

# **OIL ANALYSIS REPORT**

# Martinsville [Martinsville] Oil - Port Main Engine

Port Main Engine

**DIESEL ENGINE OIL SAE 15W40 (150 GAL)** 



Sample Rating Trend



### Recommendation

Resample at the next service interval to monitor.

All component wear rates are normal.

### Contamination

There is no indication of any contamination in the

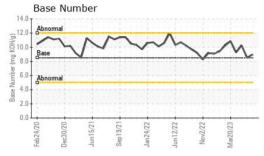
### **Fluid Condition**

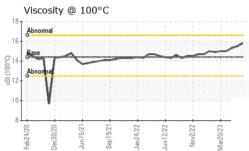
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

Sample Number         Client Info         WC0769180         WC0683412         WC0683410           Sample Date         Client Info         10 Jul 2023         13 Jun 2023         15 May 2023           Machine Age         hrs         Client Info         16120         15506         14928           Oil Age         hrs         Client Info         7446         728         6252           Oil Changed         Client Info         N/A         Not Changd         N/A           Sample Status         NORMAL         NORMAL         NORMAL         NORMAL           CONTAMINATION         method         limit/base         current         history1         history2           Fuel         WC Method         >4.0         <1.0         <1.0         <1.0           Glycol         WC Method         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >75         54         52         45           Chromium         ppm         ASTM D5185m         >8         <1         <1         <1           Nickel         ppm         ASTM D5185m         >3	SAMPLE INFORM	IATION	method	limit/base	current	history1	history2
Sample Date						•	•
Machine Age         hrs         Client Info         16120         15506         14928           Oil Age         hrs         Client Info         7446         728         6252           Oil Changed         Client Info         N/A         Not Changd         N/A           Sample Status         Image: Control of Mode         Normal         Normal         Normal         Normal           CONTAMINATION         method         Image: Control of Mode         Image: Control of Mode         Neg         Neg           Fuel         WC Method         VC Method         Neg         NEG         NEG           WEAR METALS         method         Imitibase         current         history1         history2           Iron         ppm         ASTM D5185m         >3         <1         <1         <1         <1         NEG           WEAR METALS         method         Imitibase         current         history1         history2         Instructory2         Instructory2         history2         1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1	·						
Oil Age         hrs         Client Info         7446         728         6252           Oil Changed         Client Info         N/A         Not Changd         N/A           Sample Status         NormAL         NORMAL         NORMAL         NORMAL           CONTAMINATION         method         limit/base         current         history1         history2           Fuel         WC Method         Al.0         <1.0         <1.0         <1.0         <1.0           Glycol         WC Method         NEG         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >75         54         52         45           Chromium         ppm         ASTM D5185m         >2         0         0         0           Chromium         ppm         ASTM D5185m         >3         <1         <1         <1         <1           Silver         ppm         ASTM D5185m         >3         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1	•	hre					,
Cilient Info   N/A   Not Changd   N/A   NORMAL   NORMAL							
NORMAL   NORMAL   NORMAL   NORMAL   CONTAMINATION   method   limit/base   current   history1   history2   history2	•	1110					
CONTAMINATION         method         limit/base         current         history1         history2           Fuel         WC Method         >4.0         <1.0	-		Oliciti IIIIo				
Fuel		1	method	limit/base	-		
WEAR METALS		N .				•	•
WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >75         54         52         45           Chromium         ppm         ASTM D5185m         >8         <1				>4.0			
Iron	Glycol		vvC ivietriod		NEG	NEG	NEG
Chromium         ppm         ASTM D5185m         >8         <1	WEAR METALS		method	limit/base	current	history1	history2
Nickel		ppm					
Titanium		ppm	ASTM D5185m	>8			
Silver         ppm         ASTM D5185m         >2         0         0         0           Aluminum         ppm         ASTM D5185m         >15         <1         2         2           Lead         ppm         ASTM D5185m         >18         20         19         14           Copper         ppm         ASTM D5185m         >80         36         34         32           Tin         ppm         ASTM D5185m         >14         1         2         <1           Vanadium         ppm         ASTM D5185m         >14         1         2         <1           Cadmium         ppm         ASTM D5185m         <1         <1         0         <1         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         250         55         59         58           Barium         ppm         ASTM D5185m         10         0         0         0         0           Molybdenum         ppm         ASTM D5185m         10         0         0         0         0           Manganesium         ppm         ASTM D5185m	Nickel	ppm	ASTM D5185m	>2	0	0	0
Aluminum         ppm         ASTM D5185m         >15         <1         2         2           Lead         ppm         ASTM D5185m         >18         20         19         14           Copper         ppm         ASTM D5185m         >80         36         34         32           Tin         ppm         ASTM D5185m         >14         1         2         <1	Titanium	ppm	ASTM D5185m	>3			
