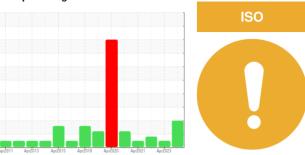


OIL ANALYSIS REPORT

Sample Rating Trend



ALSTOM 3303

Component **Hydraulic System**

ESSO UNIVIS N 32 (55 GAL)

DIAGNOSIS

Recommendation

No corrective action is recommended at this time. Resample at the next service interval to monitor.

Wear

All component wear rates are normal.

Contamination

There is a moderate amount of particulates present in the oil.

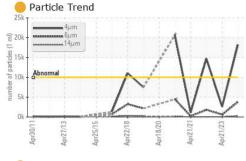
Fluid Condition

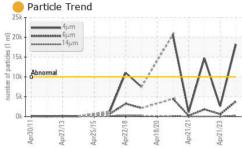
The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

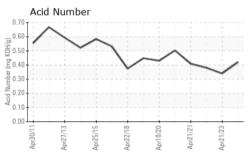
Sample Number Client Info WC0798966 WC0649677 WC0592280 Sample Date Client Info 18 Apr 2024 21 Apr 2023 15 Apr 2022 Machine Age hrs Client Info 0 0 0 0 0 0 0 0 0			Apr2011 A	or2013 Apr2015 Apr	2018 Apr2020 Apr2021	Apr2023	
Sample Date	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age hrs Client Info 0 0 0 0 0 0 0 0 0	Sample Number		Client Info		WC0798966	WC0649677	WC0592280
Oil Age hrs Client Info N/A	Sample Date		Client Info		18 Apr 2024	21 Apr 2023	15 Apr 2022
Cilient Info N/A N/A N/A ATTENTION NORMAL ATTENTION NEGRO NEG NEG	Machine Age	hrs	Client Info		0	0	0
CONTAMINATION method limit/base current history1 history2	Oil Age	hrs	Client Info		0	0	0
CONTAMINATION method limit/base current history1 history2 Water WC Method >0.1 NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >20 4 4 3 Chromium ppm ASTM D5185m >10 8 7 5 Nickel ppm ASTM D5185m >10 38 36 37 Titanium ppm ASTM D5185m 0 0 0 0 Silver ppm ASTM D5185m 0 0 <1	Oil Changed		Client Info		N/A	N/A	N/A
Water WC Method >0.1 NEG NEG NEG WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185m >20 4 4 3 Chromium ppm ASTM D5185m >10 8 7 5 Nickel ppm ASTM D5185m >10 38 36 37 Titanium ppm ASTM D5185m >10 0 0 0 Silver ppm ASTM D5185m 0 0 0 <1 Aluminum ppm ASTM D5185m >10 17 19 18 Copper ppm ASTM D5185m >10 0 <1 1 Aluminum ppm ASTM D5185m >10 0 <1 <1 Alead ppm ASTM D5185m >10 0 <1 <1 Alead ppm ASTM D5185m 0 0 0 0	Sample Status				ATTENTION	NORMAL	ATTENTION
WEAR METALS method limit/base current nistory1 history2 Iron ppm ASTM D5185m >20 4 4 3 Chromium ppm ASTM D5185m >10 8 7 5 Nickel ppm ASTM D5185m 0 0 0 0 Silver ppm ASTM D5185m 0 0 0 -1 Aluminum ppm ASTM D5185m >10 -1 0 -1 Lead ppm ASTM D5185m >10 -1 19 18 Copper ppm ASTM D5185m >10 0 -1 -1 Lead ppm ASTM D5185m >10 0 -1 -1 Copper ppm ASTM D5185m >10 0 -1 -1 Cadamium ppm ASTM D5185m 0 0 0 0 ADDITIVES method limit/base current nistory1 <t< td=""><td>CONTAMINATION</td><td>N</td><td>method</td><td>limit/base</td><th>current</th><td>history1</td><td>history2</td></t<>	CONTAMINATION	N	method	limit/base	current	history1	history2
Irron	Water		WC Method	>0.1	NEG	NEG	NEG
Chromium ppm ASTM D5185m >10 8 7 5 Nickel ppm ASTM D5185m >10 38 36 37 Titanium ppm ASTM D5185m >10 0 0 0 Silver ppm ASTM D5185m 0 0 0 -1 Aluminum ppm ASTM D5185m >10 17 19 18 Copper ppm ASTM D5185m >10 17 19 18 Copper ppm ASTM D5185m >10 0 <1 -1 Copper ppm ASTM D5185m >10 0 <1 <1 Antimony ppm ASTM D5185m 0 0 <1 <1 Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 1 0 0 2 Barium ppm ASTM D5185m 1 0 0	WEAR METALS		method	limit/base	current	history1	history2
Nickel ppm ASTM D5185m >10 38 36 37 Titanium ppm ASTM D5185m 0 0 0 0 Silver ppm ASTM D5185m 0 0 0 0 0 Aluminum ppm ASTM D5185m 10 17 19 18 Copper ppm ASTM D5185m >75 8 8 8 10 Tin ppm ASTM D5185m >10 0 0 1 0 17 Antimony ppm ASTM D5185m >10 0 0 1 17 19 18 Copper ppm ASTM D5185m >10 0 0 1 17 19 18 Copper ppm ASTM D5185m >10 0 0 1 17 19 18 Copper ppm ASTM D5185m >10 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Iron	ppm	ASTM D5185m	>20	4	4	3
Titanium	Chromium	ppm	ASTM D5185m	>10	8	7	5
Silver	Nickel	ppm	ASTM D5185m	>10	38	36	37
Aluminum ppm ASTM D5185m >10 <1 0 <1 Lead ppm ASTM D5185m >10 17 19 18 Copper ppm ASTM D5185m >75 8 8 10 Tin ppm ASTM D5185m >10 0 <1	Titanium	ppm	ASTM D5185m		0	0	0
