

## 7628 HR for Use in Single Ply Dielectrics Tony Senese

Designing multilayer constructions involves several critical choices. Cost and function have become increasingly hard to balance for certain low layer count PCB's. Using higher resin content 7628 prepreg is one way to manufacture certain designs at a lower cost. The use of 7628HR combined with thicker core material for a typical .059" 4-layer can save as much as 20% on materials.

### Critical Factors

The use of high resin content 7628 prepreg is limited by the following factors.

1. Dielectric spacing requirements
2. Copper fill requirements
3. Resin flow constraints

These limitations are dictated by both the design of the individual PCB, the number of PCB's per panel and the laminated panel size.

### Dielectric Spacing

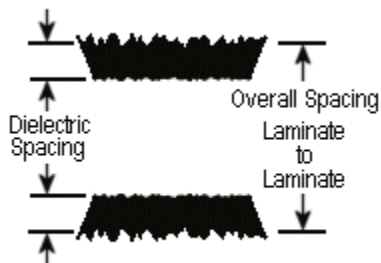
The required spacing between layers will not always be specified, but in order to use 7628 HR it must fall within a certain range. Unlike conventional constructions, 7628HR cannot be dialed in. The glass style and resin content produce a unique yielded thickness depending on the circuit configuration

The following table gives typical values for 7628HR dielectric spacing.

	Foil/GND	Foil/SIG	GND/GND	GND/SIG	SIG/SIG
1/2 oz	7.97	7.58	7.84	7.45	7.06
1 oz	7.85	7.1	7.6	6.85	6.1
2 oz	7.6	6.1	7.1	N/A	N/A

*These values are estimates based on one circuit configuration.*

This is the approximate nominal measurement from the top of layer a to the top of layer b, or the "dielectric spacing" shown in the following diagram.



These values are estimates based on one circuit configuration.

### Copper filling requirements

It takes more resin to fill opposing signal traces than opposing ground planes. The difference depends on the amount of etched area, and how many images are repeated on each panel. The configuration of the circuit can also create low pressure areas that make higher pressure or more resin necessary to insure void free lamination.

Using one ply of any prepreg presents some risk for certain types of circuits. 7628HR has less than 50% resin by weight, this means that it has lower resin content than any style other than standard 7628. Care should be exercised to make sure the design will allow the use of 7628HR.

2 ounce copper can be filled for designs that do not have tight filling requirements, but not for designs with more than 2 images per panel. The spaces in between the images will act as low pressure areas and will be prone to voids.

### Resin Flow Constraints

7628HR will flow more than standard 7628 prepregs. Even though the rheology of the prepreg is matched to the other glass styles, the additional 5-7% resin on the surface of the fabric, can be more easily pushed towards the edges of the panel. Standard 7628 has an approximate resin buttercoat of .0005-.0007". 7628HR has a buttercoat of approximately .0008-.0010". If a smaller panel size is used (less than 18x24), lower pressure may be necessary if multiple plies (4 or more) of 7628HR are used. Up to a 25% reduction in laminating pressure may be needed to insure proper flow and avoid the "footballing" effect. This is where there is a large drop off in thickness at the edges of the panel due to excessive resin flow.

### Conclusion

Proper use of 7628 HR can optimize the cost of materials for certain low cost printed circuit boards. Care should be taken to make sure the design and process is compatible with the product.