

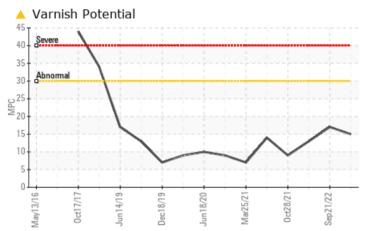


IMM #4 (S/N 2018165)

Hydraulic System

PETRO CANADA HYDREX AW 46 (3000 LTR)

COMPONENT CONDITION SUMMARY



RECOMMENDATION

We recommend an early resample to monitor this condition. No other corrective action is recommended at this time. Please contact your representative for information regarding the proper sampling kits for your service. NOTE: We recommend using IND 3 test kits, this testkit includes Analytical Ferrography which provides a detailed morphological analysis of wear particles present in the fluid.

MPC Varnish Potential	Scale	ASTM D7843(m)*	>15	<u> </u>	<u> </u>	13

MARGINAL

MARGINAL

ATTENTION

PROBLEMATIC TEST RESULTS

Sample Status

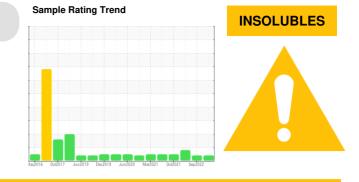
Customer Id: ROPOAK Sample No.: PC0076954 Lab Number: 02571223 Test Package: IND 2



To manage this report scan the QR code

To discuss the diagnosis or test data: Kevin Marson +1 (289)291-4644 x4644 <u>Kevin.Marson@wearcheck.com</u>

To change component or sample information: Gloria Gonzalez +1 (289)291-4643 x4643 gloria.gonzalez@wearcheck.com



RECOMMENDE	RECOMMENDED ACTIONS					
Action	Status	Date	Done By	Description		
Resample			?	We recommend an early resample to monitor this condition.		
Contact Required			?	Please contact your representative for information regarding the proper sampling kits for your service.		
Alert			?	NOTE: We recommend using IND 3 test kits,		

HISTORICAL DIAGNOSIS



21 Sep 2022 Diag: Kevin Marson





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



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 light amount of silt (particulates < 14 microns in size) present in the oil. MPC (Membrane Patch Colorimetry) test indicates acceptable levels of varnish present. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

28 Oct 2021 Diag: Wes Davis



Resample at the next service interval to monitor.All component wear rates are normal. MPC (Membrane Patch Colorimetry) test indicates acceptable levels of varnish present. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The system and fluid cleanliness is acceptable. The AN level is acceptable for



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OIL ANALYSIS REPORT

IMM #4 (S/N 2018165)

Hydraulic System Fluid PETRO CANADA HYDREX AW 46 (3000 LTR)

DIAGNOSIS

Recommendation

We recommend an early resample to monitor this condition. No other corrective action is recommended at this time. Please contact your representative for information regarding the proper sampling kits for your service. NOTE: We recommend using IND 3 test kits, this testkit includes Analytical Ferrography which provides a detailed morphological analysis of wear particles present in the fluid.

Wear

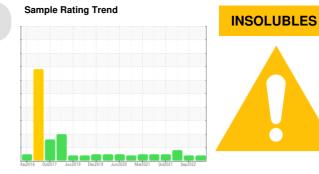
Component wear rates appear to be normal (unconfirmed).

Contamination

MPC (Membrane Patch Colorimetry) test indicates a light concentration of varnish present.

