

List of Leading Underfill Materials and Recommended VFM Profiles

Vendor	Adhesive	VFM Cure	Convection Cure	Resin Type
<i>Dexter</i>	FP4526	2 min @ 120°C 2.5 min @ 160°C Total time: 4.5 minutes	60 min 110°C 30 min @ 150°C 90 minutes	Epoxy
<i>Dexter</i>	FP4527	2 min @ 120°C 2.5 min @ 160°C Total time: 4.5 minutes	60 min 110°C 30 min @ 150°C 90 minutes	Epoxy
<i>Dexter</i>	FP4511	2 min @ 120°C 2.5 min @ 160°C Total time: 4.5 minutes	120 min 150°C 120 minutes	Epoxy
<i>Namics</i>	U8437-2	3.5 min @ 120°C Total time: 3.5 minutes	15 min @ 120°C 15 minutes	Epoxy
<i>Dow Chemical</i>	6810	5 min @ 150°C Total time: 5 minutes	60 min @ 150°C 60 minutes	Silicone
<i>Johnson Matthey</i>	Expressin	2 min @ 120°C 1 min @ 150°C 7 min @ 165°C Total time: 10 minutes	15 min @ 120°C 15 min @ 150°C 60 min @ 165°C 90 minutes	Cyanate
<i>Loctite</i>	FMD638	2 min @ 130°C 2 min @ 150°C Total time: 4 minutes	20 min @ 150°C 20 minutes	Epoxy
<i>Loctite</i>	FMD639	2 min @ 130°C 2 min @ 150°C Total time: 4 minutes	30 min @ 150°C 30 minutes	Epoxy

Notes:

1. The adhesives listed above were VFM cured at the indicated profiles and found to have the same properties as the convection cured samples.
2. Each and every indicated profile provides a good starting point. An applications engineer should first attempt to profile to the recommended VFM cure. Minor changes may be required depending on the electronic packages being underfilled.
3. More underfills (beyond those indicated in the above table) have been successfully cured with VFM. Limited property analysis was performed on the non-published underfills. The table will evolve to include all adequately tested underfills.
4. Total time indicated does not include ramp up or ramp down periods. Typically VFM ramp up times are within 1-2 minutes while convection ramp times are typically 10-30 minutes each (up and down).