

Area

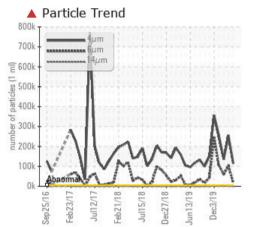
PROBLEM SUMMARY

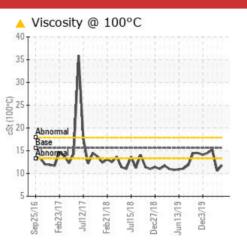
Water Injection

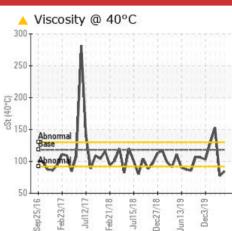
Pump - Glycol Circulation (B) (S/N Sample Tag PA-38002B) Pump

PETRO CANADA DURON HP 15W40 (7 LTR)

COMPONENT CONDITION SUMMARY







ISO

RECOMMENDATION

Check seals and/or filters for points of contaminant entry. The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather. We recommend you service the filters on this component. Resample in 30-45 days to monitor this situation.

PROBLEMATIC TEST RESULTS							
Sample Status				SEVERE	SEVERE	SEVERE	
Particles >4µm		ASTM D7647	>5000	114109	▲ 254999	▲ 135416	
Particles >6µm		ASTM D7647	>1300	a 20164	1 01822	6 1155	
Particles >14µm		ASTM D7647	>40	🔺 163	1 136	▲ 5063	
Oil Cleanliness		ISO 4406 (c)	>19/17/12	4 /22/15	▲ 25/24/17	▲ 24/23/20	
Visc @ 40°C	cSt	ASTM D7279(m)	118.2	<u> </u>	▲ 77.4	153	
Visc @ 100°C	cSt	ASTM D7279(m)	15.6	11.8	1 0.6	15.2	

Sample Rating Trend

Customer Id: TERHAM Sample No.: PC Lab Number: 02631666 Test Package: MAR 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 <u>gloria.gonzalez@wearcheck.com</u>

RECOMMEND	ED ACTIONS			
Action Change Filter	Status	Date	Done By ?	Description We recommend you service the filters on this component.
Resample			?	Resample in 30-45 days to monitor this situation.
Check Breathers			?	The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather.
Check Seals			?	Check seals and/or filters for points of contaminant entry.

HISTORICAL DIAGNOSIS

ISO

13 Mar 2024 Diag: Kevin Marson

We advise that you check all areas where contaminants can enter the system. We recommend that you drain the oil from the component if this has not already been done. We recommend you service the filters on this component. Resample in 30-45 days to monitor this situation.Copper ppm levels are abnormal. There is a high amount of particulates (2 to 100 microns in size) present in the oil. The system cleanliness code is much higher than the acceptable limit for the target ISO 4406 cleanliness code. Viscosity of sample indicates oil is within SAE 10W30 range, advise investigate. The AN level is acceptable for this fluid. The oil is no longer serviceable as a result of the abnormal and/or severe wear.



ISO

27 Jan 2020 Diag: Bill Quesnel

We advise that you check all areas where contaminants can enter the system. We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather. Resample in 30-45 days to monitor this situation.All component wear rates are normal. Particles >14 μ m are severely high. Particles >21 μ m are severely high. Particles >38 μ m are severely high. Particles >6 μ m are severely high. Particles >4 μ m are severely high. Particles >71 μ m are abnormally high. The system cleanliness code is much higher than the acceptable limit for the target ISO 4406 cleanliness code. Viscosity of sample indicates oil is within SAE 40 range, advise investigate. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.





01 Jan 2020 Diag: Kevin Marson

We advise that you check all areas where contaminants can enter the system. We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather. Resample in 30-45 days to monitor this situation.All component wear rates are normal. Particles >14 μ m are severely high. Particles >21 μ m are severely high. Particles >38 μ m are abnormally high. The system cleanliness code is much higher than the acceptable limit for the target ISO 4406 cleanliness code. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.





