



Reaction Injection Molding

Case Study: Kendro Products – Reaction Injection Molding Chosen for Encapsulation of Complex Metal Assembly and Printed Circuit Board

Kendro Laboratory Products, a wholly owned company of lab technology and instrument service giant ThermoFisher Scientific, is a global leader in products and services for the life science, material science, drug discovery, and bioprocessing markets. The company manufactures and markets a wide variety of equipment for the pharmaceutical, biotechnology, clinical, diagnostic, and blood processing sectors. When the opportunity presented itself to develop a new high speed centrifuge cover that required encapsulation of a complex metal assembly into one molded part, as well as the encapsulation of sophisticated electronics, Kendro turned to Exothermic Molding and RIM technology.

The centrifuge cover had to withstand destructive burst tests to ensure operator safety, as well as provide a thermal barrier necessary in technical centrifuge applications. To achieve these goals, a 1/4" Aluminum Plate with a hydro formed aluminum shell spot welded to the plate, along with a steel alloy strap, needed to be encapsulated into a single molded part. RIM's low temperature, low pressure, highly adhesive process allows encapsulation of metal plates without any deformation. It also provides many cosmetic advantages.



Figure 1A 1/4" aluminum plate and a steel alloy strap are molded into a single part, as shown above. Encapsulation using RIM was chosen for two different applications on one product manufactured by Kendro Laboratory Products. Above (right), sophisticated electronics are encapsulated to protect against damage.

Variable wall thicknesses of .062" - 1", produced from high density self-skinning foam, allowed for important design freedoms. Low cost, fabricated aluminum molds were used and finishing included painting and threaded brass inserts.

Another part for the centrifuge, the ID Sensor, required the encapsulation of a printed circuit board to protect sensitive electronics and guard proprietary design information. Because exposure to heat and pressure can damage printed circuit boards, the RIM process was perfect for their safe encapsulation. The mold for this part required "soft" parts allowing the wires attached to the printed circuit board to extend out of the encapsulation.

Along with achieving design goals, the encapsulated parts had the added advantage of part consolidation, reducing the complexity of purchasing, receiving, inspection and warehousing.

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**

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ISO 9001:2008 Certified

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