

# **OIL ANALYSIS REPORT**

HPU08 HTS43

Component **Hydraulic System** 

ANDEROL Royco 950 MIL-PRF-7024 Type II (--- GAL)

# Sample Rating Trend



# **DIAGNOSIS**

# Recommendation

No corrective action is recommended at this time. Resample at the next service interval to monitor.

All component wear rates are normal.

## Contamination

There is a moderate amount of particulates present in the oil. There is a light concentration of water present in the oil. The system cleanliness is above the acceptable limit for the target ISO 4406 cleanliness code.

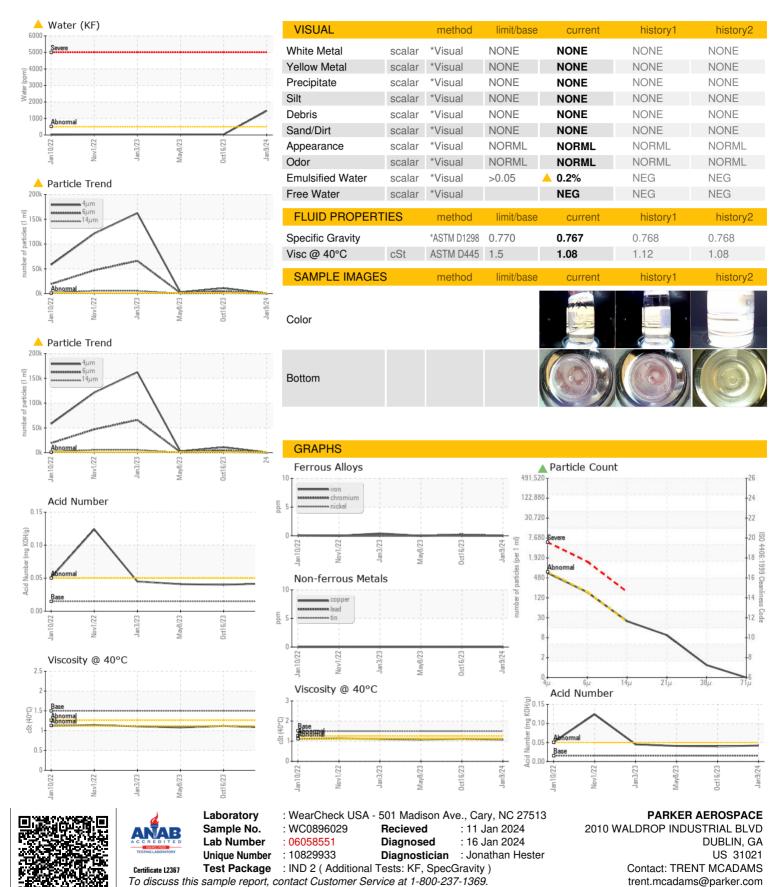
## **Fluid Condition**

The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

Sample Number         Client Info         WC0896029         WC0817691         WC077866           Sample Date         Client Info         09 Jan 2024         16 Oct 2023         08 May 200           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         N/A           Sample Status         Method         Imilitrose         Limitrose         Limitrose         Limitrose         Limitrose         ABNORMAL         A	I ( GAL)		Jan 2022	Nov2022 Jan2023	May2023 Oct2023	Jan 2024	
Sample Date         Client Info         09 Jan 2024         16 Oct 2023         08 May 202           Machine Age         hrs         Client Info         0         0         0         0           Oil Age         hrs         Client Info         0         0         0         0           Oil Old Age         hrs         Client Info         N/A         N/A         N/A         N/A           Sample Status         Client Info         N/A         N/A         N/A         N/A         N/A           WEAR METALS         method         limit/base         current         history1         history1           Iron         ppm         ASTM D5185m         20         0         0         0           Chromium         ppm         ASTM D5185m         20         0         0         0           Nickel         ppm         ASTM D5185m         20         0         0         0           Jaminum         ppm         ASTM D5185m         20         0         0         0           Jaminum         ppm         ASTM D5185m         20         0         0         0           Copper         ppm         ASTM D5185m         20         0         0	SAMPLE INFORM	MATION	method	limit/base	current	history1	history2
Machine Age   hrs   Client Info   0   0   0   0   0   0   0   0   0	Sample Number		Client Info		WC0896029	WC0817691	WC0778664
Oil Age         hrs         Client Info         0         0         0           Oil Changed         Client Info         N/A         N/A         N/A         N/A           Sample Status         Client Info         N/A         N/A         N/A         N/A           WEAR METALS         method         limit/base         current         history1         history1           Iron         ppm         ASTM D5185m         20         0         0         0           Chromium         ppm         ASTM D5185m         20         0         0         1           Nickel         ppm         ASTM D5185m         20         0         0         0           Silver         ppm         ASTM D5185m         20         0         0         0           Aluminum         ppm         ASTM D5185m         20         0         0         0           Aluminum         ppm         ASTM D5185m         20         0         0         0           Lead         ppm         ASTM D5185m         20         0         0         0           Copper         ppm         ASTM D5185m         20         0         0         0           Tin	Sample Date		Client Info		09 Jan 2024	16 Oct 2023	08 May 2023
Cilichanged   Cilicht Info   N/A   ABNORMAL   ABNOR	Machine Age	hrs	Client Info		0	0	0
Sample Status         ABNORMAL	Oil Age	hrs	Client Info		0	0	0
WEAR METALS         method         limit/base         current         history1         history           Iron         ppm         ASTM D5185m         >20         0         0         0         0           Chromium         ppm         ASTM D5185m         >20         0         -1         0           Nickel         ppm         ASTM D5185m         >20         0         0         -1           Silver         ppm         ASTM D5185m         >20         0         0         0           Aluminum         ppm         ASTM D5185m         >20         0         0         0           Aluminum         ppm         ASTM D5185m         >20         0         0         0           Lead         ppm         ASTM D5185m         >20         0         0         0           Copper         ppm         ASTM D5185m         >20         0         0         0           Vanadium         ppm         ASTM D5185m         0         0         0         0           Cadmium         ppm         ASTM D5185m         0         0         0         0           Boron         ppm         ASTM D5185m         0         0         0<	Oil Changed		Client Info		N/A	N/A	N/A
