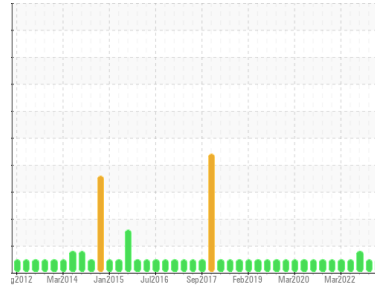




OIL ANALYSIS REPORT

Sample Rating Trend



NORMAL



Area
System 45 - Fire Water
 Machine Id
Z-4501A Diesel Engine Lube Oil
 Component
Diesel Engine
 Fluid
IRVING IDO UNIVERSAL SAE 15W40 (180 LTR)

DIAGNOSIS

Recommendation

Resample at the next service interval to monitor.

Wear

All component wear rates are normal. The ferrography results are normal indicating no abnormal wear in the system.

Contaminants

The water content is negligible. There is no indication of any contamination in the oil.

Oil Condition

The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

SAMPLE INFORMATION

method	limit/base	current	history1	history2
Sample Number	Client Info	PP	PP	PP
Sample Date	Client Info	10 Dec 2023	31 Aug 2023	27 Sep 2022
Machine Age	hrs Client Info	0	0	0
Oil Age	hrs Client Info	0	0	0
Oil Changed	Client Info	N/A	N/A	N/A
Sample Status		NORMAL	NORMAL	MARGINAL

CONTAMINATION

method	limit/base	current	history1	history2
Fuel	WC Method >5	<1.0	<1.0	<1.0
Glycol	WC Method	NEG	NEG	NEG

WEAR METALS

method	limit/base	current	history1	history2
PQ	ASTM D8184*	0	0	0
Iron	ppm ASTM D5185(m) >100	5	5	5
Chromium	ppm ASTM D5185(m) >20	0	<1	0
Nickel	ppm ASTM D5185(m) >4	<1	0	<1
Titanium	ppm ASTM D5185(m)	0	0	0
Silver	ppm ASTM D5185(m) >3	<1	0	▲ 3
Aluminum	ppm ASTM D5185(m) >20	2	2	2
Lead	ppm ASTM D5185(m) >40	8	7	2
Copper	ppm ASTM D5185(m) >330	8	7	8
Tin	ppm ASTM D5185(m) >15	<1	<1	<1
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)	63	64	65
Barium	ppm ASTM D5185(m)	<1	0	0
Molybdenum	ppm ASTM D5185(m)	6	6	6
Manganese	ppm ASTM D5185(m)	0	0	<1
Magnesium	ppm ASTM D5185(m)	23	25	23
Calcium	ppm ASTM D5185(m)	2207	2191	2250
Phosphorus	ppm ASTM D5185(m)	999	1065	1084
Zinc	ppm ASTM D5185(m) 1300	1151	1159	1149
Sulfur	ppm ASTM D5185(m)	3254	3325	3373
Lithium	ppm ASTM D5185(m)	<1	<1	<1

