



FLUID ANALYSIS

UIN 0894A3D

Hydraulic System

Unit No. TMT1602

Unit:
Make
Model
Serial No. 220114

Site

Compartment:

Name Hydraulic System Top of tank
Make
Model
Serial No.
Capacity: Ltrs

Customer:
UNION PACIFIC RAILROAD
900 N 500 West
Salt Lake City UT 84116
USA

DIAGNOSIS

Unit Make and/or Model not given. Oil type and/or fluid grade not given. Time on oil not provided with sample. No recommended action at this time. Resample at normal intervals.

ANALYST: Michael.Costello

LEGEND				
Normal	Severe	Abnormal	Caution	Normal

DATE SAMPLED	25-Mar-21
DATE RECEIVED	29-Mar-21
DATE REPORTED	31-Mar-21

LAB NO.	40111214362
SIF NO.	38754648
TIME ON UNIT	5345
TIME ON OIL	
OIL BRAND	Unidentified
OIL TYPE	Unidentified
OIL GRADE	Unknown
OIL ADDED	
FILTER	Not Applicable
OIL CHANGED	Not Changed
WO NUMBER	

Metals (ppm)

Iron (Fe)	3
Chromium (Cr)	<1
Lead (Pb)	<1
Copper (Cu)	8
Tin (Sn)	<1
Aluminium (Al)	<1
Nickel (Ni)	<1
Silver (Ag)	<1
Titanium (Ti)	<1
Vanadium (V)	<1

Contaminants (ppm)

Silicon (Si)	2
Sodium (Na)	<1
Potassium (K)	<1
Water by Karl Fischer % (E203/D6304)	0.01
Solids (%)	<0.1

Additives (ppm)

Magnesium (Mg)	8
Calcium (Ca)	80
Barium (Ba)	<1
Phosphorus (P)	346
Zinc (Zn)	465
Molybdenum (Mo)	1
Boron (B)	<5

Physical Tests

Viscosity (cSt 40C)	43.8
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Physical / Chemical

Acid Number (mgKOH/g)	0.70
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Particle Count

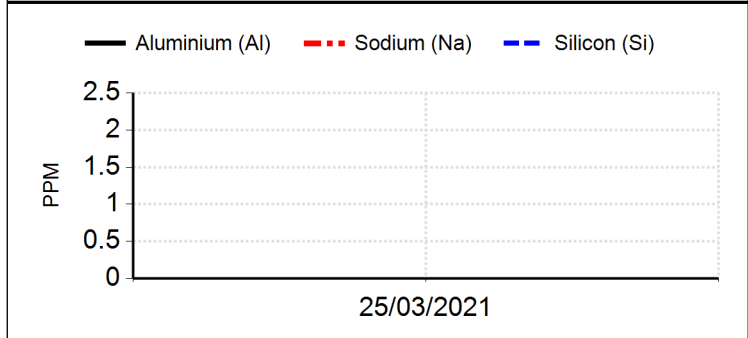
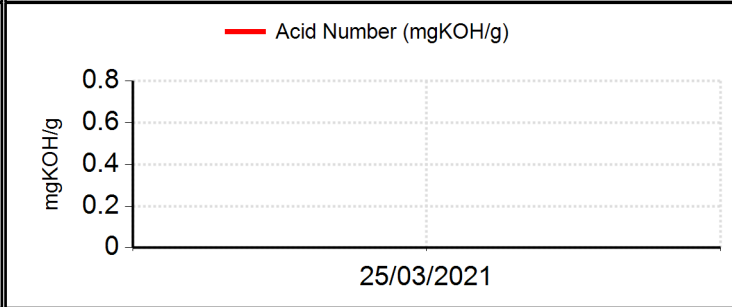
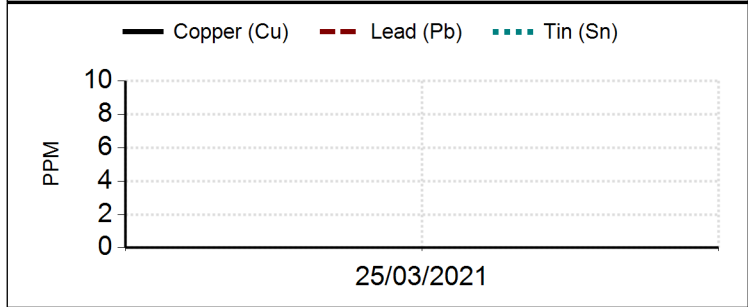
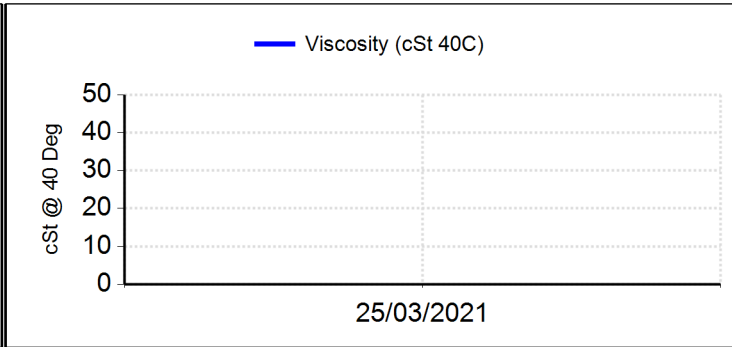
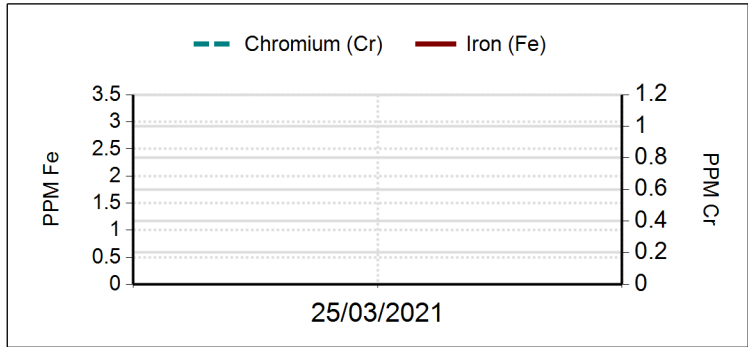
ISO 4406 Rating	18/15/12
> 4 Micron (particles/ml)	1488
> 6 Micron (particles/ml)	228
> 14 Micron (particles/ml)	39
> 21 Micron (particles/ml)	13
> 38 Micron (particles/ml)	1