OIL ANALYSIS REPORT

Area Water Injection Pump - Glycol Circulation (B) (S/N Sample Tag PA-38002B) Pump

Fluid PETRO CANADA DURON HP 15W40 (7 LTR)

DIAGNOSIS

Recommendation

Check seals and/or filters for points of contaminant entry. The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather. We recommend you service the filters on this component. Resample in 30-45 days to monitor this situation.

Wear

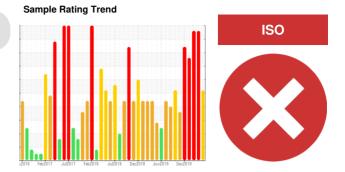
All component wear rates are normal.

Contamination

There is a high amount of silt (particulates < 14 microns in size) present in the oil. The system cleanliness code is much higher than the acceptable limit for the target ISO 4406 cleanliness code.

Fluid Condition

Viscosity of sample indicates oil is within SAE 10W30 range, advise investigate. The AN level is acceptable for this fluid. The oil is still serviceable provided that the contaminant(s) can be reduced to acceptable levels.



SAMPLE INFOR	RMATION	method	limit/base	current	history1	history2
Sample Number		Client Info		PC	PC	PC
Sample Date		Client Info		07 Apr 2024	13 Mar 2024	27 Jan 2020
Machine Age	kms	Client Info		0	0	0
Oil Age	kms	Client Info		0	0	0
Oil Changed		Client Info		N/A	N/A	N/A
Sample Status				SEVERE	SEVERE	SEVERE
CONTAMINAT	ΓΙΟΝ	method	limit/base	current	history1	history2
Water		WC Method	>.1	NEG	NEG	NEG
WEAR METAL	_S	method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185(m)	>75	6	20	2
Chromium	ppm	ASTM D5185(m)	>5	0	0	<1
Nickel	ppm	ASTM D5185(m)		0	0	0
Titanium	ppm	ASTM D5185(m)		0	<1	<1
Silver	ppm	ASTM D5185(m)		0	0	0
Aluminum	ppm	ASTM D5185(m)	>5	<1	2	<1
Lead	ppm	ASTM D5185(m)	>10	0	1	0
Copper	ppm	ASTM D5185(m)	>15	4	A 30	<1
Tin	ppm	ASTM D5185(m)		0	<1	0
Antimony	ppm	ASTM D5185(m)		0	0	<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
ADDITIVES Boron	ppm	method ASTM D5185(m)	limit/base	current	history1 2	history2
Boron	ppm ppm		0			
Boron Barium		ASTM D5185(m)	0	1	2	1
Boron Barium Molybdenum	ppm ppm	ASTM D5185(m) ASTM D5185(m)	0 0 60	1 0	2	1 <1
Boron Barium Molybdenum Manganese	ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 60	1 0 62	2 0 65	1 <1 60
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 60 0	1 0 62 0	2 0 65 0	1 <1 60 <1
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 60 0 1010	1 0 62 0 973	2 0 65 0 1002	1 <1 60 <1 983
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 60 0 1010 1070	1 0 62 0 973 1043	2 0 65 0 1002 1184	1 <1 60 <1 983 991
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 60 0 1010 1070 1150	1 0 62 0 973 1043 1034	2 0 65 0 1002 1184 1069	1 <1 60 <1 983 991 1012
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 60 0 1010 1070 1150 1270	1 0 62 0 973 1043 1034 1175	2 0 65 0 1002 1184 1069 1214	1 <1 60 <1 983 991 1012 1177
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 60 0 1010 1070 1150 1270	1 0 62 0 973 1043 1034 1175 2657	2 0 65 0 1002 1184 1069 1214 2955	1 <1 60 <1 983 991 1012 1177 2704
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 60 0 1010 1070 1150 1270 2060	1 0 62 0 973 1043 1034 1175 2657 <1	2 0 65 0 1002 1184 1069 1214 2955 <1	1 <1 60 <1 983 991 1012 1177 2704 <1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	0 0 60 1010 1070 1150 1270 2060	1 0 62 0 973 1043 1034 1175 2657 <1 current	2 0 65 0 1002 1184 1069 1214 2955 <1 history1	1 <1 60 <1 983 991 1012 1177 2704 <1 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) method ASTM D5185(m)	0 0 60 1010 1070 1150 1270 2060	1 0 62 0 973 1043 1034 1175 2657 <1 <i>current</i> 3	2 0 65 0 1002 1184 1069 1214 2955 <1 history1 4	1 <1 60 <1 983 991 1012 1177 2704 <1 history2 5
