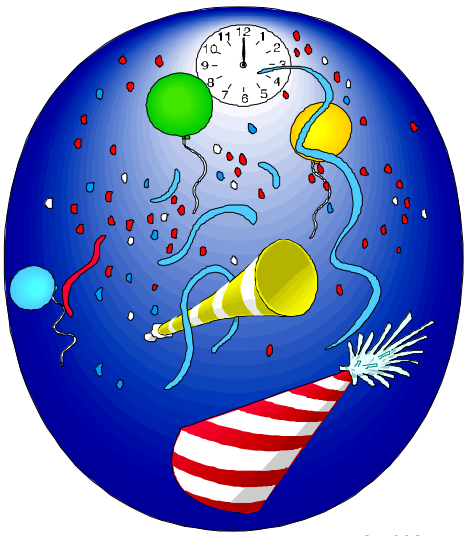
NEW YEAR 2008!

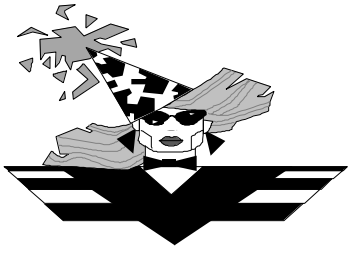
Penetrant Professor from Met-L-Chek®



ELECTROSTATIC DEVELOPER APPLICATION

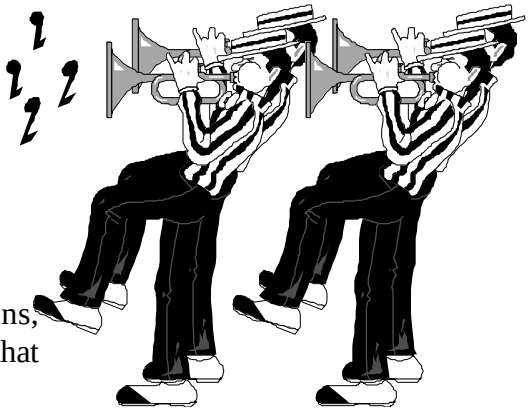
We suggested, in the last issue, that we would discuss some of the results of the **CASR** work on developer application, and, in particular the recent work on electrostatic application.

At the Fall ASNT meeting in Las Vegas, a technical paper on this method was presented, and this was followed up by a telephone conference on December 12 to review the results and to discuss future work. The first thing that becomes obvious is that there are a multitude of variables involved in the application by electrostatic means – perhaps a bewildering array of these, and sorting out those that are the most important may be challenging, particularly since the research team has only a single electrostatic unit with which to make the tests, and since the laboratory conditions are only an approximation of what is encountered in the field. A listing of the variables identified by the research team is as follows:



Fluidizing air
Powder output
Total air volume
Conveying air volume
Supplementary air volume
Spray current
Charge voltage
Spray time
Gun to specimen distance
Gun to specimen angle
Gun motion
Specimen grounding
Humidity
Temperature
Spray booth exhaust air rate
Compressed air quality

But despite these complications, early work has produced results that help to explain parts of the process. The first tests were made using samples to determine how the developer deposited on parts. It was found (not surprisingly) that the longer the developer was applied, the thicker the coating became. The coating thicknesses for various application times were measured and plotted. Following this set of experiments, cracked specimens were subjected to standard PE level 4 inspection, and developed using the various thicknesses found during the preceding experiments. The results were really not surprising, although the numerical results are very important. Anyone who has used aerosol non aqueous developer understands that there is an optimum



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thickness to get the best results, and that too little developer does not produce good indications, and too much developer masks the indications. This is exactly what was found with the electrostatic application. In terms of the optimum thickness, this was obtained by a spray application time of 3.5 to 4.0 seconds, which produced a coating that was approximately 0.002 inches thick. When these results were compared with the base line case, the results approached 80% of the base line. Remember that the base line case was obtained by using the dip and drag method, which results in the best performance.

It was also found that the developer thickness varied depending upon the orientation of the part being developed. For a metal bar, the thickest developer coat formed on the face towards the spray gun. Thinner coats formed on the part sides, and the thinnest coat formed on the back of the part. The committee considered this, and one suggestion was that if multiple guns were used, equal coatings might result on all sides of the part. Testing this is a good idea, but may run into the problem that the research group has only one gun. The suggestion was made that the idea might be tested by using the single gun, but making multiple applications from several angles. The team will probably consider ways of performing this test, which could show encouraging results.

This work continues, and a summation of the developer study results will appear in MATERIALS EVALUATION, perhaps during the Summer of 2008. Bill Mooz, of Met-L-Chek, is the Associate Technical Editor for Penetrants, and will process these informative and interesting papers as soon as he receives them for publication.

QUESTIONS

We often talk about the various questions that we get on almost a daily basis. Some of these are serious technical questions, some address highly different processing problems, some concern the environment, and many are directed at audits and auditing procedures. We do not consider any question to be trivial, since, no matter what it is, it is a problem that the questioner needs to solve. And, if the subject is something that we think will either interest or benefit others in the NDT community, we usually report on it in these pages.

So here is the essence of a question that we recently received. The penetrant inspector had a part and an accompanying specification that required the part to be inspected by **Type 1, level 2, Method D**. But the inspector's line was only equipped for **Type 1, level 3, Method A** inspection. This posed a quandary, and we were questioned about whether the fact that the existing line was a level 3 Method A line, could it perform adequately in place of a level 2 Method D line.

While this is an interesting technical question, about which long discussions over a beer could take place, we could not answer it for this inspector. The reason is that the part was accompanied by a specification that required it to be inspected by **level 2, Method D**. No matter what our opinion might be, the specification is what counts. However, if the question was directed to the customer who also sent the specification, the inspector would get a "yes or no" answer. It is the old story that the customer is always right.

The Penetrant Professor

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