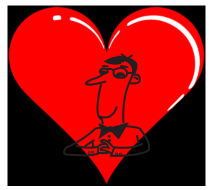
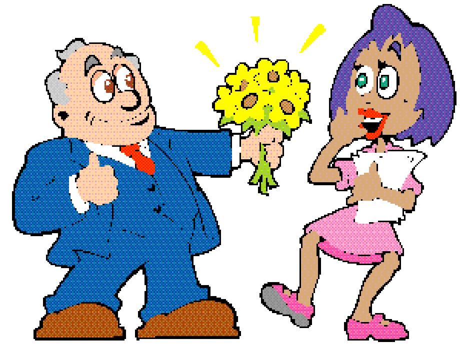
The February 2009 Penetrant Professor from Met-L-Chek®





A NEW IDEA

Those who were at the Fall ASNT Conference and attended the Penetrant technical talks heard a presentation by Charles Mazel, of **Blueline NDT**. His talk discussed some new ideas about working with fluorescent magnetic particle inspection and fluorescent penetrant inspection. We all know how these inspections work. In order to see any indications of flaws, we go into a dark booth, and examine the processed part with a black (UV-A) light that emits at a wave length of 365 nanometers. Any faults show up as fluorescent indications. These are the result of the interaction between the excitation provided by the 365 nm UV-A and the dyes used in the penetrants or on the magnetic particles. The interaction is the result of physics that are pretty well understood, and the selection of 365 nm UV-A was made years ago, and has become a standard in the NDT industry.

The question that **Blueline NDT** has addressed is the question of whether there are other light frequencies that also may cause the magnetic particles or penetrants to fluoresce. Their investigations have shown that as the frequency of the excitation light is moved from 365 nm towards the blue range, the dyes used in magnetic and penetrant inspection continue to fluoresce, although at different intensities. The paper presented at the ASNT meeting illustrated graphs of the intensity as a function of the light frequency for several commercial magnetic particles and penetrants, and demonstrated that it was possible to use blue light as a practical excitation source in some instances.

Why would one want to do this when the standard UV-A light works just fine, and is required by every specification under which one might work? There are several reasons that were articulated in the talk. One is that the blue light can be provided from sources that generate no heat, and which are easily portable. These can be "instant on, instant off", and generated by LED sources. They also apparently do not have the same reaction on the skin that UV-A does. So an inspector can have a simple portable source of inspection light with him or her that is quick to turn on and off, is cool to operate, and allows inspecting for flaws or for in process monitoring.

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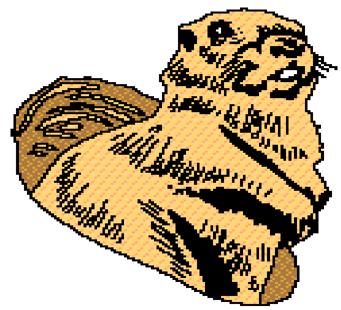
What are the limitations? This is a science that is presently in transition. First, one must understand that the use of any excitation source other than one that emits at 365 nm is not presently allowed by any major specification. Thus one could not use blue light for final inspection, if the inspection is performed under the major specifications. Secondly, the response of the various commercial magnetic particles and penetrants to the blue light is not consistent. Some particles respond less brightly than when using the 365 nm source, and some respond more brightly. This phenomenon can be compensated for by adjusting the intensity of the blue light to produce the equivalent results when using the 365 nm excitation intensity, but one must know exactly how to do this.

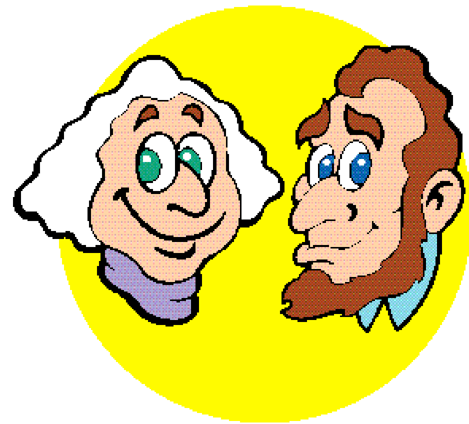
So what is the point? One may not be working to any specification or to a local specification that does not limit the inspection to the use of 365 nm UV-A. Or, one may find it useful or convenient to examine a part prior to final inspection, so that parts with obvious flaws could be culled from the production line prior to entering the inspection booth, thus lowering the load on the inspector. There are undoubtedly other potential applications that will occur to inspectors.

We would recommend that those interested wait for the published article that will appear in the March edition of MATERIALS EVALUATION, so that they have the full story as presented by **Blueline NDT.** We would also suggest that, for the present, at least, caution is the watchword because of the variables involved and the specifications under which one works. But the idea is new and novel and may be of interest and help in some applications.



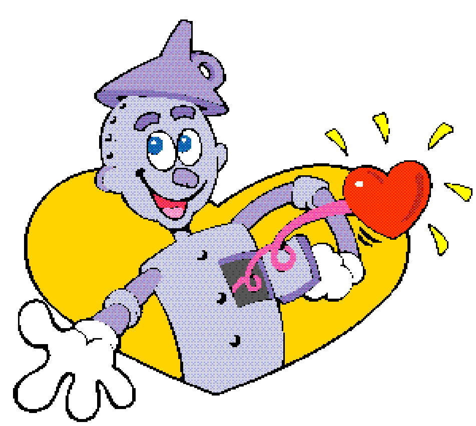
QUERIES

We write about these from time to time especially when we get an unusual one. We also do not criticize any questions that we get, and we do not criticize the person asking the question. It is just too easy to make judgment that the person asking the question is uninformed, when actually the person is trying to interpret a specification that has been written in unclear or ambiguous language. So we report these without judgment, but sometimes with comments.



A recent inquiry came from an inspector who wanted to know how to measure the water content in his post emulsifiable penetrant. As most of us understand, there is no water in PE penetrants. In fact, they are pretty much incapable of holding water. This being the case, there is no way to measure water content, when any such measure would give a result of zero. However, in this case, we were advised that the inspector was working under a specification that required the measurement of water content. This was most likely a case of poor or ambiguous wording in the specification, and the inspector was to be commended for pursuing the question with us. Do we know of any specification written in this way? Actually we do not. However, despite over 50 years in this business, nothing surprises us. We cannot know everything, and there are new specifications and procedures being written all the time. Some by very knowledgeable people and some by less knowledgeable people. But we do understand that it makes little sense to measure the water content of a PE penetrant.

The Penetrant Professor



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