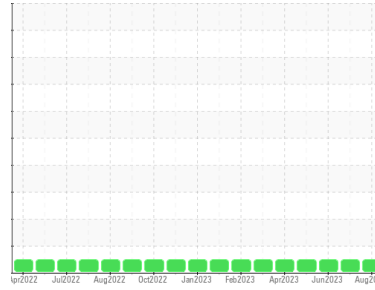


OIL ANALYSIS REPORT

Sample Rating Trend

NORMAL



Area
WILLMAR
Machine Id
Unit 01 DB040101E

Component
Natural Gas Engine
Fluid
DIESEL ENGINE OIL SAE 40 (250 GAL)

DIAGNOSIS

Recommendation

No corrective action is recommended at this time. Resample at the next service interval to monitor. (Customer Sample Comment: 27 Gallons Make-up Oil)

Wear

All component wear rates are normal.

Contamination

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

Fluid Condition

The BN result indicates that there is suitable alkalinity remaining in the 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			PCA0050290	PCA0050289	PCA0050288
Sample Date	Client Info			28 Aug 2023	24 Jul 2023	29 Jun 2023
Machine Age	hrs	Client Info		5035	4871	4716
Oil Age	hrs	Client Info		5035	4871	4716
Oil Changed		Client Info		Filtered	Filtered	Changed
Sample Status				NORMAL	NORMAL	NORMAL

WEAR METALS		method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>50	4	4	4
Chromium	ppm	ASTM D5185m	>4	0	0	0
Nickel	ppm	ASTM D5185m	>2	0	0	0
Titanium	ppm	ASTM D5185m		0	0	0
Silver	ppm	ASTM D5185m	>3	0	0	0
Aluminum	ppm	ASTM D5185m	>9	2	1	<1
Lead	ppm	ASTM D5185m	>30	3	3	3
Copper	ppm	ASTM D5185m	>35	3	3	3
Tin	ppm	ASTM D5185m	>4	<1	<1	<1
Vanadium	ppm	ASTM D5185m		<1	0	0
Cadmium	ppm	ASTM D5185m		0	0	<1

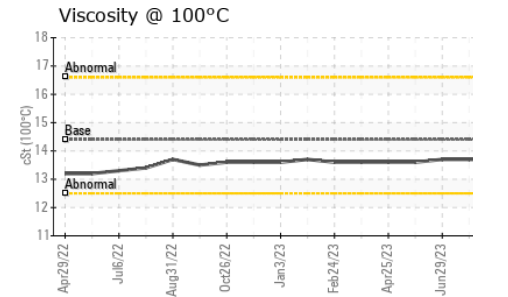
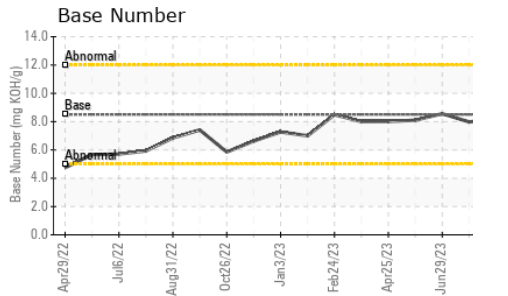
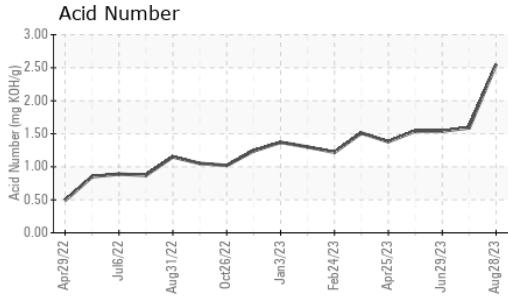
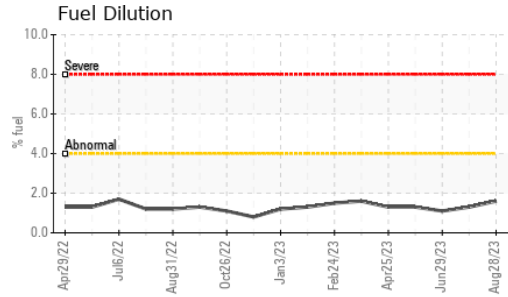
ADDITIVES		method	limit/base	current	history1	history2
Boron	ppm	ASTM D5185m	250	0	0	0
Barium	ppm	ASTM D5185m	10	0	0	2
Molybdenum	ppm	ASTM D5185m	100	2	<1	<1
Manganese	ppm	ASTM D5185m		<1	0	<1
Magnesium	ppm	ASTM D5185m	450	928	829	832
Calcium	ppm	ASTM D5185m	3000	1158	1118	1118
Phosphorus	ppm	ASTM D5185m	1150	1123	1091	1102
Zinc	ppm	ASTM D5185m	1350	1338	1239	1257
Sulfur	ppm	ASTM D5185m	4250	3795	3033	3485

CONTAMINANTS		method	limit/base	current	history1	history2
Silicon	ppm	ASTM D5185m	>+100	3	2	3
Sodium	ppm	ASTM D5185m	>216	4	0	0
Potassium	ppm	ASTM D5185m	>20	4	5	5
Fuel	%	ASTM D3524	>4.0	1.6	1.3	1.1

