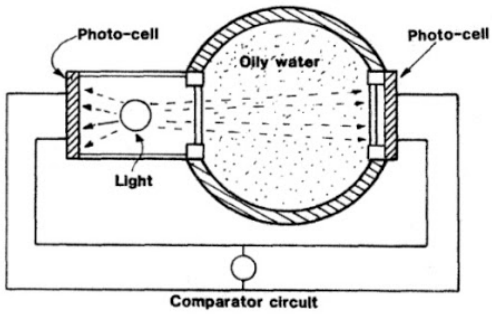
Check Your Tech: Oil Detection

Understanding Oil Detection

The history of Oily Water Separators (OWS) and Oil Content Monitors (OCM) on board commercial vessels is frustrating, confusing, and more often than not, very expensive.



Monitor for oily water using direct light

The majority of commercial Oily Water Separator equipment is supplied with Oil Content Monitors that utilize light-scattering detection technology. These OCMs work by shining a laser light into an oily waste sample cell. As the light travels through the sample cell, it is reflected off of various molecules in the water so that its energy is attenuated. At the other end of the cell are photo detectors that can measure the amount of light energy coming out of the cell. This ratio of "light in" to "light out" correlates to a concentration level of oil in parts per million.

Dirty Dilemmas

Two major problems can occur when using light-scatter technology. The first is an issue of turbity. Turbidity is a measure of the degree to which the water loses its transparency due to the presence of suspended particulates. The laser is not discriminating, in other words, it cannot tell if a molecule is oil, particulate, or sediment. If the Oily Water Separator and its associated piping is old or in poor material condition. The laser light is going to reflect and attenuate regardless of what type of molecule it hits. For example, if particles of rust are running through your OWS (which isn't unusual for an older OWS), the light in/light out ratio of a light-scatter Oil Content Monitor will interpret this as a high concentration of oil. You'll constantly be getting false positive high alarms, and after wasting a lot of man-hours trying to fix it, you'll mistakenly assume that your OWS is broken.

"We've come across numerous ship engineers who contact us to replace their Oily Water Separator because they are stuck with constant 15ppm alarms. However, we find that their problems are usually misdiagnosed to the OWS, when the real culprit is their Oil Content Monitors."

- Steve Ketchum,
Director of Business Development, NAG Marine

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The second problem is that many ships use surfactants and detergents to clean their bilges. These chemicals are designed to breakdown oil particles into very tiny ultra-emulsified molecules to assist in cleaning. In many cases, the photo detectors in light scattering OCMs are usually not sensitive enough to detect ultra-emulsified oil molecules of less than 10 microns in size, i.e. these molecules are so small that the laser light isn't scattered enough to be noticed. So now you could have an even bigger problem – a false negative that could potentially allow ultra-emulsified oils to be discharged over the side of the ship and which could put a tell-tale oil sheen on the water.

A Slick Solution

To combat these problems, NAG supplies a line of Oil Content Monitors that are based on UV Fluorescence detection technology. UV Fluorescence detection is based on the physical properties of oil molecules that allow it to absorb energy of one specific wavelength and emit light energy at a longer wavelength.

Fluorescence occurs when a molecule absorbs light energy of one specific wavelength and emits light energy of a longer wavelength. Oil compounds each have a unique "wavelength signature", and these signatures can be displayed as an actual concentration of oil in water. Fluorescence makes the NAG Oil Content Monitors resistant to interferences by turbidity or particles/sediments in the bilge, which adversely impact light-scatter OCMs.

If a substance does not fluoresce at the specific wavelengths for the monitored oil molecule, it will not interfere as a 'false positive'. Fluorescence is also able to detect ultra-emulsified oil molecules to the parts per BILLION level, far greater than competing light scatter OCMs.

Questions? Call us to find out about an oil detection solution that's right for you

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