Aluminum ppm ASTM D5185m >10 <1 0 <1 19 18 Copper ppm ASTM D5185m >10 17 19 18 Copper ppm ASTM D5185m >75 8 8 10 Tin ppm ASTM D5185m >10 0 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1	Silver	ppm	ASTM D5185m		0	0	<1
Lead ppm ASTM D5185m >10 17 19 18 Copper ppm ASTM D5185m >75 8 8 10 Tin ppm ASTM D5185m >10 0 <1 <1 Antimony ppm ASTM D5185m 0 0 0 0 Vanadium ppm ASTM D5185m 0 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 0 Boron ppm ASTM D5185m 0 0 0 0 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 0 0 0 0 Manganesium ppm ASTM D5185m 0 0 0 0 Phosphorus ppm ASTM D5185m 74 55 55 59 Phosphorus ppm ASTM D5185m 338 456 474	Aluminum		ASTM D5185m	>10	<1	0	<1
Copper ppm ASTM D5185m >75 8 8 10 Tin ppm ASTM D5185m >10 0 <1	Lead				17	19	
Tin ppm ASTM D5185m >10 0 <1 <1 <1 <1				>75		8	
Antimony ppm ASTM D5185m Vanadium ppm ASTM D5185m 0 0 0 Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m 1 0 0 2 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 3 0 0 0 0 Manganese ppm ASTM D5185m 0 0 0 0 0 Magnesium ppm ASTM D5185m 0 <1	• •						
Vanadium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m .1 0 0 2 Barium ppm ASTM D5185m .0 0 0 0 Molybdenum ppm ASTM D5185m .3 0 0 0 0 Manganese ppm ASTM D5185m .0 0 0 0 0 Magnesium ppm ASTM D5185m 0 <1					-		
Cadmium ppm ASTM D5185m 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185m .1 0 0 2 Barium ppm ASTM D5185m 0 0 0 0 Molybdenum ppm ASTM D5185m 3 0 0 0 Manganese ppm ASTM D5185m 0 0 0 0 Magnesium ppm ASTM D5185m 0 <1	•				0	0	0
Boron ppm ASTM D5185m .1 0 0 2 Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m .3 0 0 0 Manganese ppm ASTM D5185m 0 <1 2 <1 Calcium ppm ASTM D5185m 74 55 55 59 Phosphorus ppm ASTM D5185m 266 360 355 383 Zinc ppm ASTM D5185m 338 456 474 437 Sulfur ppm ASTM D5185m 3324 2991 2712 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 2 2 1 Sodium ppm ASTM D5185m >20 <1 <1 0 FLUID CLEANLINESS method limit/base current history1 histo	Cadmium						
Barium ppm ASTM D5185m 0 0 0 Molybdenum ppm ASTM D5185m 3 0 0 0 Manganese ppm ASTM D5185m 0 <1 2 <1 Calcium ppm ASTM D5185m 0 <1 2 <1 Calcium ppm ASTM D5185m 74 55 55 59 Phosphorus ppm ASTM D5185m 266 360 355 383 Zinc ppm ASTM D5185m 338 456 474 437 Sulfur ppm ASTM D5185m 3324 2991 2712 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 2 2 1 Sodium ppm ASTM D5185m >20 2 2 1 Sodium ppm ASTM D5185m >20 <1 <1 0	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum ppm ASTM D5185m .3 0 0 0 Manganese ppm ASTM D5185m 0 0 0 0 Magnesium ppm ASTM D5185m 0 <1 2 <1 Calcium ppm ASTM D5185m 74 55 55 59 Phosphorus ppm ASTM D5185m 266 360 355 383 Zinc ppm ASTM D5185m 338 456 474 437 Sulfur ppm ASTM D5185m 3324 2991 2712 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 2 2 1 Sodium ppm ASTM D5185m >20 2 2 1 Sodium ppm ASTM D5185m 3 2 3 2 3 Potassium ppm ASTM D5185m >20 <1 <td>Boron</td> <td>ppm</td> <td>ASTM D5185m</td> <td>.1</td> <th>0</th> <td>0</td> <td>2</td>	Boron	ppm	ASTM D5185m	.1	0	0	2
Manganese ppm ASTM D5185m 0 0 0 Magnesium ppm ASTM D5185m 0 <1	Barium	ppm	ASTM D5185m		0	0	0
Magnesium ppm ASTM D5185m 0 <1 2 <1 Calcium ppm ASTM D5185m 74 55 55 59 Phosphorus ppm ASTM D5185m 266 360 355 383 Zinc ppm ASTM D5185m 338 456 474 437 Sulfur ppm ASTM D5185m 3324 2991 2712 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 2 2 1 Sodium ppm ASTM D5185m >20 2 2 1 Sodium ppm ASTM D5185m >20 <1 <1 0 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4μm ASTM D7647 >10000 18213 2607 14722 Particles >6μm ASTM D7647 >160 267	Molybdenum	ppm	ASTM D5185m	.3	0	0	0
Calcium ppm ASTM D5185m 74 55 55 59 Phosphorus ppm ASTM D5185m 266 360 355 383 Zinc ppm ASTM D5185m 338 456 474 437 Sulfur ppm ASTM D5185m 3324 2991 2712 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 2 2 1 Sodium ppm ASTM D5185m >20 2 2 1 Sodium ppm ASTM D5185m >20 <1	Manganese	ppm	ASTM D5185m		0	0	0
