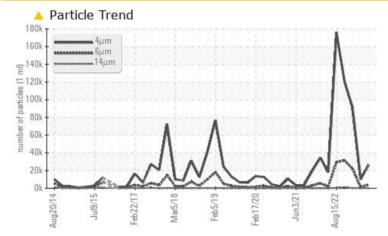


PROBLEM SUMMARY

FES C 1 (S/N S0846)

Refrigeration Compressor Fluid USPI ALT-68 SC (100 GAL)

COMPONENT CONDITION SUMMARY



RECOMMENDATION

Resample at the next service interval to monitor.

PROBLEMATIC TE	ST RESULTS			
Sample Status		ATTENTION	NORMAL	ABNORMAL
Particles >6µm	ASTM D7647 >2	500 🔺 4113	1063	A 21986
Oil Cleanliness	ISO 4406 (c) >	/18/15 🔺 22/19/14	21/17/11	▲ 24/22/14

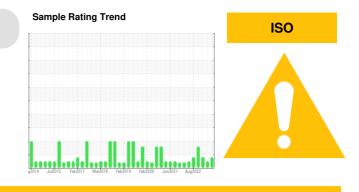
Customer Id: TYSFORMS Sample No.: USP0001861 Lab Number: 05961813 Test Package: IND 2



To manage this report scan the QR code

To discuss the diagnosis or test data: Doug Bogart +1 (800)237-1369 x4016 <u>dougb@wearcheckusa.com</u>

To change component or sample information: Customer Service +1 1-800-237-1369 customerservice@wearcheck.com



RECOMMENDED ACTIONS

There are no recommended actions for this sample.

HISTORICAL DIAGNOSIS

16 Jul 2023 Diag: Doug Bogart



Resample at the next service interval to monitor. All component wear rates are normal. There is no indication of any contamination in the component. The amount and size of particulates present in the system is acceptable. The

AN level is acceptable for this fluid. The condition of the oil is suitable for further service.



06 Feb 2023 Diag: Doug Bogart

Resample at the next service interval to monitor.All component wear rates are normal. There is a high amount of silt (particulates < 14 microns in size) present in the oil. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.





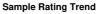
31 Oct 2022 Diag: Doug Bogart

We recommend you service the filters on this component. Resample at the next service interval to monitor.All component wear rates are normal. There is a high amount of particulates present in the oil. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.





OIL ANALYSIS REPORT



ISO

FES C 1 (S/N S0846)

Refrigeration Compressor Fluid USPI ALT-68 SC (100 GAL)

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor.

Wear

All component wear rates are normal.

Contamination

There is a moderate amount of silt (particulates < 14 microns in size) present in the oil.

