

# WEAR SEVERE CONTAMINATION SEVERE FLUID CONDITION NORMAL

#### Machine Id LIEBHERR 31229 Component Left Final Drive Fluid GEAR OIL SAE 80W90 (--- QTS)

## RECOMMENDATION

We advise that you check all areas where dirt can enter the system. Oil and filter change at the time of sampling has been noted. We advise that you inspect for the source(s) of wear. We recommend an early resample to monitor this condition.

**WEAR** 

Bearing and/or gear wear is indicated.

#### CONTAMINATION

Elemental levels of silicon (Si) and aluminum (Al) indicate aluminasilicate (coarse dirt) ingress.

## FLUID CONDITION

The oil is no longer serviceable due to the presence of contaminants.

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		WC0924404	WC0846551	WC0846479
Sample Date		Client Info		23 May 2024	29 Sep 2023	29 Sep 2023
Machine Age	hrs	Client Info		11435	0	0
Oil Age	hrs	Client Info		750	58	58
Filter Age	hrs	Client Info		750	58	58
Oil Changed		Client Info		Changed	Changed	N/A
Filter Changed		Client Info		Changed	Changed	N/A
Sample Status				SEVERE	ABNORMAL	SEVERE
		40TH DE405			070	
Iron	ppm	ASTM D5185m	>500	▲ 1643	▲ 678	▲ 1145
Chromium	ppm	ASTM D5185m	>10	A 26	▲ 11 0	
Nickel	ppm	ASTM D5185m	>10	6	2	4
Titanium	ppm	ASTM D5185m		6	<1	4
Sliver	ppm		05	0	10	
Aluminum	ppm	ASTM D5185m	>25	0108	16	/5
Lead	ppm	ASTM D5185m	>25	1	<1	< 1
Copper	ppm	ASTM D5185m	>50	<u> </u>	5	28
lin	ppm	ASTM D5185m	>10	3	<1	2
Vanadium	ppm	ASTM D5185m	NONE	<1	0	<1
White Metal	scalar	^Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	^Visual	NONE	NONE	NONE	NONE
Silicon	ppm	ASTM D5185m	>75	<b>4</b> 94	51	▲ 330
Silicon Potassium	ppm ppm	ASTM D5185m ASTM D5185m	>75 >20	▲ 494 29	51 3	▲ 330 19
Silicon Potassium Water	ppm ppm	ASTM D5185m ASTM D5185m WC Method	>75 >20 >0.2	▲ 494 29 NEG	51 3 NEG	▲ 330 19 NEG
Silicon Potassium Water Silt	ppm ppm scalar	ASTM D5185m ASTM D5185m WC Method *Visual	>75 >20 >0.2 NONE	<ul> <li>494</li> <li>29</li> <li>NEG</li> <li>NONE</li> </ul>	51 3 NEG NONE	<ul> <li>330</li> <li>19</li> <li>NEG</li> <li>NONE</li> </ul>
Silicon Potassium Water Silt Debris	ppm ppm scalar scalar	ASTM D5185m ASTM D5185m WC Method *Visual *Visual	>75 >20 >0.2 NONE NONE	<ul> <li>494</li> <li>29</li> <li>NEG</li> <li>NONE</li> <li>NONE</li> </ul>	51 3 NEG NONE LIGHT	<ul> <li>330</li> <li>19</li> <li>NEG</li> <li>NONE</li> <li>LIGHT</li> </ul>
Silicon Potassium Water Silt Debris Sand/Dirt	ppm ppm scalar scalar scalar	ASTM D5185m ASTM D5185m WC Method *Visual *Visual *Visual	>75 >20 >0.2 NONE NONE NONE	<ul> <li>494</li> <li>29</li> <li>NEG</li> <li>NONE</li> <li>NONE</li> <li>NONE</li> </ul>	51 3 NEG NONE LIGHT NONE	<ul> <li>330</li> <li>19</li> <li>NEG</li> <li>NONE</li> <li>LIGHT</li> <li>NONE</li> </ul>
Silicon Potassium Water Silt Debris Sand/Dirt Appearance	ppm ppm scalar scalar scalar scalar	ASTM D5185m ASTM D5185m WC Method *Visual *Visual *Visual *Visual	>75 >20 >0.2 NONE NONE NORE	<ul> <li>494</li> <li>29</li> <li>NEG</li> <li>NONE</li> <li>NONE</li> <li>NORML</li> </ul>	51 3 NEG NONE LIGHT NONE NORML	<ul> <li>330</li> <li>19</li> <li>NEG</li> <li>NONE</li> <li>LIGHT</li> <li>NONE</li> <li>NORML</li> </ul>