Iron	Sample Status				ABNORMAL	ABNORMAL	ABNORMAL
Chromium         ppm         ASTM D5185m         >20         0         <1	WEAR METALS		method	limit/base	current	history1	history2
Sickel	ron	ppm	ASTM D5185m	>20	0	0	0
Description   Description	Chromium	ppm	ASTM D5185m	>20	0	<1	0
Silver	Nickel	ppm	ASTM D5185m	>20	0	0	<1
Astmorphism	Γitanium	ppm	ASTM D5185m		0	0	0
Lead         ppm         ASTM D5185m         >20         0         0         0           Copper         ppm         ASTM D5185m         >20         0         0         0           Copper         ppm         ASTM D5185m         >20         0         0         0           Vanadium         ppm         ASTM D5185m         0         0         0         0           ACADITIVES         method         limit/base         current         history1         history           ADDITIVES         method         limit/base         current         history1         history           ADDITIVES         method         limit/base         current         history1         history1           ADDITIVES         method         limit/base         current         history1         history1           Boarium         ppm         ASTM D5185m         0         0         0         0           Boarium         ppm         ASTM D5185m         0         <1         0         0           Calcium         ppm         ASTM D5185m         9         0         8         2           Zinc         ppm         ASTM D5185m         0         0         0	Silver	ppm	ASTM D5185m		0	0	0
Copper         ppm         ASTM D5185m         >20         0         0         0           Fin         ppm         ASTM D5185m         >20         0         0         0           Adadium         ppm         ASTM D5185m         0         0         0         0           ADDITIVES         method         limit/base         current         history         history           Boron         ppm         ASTM D5185m         0         0         0         0           Barium         ppm         ASTM D5185m         0         0         0         0           Barium         ppm         ASTM D5185m         0         0         0         0           Manganesium         ppm         ASTM D5185m         0         0         0         0           Adagensium         ppm         ASTM D5185m         0         <1	Aluminum	ppm	ASTM D5185m	>20	0	2	0
Fin	_ead	ppm	ASTM D5185m	>20	0	0	0
Vanadium         ppm         ASTM D5185m         0         0         0           Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history1           Boron         ppm         ASTM D5185m         0         0         0         0           Boron         ppm         ASTM D5185m         0         0         0         0           Molybdenum         ppm         ASTM D5185m         0         0         0         0           Magnesium         ppm         ASTM D5185m         0         0         0         0           Magnesium         ppm         ASTM D5185m         0         <1         0         0           Calcium         ppm         ASTM D5185m         0         <1         0         0           Phosphorus         ppm         ASTM D5185m         0         <1         0         0           Silicon         ppm         ASTM D5185m         0         0         0         0           CONTAMINANTS         method         limit/base         current         history1         history1	Copper	ppm	ASTM D5185m	>20	0	0	0
Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history1           Boron         ppm         ASTM D5185m         0         0         0           Barium         ppm         ASTM D5185m         0         0         0           Woldybdenum         ppm         ASTM D5185m         0         0         0           Wanganese         ppm         ASTM D5185m         0         0         0           Wanganesium         ppm         ASTM D5185m         0         <1         0           Calcium         ppm         ASTM D5185m         0         <1         0           Phosphorus         ppm         ASTM D5185m         0         0         0           Zinc         ppm         ASTM D5185m         0         0         0           Zinc         ppm         ASTM D5185m         <0         1         1           CONTAMINANTS         method         limit/base         current         history1         history1           Bistory         ASTM D5185m         >15         0         1         1         1	Γin	ppm	ASTM D5185m	>20	0	0	0