Fluid Condition

The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

2014 Ju2015 Feb2017 Mar2018 Feb2013 Feb2020 Junt021 Mar2012

Sample Number Client Info USP001861 USP243716 Oli Clange Client Info N/A ATTM251555 Current history1 history2 N/A N/A	SAMPLE INFORM		method	limit/base	current	history1	history2
Sample Date Client Info 26 Sep 2023 16 Jul 2023 06 Feb 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 Client Info N/A N/A N/A WEAR METALS method Imit/base current history1 history2 Iron ppm ASTM 05165m >8 1 1 3 Okckel ppm ASTM 05165m >2 0 0 -1 Nickel ppm ASTM 05165m >2 0 0 -1 Aluminum ppm ASTM 05165m >2 0 0 -1 Aluminum ppm ASTM 05165m >2 0 0 -1 Aluminum ppm ASTM 05165m >2 0 0 -1 Vanadium ppm ASTM 05165m							
Machine Age hrs Client Info 0 0 0 0 Oil Age hrs Client Info 0 0 0 0 Oil Changed Client Info N/A N/A N/A N/A Sample Status Client Info ATTENTION NORMAL ABNORMAL WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >2 0 0 0 Nickel ppm ASTM D5185m >2 0 0 -1 Aluminum ppm ASTM D5185m >2 0 0 -1 Silver ppm ASTM D5185m >2 0 0 -1 Aluminum ppm ASTM D5185m >4 <1							
Oil Age hrs Client Info NA NA NA Sample Status Client Info NA NA NA NA WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >8 1 1 3 C Chromium ppm ASTM D5185m >2 0 0 0 0 Nickel ppm ASTM D5185m >2 0 0 -1 0 0 0 Auminum ppm ASTM D5185m >2 0		h an			-		
Oil Changed Client Info N/A N/A N/A N/A Sample Status method limit/base current history1 history2 Iron ppm ASTM D5185m >8 1 1 3 Chromium ppm ASTM D5185m >2 0 0 0 Nickel ppm ASTM D5185m >2 0 0 -1 Nickel ppm ASTM D5185m >2 0 0 -1 Aluminum ppm ASTM D5185m >2 0 0 0 Cadmium ppm ASTM D5185m >3 0 0 0 Cadmium ppm ASTM D5185m >4 -1 0 0 0 Cadmium ppm ASTM D5185m <4 -1 0 0 0 Cadmium ppm ASTM D5185m <1 0 0 0 Barium ppm ASTM D5185m <1 0	•				-		
Sample Status method Imit/base current history1 ABNORMAL WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >8 1 1 3 Chromium ppm ASTM D5185m >2 0 0 0 Nickel ppm ASTM D5185m >2 0 0 -1 Titanium ppm ASTM D5185m >2 0 0 -1 Auminum ppm ASTM D5185m >2 0 0 -1 Auminum ppm ASTM D5185m >2 0 0 -1 Copper ppm ASTM D5185m >4 -1 0 -1 Cadmium ppm ASTM D5185m <4	•	nrs					÷
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >8 1 1 3 Chromium ppm ASTM D5185m >2 0 0 0 Nickel ppm ASTM D5185m >2 0 0 -1 Titanium ppm ASTM D5185m >2 0 0 -1 Auminum ppm ASTM D5185m >2 0 0 0 Lead ppm ASTM D5185m >2 0 0 0 Cadmium ppm ASTM D5185m >4 -1 0 -1 Vanadium ppm ASTM D5185m <	-		Client Into				
Iron ppm ASTM D5185m >8 1 1 3 Chromium ppm ASTM D5185m >2 0 0 0 Nickel ppm ASTM D5185m >2 0 0 0 Silver ppm ASTM D5185m >2 0 0 0 Silver ppm ASTM D5185m >2 0 0 0 Lead ppm ASTM D5185m >3 0 0 0 Copper ppm ASTM D5185m >8 <1 0 0 Vanadium ppm ASTM D5185m >4 <1 0 0 Cadmium ppm ASTM D5185m <4 <1 0 0 Boron ppm ASTM D5185m <0 0 0 0 Magnesium ppm ASTM D5185m <1 0 0 0 Coldeum ppm ASTM D5185m <1 0 0 0	Sample Status				ATTENTION	NORIVIAL	ABINORIVIAL
