

Corrosion Testing

What is corrosion?

Corrosion is referred to as the deterioration of a material through chemical interaction with the surrounding environment. Corrosion caused by fuels and lubricants can result from a number of parameters which include:

- Undesirable sulfur compounds
- Moisture
- Dissolved salts
- Temperature

Left unchecked, corrosion can cause irreversible damage to engines, pipelines and other assets. Such problems are not only costly to rectify but can lead to equipment failure as well as health and safety risks.

As an example, corrosion damage to the fuel system of aero engines has in the past been clearly attributed to the presence in some aviation turbine fuels (ATF's) of undesirable sulfur compounds.

Most fuel and lubricant specifications include test methods for corrosion.



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Corrosion testing is fundamental in assessing how fuels and lubricants perform under simulated service conditions and helps to support effective control and prevention of problems caused by corrosion. Laboratory tests assist to:

- Determine whether a fuel sample has been contaminated with potentially corrosive agents such as hydrogen sulfide, mercaptans, elemental sulfur, or inorganic acids.
- Rate the effectiveness of copper and silver corrosion inhibitors in preventing corrosion.
- Identify those fuel blend components that may lead to the corrosion of alloys such as brass, bronze and silver, these alloys being often found in fuel system components.

Copper strip tarnish test

The Copper Strip Tarnish Test assesses the relative degree of corrosiveness of petroleum products, including aviation fuels, automotive gasoline, natural gasoline, solvents, kerosene, diesel fuel, distillate fuel oil, lubricating oil and other products.

The corrosiveness of the fuel is measured by a combination of copper strip and silver strip corrosion tests. The present paper relates various aspects of corrosiveness of different types of sulfur compounds in ATF's toward copper and silver. The corrosive action of elemental sulfur in the presence of naturally occurring sulfur compounds and organic peroxides has been fully discussed on the basis of experimental data. Of the various types of sulfur compounds likely to be present in ATF's, only hydrogen sulfide and elemental sulfur were found to be corrosive to copper and silver at very low dosages. Naturally occurring sulfur compounds and peroxides were observed to inhibit the corrosive action of elemental sulfur to some extent. Silver is more susceptible to corrosion than copper.



> 11310-0 Copper Silver Block Bath

Further information about corrosion testing can be found at www.stanhope-seta.co.uk/corrosion.asp