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FITCH FUEL CATALYST

Drop In

<p>F2T - Drop-In \$16.95</p> 	<p>F4T - Drop-In \$24.95</p> 	<p>F4T - Pack of 4 \$99.95</p> 
<p>Hand-held outdoor power equipment with engines under 3.5hp. Note: all Drop In units include Green Tags to offset emissions for one (1) year.</p> <p>1 Eco Points</p>	<p>Engines over 3.5 hp not exceeding 25 hp; small portable generators, walk behind mowers, tractors and go-carts. For gas fuel tanks up to 5 gallons, diesel up to 4 gallons. (tractors with 2 tanks or exceeding 25 HP must use 2 - F4T applications)</p> <p>1 Eco Points</p>	<p>Pack of Four (4) of the F4T</p> <p>5 Eco Points</p>
<p>F5T - Drop-In \$49.95</p> 	<p>F6T - Drop-In \$149.95</p> 	<p>F8T - Drop-In \$199.95</p> 
<p>Motorcycles, outboard motors, snowmobiles, tractors, jet skis, ATVs and personal watercraft</p> <p>1 Eco Points</p>	<p>Truck/SUV drop in application up to 18 gallon fuel tank (diesel engine) or 25 gallon fuel tank (gasoline engine) (6 drop ins and installation tool included)</p> <p>3 Eco Points</p>	<p>Truck/SUV drop in application up to 25 gallon fuel tank (diesel engine) or 35 gallon fuel tank (gasoline engine) (8 drop ins and installation tool included)</p> <p>5 Eco Points</p>

F10T - Truck/SUV drop in application up to 35 gallon fuel tank (diesel engine) or 45 gallon fuel tank (gasoline engine) (10 drop ins and installation tool included, \$249.95 10 Eco Points).

F12T - Truck/SUV/Heavy Equipment drop in application up to 45 gallon fuel tank (diesel engine) or 55 gallon fuel tank (gasoline engine) (12 drop ins and installation tool included. \$349.95 10 Eco Points).



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In-Line

F50 In-Line \$99.95	F100 In-Line \$129.95	F200 In-Line \$169.95
		
<p>Garden tractors, agricultural equipment, snow generators, home heating oil burners and truck refrigeration units (up to 3 gph). Note: all In-Line units include Green Tags to offset emissions for one (1) year.</p>	<p>Gasoline Engines - All 4 cylinder (non-turbo) Diesel Engines - Under 4 cylinder 5 Eco Points</p>	<p>Gasoline Engines - 4 cylinder turbo, V6 & V 8 engines - Max 5.7 liters/350 in/ not exceeding 200 Horsepower Diesel Engines - 4 cylinder engines up to 3.5 liter/214 inc/ not exceeding 125 Horsepower (Max fuel flow 20 gph/ 76 lph) 5 Eco Points</p>
F300 In-Line \$219.95	F400 In-Line \$299.95	F500 In-Line \$399.95
		
<p>Gasoline Engines - Trucks/SUVs/Auto engines up to 6.8 liters/415 in/ not exceeding 300 HP (Excluding V10 engines) Diesel Engines - Engines up to 4.7 liter/286 cu in/ not exceeding 175 HP (Max fuel flow 30 gph/ 114 lph) 5 Eco Points</p>	<p>Gasoline Engines - all V10s (except Dodge), engines up to 8.6 liters/525 cu in/ not exceeding 400 HP Diesel Engines - engines up to 7.3 liters/445 cu in/ not exceeding 300 HP (Max fuel flow 60 gph 227 lph) 5 Eco Points</p>	<p>Gasoline engines - Truck/SUV/Auto/Marine/Heavy Duty Equipment engines up to 14.6 liters/890 in/ not exceeding 500 HP (Including V10 Dodge) Diesel engines - Truck/SUV/Auto/Marine/ Heavy Duty Equipment engines up to 14.6 liters/890 in/ not exceeding 400 HP (Max fuel flow 80 gph) 5 Eco Points</p>

Discontinued

F750 In-Line - Gasoline Engines - Truck/Marine/Heavy Duty Equipment//Hi-performance Auto engines up to 750 HP.... Diesel Engines - Truck/Marine/Heavy Duty Equipment up to 15 liters/915 cu in/ not exceeding 450 HP (Maximum fuel flow 120 gph) \$589.95 10 Eco Points.

