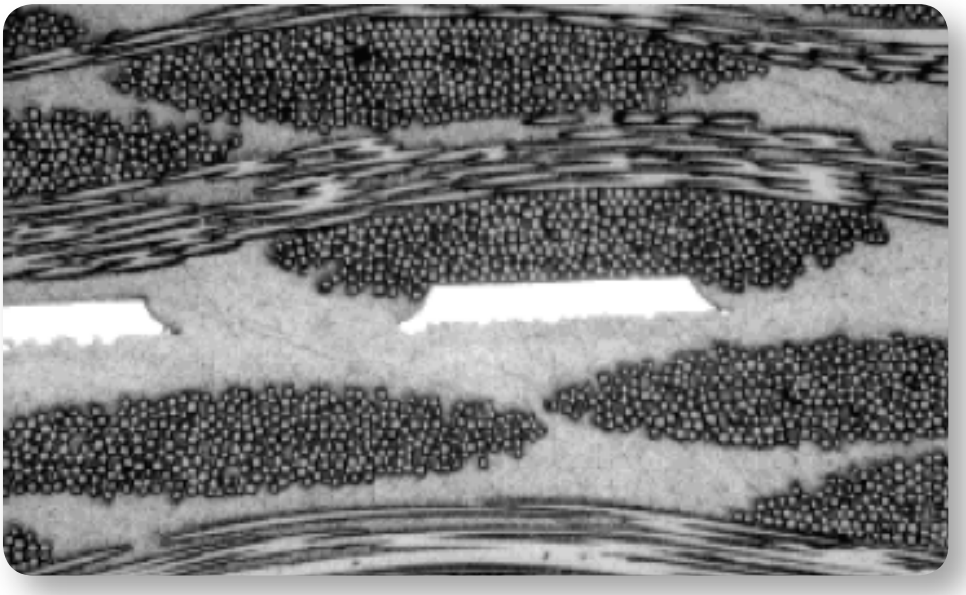
ARLON
ELECTRONIC MATERIALS

APPLICATION NOTES

GLASS COMPRESSION

Arlon 2013



Glass compression is caused when excessive resin flow occurs, leaving glass bundles compressed against themselves and physically contacting inner signal layers within the lamination package, as illustrated in the photomicrograph, above. This phenomenon is believed to result in an increased likelihood of shorts and or current leakage within the package, since a layer of pure resin between the glass bundle and the copper represents the most effective dielectric in the composite.

Glass compression can occur as a result of high pressure in combination with fast heat-up rates, the combination of reduced resin viscosity due to the faster heat up rate with pressure that causes excessive flow. It is more likely to occur with lower resin content and/or heavier glass styles that have less resin content in total and less of a surface "butter-coat."

Because the retained resin content is low, the laminate is structurally weakened. Additionally, drilling and fabrication problems may result. Other possibilities include high chemical absorption (wicking), pink ring, delamination and measling in addition to the increased risk of current leakage.

Several approaches can be used to reduce glass compression:

1. The simplest "fix" is simply to reduce laminating pressure to eliminate the excessive flow. In this case care needs to be taken that enough flow remains to fill inner layer circuitry and to prevent dryness in low pressure areas.
2. Slowing heating rate in combination with reduced lamination pressure to retain more of the resin in the package. (Note: This will also reduce the tendency of a PWB to "football," or to be thinner at the edges than in the center.)
3. Consider the use of higher resin content fabrics used to build dielectric thickness, especially those in direct contact with a signal layer. Use of a heavier glass, with a high resin prepreg based on 106 or 108u0 glass directly against the signal layer, can be effective in combination with controlled pressure and flow.
4. Use Vacuum assisted lamination, which allows pressure reductions to about 60% of the pressure used in non-vacuum process. While most of the industry now uses vacuum lamination routinely, if it is not in use, generally higher pressures are used to ensure sufficient flow and fill.

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