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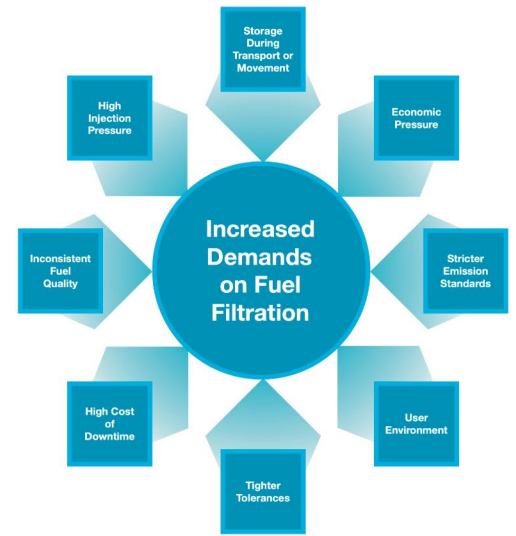
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Ensuring Continuity and Reliability in Diesel Power Generation

Today's diesel powered generators are more efficient, have tighter tolerance between internal components and are required to meet even cleaner emission standards. In order to ensure high efficiency operation and to minimize unplanned downtime, fuel cleanliness should be of the utmost concern.

We understand that fuel cleanliness begins at the source, the refinery, and ends when the fuel is combusted. Fuel may leave the refineries clean, but as they are stored and transferred, solid and water contaminants are introduced to the fuel causing quality to fall below OEM required specifications.

DEPURDiesel solutions includes a complete range of products and technologies to help you achieve your fuel cleanliness needs. Our fuel conditioning solutions will help you see the contaminants which can cause premature injection failures.



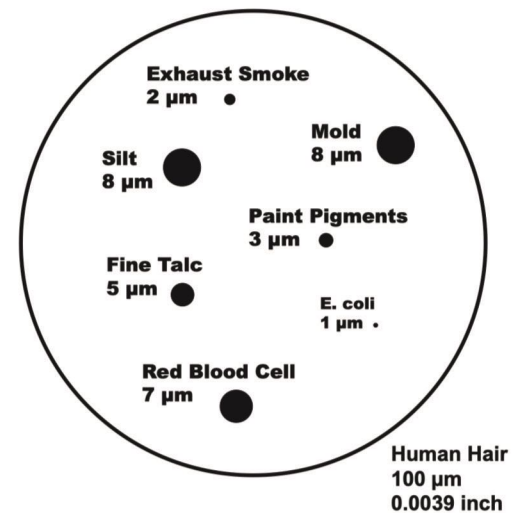
How Big are Contaminants?

It is common for diesel equipment users to inquire as to what fuel quality needs to be attained for their application or equipment. First, this question should be posed to the equipment or engine OEM.

Many OEM's have published required fuel cleanliness levels and OEM's could deny warranty claims if these standards are not met.

Although, most equipment will have on-board filters to achieve the required cleanliness level, in order for the on-board filters to extend the life of equipment, the fuel delivered to the vehicle must meet certain initial cleanliness level. Poor to fair fuel quality may have a sufficient level of contamination to overwhelm the on-board filters, increasing equipment wear, causing either short or long term issues. Further, some OEM's require a given level of fuel quality to be delivered to the vehicle to maintain the engine warranty.

A single fuel related unplanned equipment upset can easily surpass the same cost of several years of a well-run fuel maintenance program which includes the bulk fuel filtration costs.



Bulk Diesel ISO4406 Quality Ranges*		
Poor	> 22/20/18	
Fair	22/20/18	19/17/15
Good	18/16/13	16/14/12
Excellent	< 15/13/11	

*ISO 4406:1999 Cleanliness Standards

Sources of Contaminants

Contaminants are commonly introduced during transfer and storage. When fuel is loaded into transport storage or bulk storage terminals, existing contaminants will mix with the new fuel. Real world maintenance practices may also accentuate the problems, where transfer nozzles may be contaminated as no dust caps are fitted, schedules are missed and replacement of expired or damaged equipment is not performed.

