

OIL ANALYSIS REPORT

Sample Rating Trend

ISO

HOWDEN TYSDAR 20B

Component Refrigeration Compressor

USPI ALT-68 SC (--- 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 < 6 microns in size) present in the oil.

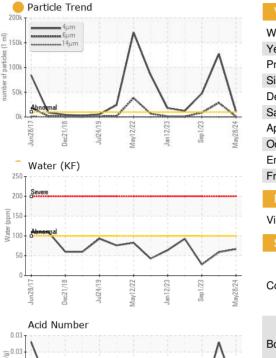
Fluid Condition

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

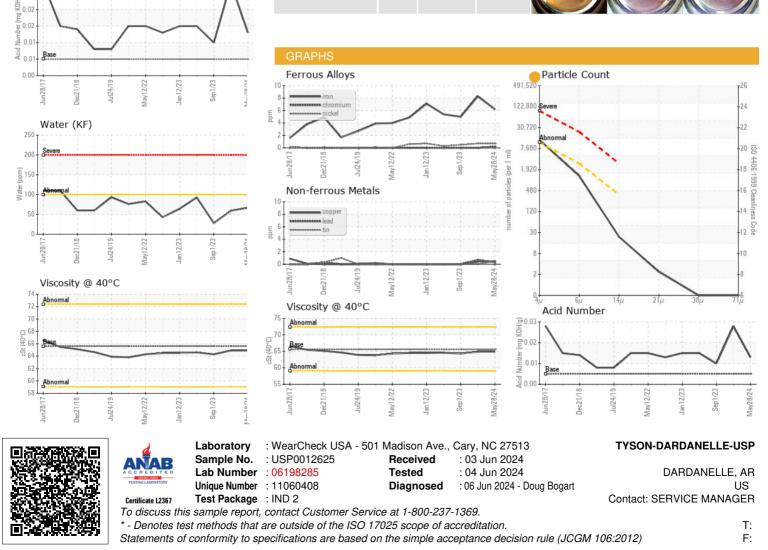
Sample NumberClient InfoUSP0012825USP0007690USP000137Sample DateClient Info28 May 202420 Feb 202410 Sep 2023Machine AgehrsClient Info1083500Oil AgeClient InfoN/AN/AN/ASample StatusClient InfoN/AN/AN/AWEAR METALSmethodImt/Sep 20<10VictorppmASTM D51551InonppmASTM D51551-NickelppmASTM D51551-TitaniumppmASTM D51551-SilverppmASTM D515510SilverppmASTM D515510CopperppmASTM D515510CopperppmASTM D515510VanadiumppmASTM D5155-100NaminumppmASTM D5155-100VanadiumppmASTM D5155-100North Eiser00-100NaminumppmASTM D5155-<1000SilverppmASTM D5155-<1000NaminumppmASTM D5155-<1000SilverppmASTM D5155 <t< th=""><th>SAMPLE INFORM</th><th>IATION</th><th>method</th><th>limit/base</th><th>current</th><th>history1</th><th>history2</th></t<>	SAMPLE INFORM	IATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 10835 10775 10775 Oil Age irrs Client Info 0 0 0 Oil Changed Client Info N/A N/A N/A Sample Status Immibbase current history1 history2 Iron ppm ASTM D5185m >8 6 8 5 Chromium ppm ASTM D5185m >2 <1 0 0 Nickel ppm ASTM D5185m >2 <1 <1 0 Silver ppm ASTM D5185m >2 0 0 0 Lead ppm ASTM D5185m >2 1 <1 0 0 Cadmium ppm ASTM D5185m >4 <1 0 0 0 Cadmium ppm ASTM D5185m <1 0 0 0 Manganese ppm ASTM D5185m <1 0 0 0 Mang	Sample Number		Client Info		USP0012625	USP0007690	USP0000137
Oil Age hrs Client Info 0 0 0 Oil Changed Client Info N/A N/A N/A N/A Sample Status n nethod imit/base current History1 History2 Iron ppm ASTM D5185m >8 6 8 5 Chromium ppm ASTM D5185m >2 <1 0 0 Nickel ppm ASTM D5185m >2 <1 <1 <1 <1 Silver ppm ASTM D5185m >2 <1 <1 0 0 Aluminum ppm ASTM D5185m >2 <1 <1 0 0 Copper ppm ASTM D5185m >2 <1 0 0 0 Cadmium ppm ASTM D5185m <1 0 0 0 0 Barinum ppm ASTM D5185m <1 0 0 0 0 Magnesium <t< th=""><th>Sample Date</th><th></th><th>Client Info</th><th></th><th>28 May 2024</th><th>20 Feb 2024</th><th>01 Sep 2023</th></t<>	Sample Date		Client Info		28 May 2024	20 Feb 2024	01 Sep 2023
Oil Changed Sample Status Client Info N/A N/A N/A AA WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >2 <1 0 0 Nickel ppm ASTM D5185m >2 <1 0 0 Nickel ppm ASTM D5185m >2 <1 0 0 Auminum ppm ASTM D5185m >2 0 0 0 Auminum ppm ASTM D5185m >2 0 0 0 Lead ppm ASTM D5185m >2 <1 <1 0 Vanadium ppm ASTM D5185m >4 <1 0 0 Vanadium ppm ASTM D5185m <1 0 0 0 Barium ppm ASTM D5185m 0 0 0 0 Magnesum ppm ASTM D5185m <1 0 0	Machine Age	hrs	Client Info		10835	10775	10775
Sample Status method Imit/base current history1 history2 Iron ppm ASTM D5185m >8 6 8 5 Chromium ppm ASTM D5185m >2 <1 0 0 Nickel ppm ASTM D5185m >2 <1 0 0 Nickel ppm ASTM D5185m >2 <1 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >2 <1 <1 0 0 Copper ppm ASTM D5185m >2 <1 <1 0 0 Cadmium ppm ASTM D5185m <4 <1 0 0 0 Cadmium ppm ASTM D5185m <1 0 0 0 Boron ppm ASTM D5185m <1 0 0 0 Barium ppm ASTM D5185m <1	Oil Age	hrs	Client Info		0	0	0
WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >8 6 8 5 Chromium ppm ASTM D5185m <1 0 0 Nickel ppm ASTM D5185m <1 0 0 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >2 0 0 0 Lead ppm ASTM D5185m >2 <1 0 0 Vanadium ppm ASTM D5185m <2 <1 0 0 Vanadium ppm ASTM D5185m <1 0 0 0 Cadmium ppm ASTM D5185m <1 0 0 0 Manganees ppm ASTM D5185m <1 0 0 0 Manganees ppm ASTM D5185m <1 0 0 0 S	Oil Changed		Client Info		N/A	N/A	N/A
Iron ppm ASTM D5185m >8 6 8 5 Chromium ppm ASTM D5185m <1 <1 <1 Titanium ppm ASTM D5185m <1 <1 <1 Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >2 0 0 0 Lead ppm ASTM D5185m >3 1 <1 0 Copper ppm ASTM D5185m >2 <1 0 0 Yanadium ppm ASTM D5185m < <1 0 0 Cadmium ppm ASTM D5185m <1 0 0 0 ADDITIVES method Imit/base current history1 history2 Boron ppm ASTM D5185m 0 0 0 0 Magnese ppm ASTM D5185m <1 0 0 0 Magnes	Sample Status				ATTENTION	ABNORMAL	ABNORMAL
Chromium ppm ASTM D5185m >2 <1	WEAR METALS		method	limit/base	current	history1	history2
Nickel ppm ASTM D5185m <1	Iron	ppm	ASTM D5185m	>8	6	8	5
Titanium ppm ASTM D5185m <1	Chromium	ppm	ASTM D5185m	>2	<1	0	0
Silver ppm ASTM D5185m >2 0 0 0 Aluminum ppm ASTM D5185m >3 1 <1 0 Lead ppm ASTM D5185m >2 <1 <1 0 Copper ppm ASTM D5185m >2 <1 <1 0 Tin ppm ASTM D5185m >4 <1 0 0 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 Magnesium ppm ASTM D5185m <1 0 0 0 Galcium ppm ASTM D5185m <1 0 0 1 1 Zinc ppm ASTM D5185m 0 11 1 2 0	Nickel	ppm	ASTM D5185m		<1	<1	<1
Aluminum ppm ASTM D5185m >3 1 <1	Titanium	ppm	ASTM D5185m		<1	0	0
Lead ppm ASTM D5185m >2 <1	Silver	ppm	ASTM D5185m	>2	0	0	0
Copper ppm ASTM D5185m >8 <1	Aluminum	ppm	ASTM D5185m	>3	1	<1	0
Copper ppm ASTM D5185m >8 <1	Lead			>2	<1	<1	0
Tin ppm ASTM D5185m >4 <1				>8	<1	<1	0
Vanadium ppm ASTM D5185m <1	••						0
Cadmium ppm ASTM D5185m <1	Vanadium						0
Boron ppm ASTM D5185m 0 0 0 Barium ppm ASTM D5185m <1 0 0 Molybdenum ppm ASTM D5185m <1 0 0 Manganese ppm ASTM D5185m 0 <1 <1 Magnesium ppm ASTM D5185m 0 0 0 Calcium ppm ASTM D5185m 0 <1 <1 Zinc ppm ASTM D5185m 0 <1 <1 Zinc ppm ASTM D5185m 50 0 11 12 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 1 1 <1 Vater % ASTM D5185m >20 1 <1 1 Vater % ASTM D5185m >20 1 <1 1 Vater % ASTM D5185m >20 1 <th>Cadmium</th> <th></th> <th>ASTM D5185m</th> <th></th> <th><1</th> <th></th> <th>0</th>	Cadmium		ASTM D5185m		<1		0
Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m <1 0 0 Magnesium ppm ASTM D5185m 0 <1 <1 Magnesium ppm ASTM D5185m <1 0 0 Calcium ppm ASTM D5185m <0 0 0 Phosphorus ppm ASTM D5185m 0 <1 <1 Zinc ppm ASTM D5185m 0 <11 <1 Zinc ppm ASTM D5185m 50 0 11 12 CONTAMINANTS method imit/base current history1 history2 Silicon ppm ASTM D5185m >20 1 <1 1 Vater % ASTM D6304 >0.01 0.006 0.003 0.003 pm Water pm ASTM D647 >1000 11810 127345 47289 Particles >4µm ASTM D7647<	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m <1	Boron	ppm	ASTM D5185m		0	0	0