ADDITIVES         method         limit/base         current         history1         history           Boron         ppm         ASTM D5185m         0         0         0           Barium         ppm         ASTM D5185m         0         0         0           Molybdenum         ppm         ASTM D5185m         0         0         0           Magnesium         ppm         ASTM D5185m         0         0         0           Magnesium         ppm         ASTM D5185m         0         <1	/anadium	ppm	ASTM D5185m		0	0	0
Boron ppm ASTM D5185m 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Cadmium	ppm	ASTM D5185m		0	0	0
Barium	ADDITIVES		method	limit/base	current	history1	history2
Sarium	Boron	ppm	ASTM D5185m		0	0	0
Manganese         ppm         ASTM D5185m         0         0         0           Magnesium         ppm         ASTM D5185m         0         <1         0           Calcium         ppm         ASTM D5185m         0         <1         0           Phosphorus         ppm         ASTM D5185m         9         0         8           Zinc         ppm         ASTM D5185m         0         0         0           Sulfur         ppm         ASTM D5185m         <1         0         0           CONTAMINANTS         method         limit/base         current         history1         history1           Silicon         ppm         ASTM D5185m         >15         0         1         1           Contassium         ppm         ASTM D5185m         >15         0         1         1           Potassium         ppm         ASTM D5185m         >20         0         <1         0           Vater         %         ASTM D5185m         >20         0         <1         0           Vater         %         ASTM D5185m         >20         0         <1         0           Vater         %         ASTM D6185m	Barium	ppm	ASTM D5185m		0	0	0
Magnesium         ppm         ASTM D5185m         0         <1         0           Calcium         ppm         ASTM D5185m         9         0         8           Zinc         ppm         ASTM D5185m         9         0         8           Zinc         ppm         ASTM D5185m         9         0         0           Sulfur         ppm         ASTM D5185m         0         0         0           CONTAMINANTS         method         limit/base         current         history1         history1           Silicon         ppm         ASTM D5185m         >15         0         1         1           Godium         ppm         ASTM D5185m         >0         1         <1         0           Potassium         ppm         ASTM D5185m         >20         0         <1         0         1           Vater         %         ASTM D5185m         >20         0         <1         0         1           Potatssium         ppm         ASTM D5185m         >20         0         <1         0         0           Water         %         ASTM D6304         >0.05         △ 0.146         0.003         0.003	Molybdenum	ppm	ASTM D5185m		0	0	0
Calcium         ppm         ASTM D5185m         0         <1         0           Phosphorus         ppm         ASTM D5185m         9         0         8           Zinc         ppm         ASTM D5185m         0         0         0           Sulfur         ppm         ASTM D5185m         <1         0         0           CONTAMINANTS         method         limit/base         current         history1         history           Gilicon         ppm         ASTM D5185m         >15         0         1         1           Godium         ppm         ASTM D5185m         >20         0         1         <1           Potassium         ppm         ASTM D5185m         >20         0         <1         0           Water         %         ASTM D5185m         >20         0         <1         0           Water         %         ASTM D5185m         >20         0         <1         0           Water         %         ASTM D5185m         >20         0         <1         0           Particles >4m         ASTM D6304         >0.005         4         0.146         0.003         0.003           Particles >4μm	Manganese	ppm	ASTM D5185m		0	0	0
