



## Efficient Fuel Solutions



[www.fuelspec.com](http://www.fuelspec.com)

**FuelSpec<sup>®</sup> Combustion Catalysts**

*a green technology*

# Frequently Asked Questions

## **FuelSpec<sup>®</sup> Combustion Catalysts – Frequently Asked Questions**

### ***What are FuelSpec<sup>®</sup> combustion catalysts?***

FuelSpec<sup>®</sup> combustion catalysts are a product line of liquid chemicals, which, when added to various fuels, improve the combustion of those fuels. FuelSpec<sup>®</sup> combustion catalysts are registered with the United States Environmental Protection Agency, and are protected under current and pending patent filings.

### ***What are the benefits to customers from the use of FuelSpec<sup>®</sup> combustion catalysts?***

When mixed in the proper amount, FuelSpec<sup>®</sup> combustion catalysts provide –

- Fuel savings
- Emissions reduction
- Equipment operating and maintenance costs reduction

### ***Is there a simple way to calculate fuel savings?***

In general, customers will save about \$3 (or more) for every \$1 they spend on FuelSpec<sup>®</sup> combustion catalysts, providing a net saving of \$2 (or more).

### ***How much fuel savings can a customer expect?***

FuelSpec<sup>®</sup> combustion catalysts provide the following estimated savings for different types of fuel –

- For ultra-low sulfur Diesel containing equal to or less than 15 ppm sulfur (0.0015% sulfur) used in the US for on-road transportation, customers can expect about 7% fuel savings
- For high sulfur fuels, including heavy fuel oil containing up to 25,000 ppm sulfur or more (2.5% sulfur or more) used for maritime, power generation and home heating needs, customers can expect 10% or more fuel savings
- Customers using fuels containing intermediate levels of sulfur will see fuel savings between 7% and 10% (even though fuel savings for refined or distillate fuels containing less sulfur are lower, since distillate fuels are costlier, a net savings of \$2 or more for every \$1 spent is maintained)

***What is the proper amount of FuelSpec<sup>®</sup> combustion catalysts required for mixing with fuels?***

In general, EFS recommends a mixture of 1 part of FuelSpec<sup>®</sup> with 3,840 parts of fuel (or, 1 ounce of FuelSpec<sup>®</sup> mixed with 30 gallons of fuel).

***What are the fuels on which FuelSpec<sup>®</sup> combustion catalysts can be used?***

FuelSpec<sup>®</sup> combustion catalysts work very effectively on all commercially used Diesel and heavy fuels. These fuels range from ultra-low sulfur Diesel to heavy fuel oils such as marine RMG 380 cSt and RMK 700 cSt blends, and include intermediate fuels variously called #2, #4, #5 Diesel (and others).

***What are the equipment types where FuelSpec<sup>®</sup> combustion catalysts can be used?***

FuelSpec<sup>®</sup> combustion catalysts can be used effectively and safely on equipment that combusts Diesel and other heavy fuel oils. These include all compression-ignited engines running on two-stroke and four-stroke cycles, ranging from slow speed to high speed in RPM.

***What are the industries where FuelSpec<sup>®</sup> combustion catalysts provide benefits?***

FuelSpec<sup>®</sup> combustion catalysts provide a high return-on-investment solution to owners and operators of ships, power generation equipment, trucks and buses, railroads, home heating equipment, as well as other equipment that consumes Diesel and heavy fuel oils.

***How much emissions reduction can be expected by a customer using FuelSpec<sup>®</sup> combustion catalysts?***

FuelSpec<sup>®</sup> combustion catalysts improve the combustion of fuel. This causes a direct reduction in the harmful emissions of ash, Diesel particulate matter (PM), carbon monoxide and NOx. Based on the properties of the fuel, customers will see reductions of up to 10% ash, up to 80% Diesel PM and complete elimination of visible smoke, up to 90% carbon monoxide and up to 30% NOx. Since combustion is affected by variables including fuel-type, the condition of the equipment as well as atmospheric conditions, customers may see a range of reduction in harmful emissions. Furthermore, customers will also see a reduction in emissions such as carbon dioxide, sulfur dioxide and other harmful products resulting from the reduced usage of fuel (for equivalent power output).

***Does the use of other emissions reduction methods and technologies restrict or inhibit the use of FuelSpec<sup>®</sup> combustion catalysts?***

No. For example, FuelSpec<sup>®</sup> combustion catalysts can be used effectively in conjunction with SCR systems, Diesel particulate filters, and other post-combustion emissions reduction technologies. Similarly, emissions reduction methods such as “Diesel Emission Fluids” that are used in most modern Class 6, 7 and 8 tractors (and on other Diesel-engine powered vehicles) are also compatible with FuelSpec<sup>®</sup> combustion catalysts. FuelSpec<sup>®</sup> products simply improve the efficiency of combustion of the fuel, and do not work against other emissions reduction methods and technologies.

