



ASTM TESTING PROCEDURE REPORT

ECO FXO INDUSTRIAL®

The attached document is a written confirmation of testing results from the laboratory that carried out the "CORROSION TEST" with the solid fuel additive ECO FXO INDUSTRIAL. "ANALYSIS CONFIRMATION" related to the solid fuel additive ECO FXO INDUSTRIAL classified it as "safe for USE".

Testing was carried out using ASTM TESTING PROCEDURE D-130 (ASTM - American Society for Testing and Materials).

During the implementation of ECO FXO INDUSTRIAL solid fuel additive, namely using the **ASTM TESTING PROCEDURE D-130**, it has been determined that the sample is "**PASSING**". Therefore, the testing result proves that the solid fuel additive ECO FXO INDUSTRIAL "**DOES NOT CAUSE CORROSION**" and therefore is "**SAFE FOR USE**".

HEAVY FUEL SPECIFICATION:

Viscosity @ 50°C, cst	258.5	ASTM D 445
Sulphur, %	2.24	ASTM D 4294
Vanadium, ppm	97.5	Atomic absorption
Sodium, ppm	12.5	Atomic absorption
Silicon, ppm	62.1	Atomic absorption
Aluminum, ppm	48.5	Atomic absorption
Copper corrosion test	PASSING	ASTM D 130

We have added 50 ppm of ECO FXO INDUSTRIAL solid fuel additive to a sample of heavy fuel and repeated the copper corrosion test in accordance with ASTM D-130.

Fuel tank + 50 ppm ECO FXO INDUSTRIAL passes the ASTM D-130.

By following the ASTM D-130 TESTING PROCEDURE, which is shown in detail in the attached ANALYSIS CERTIFICATE, any appropriately equipped laboratory will get the same testing results.



ECO FXO INDUSTRIAL is mixture of organic compounds easily dissolvable in fuels. The dissolving process in the fuel causes a mild effect on fuel characteristics. Therefore, testing using the ASTM D-130 method confirmed that the mixture “fuel + ECO FXO INDUSTRIAL” **DOES NOT CAUSE CORROSION** and in accordance is **SAFE FOR ALL APPLICATIONS**.

DETERMINING FUEL MIXTURE MATCHES USING A SPOT TEST METHOD.

This method is used to evaluate residual fuel in relation to its match with a certain distilled fuel. This procedure indicates the amount of asphaltene sediment that can be expected when mixing integral elements. Degree of matching is determined by a given numerical value of the reference point (**SPOT**) which is closest to the one obtained under testing conditions. Values of three or more indicated that the fuel resulting from a mixture of these integral elements may cause problems in operation, such as centrifugal overload, clogging of the sieve and sediments in the tank.

In practice, even in cases of a high reference point (**SPOT**), treating the fuel with ECO FXO INDUSTRIAL will lower the degree of matching and make it almost usable, owing to properties of dispersing asphaltene sediments. Usually, in a high degree of matching, ECO FXO INDUSTRIAL will lower the value by 1 or 2 points.

Fuel is more stable and contains less deposited material. There are fewer deposits on the bottom of the fuel tank, filters are cleaner, need for MAINTENANCE is reduced.

ECO FXO INDUSTRIAL ASTM D-473 (HFO)

Determining sediment levels using extraction.

This method measures sediment levels in fuel, indicating the tendency to create thick sediments and a predisposition to filter plugging-up in case of that type of fuel. Although this testing has been confirmed on heavy oils, it once again clearly proves the efficiency of ECO FXO INDUSTRIAL to disperse, regardless of the type of fuel in question.

USING ECO FXO INDUSTRIAL reduces the sediment by 30%.

ECO FXO INDUSTRIAL will disperse solid particles in the fuel and practically prevent sediment buildup on the bottom of the fuel tank. This is also useful for the filters which will remain much cleaner.

ECO FXO INDUSTRIAL ASTM D 4870 (HFO)

Determining sediment levels in fuel oil, light distillate oil, diesel and gasoline, using the hot filtering method.

The hot filtering method is more stringent than the ASTM D-473. Adding waste does not affect the results, and there are more representative of the total sediment amount in the fuel. Analysis results show a 50% decrease in sediment measured in the fuel with added ECO FXO INDUSTRIAL. The ASTM D-4870 procedure shows that the sediment on the bottom of the fuel tank has virtually been removed, meaning the filters will remain much cleaner. Calculation of the number of droplets created during atomization and measurement of their mean diameter. The smaller the droplets are, the better the atomization, and therefore a more complete combustion.

Results are the following:

	Mean diameter	Number of droplets
Without ECO FXO INDUSTRIAL	56 microns	965
With ECO FXO INDUSTRIAL	48 microns	1187
Results	Decrease of 15%	Increase of 23%

Creation of the largest possible amount of droplets with a smaller diameter means more fuel exposed to oxygen for a more complete combustion. This more complete combustion will lead to smaller deposits of carbon particles and reduced emissions.

DETERMINING THE ABILITY OF ECO FXO INDUSTRIAL TO DISPERSE (CLEAN).

Due to a strong tendency of asphaltene molecules to gather, they present a great challenge to dispersing abilities of the additive and are very hard to burn off completely. ECO FXO INDUSTRIAL can disperse over 80% of gathered asphaltenes in any given fuel. Asphaltenes are broken into many smaller particles and are finally dispersed throughout the fuel, making their combustion more complete, owing to a great reduction in their size.



Produced by:
FLEX-O Canada Inc.

ORBIS CALCULUS d.o.o.
Crvenog križa 31
10000 Zagreb, Croatia
t: +385.1.606.1863
t2: +385.1.606.1864
em@il: info@flexoeco.com