Chromium ppm ASTM D5185m >2 0 0 0 Nickel ppm ASTM D5185m 0 0 <1 Titanium ppm ASTM D5185m >2 0 0 <1 Silver ppm ASTM D5185m >2 0 0 0 Lead ppm ASTM D5185m >3 0 0 0 Copper ppm ASTM D5185m >4 <1 0 0 Vanadium ppm ASTM D5185m >4 <1 0 0 Cadmium ppm ASTM D5185m <4 <1 0 0 Astm D5185m <1 0 0 0 0 Cadmium ppm ASTM D5185m <1 0 0 0 Baron ppm ASTM D5185m <1 0 0 0 Coldeum ppm ASTM D5185m <1 0 0 0 <td< th=""><th>WEAR METALS</th><th></th><th>method</th><th>limit/base</th><th>current</th><th>history1</th><th>history2</th></td<>	WEAR METALS		method	limit/base	current	history1	history2
Nickel ppm ASTM D5185m 0 0 <1 Titanium ppm ASTM D5185m >2 0 0 <1	Iron	ppm	ASTM D5185m	>8	1	1	3
Titanium ppm ASTM D5185m <1 0 0 Silver ppm ASTM D5185m >2 0 0 <1	Chromium	ppm	ASTM D5185m	>2	0	0	0
Silver ppm ASTM D5185m >2 0 0 <1 Aluminum ppm ASTM D5185m >3 0 0 0 Lead ppm ASTM D5185m >2 0 0 0 Copper ppm ASTM D5185m >8 <1	Nickel	ppm	ASTM D5185m		0	0	<1
Aluminum ppm ASTM D5185m >3 0 0 0 Lead ppm ASTM D5185m >2 0 0 0 Copper ppm ASTM D5185m >2 0 0 0 Vanadium ppm ASTM D5185m >4 <1	Titanium	ppm	ASTM D5185m		<1	0	0
Lead ppm ASTM D5185m >2 0 0 0 Copper ppm ASTM D5185m >8 <1	Silver	ppm	ASTM D5185m	>2	0	0	<1
Copper ppm ASTM D5185m >8 <1 0 <1 Tin ppm ASTM D5185m >4 <1	Aluminum	ppm	ASTM D5185m	>3	0	0	0
Tin ppm ASTM D5185m >4 <1 0 <1 Vanadium ppm ASTM D5185m <1 0 0 Cadmium ppm ASTM D5185m <1 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 Barium ppm ASTM D5185m 0 0 0 0 Magnese ppm ASTM D5185m 0 0 0 0 Magnesium ppm ASTM D5185m <1 0 0 0 Calcium ppm ASTM D5185m 0 <1 0 0 Jilton ppm ASTM D5185m 0 16 17 8 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 3 2 2 2 Sodium ppm ASTM D5185m >15 3 2 2 <t< td=""><td>Lead</td><td>ppm</td><td>ASTM D5185m</td><td>>2</td><th>0</th><td>0</td><td>0</td></t<>	Lead	ppm	ASTM D5185m	>2	0	0	0
Vanadium ppm ASTM D5185m <1 0 0 Cadmium ppm ASTM D5185m <1	Copper	ppm	ASTM D5185m	>8	<1	0	<1
Cadmium ppm ASTM D5185m <1 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 0 0 0 0 Manganese ppm ASTM D5185m <1 0 0 0 Magnesium ppm ASTM D5185m <1 0 0 0 Calcium ppm ASTM D5185m <1 0 0 0 Sulfur ppm ASTM D5185m <16 0 0 0 Sulfur ppm ASTM D5185m 50 16 17 8 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 1 0 <1 <	Tin	ppm	ASTM D5185m	>4	<1	0	<1
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 0 0 0 Magnese ppm ASTM D5185m <1	Vanadium	ppm	ASTM D5185m		<1	0	0
Boron ppm ASTM D5185m 0 0 0 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 0 0 0 Manganese ppm ASTM D5185m <1	Cadmium		ASTM D5185m		<1	0	0
Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 0 0 0 Manganese ppm ASTM D5185m <1 0 0 Magnesium ppm ASTM D5185m <1 0 0 Calcium ppm ASTM D5185m <1 0 0 Phosphorus ppm ASTM D5185m 0 <1 0 Zinc ppm ASTM D5185m 0 0 0 0 Sulfur ppm ASTM D5185m 50 16 17 8 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 3 2 2 Sodium ppm ASTM D5185m >20 1 0 <1 Potassium ppm ASTM D5630 >0.01 0.004 0.006 0.004 ppm Water ppm ASTM D	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m 0 0 0 Manganese ppm ASTM D5185m <1	Boron	ppm	ASTM D5185m		0	0	0
Manganese ppm ASTM D5185m <1 0 0 Magnesium ppm ASTM D5185m <1	Barium	ppm	ASTM D5185m		0	0	0
Magnesium ppm ASTM D5185m <1 0 0 Calcium ppm ASTM D5185m 0 <1	Molybdenum	ppm	ASTM D5185m		0	0	0
