

# Masking and Underfill Dispensing for Medical Device

## Case Study

In one of our [medical](#) applications projects, the customer wanted to dispense a mask to protect gold leads and an underfill on a silicon substrate with a clear test die. The substrates were Dymax X-499-91-C for Masking and Epoxibond-106M-1 for Underfill Dispensing

### Recommended Dispensing Process:

A conveyORIZED [MAX Series High Precision Dispensing System](#) equipped with a **Precision Auger Dispense Pump** and a time pressure system were used for the evaluation. The Precision Auger Pump was selected to dispense small volumes of material accurately. The Underfill material was specified with a noticeably short pot life which allowed us to dispense the material directly from the syringe with controlled air pressure and a disposable needle. If the material had had a longer pot life a different pump would have been selected.

### Dispense Parameters:

The substrate was programmed using our proprietary FLOWare software. Dispensing accurately and repeatedly requires a combination of precise needle positioning and total control of the gantry and pump action.

Due to the size of the substrate and alignment points a 2X magnifier was added to the camera. This allowed us to use the small alignment marks in the corners and the substrate edge for precise alignment. The mask had excellent dispensing properties and held its form very well after dispensing, even without a UV flash. The mask covered the leads completely without noticeable flow leaving space enough for the underfill process. After the masking material had cured, the underfill process was programmed and run with similar heights to that of the dispensed mask.

Dispense Settings	Height	Velocity	Valve Speed	Air Pressure / Vacuum
Mask	0.002 in	0.14 in/sec	14000 cts/sec	8 PSI / 0.0 PSI
Underfill	0.008 in	.100 in/sec	N/A	13 PSI / -3.0 PSI

### Conclusions: Masking and Underfill Dispensing for Medical Device

Both dispensing processes were successful for the process as described. Adjusting the masking line widths and lengths is a straightforward process. The positioning of the mask was critical to make sure that sufficient space is allocated for the underfill epoxy.

### Final Dispensing Equipment Recommendation:

Dispense System : [MAX Series System](#) with auto vision, red/blue illuminator, autocalibration station – backlit, needle wiper  
Dispense Pump : [Precision Auger Pump](#) & [Time Pressure System](#)  
Material (1) : Dymax X-499-91-C for Masking  
Material (2) : Epoxibond-106M-1 for Underfill Dispensing  
Needle Size and Type : 25G Precision needle  
Needle Size and Type : 0.25 inch long plastic hub 25G needle

GPD Global offers [dispensing system](#) customization and [in-house application evaluations](#) with our customers. Call 1.970.245.0408 or email [request@gpd-global.com](mailto:request@gpd-global.com).

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