Phosphorus         ppm         ASTM D5185m         9         0         8           Zinc         ppm         ASTM D5185m         0         0         0           Sulfur         ppm         ASTM D5185m         <1         0         0           CONTAMINANTS         method         limit/base         current         history1         history1           Silicon         ppm         ASTM D5185m         >15         0         1         1           Sodium         ppm         ASTM D5185m         0         1         1         1           Potassium         ppm         ASTM D5185m         >20         0         1         1         1           Potassium         ppm         ASTM D5185m         >20         0         <1         0           Water         %         ASTM D5185m         >20         0         <1         0           Water         %         ASTM D5185m         >20         0         <1         0           Water         %         ASTM D6304         >0.05         ▲ 0.146         0.003         0.003           Particles >4µm         ASTM D7647         >640         592         ▲ 10771         △ 2499	Magnesium	ppm	ASTM D5185m		0	<1	0
Zinc         ppm         ASTM D5185m         0         0         0           Sulfur         ppm         ASTM D5185m         <1         0         0           CONTAMINANTS         method         limit/base         current         history1         history           Silicon         ppm         ASTM D5185m         >15         0         1         1           Sodium         ppm         ASTM D5185m         >20         0         <1         0           Potassium         ppm         ASTM D5185m         >20         0         <1         0           Vater         %         ASTM D6304         >0.05         ▲ 0.146         0.003         0.003           Vater         %         ASTM D6304         >500         ▲ 1459         28.1         25.7           FLUID CLEANLINESS         method         limit/base         current         history1         history           Particles >4μm         ASTM D7647         >640         592         ▲ 10771         ▲ 2499           Particles >14μm         ASTM D7647         >20         ▲ 21         ▲ 538         ▲ 114           Particles >21μm         ASTM D7647         >3         1         2         0	Calcium	ppm	ASTM D5185m		0	<1	0
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >15         0         1         1           Sodium         ppm         ASTM D5185m         >20         0         1         <1	Phosphorus	ppm	ASTM D5185m		9	0	8
CONTAMINANTS         method         limit/base         current         history1         history1           Silicon         ppm         ASTM D5185m         >15         0         1         1           Sodium         ppm         ASTM D5185m         0         1         <1	Zinc	ppm	ASTM D5185m		0	0	0
Silicon ppm ASTM D5185m >15 0 1 1 1 Sodium ppm ASTM D5185m 0 1 <1 Potassium ppm ASTM D5185m >20 0 <1 0 Water % ASTM D6304 >0.05 ▲ 0.146 0.003 0.003 ppm Water ppm ASTM D6304 >500 ▲ 1459 28.1 25.7  FLUID CLEANLINESS method limit/base current history1 history Particles >4µm ASTM D7647 >640 592 ▲ 10771 ▲ 2499 Particles >6µm ASTM D7647 >160 156 ▲ 4331 ▲ 1180 Particles >14µm ASTM D7647 >20 ▲ 21 ▲ 538 ▲ 114 Particles >21µm ASTM D7647 >4 ▲ 8 ▲ 147 ▲ 24 Particles >38µm ASTM D7647 >3 1 2 0 Particles >71µm ASTM D7647 >3 0 0 0 Dil Cleanliness ISO 4406 (c) >16/14/11 ▲ 16/14/12 ▲ 21/19/16 ▲ 18/17/14  FLUID DEGRADATION method limit/base current history1 history	Sulfur	ppm	ASTM D5185m		<1	0	0
Sodium         ppm         ASTM D5185m         0         1         <1           Potassium         ppm         ASTM D5185m         >20         0         <1         0           Water         %         ASTM D6304         >0.05         ▲ 0.146         0.003         0.003           opm Water         ppm         ASTM D6304         >500         ▲ 1459         28.1         25.7           FLUID CLEANLINESS         method         limit/base         current         history1         history1           Particles >4μm         ASTM D7647         >640         592         ▲ 10771         ▲ 2499           Particles >6μm         ASTM D7647         >160         156         ▲ 4331         ▲ 1180           Particles >14μm         ASTM D7647         >20         ▲ 21         ▲ 538         ▲ 114           Particles >21μm         ASTM D7647         >3         1         2         0           Particles >38μm         ASTM D7647         >3         0         0         0           Particles >71μm         ASTM D7647         >3         0         0         0           Dil Cleanliness         ISO 4406 (c)         >16/14/11         ▲ 16/14/12         ▲ 21/19/16         ▲ 18/	CONTAMINANTS	;	method	limit/base	current	history1	history2