Lead         ppm         ASTM D5185m         >18         20         19         14           Copper         ppm         ASTM D5185m         >80         36         34         32           Tin         ppm         ASTM D5185m         >14         1         2         <1           Vanadium         ppm         ASTM D5185m         < 1         <1         0           Cadmium         ppm         ASTM D5185m         0         <1         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         250         55         59         58           Barium         ppm         ASTM D5185m         10         0         0         0           Molybdenum         ppm         ASTM D5185m         100         82         82         77           Manganese         ppm         ASTM D5185m         10         82         82         77           Manganesium         ppm         ASTM D5185m         450         1354         1422         1342           Calcium         ppm         ASTM D5185m         3000         1544         1639         144	Silver	ppm	ASTM D5185m	>2	0		
Copper         ppm         ASTM D5185m         >80         36         34         32           Tin         ppm         ASTM D5185m         >14         1         2         <1	Aluminum	ppm	ASTM D5185m	>15	<1	2	2
Tin	Lead	ppm	ASTM D5185m	>18	20	19	14
Vanadium         ppm         ASTM D5185m         <1         <1         0           Cadmium         ppm         ASTM D5185m         0         <1         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         250         55         59         58           Barium         ppm         ASTM D5185m         10         0         0         0           Molybdenum         ppm         ASTM D5185m         100         82         82         77           Manganese         ppm         ASTM D5185m         100         82         82         77           Magnesium         ppm         ASTM D5185m         100         1354         1422         1342         1342           Calcium         ppm         ASTM D5185m         3000         1544         1639         1444           Phosphorus         ppm         ASTM D5185m         1150         985         1031         949           Zinc         ppm         ASTM D5185m         1208         1309         1205           Sulfur         ppm         ASTM D5185m         >20         3440	Copper	ppm	ASTM D5185m	>80	36	34	32
Cadmium         ppm         ASTM D5185m         0         <1         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         250         55         59         58           Barium         ppm         ASTM D5185m         10         0         0         0           Molybdenum         ppm         ASTM D5185m         100         82         82         77           Manganese         ppm         ASTM D5185m         100         82         82         77           Magnesium         ppm         ASTM D5185m         450         1354         1422         1342           Calcium         ppm         ASTM D5185m         3000         1544         1639         1444           Phosphorus         ppm         ASTM D5185m         1150         985         1031         949           Zinc         ppm         ASTM D5185m         1350         1208         1309         1205           Sulfur         ppm         ASTM D5185m         >20         3440         3692         3428           CONTAMINANTS         method         limit/base         current </td <td>Tin</td> <td>ppm</td> <td>ASTM D5185m</td> <td>&gt;14</td> <th>1</th> <td>2</td> <td>&lt;1</td>	Tin	ppm	ASTM D5185m	>14	1	2	<1
ADDITIVES	Vanadium	ppm	ASTM D5185m		<1	<1	0
Boron	Cadmium	ppm	ASTM D5185m		0	<1	0
Barium         ppm         ASTM D5185m         10         0         0         0           Molybdenum         ppm         ASTM D5185m         100         82         82         77           Manganese         ppm         ASTM D5185m         100         82         82         77           Manganese         ppm         ASTM D5185m         100         1354         1422         1342           Calcium         ppm         ASTM D5185m         3000         1544         1639         1444           Phosphorus         ppm         ASTM D5185m         1150         985         1031         949           Zinc         ppm         ASTM D5185m         1350         1208         1309         1205           Sulfur         ppm         ASTM D5185m         4250         3440         3692         3428           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         4         4         5           Sodium         ppm         ASTM D5185m         >20         <1         3         2           INFRA-RED         method         limit	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         100         82         82         77           Manganese         ppm         ASTM D5185m         450         1354         1422         1342           Calcium         ppm         ASTM D5185m         450         1354         1422         1342           Calcium         ppm         ASTM D5185m         3000         1544         1639         1444           Phosphorus         ppm         ASTM D5185m         1150         985         1031         949           Zinc         ppm         ASTM D5185m         1350         1208         1309         1205           Sulfur         ppm         ASTM D5185m         4250         3440         3692         3428           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         4         4         5           Sodium         ppm         ASTM D5185m         >20         4         4         4           Potassium         ppm         ASTM D5185m         >20         <1	Boron	ppm	ASTM D5185m	250	55	59	58
Manganese         ppm         ASTM D5185m         <1         1         <1           Magnesium         ppm         ASTM D5185m         450         1354         1422         1342           Calcium         ppm         ASTM D5185m         3000         1544         1639         1444           Phosphorus         ppm         ASTM D5185m         1150         985         1031         949           Zinc         ppm         ASTM D5185m         1350         1208         1309         1205           Sulfur         ppm         ASTM D5185m         4250         3440         3692         3428           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         4         4         5           Sodium         ppm         ASTM D5185m         >158         4         4         4           Potassium         ppm         ASTM D5185m         >20         <1         3         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0.6<	Barium	ppm	ASTM D5185m	10	0	0	0
