

Epoxy resin for aluminum assembly



CASE STUDY

Challenge

Gichner Shelter Systems is a manufacturer of tactical shelters, containers, and subsystems, used by the United States Armed Forces and its Allies. Gichner was limited by their current application system due to increased repairs, resulting in decreased uptime and increased cost. In addition, lack of process control, coupled with ratio deviations meant significant re-work and scrap due to de-lamination of the final product. Gichner needed to start tracking material usage. This feature was not available on their existing equipment.

Solution

The Graco HFR Metering System™ was installed and the material was configured at a 2:1 ratio by volume. It was dispensed using a Graco Fusion® AP Gun. Primary heat for ISO and resin was set at 140°F (60°C) dispensed at 15.7 MPa (157 bar) (2,250 psi). The B-side material was being delivered from a tote. A-side circulation routed back to the original drum while B-side circulation was routed to a waste drum.

Results

The integration of the Fusion gun and the impingement mixing principles eliminated the need for a static mixer and solvent cleaning. The improved process efficiency and overall product quality reduced scrap and rework. In addition, locally stocked standardized parts eliminated the need for hand-made repair parts.

A significant advantage for Gichner was the ability to meet the material management request of tracking material usage through the USB data download. The Graco Fusion AP Gun and high pressure mixing of the new system created consistent optimal resin mix enabling complete coverage with less material and decreasing occurrences of de-lamination.



GRACO HFR METERING SYSTEM

Operators definitely like the way the machine worked and commented that it sprayed better than what they were previously using.

SPECIFICATIONS

END USER

Gichner Shelter Systems

INDUSTRY

Aluminum assembly

APPLICATION

- Spraying a two-component adhesive epoxy resin adhesive for aluminum assembly
- EPIC Epoxy Resin
- 2:1 by volume

MATERIAL SPECS

R1003/H5002 Epoxy Resin

MATERIAL SUPPLIER

- EPIC

Typical Properties

- Ratio (B:A) by volume: 2:1
- Viscosity:
 - A side 8,500-12,000 cps at 25°C
 - B side 9,000-14,000 cps at 25°C
 - Mixed 2,000–2,200 cps at 60°C
- Gel time:
 - 4 hours at 77°F (25°C)
 - or 20 minutes at 169°F (76°C)
- Cure time:
 - 7 days at 77°F (25°C)
 - or 1 hour at 169°F (76°C)

GRACO EQUIPMENT

- Graco HFR Metering System
- Graco Fusion AP Gun

CONFIGURATION

- Part number: HFRA-14AJAFDBDNNN
- Blue pump (B): 80 cc
- Red pump (A): 40 cc
- Heat zones: 4 heat zones (two in-line heaters & dual zone hose)
- Hoses:
 - 3/8 in (9.5 mm) x 1/4 in (6.3 mm) x 50 ft (15.2 m) heated
 - 1/4 in (6.3 mm) x 10 ft (3 m) heated whip
- 0.050 (B) / 0.032 (A) orifices
- 145°F (63°C) primary heat (A & B)
- 140°F (60°C) for ISO
- 140°F (60°C) for resin
- 15.7MPa (157 bar) (2,250 psi) dispense pressure

Accessories:

- Casters
- T2 feed kit with 3/4 in (19 mm) feed hoses
- Circulation kit with 1/4 in (6.3 mm) 24.1 MPa (241 bar) (3500 psi) hoses

Delivery Method:

- Fusion AP with solvent purge (two static mixers with rack tip)



Benefits:

- Resin has a better mix than existing system, requires less materials
- Increased productivity
- Decreased production time and improved process control
- Fusion gun allows for a faster application cycle and reduced cycle time
- Modular design of Fusion gun allows for periodic cleaning of the mix module/component
- Advanced Display Module with USB data download allows visibility of error and event logs