Shedding Light on Light-Weight Catalyzation

By Bob Cottrell, CPIM

The lighter weight of many of Arjay's Performance Products is most often a good thing. But one area where light weight can lead to bad things is when an end user decides on the level of catalyst to add to the product.

Comparison of Volume and Weight Percentages of Various Shop Floor Products

Product	Wgt/Gal	% by Vol	% by Wgt	% +/-
Arjay 3201	11.5	1.5	1.1	-37
Typical Gel Coat	9.6	1.5	1.3	-14
Typical Resin	9.5	1.5	1.3	-14
Arjay 2012	8.6	1.5	1.46	-3.5
Water	**8.35**	**1.5**	**1.5**	**0.00**
Arjay 6011	7.2	1.5	1.7	14
Arjay 4001	6.5	1.5	1.9	23
Arjay J-Core	5.0	1.5	2.5	40

Most people working on the shop floor (whether they realize it or not) think in terms of percent by volume. They may know that there are 3.8 liters in a gallon and 3,800 milliliters in that gallon. They may even calculate that if they intend to catalyze at 1 ½ per cent, they have to add (.015 x 3,800) 57 ml per gallon. Sounds correct, right? No, it is not! Such an approach can result in serious over catalyzation of lighter weight bonding compounds. Let's look at why.

For reasons of accuracy and repeatability, Arjay sets the gel time of all of our products on the basis of WEIGHT per cent, not VOLUME per cent. Our data sheets and certificates of analyses show the gel time and related data (exotherm temperature, etc.) at 1 ½ per cent by weight. The following table illustrates the difference between weight and volume per cent for various products used on the shop floor.

As you can see, for most products used in production, there are considerable differences between volume and weight percentages. But for lighter weight products the difference is exceptional – from 23 to 40%. As a practical matter what this means is that lighter weight products can be considerably over catalyzed using the same "rules of thumb" that work reasonably well for gel coat, resin and medium weight putties.

The easiest way to accurately determine the appropriate catalyst amount is to reference the guide on Arjay's website, www.arjaytech.com for the particular product in question. These are available in PDF format and can be printed out for use by shop floor personnel. The catalyst quantities indicated take into account the difference between weight and volume per cent and also varying material temperatures. These guides work great for hand catalyzation, but the use of dispensing equipment poses yet another complication.

Such dispending equipment is calibrated to deliver the desired catalyst amount based on a volume per cent. As more and more manufacturers utilize equipment to apply lighter weight materials, this fact should be understood by those persons responsible for setting the catalyst amount.

A simple formula for calculating the volume per cent (V%) setting on equipment is: V% = 0.119 x W% x D
Where W% is the weight per cent desired and D is the product density in pounds per gallon.

For example, from table 1 for Arjay's J-Core the setting should be 0.9% to achieve 1.5% by weight (0.119 x 1.5 x 5.0). Keep in mind that this would be the setting at 77 degrees F and higher temperatures would require an even lower setting. Between the website Catalyzation Guides and the above formula, you should be able to utilize the appropriate amount of catalyst regardless of the density of the product being used.

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