Fluid Condition

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

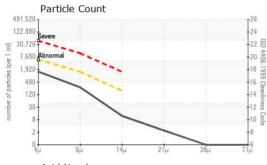


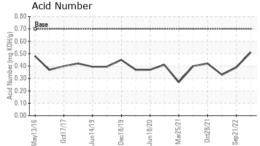
Sample Date Client Info 11 Jul 2023 21 Sep 2022 10 May 2022 Machine Age mths Client Info 0 0 0 0 Oil Age mths Client Info 0 6 0 0 Oil Changed Client Info N/A N/A N/A N/A Sample Status Client Info N/A N/A N/A N/A WEAR METALS method Imit/base current history1 history2 Iron ppm ASTM D5185(m) >40 1 1 1 Okckel ppm ASTM D5185(m) >20 1 0 0 0 Intension ppm ASTM D5185(m) >20 1 0 0 0 Astm D5185(m) >44 0 0 0 0 0 Astm D5185(m) >60 <1	SAMPLE INFORM	ATION	method	limit/base	current	history1	history2		
Machine Age mths Client Info 0 0 0 Oil Age mths Client Info N/A N/A N/A Sample Status Client Info N/A N/A N/A N/A WEAR METALS method limit/base current history1 history2 Iron ppm ASTM D5185(m) >40 1 1 1 Chromium ppm ASTM D5185(m) >20 <1	Sample Number		Client Info		PC0076954	PC0062458	PC0044234		
Machine AgemthsClient Info000Oil AgemthsClient InfoN/AN/AN/ASample StatusClient InfoN/AMARGINALATTENTIONWEAR METALSmethodIlmit/basecurrenthistory1history2IronppmASTM D5185(m)>40111ChromiumppmASTM D5185(m)>20<1	Sample Date		Client Info		11 Jul 2023	21 Sep 2022	10 May 2022		
Oil ChangedClient InfoN/AN/AN/AN/ASample StatusImage StatusImage StatusATTENTIONWEAR METALSmethodlimit/basecurrenthistory1history2IronppmASTN D518(m)>40111ChromiumppmASTN D518(m)>20<1	<1	<1	Machine Age r	mths	Client Info		0		
Oil ChangedClient InfoN/AN/AN/AN/ASample StatusIIMARGINALMARGINALATTENTIONWEAR METALSmethodlimit/basecurrenthistory1history2IronppmASTN 0518(m)>40111ChromiumppmASTN 0518(m)>20<1	Oil Age r	mths	Client Info		0	6	0		
Sample Status method Imit/base current history1 history2 Iron ppm ASTM D5185(m) >40 1 1 1 Chromium ppm ASTM D5185(m) >40 0 0 0 Nickel ppm ASTM D5185(m) >20 <1	Oil Changed		Client Info		N/A	N/A	N/A		
Iron ppm ASTM D5185(m) >40 1 1 1 Chromium ppm ASTM D5185(m) >4 0 0 0 Nickel ppm ASTM D5185(m) >20 <1 0 0 Silver ppm ASTM D5185(m) 0 0 0 0 Aluminum ppm ASTM D5185(m) >40 0 0 0 Lead ppm ASTM D5185(m) >40 0 0 0 Copper ppm ASTM D5185(m) >40 0 0 0 Antimony ppm ASTM D5185(m) 0 0 0 0 Antimony ppm ASTM D5185(m) 0 0 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 0 0 Addition ppm ASTM D5185(m) 0 0 0 0 Barium ppm ASTM D5185(m) 0	Sample Status				MARGINAL	MARGINAL	ATTENTION		
Chromium ppm ASTM D5185(m) s-4 0 0 0 Nickel ppm ASTM D5185(m) >20 <1	WEAR METALS		method	limit/base	current	history1	history2		
Nickel ppm ASTM D5185(m) >20 <1 0 <1 Titanium ppm ASTM D5185(m) 0 0 0 0 Silver ppm ASTM D5185(m) 0 0 0 0 Auminum ppm ASTM D5185(m) >4 0 0 0 Lead ppm ASTM D5185(m) >4 0 0 0 Copper ppm ASTM D5185(m) >4 0 0 0 Vanadium ppm ASTM D5185(m) 0 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 0 ACMDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 0 0 0 Maganese ppm ASTM D5185(m) 0 0 0 0 Magnesium pm ASTM D5185(m) 0 1 0	Iron p	opm	ASTM D5185(m)	>40	1	1	1		
Titanium ppm ASTM D5185(m) 0 0 0 Silver ppm ASTM D5185(m) 0 0 0 Aluminum ppm ASTM D5185(m) >44 0 0 0 Lead ppm ASTM D5185(m) >10 0 0 0 Copper ppm ASTM D5185(m) >60 <1	Chromium p	opm	ASTM D5185(m)	>4	0	0	0		
