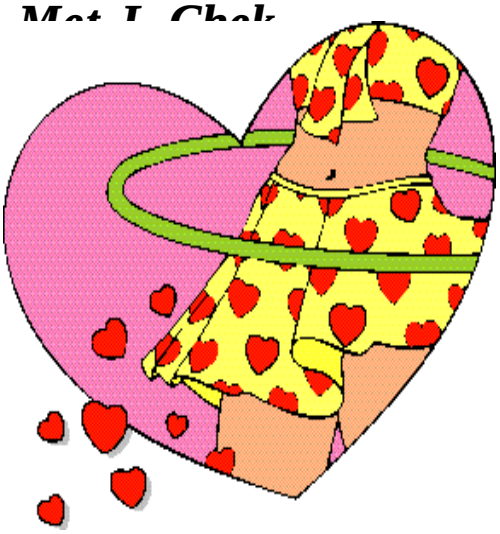
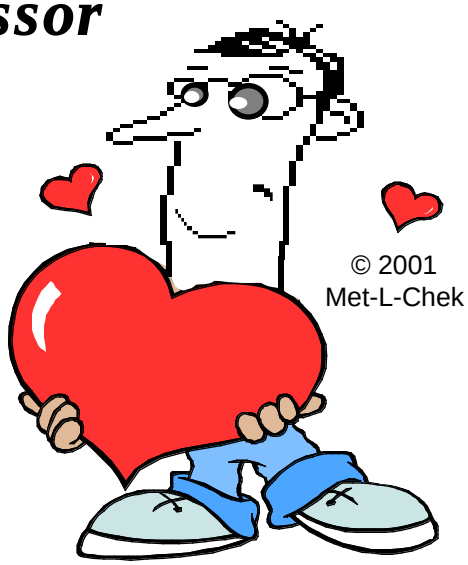
The Penetrant Professor

from Met-L-Chek



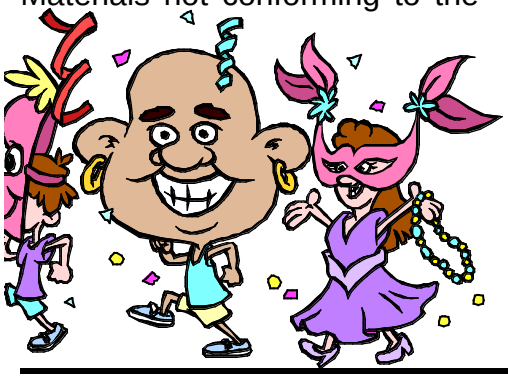


CATCH 22 ??

At Met-L-Chek, we are almost continuously involved with the writing and rewriting of specifications. It is part of our function as active members of the various committees of ASNT, SAE/AMS, and ASTM. Sometimes this work is rewarding, and sometimes it is just plain time consuming. Recently, we were reviewing ASTM 1209, and we were reminded of an old conundrum. It has to do with which penetrants may be used, and the conundrum involves three specifications, AMS-2644, ASTM E-1417, and ASTM 1209.

Let's first look at ASTM E-1417. Paragraph 6.5.1 reads as follows:

"Qualified Materials — Only materials listed or approved for listing on QPL AMS 2644 (reference AMS 2644) shall be used for penetrant inspection. Materials not conforming to the requirements of AMS 2644 may be used only when a waiver in obtained from the contracting agency."



But then, in paragraph 7.5, we find the following statement:

"Type I penetrants that are qualified to AMS 2644 may be used without developer under either one of the following conditions:"

This theme is also present in ASTM 1209. ASTM 1209 requires adherence to ASTM E 1417, and paragraph 5.2 states:

"NOTE: the need for a developer is determined by the Cognizant Engineering Organization…"

The Catch 22 is that all penetrants listed on QPL AMS 2644 have been tested with developers, and this is a condition of their listing. There are currently no approved penetrants for use without developers. Therefore, since ASTM E 1417 only allows the use of penetrants approved for listing on QPL AMS 2644, in theory none of the penetrants listed on the QPL may be used for inspections conducted without developer in accordance with ASTM E 1417 or ASTM 1209.