F1000 In-Line - Gasoline Engines - Hi- performance Auto/Heavy Duty Equipment/Truck engines up to 1000 HP Diesel Engines - Heavy Duty engines up to 750 HP (Maximum fuel flow of 180 gph/ 681 lph). \$789.95 10 Eco Points.



FAQ

(FREQUENTLY ASKED QUESTIONS)

Q. What is the difference between a fuel catalyst and an additive?

A. An additive is usually a chemical introduced into solution with fuel. Additives must be replenished at each refueling. A catalyst affects the fuel but does not become part of it.

Q. What are the major components of the Fitch® Fuel Catalyst?

A. The Catalyst is a composite of a number of metals forming an alloy. These metals are coalesced by a propriety process.

Q. How does the catalyst work?

A. All hydrocarbon fuels contain gums and resins which cause the fuel molecules of petrol and Diesel fuel to conglomerate in clusters. These clusters are too large to burn completely in the extremely short time that the burning fuel is in the combustion chamber. Therefore, these unburned molecules enter the exhaust stream as a smoky gas and do not contribute any power to the operation of the engine. The Catalyst dissolves these gums and resins so that these clusters of molecules do not form, allowing all the fuel to be used for power. The theory is verified by the fact that the catalyst fuel consistently produces exhaust emissions reductions of 50% or more in both hydrocarbons and carbon monoxide, thus indicating more complete combustion.



Q. What are the benefits to be gained from the use of the Catalyst?

A. Engine starting is easier, maintenance is less costly, fuel cost per kilometer is reduced and engine life is increased with more power and less pollution.

Q. How is the Catalyst introduced to the fuel supply?

A. For small engines of 50 HP or less, a small Catalyst unit, called a 'Drop-In', is simply inserted into the fuel tank. For larger engines either drop-in's or an in-line canister style Catalyst is installed in the fuel line.

Q. What type of engines will benefit from the use of the Catalyst?

A. The catalyst is effective on any petrol, diesel or LPG engine or any engine which is run on Fossil fuel, including buses, marine equipment, farm machinery, stationary pumps, generators, lawn and garden equipment, etc.

Q. How long does the Catalyst last?

A. The Fitch® Fuel Catalyst warranty is for 400,000 kilometers, 5,000 operating hours or five years, whichever comes first. It is a maintenance-free device.

Q. What is the difference between a Fitch® Fuel Catalyst and a Catalytic Converter?

A. The Fitch® Fuel Catalyst pretreats the fuel before the combustion process and by increasing combustion efficiency reduces the creation of pollutants. Catalytic Converters are installed at the end of the





combustion process where they remove pollutants after they have already been created.

Q. Can the Fitch® Fuel Catalyst be used in conjunction with a catalytic converter?

A. Absolutely - it will help extend the useful life of the catalytic converter.

Q. How much does the catalyst cost?

A. This depends on the size of the engine. Small engines like push and ride on lawn mowers can be equipped from \$40, with motorcycles around \$50. Cars start from around \$300 up to \$660, with large truck units costing between \$780 to \$1800.

OVERVIEW

By: Al Berlin, Ph.D Research & Product Development for Advanced Power Systems Prior to working on the development of the Fitch Fuel Catalyst Dr. Al Berlin was Director of Analytic Services for United Oil Products, a developer of the exhaust catalytic converter.

What Is a Catalyst?

A catalyst is a substance that increases the rate, or speed, of a reaction, at some temperature, without itself being transformed. A catalyst does this by reducing the energy required for the reaction to occur, thus saving energy, time and money. For example a vessel containing hydrochloric acid and tin will be stable. Upon adding a minute dose of a few hundredths of a grain of platinum, hydrogen gas will begin to boil off. At the end of the reaction, the platinum is in its original condition.

The Fitch Fuel Catalyst induces chemical reactions among fuel molecules at low temperatures such as those our vehicles and fuel tanks experience and it returns to its original state at the conclusion of the reaction ready to initiate a new sequence.

