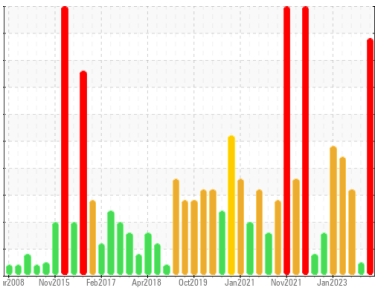
PROBLEM SUMMARY

Sample Rating Trend

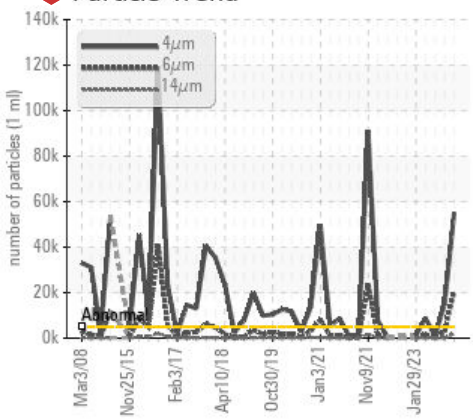


ISO

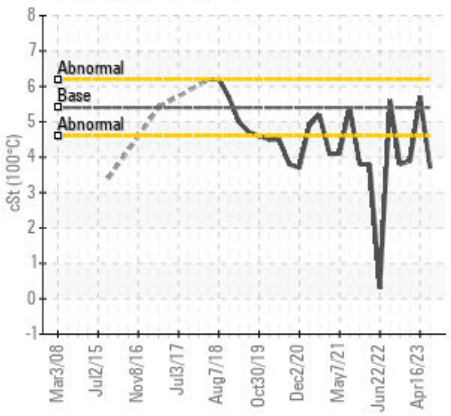
Area
System 33 - Gas Compression
Machine Id
Z-3301A Turbine Hydraulic Starter Oil Train A (S/N D-3309A)
Component
Hydraulic System
Fluid
IRVING D & E ISO 32 (290 LTR)

COMPONENT CONDITION SUMMARY

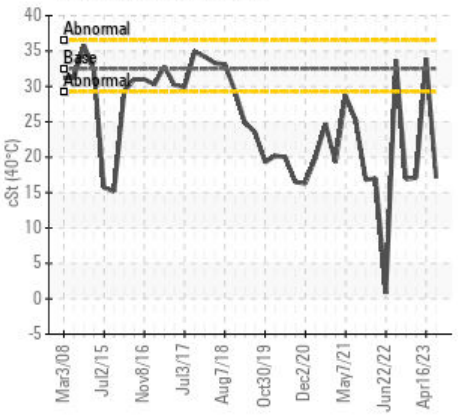
Particle Trend



Viscosity @ 100°C



Viscosity @ 40°C



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	NORMAL	ABNORMAL
Particles >4µm		ASTM D7647	>5000	**55146**	896	14883
Particles >6µm		ASTM D7647	>1300	**20464**	172	2730
Particles >14µm		ASTM D7647	>160	**1962**	12	65
Particles >21µm		ASTM D7647	>40	**504**	4	13
Particles >38µm		ASTM D7647	>10	**45**	1	1
Oil Cleanliness		ISO 4406 (c)	>19/17/14	**23/22/18**	17/15/11	21/19/13
Visc @ 40°C	cSt	ASTM D7279(m)	32.5	**17.1**	33.9	17.1
Visc @ 100°C	cSt	ASTM D7279(m)	5.4	**3.7**	5.7	3.9

Customer Id: HIBSTJ
Sample No.: PP
Lab Number: 02589292
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

16 Apr 2023 Diag: Bill Quesnel

NORMAL

Resample at the next service interval to monitor.All component wear rates are normal. The direct-reading & analytical ferrographic results are normal indicating no abnormal wear in the system. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The water content is negligible. The system and fluid cleanliness is acceptable. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

view report

16 Apr 2023 Diag: Kevin Marson

VISCOSITY

Due to this condition we recommend the following action... We advise an early resample to confirm this situation. NOTE: The current sample results do not match this units historical trend, indicating the sample may not be from this component/unit.All component wear rates are normal. There is a moderate amount of silt (particulates < 14 microns in size) present in the oil. The water content is negligible. Viscosity of sample indicates oil is within ISO 15 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 oil is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.