FLUID ANALYSIS

UIN 0894A3D



Filter Image

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U.S. Laboratories

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6180 Halle Dr. Suite D
Valley View, OH 44125
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New Zealand
Wellington

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Kuala Lumpur, Singapore

Europe
Prague

TEST METHODS:

Acid Number: ASTM D974/D664 (*M)
Base Number: ASTM D4739 (*M)
Base Number (Perchloric): ASTM D2896 (*M)
Fuel Dilution by GC: ASTM D7593
Fuel Dilution Visc/Setaflash In House
Fuel Soot ATR/IR: ASTM D7686 (*M)
Soot by FTIR: ASTM D7844
Glycol: In House
Metals by ICP AES: ASTM D5185 (*M)
Ox, NOx, SOx, FTIR: ASTM E2412/D7418/D7414 D7415
PQ Index: ASTM D8120 (*M)
Particle Count: ASTM D7647 (*M) / ISO 4406
Viscosity: ASTM D445 (*M) / D7279 (*M)
Water KF: D6304 / E203 (*M)
Water Crackle: In House

*M - Modified Method

Since services are based on samples and information supplied by others, and since corrective actions, if any, are necessarily taken by others, these services are rendered without any warranty or liability of any kind beyond the actual amount paid to ALS Tribology for the services. Reported recommendations are based on interpretations of the generated test results and historical data. Certain test results appearing in this report may have been tested at other ALS laboratories within the Tribology divisional network.

Union Pacific Railroad
Attn: Hill, Robertt
900 N 500 West
Salt Lake City UT 84116
USA

0003 v1.5



FLUID ANALYSIS

UIN 0894A3E

Hydraulic System

Unit No. TMT1602

Unit:
Make
Model
Serial No. 220114

Site

Compartment:






Name Hydraulic System Middle of tank
Make
Model
Serial No.
Capacity: 0.0 Ltrs

Customer:
UNION PACIFIC RAILROAD
900 N 500 West
Salt Lake City UT 84116
USA

DIAGNOSIS

Unit Make and/or Model not given. Oil type and/or fluid grade not given. Time on oil not provided with sample. No recommended action at this time. Resample at normal intervals.