Silicon Potassium Water Silt Debris Sand/Dirt Appearance Odor	ppm ppm scalar scalar scalar scalar scalar	ASTM D5185m ASTM D5185m WC Method *Visual *Visual *Visual *Visual *Visual	>75 >20 >0.2 NONE NONE NONE NORML NORML	<ul> <li>494</li> <li>29</li> <li>NEG</li> <li>NONE</li> <li>NONE</li> <li>NORE</li> <li>NORML</li> <li>NORML</li> </ul>	51 3 NEG NONE LIGHT NONE NORML NORML	<ul> <li>330</li> <li>19</li> <li>NEG</li> <li>NONE</li> <li>LIGHT</li> <li>NORML</li> <li>NORML</li> </ul>
Silicon Potassium Water Silt Debris Sand/Dirt Appearance Odor Emulsified Water	ppm ppm scalar scalar scalar scalar scalar scalar	ASTM D5185m ASTM D5185m WC Method *Visual *Visual *Visual *Visual *Visual *Visual	>75 >20 >0.2 NONE NONE NONE NORML >0.2	<ul> <li>494</li> <li>29</li> <li>NEG</li> <li>NONE</li> <li>NONE</li> <li>NORML</li> <li>NEG</li> </ul>	51 3 NEG NONE LIGHT NONE NORML NORML NEG	<ul> <li>330</li> <li>19</li> <li>NEG</li> <li>NONE</li> <li>LIGHT</li> <li>NONE</li> <li>NORML</li> <li>NORML</li> <li>NEG</li> </ul>
Silicon Potassium Water Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium	ppm ppm scalar scalar scalar scalar scalar scalar scalar	ASTM D5185m ASTM D5185m WC Method *Visual *Visual *Visual *Visual *Visual *Visual ASTM D5185m	>75 >20 >0.2 NONE NONE NORML NORML >0.2 >170	<ul> <li>494</li> <li>29</li> <li>NEG</li> <li>NONE</li> <li>NONE</li> <li>NORML</li> <li>NORML</li> <li>NEG</li> <li>22</li> </ul>	51 3 NEG NONE LIGHT NORML NORML NEG	<ul> <li>330</li> <li>19</li> <li>NEG</li> <li>NONE</li> <li>LIGHT</li> <li>NORML</li> <li>NORML</li> <li>NEG</li> <li>14</li> </ul>
Silicon Potassium Water Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium Boron	ppm ppm scalar scalar scalar scalar scalar scalar ppm	ASTM D5185m ASTM D5185m WC Method *Visual *Visual *Visual *Visual *Visual ASTM D5185m ASTM D5185m	>75 >20 >0.2 NONE NONE NORML NORML >0.2 >170 400	<ul> <li>494</li> <li>29</li> <li>NEG</li> <li>NONE</li> <li>NONE</li> <li>NORML</li> <li>NORML</li> <li>NEG</li> <li>22</li> <li>91</li> </ul>	51 3 NEG NONE LIGHT NONE NORML NEG <1 115	<ul> <li>330</li> <li>19</li> <li>NEG</li> <li>NONE</li> <li>LIGHT</li> <li>NORML</li> <li>NORML</li> <li>NEG</li> <li>14</li> <li>91</li> </ul>
Silicon Potassium Water Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium Boron Barium	ppm ppm scalar scalar scalar scalar scalar scalar ppm ppm	ASTM D5185m ASTM D5185m WC Method *Visual *Visual *Visual *Visual *Visual *Visual ASTM D5185m ASTM D5185m	>75 >20 >0.2 NONE NONE NORML NORML >0.2 >170 400 200	<ul> <li>494</li> <li>29</li> <li>NEG</li> <li>NONE</li> <li>NONE</li> <li>NORML</li> <li>NORML</li> <li>NEG</li> <li>22</li> <li>91</li> <li>&lt;1</li> </ul>	51 3 NEG NONE LIGHT NORML NORML NEG <1 115 0	<ul> <li>330</li> <li>19</li> <li>NEG</li> <li>NONE</li> <li>LIGHT</li> <li>NORML</li> <li>NORML</li> <li>NORML</li> <li>NEG</li> <li>14</li> <li>91</li> <li>0</li> </ul>
