

Analysis Report

Component Information		Sample Information	Customer Information
Machine Type:	Industrial Gear	Received: 03/07/2022	Lake Rd Plant
Lubricant:	PETRO-CANADA/Turboflo R&O 220	Report: 03/07/2022	20338 Progress Drive Strongsville, OH 4414
Machine MFG:	FALK	Sample No.: 3079 - 2 - 14 - 11	Contact: Jack Boilerman
Machine MOD:	2040F 2A	Analyst/Test: ETR / AFDATPCKF	

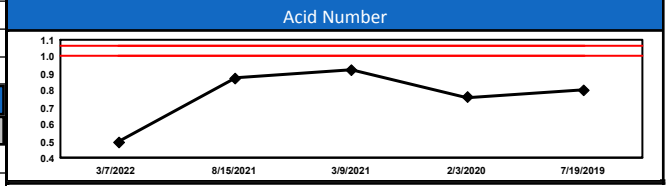
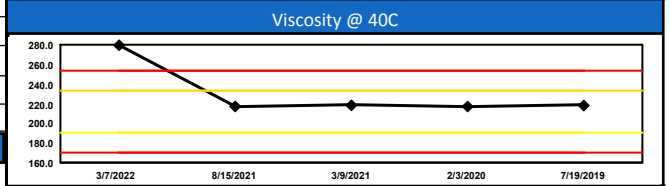
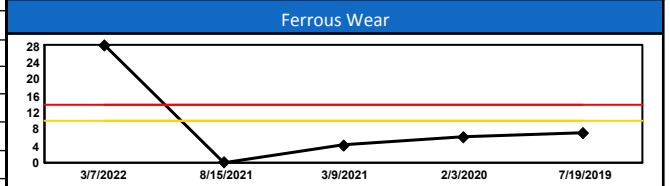
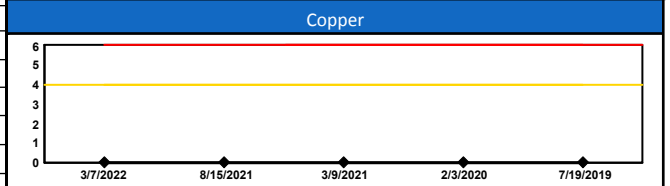
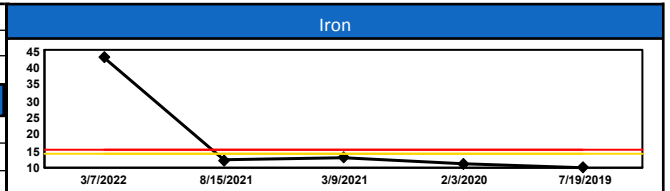
PROBLEMS
High Viscosity 40C
Excessive Wear
High Ferrous Wear

COMMENTS The viscosity (279.6 cSt) is higher than expected for PETRO-CANADA-Turboflo R&O 220 and considered abnormal. The viscosity specification for this lubricant is 211.7 cSt. Typical causes for higher than expected viscosity are: wrong lubricant indicated, contamination with another product and lubricant degradation. The high level of wear (iron) and elevated ferrous wear concentration suggest that an abnormal wear mode exists. Check this gearbox for excessive noise, vibration or high temperature.

CUSTOMER NOTES

Date Sampled	NEW OIL	03/07/2022	8/15/2021	3/9/2021	2/3/2020	7/19/2019
Lab No	1253777	2478243	2338228	2178020	1875930	1737535
Machine / Lube Cond.		M / C	N / N	N / N	N / N	N / N

ELEMENTAL SPECTROSCOPY (ppm) ASTM D5185 Mod (-) indicates below detection limit							
Wear Metals	Iron	-	43	12	13	11	10
	Copper	-	-	-	-	-	-
	Lead	-	-	-	-	-	-
	Aluminum	-	2	-	-	-	-
	Tin	-	-	-	-	-	-
	Nickel	-	-	-	-	-	-
	Chromium	-	-	-	-	-	-
	Titanium	-	-	-	-	-	-
	Vanadium	-	-	-	-	-	-
Additives	Calcium	-	7	2	-	2	-
	Magnesium	-	-	-	-	-	-
	Phosphorus	-	261	299	325	325	299
	Zinc	-	12	-	3	4	-
	Barium	-	-	-	-	-	-
	Molybdenum	-	-	-	-	-	-
Contaminants	Silicon	-	23	12	12	11	11
	Boron	-	14	48	68	72	54
	Lithium	-	-	-	-	-	-
	Sodium	-	-	-	-	-	-
	Potassium	-	-	-	-	-	-



FTIR SPECTROSCOPY (Indexing Numbers) ASTM E2412							
Oxidation	2	3	9	11	12	11	
Nitration	2	4	2	3	3	3	
Anti Wear	8	10	10	12	11	10	
Other Fluid	39	44	43	43	42	41	