Calcium ppm ASTM D5185m <1 0 0 Phosphorus ppm ASTM D5185m 0 <1 0 Zinc ppm ASTM D5185m 0 0 0 Sulfur ppm ASTM D5185m 50 16 17 8 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 3 2 2 Sodium ppm ASTM D5185m >15 3 2 2 Sodium ppm ASTM D5185m >20 1 0 <1 Potassium ppm ASTM D5185m >20 1 0 <1 Water % ASTM D6304 >0.01 0.004 0.006 0.004 ppm ASTM D7647 26203 10112 91539 Particles >4µm ASTM D7647 >2500 4113 1063 21986 Particles >14µm ASTM D7647 >200 16 126 Particles >21µm ASTM D7647	Manganese	ppm	ASTM D5185m		<1	0	0
Phosphorus ppm ASTM D5185m 0 <1 0 Zinc ppm ASTM D5185m 50 16 17 8 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 3 2 2 Sodium ppm ASTM D5185m >20 1 0 <1 Potassium ppm ASTM D5185m >20 1 0 <1 Water % ASTM D5185m >20 1 0 <1 0 Particles >4µm ASTM D5044 >0.01 0.004 0.006 0.004 21986 Particles >4µm ASTM D7647 >2500 4113	Magnesium	ppm	ASTM D5185m		<1	0	0
Zinc ppm ASTM D5185m 0 0 0 0 Sulfur ppm ASTM D5185m 50 16 17 8 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 3 2 2 2 Sodium ppm ASTM D5185m >15 3 2 2 2 Sodium ppm ASTM D5185m >20 1 0 <1	Calcium	ppm	ASTM D5185m		<1	0	0
Sulfur ppm ASTM D5185m 50 16 17 8 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 3 2 2 Sodium ppm ASTM D5185m >15 3 2 2 Sodium ppm ASTM D5185m >20 1 0 <1 Potassium ppm ASTM D5185m >20 1 0 <1 Water % ASTM D5185m >20 1 0 <1 Water % ASTM D6304 >0.01 0.004 0.006 0.004 ppm Water ppm ASTM D6304 >100 49.8 62.1 40.3 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 >2500 4113 1063 21986 Particles >51µm ASTM D7647 >20 0	Phosphorus	ppm	ASTM D5185m		0	<1	0
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 3 2 2 Sodium ppm ASTM D5185m >15 3 2 2 Sodium ppm ASTM D5185m >20 1 0 <1	Zinc	ppm	ASTM D5185m		0	0	0
Silicon ppm ASTM D5185m >15 3 2 2 Sodium ppm ASTM D5185m <11 0 <1 Potassium ppm ASTM D5185m >20 1 0 <1 Potassium ppm ASTM D5185m >20 1 0 <1 Water % ASTM D6304 >0.01 0.004 0.006 0.004 ppm Water ppm ASTM D6304 >100 49.8 62.1 40.3 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 2500 4 4113 1063 21986 Particles >6µm ASTM D7647 >320 90 16 126 Particles >14µm ASTM D7647 >320 90 16 126 Particles >21µm ASTM D7647 >20 0 1 3 Particles >38µm ASTM D7647 >20 0 1 3 Particles >71µm ASTM D7647 20 0 1 3	Sulfur	ppm	ASTM D5185m	50	16	17	8
Sodium ppm ASTM D5185m <1 0 <1 Potassium ppm ASTM D5185m >20 1 0 <1	CONTAMINANTS		method	limit/base	current	history1	history2
Sodium ppm ASTM D5185m <1 0 <1 Potassium ppm ASTM D5185m >20 1 0 <1	Silicon	ppm	ASTM D5185m	>15	3	2	2
Water % ASTM D6304 >0.01 0.004 0.006 0.004 ppm Water ppm ASTM D6304 >100 49.8 62.1 40.3 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 26203 10112 91539 Particles >6µm ASTM D7647 >2500 ▲ 4113 1063 ▲ 21986 Particles >14µm ASTM D7647 >320 90 16 126 Particles >21µm ASTM D7647 >20 0 1 3 Particles >38µm ASTM D7647 >20 0 1 3 Particles >71µm ASTM D7647 >4 0 0 1 Oil Cleanliness ISO 4406 (c) >/18/15 22/19/14 21/17/11 24/22/14 FLUID DEGRADATION method limit/base current history1 history2	Sodium		ASTM D5185m		<1	0	<1
ppm Water ppm ASTM D6304 >100 49.8 62.1 40.3 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 26203 10112 91539 Particles >6µm ASTM D7647 >2500 ▲ 4113 1063 ▲ 21986 Particles >14µm ASTM D7647 >320 90 16 126 Particles >14µm ASTM D7647 >320 90 16 126 Particles >21µm ASTM D7647 >80 13 5 9 Particles >38µm ASTM D7647 >20 0 1 3 Particles >71µm ASTM D7647 >4 0 0 1 Oil Cleanliness ISO 4406 (c) >/18/15 22/19/14 21/17/11 24/22/14 FLUID DEGRADATION method limit/base current history1 history2	Potassium	ppm	ASTM D5185m	>20	1	0	<1
FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 26203 10112 91539 Particles >6µm ASTM D7647 >2500 ▲ 4113 1063 ▲ 21986 Particles >6µm ASTM D7647 >320 90 16 126 Particles >14µm ASTM D7647 >320 90 16 126 Particles >21µm ASTM D7647 >80 13 5 9 Particles >38µm ASTM D7647 >20 0 1 3 Particles >71µm ASTM D7647 >4 0 0 1 Oil Cleanliness ISO 4406 (c) >/18/15 22/19/14 21/17/11 24/22/14 FLUID DEGRADATION method limit/base current history1 history2	Water		ASTM D6304	>0.01	0.004	0.006	0.004
Particles >4μm ASTM D7647 26203 10112 91539 Particles >6μm ASTM D7647 >2500 ▲ 4113 1063 ▲ 21986 Particles >14μm ASTM D7647 >320 90 16 126 Particles >21μm ASTM D7647 >80 13 5 9 Particles >21μm ASTM D7647 >20 0 1 3 Particles >38μm ASTM D7647 >20 0 1 3 Particles >71μm ASTM D7647 >4 0 0 1 Oil Cleanliness ISO 4406 (c) >/18/15 22/19/14 21/17/11 24/22/14 FLUID DEGRADATION method limit/base current history1 history2	ppm Water	ppm	ASTM D6304	>100	49.8	62.1	40.3
Particles >6µm ASTM D7647 >2500 ▲ 4113 1063 ≥1986 Particles >14µm ASTM D7647 >320 90 16 126 Particles >21µm ASTM D7647 >80 13 5 9 Particles >38µm ASTM D7647 >20 0 1 3 Particles >38µm ASTM D7647 >20 0 1 3 Particles >71µm ASTM D7647 >4 0 0 1 Oil Cleanliness ISO 4406 (c) >/18/15 22/19/14 21/17/11 24/22/14 FLUID DEGRADATION method limit/base current history1 history2	FLUID CLEANLIN	IESS	method	limit/base	current	history1	history2
Particles >14µm ASTM D7647 >320 90 16 126 Particles >21µm ASTM D7647 >80 13 5 9 Particles >38µm ASTM D7647 >20 0 1 3 Particles >71µm ASTM D7647 >4 0 0 1 Oil Cleanliness ISO 4406 (c) >/18/15 22/19/14 21/17/11 24/22/14 FLUID DEGRADATION method limit/base current history1 history2	Particles >4µm		ASTM D7647		26203	10112	91539
Particles >21µm ASTM D7647 >80 13 5 9 Particles >38µm ASTM D7647 >20 0 1 3 Particles >38µm ASTM D7647 >20 0 1 3 Particles >71µm ASTM D7647 >4 0 0 1 Oil Cleanliness ISO 4406 (c) >/18/15 22/19/14 21/17/11 24/22/14 FLUID DEGRADATION method limit/base current history1 history2	Particles >6µm		ASTM D7647	>2500	<u> </u>	1063	A 21986
Particles >38μm ASTM D7647 >20 0 1 3 Particles >71μm ASTM D7647 >4 0 0 1 Oil Cleanliness ISO 4406 (c) >/18/15 22/19/14 21/17/11 24/22/14 FLUID DEGRADATION method limit/base current history1 history2	Particles >14µm		ASTM D7647	>320	90	16	126
Particles >71μm ASTM D7647 >4 0 0 1 Oil Cleanliness ISO 4406 (c) >/18/15 22/19/14 21/17/11 24/22/14 FLUID DEGRADATION method limit/base current history1 history2	Particles >21µm		ASTM D7647	>80	13	5	9
Oil Cleanliness ISO 4406 (c) >/18/15 22/19/14 21/17/11 24/22/14 FLUID DEGRADATION method limit/base current history1 history2	Particles >38µm		ASTM D7647	>20	0	1	3
Oil Cleanliness ISO 4406 (c) >/18/15 22/19/14 21/17/11 24/22/14 FLUID DEGRADATION method limit/base current history1 history2	Particles >71µm		ASTM D7647	>4	0	0	1
	Oil Cleanliness				A 22/19/14	21/17/11	▲ 24/22/14
Acid Number (AN) mg KOH/g ASTM D974 0.005 0.015 0.013 0.015	FLUID DEGRADA	TION	method	limit/base	current	history1	history2
	Acid Number (AN)	mg KOH/g	ASTM D974	0.005	0.015	0.013	0.015



