



Devil's Tower Wyoming



## *The Penetrant Professor from **Met-L-Chek**<sup>®</sup>*



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### *June 2011 ASTM Meeting*

Committee E-07 met in the Disneyland complex in Anaheim during the week of June 12, 2011. A highlight of the meeting was that the balloted draft of ASTM E-1444 appears to be finalized, with no further discussion, additions or changes. Discussion of ASTM E-1417 lasted much longer and was, at times, contentious. One of the problems that was addressed was how to assure that inspection was carried out with less than 2 foot candles of white light being emitted from the newer LED UV-A sources. While it is clear that white light must be minimized, instrumentation to accurately measure the intensity of white light in a black light stream appears to be presently unavailable. As a result, the requirement to measure this was voted non persuasive. This apparently will conclude the work on ASTM E-1417. The meeting was attended by John Brausche of

the Air Force Materials Laboratory, who announced that he intends to create a new ASTM task group to address creating a specification for UV-A sources, and we can imagine that this new committee will address the concerns that were discussed in this meeting. Since these UV-A sources are used in both penetrant and magnetic inspection, and since there has been a proliferation of new types of sources, this news was met with appreciation, if not with enthusiasm. These notes do not usually convey any hint of the difficulties of dealing with the members' comments, both pro and con, regarding the creation of a better specification, or with the time and efforts of the members who do this on a volunteer basis. It is true dedication, and the committee is fortunate that they enjoy the leadership of George Hopman, who manages to keep the members concentrated on

the subject at hand, even when they want to wander off the subject, and all with good humor.



### *Hydrophilic Emulsifier*

We probably do not say enough times that the subjects that are addressed in this publication originate with those folks who use penetrants. The last issue featured information about hydrophilic emulsifiers, and as usual, we received comments on the article. We relish receiving comments, because they come from the users of penetrants, who have vastly more hands on experience

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than we do, and those comments always manage to sharpen what we have published.

In the case at hand, a couple of additions to our article were suggested. The first of these was that the generation of a refractometer concentration chart for each batch of emulsifier is not necessary. The objective of making the curve is really to calibrate the refractometer, and as long as the same instrument is used with the same manufacturer's emulsifier, the chart should be adequate. Variations in the emulsifier from batch to batch are small enough to not be of consequence, and making a new curve for each batch would essentially result in the same curve. Naturally, you must make sure that the curve that you make refers to a specific refractometer that is used with a specific emulsifier. Making a chart for one manufacturer's emulsifier and then trying to use it for a different manufacturer's emulsifier will not work. If you have emulsifiers from different manufacturers, you must assign a specific refractometer and its chart to each manufacturer. Where the calibrated refractometer comes into play is when you need to add new emulsifier and/or water to the tank to bring the level up.

When this is done, the tank likely has more than one batch of emulsifier in it, but as long as you use the refractometer that you have calibrated, no matter how many different batches of emulsifier are in the tank, you should be OK. If you use Met-L-Chek E-58D emulsifier, we supply a graph that uses a specific refractometer and can supply the same instrument for use with E-58D. If you use E-58D and already have a different refractometer, when you make your chart, you will find that the curve shifts a bit to the right or left of the curve generated with the instrument that we use.



## Surface Roughness

We get a wide range of questions, from the sublime to the ridiculous. But we always understand that the question, no matter how "far out" it might seem, is an important one for the person who has asked it, and we treat it that way. Our days are livened by some of the things that puzzle our readers, and we recently had a question that we had never received before. Here it is, verbatim:

What is the correlation of the sensitivity level of penetrant and surface roughness? ie: what sensitivity level would fit with what RMS range?

Did you ever think about this? Probably not, but someone did, and they asked the question. The answer, of course, is that there is no correlation between sensitivity and surface roughness. Sensitivity is measured

on candidate penetrants at the Air Force Materials Lab at Wright-Patterson Air Force Base, and the sensitivity level is assigned and used in the Qualified Products List. The test method uses low cycle fatigue cracked bars, with smooth surfaces. This does not imply that surface roughness is not important, but it does mean that surface roughness has no correlation to the penetrant sensitivity. When the sensitivity levels is being determined, separate tests are made to determine the background fluorescence left by the penetrant system. The object is to have a minimum of background, so that the signal to noise ratio is high. When the criteria are met and a penetrant is listed on the QPL, a user is assured that the material will provide the assigned sensitivity level with a background that was found acceptable on a standardized sandblasted panel. In actual use, surface roughness can affect how easily surface indications can be seen and interpreted because of background fluorescence that is more prominent with rougher surfaces. In these cases, the sensitivity has not changed, but the ability to clearly see indications can be affected by the increased background.

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