



Reaction Injection Molding

Case Study: Becton Dickinson Products – RIM Enables Complex Design Geometries in Medical System Enclosure Panels

The PHOENIX Automated Microbiology System, developed by the Biosciences division of Becton Dickinson and Company, is used in large commercial and hospital laboratories. The system performs automated analysis of infectious agents and has the capacity to perform from one to 100 determinations simultaneously. The PHOENIX System applies world-renowned BACTEC™ System efficiency to automated identification and susceptibility testing. The sealed panel never moves — so it can't dislodge, jam, crack or leak. The PHOENIX instrument's efficient design reduces maintenance, saves tech hours and minimizes downtime.



When they were in the planning phase, designers were drawn to RIM Technology for the complex geometries of the relatively large parts, varying wall thicknesses and the requirement for reinforcing ribs and molded-in bosses. The access door, door frame and the large right and left front panels of the unit's carousel bay are made using the polyurethane RIM process, provided by **Exothermic Molding, Inc.**

The four RIM-molded parts feature a complex, convex-curved surface. At more than 32 inches tall and 21 inches wide, the door and its frame feature an arc radius of 18 inches. The door has raised surface features as well. The RIM process is ideally suited for both of these design features, and designers agreed they couldn't achieve such complex geometries with sheet metal. The process also allowed varying wall thicknesses from as little as 0.090 inches to as much as 0.40 inches, as well as extensive reinforcing rib structure.

The RIM parts are molded with aluminum tooling cut directly from CAD files. Only three molds were necessary to create a total of five parts, with the right and left panels produced from one family mold, and the door and handle produced in another. This creative tooling approach, along with 3D CAD files, are cost cutting features made possible by the experience of **Exothermic Molding** and the design flexibility of the RIM process.



Exothermic Molding paints and silk-screens the molded parts in-house. Additionally, significant

assembly is done for Becton Dickinson including installing metal inserts, sheet metal shielding, latches and various other components. Exothermic provides value added sourcing and assembly of dozens of components including sheet metal, insulation, bushings, injection molded components, solenoids and hardware. The parts are then carefully packed and shipped directly to BD's assembly floor.

The benefits of reaction injection molding include:

- *Large, sculpted parts can be molded economically.*
- *Variable thickness walls within the same mold allow for greater design freedom. Wall thickness may range from .125 to 1.125 inches.*
- *Closed molds produce accurately molded and structurally strong parts.*
- *Lower tooling cost and shorter tooling lead time.*
- *A wide variety of material properties including UL94VO.*
- *Electronic components, metal parts, glass and other materials are easily encapsulated.*
- *RIM parts are lower cost than the same parts made from metal or fiberglass.*
- *Compared to fiberglass, RIM parts have improved repeatability.*
- *Composites - RIM parts can be reinforced with many materials.*

Exothermic Molding capabilities:

- **CAD Engineering Review**
- **Mold Design**
- **Mold Manufacture**
- **Mold Repair/ Modification**
- **RIM Molding**
- **Precision Painting**
- **Silk Screening**
- **Assembly**

Exothermic Molding, Inc.
50 Lafayette Place
Kenilworth, New Jersey 07033
phone 908 272-2299
Fax 908 272-3355
sales@exothermic.com

Exothermic Molding delivers large, lightweight RIM parts quickly...at competitive prices.



Exothermic Molding is an ISO 9001:2008 Certified company.