Pot Life, Working Life and Gel Time of Epoxies

Pot life, working life, and gel time are properties of an epoxy that can vary greatly from product to product. These properties play a vital role in material selection when choosing an adhesive for a specific manufacturing environment or process. When selecting an epoxy, pot life may be an important concern for one application, but not for another. When it matters, it is important to know how to interpret product test data on a product’s datasheet concerning these properties.

**Pot Life vs. Working Life**

Pot life and working life are often taken to mean the same thing, but that is not always the case. **Pot life** is defined as the amount of time it takes for an initial mixed viscosity to double, or quadruple for lower viscosity products (<1000 cPs). Timing starts from the moment the product is mixed, and is measured at room temperature (23˚C).

**Working life**, on the other hand, is the amount of time an epoxy remains low enough in viscosity that it can still be easily applied to a part or substrate in a particular application. For that reason, working life can vary from application to application, and even by the application method of the epoxy, so there is no uniform method for quantifying this property.

Pot life can act as a guide in determining working life by providing a rough timeline of viscosity growth, remembering that viscosity doubles for every pot life value.

One example for review is the pot life determination of EPO-TEK® H70E, see Table 1 below. It starts with an initial viscosity of 5632 cPs and doubles after 56 hours. You can estimate that in another 56 hours, the viscosity will be at least 22,000 cPs.

**Gel Time**

Gel time is another term that is often used interchangeably with pot life, although there are some differences. Both terms are used to describe the thickening of an epoxy after it is mixed, but gel time is often tested at elevated temperatures as well.

Gel time is determined by heating the epoxy and observing when it starts to become stringy, or gel-like, though not quite fully cured. It will most likely be at a higher viscosity at the end of it’s pot life measurement.

This value can be useful for manufacturing purposes if one needs to move a part before the cure is complete, but does not want any shift in a component placement. It is not, however, a standard quality control test and should be determined experimentally in each application, if needed.