

FASTEX

What is Fastex ?

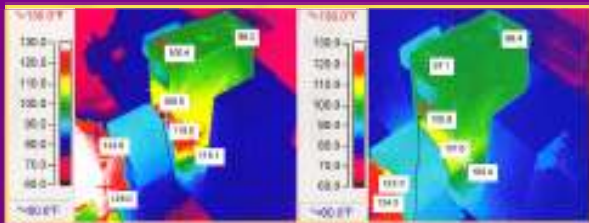
Fastex FSM is a third-generation surface modifier that combines very effective Extreme Pressure, Anti-Wear & Friction Reducing properties to improve all lubrication applications.

Technology Behind Fastex FSM

Fastex surface modifier is a complex blend of esters combined with a highly refined and modified hydrocarbon base fluid that has been specially formulated to improve boundary Lubrication. It does not contain Boron, PTFE, Graphite, Zinc, Molybdenum or any solid based components.

Fastex surface modifier both significantly reduces friction and improves the anti-wear characteristics at metal surfaces. The modified boundary film has a very high shear strength and provides a low friction and high anti-wear barrier between metal surfaces to protect against thermal damage traditionally caused by extreme loading pressures, oil film breakdown or lubricant failure.

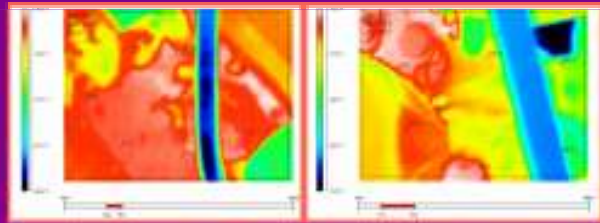
Infra-Red Images of Gear Box
(Before Fastex) (After Fastex)



10% Spot Surface Temperature Decrease
(5% average)

Pictures Courtesy of General Motors, Linden, USA

Infra-Red Images of Heavy Duty Diesel Engine
(Before Fastex) (After Fastex)



Average Drop in Surface Temperature was 25%
across the fleet

Pictures Courtesy of Karnataka State Road Transport

Benefits of Fastex FSM in Heavy Duty Diesel Applications

Reduces Engine & Equipment
Maintenance

Improves Overall Equipment
Effectiveness

Extends Oil Life by 30-50%

Improves Energy Efficiency

Lowers Hot Spot Temperature &
Vibration Substantially

Increases Equipment Life
Expectancy

Reduces Frictional Energy
Losses

Fully Formulated Oils Available

Fastex surface modifier can be provided for incorporation into customer's existing crankcase or gear lubricants or as fully formulated crankcase and gear lubricants meeting or exceeding OEM & Industry standard specifications.

Applications

Fastex FSM is used in a wide range of industrial and marine applications - steam & gas turbines; diesel and natural gas engines; air compressors; gear boxes; hydraulic systems; plastics & glass molding / metal casting equipment; paper and board mills; machine tools (slideways, punch & dies, drills, turning/milling cutters, etc.) being some of the typical applications.

Methodology

Fastex FSM is added at a ratio of, typically, 5% (by volume) to the existing system lubricating oil which is used as a transport medium throughout the lubrication system. The resulting modified metal surface acts as a microscopic bearing. In areas where the surface temperature (as a result of friction) exceeds, approximately, 122°F (50°C) a bond is formed on the surface of the metal. The resulting modified metal surface acts as a microscopic bearing.

Typical Physical Characteristics

Characteristic	Test Method	Units	Fastex FSM
Density @60°F/15°C	ASTM D1298	kg/l	1.07
Kinematic Viscosity @ 104°F/40°C	ASTM D445	CSt	17.7
Flash Point	ASTMD92	°F/°C	250/121
Total Acid No. (TAN)	ASTM D664	mgKOH/g	0.07
Pour Point	ASTM D97	°F/°C	-22/-30
Color	ASTM D1500		<1.0

Global Application Data

US Locomotive - Improved fuel efficiency, improved power, improved lubricant life, reduced gear & engine wear.

