



## APPROVED SOLVENT CLEANERS

Met-L-Chek R-503 (PMC 9094) and R-504 (PMC 9008) are listed in P&W's Fluorescent Penetrant Method (FPM) Master, paragraph 10.7.1 as the approved chromate free solvents to use when evaluating fluorescing indications.



## TWO NEW MET-L-CHEK ADDITIONS TO QPL-AMS-2644

If you are interested in a level one or level two water washable fluorescent penetrant which has exceptionally easy washability, is a very bright yellowish green, and which meets all AMS-2644 and ASTM E-1417 requirements, contact us about FP-921 or FP-922. These two new penetrants have been formulated to meet requests for penetrants which are non-gelling, but which also feature good sensitivity, high brightness, exceptional color, and



## Penetrant Professor from Met-L-Chek



ease of removal from rough castings. Both of these have just been added to the QPL, and are available on order. Interested in a sample? Just contact us and describe your application, and we will be pleased to give you a sample of either FP-921 or FP-922 to test, and which will demonstrate its very desirable features.

## BRIGHTNESS

The brightness of fluorescent penetrants is an important characteristic. Because of its importance, brightness measurements have been a part of penetrant specifications for about 50 years. A specified level of brightness is required for the qualification of a fluorescent penetrant under AMS 2644, and periodic brightness measurements are required by ASTM E 1417 to assure that the penetrant bath is performing properly. But the method of measuring brightness has almost always been subject to criticism, and there is presently work underway to examine this subject.



## SO, WHAT'S THE PROBLEM?

There are actually two problems, which we will discuss separately. The first problem, and the one which caused the present examination of brightness concerns the question of "how bright should the penetrant be?" When the controlling specification was MIL-I-25135, there was a "reference standard" penetrant for each sensitivity level. The brightness of any candidate penetrant was compared to this reference standard, and was required to be a minimum of 85% of the brightness of the appropriate reference standard penetrant.

When MIL-I-25135 was replaced by AMS 2644, all penetrants which were qualified at that time under MIL-I-25135 were automatically qualified under AMS 2644. However, when AMS 2644 was written, the penetrant brightness requirements were changed. Instead of using a reference standard for each sensitivity level, brightness was to be compared to the brightness of the level four reference standard. In theory this was reasonable, since it reduced



the number of reference standards. But in practice, problems developed, because a systematic examination of the relationship between the two measuring methods was not conducted. Instead, the minimum qualification brightness requirements were rather arbitrarily set at 95% for level 4, 90% for level 3, 80% for level 2, 65% for level 1, and 50% for level 1/2, all compared to the level 4 reference standard.

Because no comparison had been made between the two methods, it was soon found that some penetrants which would pass the MIL-I-25135 brightness test, failed the AMS 2644 test. This was appropriately recognized as a problem with the specification, since these penetrants were not only approved, but had a long history of successful use.

## WHAT'S THE SOLUTION?

Wright Aeronautical Laboratories is examining the situation in several ways. They have sent a set of 20 coded samples of penetrant to each penetrant manufacturer, with a request to test the brightness of each, compared to the level 4 reference standard. They have also requested data on production samples of each manufacturer's penetrants, as well as a detailed description of the brightness measuring technique used. When

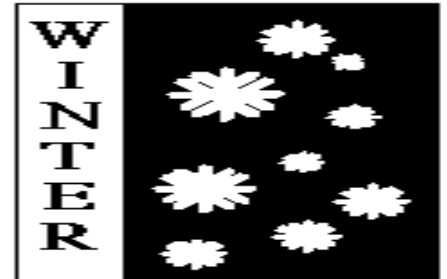
these data are collected, it should provide a better basis for making any changes in the AMS specification.

## NOW THE SECOND PROBLEM

The brightness measurements are made by soaking small pieces of filter paper in a diluted penetrant solution, drying these, and then making the brightness measurement with a photofluorometer. During the entire time in which MIL-I-25135 was in effect, two photofluorometers were approved for use — the Turner, and the Coleman. Both of these instruments eventually were discontinued by the manufacturers and became unavailable. To satisfy the need for such an instrument, the S-291 appeared on the market.

To show that the S-291 was the equivalent of the approved instruments, some tests were made, comparing it with both the Turner and the Coleman. It was surprising to find that each instrument produced results which were statistically different than either of the other instruments. This subject was discussed in some detail in the November 1998 issue of this newsletter. The present situation is that there are now three approved instruments, but one cannot be relied upon to produce the same results as another. This is the second problem, and the solution for it may be more difficult to find. But

the data being collected to assist with the first problem will undoubtedly contribute to more knowledge about the second problem. Rely upon the PENETRANT PROFESSOR to keep you informed.



## E-MAILED PENETRANT PROFESSOR

Met-L-Chek will soon begin to send the PENETRANT PROFESSOR by email instead of by regular mail. So that you will not miss an issue, please email us the email address at which you wish to receive your copy. Send it to [info@met-l-chek.com](mailto:info@met-l-chek.com). There are a number of advantages to receiving the PENETRANT PROFESSOR by email. First, the delivery time is almost zero. As soon as we send it, it will be in your "in box". Second, much of the issue will be in color, which makes it more attractive. Third, you may send us comments, contributions, or corrections via email. So please respond with your address, and we will add you to our list of email recipients. Remember, send it to [info@met-l-chek.com](mailto:info@met-l-chek.com).

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**The Penetrant Professor**

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