Types of contaminants which can cause equipment failures include:

- Simple rust, airborne dirt and water.
- Temperature variation (precipitation of dissolved water).
- Additive impact and compatibility issues (note most low sulphur diesel will contain a lubricity improver which may stabilize water haze) as well as possible low temperature and combustion improver (cetane) additives.
- Biodiesel compatibility, aging and purity issues.
- Microbiological spoilage.

Contaminants as small as 4 microns in diameter can cause extensive injector damages in today's modern diesel engines.

Effects of Contaminants

ABRASIVE CONTAMINANTS ACCELERATES INJECTOR WEAR

Increased injection pressure action on the same level of abrasive contaminants in fuel will result in accelerated injector abrasive wear. Abrasive wear can only be reduced by removing abrasives from the fuel. On-board filtration is effective up to certain initial fuel cleanliness levels. Additional pre-filtration may be needed to transform cleanliness level of the fuel supply to meet operating requirements of on-board filters.

WATER IN FUEL IS A KEY CAUSE IN INJECTOR FAILURE

An excessive amount of latent water in the fuel is a key cause of injector failure. Water has inadequate film strength to minimize metal-to-metal contact between the plunger and the barrel, resulting in plunger scuffing or seizure. Water can be effectively removed by the use and regular maintenance of a water separator or bulk fuel filter/water coalescer. Removal of excess latent water is essential to prevent scuffing with the upcoming injection pressure increases and subsequent hydraulic loading of internal injector parts.

EXCESSIVE FUEL TEMPERATURE

Increasing fuel temperature reduces fuel viscosity and fuel film strength. Injector plunger and barrel scuffing are highly probably because of the reduced fuel film strength. Limiting the maximum fuel temperature will become even more critical with the increased use of very low sulfur fuel which has lower film strength, and common rail fuel systems which run elevated fuel temperatures.

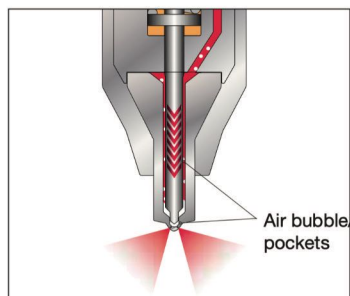
SUPPLY PRESSURE IS CRUCIAL TO PROPER FILLING AND PROPER OPERATION OF THE INJECTOR

When fuel filters are plugged and restrict the flow of fuel entering the injector this causes vacuum bubbles which implodes resulting in incomplete filling.

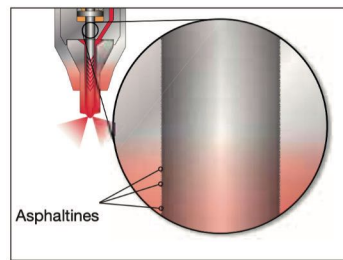
Incomplete filling of the injector can cause erratic fuel delivery and may eventually lead to internal cavitation damage to the injector.



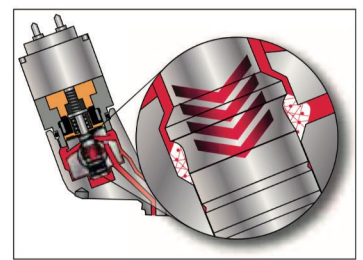
Injector plunger scuffing and seizure is nearly always caused by excessive amounts of water in the fuel.



Air bubbles in the tip of injector provides no damping allowing the check to impact the tip with much greater force.



Asphaltines formed by very hot fuel contain highly abrasive particles.



Low fuel supply pressure from plugged fuel filters can cause cavitation damage of injector poppet valve during injector fill.

