Potting solar panel junction boxes

CASE STUDY

Challenge

Solar panel junction boxes require potting to protect the ribbon wire connection from corrosion and to protect against moisture ingress through the back panel. The potting material must seal and adhere to a variety of substrates including a plastic junction box, metal ribbon wires and the glass back panel. For this particular potting application, the customer chose QSil 6201 (UL pending) silicone potting material with a ratio of 20:1 part by volume (pbv). Ratio, flow rate and volumetric consistency are all critical factors when potting junction boxes.

Solution

Graco and its distributor partner worked together to provide a meter, mix and dispense system to process a 20:1 pbv silicone potting material with a volumetric displacement of approximately 30 cc's. To verify the equipment was an exact fit for this material, Graco qualified the PR70v™ Meter, Mix and Dispense System at the Graco Ohio application development labs in North Canton, Ohio. The 20:1 pbv ratio was easily obtainable with the PR70v variable ratio system. Ratio and volumetric displacement repeatability studies proved the system to be reliable in processing the 20:1 mix ratio potting material.

The PR70v was equipped with an MD2 Dispense Valve with spring-loaded poppet nose to keep the base material (100 parts) separate from the catalyst material (5 parts) within the MD2 valve. Since the catalyst material is moisture sensitive, the low volume reservoir is equipped for nitrogen or a desiccant to displace or absorb moist air and a low level sensor to indicate when refill is required. The base tank is equipped with high/low level sensors and an automatic refill solenoid kit for automatic refilling of the reservoir by a drum supply system.

Results

The Graco PR70v provided the customer with a reliable system to process the 20:1 mix ratio material. With the level sensors and automatic high volume side auto-refill, the system is capable of high volume solar panel production.

Graco PR70v Meter, Mix and Dispense System

MD2 Dispense Valve

SPECIFICATIONS

END USER

Solar panel manufacturer

INDUSTRY

Solar Photovoltaic Panel Assembly

MATERIAL SUPPLIER / DISTRIBUTOR

Quantum Silicones – Richmond, VA

APPLICATION

Junction box potting

Material Specs:

- QSil 6201 (UL pending) silicone potting material

Typical Properties

- Ratio (A:B) by volume 20:1
- Viscosity:
  - Part A - 6,000 cps
  - Part B – 30 cps
- Silicone

GRACO EQUIPMENT

- Graco PR70v™ Meter, Mix and Dispense System

CONFIGURATION

- Part Number: PR7E-JAYA1EACA334411JAJAANN3
- Blue side pump: 960
- Red side pump: 80
- Hoses
  - 1/2 in (12.7 mm) x 15 ft (4.5 meter) SS braid, TFE lined
  - 3/16 in (4.7 mm) x 15 ft (4.5 meter) SS braid, TFE lined

Accessories:

- MD2 Dispense Valve with 10:1 nose poppet valve
- Pressure transducers
- Need at least a 32 element static mixer or a combo mixer for optimum mixing

Delivery Method`:

- 30 liter off board high volume tank with stand
- High volume reservoir equipped with automatic high / low level sensors and material transfer control
- 5:1 55-gallon drum supply pump for high volume reservoir
- 30 liter low volume tank with low level sensor
- Nitrogen kit for low volume reservoir or desiccant

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