Godium         ppm         ASTM D5185m         0         1         <1           Potassium         ppm         ASTM D5185m         >20         0         <1         0           Water         %         ASTM D6304         >0.05         ▲ 0.146         0.003         0.003           opm Water         ppm         ASTM D6304         >500         ▲ 1459         28.1         25.7           FLUID CLEANLINESS         method         limit/base         current         history1         history1           Particles >4μm         ASTM D7647         >640         592         ▲ 10771         ▲ 2499           Particles >6μm         ASTM D7647         >160         156         ▲ 4331         ▲ 1180           Particles >14μm         ASTM D7647         >20         ▲ 21         ▲ 538         ▲ 114           Particles >21μm         ASTM D7647         >4         ▲ 8         ▲ 147         ▲ 24           Particles >38μm         ASTM D7647         >3         0         0         0           Particles >71μm         ASTM D7647         >3         0         0         0           Particles >71μm         ASTM D7647         >3         0         0         0 <t< td=""><td>Silicon</td><td>ppm</td><td>ASTM D5185m</td><td>&gt;15</td><th>0</th><td>1</td><td>1</td></t<>	Silicon	ppm	ASTM D5185m	>15	0	1	1
Water         %         ASTM D6304         >0.05         ▲ 0.146         0.003         0.003           opm Water         ppm         ASTM D6304         >500         ▲ 1459         28.1         25.7           FLUID CLEANLINESS         method         limit/base         current         history1         history1           Particles >4μm         ASTM D7647         >640         592         ▲ 10771         ▲ 2499           Particles >6μm         ASTM D7647         >160         156         ▲ 4331         ▲ 1180           Particles >14μm         ASTM D7647         >20         ▲ 21         ▲ 538         ▲ 114           Particles >21μm         ASTM D7647         >4         ▲ 8         ▲ 147         ▲ 24           Particles >38μm         ASTM D7647         >3         1         2         0           Particles >71μm         ASTM D7647         >3         0         0         0           Oil Cleanliness         ISO 4406 (c)         >16/14/11         ▲ 16/14/12         ▲ 21/19/16         ▲ 18/17/14           FLUID DEGRADATION         method         limit/base         current         history1         history1	Sodium	ppm	ASTM D5185m		0	1	<1
Opm Water         ppm         ASTM D6304         >500         ▲ 1459         28.1         25.7           FLUID CLEANLINESS         method         limit/base         current         history1         history1           Particles >4μm         ASTM D7647         >640         592         ▲ 10771         ▲ 2499           Particles >6μm         ASTM D7647         >160         156         ▲ 4331         ▲ 1180           Particles >14μm         ASTM D7647         >20         ▲ 21         ▲ 538         ▲ 114           Particles >21μm         ASTM D7647         >4         ▲ 8         ▲ 147         ▲ 24           Particles >38μm         ASTM D7647         >3         1         2         0           Particles >71μm         ASTM D7647         >3         0         0         0           Dil Cleanliness         ISO 4406 (c)         >16/14/11         ▲ 16/14/12         ▲ 21/19/16         ▲ 18/17/14           FLUID DEGRADATION         method         limit/base         current         history1         history	Potassium	ppm	ASTM D5185m	>20	0	<1	0
FLUID CLEANLINESS         method         limit/base         current         history1         history1           Particles >4μm         ASTM D7647         >640         592         Δ 10771         Δ 2499           Particles >6μm         ASTM D7647         >160         156         Δ 4331         Δ 1180           Particles >14μm         ASTM D7647         >20         Δ 21         Δ 538         Δ 114           Particles >21μm         ASTM D7647         >4         Δ 8         Δ 147         Δ 24           Particles >38μm         ASTM D7647         >3         1         2         0           Particles >71μm         ASTM D7647         >3         0         0         0           Dil Cleanliness         ISO 4406 (c)         >16/14/11         Δ 16/14/12         Δ 21/19/16         Δ 18/17/14           FLUID DEGRADATION         method         limit/base         current         history1         history1	Nater	%	ASTM D6304	>0.05	<b>0.146</b>	0.003	0.003