CONTAMINANTS

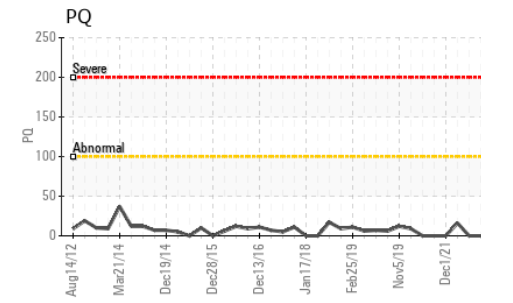
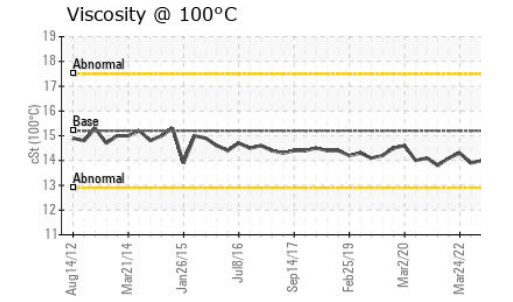
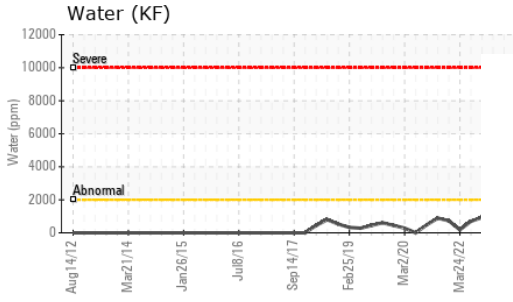
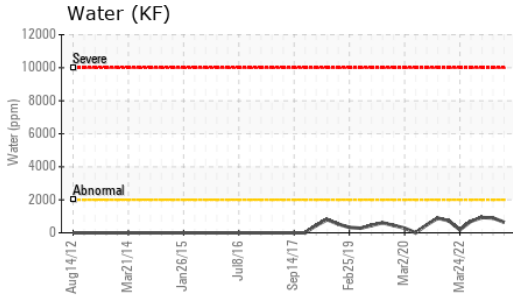
method	limit/base	current	history1	history2
Silicon	ppm ASTM D5185(m) >25	3	4	4
Sodium	ppm ASTM D5185(m)	9	10	10
Potassium	ppm ASTM D5185(m) >20	0	1	1
Water	% ASTM D6304* >0.2	0.063	0.089	0.092
ppm Water	ppm ASTM D6304* >2000	639	899.9	927.8

INFRA-RED

method	limit/base	current	history1	history2
Soot %	% ASTM D7844* >3	0.1	0.1	0
Nitration	Abs/cm ASTM D7624* >20	9.5	9.5	9.6
Sulfation	Abs./1mm ASTM D7415* >30	18.5	18.4	18.9



OIL ANALYSIS REPORT

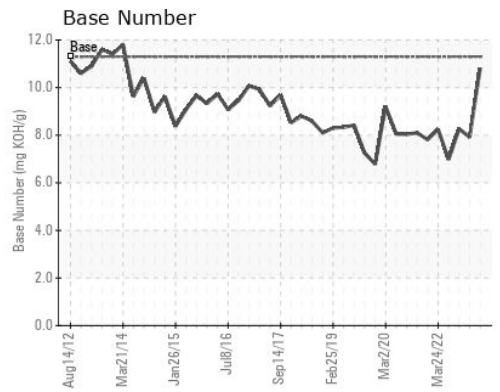
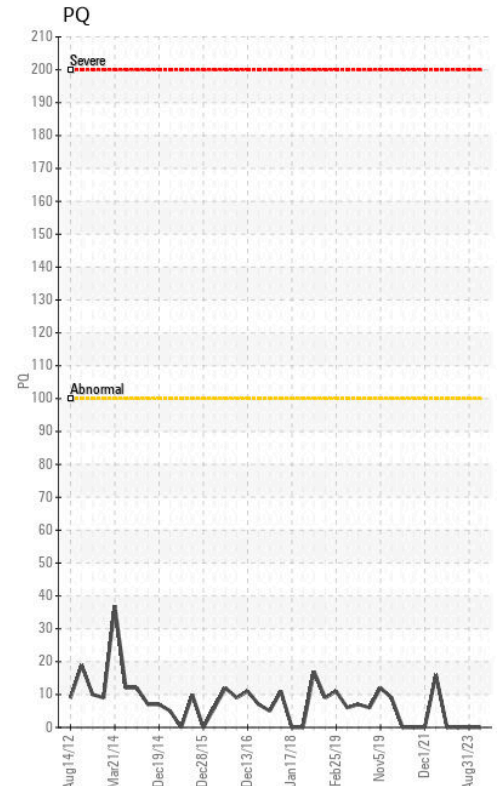
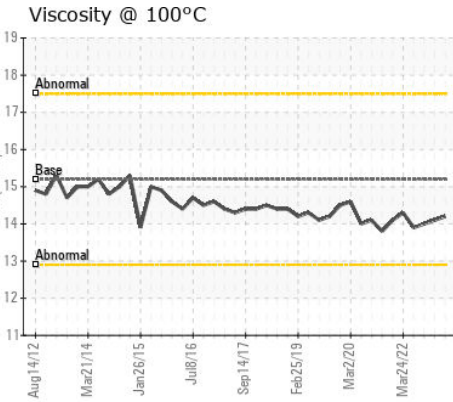
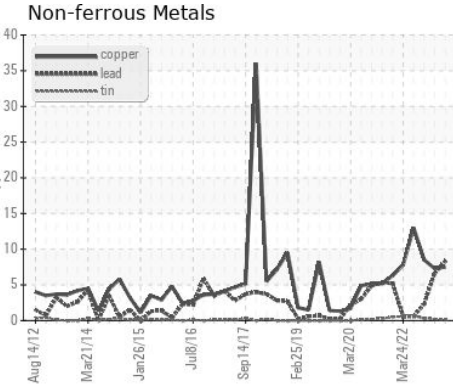
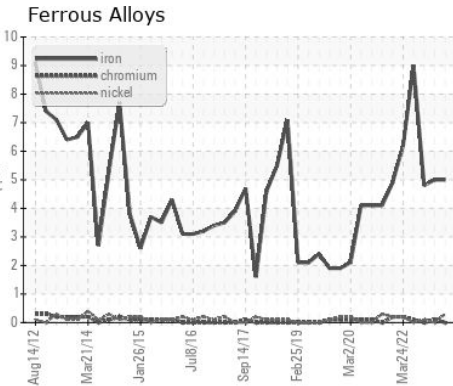


