



## Encapsulation Yields Thin Wall Ground Insulation

Ametek EMG wanted to find an alternative to the powder coat epoxy used to insulate their BLDC motors. Recurrent manufacturing issues, including pin holes in the epoxy inside stator slots, were leading to unacceptable yield losses.

The solution Ametek and Encap envisioned was a one-step encapsulation of its stator laminations. In addition to eliminating the powder coat epoxy, they saw the opportunity to eliminate additional components, including three legs which serve to hold the stator off a mating PCB. To achieve maximum manufacturing efficiencies, the companies also set a goal of eliminating existing rivets and using the plastic encapsulant to lock the loose laminations together into a stack.

Encap recommended a preapproved UL system to achieve the needed Class B UL 1446 insulation system requirement. For regulatory reasons, a material thickness in the slots of 0.015" was chosen, though further testing showed the stator is capable of passing hi pot testing at slot thicknesses as low as 0.005" to 0.008" .

Loose laminations are loaded directly into the injection mold and are then encapsulated. The mold is designed to adjust for lam stack tolerances of up to +/- one lamination. The fast manufacturing times which are inherent to injection molding greatly expand capacity. Ametek was able to meet all its goals in this encapsulation program, developing a high quality, simplified design.

### Benefits Achieved:

- Elimination of powder coat epoxy quality issues
- Loose lams loaded directly into mold and encapsulated
- Passed hi pot at as low as 0.005" to 0.008"
- Use of a pre-approved Class B UL 1446 insulation system
- Cost and component reduction