Particles >4μm       ASTM D7647       >640       592       ▲ 10771       ▲ 2499         Particles >6μm       ASTM D7647       >160       156       ▲ 4331       ▲ 1180         Particles >14μm       ASTM D7647       >20       ▲ 21       ▲ 538       ▲ 114         Particles >21μm       ASTM D7647       >4       ▲ 8       ▲ 147       ▲ 24         Particles >38μm       ASTM D7647       >3       1       2       0         Particles >71μm       ASTM D7647       >3       0       0       0         Oil Cleanliness       ISO 4406 (c)       >16/14/11       ▲ 16/14/12       ▲ 21/19/16       ▲ 18/17/14         FLUID DEGRADATION       method       limit/base       current       history1       history	opm Water	ppm	ASTM D6304	>500	<b>1459</b>	28.1	25.7
Particles >6μm       ASTM D7647       >160       156       4331       1180         Particles >14μm       ASTM D7647       >20       21       538       114         Particles >21μm       ASTM D7647       >4       8       147       24         Particles >38μm       ASTM D7647       >3       1       2       0         Particles >71μm       ASTM D7647       >3       0       0       0         Dil Cleanliness       ISO 4406 (c)       >16/14/11       16/14/12       21/19/16       18/17/14         FLUID DEGRADATION       method       limit/base       current       history1       history	FLUID CLEANLIN	IESS	method	limit/base	current	history1	history2
Particles >14μm       ASTM D7647       >20       ▲ 21       ▲ 538       ▲ 114         Particles >21μm       ASTM D7647       >4       ▲ 8       ▲ 147       ▲ 24         Particles >38μm       ASTM D7647       >3       1       2       0         Particles >71μm       ASTM D7647       >3       0       0       0         Oil Cleanliness       ISO 4406 (c)       >16/14/11       ▲ 16/14/12       ▲ 21/19/16       ▲ 18/17/14         FLUID DEGRADATION       method       limit/base       current       history1       history	Particles >4µm		ASTM D7647	>640	592	<u> </u>	<u>^</u> 2499
Particles >21μm         ASTM D7647         >4         ▲ 8         ▲ 147         ▲ 24           Particles >38μm         ASTM D7647         >3         1         2         0           Particles >71μm         ASTM D7647         >3         0         0         0           Oil Cleanliness         ISO 4406 (c)         >16/14/11         ▲ 16/14/12         ▲ 21/19/16         ▲ 18/17/14           FLUID DEGRADATION         method         limit/base         current         history	Particles >6µm		ASTM D7647	>160	156	<b>▲</b> 4331	<u></u> 1180
Particles >38μm         ASTM D7647         >3         1         2         0           Particles >71μm         ASTM D7647         >3         0         0         0           Oil Cleanliness         ISO 4406 (c)         >16/14/11         ▲ 16/14/12         ▲ 21/19/16         ▲ 18/17/14           FLUID DEGRADATION         method         limit/base         current         history         history	Particles >14µm		ASTM D7647	>20	<b>2</b> 1	<b>△</b> 538	<b>▲</b> 114
Particles >71μm         ASTM D7647         >3         0         0         0           Dil Cleanliness         ISO 4406 (c)         >16/14/11         ▲ 16/14/12         ▲ 21/19/16         ▲ 18/17/14           FLUID DEGRADATION         method         limit/base         current         history         history	Particles >21μm		ASTM D7647	>4	<b>8</b>	<u> </u>	<u>4</u> 24
Dil Cleanliness       ISO 4406 (c) >16/14/11 ▲ 16/14/12 ▲ 21/19/16 ▲ 18/17/14         FLUID DEGRADATION       method       limit/base       current       history1       history	Particles >38μm		ASTM D7647	>3	1	2	0
FLUID DEGRADATION method limit/base current history1 history	Particles >71µm		ASTM D7647	>3	0	0	0
	Oil Cleanliness		ISO 4406 (c)	>16/14/11	<b>16/14/12</b>	<u>^</u> 21/19/16	<b>▲</b> 18/17/14
Acid Number (AN)         mg KOH/g         ASTM D8045         0.015         0.042         0.04         0.041	FLUID DEGRADA	TION	method	limit/base	current	history1	history2
	Acid Number (AN)	mg KOH/g	ASTM D8045	0.015	0.042	0.04	0.041



# **OIL ANALYSIS REPORT**



\* - 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:

T: (478)275-4030