Canadian Coastguard - Less oil sludge, engine wear. Overhaul period increase by 20%.

Icelandic Fishing Trawlers - 33 % less engine wear, 10.1% fuel efficiency, 13% electrical power reductions from generator.

Karnataka State Road Transport - 5% fuel efficiency, 40% less engine wear, 25% reduction in vibration, 50% extended oil drain intervals.

Major industrial users include - Hyundai, Honda, Nissan, General Motors, Toyota & Michelin.

Major fleet users include SEPTA (Railroad), Miami Dade (Railroad & Buses), Reading & Northern (Rail), Tri-Rail (Buses & Rail), Nova Scotia Government Ferries & Canadian Coastguard.

What is Enercat™ ?

Enercat™ is an advanced fuel combustion catalyst that makes use of the original, patented nano-particle cerium oxide technology.

Technology Behind Enercat™

A nano-particle formulation, Enercat™ is a fuel borne additive that catalyses combustion while simultaneously reducing harmful emissions. Enercat™ technology uses the oxygen storage capacity of cerium oxide to promote a more complete fuel burn which helps to reduce fuel consumption.



Electron Micrograph of Enercat™
Cerium Oxide Nanoparticle



Presence of Carbon Deposits



Before Enercat™



After Enercat™

Benefits of Enercat™

Improves Fuel Efficiency

Reduces Harmful Emissions

No Increase in Ultra-Fine
Particulate Emissions

Extensive No-Harms Experience
Across Many Engines

Reduces Overall Engine
Maintenance Cost

Reduces Engine Deposits

Engineered to Eliminate Biodiesel NOx Increases

When compared to regular diesel, biodiesel has been proven to produce less toxics and pollutants, such as PM, CO and THC. However several worldwide authorities have reported that use of biodiesel blends in diesel engines, results in an increase in NOx emissions. NOx emissions have shown to be a major contributor to smog & respiratory health problems in humans.

Enercat™ is compatible with all biodiesel fuels from B5 - B100. When used in biodiesel fuels, Enercat™ will :

- Eliminate The NOx Increase of Regular Biodiesel
- Reduce Particulate Matter (PM), Carbon Monoxide (CO) & Total Hydrocarbons (THC)
- Improves Cetane, Energy, Power, and Fuel Efficiency

Applications

Enercat™ is a highly versatile additive and there is no requirement for modifications to the engine where Enercat™ is being used.

Enercat™ has a demonstrated track record of performance. At the same time as enabling consumers to reduce their diesel fuel & engine maintenance costs, Enercat™ contributes to improving air quality by reducing harmful emissions.

Compatibility With Other Technologies

New Engines - EURO IV & EURO V	Bio-Diesel
Diesel Oxidation Catalysts	Hybrid Bus
Diesel Particulate Traps	SCR

Compatibility With Materials & Components

Ample program of “No harm” tests carried out by international laboratories

Bosch 1000 hour fuel pump test pass

Enercat™ was tested with different materials such as metals, elastomers, rubber, etc
No adverse effects were observed

Cerium Oxide Mechanism in Diesel Fuel

Cerium Oxide nano particles dosed directly into diesel fuel. Low Enercat™ additive dose rate means fuel dosed with just 5ppm of active Cerium Oxide nanoparticles.

Very stable dispersion. Extremely small particle size means very high surface area to catalyse combustion.

Increases oxygen availability in the fuel mixture due to higher oxygen storage capacity compared to other nanoparticulate cerium oxide.

Results in a more complete fuel burn.

Reduces fuel consumption and unburned hydrocarbon emission.

Assists in burning of carbon and reduces combustion chamber deposits.

Helps reduce injector fouling.

Customised Delivery

Enercat™ can be blended on site using Energenics' proprietary blending equipment

All components are blended using a computerised dosing unit which offers high accuracy and homogeneous blending. This operation is fully automated without any need for constant human supervision.