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m)	0 0 60 1010 1070 1150 1270 2060 limit/base >20	1 0 62 0 973 1043 1034 1175 2657 <1 <i>current</i> 3 2	2 0 65 0 1002 1184 1069 1214 2955 <1 history1 4 6	1 <1 60 <1 983 991 1012 1177 2704 <1 history2 5 <
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m)	0 0 60 1010 1070 1150 1270 2060 limit/base >20	1 0 62 0 973 1043 1034 1175 2657 <1 current 3 2 2 <1	2 0 65 0 1002 1184 1069 1214 2955 <1 history1 4 6 1	1 <1 60 <1 983 991 1012 1177 2704 <1 history2 5 <1 <1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEAN Particles >4µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m)	0 0 0 1010 1070 1150 1270 2060 iimit/base >20	1 0 62 0 973 1043 1034 1175 2657 <1 <i>current</i> 3 2 2 <1 <i>current</i>	2 0 65 0 1002 1184 1069 1214 2955 <1 history1 4 6 1 1	1 <1 60 <1 983 991 1012 1177 2704 <1 <1 history2 5 < <1 <1 <1 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEAN Particles >4µm Particles >6µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m)	0 0 0 1010 1070 1150 1270 2060 imit/base >20 imit/base >5000	1 0 62 0 973 1043 1034 1175 2657 <1 current 3 2 2 <1 current current 114109	2 0 65 0 1002 1184 1069 1214 2955 <1 history1 4 6 1 1 history1 ▲ 254999	1 <1 60 <1 983 991 1012 1177 2704 <1 history2 5 <1 <1 history2 ▲ 135416
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEAN Particles >4µm Particles >6µm Particles >14µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D7647 ASTM D7647 ASTM D7647	0 0 0 1010 1070 1150 1270 2060 imit/base >20 imit/base >20 imit/base >20 >20	1 0 62 0 973 1043 1034 1175 2657 <1 current 3 2657 <1 current 3 2 1 2 <1 current 114109 ▲ 114109	2 0 65 0 1002 1184 1069 1214 2955 <1 history1 4 6 1 1 history1 ↓ 254999 ▲ 101822 ▲ 1136	1 <1 60 <1 983 991 1012 1177 2704 <1 <1 <1 <1 <1 <1 <1 <1 <1 <1
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEAN Particles >4µm Particles >6µm Particles >14µm Particles >21µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D7647 ASTM D7647 ASTM D7647 ASTM D7647	0 0 0 1010 1070 1150 1270 2060 imit/base >20 imit/base >20 imit/base >20 >20	1 0 62 0 973 1043 1034 1175 2657 <1 current 3 2 57 <1 current ▲ 114109 ▲ 20164 ▲ 163 ● 19	2 0 65 1002 1184 1069 1214 2955 <1 history1 4 6 1 history1 4 5 254999 101822 101822 1136	1 <1 60 <1 983 991 1012 1177 2704 <1 ×1 bistory2 5 <1 <1 ×1 ×1 ×1 ×1 ×1 ×1 ×1 ×1 ×1 ×
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEAN Particles >4µm Particles >6µm Particles >21µm Particles >38µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D7647 ASTM D7647 ASTM D7647 ASTM D7647	0 0 0 1010 1070 1150 1270 2060 2060 200 200 200 200 200 200 200	1 0 62 0 973 1043 1034 1175 2657 <1 current 3 2657 <1 current 3 2 1 2 <1 current 114109 ▲ 114109	2 0 65 0 1002 1184 1069 1214 2955 <1 history1 4 6 1 1 history1 ↓ 254999 ▲ 101822 ▲ 1136	1 <1 60 <1 983 991 1012 1177 2704 <1 ×1 5 <1 ×1 ×1 ×1 ×1 ×1 ×1 ×1 ×1 ×1 ×
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEAN Particles >4µm Particles >14µm Particles >21µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D7647 ASTM D7647 ASTM D7647 ASTM D7647	0 0 0 1010 1070 1150 1270 2060 imit/base >20 imit/base >20 imit/base >20 >20 >1300 >40 >10	1 0 62 0 973 1043 1034 1175 2657 <1 Current 3 2 57 <1 Current 3 2 <1 Current 1 4 114109 ▲ 20164 ▲ 163 ● 19 2	2 0 65 0 1002 1184 1069 1214 2955 <1 i kistory1 4 6 6 1 1 kistory1 ▲ 254999 ▲ 101822 ▲ 1136 ▲ 229 ▲ 12	1 <1 60 <1 983 991 1012 1177 2704 <1 ×1 bistory2 5 <1 <1 ×1 ×1 ×1 ×1 ×1 ×1 ×1 ×1 ×1 ×



