APPLICATION NOTES

SPI Supplies
206 Garfield Avenue,
West Chester, PA 19380, USA

Vacseal® High Vacuum Leak Sealant

Curing protocols and tips for successful application of the product

Some examples of curing conditions are given below:

300° C for 30-40 minutes
260° C for 1 hour

Room temperature: Very long cure time (days, maybe weeks)

Use of vacuum:
If one really has a system to which no (or very low) heat can be applied, the curing process can be accelerated via the use of vacuum. The curing process involves an evaporation of the solvent and anything done to accelerate that evaporation will enhance the curing time. The product was not designed in this way and the final properties, and the longevity of the seal might not be as good if done this way but we mention it as an option.

The curing of Vacseal® at the higher temperatures poses no particular problems for most users since for use in a UHV system, bake outs are necessary anyhow. But once in a while, questions are asked about cure protocols at lower temperatures. As a rough rule of thumb, for every drop in temperature of 10° C, one could expect a slowing of about 10X in the cure rate. Hence, dropping the cure temperature from 260° C to 250° C would increase the cure time from 1 hour to ten ours and another 10° C drop to 240° C, to 100 hours.

We are not sure that a cure at room temperature would be predictable from the Arhennius kind of analysis just presented, but we do know that Vacseal® will cure after a very long time.

For someone wanting to do a room temperature cure, while possible, they have to be prepared to consider the following:

a) The wait could be days or weeks, perhaps longer.

b) The curing time will depend on the thickness of the layer of Vacseal® being used. A thinner layer will cure in much shorter time than a thicker layer.

The curing mechanism of Vacseal, simply put, is that the solvent is driven off by heat, and the polymer is left behind, forming the seal. The problem is that cured polymer on the outside (in

other words a "skin" effect) prevents the transport and removal of solvent from the inside, so complete curing takes a long time, and the effect of the vacuum makes it even more complicated. Fortunately, the presence of a vacuum speeds the curing time, which is beneficial.

At temperatures below about 200°C it is difficult to predict the curing time, but it will probably take several days before the sample is well enough cured that it can be used. Unfortunately, there have been situations where the outside cured well enough that solvent remained within the polymer for many months, creating a continuing outgassing problem.

Because of the nature of the silicone, even when fully cured, it can have a somewhat "sticky" feel to it, so air dried applications might have this same kind of "sticky" feel, when in fact the cure cycle is more complete than it might at first appear.

We do not recommend room temperature cures, the product was designed for higher temperature cure protocols. But, when there is no choice in the matter, one will have to display extraordinary patience.....

APPLICATION

Prior to using the sealant, surface dirt should be removed from the suspected area. Any hydrocarbon solvent is recommended for removal of greasy surface dirt. New systems can be sprayed or painted directly.

REMOVAL

In event it is desirable to remove the sealant, cured sealant is easily removed with any acetate, ketone, or ester solvent. The uncured sealant can be removed by wiping with any standard hydrocarbon solvent.

Revised: EER

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