Acid Number

0.04

(B/HO)

OIL ANALYSIS REPORT

scalar

scalar

scalar

scalar

scalar

method

*Visual

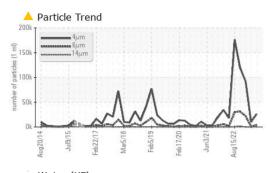
*Visual

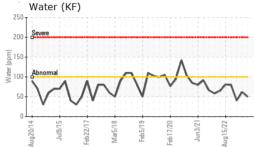
*Visual

*Visual

*Visual

scalar *Visual







limit/base

NONE

NONE

NONE

NONE

NONE

NONE

current

NONE

NONE

NONE

NONE

NONE

NONE

history1

NONE

NONE

NONE

NONE

NONE

NONE

history2

NONE

NONE

NONE

NONE

VLITE

NONE

Bottom

Color

VISUAL

White Metal

Yellow Metal

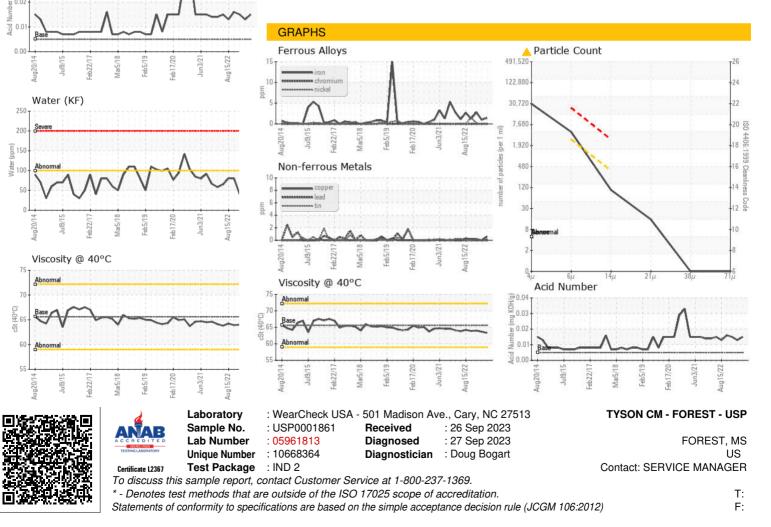
Precipitate

Silt

Debris

Odor

Sand/Dirt



Report Id: TYSFORMS [WUSCAR] 05961813 (Generated: 10/04/2023 20:05:59) Rev: 1

Contact/Location: SERVICE MANAGER - TYSFORMS