Magnesium         ppm         ASTM D5185m         450         1354         1422         1342           Calcium         ppm         ASTM D5185m         3000         1544         1639         1444           Phosphorus         ppm         ASTM D5185m         1150         985         1031         949           Zinc         ppm         ASTM D5185m         1350         1208         1309         1205           Sulfur         ppm         ASTM D5185m         4250         3440         3692         3428           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         4         4         5           Sodium         ppm         ASTM D5185m         >158         4         4         4           Potassium         ppm         ASTM D5185m         >20         <1         3         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624         >20         14.1         13.5         13.6           Sulfation         Abs/.1mm         *ASTM D7415<	Molybdenum	ppm	ASTM D5185m	100	82	82	77
Calcium         ppm         ASTM D5185m         3000         1544         1639         1444           Phosphorus         ppm         ASTM D5185m         1150         985         1031         949           Zinc         ppm         ASTM D5185m         1350         1208         1309         1205           Sulfur         ppm         ASTM D5185m         4250         3440         3692         3428           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         4         4         5           Sodium         ppm         ASTM D5185m         >158         4         4         4           Potassium         ppm         ASTM D5185m         >20         <1	Manganese	ppm	ASTM D5185m		<1	1	<1
Phosphorus         ppm         ASTM D5185m         1150         985         1031         949           Zinc         ppm         ASTM D5185m         1350         1208         1309         1205           Sulfur         ppm         ASTM D5185m         4250         3440         3692         3428           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         4         4         5           Sodium         ppm         ASTM D5185m         >158         4         4         4           Potassium         ppm         ASTM D5185m         >20         <1	Magnesium	ppm	ASTM D5185m	450	1354	1422	1342
Zinc         ppm         ASTM D5185m         1350         1208         1309         1205           Sulfur         ppm         ASTM D5185m         4250         3440         3692         3428           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         4         4         5           Sodium         ppm         ASTM D5185m         >158         4         4         4           Potassium         ppm         ASTM D5185m         >20         <1	Calcium	ppm	ASTM D5185m	3000	1544	1639	1444
Sulfur         ppm         ASTM D5185m         4250         3440         3692         3428           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         4         4         5           Sodium         ppm         ASTM D5185m         >158         4         4         4           Potassium         ppm         ASTM D5185m         >20         <1	Phosphorus	ppm	ASTM D5185m	1150	985	1031	949
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >20         4         4         5           Sodium         ppm         ASTM D5185m         >158         4         4         4           Potassium         ppm         ASTM D5185m         >20         <1	Zinc	ppm	ASTM D5185m	1350	1208	1309	1205
Silicon         ppm         ASTM D5185m         >20         4         4         5           Sodium         ppm         ASTM D5185m         >158         4         4         4           Potassium         ppm         ASTM D5185m         >20         <1         3         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0.6         0.6         0.5           Nitration         Abs/cm         *ASTM D7624         >20         14.1         13.5         13.6           Sulfation         Abs/.1mm         *ASTM D7415         >30         27.3         28.6         28.3           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         27.5         30.0         28.3	Sulfur	ppm	ASTM D5185m	4250	3440	3692	3428
Sodium         ppm         ASTM D5185m         >158         4         4         4           Potassium         ppm         ASTM D5185m         >20         <1	CONTAMINANTS		method	limit/base	current	history1	history2
Potassium         ppm         ASTM D5185m         >20         <1	Silicon	ppm	ASTM D5185m	>20	4	4	5
Potassium         ppm         ASTM D5185m         >20         <1         3         2           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         0.6         0.6         0.5           Nitration         Abs/cm         *ASTM D7624         >20         14.1         13.5         13.6           Sulfation         Abs/.1mm         *ASTM D7415         >30         27.3         28.6         28.3           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         27.5         30.0         28.3		ppm	ASTM D5185m	>158	4	4	4
Soot %         %         *ASTM D7844         0.6         0.6         0.5           Nitration         Abs/cm         *ASTM D7624         >20         14.1         13.5         13.6           Sulfation         Abs/.1mm         *ASTM D7415         >30         27.3         28.6         28.3           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         27.5         30.0         28.3	Potassium	ppm	ASTM D5185m	>20	<1	3	2
Nitration         Abs/cm         *ASTM D7624         >20         14.1         13.5         13.6           Sulfation         Abs/.1mm         *ASTM D7415         >30         27.3         28.6         28.3           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         27.5         30.0         28.3	INFRA-RED		method	limit/base	current	history1	history2
Nitration         Abs/cm         *ASTM D7624         >20         14.1         13.5         13.6           Sulfation         Abs/.1mm         *ASTM D7415         >30         27.3         28.6         28.3           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         27.5         30.0         28.3	Soot %	%	*ASTM D7844		0.6	0.6	0.5
Sulfation         Abs/.1mm         *ASTM D7415         >30         27.3         28.6         28.3           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         27.5         30.0         28.3				>20			
Oxidation Abs/.1mm *ASTM D7414 >25 <b>27.5</b> 30.0 28.3							
	FLUID DEGRADA	TION	method	limit/base	current	history1	history2
	Oxidation	Abs/.1mm	*ASTM D7414	>25	27.5	30.0	28.3



