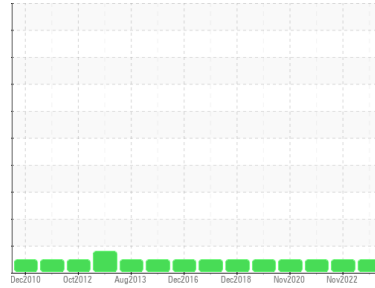




OIL ANALYSIS REPORT

Sample Rating Trend

NORMAL



Area
MATTE PROCESSING/SEPARATION
 Machine Id
3B BALL MILL (5120) (S/N 62-52-000-732)
 Component
Gearbox
 Fluid
SHELL OMALA 320 (80 LTR)

DIAGNOSIS

Recommendation

Confirm the source of the lubricant being utilized for top-up/fill. Resample at the next service interval to monitor. The fluid was specified as SHELL OMALA 320, however, a fluid match indicates that this fluid is ISO 320 Synthetic (PAO) Gear Oil. Please confirm the oil type and grade on your next sample.

Wear

All component wear rates are normal.

Contamination

There is no indication of any contamination in the oil.

Fluid Condition

Additive levels indicate the addition of a different brand, or type of oil. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

SAMPLE INFORMATION		method	limit/base	current	history1	history2
Sample Number	Client Info			WC0530926	WC0623776	WC0623772
Sample Date	Client Info			28 Nov 2023	24 Nov 2022	29 Nov 2021
Machine Age	yrs	Client Info		0	0	0
Oil Age	yrs	Client Info		0	0	0
Oil Changed	Client Info			Changed	Changed	Changed
Sample Status				NORMAL	NORMAL	NORMAL

CONTAMINATION		method	limit/base	current	history1	history2
Water	WC Method		>0.2	NEG	NEG	NEG

WEAR METALS		method	limit/base	current	history1	history2
PQ		ASTM D8184*		0	0	0
Iron	ppm	ASTM D5185(m)	>200	9	5	20
Chromium	ppm	ASTM D5185(m)	>15	0	0	<1
Nickel	ppm	ASTM D5185(m)	>15	<1	<1	2
Titanium	ppm	ASTM D5185(m)		0	0	0
Silver	ppm	ASTM D5185(m)		<1	0	0
Aluminum	ppm	ASTM D5185(m)	>25	0	<1	<1
Lead	ppm	ASTM D5185(m)	>100	<1	<1	<1
Copper	ppm	ASTM D5185(m)	>200	<1	<1	3
Tin	ppm	ASTM D5185(m)	>25	0	0	0
Antimony	ppm	ASTM D5185(m)	>5	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

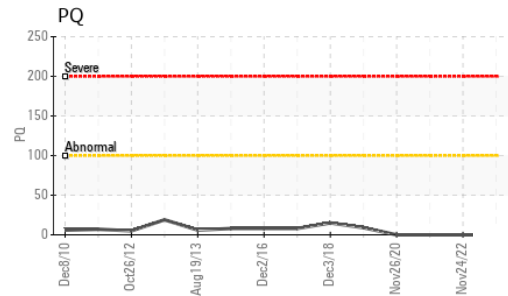
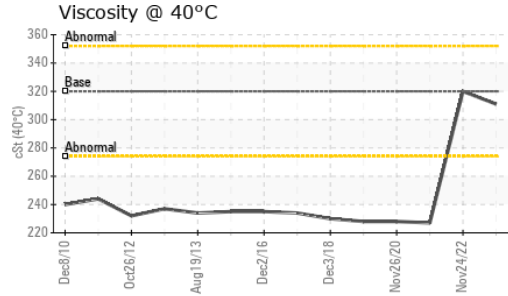
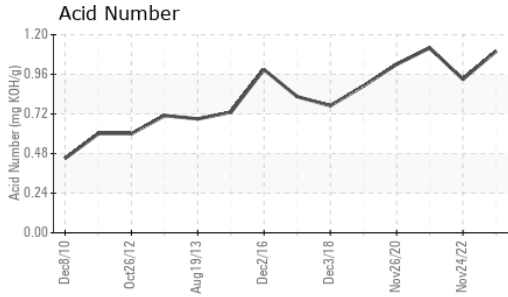
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185(m)	5.5	21	25	7
Barium	ppm	ASTM D5185(m)	0.4	<1	0	0
Molybdenum	ppm	ASTM D5185(m)	0.5	0	0	0
Manganese	ppm	ASTM D5185(m)		0	0	<1
Magnesium	ppm	ASTM D5185(m)	23	0	0	0
Calcium	ppm	ASTM D5185(m)	13	<1	0	2
Phosphorus	ppm	ASTM D5185(m)	450	384	444	327
Zinc	ppm	ASTM D5185(m)	9.9	3	2	10
Sulfur	ppm	ASTM D5185(m)	8181	4316	4669	4292
Lithium	ppm	ASTM D5185(m)		<1	<1	<1

