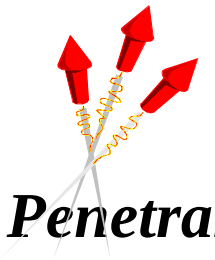


The Penetrant Professor from Met-L-Chek®

MY, HOW TIME FLIES!

It occurred to us that this newsletter had been around for a long time, but we were surprised to see that it is something like 180 issues old – from 1993 till now. We thought that it would be fun to reminisce a bit, kind of like a walk back through time.

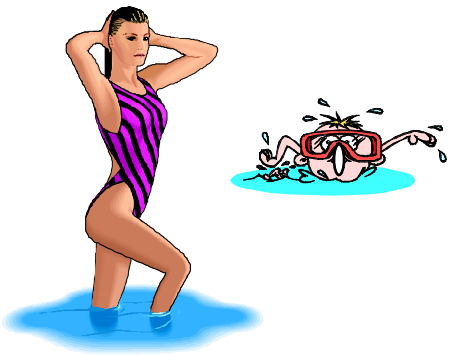
In 1993, the"PENETRANT PROFESSOR" was sent out in the U. S. Mail by Sally, and requests to be on the mailing list were sent to her. The graphics of the newsletter were done by Melodie, and progressed from the very simple to a caricature of the professor himself that changes with the times and the weather. Sally has been gone for more than ten years, and has been replaced by Beverly, who handles Gov. contracts. It is Beverly who maintains the address list for the PEN-PROF, but the days of using the U. S. Mail are long gone, in favor of the internet and email. Melodie is gone, as are Maria and Heather having been replaced by Leslie. But our other personnel are the same. Rick is the office manager. Carlos, Berto, and Mario handle manufacturing, packaging and shipping. Calls for technical advice or assistance are fielded by Rick, or by Mike or Bill.

And the Professor? We frequently are asked for his true identity, and the answer has remained the same over the years. It is, as the French say, a "Nom de Plume". But enough about that. The bottom line is that we are all here ready to serve you in any way that we can that assists in the proper use of penetrant.

NOW TO NEWS U CAN USE

There is a bit of turmoil concerning hydrophilic emulsifiers that we had tried to address by providing a concentration chart in our literature, and subsequently we added this to the labels on the containers. But, then there were claims that this might not be applicable to all batches. So, then we switched to providing a custom graph for each batch, so that any uncertainty concerning the applicability of the chart to the material could be dispelled. Despite this, we are told that some auditors now require that the user of the emulsifier develop his or her own dilution chart, and that the user should not use the chart that has been provided. Users of our E-58D hydrophilic emulsifier should be aware that an auditor might not accept the use of the chart that we provide, and that is developed by us in our laboratory for each individual batch.

The argument is that the user may have a refractometer that is different enough from the one we use that the results may be off from our chart. The easy solution to this is to use our chart as a base starting point. Make up two known solutions of emulsifier, and take readings on your refractometer. Now plot the two



Met-L-Chek Co., 1639 Euclid St., Santa Monica, CA 90404, U.S.A
Phone: 310-450-1111 Fax: 310-452-4046 Email: info@met-l-chek.com Web: www.met-l-chek.com

readings on the chart. Draw a line through the points and this is your chart for concentration control using your refractometer. In most cases the line will be on or next to the line we have provided. It will prove of little practical difference but will make your auditor happy, which will cause you less pain.

MORE ABOUT EMULSIFIER

A follow on to the previous discussion is the result of numerous phone calls regarding how to make up a bath of hydrophilic emulsifier. We tell the inquirer to make up a 20% concentration of emulsifier. After a long silence we are asked how do you know how to make up that concentration?

The concentration at which the E-58D emulsifier was qualified is 20%, and that is the concentration that almost all of the companies use, when immersion is the method of use. So 20% is the correct value. 20% may be expressed several ways. In decimal form it is 0.20. In fractional form it is 1/5. In textual form it is "one in five". In practical terms, one can express it by saying that one part of emulsifier is added to four parts of water.

Let's look at some situations where one must make the dilution.

Example one – diluting a container of E-58D. This is easy. You take one container of E-58D concentrate, as received from Met-L-Chek, and add it to four containers of water. The result is a 20% solution of E-58D.

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<info@met-l-chek.com>

This is easy to check. After the mixing, there are five containers of solution, made up of one container of E-58D concentrate and four containers of water. So the E-58D concentration is one in five, or 1/5, or 20%. Does the size of the container make any difference? Not at all, as long as the same container is used. If one 5 gallon container of E-58D concentrate is mixed with four 5 gallon containers of water, the result is a 20% solution. If one 55 gallon drum of E-58D concentrate is mixed with four 55 gallon drums of water, the result is the same – a 20% solution.

Example two – making up a known quantity of a 20% solution. This involves a bit more arithmetic.

Suppose that you want to make up 250 gallons of a 20% solution of E-58D. The questions is, "How much E-58D concentrate is used, and how much water is added?" The first step is to calculate the amount of E-58D concentrate required. This is equal to 20% of the 250 gallons required, or 1/5 of the 250 gallons required. 0.20 times 250 gallons equals 50 gallons. Or, 1/5 of 250 equals 250/5 equals 50 gallons of E-58D concentrate. The amount of water can be calculated several ways. The easy way is to understand that a 20% solution consists of adding four parts of water to one part of E-58D concentrate. So 50 gallons of the E-58D concentrate would require four times as much water, or 4 times 50 equals 200 gallons of water. The final solution consists of 50 gallons of E-58D concentrate and 200 gallons of water, and 50 plus 200 equals 250 gallons.

The other way to calculate the amount of water is to understand that if the final solution is to be 20% E-58D, then the percentage of water must be 80%. Or, if the E-58D is to be 1/5 of the solution, then the water must be 4/5 of the solution. Using the 80%, the water will be 0.80 times 250 equals 200 gallons.
Using the 4/5, the water will be 4/5 times 250 equals 200 gallons.

Or, you can just subtract the amount of E-58D concentrate from the total to get the amount of water. 250 gallons total minus 50 gallons E-58D concentrate equals 200 gallons of water.

All roads lead to Rome, and if you are a bit uncertain, you can use one of these methods to check on another to be sure that you have the correct amounts.

The Penetrant Professor

Bill & Mike visit NDT- Europa in the Netherlands.

HYDROPHILIC EMULSIFIER MIXING GUIDE

VOLUME PARTS EMULSIFIER	VOLUME PARTS WATER	EMULSIFIER CONCENTRATION
	for immersion applications	
1	1	50 %
1	2	33.3 %
1	3	25 %
1	4	20 %
1	5	16.6 %
1	6	14.2 %
1	7	12.5 %
1	8	11.1 %
1	9	10 %
	for spray applications	
1	19	5 %
1	24	4 %
1	32	3 %
1	47	2 %

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