



## Fuel Housekeeping Eases Maintenance Costs

Engine performance and profitable operations depend significantly on the quality of fuel being used.

Yet, the only way to know what's really powering your equipment is through good fuel housekeeping and a thorough analysis program.

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### Routine Testing

On-the-spot checks and laboratory tests allow you to confirm that you are receiving on-spec fuel, free of contamination. Then, regular testing of the fuel contained in storage tanks will identify the presence of potentially harmful contaminants and degradation of quality.

This analysis enables you to take corrective action before critical conditions endanger your engines.

Scheduled fuel analysis—from delivery to storage to fuel tanks—is a major and necessary element of sophisticated maintenance programs.

Diesel fuels are blends of middle distillates. They are designed to provide proper volatility, compression characteristics, viscosity, sulfur level, gravity and other properties. Various additives—which impart special properties to the fuel—are also present.

Properties of commercial diesel fuels for trucking, construction, mining and stand-by power generation depend on the nature of the crude oils from which they are derived, plus the methods of refining and transfer to your location. Age of the fuel is an important factor, as well. ASTM defines 'long-term' storage at six months or longer.

Basic requirements for all fuels are satisfactory ignition and combustion, suitability with your fuel injection systems, and convenient handling at all levels—from refinery to injectors—without suffering degradation or contamination.

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### Analysis of New Deliveries

Fleet and maintenance managers need to be aware of the physical characteristics of their incoming and stored fuel.

To meet that requirement, Analysts provides a full range of analysis packages for all types of fuels. The programs make fuel management an effective part of both operational and maintenance functions. These packages cover fuel analysis at delivery, during storage, and in service tanks.

All new deliveries should be sampled and tested to measure specified physical properties. It is essential that new stock meets the specifications of the product you ordered. From a variety of causes, fuel can be out of grade from those specs.

Or, contamination may have occurred between refining, handling and delivery to your location.

Quality assurance and specification tests will confirm that the fuel received provides the expected ignition characteristics, emissions standards and fuel-system operation. These tests establish benchmarks for monitoring the quality and contamination levels for the remaining life of the fuel. From the tests, you'll know practical information for fuel storage, handling and seasonal blending.

Analysts applies a series of ASTM tests matched to the type of fuel you use. From your samples, our lab determines the physical properties of new stock. The analysis also confirms the product grade and that the new delivery is free of contamination.

Depending on the type and grade of fuel, additional analyses measure sulfur content, cetane number, viscosity, flash point, cloud point, ash content, carbon residue, copper corrosion, water/sediment and other critical properties.

Ideally, this analysis should be performed before the new delivery is dispensed into bulk storage tanks and mixed with known clean fuel. At the very least, it should be performed at the time of delivery to ascertain the fuel's characteristics.

## Monitoring Stability

In long term storage, chemical oxidation promotes varnish formation and associated deposits or sediment. Stability tests by Analysts' laboratories determine whether your fuel will store as-is, or if additives need to be used to slow oxidation.

An important area monitored in fuel housekeeping and management is copper corrosion. Special testing estimates your stored fuel's corrosive potential because copper alloys in fuel-delivery systems are corroded by the same sulfur-based acids that attack engine parts in service.

Fuel "flow" is especially important in cold weather operation. Two separate assessments of low temperature paraffin formation can be performed to:

- ➔ Indicate when additives are needed
- ➔ Determine the lowest temperature at which your fuel should be used.



## Contaminant Protection

Once your fuel has been correctly specified and stabilized for storage and use, it must be kept free of contamination. Several of the following risk factors can emerge.

- ➔ Fuel is subject to the formation of degrading by-products, some of which can become large enough to plug filters or otherwise diminish engine performance. During long term storage, fuel comes in contact with air and moisture, usually due to condensation. This leads to the formation of gums and sediments.
- ➔ During long-term storage, the instability of a fuel and the resulting degradation and oxidation contribute to a formation of suspended insolubles. This contamination can cause filter plugging, combustion-chamber deposits and varnishing or lacquering of injection-system components.
- ➔ Accumulation of water in the bottom of fuel-storage tanks can cause corrosion of the tank and eventually, the engine-fuel system. These corrosion particles can cause abrasive wear during fuel delivery.
- ➔ When solid contaminants and water accumulate in storage tanks, you face the possibility of water-particulate sludges forming. Excessive amounts of water will promote the growth of microorganisms. A microbial infection of this type leads to clogged filters, damaged fuel pumps and injectors and corrosive by-products.

Separate spectrochemical and physical tests detect inherent trace metals, metallic-corrosion products and solid contaminants such as sand and dirt. Analysts' identification and measurement of water, microorganisms and solid contaminants help you detect and correct improper fuel handling and filtration, leaking storage containers, or storage tank corrosion problems before they cripple your fuel storage and damage your engines.



## Variety of Analysis Packages

Several test packages are available and include sampling from different storage levels. In some cases, special sampling kits are necessary. Your Analysts representative will explain sampling procedures for each test and the benefits of scheduled testing in detail. Call the lab nearest you to speak with a technical representative. Or visit us at [www.analystsinc.com](http://www.analystsinc.com).

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