Particle Count

491,520 122,880

Ê 30,720

7 68

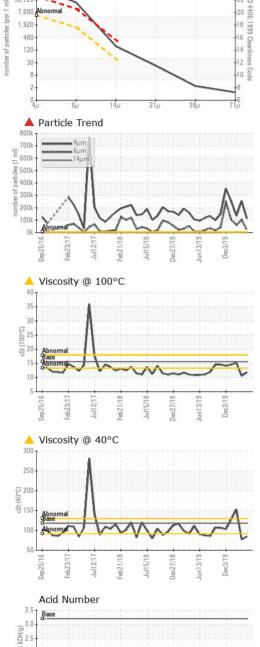
1.92

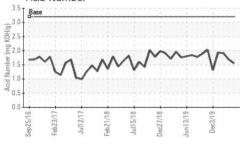
OIL ANALYSIS REPORT

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22 8

FLUID DEGRAD	DATION	method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D974*	3.2	1.55	1.69	1.91
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	VLITE	NONE
Sand/Dirt	scalar	Visual*	NONE	NONE	VLITE	NONE
Appearance	scalar	Visual*	NORML	NORML	NORML	HAZY
Odor	scalar	Visual*	NORML	NORML	NORML	NORML
Emulsified Water	scalar	Visual*	>.1	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)	118.2	A 84.5	A 77.4	153
Visc @ 100°C	cSt	ASTM D7279(m)	15.6	<u> </u>	1 0.6	15.2
Viscosity Index (VI)	Scale	ASTM D2270*	139	132	122	9 9
SAMPLE IMAG	iES	method	limit/base	current	history1	history2
Color						
Bottom						





Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 CALA Received : 26 Apr 2024 Sample No. : PC Lab Number : 02631666 Tested : 30 Apr 2024 ISO 17025:2017 Accredited Laboratory Unique Number : 5772819 Diagnosed : 30 Apr 2024 - Kevin Marson Test Package : MAR 2 (Additional Tests: KV100, PrtCount, TAN MAN, VI) To discuss this sample report, contact Customer Service at 1-800-268-2131. Test denoted (*) outside scope of accreditation, (m) method modified, (e) tested at external lab. Validity of results and interpretation are based on the sample and information as supplied.

Suncor - Terra Nova Projects

Scotia Centre, 235 Water Strret St. John`s, NL CA A1C 1B6 Contact: Josh Hynes joshynes@suncor.com T: (709)778-3575 F: (709)724-2835

Report Id: TERHAM [WCAMIS] 02631666 (Generated: 04/30/2024 07:13:38) Rev: 1

Contact/Location: Josh Hynes - TERHAM

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