

Abstract

Results of E-Beam Prepreg Debulking Study

Electron beam curing of composites is a non-autoclave process, and consolidation pressure during cure has therefore been limited to that which may be provided by vacuum bagging the part, or by the application of direct mechanical force. Tooling to apply mechanical force tends to be limited to simple geometric shapes and may also block (shadow) the electron beam's path to the composite. Vacuum bagging is readily adapted to most complex three-dimensional parts but the applied consolidation is limited to roughly atmospheric pressure and therefore cannot be relied on to collapse the expansion of volatiles during cure of the electron beam cured laminate. Preventive measures are, therefore, needed to reduce the factors that cause voids. A critical opportunity to reduce voids in the cured laminate is to minimize air entrapment between plies during lay-up. This paper reports on the results of trials conducted with IM7/3K and IM7/8HM unidirectional tape prepregs to evaluate vacuum debulking and other process parameters on the reduction of voids in electron beam cured laminates.

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