Reformulation of Hydrocarbon Fuel via Fitch Fuel Catalyst

Fuels are complex. Most of us think of fuels such as gasoline as a homogeneous commodity without realizing that it is not perfect or uniform. As purchased at the pump fuel is a mixture of about forty primary but as many as a thousand secondary different species of hydrocarbon molecules. If fuel were pure there would be few or only one type of molecule. Natural gas types of molecules are too short and light, and asphalt types of molecules are too long and heavy, *yet many of these light and heavy molecules are in the gasoline and diesel fuels available at the pump.*

Refineries, where fuel is manufactured from crude oil, cannot remove many poorly performing molecules to make a more ideal fuel. In addition, once fuel leaves the refinery or is stored it is subject to attack by oxygen, ozone, and microorganisms (bacteria, yeast, and mold) that grow in the fuel. All these processes degrade the fuel to make a poorer product that prevents engines from performing at optimum levels.

This poor fuel does not combust completely in engines and does not yield its maximum potential energy. Some of it forms carbon deposits and gums, and some is not completely burned putting unburned hydrocarbons into the exhaust. Over time, engines develop problems caused by sub-optimal fuel. These include gumming and constriction of fuel systems and carbon deposits in the combustion chamber and exhaust system.



This is one reason that today's vehicles need an exhaust catalytic converter to reduce toxic auto emissions. These toxic gasses (Unburned Hydrocarbons UHC and Carbon Monoxide CO) would not exist if the fuel / energy conversion in the engine was perfect. Exhaust system catalytic converters provide an environment for a chemical reaction where unburned hydrocarbons completely combust hence the combustion process continues but outside the engine combustion chamber where no useful energy is extracted. Over time, engines develop problems caused by sub-optimal fuel including gumming and constriction of fuel systems and carbon deposits in the combustion chamber and exhaust system.

With a **Fitch Fuel Catalyst** it is possible to deal with fuel problems in an effective way. The Fitch Fuel Catalyst reformulates fuel prior to combustion on board the vehicle, preventing oxygen and most diseases from attacking the fuel and reversing any degradation that may have occurred prior to the fuel being introduced to the vehicle. The Fitch Fuel Catalyst assists the combustion process by insuring that fuel is highly uniform, potent, consistent, and stable. It performs its function at the temperatures experienced in fuel tanks without any requirement for elevated temperatures or pressures, which is what makes the Fitch Fuel Catalyst so convenient and useful.

The Fitch Fuel Catalyst is not a fuel additive. It is a special alloy that does not dissolve in fuel. On the alloy surface the fuel is reformulated to a state that is capable of a more complete combustion. As a result, the engine converts the chemical energy in the fuel to mechanical energy in a more efficient manner. The engine power is increased as a result and the toxic exhaust emissions are decreased, frequently by more than half.

The Fitch Fuel Catalyst makes a material difference in an engines' power, fuel economy, and maintenance costs as well as air quality. As engines of all vintages use similar fuel the Fitch Fuel Catalyst can be used on any engine with confidence

What does the Fitch Fuel Catalyst do to fuel to improve it?

One way to describe how The Fitch Fuel Catalyst benefits the consumer or engine builder is by the differences in the composition of the fuel that results from exposure to the catalyst.

Gasoline

In gasoline (C7 - C11) we have measured changes due to the presence of the Fitch Fuel Catalyst. Here are some of the more significant ones and the implication of them

Analyses of the gasoline distribution after contact with the FFC shows changes in the composition of organic compounds in gasoline.

1. Light non-gasoline hydrocarbons present in the untreated fuel like C1 - C4 are markedly diminished and
2. Branched hydrocarbons larger than C4 were enhanced

Experimental data confirm that the Fitch Fuel Catalyst successfully:

1. Suppresses bacterial growth in gasoline minimizing this problem
2. Improves the Oxidation Stability of gasoline as measured by ASTM D525



The structure of a hydrocarbon molecule (straight, ring, or branched in shape) as well the number of carbon and hydrogen atoms per molecule is important to how well a molecule performs in a combustion engine. Molecules with the same number of hydrogen and carbon atoms but with different structures behave differently in an engine. Highly branched fuel molecules have been shown to be more desirable than straight chain molecules even when the number of carbon and hydrogen atoms per molecule is identical. An increase in the branched compounds and a reduction in the small light hydrocarbons enhances octane number of gasoline leading to improvement in engine performance and reduction of soot. More complex (branched) fuel molecules such as those produced through the influence of the Fitch Fuel Catalyst reduce power robbing knock. It has been determined through experiment that branched fuel molecules such as iso-octane are much less likely to knock compared to normal pentane.

