

## Chip on Board Assembly using Dam & Fill process

### Introduction

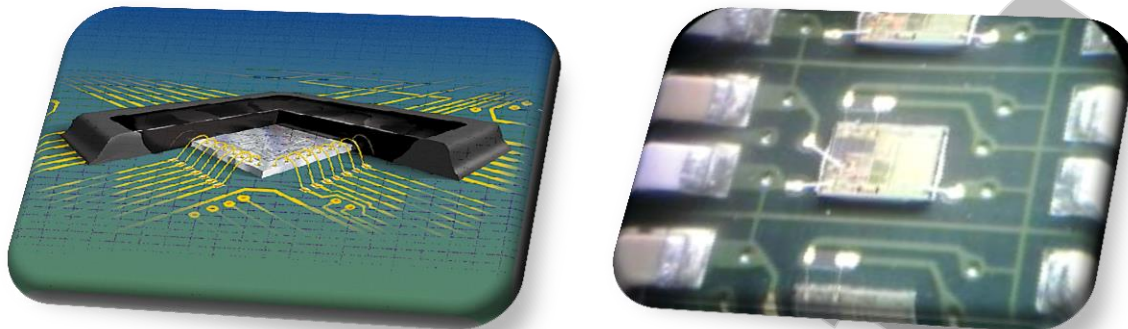
- SPEL has implemented its DAM and FILL processing over PCB substrate for a Multi-Chip Module (MCM)
- MCM includes ASIC chip and surface mount passive components targeting growing application segments like RFID
- Seamless integration of the COB process with the singulation process used in QFN separation
- SPEL was qualified for mass production, after the successful Process and evaluation.
- Process solutions were developed indigenously using our existing resources.
- DAM and FILL process is a good show of our QUICK ADAPTABILITY to new process developments.

### Encapsulation Material Characteristics

<b>Technology</b>	Epoxy
<b>Appearance</b>	Black
<b>Product Benefits</b>	<ul style="list-style-type: none"> <li>• High purity</li> <li>• Minimal slumping</li> <li>• Green product</li> </ul>
<b>Filler Weight, %</b>	72
<b>Cure</b>	Heat cure
<b>Application</b>	Encapsulant - dam
<b>Operating Temperature</b>	-65 to 150 °C
<b>Typical Package Application</b>	BGA and IC memory cards

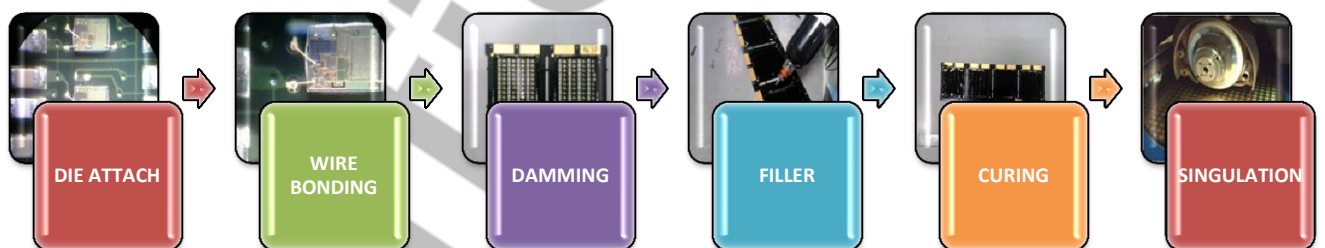
<b>Technology</b>	Epoxy
<b>Appearance</b>	Black
<b>Product Benefits</b>	<ul style="list-style-type: none"> <li>• High purity</li> <li>• Low stress</li> <li>• Good moisture resistance</li> <li>• Exhibits relatively high flow</li> <li>• High temperature performance</li> <li>• Excellent chemical resistance</li> </ul>
<b>Filler Weight, %</b>	73
<b>Cure</b>	Heat cure
<b>Application</b>	Encapsulant
<b>Operating Temperature</b>	-65 to 150 °C
<b>Typical Package Application</b>	Automotive applications, BGA, IC memory cards, Chip carriers, Hybrid circuits, Chip-on-board, Multi-chip modules and Pin grid arrays

## DAM and FILL



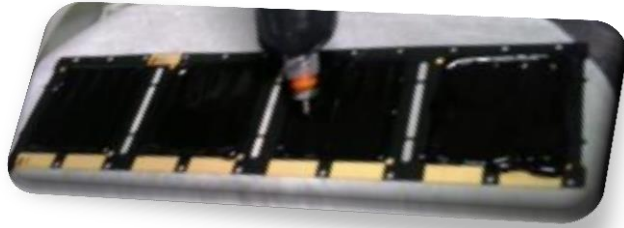
- FP4451 is high viscous damming material is designed as a flow control barrier around areas of bare chip encapsulation
- FP 4450 is a low viscous filler material for easy flow of mold compound to fill the Dam and provide an even flat surface
- FP4451 used in combination with FP4450 passed pressure pot performance up to 500 hours with no failures depending on device and package type.

## Process Flow



## Engineering Challenges

- Experimental analysis was performed on DAMMING Parameters with different Materials and Equipment.
- Minimum handling of PCB during the entire PROCESS FLOW.
- Results were evaluated and suitable Parameters, Tools were set for flawless encapsulation.
- Modified the existing equipment to cater the process needs.
- PCB cross bow / Camber after oven cure should be +/- 1mm for better singulation.



### Process Control

Key controls were put in to work on the following,

- Constant Air pressure with controlled vacuum holding.
- Size of the nozzle tip hole, Speed of nozzle travel is the two key DAM height deciding parameters.
- Temperature of the substrate helps in uniform distribution of the FILLER material.
- Staging and Post cure after DAM and FILL

### Quality and Reliability Assured

- No Delamination at Time Zero and after preconditioning
- Assembly Yield of 99% and above

### Opportunities unlimited

Successful implementation of Dam & Fill process has opened up opportunities in the exciting world of components assembly & integration. SPEL has required capability, expertise in providing Customised solutions for Customer needs