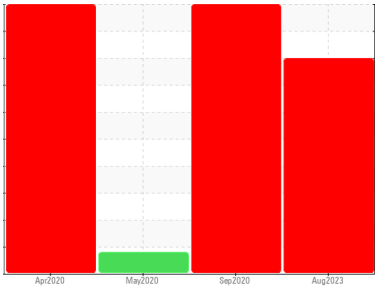
PROBLEM SUMMARY

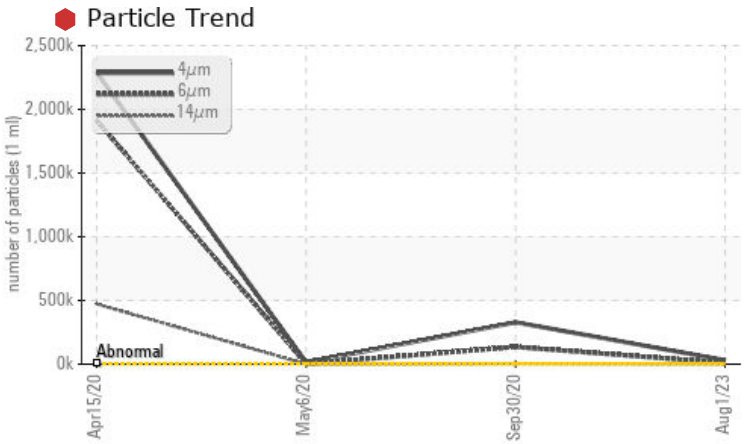
Sample Rating Trend



ISO

Area
Fwd Machinery Space [450164935]
Machine Id
Thruster Aft Port - Steering Tube Seal (S/N Sample Tag CL-06002-S5)
Component
Steering
Fluid
CASTROL ALPHA SP150 (35 LTR)

COMPONENT CONDITION SUMMARY



RECOMMENDATION

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.

PROBLEMATIC TEST RESULTS

Sample Status				SEVERE	SEVERE	ABNORMAL
Particles >4µm		ASTM D7647	>2500	**30533**	328396	13226
Particles >6µm		ASTM D7647	>640	**9290**	135250	2483
Particles >14µm		ASTM D7647	>80	**737**	5387	56
Particles >21µm		ASTM D7647	>20	**199**	1285	13
Particles >38µm		ASTM D7647	>4	**8**	30	0
Oil Cleanliness		ISO 4406 (c)	>18/16/13	**22/20/17**	26/24/20	21/18/13

Customer Id: TERHAM
Sample No.: PC
Lab Number: 02573832
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 Filter	---	---	?	We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid.
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.
Filter Fluid	---	---	?	We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid.

HISTORICAL DIAGNOSIS

ISO

30 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 advise that you use off-line filtration with water adsorbent filters to attempt to remove the water from this fluid. We recommend that you drain the fluid from the component if this has not already been done. We recommend that you change the oil. Resample in 30-45 days to monitor this situation.Chromium, iron and nickel ppm levels are abnormal. Particles >14µm are severely high. Particles >21µm are severely high. Particles >6µm are severely high. Particles >4µm are severely high. Particles >4µm are severely high.. Particles >4µm are severely high... Particles >38µm are abnormally high. There is a moderate concentration of water present in the fluid. Free water present. The white residue present in the sample is fluid additive precipitate. 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

06 May 2020 Diag: Kevin Marson

ISO

We recommend you service the filters on this component. We recommend an early resample to monitor this condition.All component wear rates are normal. Particles >4µm are abnormally high. Particles >6µm are abnormally high. The AN level is acceptable for this fluid. The condition of the fluid is suitable for further service.