FLUID DEGRADATION	method	limit/base	current	history1	history2	
Oxidation	Abs./1mm	ASTM D7414*	>25	14.3	14.2	14.8
Base Number (BN)	mg KOH/g	ASTM D2896*	11.3	10.81	7.91	8.27

VISUAL	method	limit/base	current	history1	history2	
Emulsified Water	scalar	Visual*	>0.2	NEG	NEG	NEG
Free Water	scalar	Visual*		NEG	NEG	NEG

FLUID PROPERTIES	method	limit/base	current	history1	history2	
Visc @ 100°C	cSt	ASTM D7279(m)	15.2	14.2	14.1	14.0

GRAPHS

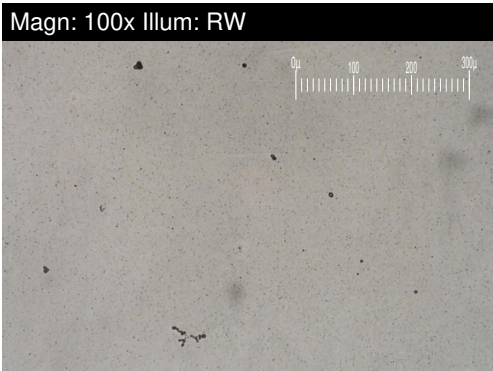
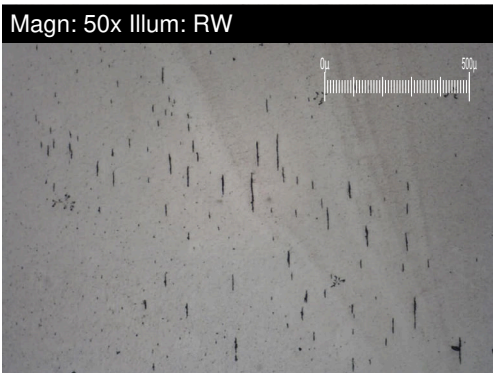
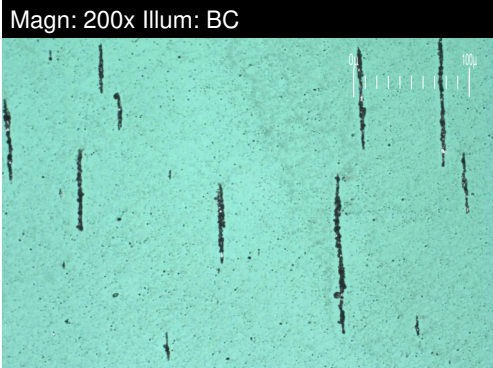


Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9 **HIBERNIA MGMT & DEVELOPMENT CO. LTD**
Sample No. : PP **Received** : 15 Dec 2023 **SUITE 1000,, 100 NEW GOWER STREET**
Lab Number : 02603372 **Diagnosed** : 20 Dec 2023 **ST.JOHNS, NL**
Unique Number : 5696457 **Diagnostician** : Kevin Marson **CA A1C 6K3**
Test Package : MAR 3 (Additional Tests: KF)
 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.



FERROGRAPHY REPORT

Area
System 45 - Fire Water
 Machine Id
Z-4501A Diesel Engine Lube Oil
 Component
Diesel Engine
 Fluid
IRVING IDO UNIVERSAL SAE 15W40 (180 LTR)

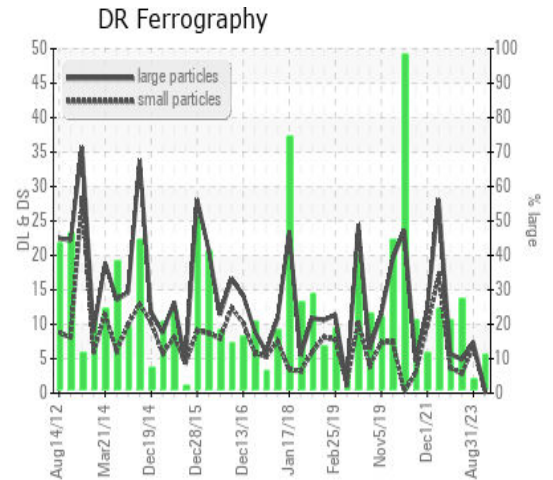


DR-FERROGRAPHY		method	limit/base	current	history1	history2
Large Particles		DR-Ferr*		0.5	7.4	4.9
Small Particles		DR-Ferr*		0.4	6.8	2.8
Total Particles		DR-Ferr*	>---	0.9	14.2	7.7
Large Particles Percentage	%	DR-Ferr*		11.1	4.2	27.3
Severity Index		DR-Ferr*		0	4	10

FERROGRAPHY		method	limit/base	current	history1	history2
Ferrous Rubbing	Scale 0-10	ASTM D7684*		3	2	2
Ferrous Sliding	Scale 0-10	ASTM D7684*				
Ferrous Cutting	Scale 0-10	ASTM D7684*				
Ferrous Rolling	Scale 0-10	ASTM D7684*		1	1	1
Ferrous Break-in	Scale 0-10	ASTM D7684*				
Ferrous Spheres	Scale 0-10	ASTM D7684*				
Ferrous Black Oxides	Scale 0-10	ASTM D7684*		1	1	
Ferrous Red Oxides	Scale 0-10	ASTM D7684*				
Ferrous Corrosive	Scale 0-10	ASTM D7684*				1
Ferrous Other	Scale 0-10	ASTM D7684*				
Nonferrous Rubbing	Scale 0-10	ASTM D7684*				
Nonferrous Sliding	Scale 0-10	ASTM D7684*				
Nonferrous Cutting	Scale 0-10	ASTM D7684*				
Nonferrous Rolling	Scale 0-10	ASTM D7684*				
Nonferrous Other	Scale 0-10	ASTM D7684*				
Carbonaceous Material	Scale 0-10	ASTM D7684*			1	2
Lubricant Degradation	Scale 0-10	ASTM D7684*				
Sand/Dirt	Scale 0-10	ASTM D7684*		1	1	1
Fibres	Scale 0-10	ASTM D7684*				
Spheres	Scale 0-10	ASTM D7684*				
Other	Scale 0-10	ASTM D7684*		2	1	

WEAR

All component wear rates are normal.
 The ferrography results are normal indicating no abnormal wear in the system.



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