***How does the use of FuelSpec<sup>®</sup> combustion catalysts reduce operating and maintenance costs for customers?***

The function of FuelSpec<sup>®</sup> combustion catalysts is to improve the efficiency of combustion, thereby, causing a greater portion of the fuel to be consumed (and to release more energy). Better combustion causes a reduction in the amount of fuel that remains uncombusted or partially combusted, thereby reducing carbon and soot buildup in the combustion and exhaust spaces of the equipment (including the contamination of soot in the lubricating oils of the equipment). This causes the equipment to experience less wear and to run more smoothly, providing a direct reduction in operating and maintenance costs.

***Is the use of FuelSpec<sup>®</sup> combustion catalysts safe?***

Yes. FuelSpec<sup>®</sup> combustion catalysts are safe for use on equipment and the fuel, and do not harm any parts and components used for the storage and processing of fuel. Since FuelSpec<sup>®</sup> combustion catalysts provide a chemical solution by improving the combustion efficiency of the fuel, they do not affect the mechanical configuration of the equipment, including ignition timing, fuel injector performance and any other mechanical aspect of operating and controlling the equipment. Furthermore, all products of combustion are emitted through the exhaust, and are benign to the environment and to all life forms. In fact, not only do FuelSpec<sup>®</sup> combustion catalysts improve the performance of equipment by reducing wear and elongating its life; due to a significant reduction in harmful emissions, they also have a positive and beneficial effect on human health and on the environment. Finally, use of FuelSpec<sup>®</sup> combustion catalysts does not negatively interact with other fuel additives (such as icing & corrosion inhibitors, antistatic agents, lubricants, and other solvents, dispersants, surfactants & detergents, etc.).

***Is it safe to store and transport FuelSpec® combustion catalysts?***

Yes. FuelSpec® combustion catalysts are non-hazardous and non-reactive. They can be shipped via air cargo, have high flash-points and extremely low freezing points, a long shelf-life, and can stay in storage, or mixed in fuel, for long periods of time without any degradation.

***What kind of equipment is needed for injecting FuelSpec® combustion catalysts into the fuel and what is the cost of this equipment?***

EFS provides easy to install, reliable, long-life, maintenance free and cost-effective equipment for injecting FuelSpec® combustion catalysts into the customer's equipment and fuel systems. Depending upon the customers' needs and the application, EFS will provide FuelSpec® Inject™ LCS and FuelSpec® Inject™ FCS injection systems (pat. pending). Retrofitting the equipment is simple and does not cause significant down time. While the cost of equipment varies with the application, a typical Class 8 truck owner will save more than the total cost of equipment plus FuelSpec® products, within less than 6 months of using the technology (after this initial period of recovering the cost of the equipment, the savings go back to a net savings of \$2 for every \$1 spent on FuelSpec® products for the life of the truck). Other customers, such as owners and operators of ships, power generation equipment, etc., will realize considerably higher savings due to the larger amounts of fuel saved. If applicable, central fueling facilities are also be retrofitted easily.

***Does use of FuelSpec® combustion catalysts void or negatively affect equipment warranty?***

While the situation varies across different industries, FuelSpec® products do not have any negative effect on equipment, and use of the products will not void or negatively affect equipment warranties currently in place. In the US, the Magnuson-Moss Warranty Act (more information available at [http://en.wikipedia.org/wiki/Magnuson%E2%80%93Moss\\_Warranty\\_Act](http://en.wikipedia.org/wiki/Magnuson%E2%80%93Moss_Warranty_Act)) is a federal law enacted in 1975 that prohibits original equipment manufacturers from voiding their warranties due to the use of after-market products such as FuelSpec® combustion catalysts. There is a high likelihood that customers are already using other fuel additives for their combustion equipment, without voiding original equipment warranties (such products referenced above in the section, ***Is the use of FuelSpec® combustion catalysts safe?***). FuelSpec® combustion catalysts do not contain any harmful components and extended testing of the product has shown actual reduction of wear on combustion equipment. EFS works with each customer to ensure that all information regarding FuelSpec® products is provided to the customer and that there are no issues related to equipment warranty.

***How can FuelSpec<sup>®</sup> combustion catalysts work effectively in such small quantities?***

EFS has conducted extensive research and testing to develop highly effective FuelSpec<sup>®</sup> products by optimizing the chemical constituents, component particle sizes and effective mixing techniques, so that the technology provides high performance and a high return-on-investment for EFS customers.

***Can we get more information about EFS?***

The EFS team comprises of professionals experienced in all aspects of the development, formulation, manufacturing and application of FuelSpec<sup>®</sup> combustion catalysts. After conducting an extensive review of the technology starting in early 2012, EFS acquired the patents and other assets pertaining to FuelSpec<sup>®</sup> combustion catalysts in July 2014; EFS is commercializing the technology worldwide, across a range of industries. EFS is supported by investors with significant experience in providing energy conservation to Fortune 100 companies. All FuelSpec<sup>®</sup> combustion catalysts and injection equipment are manufactured in the United States.