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185(m)	>50	<1	1	<1
Sodium	ppm	ASTM D5185(m)		<1	<1	<1
Potassium	ppm	ASTM D5185(m)	>20	0	0	<1

FLUID DEGRADATION		method	limit/base	current	history1	history2
Acid Number (AN)	mg KOH/g	ASTM D974*		1.10	0.93	1.12



OIL ANALYSIS REPORT

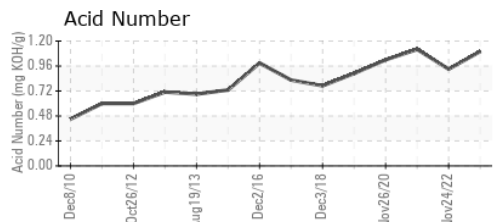
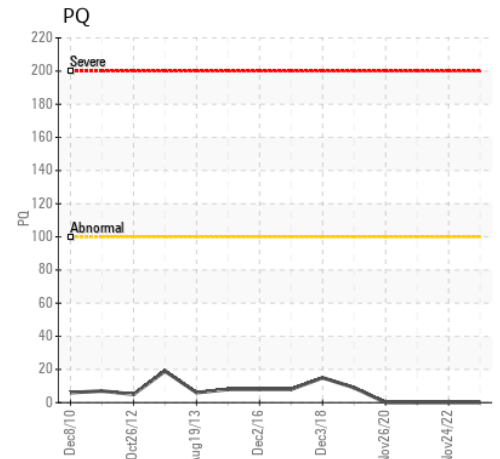
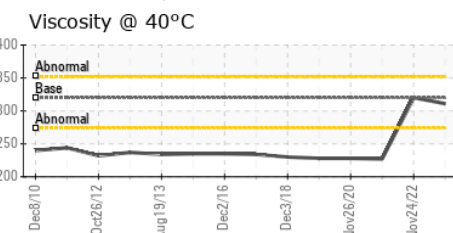
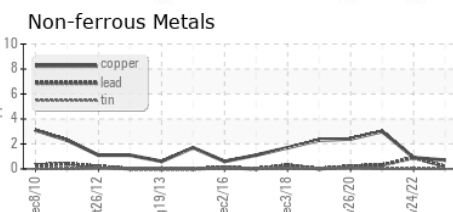
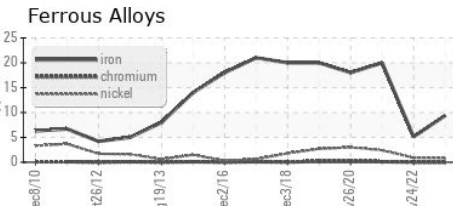


VISUAL	method	limit/base	current	history1	history2
White Metal	scalar	Visual*	NONE	NONE	VLITE
Yellow Metal	scalar	Visual*	NONE	NONE	NONE
Precipitate	scalar	Visual*	NONE	NONE	NONE
Silt	scalar	Visual*	NONE	NONE	NONE
Debris	scalar	Visual*	NONE	NONE	VLITE
Sand/Dirt	scalar	Visual*	NONE	NONE	NONE
Appearance	scalar	Visual*	NORML	NORML	NORML
Odor	scalar	Visual*	NORML	NORML	NORML
Emulsified Water	scalar	Visual*	>0.2	NEG	NEG
Free Water	scalar	Visual*		NEG	NEG

FLUID PROPERTIES	method	limit/base	current	history1	history2
Visc @ 40°C	cSt	ASTM D7279(m)	320	311	320

SAMPLE IMAGES	method	limit/base	current	history1	history2
Color					
Bottom					

GRAPHS



Laboratory : WearCheck - C8-1175 Appleby Line, Burlington, ON L7L 5H9
Sample No. : WC0530926 **Received** : 07 Dec 2023
Lab Number : 02601691 **Diagnosed** : 08 Dec 2023
Unique Number : 5694776 **Diagnostician** : Kevin Marson
Test Package : IND 2 (Additional Tests: TAN Man)

Vale - Copper Cliff Smelter
 COPPER CLIFF SMELTER WAREHOUSE, 155 BALSAM ST.
 COPPER CLIFF, ON
 CA P0M 1N0
 Contact: Andy Kozachanko
 andrew.kozachanko@vale.com
 T: (705)682-6687
 F: (705)682-6939

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.