view report

17 Mar 2023 Diag: Bill Quesnel

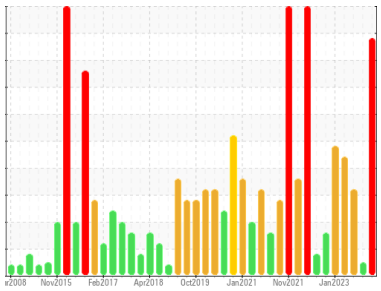
OFF SPEC

We recommend you service the filters on this component. Confirm the source of the lubricant being utilized for top-up/fill. It is also possible that this sample was taken from a different machine, or possibly mis-identified. Resample at the next service interval to monitor.All component wear rates are normal. There is a light amount of silt (particulates < 14 microns in size) present in the oil. The water content is negligible. Viscosity of sample indicates oil is within ISO 15 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.

view report

OIL ANALYSIS REPORT

Sample Rating Trend



ISO

Area
System 33 - Gas Compression
Machine Id
Z-3301A Turbine Hydraulic Starter Oil Train A (S/N D-3309A)
Component
Hydraulic System
Fluid
IRVING D & E ISO 32 (290 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 oil. The water content is negligible.

Fluid Condition

Viscosity of sample indicates oil is within ISO 15 range, advise investigate. The AN level is acceptable for this fluid. The oil 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		**PP**	PP	PP
Sample Date		Client Info		**24 Sep 2023**	16 Apr 2023	16 Apr 2023
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**	NORMAL	ABNORMAL

WEAR METALS		method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185(m)	>20	**0**	<1	<1
Chromium	ppm	ASTM D5185(m)	>10	**0**	0	0
Nickel	ppm	ASTM D5185(m)	>10	**0**	<1	<1
Titanium	ppm	ASTM D5185(m)		**0**	0	0
Silver	ppm	ASTM D5185(m)		**<1**	0	0
Aluminum	ppm	ASTM D5185(m)	>10	**<1**	<1	<1
Lead	ppm	ASTM D5185(m)	>20	**0**	0	0
Copper	ppm	ASTM D5185(m)	>20	**<1**	0	0
Tin	ppm	ASTM D5185(m)	>10	**0**	<1	0
Antimony	ppm	ASTM D5185(m)		**0**	0	<1
Vanadium	ppm	ASTM D5185(m)		**0**	0	0
Beryllium	ppm	ASTM D5185(m)		**0**	0	0
Cadmium	ppm	ASTM D5185(m)		**0**	0	0

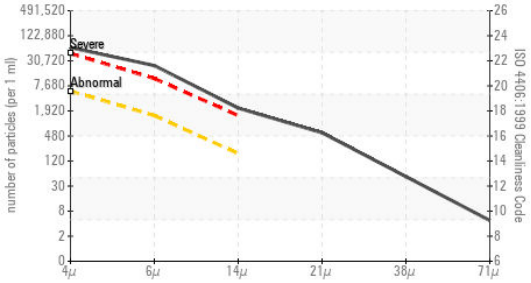
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185(m)	0.0	**<1**	<1	0
Barium	ppm	ASTM D5185(m)	0.2	**<1**	0	0
Molybdenum	ppm	ASTM D5185(m)	0.0	**0**	0	0
Manganese	ppm	ASTM D5185(m)		**0**	0	0
Magnesium	ppm	ASTM D5185(m)	0.3	**0**	0	0
Calcium	ppm	ASTM D5185(m)	2.0	**<1**	0	0
Phosphorus	ppm	ASTM D5185(m)	4.6	**3**	4	▲ <1
Zinc	ppm	ASTM D5185(m)	7.4	**1**	2	▲ <1
Sulfur	ppm	ASTM D5185(m)		**437**	2413	▲ 551
Lithium	ppm	ASTM D5185(m)		**<1**	<1	<1

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185(m)	>15	**<1**	<1	0
Sodium	ppm	ASTM D5185(m)		**0**	2	0
Potassium	ppm	ASTM D5185(m)	>20	**0**	0	0
Water	%	ASTM D6304*	>0.05	**0.003**	0.00	0.001
ppm Water	ppm	ASTM D6304*	>500	**32.6**	0.00	0.6

