

# Reaction Injection Molding



Reaction injection molding (RIM) involves the injection of liquid polyurethane systems into a mold. The components then polymerize within the mold to form a part.

**Dispensing.** The two reactive materials, polyol and isocyanate, are kept separate until they reach the mixing head. When it is time to dispense a shot into a closed mold, or make a pour into an open mold, the machine automatically switches from recirculation to dispense mode.

At this point, the metering pumps precisely deliver the materials to the mixing head at the required volume, ratio, flow rate and temperature. The chemicals are then mixed by either high-pressure impingement (about 2500 psi) or in a high shear dynamic mix chamber. The mixture is then injected into a closed mold or poured into an open mold or cavity.

**Molding.** An immediate chemical reaction occurs inside the mixing head, with a continued exothermic reaction inside the mold cavity as the curing process progresses. When processing foams, significant forces created inside the mold must be resisted to ensure the integrity of the part. The clamping pressure required can be up to many tons depending on the size, expansion rates, and the desired density of the part, along with other material factors.

Mounting the mold in a pneumatic or hydraulic press provides the force required to keep the mold tightly closed during the curing process. Elastomeric materials often require very little clamping pressure as they do not expand or generate internal mold forces.

Reaction injection molding is used in a score of industries and products, including doors, windows and decorative millwork for the construction industry; interior components such as steering wheels, dashboards and NVH (noise, vibration, harshness) applications for the automotive industry; military and aerospace applications; computer enclosures in the electronics industry; and insulation in refrigerators in the appliances industry.