MORTRACE™ Fuel Marking Systems

Description

Rohm and Haas is a pioneer in the field of chemical markers for petroleum applications and has been supplying them under the MORTRACE brand name for over 30 years. MORTRACE markers are completely miscible in fuels and impart little to no colour to the marked fuel. They can be detected by a simple extraction procedure that gives a clear, positive colour reaction when they are present.

In many countries around the world, MORTRACE markers are employed in government sponsored fuel marking programs designed to enable identification of the presence of tax-free or subsidized fuels in uses that are taxed at a higher rate. An example of this is kerosene which is often tax exempt and left unchecked could be used as an adulterant in road fuels. A visible dye is often used in conjunction with a MORTRACE marker to give a quick visual identification of tax-free or subsidized fuels.

Applications

MORTRACE markers are compatible with dyestuffs used for the colouration of petroleum products. When used alone or in combination with Rohm and Haas’ AUTOMATE™ dyes, they can be used to identify a particular fuel for:

- Brand authentication
- Prevention and detection of fuel tax evasion
- Detection of unauthorized usage or theft
- Quantification of additive package addition

Laundering Resistance

When markers are used to identify subsidized or tax exempt fuel to reveal theft, they may be subjected to illicit/illegal treatment to remove both dyes and markers. We refer to this as laundering.

MORTRACE markers exhibit excellent resistance to common removal techniques making such activity both difficult and expensive. This is a key competitive advantage over other extractable or development markers that can be readily removed through the use of readily available absorbents such as activated charcoal, Fullers earth or alumina.

Usage of MORTRACE Markers

Typically, MORTRACE marker is added at levels between 5 and 50 mg/l to the fuel at the Company’s distribution terminals using an accurate dosing system. Where possible, the marker is pre-mixed with other fuel additives such as dyes or detergents to avoid the cost of a separate injection system. MORTRACE markers disperse readily and can be manually added to tank truck prior to filling with confidence that a homogenous solution will result. When marking fuel in an existing storage tank, it is important that measures are taken to ensure thorough mixing.

This can be achieved in several ways:

- Use of in-line injector to introduce the marker into the petroleum product during its flow through a feed pipe into a storage area.
- Through slug injection of the marker into the tank prior to filling with fuel. The action of filling the tank should provide sufficient movement to ensure mixing of the marker with the fuel. If possible, more thorough mixing can be achieved by pumping fuel from the bottom of the storage tank into the top, or alternatively to stir the contents of the tank.
During the implementation of the marker program it will be necessary to estimate the amount of unmarked fuel present in the storage tank. The total volume of marker to be injected is determined by combining the existing volume in the tank with the new delivery and applying the target dose rate. It is also recommended a high initial dosage rate of the marker is used (double the normal level) to ensure adequate marking levels when marked fuel is first introduced into the distribution network in order to speed up the rate in which the fuel reaches equilibrium in the market. This slug injection should occur prior to receipt of the new delivery.

**Sampling and Testing**

MORTRACE markers are all designed to respond to a simple "mix and shake" reaction to produce a positive colour to indicate their presence.

Test kits are available for simple or semi quantitative estimations of the amount of MORTRACE present in a fuel.

The normal procedure is to partially fill a test vial with fuel believed to contain the marker and to mix with the specific reagent for the marker. In order to detect low levels of the marker, the volumes of fuel and reagent are adjusted so that there is 5 times the amount of fuel to the amount of reagent. These reagents are water based solutions and will, therefore, settle to the bottom of the test vial after mixing and shaking with the fuel. Using the ratio of fuel to reagent indicated above, a strong colour will be produced in the lower water layer. If the lower water layer remains colourless, no marker is present. Dependent upon the intensity of the colour, an estimate of the amount of marker, and therefore marked fuel, can be made. This estimation can be facilitated by comparing the intensity of the colour with a colour chart, or by using colour filters in a comparator.

More accurate estimations of the quantity of a marker present and therefore amount of marked fuel can be made in the laboratory by using standard quantitative analytical procedures. These will normally require use of a spectrophotometer, colorimeter or tintometer/comparator to accurately measure the colour produced compared to suitable standards.

**Technical Service**

Rohm and Haas offers a wide range of technical services including custom design of a marker package that meets your specific needs, help in defining the lowest cost and most effective injection method, as well as on-going technical training and assistance. MORTRACE markers are custom designed and when used for brand identification either in a geographic area or as a company identification, Rohm and Haas can enter a supply contract to ensure no other MORTRACE markers are supplied within the location which will cause interference.

**Technical Information**

Full toxicological and technical data are available on all the products and provide information on their safe handling, storage and usage.

*Ask your Rohm and Haas representative for a demonstration of our MORTRACE Marker System and the strong technical support that goes with it.*

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