Continuous Hot Melt Supply System for Prepreg Resins

PROCESS SOLUTION

Challenge

With today's fast cycle rate production demands, prepreg material manufacturers need to use faster curing resins since there is not enough time to mix and pour the premix with a traditional resin batch mixing process. Traditionally, a prepreg manufacturer would need to quickly transfer reactive mixes into small volume containers and freeze to stop the reaction. Later on, these small pails would be re-melted and poured onto a prepreg filming line. This batch mix, freeze/thaw process is a lengthy, wasteful process and is not conducive to mass production.

Solution

With Graco hot melt resin metering solutions, prepreg manufacturers can replace the batch mixing with a continuous inline melt and mix system. By combining several Graco platforms to provide a continuous in-line automated premix process, and delivering hot premix to a filmer or direct to a compression mold, the batch mix, freeze/thaw process can be eliminated.

The Graco system continuously melts, proportions, mixes and delivers the prepreg resin and hardener mix directly to the prepreg coater at a flow rate of up to 4 kg/min. Supply is controlled by a sensor on the coating head to interrupt flow when the coating station is full. Under 2 kg of mixed material exists at any one time and can be easily flushed when the coating process is complete.

Results

Prepreg manufacturers can now use faster-curing resins for decreased curing time – a key requirement for fast cycle rate mass production. They will have resin waste and cleaning costs associated with batch mixing. Coating lines will have increased uptime, thanks to the fast start-up of the proportioner system. Energy consumption can be reduced and manufacturers will no longer need to preheat the drums of material since a point of dispense drum melting system is used.

Spraying resin premix to a carbon fiber preform

SPECIFICATIONS

END USER

Advanced composite prepreg suppliers

INDUSTRY

Automotive, Sporting Goods,
Wind Turbine

APPLICATION

Melting two-part resins
for prepreg production

Material Specs:

- **Resin:** Solid at room temperature, supplied in 55 gal (208 l) drums, flowable viscosity at 140° to 180°F (60° to 82°C)
- **Hardener:** Thixotropic paste at room temperature, 55 or 5 gal (208 or 19 l) containers

Process requirements:

- Preheat resin to flowable viscosity, 140° to 180°F (60° to 82°C)
- Volume mix ratios fixed, nominal between 5:1 to 10:1, other ratios available
- In-line stainless steel static mixer with quick disconnect hoses for cleaning
- Proportioner responds to level sensor in coating head

GRACO EQUIPMENT

The continuous hot melt prepreg supply system is delivered as a complete system. Each system includes:

- Therm-O-Flow® 200 – Point of use hot melt drum unloader for resin, up to 220°F (104°C)
- D200 Supply System – For hardener paste in 55 gal (200 l) drums
- D20 Supply System – For hardener paste in 5 gal (20 l) pails
- Graco HFR™ Metering System – a two-component proportioner for premix up to 190°F (88°C) – built with additional pump heaters and insulation

Accessories:

- Solvent flush pump for use of nonflammable flush media
- Tandem Therm-O-Flow
- Tandem @ D20 or D200 Supply System, depending on shipping containers
- Applicator heads to direct apply resin premix to preform

The Graco HFR™ Metering System for accurate resin-curative metering

The Graco Therm-O-Flow® 200 bulk melter for resin feed to the HFR Metering System

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