Silver ppm ASTM D5185(m) >4 0 0 0 Aluminum ppm ASTM D5185(m) >4 0 0 0 Lead ppm ASTM D5185(m) >10 0 0 0 Copper ppm ASTM D5185(m) >60 <1	Nickel p	opm	ASTM D5185(m)	>20	<1	0	<1		
Aluminum ppm ASTM D5185(m) >4 0 0 0 Lead ppm ASTM D5185(m) >10 0 0 0 Copper ppm ASTM D5185(m) >60 <1	Titanium p	opm	ASTM D5185(m)		0	0	0		
Lead ppm ASTM D5185(m) >10 0 0 0 Copper ppm ASTM D5185(m) >60 <1	Silver p	opm	ASTM D5185(m)		0	0	0		
Copper ppm ASTM D5185(m) >600 <1 <1 <1 Tin ppm ASTM D5185(m) >4 0 0 0 Antimony ppm ASTM D5185(m) 0 0 0 0 Vanadium ppm ASTM D5185(m) 0 0 0 0 Beryllium ppm ASTM D5185(m) 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 <1	Aluminum p	opm	ASTM D5185(m)	>4	0	0	0		
Tin ppm ASTM D5185(m) >4 0 0 0 Antimony ppm ASTM D5185(m) 0 0 0 0 Vanadium ppm ASTM D5185(m) 0 0 0 0 Beryllium ppm ASTM D5185(m) 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 <1	Lead p	opm	ASTM D5185(m)	>10	0	0	0		
Antimony ppm ASTM D5185(m) 0 0 0 Vanadium ppm ASTM D5185(m) 0 0 0 Beryllium ppm ASTM D5185(m) 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 0 0 0 Molybdenum ppm ASTM D5185(m) 0 0 0 0 Marganese ppm ASTM D5185(m) 0 0 0 0 Calcium ppm ASTM D5185(m) 0 1 0 0 Calcium ppm ASTM D5185(m) 50 39 44 42 Phosphorus ppm ASTM D5185(m) 300 356 349 338 Zinc ppm ASTM D5185(m) 723 723 699 Lithium	Copper p	opm	ASTM D5185(m)	>60	<1	<1	<1		
Vanadium ppm ASTM D5185(m) 0 0 0 Beryllium ppm ASTM D5185(m) 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 0 0 0 Barium ppm ASTM D5185(m) 0 0 0 0 Molybdenum ppm ASTM D5185(m) 0 0 0 0 Marganese ppm ASTM D5185(m) 0 1 0 0 Calcium ppm ASTM D5185(m) 50 39 444 42 Phosphorus ppm ASTM D5185(m) 330 356 349 338 Zinc ppm ASTM D5185(m) 760 723 723 699 Lithium ppm ASTM D5185(m) >20 0 <1	Tin p	opm	ASTM D5185(m)	>4	0	0	0		
Beryllium ppm ASTM D5185(m) 0 0 0 Cadmium ppm ASTM D5185(m) 0 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 <1 <1 0 Barium ppm ASTM D5185(m) 0 0 0 0 0 0 Molybdenum ppm ASTM D5185(m) 0 0 0 0 0 0 Magnese ppm ASTM D5185(m) 0 0 0 0 0 0 Calcium ppm ASTM D5185(m) 0 3 9 44 42 Phosphorus ppm ASTM D5185(m) 30 356 349 338 Sulfur ppm ASTM D5185(m) 430 395 397 387 Sulfur ppm ASTM D5185(m) 20 0 0 <1	Antimony p	opm	ASTM D5185(m)		0	0	0		
Cadmium ppm ASTM D5185(m) 0 0 0 ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 <1 <1 0 Barium ppm ASTM D5185(m) 0 0 <1 0 0 Molybdenum ppm ASTM D5185(m) 0 0 0 0 0 0 Magnesium ppm ASTM D5185(m) 0 1 0 0 Calcium ppm ASTM D5185(m) 0 1 0 0 Calcium ppm ASTM D5185(m) 0 1 0 0 Calcium ppm ASTM D5185(m) 30 356 349 338 Zinc ppm ASTM D5185(m) 760 723 723 699 Lithium ppm ASTM D5185(m) >20 0 0 <1 Sodium ppm ASTM D5185(m)	Vanadium p	opm	ASTM D5185(m)		0	0	0		
ADDITIVES method limit/base current history1 history2 Boron ppm ASTM D5185(m) 0 <1	Beryllium p	opm	ASTM D5185(m)		0	0	0		
Boron ppm ASTM D5185(m) 0 <1 <1 0 Barium ppm ASTM D5185(m) 0 0 0 0 0 Molybdenum ppm ASTM D5185(m) 0 0 0 0 0 Manganese ppm ASTM D5185(m) 0 0 0 0 0 Magnesium ppm ASTM D5185(m) 0 1 0 0 0 Calcium ppm ASTM D5185(m) 50 39 44 42 Phosphorus ppm ASTM D5185(m) 300 356 349 338 Zinc ppm ASTM D5185(m) 760 723 723 699 Lithium ppm ASTM D5185(m) >20 0 0 <1	Cadmium p	opm	ASTM D5185(m)		0	0	0		