Calcium ppm ASTM D5185m 74 55 55 59 Phosphorus ppm ASTM D5185m 266 360 355 383 Zinc ppm ASTM D5185m 338 456 474 437 Sulfur ppm ASTM D5185m 3324 2991 2712 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 2 2 1 Sodium ppm ASTM D5185m >20 2 2 1 Sodium ppm ASTM D5185m >20 <1	Magnesium	ppm	ASTM D5185m	0	<1	2	<1
Phosphorus ppm ASTM D5185m 266 360 355 383 Zinc ppm ASTM D5185m 338 456 474 437 Sulfur ppm ASTM D5185m 3324 2991 2712 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 2 2 1 Sodium ppm ASTM D5185m >20 2 2 1 Sodium ppm ASTM D5185m >20 2 2 1 Sodium ppm ASTM D5185m >20 <1			ASTM D5185m	74	55	55	59
Zinc ppm ASTM D5185m 338 456 474 437 Sulfur ppm ASTM D5185m 3324 2991 2712 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 2 2 1 Sodium ppm ASTM D5185m 3 2 3 2 3 Potassium ppm ASTM D5185m >20 <1 <1 0 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4μm ASTM D7647 >10000 18213 2607 14722 Particles >6μm ASTM D7647 >1300 3828 612 1804 Particles >14μm ASTM D7647 >160 267 40 47 Particles >21μm ASTM D7647 >10 2 1 2 Particles >71μm ASTM D7647 >3 0 0 0	Phosphorus			266	360	355	383
Sulfur ppm ASTM D5185m 3324 2991 2712 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >20 2 2 1 Sodium ppm ASTM D5185m 3 2 3 Potassium ppm ASTM D5185m >20 <1				338	456		
Silicon ppm ASTM D5185m >20 2 2 1 Sodium ppm ASTM D5185m 3 2 3 Potassium ppm ASTM D5185m >20 <1 <1 0 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4μm ASTM D7647 >10000 18213 2607 14722 Particles >6μm ASTM D7647 >1300 3828 612 1804 Particles >14μm ASTM D7647 >160 267 40 47 Particles >21μm ASTM D7647 >40 62 9 14 Particles >38μm ASTM D7647 >10 2 1 2 Particles >71μm ASTM D7647 3 0 0 0	-						
Sodium ppm ASTM D5185m 3 2 3 Potassium ppm ASTM D5185m >20 <1	CONTAMINANTS	;	method	limit/base	current	history1	history2
Potassium ppm ASTM D5185m >20 <1 <1 0 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4μm ASTM D7647 >10000 18213 2607 14722 Particles >6μm ASTM D7647 >1300 3828 612 1804 Particles >14μm ASTM D7647 >160 267 40 47 Particles >21μm ASTM D7647 >40 62 9 14 Particles >38μm ASTM D7647 >10 2 1 2 Particles >71μm ASTM D7647 >3 0 0 0	Silicon	ppm	ASTM D5185m	>20	2	2	1
Potassium ppm ASTM D5185m >20 <1 <1 0 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4μm ASTM D7647 >10000 18213 2607 14722 Particles >6μm ASTM D7647 >1300 3828 612 1804 Particles >14μm ASTM D7647 >160 267 40 47 Particles >21μm ASTM D7647 >40 62 9 14 Particles >38μm ASTM D7647 >10 2 1 2 Particles >71μm ASTM D7647 >3 0 0 0	Sodium	ppm	ASTM D5185m		3	2	3
Particles >4μm ASTM D7647 >10000 18213 2607 14722 Particles >6μm ASTM D7647 >1300 3828 612 1804 Particles >14μm ASTM D7647 >160 267 40 47 Particles >21μm ASTM D7647 >40 62 9 14 Particles >38μm ASTM D7647 >10 2 1 2 Particles >71μm ASTM D7647 >3 0 0 0	Potassium	ppm	ASTM D5185m	>20	<1	<1	0
Particles >6μm ASTM D7647 >1300 3828 612 1804 Particles >14μm ASTM D7647 >160 267 40 47 Particles >21μm ASTM D7647 >40 62 9 14 Particles >38μm ASTM D7647 >10 2 1 2 Particles >71μm ASTM D7647 >3 0 0 0	FLUID CLEANLIN	IESS	method	limit/base	current	history1	history2
Particles >14μm ASTM D7647 >160 267 40 47 Particles >21μm ASTM D7647 >40 62 9 14 Particles >38μm ASTM D7647 >10 2 1 2 Particles >71μm ASTM D7647 >3 0 0 0	Particles >4µm		ASTM D7647	>10000	18213	2607	14722
Particles >14μm ASTM D7647 >160 267 40 47 Particles >21μm ASTM D7647 >40 62 9 14 Particles >38μm ASTM D7647 >10 2 1 2 Particles >71μm ASTM D7647 >3 0 0 0			ASTM D7647	>1300	3828	612	1804
Particles >21μm ASTM D7647 >40 62 9 14 Particles >38μm ASTM D7647 >10 2 1 2 Particles >71μm ASTM D7647 >3 0 0 0	Particles >14µm		ASTM D7647	>160		40	47
Particles >38μm ASTM D7647 >10 2 1 2 Particles >71μm ASTM D7647 >3 0 0 0	· ·		ASTM D7647	>40		9	14
Particles >71μm ASTM D7647 >3 0 0 0							2
	'						
	Oil Cleanliness		ISO 4406 (c)	>20/17/14	<u>21/19/15</u>	19/16/12	21/18/13

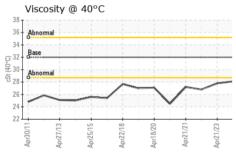


OIL ANALYSIS REPORT

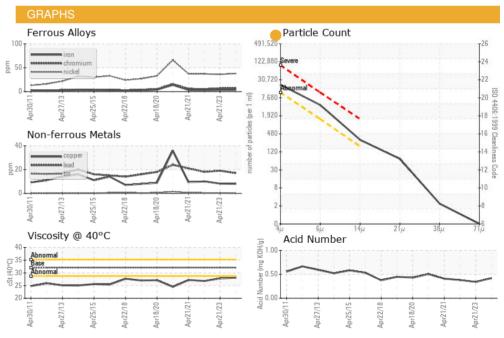








FLUID DEGRADA	TION	method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D8045		0.42	0.34	0.38
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	VLITE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	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	>0.1	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG
FLUID PROPERT	TES	method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D445	32	28.1	27.8	26.8
SAMPLE IMAGES	3	method	limit/base	current	history1	history2
Color						







Certificate 12367

Laboratory Sample No.

Lab Number : 06160325 Unique Number : 10995748

: WC0798966 Test Package : MOB 2

Bottom

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Received **Tested** Diagnosed

: 25 Apr 2024 : 26 Apr 2024 : 27 Apr 2024 - Don Baldridge

AMTRAK 1401 W STREET NE, HIGH SPEED RAIL 2ND FLOOR WASHINGTON, DC

US 20018 Contact: MICHAEL PORTER michael.porter@amtrak.com

To discuss this sample report, contact Customer Service at 1-800-237-1369. * - Denotes test methods that are outside of the ISO 17025 scope of accreditation.

Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

T: (202)870-1399