DeKALB MOLDED PLASTICS

Committed to Your Solutions

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Structural Foam

DeKALB Molded Plastics prides itself on the ability to offer complete custom molding solutions for your structural plastic molded products. From engineering design support assistance, to full concept project management, our resources can effectively manage your needs. We proudly offer the following plastic manufacturing processes:

Structural Foam Process

The structural foam process allows production of rigid plastic products which have a cellular foamed core surrounded by an outer skin forming a total integral structure. Products molded with the structural foam process have a high strength to weight ratio and are 3 to 4 times more rigid than solid parts of the same weight.

Gas Assist Molding

The gas assist molding process utilizes nitrogen to hollow out large, thick, wall sections. The gas does not mix with the resin, but instead forms continuous channels through the hotter, less viscous, sections of the melt stream. This allows molding of thick wall sections without sink marks and without the characteristic swirl appearance of structural foam.

Molded Processes

- Multi-nozzle Structural Foam
- Single-nozzle Structural Foam
- Gas Assist Molding
- Gas Counter Pressure
- Structural Web

Benefits

There are numerous benefits to selecting structural foam or gas assist molding. Structural foam molding is an excellent conversion alternative for wood, metal, concrete and fiberglass. . It can also offer a significant ROI in comparison to other processes such as rotational molding, RIM, thermoforming, die cast, injection, and SMC. The result is a significant reduction in cost and vast increase in productivity. The following are the key benefits of structural foam molding:

- 20% less weight than high pressure parts
- 3-4 times more rigid than solid parts
- Substantial cost reductions
- Low mold cavity pressure allows lower cost tooling
- High stiffness-to-weight ratio
- High dimensional stability
- Capable of molding parts as thin as .156” thick or greater
- Low warp and part stress
- Multiple molds can run simultaneously
- Functions as excellent substrate for high quality painted finish applications
- Virtually any thermoplastic can be foamed

Gas assist molding is a low pressure injection molding process where nitrogen gas is injected into a polymer melt immediately after the injection of a plastic resin into the mold.

Key benefits of gas assist molding are as follows:

- Design freedom utilizing thick and thin wall sections
- Hollow gas channels increase stiffness and reduce cooling time
- Improved aesthetics (low warp, no sink marks, etc.)
- Reduced cavity pressure equals lower tonnage, more efficient machines
- Significantly reduced cooling and overall cycle time

Process Comparison

Structural Foam Molding vs. Injection Molding

With so many molding processes available, it can be like a puzzle trying to figure out which is best for your product. Luckily, DeKALB is here to clear up the clutter. While injection molding is probably the most common molding process out there, considering structural foam as an alternative can:

- Create stronger and larger parts
- Build thicker wall sections
- Save on cost of tooling
- Reduce material costs

Stronger, Larger Parts

Structural foam is lauded for its ability to mold large plastic parts. As it's a low-pressure molding process using a chemical blowing agent, parts are created with additional "structure" that provides increased strength. Meanwhile, injection molding is limited to mostly small critical tolerance parts.

Thicker Wall Sections

While both structural foam and injection molding offer variable walls, it's structural foam that gives you the most flexibility – and the thickest wall sections. Structural foam allows a range of thickness from .1875" to .5", while injection molding is generally limited: .06" to .1875".

Tooling Cost Savings

It's all about the bottom line. If you're looking to get more bang for your buck, structural foam is the way to go. Injection molding has higher upfront tooling costs while structural foam's low pressure process allows for lower cost aluminum tooling. For larger plastic parts, it's a no brainer.

Reduced Material Costs

The structural foam process promotes a weight savings of up to 20% versus injection molding due to the foaming methodology. This can equate to both material and transportation cost reductions.

Structural Foam Molding vs. Thermoforming Molding

Could an Alternative to Thermoforming Differentiate While Reducing Costs?

