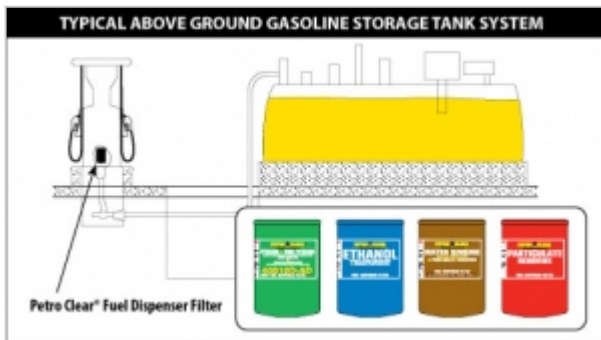
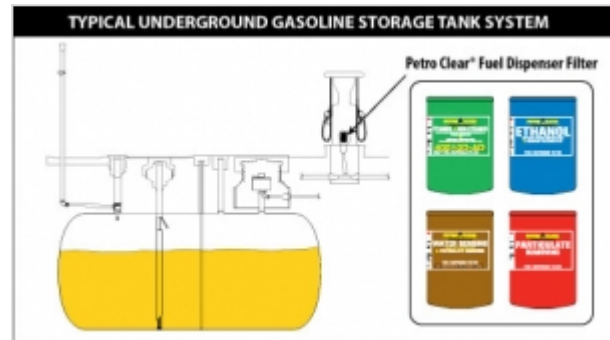


Petrol PLAZA

The Future of Fuel Filters - New fuel markets create need for enhanced fuel-filter performance

Fuel(s)	Problem(s)	Solution
▶ Ethanol Blended Gasoline ▶ 100% Gasoline	Particulate (Dirt) Water Phase Separation	Phase Separation Detection & Water Sensing & Particulate Removing
▶ Ethanol Blended Gasoline	Particulate (Dirt) Phase Separation	Phase Separation Detection "Alert" & Particulate Removing
▶ 100% Gasoline Only ▶ Diesel, Biodiesel and ULSD ▶ E5, ND or Less	Particulate (Dirt) Water	Water Sensing & Particulate Removing
▶ All Ethanol Blended Gasoline ▶ 100% Gasoline ▶ Diesel, Biodiesel and ULSD	Particulate (Dirt)	Particulate Removing Only



At the most basic level, fuel-dispenser filters are designed to protect a fuel dispenser's meter and an engine's fuel system by removing a wide variety of contaminants such as rust, dirt, scale and other foreign materials from the fuel before they can enter the vehicle. Filters are designed either for a single purpose for example dirt (particulate) removal: or they can be designed for multiple functions such as filtering dirt, while also sensing the presence of water contamination which can be extremely damaging to engine operation. Being able to rely on a dispenser's fuel filter is more important than ever as today's demanding engines need more protection to keep vital engine components such as fuel injectors clean and functioning at the optimum level.

Spin-on Filters

The most common type of dispenser fuel filter is the "spin-on" filter. They are called this because they "spin on and off" to make changing the filter for a new one, when the old one is full of the

contamination it has filtered out, easier. The “spin-on” filter is mounted to a threaded base plate at a point that allows the fuel to pass through them before entering a vehicle’s fuel tank. A rubber sealing gasket creates a seal between filter and mounting base and keeps the fuel from leaking out, while a filtering media traps the contaminants before they can pass through to the vehicle.

Changes in Fuel Types

A major change in what dispenser fuel filters are asked to do and how they perform is the types of fuel that are now required to pass through them. Whereas there used to be only a choice of regular or ethyl then leaded or unleaded gasoline. Drivers now can fill up—depending on the type of vehicle they operate—with gasoline that is 10, 15, or up to 85% ethanol, Biodiesel made from soy beans, animal fat or reprocessed frying oils or USLD (Ultra Low Sulfur Diesel) and alternative-fuel types that are predominantly composed of higher ethanol blends.

These new fuel types raise compatibility concerns as the filters used must be able to handle the specific characteristics of the fuel. That has led to the creation of a whole new generation of dispenser fuel filters that have been designed to mesh with these new fuel types.

For instance, there filters being developed for use in non-ethanol blends and diesel fuels that sense (react) to water in the bulk fuel tank and will slow the flow down as a indication there is a problem that needs to be taken care of since engines will not run on water. Different filters are needed specifically with ethanol blended fuels for the detection of phase separation. Phase separation occurs when enough water contaminates ethanol-treated gasoline, causing the ethanol that is bonded to the gasoline, to separate and attach itself to the water molecules breaking the gas/ethanol bond, leaving two distinct layers in the storage tank, a low-octane gasoline-only layer at the top and an ethanol/water “cocktail” along the bottom. If phase-separated gasoline is dispensed into a vehicle’s engine, the engine will not run or, in the worst-case scenario, major engine failure will occur costing thousands of dollars to repair. To combat this potential problem, phase separation “Alert” filters have been developed that will notify the operator of the condition by slowing fuel flow to less than one gallon per minute. This alerts the operator that phase separation may be occurring in the storage tanks and the fuel should be tested. Besides the Phase Separation issue, ethanol’s solvent nature also means that tanks, hoses and other fueling components will be scoured (cleaned) by the alcohol, with the result that many more contaminants will be thrown at the filter, which must operate at a level high enough to properly filter out these particles.

Care must also be taken that the filter components, such as filtration medias and coatings, are compatible with the wider array of fuel types available today. To handle this high array of fuels, dispenser filters are being created that are epoxy-coated inside to prevent corrosion of the filter body. This is crucial in preventing the filter from rusting on the inside, which adds more contaminants, shortens filter life and eliminates the potential of the filter leaking hazardous fuel into the environment or causing injury . As for the outside of the filter, they are Powder Coated to resist the effects of outside conditions. This Powder Coating eliminates the Volatile Organic Compounds (VOCs)

that are released to the atmosphere when drying liquid paint. The Powder Coating also eliminates hazardous spills and disposal of hazardous waste associated with conventional painting liquids, since the powder can be reclaimed, and used, which is a crucial consideration for environmental protection concerns during manufacturing.

Filter System Equipment

Filter adapter heads are also being developed and available, that are made of cast iron or aluminum alloy and machined for a better fit for the spin-on dispenser filter. The adapters are especially helpful when plumbing a new system or retrofitting an old one. There are also various adapter sizes for different flow rates and connections.

Looking Ahead

As the dispenser fuel filter universe continues to evolve, the industry's leading companies are taking a proactive approach. This includes the use of advanced testing equipment that determines the filter's optimum design and performance parameters, both inside and outside the filter. This approach has led to the latest in cutting-edge fuel-filter technology, and will be at the forefront of future design and performance enhancements as the world of motor fuels continues to evolve.

Michael J. Gruca has been an Engineer in industry for over 39 years, 11 years in the design of hydraulic system and the last 28 years in the design of filtration. He has worked with most major oil companies, auto and truck manufacturers to develop filters for their needs. He holds several patents for fuel dispenser filters. In his current position he is responsible for design and development of filters for fuel dispensing, Mike works with a strong network of distributors who provide customers with high-performance dispenser filters for use with fuels including all blends of Gasoline, Ethanol Blended Gasoline, Diesel and Biodiesel.