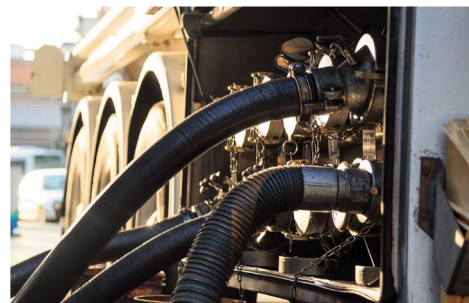
DEPURDiesel Solutions

Proven solutions to ensure your fuel quality is up to specification when you need it.

Distribution/Transport

Fuel may meet diesel engine cleanliness requires when they leave refineries, but what happens during transport and storage? Contaminants like silica, dust, pipe scale, algae, and water are common contaminants introduced during transport and storage of bulk diesel fuel. The more transfer points you have the greater the opportunity for fuel contamination. To ensure fuel does not become off specification at delivery, filtration systems should be incorporated at every transfer point in the supply chain.

- Bulk filtration and water removal solutions at reception and loading
- Condition monitoring to ensure accountability along the supply chain
- Control of contaminants and prevent continuation of existing fuel supplies



On-Site Fuel Storage

How reliable is your fuel when you need it? DEPURDiesel filtration solutions protect your vital assets from harmful contaminants. Even contaminants at microscopic sizes can cause catastrophic damage or unnecessary downtime. To ensure continuity and reliability of power, on-site filtration is a must in addition to establishing a filtration regime. Our solutions can be implemented at:

- Data Centers
- Municipal Power
- Hospital Emergency Power
- Underground Storage



Containerized Power

Increase demand for greener energy and quick power establishment in countries without the proper infrastructure have created a demand for a supplemental energy source such as diesel in order to ensure power is consistent, reliable, and allows for reduction of loads on existing power grids. Wind and solar energy is not consistent so additional diesel power in containers are used to ensure steady flow of electricity.

For remote location where electric infrastructures are non-existent, containerized power modules provide fast and reliable temporary power to a small city while the infrastructure is being established.

Applications for Containerized Power includes:

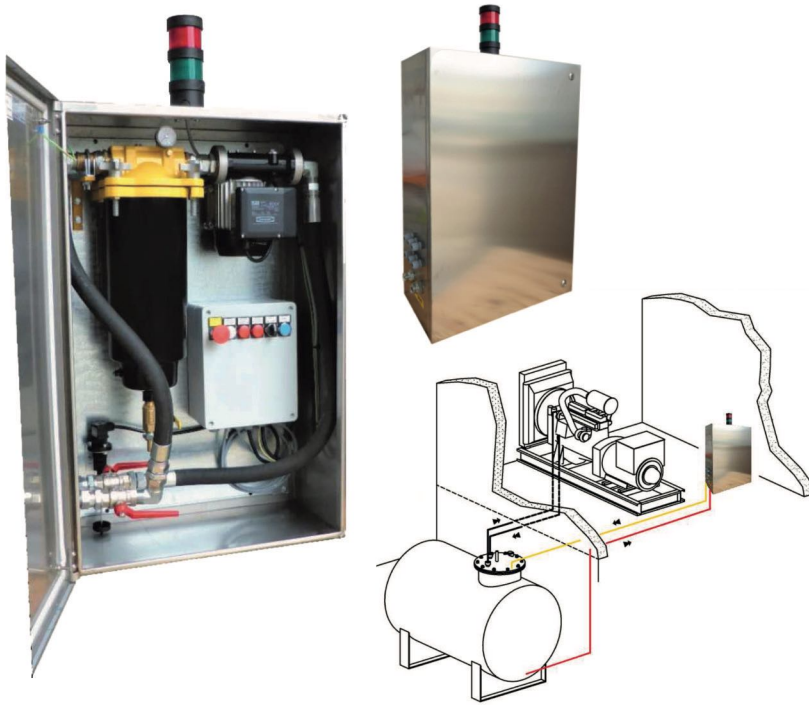
- Fuel quality accountability at reception
- Filtration Prior to Storage
- Maintenance Fuel Forwarding
- Filtration at Dispense



DIESEL DEFENDER 79 plus

AUTOMATIC UNIT FOR DIESEL FILTRATION / WATER SEPARATION

- ▶ Designed for engine feed tanks or outdoor tanks
- ▶ Recirculates and purifies the stored fuel constantly and automatically.
- ▶ Maintains an optimum level of cleanliness for pumps and injectors.



