



The Penetrant Professor from **Met-L-Chek**[®]



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Developer

We will never forget the words of **Ward Rummel**, who was answering a question from the audience after he had made a presentation about the use of penetrant inspection at a national **ASNT** meeting. The question was, “*Do you need to use developer?*” Ward’s answer was very much to the point, as he answered, “*Only if you want to find the cracks!*”

The proper use of developer is essential for achieving good inspection, and every specification requires it. This, in turn, makes it important to maintain the developer in good condition. To highlight this, the **September 2017** issue of **MATERIALS EVALUATION** contains a “**Back to Basics**” article on ways to assure that the developer that you use is in top condition. It is a matter of good housekeeping and common sense, and the results of

maintaining the developer health will be consistent penetrant inspection.



ASTM E-1135

What is **ASTM E-1135** and what is going on with it? We need to go way back to the early **1950’s** and the initial development of specifications concerning penetrants to understand this. At that time, those in the **Air Force** decided that it would be a good idea to measure the brightness of fluorescent penetrants. Not a bad idea, since the brighter the penetrant indication, the easier it would be to see it. OK, but how should this be measured? It was finally decided to imitate the penetrant indications by soaking a piece of white filter paper with dilute penetrant and then measure the brightness under UV-A

light with a fluorometer. The idea was that the filter paper would substitute for developer and that the diluted penetrant would simulate the penetrant indications. No one ever made any tests to see if this replication was in any way indicative of the brightness of actual indications, but the test survived and is written into **ASTM E-1135** and used today. Now **ASTM Committee E-07** is looking into the details of the test. The purpose is to see if measurements made by different technicians, at different locations, and using different apparatus, get consistent results. Round Robin tests are underway to determine this. These tests are being made on samples that have been analyzed by each major manufacturer and independent test labs, using test criteria that are specific in the way that the samples are prepared and the way that the brightness measurements are made. The tests have been designed at **Met-L-Chek**, where the results will be analyzed and presented to **ASTM Committee E-07**, as part of an update to this specification



AMS Committe K

The **AMS Committee K** met in Ft. Lauderdale FL September 18,2017 durring the **A4A** NDT conference.

AMS-2632 & **AMS-2630** dealing with **UT Inspection** will be consolidated into one specification with some clarification of areas of ambiguity. The sponsor is **Mark Pompe**.

ARP-4462 on **Barkhausen Noise Inspection**, Sponored by **James Thomas**, is in need of votes “yes” or “no”, not waivers. This is a common problem for methods not used by large numbers of members. If you use this specification get involved, make a difference!

AMS-2647 **Fluorescent Penetrant Inspection Aircraft Engine Components** is out for a vote, sponsor is **John Brausch**.

AMS-2644, which is the **Penetrant Material Qualificaion** specification, is under review. The **Air Force** has tightened the control of the two key performance test requirements of **sensitivity** and **removability**.

John Brausch reported, that all **Method A** (fluorescent water washable penetrant) materials have been run per the new test criteria. Considerable data has been generated and will take time to analyse. In the mean time the removability tests will start on all the **Method A** samples.

AMS-3046 which is **aerosol fluorescent magnetic particle materials**, has been found by the **Air Force** to be lacking in details of how materials are evaluated. To resolve this a task group is being formed to further clarify a test or tests to better quantify performance.

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Decisions



Sometimes the **Penetrant Professor** digresses from discussing NDT in detail, and this is just such a digression. Recently, a book titled “**MAKE UP YOUR MIND**” was published, and it details the way that decisions are made. Obviously, NDT is all about making decisions at many levels, and the clinical exposition of the way that decisions can be, and are, made is well worth looking into. Reading it will frame the decision process in a way that can improve the decisions that are made in your function in the world of NDT. Just as an example, the book outlines ten prevalent judgment bases, and puts them in order of their ranking. At the top of the list are judgments that are probability based, and at the very bottom are judgments that are indifference based. Understanding these rankings can sharpen the decisions that one makes every day. We recommend this book for anyone who wishes to sharpen their ability to make the best decisions. The complete title of the book is **Make Up Your Mind: A Decision Making Guide to Thinking Clearly and Choosing Wisely**.

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UVA Wavelength Verification vs Intensity

The latest revision of **ASTM E-1417M-16** recognizes both mercury vapor bulbs and LED UV-A lamps as acceptable lights for fluorescent penetrant inspection. However, there are some stipulations on the use of LED UV-A lamps that are not applicable to the old mercury vapor bulbs. Since this is a relatively new requirement in the specification, it may cause some confusion for auditors, and inspectors. In **ASTM E-1417M-16 § 6.6.1.2**, it states LED lights must comply with **ASTM E-3022**, which specifies that the peak wavelength be between 360nm-370nm. In **§ 1.2** it states that the testing and certification of the lights is “intended to be performed only by the manufacturer and that the test procedure is not intended to be utilized by the end user.” This is the light manufacturers specification, and the manufacture will supply the user a certification of compliance to the specification.

This is different than the **ASTM E-1417** light intensity requirements of $1000\mu W/cm^2$ at 15”(38.1cm) for inspection purposes; which the user must monitor daily with a radiometer.

Avoid an audit problem and keep the lamp suppliers LED wavelength certification with your daily intensity measurements.

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Improving Inspection

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