

## Busbar Edge Conditioning FR4 Approach

A previous App Note on [Best Practices for Edge Conditioning and Sealing of Laminated Busbars](#) identified four key approaches as shown below. This App Note provides a drilldown on the FR4 approach.

Open Edge	Pinch Sealing	FR4	Epoxy Edge Filled
-----------	---------------	-----	-------------------

FR4 is a type of epoxy resin-based fiberglass material that is commonly used as an insulating layer in laminated busbars. It can be used as insulators or specially designed to form a strong insulated edge. In the FR4 edge conditioning approach, these insulating layers are extended to provide good structural protection for the conductive layers.

### Advantages:

- **Electrical Insulation:** FR4 has excellent dielectric properties, making it an effective electrical insulator
- **Mechanical Strength:** It offers good mechanical strength and resistance to physical stress.
- **Heat Resistance:** FR4 is capable of withstanding higher temperatures, making it suitable for high-power applications.
- **Higher throughput** than Epoxy Edge Fill and is very repeatable and consistent.

### Cost and Tradeoffs:

- **Cost:** Higher material cost and initial design time.
- FR4 is excellent for electrical insulation and mechanical protection but may need to be paired with epoxy to provide a full barrier against external contaminants.

### Applications:

- Applications that require high mechanical strength.

### Key Considerations:

The FR4 process is very repeatable and robust. While adding FR4 provides the highest structural strength, it also has a larger footprint than epoxy. So, depending on application requirements, the Epoxy Fill method may be a better alternative if space is an issue.

### Summary:

FR4 is more expensive than Open Edge or Pinch Seal, but it provides superior mechanical properties.

Our Design Team can help you select the right approach or combination of approaches for your application.

### FR4 EDGE FILL CONSTRUCTION