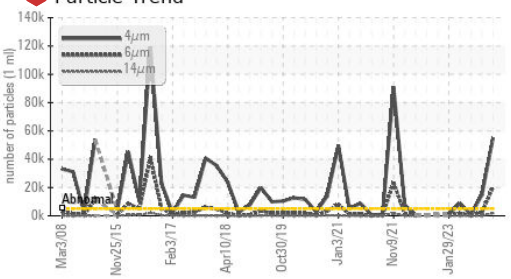
FLUID CLEANLINESS		method	limit/base	current	history1	history2
Particles >4µm		ASTM D7647	>5000	● **55146**	896	▲ 14883
Particles >6µm		ASTM D7647	>1300	● **20464**	172	▲ 2730
Particles >14µm		ASTM D7647	>160	● **1962**	12	65
Particles >21µm		ASTM D7647	>40	● **504**	4	13
Particles >38µm		ASTM D7647	>10	▲ **45**	1	1
Particles >71µm		ASTM D7647	>3	**4**	0	0
Oil Cleanliness		ISO 4406 (c)	>19/17/14	● **23/22/18**	17/15/11	▲ 21/19/13

OIL ANALYSIS REPORT

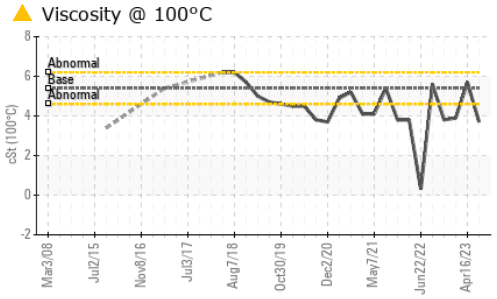
Particle Count



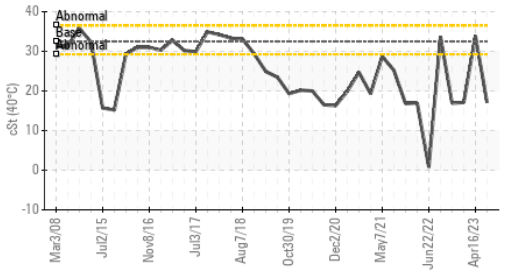
Particle Trend



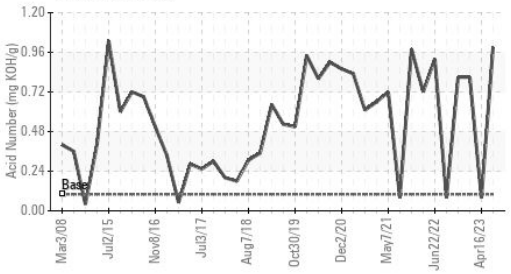
Viscosity @ 100°C



Viscosity @ 40°C



Acid Number

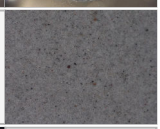
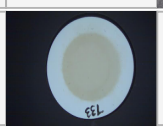


FLUID DEGRADATION		method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D974*	0.10	**0.99**	0.08	0.81

VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	Visual*	NONE	**NONE**	NONE	VLITE
Yellow Metal	scalar	Visual*	NONE	**NONE**	NONE	NONE
Precipitate	scalar	Visual*	NONE	**NONE**	NONE	NONE
Silt	scalar	Visual*	NONE	**VLITE**	NONE	NONE
Debris	scalar	Visual*	NONE	**VLITE**	NONE	VLITE
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*	>0.05	**NEG**	NEG	NEG
Free Water	scalar	Visual*		**NEG**	NEG	NEG

FLUID PROPERTIES		method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D7279(m)	32.5	▲ **17.1**	33.9	▲ 17.1
Visc @ 100°C	cSt	ASTM D7279(m)	5.4	▲ **3.7**	5.7	▲ 3.9
Viscosity Index (VI)	Scale	ASTM D2270*	99	**101**	107	123
COC Flash Point	°C	ASTM D92*	238	**---**	---	---

SEDIMENT		method	limit/base	current	history1	history2
Pentane Insolubles	%	ASTM D893(m)*		**0.049**	---	0.035

SAMPLE IMAGES	method	limit/base	current	history1	history2
Color					
Bottom					
PrtFilter			*no image*	*no image*	
MPC			*no image*		*no image*

ISO 17025:2017 Accredited Laboratory

Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9
Sample No. : PP
Lab Number : 02589292
Unique Number : 5658358
Test Package : MAR 2 (Additional Tests: COC Flash, KF, KV100, PntInsol, TAN Man, VI)

Received : 16 Oct 2023
Diagnosed : 17 Oct 2023
Diagnostician : Kevin Marson

HIBERNIA MGMT & DEVELOPMENT CO. LTD
SUITE 1000,, 100 NEW GOWER STREET
ST.JOHNS, NL
CA A1C 6K3
Contact: Sam Nash
samantha.m.nash@exxonmobil.com
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F: (709)722-3766

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.