view report

15 Apr 2020 Diag: Kevin Marson

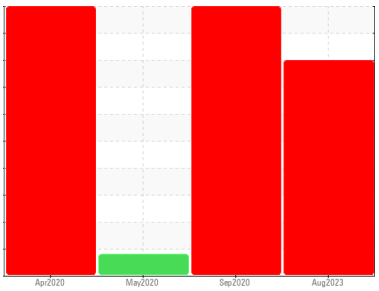
WEAR

Check seals and/or filters for points of contaminant entry. We advise that you check all areas where contaminants can enter the system. We advise that you follow the water drain-off procedure for this component, 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. We recommend that you change the oil. We recommend you service the filters on this component. Confirm the source of the lubricant being utilized for top-up/fill. Resample in 30-45 days to monitor this situation. No other corrective action is recommended at this time.Chromium and iron and nickel ppm levels are severe. PQ levels are abnormal. Wear particle analysis indicates that the ferrous rubbing and ferrous corrosive particles are abnormal. Wear particle analysis indicates that the ferrous rolling particles are marginal. The high ferrous density (PQ) index indicates that abnormal wear is occurring. ppm Water and water contamination levels are severe. Particles >38µm are severely high. Particles >6µm are severely high. Particles >71µm are severely high. Particles >14µm are severely high. Particles >21µm are severely high. Particles >4µm are severely high. Silicon ppm levels are abnormally high. There is a high concentration of water present in the fluid. Free water present. Elemental level of silicon (Si) above normal indicating ingress of seal material. The AN level is above the recommended limit. Additive levels indicate the addition of a different brand, or type of oil. The white residue present in the sample is fluid additive precipitate. The fluid is no longer serviceable as a result of the abnormal and/or severe wear.

view report

OIL ANALYSIS REPORT

Sample Rating Trend



ISO

Area
Fwd Machinery Space [450164935]
Machine Id
Thruster Aft Port - Steering Tube Seal (S/N Sample Tag CL-06002-S5)
Component
Steering
Fluid
CASTROL ALPHA SP150 (35 LTR)

DIAGNOSIS

Recommendation

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.

Wear

All component wear rates are normal.

Contamination

There is a high amount of particulates (2 to 100 microns in size) present in the fluid.

Fluid Condition

The AN level is acceptable for this fluid. The fluid is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.

SAMPLE INFORMATION		method	limit/base	current	history1	history2
Sample Number		Client Info		**PC**	PC	PC
Sample Date		Client Info		**01 Aug 2023**	30 Sep 2020	06 May 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	ABNORMAL

WEAR METALS		method	limit/base	current	history1	history2
PQ		ASTM D8184*		**6**	56	15
Iron	ppm	ASTM D5185(m)	>50	**1**	▲ 80	24
Chromium	ppm	ASTM D5185(m)	>15	**0**	▲ 15	<1
Nickel	ppm	ASTM D5185(m)	>5	**0**	▲ 11	<1
Titanium	ppm	ASTM D5185(m)		**0**	0	0
Silver	ppm	ASTM D5185(m)		**0**	<1	<1
Aluminum	ppm	ASTM D5185(m)	>5	**<1**	<1	<1
Lead	ppm	ASTM D5185(m)	>10	**0**	0	0
Copper	ppm	ASTM D5185(m)	>50	**<1**	<1	<1
Tin	ppm	ASTM D5185(m)	>5	**0**	0	0
Antimony	ppm	ASTM D5185(m)		**0**	<1	<1
Vanadium	ppm	ASTM D5185(m)		**0**	<1	0
Beryllium	ppm	ASTM D5185(m)		**0**	0	0
Cadmium	ppm	ASTM D5185(m)		**0**	0	0

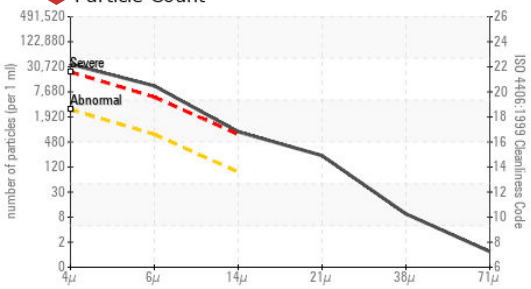
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185(m)		**14**	3	4
Barium	ppm	ASTM D5185(m)	4	**0**	0	<1
Molybdenum	ppm	ASTM D5185(m)		**0**	1	0
Manganese	ppm	ASTM D5185(m)		**0**	1	<1
Magnesium	ppm	ASTM D5185(m)	4	**<1**	2	1
Calcium	ppm	ASTM D5185(m)	4	**1**	3	1
Phosphorus	ppm	ASTM D5185(m)	330	**184**	258	298
Zinc	ppm	ASTM D5185(m)	4	**6**	4	7
Sulfur	ppm	ASTM D5185(m)		**9782**	8138	8602
Lithium	ppm	ASTM D5185(m)		**<1**	<1	<1

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185(m)	>15	**3**	2	2
Sodium	ppm	ASTM D5185(m)		**0**	8	<1
Potassium	ppm	ASTM D5185(m)	>20	**<1**	<1	<1

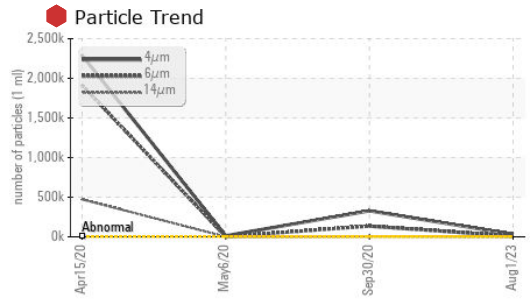
FLUID CLEANLINESS		method	limit/base	current	history1	history2
Particles >4µm		ASTM D7647	>2500	● **30533**	● 328396	▲ 13226
Particles >6µm		ASTM D7647	>640	● **9290**	● 135250	▲ 2483
Particles >14µm		ASTM D7647	>80	● **737**	● 5387	56
Particles >21µm		ASTM D7647	>20	● **199**	● 1285	13
Particles >38µm		ASTM D7647	>4	▲ **8**	▲ 30	0
Particles >71µm		ASTM D7647	>3	**1**	0	0
Oil Cleanliness		ISO 4406 (c)	>18/16/13	● **22/20/17**	● 26/24/20	▲ 21/18/13

OIL ANALYSIS REPORT

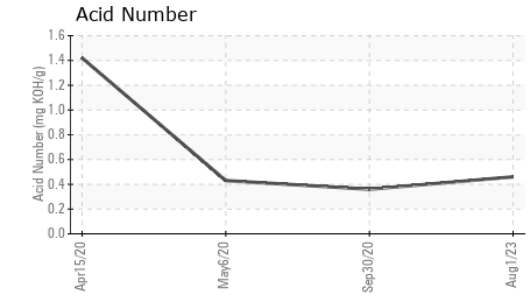
Particle Count



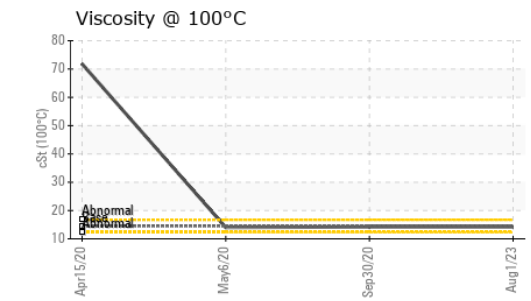
Particle Trend



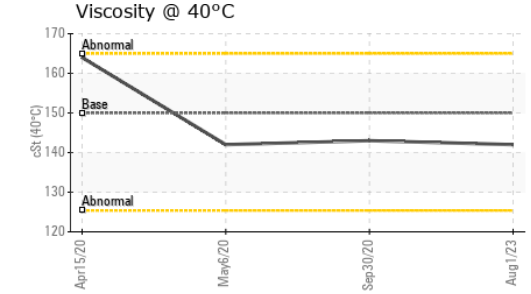
Acid Number



Viscosity @ 100°C



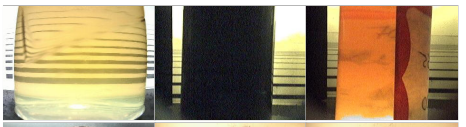
Viscosity @ 40°C



FLUID DEGRADATION		method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D974*		**0.46**	0.36	0.43

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**	▲ LIGHT	NONE
Silt	scalar	Visual*	NONE	**NONE**	NONE	NONE
Debris	scalar	Visual*	NONE	**VLITE**	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**	▲ .5%	NEG
Free Water	scalar	Visual*		**NEG**	▲ 1%	NEG

FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D7279(m)	150.0	**142**	143	142
Visc @ 100°C	cSt	ASTM D7279(m)	14.5	**14.2**	14.2	14.0
Viscosity Index (VI)	Scale	ASTM D2270*	95	**97**	96	94

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 **Received** : 02 Aug 2023
Lab Number : 02573832 **Diagnosed** : 03 Aug 2023
Unique Number : 5618883 **Diagnostician** : Kevin Marson
Test Package : MAR 2 (Additional Tests: KV100, PQ, PrtCount, VI)

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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