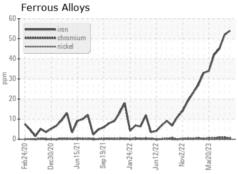
## **OIL ANALYSIS REPORT**

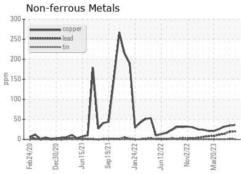


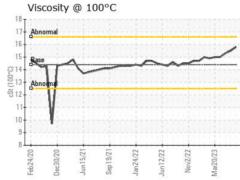


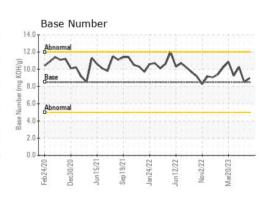
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual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

FLUID PROPERTIES		method				history2
Visc @ 100°C	cSt	ASTM D445	14.4	15.8	15.5	15.3













Certificate L2367

Laboratory Sample No. Lab Number Test Package : IND 2

: 05903430 Unique Number : 10564786

To discuss this sample report, contact Customer Service at 1-800-237-1369.

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : WC0769180

Received : 20 Jul 2023 Diagnosed : 25 Jul 2023 Diagnostician : Doug Bogart

MARATHON PETROLEUM CO. 101 12TH ST CATLETTSBURG, KY

US 41169 Contact: CORY GUMBERT

cagumbert@marathonpetroleum.com

\* - 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) T: (606)585-3950 F: x: