

# AMERGY 222 PLUS

Multifunctional Fuel Conditioner Additive

## New Cost-effective Fuel Treatment to Prevent Sludge and Injector Deposit Formation

- Ensures stability of fuel in extended storage
- Increases tolerance of blending two or more dissimilar fuels
- Reduces tank cleaning costs and optimizes purifier sludge discharge and solids removal
- Reduces carbon deposition on diesel fuel injector and exhaust components
- Increases overall fuel efficiency with better fuel energy conversion

Depending on the overall quality of fuel and the desired level of performance and system response, there are two recommended AMERGY 222 PLUS fuel conditioner dosage rate tables.

For combustion improvement, the recommended AMERGY 222 PLUS dosage rates are as follows:

### To achieve:

- The most economic treat rate and performance
- Standard performance and system response
- Premium performance and best system response

### AMERGY 222 PLUS Dosage Rate:

1/8000 (1 liter for 8 tons) of residual fuel  
 1/5000 (1 liter for 5 tons) of residual fuel  
 1/2500 (2 liters for 5 tons) of residual fuel

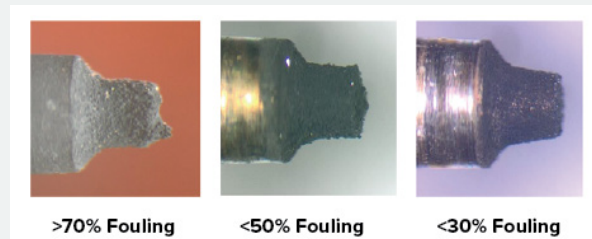
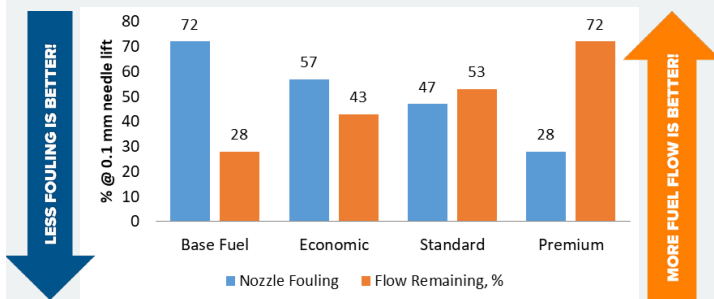
## HOW IT PERFORMS - Combustion Improvement...

### INJECTOR NOZZLE COKING TEST

Fuel injector deposits can disrupt the fuel spray pattern and atomization, which can lead to increased ignition delay and poorer combustion. In turn, poor combustion can result in increased emissions and reduced fuel efficiency. Using an industry accepted test method for evaluating the effects of diesel injector nozzle fouling, AMERGY 222 PLUS performance was able to reduce nozzle fouling and to restore fuel flow as follows at the recommended dosage rates for combustion improvement.

To visually appreciate the benefits of diesel injector cleanliness, comparative photos based on actual engine testing of fouled injector nozzles are shown below.

The photo on the left shows the untreated base fuel injector with greater than 70% fouling. The center photo shows the fuel injector with less than 50% fouling when used with standard treat rate of AMERGY 222 PLUS. The photo on the right shows the fuel injector with less than 30% fouling achieved with AMERGY 222 PLUS dosed at the premium treat rate.



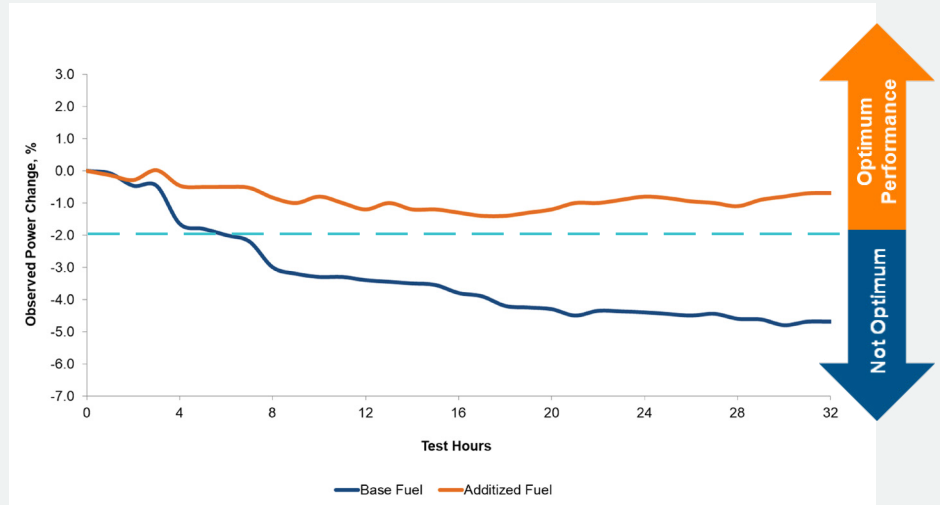
With the least amount of fouling on the fuel injector, the premium treat rate of AMERGY 222 PLUS achieved greater than 70% fuel flow remaining based on 0.1mm needle lift percentage. The premium treat rate of AMERGY 222 PLUS is the recommended dosage rate to remove built-up injector deposits and to restore fuel flow and power that was previously lost to injector fouling.

### COMMON RAIL INJECTOR NOZZLE FOULING - POWER LOSS TEST

This industry standard test involves an intensive multi-stage engine test that physically replicates common rail injector fouling in a controlled environment to determine power loss because of injector nozzle coking or deposit build-up. The test is run to show the diesel injector detergency performance difference of a single fuel after it has been additized at the premium treat rate of AMERGY 222 PLUS. Note the decrease in % Power Loss of the additized fuel when compared to the untreated base fuel.

With premium treatment of AMERGY 222 PLUS, the observed power loss remained below 1.5% for the duration of the 32-hour test period, whereas the untreated base fuel reached 5.0% power loss at the end of the test. Engine OEMs typically require operators to maintain engine power loss below 2.0% for optimum engine performance.

This evaluation indicates that using AMERGY 222 PLUS at the premium treat rate on the occasion when a problematic fuel is encountered can help to clean up fouled injectors, restore and maintain engine power loss, and attain optimum engine performance.



### HOW IT PERFORMS... STABILIZING FUEL

Two standard tests were used to demonstrate the fuel stabilizing properties of AMERGY 222 PLUS which can prevent asphaltenes from agglomerating, flocculating, and dropping out, and sludge from forming when two or more incompatible fuels are commingled.

#### Fuel Cleanliness / Compatibility (Spot) Test

This simple spot test uses chromatographic paper to determine the cleanliness of a residual fuel containing asphaltenes or the compatibility of a residual fuel with a cutter stock.

Two different residual fuel blends were tested to have a No. 3 compatibility spot rating, which suggests slightly unstable or incompatible fuel. After treating the fuel blends with 200 mg/kg of AMERGY 222 PLUS, the samples improved their spot rating to No. 2, while doubling the AMERGY 222 PLUS treatment to 400 mg/kg yielded a No. 1 spot rating, which indicates a sufficiently stable or compatible fuel blend.

FUEL	AMERGY 222 PLUS Treat rate, mg/kg	HFO:MGO 50:50 Blend	HFO:MGO 80:20 Blend
Base Fuel	0	3	3
Additized Fuel	200	2	2
	400	1	1

## Separability Number / Reserve Stability Number (RSN) Test

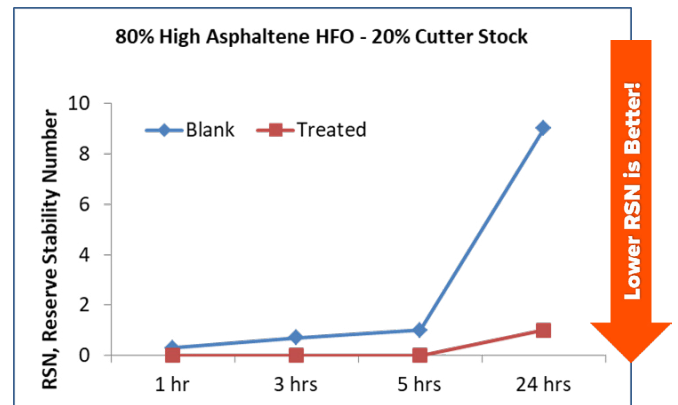
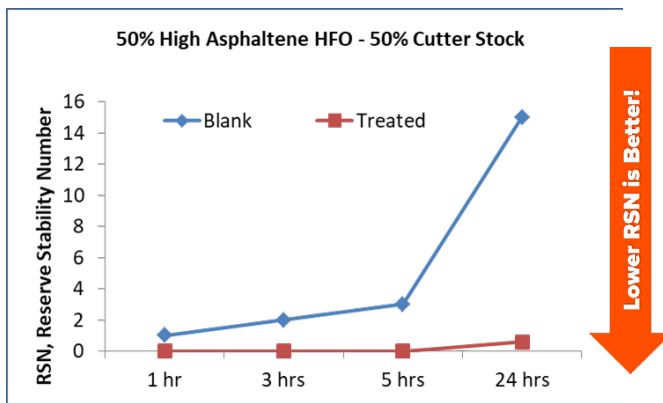
This separability number or reserve stability test uses multiple light scattering detection to determine the likelihood of the sediment including asphaltenes in fuel to flocculate out which subsequently forms fuel sludge. The method uses a prepared sample and detects the amount of light passing through as percent transmittance. The higher the rate of flocculation, the higher percentage of light transmitted. The RSN is equal to the standard deviation of 16 determinations of percent transmittance which is rated from 0 to 16 where lower RSN values are better. Fuels with tested RSN values equal to or less than 5 are considered to have high stability reserve and asphaltenes are not likely to flocculate.

These evaluations and RSN test results indicate that treating unstable fuels with AMERGY 222 PLUS can

improve an unstable fuel's reserve stability over time whilst in storage.

While used as a stand-alone fuel stabilizer, the recommended AMERGY 222 PLUS Dosage Rates are as follows:

RESERVE STABILITY NUMBER (RSN)	STABILITY COMPATIBILITY SPOT NUMBER	AMERGY 222 PLUS DOSAGE RATE
< 3	1	1 : 25,000
3 - 5	2	1 : 20,000
6 - 8	3	1 : 15,000
9 - 11	4	1 : 10,000
> 11	5	1 : 7,500



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