

## **OIL ANALYSIS REPORT**

# Area OH INGRAM [OH INGRAM] 003 645896-3

Starboard Main Engine Fluid

CHEVRON DELO 710 LE (200 GAL)

#### Recommendation

Resample at the next service interval to monitor.

#### Wear

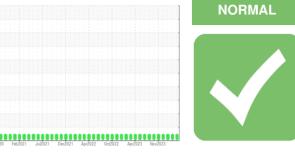
All component wear rates are normal.

#### Contamination

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 condition of the oil is suitable for further service.



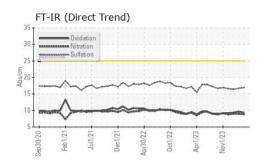
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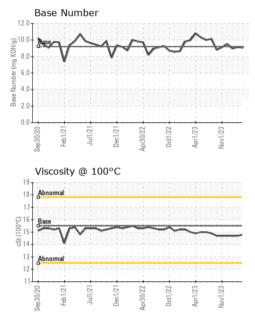
Sample Rating Trend

SAMPLE INFORM	1ATION	method	limit/base	current	history1	history2
Sample Number		Client Info		MW0063313	MW0064801	MW0064750
Sample Date		Client Info		01 May 2024	01 Feb 2024	01 Jan 2024
Machine Age	hrs	Client Info		29030	28698	27956
Oil Age	hrs	Client Info		29030	28698	27956
Oil Changed		Client Info		N/A	Not Changd	Not Changd
Sample Status				NORMAL	NORMAL	NORMAL
CONTAMINATION	٧	method	limit/base	current	history1	history2
Fuel		WC Method	>4.0	<1.0	<1.0	<1.0
Water		WC Method	>0.1	NEG	NEG	NEG
Glycol		WC Method	, 011	NEG	NEG	NEG
WEAR METALS		method	limit/base	current	history1	history2
Iron	ppm	ASTM D5185m	>75	11	8	9
Chromium	ppm	ASTM D5185m	>8	1	<1	1
Nickel	ppm	ASTM D5185m	>2	0	0	<1
Titanium	ppm	ASTM D5185m	>3	0	0	<1
Silver	ppm	ASTM D5185m	>2	0	0	0
Aluminum	ppm	ASTM D5185m	>15	1	2	2
Lead	ppm	ASTM D5185m	>18	4	3	6
Copper	ppm	ASTM D5185m	>80	13	12	12
Tin	ppm	ASTM D5185m	>14	3	3	5
Vanadium	ppm	ASTM D5185m		0	0	<1
Cadmium	ppm	ASTM D5185m		0	0	<1
ADDITIVES		method	limit/base	current	history1	history2
ADDITIVES Boron	ppm	method ASTM D5185m	limit/base	current 48	history1 38	history2 38
	ppm ppm		limit/base			
Boron		ASTM D5185m	limit/base	48	38	38
Boron Barium	ppm	ASTM D5185m ASTM D5185m	limit/base	48 0	38 0	38 0
Boron Barium Molybdenum	ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	48 0 48	38 0 43	38 0 45
Boron Barium Molybdenum Manganese	ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	48 0 48 1	38 0 43 1	38 0 45 <1
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	limit/base	48 0 48 1 15	38 0 43 1 14	38 0 45 <1 13
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		48 0 48 1 15 3733	38 0 43 1 14 3303	38 0 45 <1 13 3788
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		48 0 48 1 15 3733 3	38 0 43 1 14 3303 7	38 0 45 <1 13 3788 3
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m		48 0 48 1 15 3733 3 16	38 0 43 1 14 3303 7 <1	38 0 45 <1 13 3788 3 8
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	10	48 0 48 1 15 3733 3 16 2841	38 0 43 1 14 3303 7 <1 2146	38 0 45 <1 13 3788 3 8 2399
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	10 limit/base	48 0 48 1 15 3733 3 16 2841 current	38 0 43 1 14 3303 7 <1 2146 history1	38 0 45 <1 13 3788 3 8 2399 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m <b>method</b>	10 limit/base >20	48 0 48 1 15 3733 3 16 2841 2841 current 5	38 0 43 1 14 3303 7 <1 2146 history1 5	38 0 45 <1 13 3788 3 8 2399 history2 5
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m ASTM D5185m	10 limit/base >20 >75	48 0 48 1 15 3733 3 16 2841 <u>current</u> 5 18	38 0 43 1 14 3303 7 <1 2146 history1 5 21	38 0 45 <1 13 3788 3 8 2399 history2 5 15
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	10 10 20 >20 >75 >20	48 0 48 1 15 3733 3 16 2841 current 5 18 2	38 0 43 1 14 3303 7 <1 2146 history1 5 21 1	38 0 45 <1 13 3788 3 8 2399 history2 5 15 2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED	ppm	ASTM D5185m ASTM D5185m	10 10 >20 >75 >20 imit/base >3	48 0 48 1 15 3733 3 16 2841 <i>current</i> 5 18 2 <i>current</i> 0.4	38 0 43 1 14 3303 7 <1 2146 history1 5 21 1 1 history1	38 0 45 <1 13 3788 3 8 2399 history2 5 15 2 2 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot %	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	10 10 >20 >75 >20 imit/base >3	48 0 48 1 15 3733 3 16 2841 <b>current</b> 5 18 2 2 <b>current</b>	38 0 43 1 14 3303 7 <1 2146 history1 5 21 1 1 history1 0.4	38 0 45 <1 13 3788 3 8 2399 history2 5 15 2 15 2 history2 0.4
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	10 10 >20 >75 >20 limit/base >3 >20	48 0 48 1 15 3733 3 16 2841 <i>current</i> 5 18 2 <i>current</i> 0.4 8.8	38 0 43 1 14 3303 7 <1 2146 history1 5 21 1 5 21 1 1 history1 0.4 9.0	38 0 45 <1 13 3788 3 8 2399 history2 5 15 2 15 2 history2 0.4 9.0
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D7844 *ASTM D7624 *ASTM D7415	10 10 20 >20 >75 >20 <b>limit/base</b> >3 >20 >30 <b>limit/base</b>	48 0 48 1 15 3733 3 16 2841 <i>current</i> 5 18 2 <i>current</i> 0.4 8.8 16.9	38 0 43 1 14 3303 7 <1 2146 history1 5 21 1 5 21 1 1 <i>history1</i> 0.4 9.0 16.7 <i>history1</i>	38 0 45 <1 13 3788 3 8 2399 history2 5 15 2 5 15 2 history2 0.4 9.0 16.4 history2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur CONTAMINANTS Silicon Sodium Potassium INFRA-RED Soot % Nitration Sulfation	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185m ASTM D5185m	10 10 10 20 >20 >75 >20 limit/base >3 >20 s3 >20 >3	48 0 48 1 15 3733 3 16 2841 <b>current</b> 5 18 2 <b>current</b> 0.4 8.8 16.9	38 0 43 1 14 3303 7 <1 2146 history1 5 21 1 5 21 1 1 <i>history1</i> 0.4 9.0 16.7	38 0 45 <1 13 3788 3 8 2399 history2 5 15 2 5 15 2 <i>history2</i> 0.4 9.0 16.4