Barium ppm ASTM D5185(m) 0 0 0 0 0 Molybdenum ppm ASTM D5185(m) 0 0 0 0 Manganese ppm ASTM D5185(m) 0 0 0 0 Magnesium ppm ASTM D5185(m) 0 1 0 0 Calcium ppm ASTM D5185(m) 50 39 44 42 Phosphorus ppm ASTM D5185(m) 50 39 444 42 Phosphorus ppm ASTM D5185(m) 300 356 349 338 Zinc ppm ASTM D5185(m) 760 723 723 699 Lithium ppm ASTM D5185(m) <0 0 <1 <1 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >20 0 0 <1 Potassium ppm ASTM D5185(m) <th>ADDITIVES</th> <th></th> <th>method</th> <th>limit/base</th> <th>current</th> <th>history1</th> <th>history2</th>	ADDITIVES		method	limit/base	current	history1	history2		
Molybdenum ppm ASTM D5185(m) 0 0 0 0 0 Manganese ppm ASTM D5185(m) 0 1 0 0 Magnesium ppm ASTM D5185(m) 0 39 444 42 Phosphorus ppm ASTM D5185(m) 300 356 349 338 Zinc ppm ASTM D5185(m) 430 395 397 387 Sulfur ppm ASTM D5185(m) 760 723 723 699 Lithium ppm ASTM D5185(m) 760 723 723 699 Silicon ppm ASTM D5185(m) 760 723 723 699 Silicon ppm ASTM D5185(m) >20 0 0 <1	Boron p	opm	()		<1	<1	0		
Manganese ppm ASTM D5185(m) 0 <td>Barium p</td> <td>opm</td> <td>ASTM D5185(m)</td> <td>0</td> <th>0</th> <td>0</td> <td>0</td>	Barium p	opm	ASTM D5185(m)	0	0	0	0		
Magnesium ppm ASTM D5185(m) 0 1 0 0 Calcium ppm ASTM D5185(m) 50 39 44 42 Phosphorus ppm ASTM D5185(m) 330 356 349 338 Zinc ppm ASTM D5185(m) 430 395 397 387 Sulfur ppm ASTM D5185(m) 760 723 723 699 Lithium ppm ASTM D5185(m) 760 723 723 699 Lithium ppm ASTM D5185(m) 760 723 723 699 Lithium ppm ASTM D5185(m) 760 723 723 699 Silicon ppm ASTM D5185(m) >20 0 0 <1	Molybdenum p	opm	ASTM D5185(m)	0	-				
Calcium ppm ASTM D5185(m) 50 39 44 42 Phosphorus ppm ASTM D5185(m) 330 356 349 338 Zinc ppm ASTM D5185(m) 430 395 397 387 Sulfur ppm ASTM D5185(m) 760 723 723 699 Lithium ppm ASTM D5185(m) 700 0 <1	Manganese p	opm	ASTM D5185(m)	0	0	0	0		
Phosphorus ppm ASTM D5185(m) 330 356 349 338 Zinc ppm ASTM D5185(m) 430 395 397 387 Sulfur ppm ASTM D5185(m) 760 723 723 699 Lithium ppm ASTM D5185(m) 760 723 723 699 Lithium ppm ASTM D5185(m) 760 723 723 699 Lithium ppm ASTM D5185(m) 760 71 <1	Magnesium p	opm	ASTM D5185(m)	0	1	0	0		
Zinc ppm ASTM D5185(m) 430 395 397 387 Sulfur ppm ASTM D5185(m) 760 723 723 699 Lithium ppm ASTM D5185(m) 760 723 723 699 Lithium ppm ASTM D5185(m) 760 723 723 699 Lithium ppm ASTM D5185(m) 760 71 <1	Calcium p	opm	ASTM D5185(m)	50	39	44	42		
Sulfur ppm ASTM D5185(m) 760 723 723 699 Lithium ppm ASTM D5185(m) 760 723 723 699 Lithium ppm ASTM D5185(m) <<1	Phosphorus p	opm	ASTM D5185(m)	330	356	349	338		
Lithium ppm ASTM D5185(m) <1 <1 <1 CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185(m) >20 0 0 <1	Zinc p	opm	ASTM D5185(m)	430	395	397	387		