Manganese ppm ASTM D5185m 0 <1	Barium	ppm	ASTM D5185m		0	0	0
Manganese ppm ASTM D5185m 0 <1	Molybdenum	ppm	ASTM D5185m		<1	0	0
Magnesium ppm ASTM D5185m <1		ppm	ASTM D5185m		0	<1	<1
Phosphorus ppm ASTM D5185m 0 <1	-	ppm	ASTM D5185m		<1	0	0
Zinc ppm ASTM D5185m 2 0 0 Sulfur ppm ASTM D5185m 50 0 11 12 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 1 1 <1 Sodium ppm ASTM D5185m >20 1 <1 1 Potassium ppm ASTM D5185m >20 1 <1 1 Water % ASTM D5185m >20 1 <1 1 Water % ASTM D6304 >0.01 0.006 0.005 0.003 ppm Water ppm ASTM D7647 >1000 €11810 127345 47289 Particles >4µm ASTM D7647 >10000 €11810 127345 47289 Particles >6µm ASTM D7647 >200 124 104 Particles >1µm ASTM D7647 >20 0 0 0	Calcium	ppm	ASTM D5185m		0	0	0
Zinc ppm ASTM D5185m 2 0 0 Sulfur ppm ASTM D5185m 50 0 11 12 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 1 1 <1 Sodium ppm ASTM D5185m >20 1 <1 1 Potassium ppm ASTM D5185m >20 1 <1 1 Water % ASTM D5185m >20 1 <1 1 Water % ASTM D6304 >0.01 0.0066 0.005 0.003 ppm Water ppm ASTM D6304 >100 67 59 28.1 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 >10000 11810 127345 47289 Particles >14µm ASTM D7647 >2500 1107 285477	Phosphorus	ppm	ASTM D5185m		0	<1	<1
CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >15 1 1 <1 Sodium ppm ASTM D5185m 0 <1 1 Potassium ppm ASTM D5185m >20 1 <1 1 Water % ASTM D6304 >0.01 0.006 0.005 0.003 ppm Water ppm ASTM D6304 >100 67 59 28.1 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 >10000 11810 127345 47289 Particles >6µm ASTM D7647 >2500 1107 28547 8631 Particles >14µm ASTM D7647 >320 20 124 104 Particles >21µm ASTM D7647 >20 0 0 0 Particles >71µm ASTM D7647 >4 0 0 0 2	Zinc	ppm	ASTM D5185m		2	0	0
Silicon ppm ASTM D5185m >15 1 1 <1	Sulfur	ppm	ASTM D5185m	50	0	11	12
Sodium ppm ASTM D5185m 0 <1	CONTAMINANTS		method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 1 <1	Silicon	ppm	ASTM D5185m	>15	1	1	<1
Water % ASTM D6304 >0.01 0.006 0.005 0.003 ppm Water ppm ASTM D6304 >100 67 59 28.1 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 >10000 11810 127345 47289 Particles >6µm ASTM D7647 >2500 1107 28547 8631 Particles >6µm ASTM D7647 >320 20 124 104 Particles >21µm ASTM D7647 >80 2 5 15 Particles >38µm ASTM D7647 >20 0 0 0 Particles >71µm ASTM D7647 >4 0 0 0 Oil Cleanliness ISO 4406 (c) >20/18/15 21/17/11 24/22/14 23/20/14 FLUID DEGRADATION method limit/base current history1 history2	Sodium	ppm	ASTM D5185m		0	<1	1
ppm Water ppm ASTM D6304 >100 67 59 28.1 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 >10000 11810 127345 47289 Particles >6µm ASTM D7647 >2500 1107 ▲ 28547 ▲ 8631 Particles >14µm ASTM D7647 >320 20 124 104 Particles >21µm ASTM D7647 >80 2 5 15 Particles >38µm ASTM D7647 >20 0 0 0 Particles >71µm ASTM D7647 >4 0 0 0 Oil Cleanliness ISO 4406 (c) >20/18/15 21/17/11 24/22/14 23/20/14 FLUID DEGRADATION method limit/base current history1 history2	Potassium	ppm	ASTM D5185m	>20		<1	1
FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 >10000 11810 127345 47289 Particles >6µm ASTM D7647 >2500 1107 28547 8631 Particles >6µm ASTM D7647 >320 20 124 104 Particles >14µm ASTM D7647 >80 2 5 15 Particles >21µm ASTM D7647 >20 0 0 0 Particles >38µm ASTM D7647 >20 0 0 0 Particles >71µm ASTM D7647 >4 0 0 0 Oil Cleanliness ISO 4406 (c) >20/18/15 21/17/11 24/22/14 23/20/14 FLUID DEGRADATION method limit/base current history1 history2	Water	%	ASTM D6304	>0.01	0.006	0.005	0.003
Particles >4µm ASTM D7647 >10000 11810 ▲ 127345 ▲ 47289 Particles >6µm ASTM D7647 >2500 1107 ▲ 28547 ▲ 8631 Particles >14µm ASTM D7647 >320 20 124 104 Particles >21µm ASTM D7647 >80 2 5 15 Particles >38µm ASTM D7647 >20 0 0 0 Particles >71µm ASTM D7647 >4 0 0 0 Oil Cleanliness ISO 4406 (c) >20/18/15 21/17/11 ▲ 24/22/14 ▲ 23/20/14	ppm Water	ppm	ASTM D6304	>100	67	59	28.1
Particles >6μm ASTM D7647 >2500 1107 ▲ 28547 ▲ 8631 Particles >14μm ASTM D7647 >320 20 124 104 Particles >21μm ASTM D7647 >80 2 5 15 Particles >21μm ASTM D7647 >20 0 0 0 Particles >38μm ASTM D7647 >20 0 0 0 Particles >71μm ASTM D7647 >4 0 0 0 Oil Cleanliness ISO 4406 (c) >20/18/15 21/17/11 ▲ 24/22/14 ▲ 23/20/14	FLUID CLEANLIN	ESS	method	limit/base	current	history1	history2
Particles >14μm ASTM D7647 >320 20 124 104 Particles >21μm ASTM D7647 >80 2 5 15 Particles >38μm ASTM D7647 >20 0 0 0 Particles >38μm ASTM D7647 >20 0 0 0 Particles >71μm ASTM D7647 >4 0 0 0 Oil Cleanliness ISO 4406 (c) >20/18/15 21/17/11 24/22/14 23/20/14 FLUID DEGRADATION method limit/base current history1 history2	Particles >4µm		ASTM D7647	>10000	<u> </u>	🔺 127345	4 7289
Particles >21 μm ASTM D7647 >80 2 5 15 Particles >38μm ASTM D7647 >20 0 0 0 Particles >38μm ASTM D7647 >20 0 0 0 Particles >71μm ASTM D7647 >4 0 0 0 Oil Cleanliness ISO 4406 (c) >20/18/15 21/17/11 24/22/14 23/20/14 FLUID DEGRADATION method limit/base current history1 history2	Particles >6µm		ASTM D7647	>2500	1107	28547	A 8631
Particles >38μm ASTM D7647 >20 0 0 0 Particles >71μm ASTM D7647 >4 0 0 0 Oil Cleanliness ISO 4406 (c) >20/18/15 21/17/11 24/22/14 23/20/14 FLUID DEGRADATION method limit/base current history1 history2	Particles >14µm		ASTM D7647	>320	20	124	104
Particles >71μm ASTM D7647 >4 0 0 0 Oil Cleanliness ISO 4406 (c) >20/18/15 21/17/11 ▲ 24/22/14 ▲ 23/20/14 FLUID DEGRADATION method limit/base current history1 history2	Particles >21µm		ASTM D7647	>80	2	5	15
Oil Cleanliness ISO 4406 (c) >20/18/15 21/17/11 24/22/14 23/20/14 FLUID DEGRADATION method limit/base current history1 history2	Particles >38µm		ASTM D7647	>20		0	0
FLUID DEGRADATION method limit/base current history1 history2	Particles >71µm		ASTM D7647	>4	0	0	0
	Oil Cleanliness		ISO 4406 (c)	>20/18/15	e 21/17/11	▲ 24/22/14	a 23/20/14
Acid Number (AN) mg KOH/g ASTM D974 0.005 0.013 0.028 0.01	FLUID DEGRADA		method	limit/base	current	history1	history2
	Acid Number (AN)	mg KOH/g	ASTM D974	0.005	0.013	0.028	0.01



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Contact/Location: SERVICE MANAGER - TYSDAR