ANALYST: Michael.Costello

LEGEND				
				
Normal	Severe	Abnormal	Caution	Normal

DATE SAMPLED	25-Mar-21
DATE RECEIVED	29-Mar-21
DATE REPORTED	31-Mar-21

LAB NO.	40111214363
SIF NO.	38754646
TIME ON UNIT	5345
TIME ON OIL	
OIL BRAND	Unidentified
OIL TYPE	Unidentified
OIL GRADE	Unknown
OIL ADDED	
FILTER	Not Applicable
OIL CHANGED	Not Changed
WO NUMBER	

Metals (ppm)

Iron (Fe)	3
Chromium (Cr)	<1
Lead (Pb)	<1
Copper (Cu)	8
Tin (Sn)	<1
Aluminium (Al)	<1
Nickel (Ni)	<1
Silver (Ag)	<1
Titanium (Ti)	<1
Vanadium (V)	<1

Contaminants (ppm)

Silicon (Si)	2
Sodium (Na)	<1
Potassium (K)	<1
Water by Karl Fischer % (E203/D6304)	0.01
Solids (%)	<0.1

Additives (ppm)

Magnesium (Mg)	8
Calcium (Ca)	78
Barium (Ba)	<1
Phosphorus (P)	339
Zinc (Zn)	455
Molybdenum (Mo)	1
Boron (B)	<5

Physical Tests

Viscosity (cSt 40C)	43.6
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Physical / Chemical

Acid Number (mgKOH/g)	0.71
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Particle Count

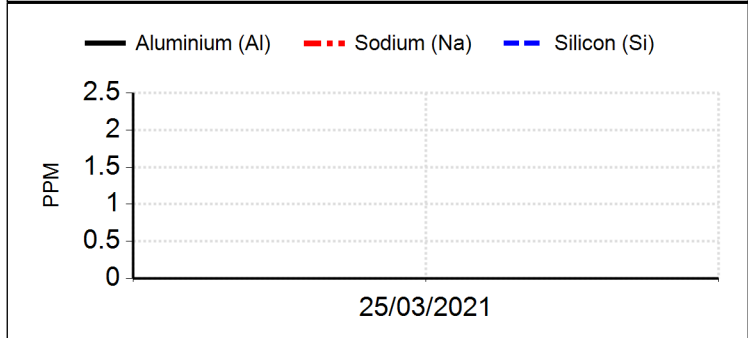
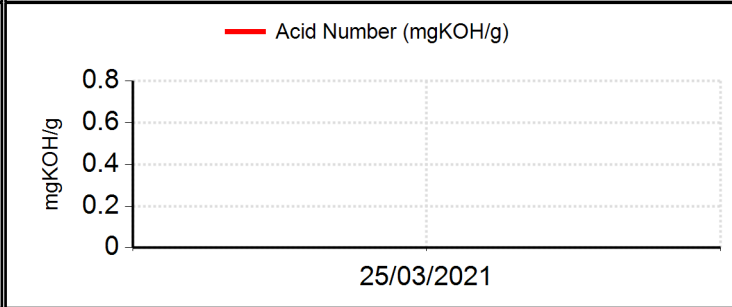
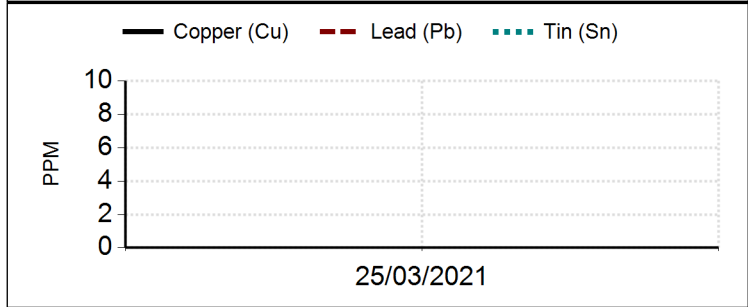
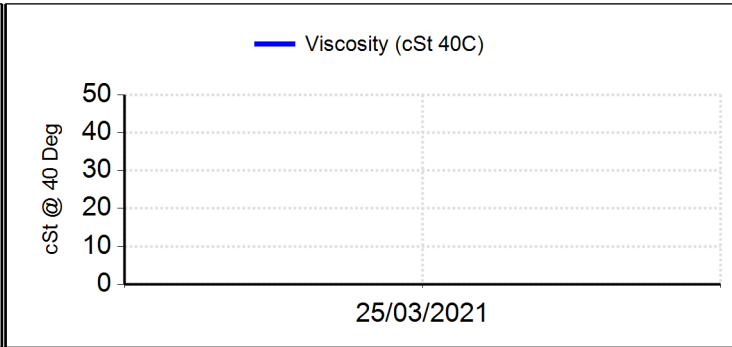
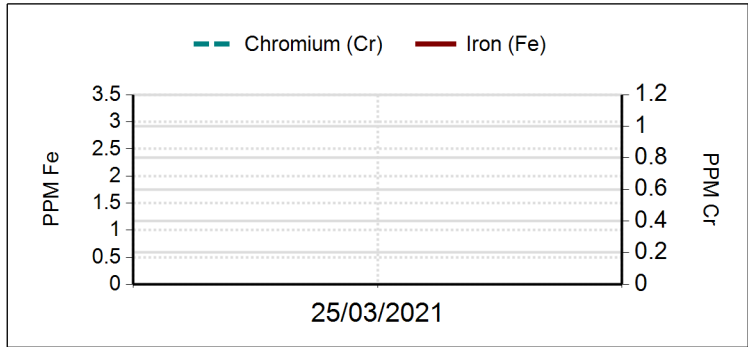
ISO 4406 Rating	17/14/12
> 4 Micron (particles/ml)	1200
> 6 Micron (particles/ml)	157
> 14 Micron (particles/ml)	26
> 21 Micron (particles/ml)	10
> 38 Micron (particles/ml)	1