The distribution curve of the various molecular weights and structures within gasoline show a reduction in the less desirable molecule population after exposure to the Fitch Fuel Catalyst and a marked increase in the concentration of molecules of desirable weight and structure. These modifications in the fuel improvement result in the improvements in power and emissions measured in engine tests.

Higher-octane fuels allow for more advanced spark timing. Advanced spark timings produce higher in-cylinder pressures and temperatures producing greater engine output torque and power.

The high fuel quality resulting from exposure to the Fitch Fuel Catalyst insures quality of combustion. The Fitch Fuel Catalyst is an octane enhancer and fuel stabilizer in one permanent device.

Diesel

In diesel fuels the Fitch Fuel Catalyst reduces the number of highly oxidized molecules. This increases the cetane value of the fuel and allows the engine to extract more power from a gallon of fuel.



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INDEPENDENT TESTING

The following US Government and approved agencies have tested and certified the Fitch® Fuel Catalyst.

NAME OF AGENCY/TESTING FACILITY	TEST PERFORMED/APPROVAL
National Institute for Petroleum & Energy Research (NIPER)	Diesel and petrol emission testing using EPA FTP75 Federal Highway Test 3 Cycle 3 Bag procedure.
US Department of Energy	GC/MS Fuel Analysis confirming Molecular changes in all fuels tested
U.S.Advanced Propulsion Technology Centre	Gas Chromatography Test on Fuels.
Southern California Air Quality Monitoring Division (SCAQMD)	Testing conducted for State & Federal EPA emissions evaluation and certification.
California Air Resources Board (CARB)	Testing conducted for State and Federal EPA emissions evaluation and Certification.
Oak Ridge National Laboratory	Government certification/military specs. Fuel analysis.
Martin Marietta Energy Systems	Atomic absorption/ICP spectroscopy test.
Carnegie Mellon Research Institute	Catalytic definition and leaching test.
Lubrication Engineers, Inc. (Mack Truck)	Oil analysis. Soot oil contamination.
Centre for Emissions Research and Analysis (CERA)	SAE J1088 Small Engine Test for State and Federal EPA emissions evaluation and certification.
U.S.Air Force Material Command.	MEEP Program for emissions and subsequent recommendation for broadscale use.
U.S.Forest Service.	Field testing on staff vehicles, heavy construction equipment and outdoor Power equipment.
U.S.Navy	Approved fitment for diesel powered vessels under the U.S.Navy Smart Ship Program.
U.S.Coast Guard American Marine Standards	Canister Body Integrity Pressure Test meets or exceeds all U.S.Coast Guard standards.
Pratt & Whitney Jet Engines Military Division	ASTM d 3421 Jet Fuel Test JP8 Thermal Oxidative Stability Test
Auto Research Labs	Reed Vapour Pressure Testing ASTM D5191 Oxygen Stability Test D525
Marine Corp. of America.	Engine Dynamometer Testing 7.3 . Litre.



Los Angeles Transit	EPA Urban Bus 3 Cycle 3 Bag Test
Los Angeles County Metropolitan Transport Authority	7 months testing using the only EPA approved chassis dyno test facility in the U.S.A.
City of Chicago, Illinois	1 year field testing on city government vehicles confirming increased fuel efficiency.
State of Texas	Natural Resource Conservation Commission, Jan. 16 th 1996, official endorsement for Department of Transport: recommendation for use on Government vehicles in urban areas.
Denton County, Texas	Emission exemption waiver granted to equipment fitted with Fitch® catalyst to operate on days of high pollution readings(hand powered equipment and mowers). Formal adoption by Denton County Police, Fire and Emergency Units for use on department vehicles and equipment.
U.S.A.Environmental Protection Agency	Federal test procedure certifying test results and verifying authenticity and subsequent issuing of EPA certification.
Hawaii State Mass Transit	Diesel particulate and opacity testing on buses.
California, Connecticut, Massachusetts, Texas and Georgia	Official State Emission Testing on Fitch® catalyst confirming before and after results.
Homelite, Division of John Deere Corp.	Performance and tear down analysis.
Darr Power(Caterpillar Distributor)	Truck Dynamometer to manufacturer specs.
Spain	ECE 15/04 EEC equivalent of the US EPA FTP 75 test procedures. Certification to follow.
Chile	State EPA tests completed. Environmental Ministry will certify.