PARTICLE COUNT (particles per ml) ISO 4406:99							
Pore Block Particle Count Alarm Limits Marginal (24/22/20)							
Pore Block ISO Code		19/18/14	21/20/16	19/17/13	17/16/12	19/17/14	
>4 Micron		4867	14972	2633	1149	2873	
>6 Micron		1892	5822	1024	446	1117	
>14 Micron		144	444	78	34	85	
>50 Micron		6	19	3	1	3	
>100 Micron		0	1	0	0	0	

VISCOSITY (centistokes) ASTM D445 MOD							
Viscosity@40°C	215.2	279.6	217.2	218.3	217.1	218.1	

ACID NUMBER (mg KOH/g) ASTM D974 MOD							
Acid Number	0.13	0.49	0.87	0.92	0.76	0.80	

WATER (%) a-ASTM D6304C b-IWI-134* c-Crackle d-IWI-135* e-IWI-370*							
Water		0.0013 (a)	0.0239 (a)	0.0103 (a)	0.0150 (a)	0.0216 (a)	

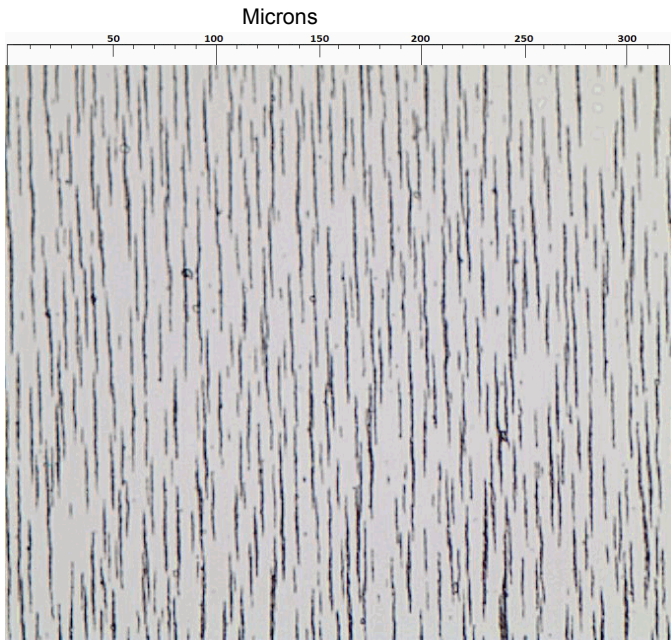
FERROUS WEAR CONCENTRATION (ppm)							
Ferrous Wear		28	0	4	6	7	

Testing performed by Eurofins TestOil. This test is accredited under the laboratory's ISO/IEC 17025 accreditation issued by the ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation L2221. (e) - Estimated sample date. (*) - Not in scope of accreditation. ABC Company assumes sole responsibility for the application of and reliance upon results and recommendations reported by Eurofins TestOil, whose obligation is limited to good faith performance.

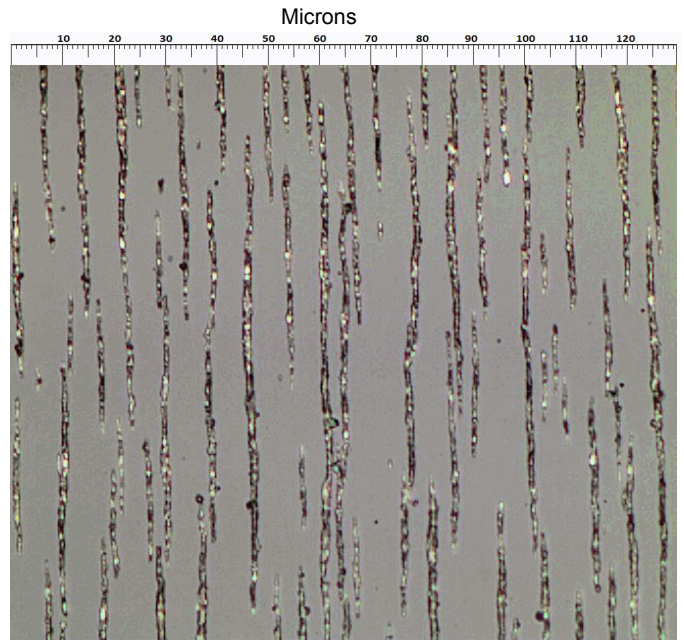
Wear Particle Analysis Report

	Trace	Light	Moderate	Heavy	Max. Size	Particle Composition
Rubbing Wear					<5	Ferrous, White Non-Ferrous
Rolling Contact						
Sliding Wear						
Rolling/Sliding Wear						
Cutting Wear						
Chunks						
Spheres						
Corrosion						
Dark Metallic Oxides						
Red Oxides						
Dust/Dirt						
Other Contaminants						
Oxidation By-Products						

Observations: Analytical ferrography did not detect abnormal particles for this sample.



200x Rubbing wear and dust/dirt.



500x Rubbing wear and dust/dirt.

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