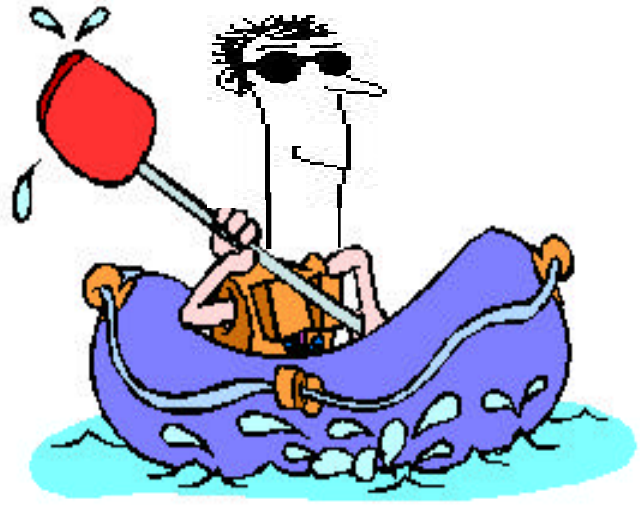
# *The Rafting Penetrant Professor from Met-L-Chek®*





*"Where in the world is Bill?"*

## AN INSPECTION EXPERIENCE

We seem to discuss auditors and inspectors in jumps and starts. Sometimes there is nothing to discuss for a long time and then, out of the blue, we hear or experience something that we feel is worth discussing. So here we go. When **MIL-I-25135C** was in effect, it included both qualification and acceptance tests for a variety of different penetrant systems, including high temperature systems. **MIL-I-25135C** was superceded by the **D** revision in **June 1984**, which did not include these different penetrant systems, and all versions of **MIL-I-25135** were superceded by **SAE AMS 2644** in 1**996**. These old military specifications have been obsolete since 1996, twelve years ago, and the **C revision has been gone for 24 years.**

So what is this about? Well, an inspector was given the job of accepting an order of visible high temperature penetrant, and, to be fair, it was his first encounter with penetrant inspection products. When he looked for a specification that applied to these products, the only one that he could find was the **C** revision of **MIL-I-25135**. And so he wanted to apply it. That was the first in a series of errors, since that specification no longer existed. The second problem was that his interpretation of the specification was that we needed to test the products for fluorescent brightness, and other acceptance tests that were listed on the **C** revision, but which did not apply to a visible penetrant system. Then the third item that arose was that he questioned ( in a polite way) whether we actually had a quality control system in place.

*Happy Fathers Day*

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A bit of preparatory work could have saved some on the job training. For example, it would have confirmed that **MIL-I-25135**, **C** revision had been dropped 24 years ago. Further, that the products in question were no longer the subject of an active specification, and that they were not subject, in any event, to tests regarding fluorescence. And last, a study of **AMS 2644** would have revealed that **Met-L-Chek®** was an approved qualification laboratory for products submitted for approval under **AMS 2644**, and that several of our products are the standards for **AMS 2644**. This could have provided some confidence that we maintained a quality control system.

We certainly believe in quality control and quality systems, which are an integral part of NDT. But we also believe that those who either inspect or audit ought to study their subject thoroughly before engaging in their duties. We believe that an inspector or an auditor should be at least as knowledgeable as the person or company that is under inspection or audit. It is at the very least counterproductive for an inspector or an auditor to have a difference of opinion about what is required, when the person under audit knows the requirements better than the inspector or auditor. That only leads to frustration, wasted time, and frequently bad feelings. In the particular case that is described here, good humor and patience on the part of both parties won the day, and we can feel good that we assisted in the **training of an auditor**.



# 2008

## MEETINGS

The Spring meeting of ASTM Committee E-07 will be held in Denver, Colorado on Tuesday, June 24, 2008.

**PENETRANT PROFESSOR is an occasional publication of the Met-L-Chek company. To receive it-- call, FAX or email Beverly Clarke**

## A LITTLE KITCHEN PHILOSOPHY

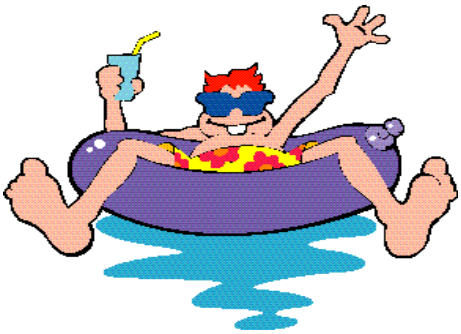
If you look through the kitchen , you will almost certainly find a measuring cup, or several sizes of such a cup. These are used in measuring the ingredients for making recipes, and usually have gradations for the contents. A popular size is "one cup", but there are also 2 cup and 4 cup sizes. In addition to the marking for cup size, there are markings for the number of ounces. One cup is equal to 8 fluid ounces, and two cups are equal to 16 fluid ounces. There is probably no one who is not familiar with this.

OK, you have a 2 cup, or 16 fluid ounce measuring cup, and you fill it with air. Actually, it is already filled with air, so you do not have to fill it. Now you take an identical measuring cup and fill it with water. Then you take a third identical cup and fill it with molten lead. Each cup holds exactly the same volume of material, namely, 16 fluid ounces.

Do these cups all weigh the same? Not at all, even though they hold the same volume of material. The contents of the cup holding air weigh 0.0014 pounds. The water weighs 1.06 pounds, and the lead weighs 11.9 pounds. There are 16 ounces to a pound, so the air weighs 0.02 ounces, the water weighs 17 ounces, and the lead weighs 190 ounces.

So now comes the question. I sell you a one pint (16 ounce) can of an unknown substance. How much should you expect the material in the can to weigh? The logical answer is that if the can holds air, you should expect 0.02 ounces, if it holds water, you should expect 17 ounces, and if it holds lead, you should expect 190 ounces. The point is that even though you know the volume of the can, that tells you only the volume of what you bought, and not the weight. One should not expect that a 16 ounce can will have 16 ounces of material weight in it. In fact, it would be unusual if it did.

The origin of this conundrum is that in our English system of measurements, there are two kinds of ounces - fluid ounces that measure volume, and weight ounces that measure weight. This confuses many people as evidence in the reoccurring questions we get about aerosol cans , namely why does our 16 ounce aerosol can not weigh 16 ounces?????



**The Penetrant Professor**