507199
Particles >6µm		ASTM D7647	>640	**413927**	228181	372301
Particles >14µm		ASTM D7647	>80	**173818**	21267	18887
Particles >21µm		ASTM D7647	>20	**45497**	6513	3796
Particles >38µm		ASTM D7647	>4	**393**	193	99
Particles >71µm		ASTM D7647	>3	**10**	5	1
Oil Cleanliness		ISO 4406 (c)	>18/16/13	**26/26/25**	26/25/22	26/26/21

OIL ANALYSIS REPORT

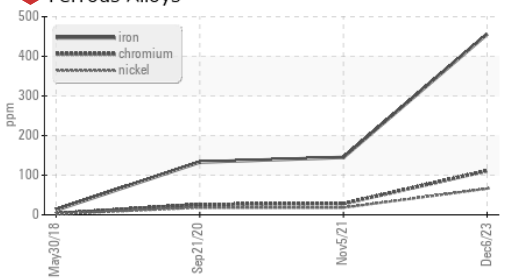
Particle Count



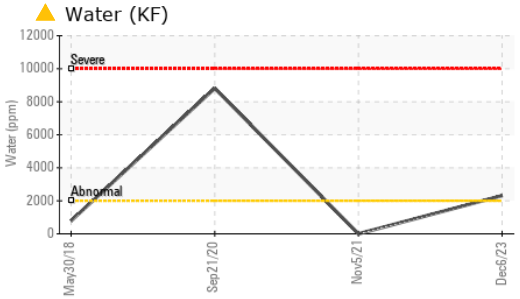
Particle Trend



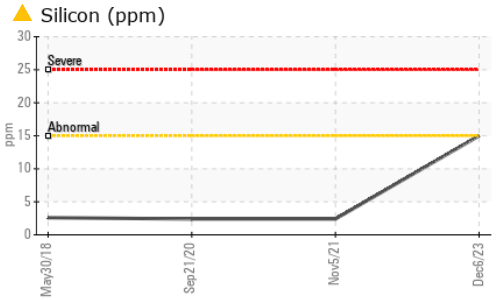
Ferrous Alloys



Water (KF)



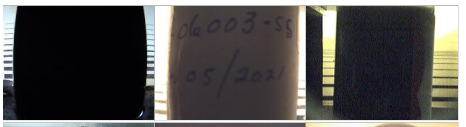
Silicon (ppm)



FLUID DEGRADATION		method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D974*		**0.52**	0.38	0.34

VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	Visual*	NONE	**NONE**	VLITE	NONE
Yellow Metal	scalar	Visual*	NONE	**NONE**	NONE	NONE
Precipitate	scalar	Visual*	NONE	**NONE**	NONE	NONE
Silt	scalar	Visual*	NONE	**NONE**	NONE	VLITE
Debris	scalar	Visual*	NONE	**NONE**	VLITE	NONE
Sand/Dirt	scalar	Visual*	NONE	**NONE**	NONE	NONE
Appearance	scalar	Visual*	NORML	**NORML**	▲ WGOIL	NORML
Odor	scalar	Visual*	NORML	**NORML**	NORML	NORML
Emulsified Water	scalar	Visual*	>0.2	▲ **.2%**	▲ .5%	▲ .5%
Free Water	scalar	Visual*		**NEG**	▲ >10%	NEG

FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D7279(m)	150.0	**155**	142	143
Visc @ 100°C	cSt	ASTM D7279(m)	14.5	**13.5**	12.6	12.6
Viscosity Index (VI)	Scale	ASTM D2270*	95	**77**	74	73

SAMPLE IMAGES	method	limit/base	current	history1	history2
Color					
Bottom					

ISO 17025:2017 Accredited Laboratory

Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9
Sample No. : PC
Lab Number : 02601695
Unique Number : 5694780
Test Package : MAR 2 (Additional Tests: KF, KV100, PQ, PRTCOUNT, TAN Man, VI)
Received : 07 Dec 2023
Diagnosed : 09 Dec 2023
Diagnostician : Kevin Marson

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.

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