We do not think that this technicality will confuse anyone and cause them to rethink their inspection process if they have already been given approval to forego the use of developer, but the wording in the specifications really should be clarified. The reason for this is that just as sure as you are reading this, an auditor will one day determine that an unapproved penetrant is in use, and this will precipitate a situation which no one will want to be in. Rest assured, we will try to refine the wording in ASTM E 1417, so that confusion about this is eliminated. It is part of our continuing effort to see that specifications are clear and unambiguous.

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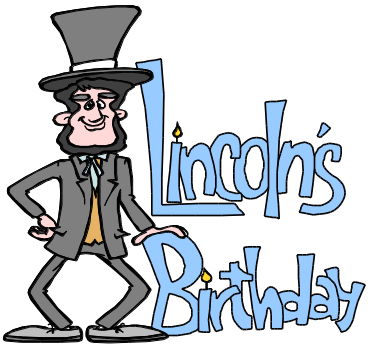
BUGS AND THEIR RELATIVES

It is a fact of life that both fungus and algae like to live in solutions of hydrophilic emulsifier. After all, the emulsifier solution that is in use is usually about 80% water, and it contains surfactants, which are a tastful meal for these "bugs". One must carefully monitor the in-use tank of emulsifier to be sure that these bugs do not set up housekeeping and multiply. If this happens, it will likely ruin the penetrant inspection process. Signs of infestation are bad odor from the tank, gooey or stringy material floating on the surface or clinging to the tank sides, or "stuff" floating in the solution. This foreign material can stick to a part, where it will absorb fluorescent penetrant, and after the part has been processed, this material will be fluorescent, as though it was a defect. In addition, these bugs consume surfactants from the solution, and this lowers the ability of the emulsifier to do its job. The process gets out of control.

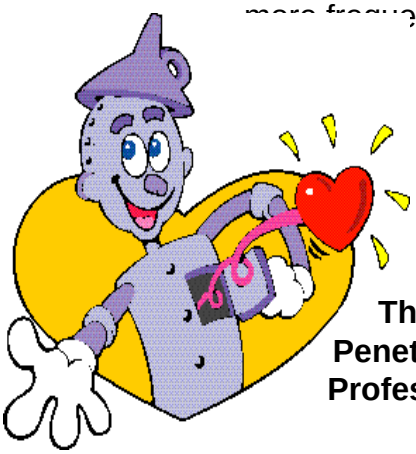
How can you protect against this happening? The answer is that the housekeeping must be scrupulously attended to. The first important item is to start with a clean tank.

And when we say clean, we mean sterile, i.e., with no bugs in it. The tank should not be mild steel, because that will be very prone to rust. Stainless steel or a lined tank is preferred. Get rid of any unnecessary piping which is connected to the tank, or any other non essential items which may be in the tank. The ideal tank has no piping connections, except possibly a drain plug, and has nothing in it, such as boards on the bottom. Piping and piping connections are ideal places for the bugs to hide, just waiting for a new tank of yummy food, and wood probably cannot be cleaned well enough to kill any bugs which have lodged in it. Clean the tank thoroughly, scrubbing it. Next, steam clean it if possible, being sure to get into any remaining pipe connections. Then fill the tank with water and add a couple of chlorine bleach tablets, such as are used in swimming pools. Let this stand overnight, and then drain it. Finally, flush the tank with clear water to remove any vestige of chorine that might remain. Now the tank is ready to receive the hydrophilic emulsifier.



Once the emulsifier tank has been filled, keep it covered at all times that it is not in active use. Fungal spores and algae float in the air, and are a major cause of tank infestation. Keeping the tank covered cuts down the possibility of these spores landing in the tank. Monitor the tank daily, looking for any sign of gook or crud. Keep testing the concentration of the emulsifier, looking for any sign that it is decreasing at an unexpected rate, which could indicate that the liquid is infected. If you detect infestation, deal with it at once. An infected tank is almost sure to affect the inspection process in a negative way.

As a final note, concentrations of hydrophilic emulsifier which are lower than 17% are more prone to infection, and must be monitored more frequently.



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