INFRA-RED		method	limit/base	current	history1	history2
Soot %	%	*ASTM D7844		0.1	0.1	0.1
Nitration	Abs/cm	*ASTM D7624	>20	4.1	4.8	4.1
Sulfation	Abs/.1mm	*ASTM D7415	>30	12.9	12.9	13.6

FLUID DEGRADATION		method	limit/base	current	history1	history2
Oxidation	Abs/.1mm	*ASTM D7414	>25	6.8	6.7	8.2
Acid Number (AN)	mg KOH/g	ASTM D8045		2.55	1.59	1.54
Base Number (BN)	mg KOH/g	ASTM D2896	8.5	8.18	7.98	8.56

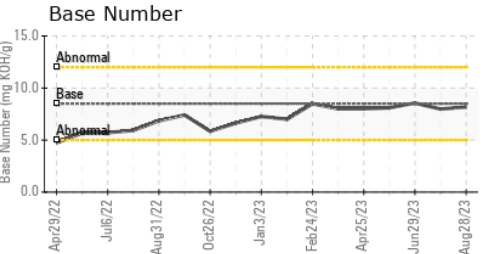
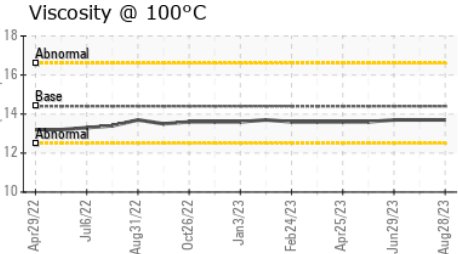
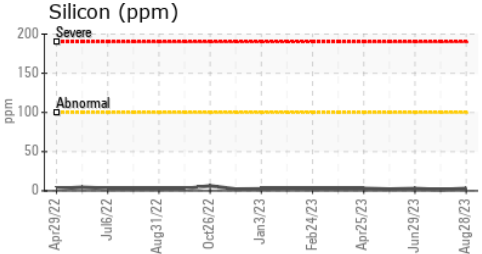
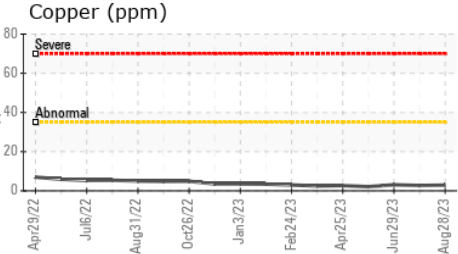
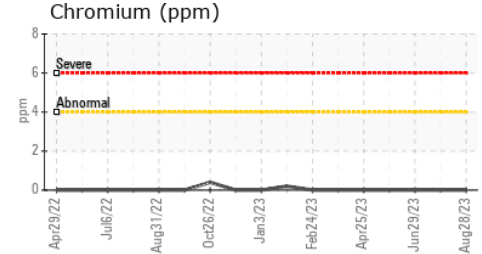
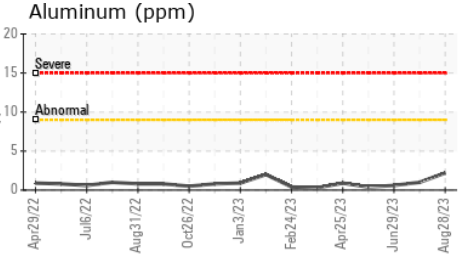
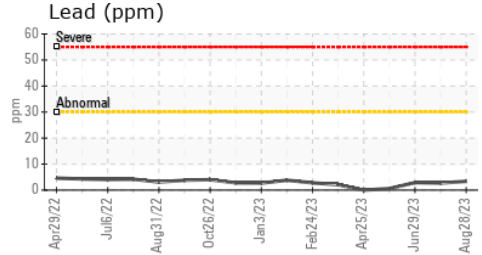
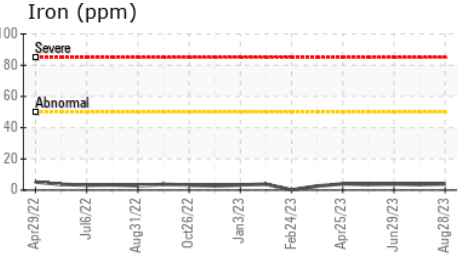
OIL ANALYSIS REPORT



VISUAL	method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.1	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG

FLUID PROPERTIES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	14.4	13.7	13.7

GRAPHS



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513
Sample No. : PCA0050290 **Received** : 07 Sep 2023
Lab Number : 05945254 **Diagnosed** : 12 Sep 2023
Unique Number : 10635866 **Diagnostician** : Jonathan Hester
Test Package : MOB 2 (Additional Tests: FuelDilution, PercentFuel)

Magellan Midstream LP - Willmar
 2131 30th Stree SW
 Willmar, MN
 US 56201
 Contact: Andrew Lauer
 andrew.lauer@magellanlp.com
 T: (320)808-4364
 F:

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)