Adding Dye to Chevron Industrial Oil Products

Dye markers may be added to industrial oils to protect brand equity, prevent misidentification and aid in identifying leaks.

With very light-colored base oils, some customers have difficulty seeing the oil flowing in sight glass openings. Adding dye is a solution to increase visibility.

This Technical Bulletin provides information on the selection and addition of dyes.

Dye selection

Dyes are commercially available in solid or liquid form. Some are soluble in polar solvents (water, alcohol, ketones), while others will dissolve in hydrocarbons. The latter are most suitable for addition to hydrocarbon-based lubricating oils. Dyes in liquid form usually contain a solvent and are much easier to dissolve in lubricating oils than solid dyes. A dye should be intense enough so that the desired level of coloration can be attained with a low concentration of added dye.

Rohm and Haas Automate® dyes are supplied in a high-flash hydrocarbon solvent and dissolve readily in petroleum-based lubricating oils. Some of the colors available are Automate Blue 8AHF, Automate Green HFXS, Automate Yellow HF, Automate Brown 2HFXS, and Automate Orange 2HFXS. HF designates a "high flash" solvent.

Dyes other than the line of Automate® brand visible dye markers may also be satisfactory. In all cases, you should contact the dye manufacturer for help with a solution tailored to your requirements.

Choosing a dye concentration

To darken oil to colors commonly encountered in lubricants, we recommend Automate® Brown 2HFXS. As little as 15 to 25 parts per million (ppm) by volume will produce oil color comparable in ASTM color to Group I base oils. This should be suitable where enhanced visibility in sight glasses is all that is needed. If lighting is poor, increasing the dye concentration to 50 ppm will produce a darker color without adverse effect on the oil.

Blue, brown, green, or orange dyes will produce strong colors at concentrations of 100 to 250 ppm by volume. These higher concentrations increase the cost of treatment and are not generally needed for enhanced visibility.

For guidance, addition of dye to 1 drum (55 gallons) of lubricating oil will require 20 milliliters (just under 1.0 fluid ounce) to achieve a concentration of 100 ppm by volume.

Dispersing dye in lubricating oil

Automate® dyes mix readily in warm, circulating oil. To add dye to an operating lubricating system, slowly pour or inject a liquid dye into well agitated oil at temperatures from 38° C – 60° C (100° F – 140° F). This should produce a uniform color within a short time. Heating is not essential to mixing dye into oil, but will reduce oil viscosity and increase the ease of obtaining a uniform color. This is particularly true for higher viscosity lubricants (ISO 150 and higher).

When it is impractical to add dye directly into well agitated oil, better dispersancy will be achieved if the dye is first added to 5 – 55 gallons of oil in an open container, which can be stirred mechanically to achieve an even color. A standing tank can be mixed by pumping oil from the tank bottom through a pump and lines which will return oil to the tank top. Mixing dye into a large batch of oil requires good mechanical stirring and works best when the oil can be heated to a temperature of 49° C – 54° C (120° F – 130° F).

Fluorescent dyes

An alternative to colored dyes is fluorescent dyes. Fluorescent dyes show no color under normal light but fluoresce under ultraviolet radiation. Fluorescent dyes are used at very low concentrations in a variety of fluids.

Other factors to consider

- When an in-service oil contains a dye that is not part of the manufacturer's formulation, confusion can occur about the identity of the product.
- A Material Safety Data Sheet (MSDS) contains information about the appearance of the oil that may differ from the actual appearance of the oil once dye is added.
- If oil samples are submitted for laboratory analysis, an uncharacteristic color can lead to misinterpretation.
- Once oil is dyed, it is the responsibility of the owner to include information about the source of the coloration.

Resources

Rohm and Haas Company

Automate® HF series

For adding color to lubricants and other solvent-based materials for differentiation or shade consistency

100 Independence Mall West
Philadelphia, PA 19106
(215)-592-3000
www.rohmhaas.com

Spectronics Corporation

Oil soluble fluorescent dye and detection units. OIL-GLO® can be used for hydrocarbon-based hydraulic oils and other industrial fluids. Other dyes are available for fuels and for water-based fluids.

956 Brush Hollow Road
Westbury NY 11590
(800) 274-8888
www.spectroline.com

UCM (United Color Manufacturing) Unisol® liquid dyes

P.O. Box 480
Newtown PA 18940
(800) 852-5942
www.unitedcolor.com

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