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UIN 0894A3E



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TEST METHODS:

Acid Number: ASTM D974/D664 (*M)
Base Number: ASTM D4739 (*M)
Base Number (Perchloric): ASTM D2896 (*M)
Fuel Dilution by GC: ASTM D7593
Fuel Dilution Visc/Setaflash In House
Fuel Soot ATR/IR: ASTM D7686 (*M)
Soot by FTIR: ASTM D7844
Glycol: In House
Metals by ICP AES: ASTM D5185 (*M)
Ox, NOx, SOx, FTIR: ASTM E2412/D7418/D7414 D7415
PQ Index: ASTM D8120 (*M)
Particle Count: ASTM D7647 (*M) / ISO 4406
Viscosity: ASTM D445 (*M) / D7279 (*M)
Water KF: D6304 / E203 (*M)
Water Crackle: In House

*M - Modified Method

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USA

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FLUID ANALYSIS

UIN 0894A40

Hydraulic System

Unit No. TMT1602

Unit:
Make
Model
Serial No. 220114

Site

Compartment:






Name Hydraulic System Bottom of tank
Make
Model
Serial No.
Capacity: 0.0 Ltrs

Customer:
UNION PACIFIC RAILROAD
900 N 500 West
Salt Lake City UT 84116
USA

DIAGNOSIS

Unit Make and/or Model not given. Oil type and/or fluid grade not given. Time on oil not provided with sample. No recommended action at this time. Resample at normal intervals.

ANALYST: Michael.Costello

LEGEND				
				
Normal	Severe	Abnormal	Caution	Normal

DATE SAMPLED	25-Mar-21
DATE RECEIVED	29-Mar-21
DATE REPORTED	31-Mar-21

LAB NO.	40111214364
SIF NO.	38754653
TIME ON UNIT	5345
TIME ON OIL	
OIL BRAND	Unidentified
OIL TYPE	Unidentified
OIL GRADE	Unknown
OIL ADDED	
FILTER	Not Applicable
OIL CHANGED	Not Changed
WO NUMBER	

Metals (ppm)	
Iron (Fe)	3
Chromium (Cr)	<1
Lead (Pb)	<1
Copper (Cu)	8
Tin (Sn)	<1
Aluminium (Al)	<1
Nickel (Ni)	<1
Silver (Ag)	<1
Titanium (Ti)	<1
Vanadium (V)	<1

Contaminants (ppm)	
Silicon (Si)	3
Sodium (Na)	<1
Potassium (K)	<1
Water by Karl Fischer % (E203/D6304)	0.01
Solids (%)	<0.1

Additives (ppm)	
Magnesium (Mg)	8
Calcium (Ca)	77
Barium (Ba)	<1
Phosphorus (P)	334
Zinc (Zn)	451
Molybdenum (Mo)	1
Boron (B)	<5

Physical Tests	
Viscosity (cSt 40C)	43.5

Physical / Chemical	
Acid Number (mgKOH/g)	0.70

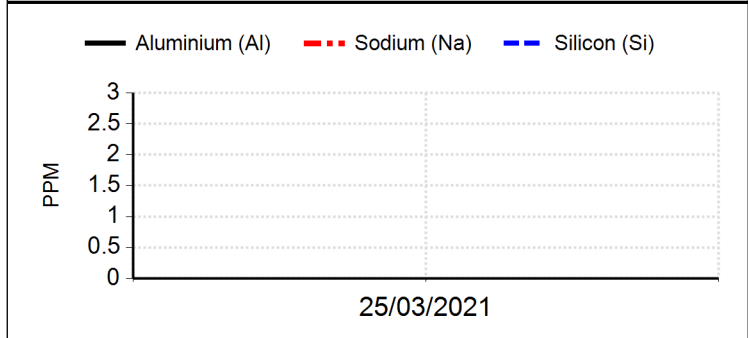
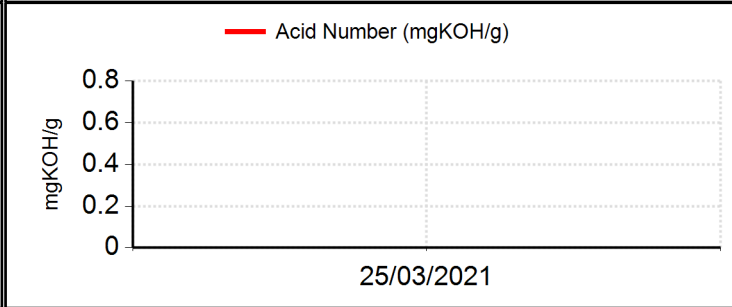
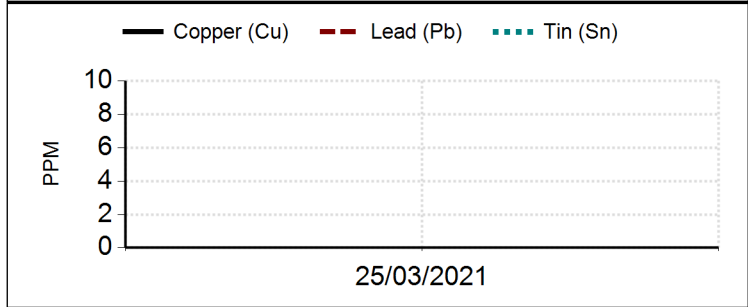
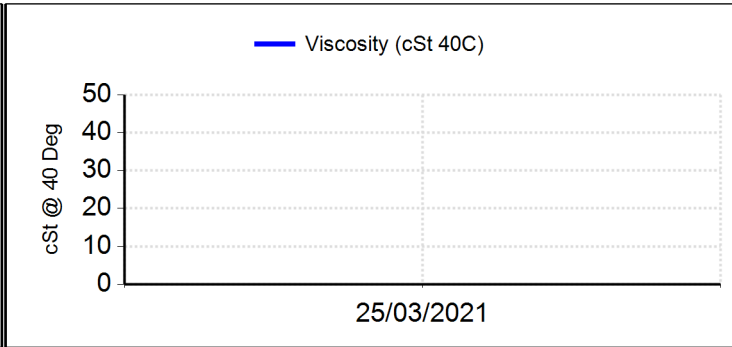
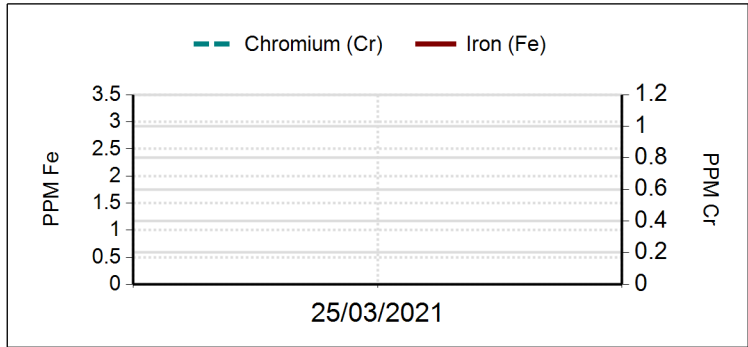
Particle Count	
ISO 4406 Rating	19/16/14
> 4 Micron (particles/ml)	2514
> 6 Micron (particles/ml)	618
> 14 Micron (particles/ml)	99
> 21 Micron (particles/ml)	33
> 38 Micron (particles/ml)	4





FLUID ANALYSIS

UIN 0894A40



Filter Image

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U.S. Laboratories

Atlanta, Georgia - 420
5300 Oakbrook Parkway
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