SPECIFICATION



Height	90 cm
Width	60 cm
Depth	30 cm
Weight	90 kg
Flow rate	79 l/min
Filtration	10 μ water separator
Max pressure	3 bar
Temperature	5 / 70°C
Fluid use	Gasolio EN590
Power	230V/50Hz - 800w
Use	External / Internal

OVERVIEW

Fuel filtration maintains an acceptable level of cleanliness to safeguard the high-pressure pump and injectors.

The DD79 Plus for external or internal applications ensures that fuel stored in engine feed tanks or cisterns is constantly and automatically recirculated and purified.

The system is equipped with a flashing light to signal the correct filtration cycle (manual/automatic with timer) or any anomalies such as: electric motor blocked due to motor protection thermal cut-out or fuel leakage inside the tank.

On request, external consents for other functions can be connected to the control panel.

FEATURES

- AISI 304 stainless steel cabinet with IP 55 protection; painted steel fuel filter; FKM pump and filter gaskets.
- Available filtration grades: 5 μ , 10 μ water separator.
- Shut-off valves: internal 1" gas (suction and discharge).
- System connections: external 1" gas (suction and delivery).
- Max door opening angle: 145° with hinges on the left.

MULTI-PARAMETER FUEL & OIL TEST KITS

- ▶ Fast, accurate results for multiple oil parameters, in an easy to use, portable kit
- ▶ Make informed on-site maintenance decisions
- ▶ Act before the onset of critical failure



The DIGI+ Water in Oil Test Kit provides state of the art, digital analysis and gives fast, accurate results for easy monitoring of trends. The kit contains a test cell together with all necessary reagents and equipment for an easy to use, economical test.

DIGI Water Kit is able to test the following parameters:

Water in oil

- Prevent corrosion, cavitation or failure of your machinery by detecting water in oil, before any damage occurs
- Minimise instability of additive packages and damaging microbe growth by monitoring your oil
- Fully portable for use on-board or in the field, test kits are extremely robust, durable and easy to use



Viscosity

- The ECON Viscostick gives a simple go/no go result. Typically it will detect 5-10% distillate fuel dilution of an SAE 30 to 40 engine oil as well as increases in viscosity due to oil contamination.



A 360° IMPROVEMENT OF THE OFFROAD DIESEL QUALITY

DESCRIPTION

360 Offroad Bio is a high-performance package specifically developed for automotive diesel fuel. Its formulation is designed to ensure a 360° of improvement of the fuel characteristics, from the storage stability for long periods to the protection of the motor, improving the fuel's properties of ignition and combustion. The high effectiveness and the proper balancing of the various components can transform a standard diesel fuel into a very high quality one, capable of generating the best performance and maintaining its exceptional characteristics over time.

The new version BIO has been developed to counteract all those phenomena specifically related to the presence of biodiesel in the diesel fuel blending.

BENEFITS

- **Reduction** of the ignition delay and catalysis of the phenomena of combustion for better fuel efficiency
- **Maintenance** of optimum operating conditions due to the presence of an innovative detergent component
- **Increased** oxidative stability and thus reducing the tendency of the fuel to form gums and deposits during long storage times
- **Reduction** of the tendency to foam • **Motor** protection from corrosion

APPLICATION

- 1 / 1.000 liter of diesel fuel to be treated

PACKAGE

- Box of 12 1- litre bottle
- 20 kg iron canister
- 190 kg iron drum



Actions

- Control of microbiological contamination
- Increase of Cetane Number
- Reduction of deposits
- Stability Improvement
- Water content control
- Corrosion inhibition



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