

# LABORATORY ANALYSIS



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**COPELAND (MHDS)**  
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Department **WINDING**  
Equipment No. **INSE0102 COIL INSERTER-PRINCIPAL (00026)**  
System **Hydraulic System**  
Oil Type **ENGINEERED LUBRICANTS ENLUBE 20-AW (--- GAL)**

## Diagnosis

We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. We recommend an early resample to monitor this condition. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample. L, % large particles, severity index and wpc levels are severe. There is a moderate amount of particulates (2 to 100 microns in size) present in the oil. The system cleanliness is above the acceptable limit for the target ISO 4406 cleanliness code. The oil is no longer serviceable as a result of the abnormal and/or severe wear.

## Sample Information

Lab Number	New	<b>2405-00143</b>	2312-00758	2308-01092
Date of Sample	(Typical)	<b>28 Apr 2024</b>	14 Dec 2023	14 Aug 2023
Oil Added		<b>UNK</b>	UNK	UNK
Last Drain Date		--	--	--
Last Filter Service		--	--	--
Sample Point		---	---	---
Sample Status		<b>SEVERE</b>	ABNORMAL	ABNORMAL

## VISCOSITY @ 100F or 40C (ASTM D-445)

SSU Vis. @ 100F	SSU	<b>239.5</b>	239.1	237.5
cSt Vis. @ 40C	cSt	46	46.30	46.0

## COLOR (BASED ON ASTM D1500 STANDARDS)

Color	Scale 0-8	<b>1.5</b>	1.5	1.5
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## PARTICLE COUNT (PER 1ML)

ISO CODE	ISO 4406(c)	>19/18/14	<b>22/20/16</b>	20/17/13	21/18/14
4 Micron & Larger	particles/ml	>5000	<b>▲ 23,462</b>	▲ 7,682	▲ 16,580
6 Micron & Larger	particles/ml	>2500	<b>▲ 6,055</b>	■ 1,157	■ 2,127
14 Micron & Larger	particles/ml	>160	<b>▲ 627</b>	■ 60	■ 90
21 Micron & Larger	particles/ml	>40	<b>▲ 227</b>	■ 15	■ 22
38 Micron & Larger	particles/ml	>10	<b>▲ 27</b>	■ 0	■ 1
70 Micron & Larger	particles/ml	>3	<b>2</b>	■ 0	■ 0

## ICP - OILS (REPORTED IN PARTS PER MILLION)

Aluminum (Al)	ppm	<b>&lt;5</b>	<5	<5
Antimony (Sb)	ppm	<b>&lt;5</b>	<5	<5
Cadmium (Cd)	ppm	<b>&lt;5</b>	<5	<5
Chromium (Cr)	ppm	<b>&lt;5</b>	<5	<5
Cobalt (Co)	ppm	<b>&lt;5</b>	<5	<5
Copper (Cu)	ppm	<b>■ 6</b>	■ <5	■ <5
Iron (Fe)	ppm	<b>■ &lt;5</b>	■ <5	■ <5
Lead (Pb)	ppm	<b>&lt;5</b>	<5	<5
Manganese (Mn)	ppm	<b>&lt;5</b>	<5	<5
Molybdenum(Mo)	ppm	<b>&lt;5</b>	<5	<5
Nickel (Ni)	ppm	<b>&lt;5</b>	<5	<5
Silver (Ag)	ppm	<b>&lt;5</b>	<5	5
Tin (Sn)	ppm	<b>&lt;5</b>	<5	<5
Titanium (Ti)	ppm	<b>&lt;5</b>	<5	<5
Vanadium (V)	ppm	<b>&lt;5</b>	<5	<5
Barium (Ba)	ppm	<b>&lt;5</b>	<5	<5
Boron (B)	ppm	<b>&lt;5</b>	<5	<5
Calcium (Ca)	ppm	<b>72</b>	76	75
Magnesium (Mg)	ppm	<b>&lt;5</b>	<5	<5
Phosphorus(P)	ppm	<b>491</b>	522	510
Silicon (Si)	ppm	<b>&lt;5</b>	<5	<5
Zinc (Zn)	ppm	715	<b>■ 590</b>	■ 624
Sulfur (S)	ppm	<b>1,430</b>	1,560	1,450

Customer Id: MOTMCA  
Sample No.: EN24050143  
Lab Number: 24050143  
Test Package: TEST

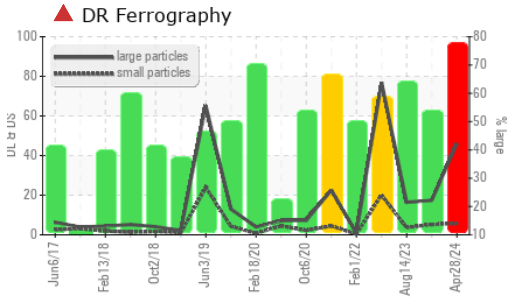


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# OIL ANALYSIS REPORT



### DR FERROGRAPHY READINGS

L		▲ <b>46.0</b>	■ 17.4	■ 16.4
S		■ <b>5.7</b>	■ 5.2	■ 3.6
WPC	DL + DS	▲ <b>51.7</b>	■ 22.6	■ 20

### Contamination

Water	>0.05	<b>NEG</b>	NEG	NEG
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