



Design Guidelines for RIM Structural Foam

Design guidelines for designing plastic parts in RIM structural foam are quite similar to those that one would use in designing thermoplastic structural foam. One added benefit to using the RIM process is the absence of sink lines. Due to this fact, molding thick cross-sections next to thin ones is no longer an obstacle.

We presently mold parts in two different rigid, self-skinning RIM systems. The major difference between the two systems is that one is U.L. rated at 1/8" minimum wall thickness and the other is rated at 1/4" minimum wall thickness. Both systems are manufactured by Dow Chemical and are two-component, water-blown polyurethane systems that are specifically designed for molding housings and enclosures for the electronics industry. The 1/8" system (*Voracor CE 125/CS 996*) is U.L. 94-V0 rated and the 1/4" system (*Voracor CE 123/CS 984*) is rated both 94-VO and 94-5VA. The U.L. file number for both of these systems is E76646, dated 11/7/01.

In order to reduce your engineering time, we recommend that you contact us during the early phase of your design process so that we can assist you in answering any questions that you might encounter.

General Design Guidelines

Wall Thickness

A minimum of 0.125" or 0.250", depending which system is being used, must generally be applied in order to maintain the U.L. rating. (*Up to 0.750" in some cases.*) Small, isolated areas can be molded as thin as 0.100" and as thick as 1.00" (please consult with us first).

Draft Angles

1 to 3 degrees per side. (*Some isolated areas can be as little as 1/2 degree.*)

Bosses

A typical boss with a 6-32 threaded insert should be about 0.500" at the top with a draft angle of 1 to 2 degrees per side. A free standing boss that is longer than 3" becomes very difficult to eject from the tool.

Vents

A vent width of 0.250" with a 0.250" rib is generally recommended. Vent lengths over 3.00" will require a support on the backside. Blind, or double kiss-thru vents are not possible in our tooling due to the difficulty of cleaning the flash between the shut-offs.

Undercuts

Most undercuts can be achieved through the use of removable aluminum core pieces or side cores. *(The cost of tooling and parts will be affected by this.)*

Radii & Fillets

Due to the fact that RIM foam is very viscous in its liquid state, generous radii and fillets are always recommended in order to insure proper filling of the tool during the molding process. A general guideline of 0.060" radius and a 0.125" fillet can be used.

Threaded Inserts

ALL of our threaded inserts are molded-in. Our experience has shown this to be the only way that we can ensure proper tolerances and pull-out strength for fasteners.

We maintain a complete inventory of 2-56, 4-40, 6-32, 8-32, 10-32, 1/4-20 and 3/8-16 fasteners. *(Usually in three different lengths of each size.)* Metric inserts are available on request. Please contact us for specific insert lengths.

Although we do not have test data on all inserts that we use, we do have pull-out results for standard length 6-32 inserts molded in our material showing that the average pull-out force is in excess of 390 pounds per insert.

Tolerances

We recommend the following tolerances be used when designing in RIM polyurethane foam:

.XX = ± 0.020 " up to 5.00", over 5.00" add 0.002"/inch

.XXX = ± 0.010 " up to 5.000", over 5.00" add 0.001"/inch

Coating & Painting

We have an in-house paint shop with full capabilities for painting two-component polyurethane and water-based paints.

We have color-matching services from Sherwin Williams and Cardinal Industrial Finishes to match any chip, Pantone or Federal Standard color.

We have in-house silk-screening and are also a U.L. certified EMI/RFI shielding facility.

EMI/RFI Shielding

We are a U.L. approved applicator of both Acheson Colloids Electrodag 550 (*Nickel Based System*) and the Electrodag 6050 (*Silver Plated Copper System, ideal for higher attenuation needs*).

Electronic Files

We can accept **.sldprt** files from Solidworks or **.igs** surface files from ProE and other applications. Mastercam software is utilized in our tool shop.

Your electronic files can be emailed to rim@designoctaves.com.
(An FTP site is also available.)

Please feel free to contact us at (831) 464-8500 with any questions that you might have regarding our services.