$\begin{tabular}{ c c c c c c c } \hline CONTAMINANTS & method & limit/base & current & history1 & history2 \\ \hline Silicon & ppm & ASTM D5185(m) > 20 & 0 & 0 & <1 \\ \hline Sodium & ppm & ASTM D5185(m) & 0 & <1 & 0 \\ \hline Potassium & ppm & ASTM D5185(m) > 20 & <1 & 0 & 0 \\ \hline Potassium & ppm & ASTM D5185(m) > 20 & <1 & 0 & 0 \\ \hline FLUID CLEANLINESS & method & limit/base & current & history1 & history2 \\ \hline Particles >4 \mu m & ASTM D7647 >5000 & 1335 & 1246 & 5239 \\ \hline Particles >6 \mu m & ASTM D7647 >1300 & 236 & 305 & 1135 \\ \hline Particles >14 \mu m & ASTM D7647 >160 & 10 & 22 & 50 \\ \hline Particles >21 \mu m & ASTM D7647 >10 & 0 & 0 & 0 \\ \hline Particles >38 \mu m & ASTM D7647 >3 & 0 & 0 & 0 \\ \hline Particles >71 \mu m & ASTM D7647 >3 & 0 & 0 & 0 \\ \hline \end{tabular}$	Sulfur ß	opm	ASTM D5185(m)	760	723	723	699		
Silicon ppm ASTM D5185(m) >20 0 0 <1 Sodium ppm ASTM D5185(m) 0 0 <1 0 Potassium ppm ASTM D5185(m) >20 <1 0 0 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 >5000 1335 1246 5239 Particles >6µm ASTM D7647 >1300 236 305 1135 Particles >14µm ASTM D7647 >40 2 4 8 Particles >21µm ASTM D7647 >10 0 0 0 Particles >38µm ASTM D7647 >33 0 0 0	Lithium p	opm	ASTM D5185(m)		<1	<1	<1		
Sodium ppm ASTM D5185(m) 0 <1 0 Potassium ppm ASTM D5185(m) >20 <1	CONTAMINANT	S	method	limit/base	current	history1	history2		
Potassium ppm ASTM D5185(m) >20 <1 0 0 FLUID CLEANLINESS method limit/base current history1 history2 Particles >4µm ASTM D7647 >5000 1335 1246 5239 Particles >6µm ASTM D7647 >1300 236 305 1135 Particles >14µm ASTM D7647 >160 10 22 50 Particles >14µm ASTM D7647 >40 2 4 8 Particles >21µm ASTM D7647 >10 0 0 0 Particles >38µm ASTM D7647 >3 0 0 0	Silicon p	opm	ASTM D5185(m)	>20	0	0	<1		
FLUID CLEANLINESS method limit/base current history1 history2 Particles >4μm ASTM D7647 >5000 1335 1246 5239 Particles >6μm ASTM D7647 >1300 236 305 1135 Particles >14μm ASTM D7647 >160 10 22 50 Particles >14μm ASTM D7647 >40 2 4 8 Particles >21μm ASTM D7647 >10 0 0 0 Particles >38μm ASTM D7647 >3 0 0 0	Sodium p	opm	ASTM D5185(m)		0	<1	0		
Particles >4μm ASTM D7647 >5000 1335 1246 5239 Particles >6μm ASTM D7647 >1300 236 305 1135 Particles >14μm ASTM D7647 >160 10 22 50 Particles >14μm ASTM D7647 >40 2 4 8 Particles >21μm ASTM D7647 >10 0 0 0 Particles >38μm ASTM D7647 >3 0 0 0	Potassium p	opm	ASTM D5185(m)	>20	<1	0	0		
Particles >6μm ASTM D7647 >1300 236 305 1135 Particles >14μm ASTM D7647 >160 10 22 50 Particles >21μm ASTM D7647 >40 2 4 8 Particles >38μm ASTM D7647 >10 0 0 0 Particles >71μm ASTM D7647 >3 0 0 0	FLUID CLEANLI	NESS	method	limit/base	current	history1	history2		
Particles >14μm ASTM D7647 >160 10 22 50 Particles >21μm ASTM D7647 >40 2 4 8 Particles >38μm ASTM D7647 >10 0 0 0 Particles >71μm ASTM D7647 >3 0 0 0	Particles >4µm		ASTM D7647	>5000	1335	1246	▲ 5239		
Particles >21μm ASTM D7647 >40 2 4 8 Particles >38μm ASTM D7647 >10 0 0 0 Particles >71μm ASTM D7647 >3 0 0 0	Particles >6µm		ASTM D7647	>1300	236	305	1135		
Particles >38μm ASTM D7647 >10 0 0 0 Particles >71μm ASTM D7647 >3 0 0 0	Particles >14µm		ASTM D7647	>160	10	22	50		
Particles >71μm ASTM D7647 >3 0 0 0	Particles >21µm		ASTM D7647	>40	2	4	8		
	Particles >38µm		ASTM D7647	>10	0	0	0		
Oil Cleanliness ISO 4406 (c) >19/17/14 18/15/10 17/15/12 🔺 20/17/13	Particles >71µm		ASTM D7647	>3	0	0	0		
	Oil Cleanliness		ISO 4406 (c)	>19/17/14	18/15/10	17/15/12	2 0/17/13		