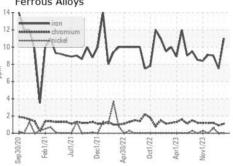
# **OIL ANALYSIS REPORT**





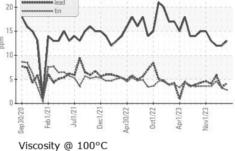
VISUAL		method	limit/base	current	history1	history2
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.1	NEG	NEG	NEG
Free Water	scalar	*Visual		NEG	NEG	NEG
FLUID PROPERT	IES	method	limit/base	current	history1	history2
Visc @ 100°C	cSt	ASTM D445	15.5	14.8	14.7	14.7
GRAPHS						

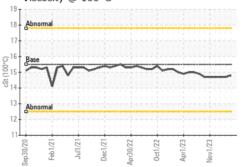
Ferrous Alloys

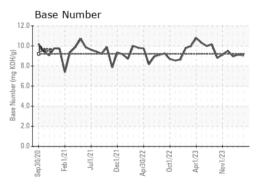




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Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513 **INGRAM BARGE** Sample No. : MW0063313 Received : 10 May 2024 900 S 3RD ST Lab Number : 06176243 Tested : 13 May 2024 PADUCAH, KY Unique Number : 11022296 Diagnosed : 13 May 2024 - Wes Davis US 42003 Test Package : MAR 2 Contact: ALLEN WILLHELM Certificate 12367 To discuss this sample report, contact Customer Service at 1-800-237-1369. allen.willhelm@ingrambarge.com T: (270)415-4467 \* - 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: (615)695-3697

Report Id: INGPAD [WUSCAR] 06176243 (Generated: 05/13/2024 19:49:53) Rev: 1

Contact/Location: ALLEN WILLHELM - INGPAD