SPECTROLINE®

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Fluorescent Leak Detection Dyes Without Co-Solvents Prevent Damage to Air-Conditioning and Refrigeration Systems

HVAC/R technicians worldwide use the fluorescent dye method of leak detection, because it is fast, exceptionally accurate, easy to use and inexpensive. However, service personnel should pay careful attention to the dye that they put into air-conditioning and refrigeration systems. Dyes containing co-solvents – materials that the dye chromophore is highly soluble in and, in turn, are soluble in oils – can impair the properties of the system's lubricant, resulting in diminished viscosity and lubricity. This could lead to equipment damage or premature failure of the system's components.

Other dye manufacturers often formulate their dyes with a co-solvent called Aromatic 200. This material was designed by Exxon as a petroleum hydrocarbon solvent for use as a carrier for industrial and oil field chemicals. It is also used as a solvent for printing inks, paints and pesticides. However, it is not designed to be added to a refrigerant lubricant since its low viscosity is detrimental to the operating parameters of refrigeration oil.

Another co-solvent that other dye manufacturers use in the formulation of their dyes is NMP, or N-methylpyrrolidone. This co-solvent is used frequently by pesticide manufacturers and it does not have the distinct, unpleasant odor of Aromatic 200. However, NMP is known to be detrimental to aluminum, light metals, rubbers and plastics — materials that make up the majority of all air-conditioning and refrigeration systems.

Both Aromatic 200 and NMP are listed in the Pesticide Action Network (PAN) as Bad Actor pesticides because of their reproductive or developmental toxicity or carcinogenity.

If too much of either co-solvent is added to an air-conditioning or refrigeration system, the lubricating properties of the system's oil are changed and would be adversely affected. In addition, the co-solvents themselves are not miscible in R-134a and other CFC, HFC or HCFC refrigerants. The potential for damage due to this is not yet known. The co-solvents can also contain naphthalene, which is listed by OSHA as a hazardous material.

Spectronics Corporation's AR-GLO® fluorescent dye offers significant advantages over other dyes that contain co-solvents. The immediate benefit is that AR-GLO is extremely cost-effective. Since AR-GLO is highly concentrated, only a small amount of the dye is needed to treat an entire air-conditioning or refrigeration system. The optimum oil-to-dye volumetric dilution ratio of AR-GLO is 500:1. In contrast, dyes that are made by diluting co-solvent bearing raw material with the lubricant must be used in considerably greater amounts (64:1 to 32:1, oil to dye, volumetric), so the effect on viscosity, lubricity, miscibility and heat transfer could become significant.

Another key benefit of AR-GLO is equipment safety. AR-GLO is the *only* fluorescent dye on the market that is specially formulated with a refrigerant-grade mineral oil, polyol ester or alkyl benzene carrier without any extraneous and possibly damaging co-solvents. This greatly helps preserve the integrity of the system and, therefore, its life.

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