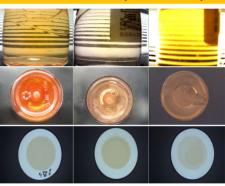
OIL ANALYSIS REPORT

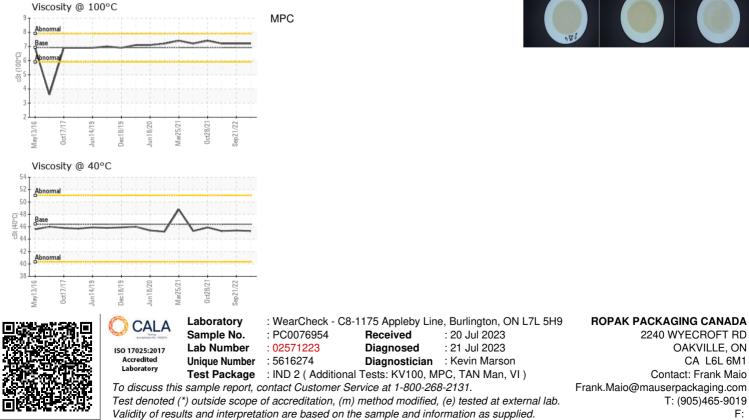
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FLUID DEGRAD	ATION	method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D974*	0.70	0.51	0.39	0.33
MPC Varnish Potential	Scale	ASTM D7843(m)*	>15	🔺 15	1 7	13
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	Visual*	NONE	NONE	NONE	NONE
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*	>0.05	NEG	NEG	NEG
Free Water	scalar	Visual*		NEG	NEG	NEG
FLUID PROPE	RTIES	method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D7279(m)	46.4	45.3	45.4	45.3
Visc @ 100°C	cSt	ASTM D7279(m)	6.92	7.2	7.2	7.2
Viscosity Index (VI)	Scale	ASTM D2270*	104	119	119	119
SAMPLE IMAG	method	limit/base	current	history1	history2	

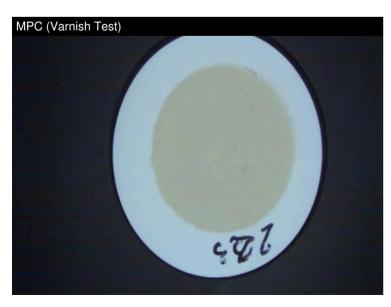




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Bottom

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Report Id: ROPOAK [WCAMIS] 02571223 (Generated: 07/21/2023 13:55:18) Rev: 1

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