Silicon Potassium Water Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium Boron Barium Molybdenum	ppm scalar scalar scalar scalar scalar scalar ppm ppm ppm	ASTM D5185m ASTM D5185m WC Method *Visual *Visual *Visual *Visual *Visual ASTM D5185m ASTM D5185m ASTM D5185m	>75 >20 >0.2 NONE NONE NORML NORML >0.2 >170 400 200 12	<ul> <li>494</li> <li>29</li> <li>NEG</li> <li>NONE</li> <li>NORML</li> <li>NORML</li> <li>NEG</li> <li>22</li> <li>91</li> <li>&lt;1</li> <li>3</li> </ul>	51 3 NEG NONE LIGHT NORML NORML NEG <1 115 0 <1	<ul> <li>330</li> <li>19</li> <li>NEG</li> <li>NONE</li> <li>LIGHT</li> <li>NORML</li> <li>NORML</li> <li>NEG</li> <li>14</li> <li>91</li> <li>0</li> <li>&lt;1</li> </ul>
Silicon Potassium Water Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium Boron Barium Molybdenum Manganese	ppm ppm scalar scalar scalar scalar scalar ppm ppm ppm ppm	ASTM D5185m ASTM D5185m WC Method *Visual *Visual *Visual *Visual *Visual ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	>75 >20 >0.2 NONE NONE NORML NORML >0.2 >170 400 200 12	<ul> <li>494</li> <li>29</li> <li>NEG</li> <li>NONE</li> <li>NORE</li> <li>NORML</li> <li>NORML</li> <li>NEG</li> <li>22</li> <li>91</li> <li>&lt;1</li> <li>3</li> <li>14</li> </ul>	51 3 NEG NONE LIGHT NORML NORML NEG <1 115 0 <1 5	<ul> <li>330</li> <li>19</li> <li>NEG</li> <li>NONE</li> <li>LIGHT</li> <li>NORML</li> <li>NORML</li> <li>NORML</li> <li>NEG</li> <li>14</li> <li>91</li> <li>0</li> <li>&lt;1</li> <li>10</li> </ul>
Silicon Potassium Water Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium Boron Barium Molybdenum Manganese Magnesium	ppm ppm scalar scalar scalar scalar scalar ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m WC Method *Visual *Visual *Visual *Visual *Visual *Visual ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	>75 >20 >0.2 NONE NONE NORML NORML >0.2 >170 400 200 12	<ul> <li>494</li> <li>29</li> <li>NEG</li> <li>NONE</li> <li>NORML</li> <li>NORML</li> <li>NEG</li> <li>22</li> <li>91</li> <li>&lt;1</li> <li>3</li> <li>14</li> <li>13</li> </ul>	51 3 NEG NONE LIGHT NORML NORML NEG <1 115 0 <1 5 8	<ul> <li>330</li> <li>19</li> <li>NEG</li> <li>NONE</li> <li>LIGHT</li> <li>NORML</li> <li>NORML</li> <li>NORML</li> <li>14</li> <li>91</li> <li>0</li> <li>&lt;1</li> <li>10</li> <li>14</li> </ul>
Silicon Potassium Water Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium Boron Barium Molybdenum Manganese Magnesium	ppm ppm scalar scalar scalar scalar scalar ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m WC Method *Visual *Visual *Visual *Visual *Visual ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	>75 >20 >0.2 NONE NONE NORML NORML >0.2 >170 400 200 12 12	<ul> <li>494</li> <li>29</li> <li>NEG</li> <li>NONE</li> <li>NORE</li> <li>NORML</li> <li>NORML</li> <li>NEG</li> <li>22</li> <li>91</li> <li>&lt;1</li> <li>3</li> <li>14</li> <li>13</li> <li>42</li> </ul>	51 3 NEG NONE LIGHT NORML NORML NEG <1 115 0 <1 5 5 8 26	<ul> <li>330</li> <li>19</li> <li>NEG</li> <li>NONE</li> <li>LIGHT</li> <li>NORML</li> <li>NORML</li> <li>NEG</li> <li>14</li> <li>91</li> <li>0</li> <li>&lt;1</li> <li>10</li> <li>14</li> <li>41</li> </ul>