There's more than one way to bake a cake. In today's world where companies are continuously looking for ways to enhance their brand, differentiate product, and do it all at a lower cost, that saying couldn't be more true. Considering structural foam as an alternative to thermoforming could yield all three benefits and more. Areas to consider include:

- Alternative Design
- Light Weighting
- Materials

Alternative Design

The design stage provides the initial entry point for 'getting it right the first time.' Careful consideration and emphasis is placed upon maximizing production efficiencies, size, shape, and tooling components. Leveraging these attributes early in the process helps ensure a continuous payback from the initial production run. With structural foam, savings can include multiple part integration (inserts, brackets, fasteners, etc.) equating to an elimination of costly secondary operations. You can also mold in louvers, holes, and grills, further driving your cost savings. Integrating the existing structure into a molded structural foam component can provide a quick ROI.

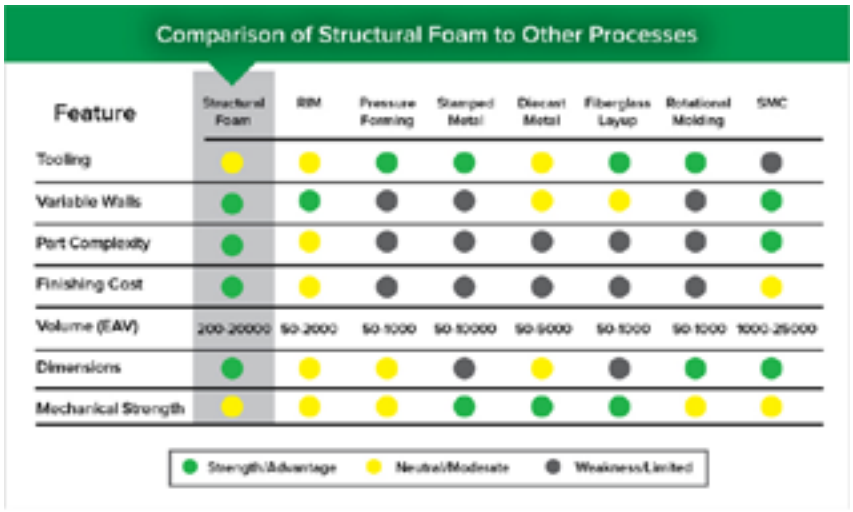
Light Weighting

Light Weighting is as it sounds: taking an existing product or concept and finding ways to minimize the product weight without jeopardizing performance or ergonomics. It can be as simple as minimizing the wall thickness or as challenging as a total redesign. Payback can be swift, with specific consideration given to resin usage savings, tooling modification costs, and annual volumes. The structural foam process is inherent to light-weighting with a typical 20% reduction in part weight while increasing the strength-to-weight ratio versus thermoforming.

Materials

Changing the resin to an alternative material with comparable performance characteristics provides the fastest route to a more sustainable product. Structural foam can be used with a wide range of thermoplastics, including thermoplastic rubbers for additional strength and sustainability gains. In fact, in comparison to thermoforming, you should see a cosmetic improvement (less sink and minimized warpage) and a lower-cost material than sheet formed product.

View the ROI Chart below for a direct comparison to your current molding operation



Structural Foam Molding vs. Reaction Injection Molding

As we've said before on the topic of injection molding – there's more than one way to bake a cake. Today's competitive landscape means everyone is looking for any edge they can get to win. Considering **structural foam molding** as an alternative to reaction injection molding (commonly known as RIM manufacturing) can:

- Offer more flexibility in volume and materials
- Create better sustainability practices
- Increase ROI and save money on your bottom line

Material Flexibility and Increased Volume

Structural foam is very robust when it comes to material choices. Reaction injection molding utilizes more expensive raw materials due to the usage of thermoset polymers which can't be recycled. Typical volumes for the RIM process are relatively small, ranging from 25 to 2,000 parts. On the other hand, structural foam can be used with nearly any thermoplastic, including thermoplastic rubber, that add strength to the final molded part. In addition, structural foam has amongst the widest production range, from 100 to 100,000+ parts.

Sustainability Practices

Unfortunately, the RIM process is not conducive to sustainability. Thermosets cannot be recycled due to the permanent chemical bonds that are formed when the material is molded. Meanwhile, the thermoplastics used in structural foam molding are easily recyclable (In fact, DeKALB processes millions of pounds of recycled resins annually).

ROI: Saving on Your Bottom Line

Savings with structural foam can come from a variety of areas, including multiple part integration (inserts, brackets, fasteners, hinges, etc.) which eliminate expensive secondary operations. The ability to mold in louvers, holes and threads further drives down your cost. