

## **PROBLEM SUMMARY**

## DS-115 [10023686205]

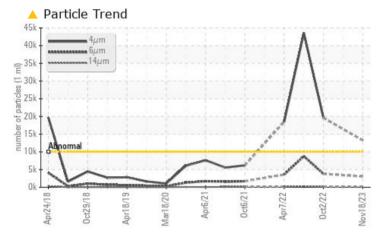
B63523 - VACUUM PUMP BUSCH RA0255 D MARLEN (S/N U053404126)

Component

Pump Fluid

### PETRO CANADA PURITY FG SYNTHETIC 100 (--- GAL)

### COMPONENT CONDITION SUMMARY



### RECOMMENDATION

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

PROBLEMATIC TEST RESULTS							
Sample Status			ATTENTION	ABNORMAL	ATTENTION		
Particles >4µm	ASTM D7647	>10000	<u> </u>		19586		
Particles >6µm	ASTM D7647	>2500	<b>A</b> 3051		<b>A</b> 3789		
Oil Cleanliness	ISO 4406 (c)	>20/18/15	<u> </u>		<b>1</b> 21/19/14		

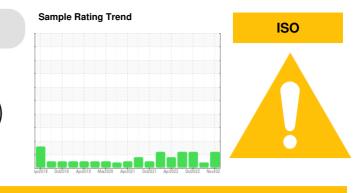
**Customer Id: HORAUS** Sample No.: WC0856072 Lab Number: 06016347 Test Package: IND 2



To manage this report scan the QR code

To discuss the diagnosis or test data: Jonathan Hester +1 919-379-4092 x4092 ihester@wearcheckusa.com

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

### 15 Aug 2023 Diag: Jonathan Hester

VIS DEBRIS



## We recommend you service the filters on this component. Resample at the next service interval to monitor. We were unable to perform a particle count due to a high concentration of particles present in this sample.All component wear rates are normal. Moderate concentration of visible dirt/debris present in the oil. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.



#### 02 Oct 2022 Diag: Don Baldridge

No corrective action is recommended at this time. Resample at the next service interval to monitor.All component wear rates are normal. There is a moderate 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.



# ISO

10 Jul 2022 Diag: Doug Bogart

No corrective action is recommended at this time. 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.



### Report Id: HORAUS [WUSCAR] 06016347 (Generated: 11/28/2023 16:52:06) Rev: 1

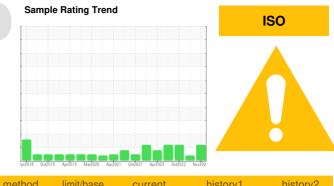


## **OIL ANALYSIS REPORT**

### DS-115 [10023686205] B63523 - VACUUM PUMP BUSCH RA0255 D MARLEN (S/N U053404126) Component

Pump

Fluid PETRO CANADA PURITY FG SYNTHETIC 100 (--- GAL)

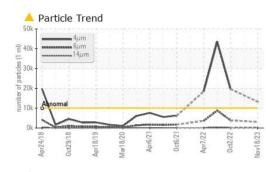


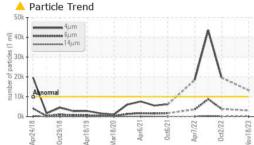
No corrective action is recommended at its inter- Resample at the next service interval to monitor.       Simple Date       Client Info       16 Nov 2023       15 Aug 2023       02 Oct 202 Machino Age         All component wear rates are normal.       Contamination       0 <th>DIAGNOSIS</th> <th>SAMPLE INFOR</th> <th>MATION</th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	DIAGNOSIS	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
esample at the next service interval to monitor. <i>Vari</i> is component wear rates are normal. Contamination here is an odderate amount of slit (particulates 4 micronis in size) present in the oil. Unit Age is suitable for further service.  Water  Ppm  Astruces  Sa	Recommendation	Sample Number		Client Info		WC0856072	WC0838658	WC0733894
Component wear rates are normal.         Contanyation         Contanyation <thcontanyation< th=""> <thcontanyation< th=""></thcontanyation<></thcontanyation<>	o corrective action is recommended at this time.	Sample Date		Client Info		18 Nov 2023	15 Aug 2023	02 Oct 2022
component wear rates are normal.       Contamination       Client Info       NA       NA       NA         Contamination       Ref is an oddrate amount of silt (particulates in size) present in the oil.       Antention       method       imatbase       current       History       history         a AN level is acceptable for further service.       Water       WCM Mindo       1       NCG       NCG       NCG       NCG         Nickel       ppm       AfTM Diffien       S-0       0       <1	esample at the next service interval to monitor.	Machine Age	hrs	Client Info		0	0	0
Contamination       Sample Status       ATTENTION       ABNORMAL       ATTENTION         pere is a moderate amount of silt (particulates present in the oil.)       CONTAMINATION       method       limit/base       current       history1       history1         AN level is asoltable for further service.       MER       MERIAL       method       scinetal       history1       history1       history1         Note is asoltable for further service.       MER       MERIAL       MERIAL       scinetal       history1       history1         Note is asoltable for further service.       NEG       NEG       NEG       NEG       NEG         Note is asoltable for further service.       NEG       Ppm       ASIM Disiss       >5       -1       0       0         Nickel       ppm       ASIM Disiss       >5       -1       0       0       0         Silver       ppm       ASIM Disiss       >5       -2       -1       -1       -1         Lead       ppm       ASIM Disiss       >5       0       0       0       0       0       0         Vandardum       ppm       ASIM Disiss       >5       0       0       0       0       0       0       0       0       0	ear	Oil Age	hrs	Client Info		0	0	0
constrained amount of sill (particulates < microns in size) present in the oil.         CONTAMINATION         method         imit/base         current         history1         history1           a Al level is acceptable for this fluid. The didion of the oil is suitable for further service.         Water         WC Method         >.1         NEG         NEG         NEG           Water         WC Method         >.1         NEG         NEG         NEG         NEG           Water         WC Method         >.1         NEG         NEG         NEG         NEG           Water         WC Method         >.1         NEG         NEG         NEG         0	component wear rates are normal.	Oil Changed		Client Info		N/A	N/A	N/A
micros in size) present in the oil.         DOINT Addition         minute of         minute of <thminute of<="" th=""></thminute>	Contamination	Sample Status				ATTENTION	ABNORMAL	ATTENTION
water       WC Method       >.1       NEG       NEG       NEG         A N level is acceptable for this fluid. The oil is suitable for further service.       im       ppm       AS1M 05186n       >.90       0       <1		CONTAMINATIC	N	method	limit/base	current	history1	history2
M level is acceptable for this fluid. The dition of the oil is suitable for further service.         Iron         ppm         ASTM 25155n         >90         0         <1         2           Chromium         ppm         ASTM 25155n         >50         0         0         0         0           Nickel         ppm         ASTM 25155n         >5         0         0         0         0           Nickel         ppm         ASTM 25155n         >3         0         0         0         0           Aluminum         ppm         ASTM 25155n         >3         0		Water		WC Method	>.1	NEG	NEG	NEG
Iron       ppm       ASTM 05185m       >>0       0       0         Nicked       ppm       ASTM 05185m       >>5       0       0       0         Titanium       ppm       ASTM 05185m       >3       0       0       0         Silver       ppm       ASTM 05185m       >3       0       0       0       0         Aluminum       ppm       ASTM 05185m       >7       2	AN level is acceptable for this fluid. The	WEAR METALS		method	limit/base	current	history1	history2
Chromium         ppm         ASTM D5155m         >5         <1         0         0           Nickel         ppm         ASTM D5155m         >5         0         0         0           Silver         ppm         ASTM D5155m         >3         0         0         0           Silver         ppm         ASTM D5155m         >3         0         0         0           Aluminum         ppm         ASTM D5155m         >12         0         0         0           Copper         ppm         ASTM D5155m         >12         0         0         0           Vanadium         ppm         ASTM D5155m         0         0         0         0           Cadmium         ppm         ASTM D5155m         0         0         0         0           ADDITIVES         method         Imitbase         current         history1         history1           Barium         ppm         ASTM D5155m         0         0         0         0           Galcium         ppm         ASTM D5155m         0         0         0         0           Marganese         ppm         ASTM D5155m         0         0         0         0 <td>idition of the oil is suitable for further service.</td> <td>Iron</td> <td>maa</td> <td>ASTM D5185m</td> <td>&gt;90</td> <th>0</th> <td>&lt;1</td> <td>2</td>	idition of the oil is suitable for further service.	Iron	maa	ASTM D5185m	>90	0	<1	2
Nickel       ppm       ASTM D515m       >5       0       0       0         Titanium       ppm       ASTM D515m       >3       0       0       0         Silve       ppm       ASTM D515m       >3       0       0       0         Aluminum       ppm       ASTM D515m       >7       2       0       <1								
Titanium       ppm       ASTM D5185m       >3       <1       0       0         Silver       ppm       ASTM D5185m       >7       2       <1								
Silver       ppm       ASTM D5185m       >3       0       0       0         Aluminum       ppm       ASTM D5185m       >12       0       0       <1								
Aluminum       ppm       ASTM D5185m       >7       2       <1       <1         Lead       ppm       ASTM D5185m       >12       0       0       <1								
Lead       ppm       ASTM D5185m       >12       0       0       <1         Copper       ppm       ASTM D5185m       >30       <1								
Copper         ppm         ASTM D5165m         >30         <1         0         <1           Tin         ppm         ASTM D5165m         >9         0         0         0           Vanadium         ppm         ASTM D5165m         >9         0         0         0           Cadmium         ppm         ASTM D5165m         0         0         0         0           ADDITIVES         method         limit/base         current         history1         history1           Boron         ppm         ASTM D5165m         0         0         0         0           Barium         ppm         ASTM D5165m         0         0         0         0           Magnesium         ppm         ASTM D5165m         0         0         0         0           Magnesium         ppm         ASTM D5165m         0         0         0         0           Suffur         ppm         ASTM D5165m         0         0         0         0         0           Suffur         ppm         ASTM D5165m         0         0         1         175           Zinc         ppm         ASTM D5165m         0         5         7								
Tin         ppm         ASTM D5185m         >9         0         0         0           Vanadium         ppm         ASTM D5185m         0         0         0         0           Cadmium         ppm         ASTM D5185m         0         0         0         0           ADDITIVES         method         limit/base         current         history1         history1           Barium         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         0         0         0           Magnaesium         ppm         ASTM D5185m         0         0         0         0           Calcium         ppm         ASTM D5185m         0         0         0         0           Sulfur         ppm         ASTM D5185m         0         0         0         0           Sulfur         ppm         ASTM D5185m         0         0         1175           Sulfur         ppm         ASTM D5185m         0         0         1         1           Potassium         ppm         ASTM D5185m         0         <1								
Vanadium         ppm         ASTM D5185m         0         0         0           Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history1           Boron         ppm         ASTM D5185m         0         0         0         0           Barium         ppm         ASTM D5185m         0         0         0         0           Manganese         ppm         ASTM D5185m         0         0         0         0           Magnesium         ppm         ASTM D5185m         0         0         0         0           Calcium         ppm         ASTM D5185m         0         0         0         0           Obsphorus         ppm         ASTM D5185m         0         0         0         0           Suffur         ppm         ASTM D5185m         0         0         0         0         0           Suffur         ppm         ASTM D5185m         0         5         7         8         Sodium         ppm         ASTM D5185m         20         <1								
Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history1           Boron         ppm         ASTM D5185m         0         0         0         0           Barium         ppm         ASTM D5185m         0         0         0         0           Magnesium         ppm         ASTM D5185m         0         0         0         0           Magnesium         ppm         ASTM D5185m         0         0         0         0           Calcium         ppm         ASTM D5185m         0         0         0         0           Calcium         ppm         ASTM D5185m         0         0         0         0           Calcium         ppm         ASTM D5185m         0         0         0         0           Sulfur         ppm         ASTM D5185m         0         0         0         0           Sulfur         ppm         ASTM D5185m         20         5         7         8           Sodium         ppm         ASTM D5185m         >20         <1					20			
ADDITIVESmethodimit/basecurrenthistory1history1BoronppmASTM DS165m000BariumppmASTM DS165m000ManganeseppmASTM DS165m000ManganeseppmASTM DS165m000CalciumppmASTM DS165m000CalciumppmASTM DS165m000CalciumppmASTM DS165m000PhosphorusppmASTM DS165m000SulfurppmASTM DS165m000SulfurppmASTM DS165m000SulfurppmASTM DS165m0578SodiumppmASTM DS165m>0578SodiumppmASTM DS165m>0111PotassiumppmASTM DS165m>20<1								
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         0         0         0           Magnesium         ppm         ASTM D5185m         0         0         0           Calcium         ppm         ASTM D5185m         0         0         0           Phosphorus         ppm         ASTM D5185m         0         -11         175           Zinc         ppm         ASTM D5185m         0         -11         175           Zinc         ppm         ASTM D5185m         0         0         0         0           Sulfur         ppm         ASTM D5185m         0         0         0         0           Solicon         ppm         ASTM D5185m         >60         5         7         8           Sodium         ppm         ASTM D5185m         >60         <11			pp		limit/base	-	-	-
Barium         ppm         ASTM D5185m         0         0         0           Molybdenum         ppm         ASTM D5185m         0         0         0           Manganese         ppm         ASTM D5185m         0         0         0           Magnesium         ppm         ASTM D5185m         0         0         0           Calcium         ppm         ASTM D5185m         0         0         0           Phosphorus         ppm         ASTM D5185m         0         0         0           Sulfur         ppm         ASTM D5185m         0         0         0           Sulfur         ppm         ASTM D5185m         0         0         0         0           Sulfur         ppm         ASTM D5185m         0         0         0         0           Sulfur         ppm         ASTM D5185m         0         0         1         1           Sodium         ppm         ASTM D5185m         >60         5         7         8           Sodium         ppm         ASTM D5185m         >20         <1								
Molybdenum       ppm       ASTM D5185m       0       0       0         Manganese       ppm       ASTM D5185m       0       0       0         Magnesium       ppm       ASTM D5185m       0       0       0         Calcium       ppm       ASTM D5185m       0       0       0         Phosphorus       ppm       ASTM D5185m       0       0       0         Sulfur       ppm       ASTM D5185m       0       0       0         Sulfur       ppm       ASTM D5185m       0       0       0         Sulfur       ppm       ASTM D5185m       0       0       0         Solium       ppm       ASTM D5185m       0       5       7       8         Sodium       ppm       ASTM D5185m       0       <1								
Manganese       ppm       ASTM D5185m       0       0       0         Magnesium       ppm       ASTM D5185m       0       0       0         Calcium       ppm       ASTM D5185m       0       0       0         Phosphorus       ppm       ASTM D5185m       0       0       0         Zinc       ppm       ASTM D5185m       0       0       0         Sulfur       ppm       ASTM D5185m       0       0       0         Sulfur       ppm       ASTM D5185m       0       0       0         Sulfur       ppm       ASTM D5185m       0       0       0       0         Sulfur       ppm       ASTM D5185m       0       5       7       8       0       0       0       0         Sodium       ppm       ASTM D5185m       >60       5       7       8       0								
MagnesiumppmASTM D5185m000CalciumppmASTM D5185m000PhosphorusppmASTM D5185m0<11		,						
Calcium       ppm       ASTM D5185m       0       0       0         Phosphorus       ppm       ASTM D5185m       0       <1		e e						
Phosphorus       ppm       ASTM D5185m       0       <1       175         Zinc       ppm       ASTM D5185m       0       0       0       0         Sulfur       ppm       ASTM D5185m       0       0       602         CONTAMINANTS       method       limit/base       current       history1       history1         Silicon       ppm       ASTM D5185m       >60       5       7       8         Sodium       ppm       ASTM D5185m       >60       5       7       8         Sodium       ppm       ASTM D5185m       >60       5       7       8         Sodium       ppm       ASTM D5185m       >20       <1       0       0         FLUID CLEANLINESS       method       limit/base       current       history1       history1         Particles >4µm       ASTM D7647       >10000       A 13245        A 3789         Particles >6µm       ASTM D7647       >2500       A 3051        A 3789         Particles >21µm       ASTM D7647       >20       3        A 3789         Particles >21µm       ASTM D7647       >20       3        A 319		0						
ZincppmASTM D5185m000SulfurppmASTM D5185m00602CONTAMINANTSmethodlimit/basecurrenthistory1history1SiliconppmASTM D5185m>60578SodiumppmASTM D5185m>60578PotassiumppmASTM D5185m>20<1								
SulfurppmASTM D5185m00602CONTAMINANTSmethodlimit/basecurrenthistory1history1SiliconppmASTM D5185m>60578SodiumppmASTM D5185m0<1			ppm					
Methodlimit/basecurrenthistory1history1history1SiliconppmASTM D5185m>60578SodiumppmASTM D5185m0<1			ppm					
Silicon       ppm       ASTM D5185m       >60       5       7       8         Sodium       ppm       ASTM D5185m       0       <1       1         Potassium       ppm       ASTM D5185m       >20       <1       0       0         FLUID CLEANLINESS       method       limit/base       current       history1       history1       history1         Particles >4µm       ASTM D7647       >10000       13245        ▲ 19586         Particles >6µm       ASTM D7647       >2500       ▲ 3051        ▲ 3789         Particles >14µm       ASTM D7647       >320       215        138         Particles >21µm       ASTM D7647       >80       62        1         Particles >38µm       ASTM D7647       >20       3        1         Particles >71µm       ASTM D7647       >4       0        0         Oil Cleanliness       ISO 4406 (c)       >20/18/15       21/19/15        4       21/19/15		Sulfur	ppm	ASTM D5185m		0	0	602
SodiumppmASTM D5185m0<11PotassiumppmASTM D5185m>20<1		CONTAMINANTS	S			current	history1	history2
PotassiumppmASTM D5185m>20<100FLUID CLEANLINESSmethodlimit/basecurrenthistory1history1Particles >4µmASTM D7647>10000▲ 13245▲ 19586Particles >6µmaASTM D7647>2500▲ 3051▲ 3789Particles >14µmASTM D7647>320215138Particles >14µmASTM D7647>806231Particles >21µmASTM D7647>2031Particles >38µmASTM D7647>400Oil CleanlinessISO 4406 (c)>20/18/1521/19/1521/19/17FLUID DEGRADATIONmethodlimit/basecurrenthistory1history1			ppm		>60	5	7	8
FLUID CLEANLINESSmethodlimit/basecurrenthistory1history1Particles >4µmASTM D7647>10000▲13245▲19586Particles >6µmASTM D7647>2500▲3051▲3789Particles >14µmASTM D7647>320215138Particles >21µmASTM D7647>806231Particles >38µmASTM D7647>2031Particles >71µmASTM D7647>400Oil CleanlinessISO 4406 (c)>20/18/1521/19/1521/19/15FLUID DEGRADATIONmethodlimit/basecurrenthistory1history1		Sodium	ppm	ASTM D5185m		0	<1	1
Particles >4μm       ASTM D7647       >10000       ▲ 13245        ▲ 19586         Particles >6μm       ASTM D7647       >2500       ▲ 3051        ▲ 3789         Particles >14μm       ASTM D7647       >320       215        138         Particles >14μm       ASTM D7647       >80       62        31         Particles >21μm       ASTM D7647       >20       3        1         Particles >38μm       ASTM D7647       >20       3        1         Particles >71μm       ASTM D7647       >4       0        0         Oil Cleanliness       ISO 4406 (c)       >20/18/15       21/19/15        21/19/17		Potassium	ppm	ASTM D5185m	>20	<1	0	0
Particles >6μm       ASTM D7647       >2500       ▲ 3051        ▲ 3789         Particles >14μm       ASTM D7647       >320       215        138         Particles >21μm       ASTM D7647       >80       62        31         Particles >38μm       ASTM D7647       >20       3        1         Particles >38μm       ASTM D7647       >20       3        1         Particles >71μm       ASTM D7647       >4       0        0         Oil Cleanliness       ISO 4406 (c)       >20/18/15       21/19/15        21/19/15		FLUID CLEANLI	NESS	method	limit/base		history1	history2
Particles >14μm       ASTM D7647       >320       215        138         Particles >21μm       ASTM D7647       >80       62        31         Particles >38μm       ASTM D7647       >20       3        1         Particles >37µm       ASTM D7647       >4       0        0         Oil Cleanliness       ISO 4406 (c)       >20/18/15       ▲ 21/19/15        ▲ 21/19/17		Particles >4µm						19586
Particles >21μm       ASTM D7647       >80       62        31         Particles >38μm       ASTM D7647       >20       3        1         Particles >71μm       ASTM D7647       >4       0        0         Oil Cleanliness       ISO 4406 (c)       >20/18/15       ▲ 21/19/15        ▲ 21/19/17         FLUID DEGRADATION       method       limit/base       current       history1       history1		Particles >6µm		ASTM D7647	>2500	<u> </u>		<b>A</b> 3789
Particles >38μm       ASTM D7647       >20       3        1         Particles >71μm       ASTM D7647       >4       0        0         Oil Cleanliness       ISO 4406 (c)       >20/18/15       21/19/15        21/19/17         FLUID DEGRADATION       method       limit/base       current       history1       history1		Particles >14µm		ASTM D7647	>320	215		138
Particles >71μm         ASTM D7647         >4         0          0           Oil Cleanliness         ISO 4406 (c)         >20/18/15 <b>21/19/15</b> Δ 21/19/15           FLUID DEGRADATION         method         limit/base         current         history1         history1		Particles >21µm		ASTM D7647	>80	62		31
Oil Cleanliness       ISO 4406 (c)       >20/18/15       21/19/15        21/19/17         FLUID DEGRADATION       method       limit/base       current       history1       history1		Particles >38µm				3		1
FLUID DEGRADATION method limit/base current history1 history		Particles >71µm		ASTM D7647	>4	0		0
		Oil Cleanliness		ISO 4406 (c)	>20/18/15	<b>A</b> 21/19/15		▲ 21/19/14
		FLUID DEGRAD	ATION	method	limit/base	current	history1	history2
Acid Number (AN) mg KOH/g ASTM D8045 0.5 0.086 0.067 0.079		Acid Number (AN)	mg KOH/g	ASTM D8045	0.5	0.086	0.067	0.079

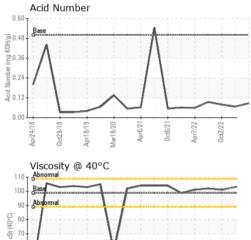
Contact/Location: RYAN LOWE - HORAUS



## **OIL ANALYSIS REPORT**







Vpr6/21

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Apr24/18

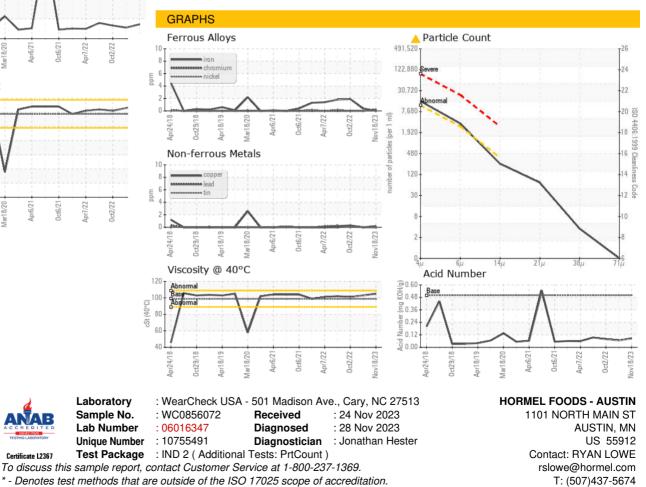
Apr18/19

Mar18/20

0ct29/18

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	🔺 MODER	VLITE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	LAYRD	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>.1	NEG	0.2%	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG
FLUID PROPERT	IES	method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D445	98.7	105	103	101
SAMPLE IMAGES	S	method	limit/base	current	history1	history2
Color						

Bottom



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

Contact/Location: RYAN LOWE - HORAUS

F: (507)437-9805