Silicon Potassium Water Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium Boron Barium Molybdenum Manganese Magnesium Calcium	ppm scalar scalar scalar scalar scalar scalar ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m WC Method *Visual *Visual *Visual *Visual *Visual ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	>75 >20 >0.2 NONE NONE NORML >0.2 >170 400 200 12 12 12 150 1650	<ul> <li>494</li> <li>29</li> <li>NEG</li> <li>NONE</li> <li>NORE</li> <li>NORML</li> <li>NORML</li> <li>NEG</li> <li>22</li> <li>91</li> <li>&lt;1</li> <li>3</li> <li>14</li> <li>13</li> <li>42</li> <li>2903</li> </ul>	51 3 NEG NONE LIGHT NORML NORML NEG <1 115 0 <1 5 8 26 3122	<ul> <li>330</li> <li>19</li> <li>NEG</li> <li>NONE</li> <li>LIGHT</li> <li>NORML</li> <li>NORML</li> <li>NEG</li> <li>14</li> <li>91</li> <li>0</li> <li>&lt;1</li> <li>10</li> <li>14</li> <li>41</li> <li>2798</li> </ul>
Silicon Potassium Water Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm scalar scalar scalar scalar scalar ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m WC Method *Visual *Visual *Visual *Visual *Visual ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	>75 >20 >0.2 NONE NONE NORML NORML >0.2 >170 400 200 12 12 12 150 1650 125	<ul> <li>494</li> <li>29</li> <li>NEG</li> <li>NONE</li> <li>NORML</li> <li>NORML</li> <li>NEG</li> <li>22</li> <li>91</li> <li>&lt;1</li> <li>3</li> <li>14</li> <li>13</li> <li>42</li> <li>2903</li> <li>31</li> </ul>	51 3 NEG NONE LIGHT NORML NORML NEG <1 115 0 <1 5 5 8 26 3122 27	<ul> <li>330</li> <li>19</li> <li>NEG</li> <li>NONE</li> <li>LIGHT</li> <li>NORML</li> <li>NORML</li> <li>NORML</li> <li>14</li> <li>91</li> <li>0</li> <li>&lt;1</li> <li>10</li> <li>14</li> <li>41</li> <li>2798</li> <li>16</li> </ul>
Silicon Potassium Water Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm scalar scalar scalar scalar scalar scalar ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m WC Method *Visual *Visual *Visual *Visual *Visual ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	>75 >20 >0.2 NONE NONE NORML >0.2 >170 400 200 12 12 12 12 150 125 22500	<ul> <li>494</li> <li>29</li> <li>NEG</li> <li>NONE</li> <li>NORE</li> <li>NORML</li> <li>NORML</li> <li>22</li> <li>91</li> <li>&lt;1</li> <li>3</li> <li>14</li> <li>13</li> <li>42</li> <li>2903</li> <li>31</li> <li>28609</li> </ul>	51 3 NEG NONE LIGHT NORML NORML NEG <1 115 0 <1 5 5 8 26 3122 27 24496	<ul> <li>330</li> <li>19</li> <li>NEG</li> <li>NONE</li> <li>LIGHT</li> <li>NORML</li> <li>NORML</li> <li>NEG</li> <li>14</li> <li>91</li> <li>0</li> <li>&lt;11</li> <li>10</li> <li>14</li> <li>2798</li> <li>16</li> <li>25222</li> </ul>

Contact/Location: CHRIS CALTON - MSCDURLH



Lab Number : 06196070

Unique Number : 11058193

SULLIVAN EASTERN INC-LIEBHERR 2860 C SLATER RD MORRISVILLE, NC : 03 Jun 2024 - Sean Felton US 27560

Contact: CHRIS CALTON

T:



Test Package : CONST Certificate L2367 To discuss this sample report, contact Customer Service at 1-800-237-1369. \* - Denotes test methods that are outside of the ISO 17025 scope of accreditation.

Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012) F: (919)484-2136

: 03 Jun 2024

Tested

Diagnosed

Contact/Location: CHRIS CALTON - MSCDURLH Page 2 of 2