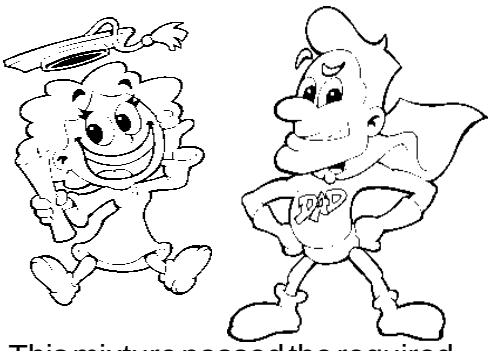
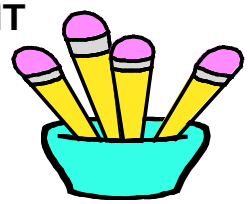


This mixture passed the required test for no reactivity with liquid oxygen, but when it was used as a penetrant, the chlorinated hydrocarbon evaporated, leaving a penetrant which would react with liquid oxygen.

## HIGH TEMPERATURE PENETRANT



There have been several forms of high temperature penetrant on the market, but one which was very different was offered in the form of crayons. There was a penetrant crayon, a remover crayon, and an aerosol developer. The crayons were available in several temperature ranges, much like Tempilsticks®. When used, a penetrant crayon in the proper temperature range was chosen, and applied to the hot surface. There the crayon melted into a low viscosity liquid which behaved very much like a traditional penetrant at room temperature. After penetration time, the remover crayon was applied to the hot surface, where it also liquefied and could be used as a solvent remover. Developer was applied and used in the traditional way. This product is also no longer on the present day market, as far as is known.

## SENSITIVITY

One of the most elusive characteristics of a penetrant to measure is its sensitivity. Many, many methods have been devised, and virtually all of them have been discarded as inadequate. One surrogate for sensitivity measuring was the "meniscus" method. It was found that a drop of fluorescent penetrant could be placed on an optical flat, and then a convex lens could be placed on this drop. The thickness of the liquid penetrant under this lens would then vary from zero, where the center of the lens touched the optical flat, to a progressively thicker layer as the distance from the center of the lens increased. Then, if UV-A (black light) illumination was used, one could see that the fluorescence of the penetrant was extinguished towards the center of the lens, leaving a circular dark spot. The diameter of this black spot was said to be a function of the dye concentration in the penetrant, and the dye concentration was said to be a measure of the sensitivity level of the penetrant. This development was felt to be important, and the desired measurements of the maximum black spot diameter were actually written into a specification of one major airframe manufacturer. The basic problem with this technique is that the concentration of the dye is only one factor in the ability of a penetrant to locate flaws. It is perfectly possible to make a liquid solution of dye which will hardly enter cracks at all, but when tested by this method would appear to be a sensitive penetrant. Today, almost no one recalls this method, the specification which required its use has been voided, and the test has been relegated to the category of an interesting scientific curiosity from the past.

These are just a few of the approaches which were used in the past to solve particular inspection problems, and which have now been superseded in various ways.

## LAMPTON WELDING SUPPLY

We take pride in the length of time that some distributors have handled Met-L-Chek penetrant products. Lampton Welding Supply is one of our old-time distributors. Lampton was started in 1946 in a garage in Wichita Kansas by Marcel Lampton. Through hard work, service to customers, and the sale of high quality products, Lampton now has seven stores, and covers most of Kansas and Oklahoma. In addition to Met-L-Chek products, Lampton sells Lincoln Electric, Miller Electric, ESAB, BOC, Victor, and Tweeco products lines. Lampton's main office in Wichita can be contacted at (316)263-3293, or (800)688-7688.

**The Penetrant Professor**

**June 1999**

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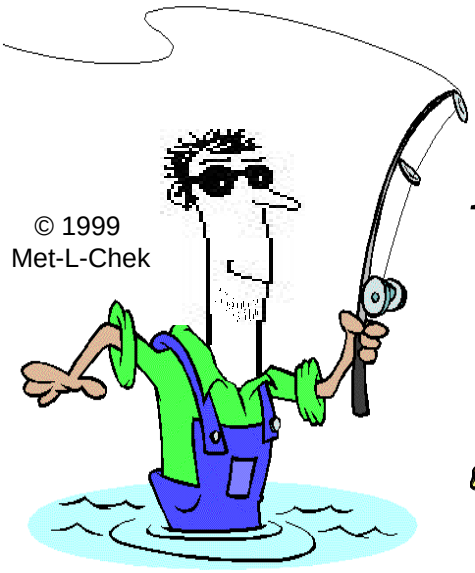
# Happy Vacation
## from Met-L-Chek's ®
# Penetrant Professor




## LEAKER PENETRANT

If you use either visible or fluorescent water based "leaker" penetrants, you might be interested in looking into Met-L-Chek VLP-1 or FLP-1. These "leaker" penetrants are formulated to meet or exceed the performance of any other similar penetrant on the market, and to do it at a lower price. If you would like to save some money, give us a call about these products. Samples are available for you to test, and a phone call will get you full information.

## OUT OF THE PAST

From time to time, THE PENETRANT PROFESSOR enjoys looking backwards at the history of penetrants and their use. This provides a quick affirmation of where the penetrant process is today, sometimes it demonstrates the ingenuity of thepenetrantmanufacturers,and it can even occasionally provide a bit of humor.

## OLD RECORDS

Recently, an old carton of 25 to 35 year old documents was discovered at the offices of the Met-L-Chek Company. These included the programs from national ASNT meetings held long ago, copies of technical papers, published reports, notes, etc. Going through these was not exactly like discovering the tomb of Tutankhamen or being a part of an Indiana Jones expedition, but it still had the flavor of rediscovery. A couple of the findings might remind old timers of things from the past and illustrate to the new folks some of the things which were tried - some of which have died a merciful death.

## LOX COMPATIBLE PENETRANT

Penetrants which were compatible with liquid oxygen were in vogue many years ago. Some penetrant manufacturers worked on the formulation of these, and came up with some interesting technical developments. For example, there was the penetrant which completely evaporated after use. This novel characteristic solved the problem of how to get rid of small traces of penetrant in surface defects, since it all simply evaporated. Now you see it, now you don't, was the way that this product worked. Presumably, the inspectors did not dally in using this method, since a delay would result in no flaw indications at all. It was also probably necessary to keep this penetrant in a tightly sealed container, so that it did not all evaporate while on the shelf.

A second formulation took a different route, and was composed of completely inert and unreactive ingredients. All of the components were unreactive with liquid oxygen, which eliminated concerns with the possibility of explosion. Neither of these products appear to be on the market in their original form, and it is not known whether either of them was ever sold in any quantity.

A third method simply took a regular penetrant and diluted it with a non reactive chlorinated hydrocarbon to the point where the mixture became non reactive.

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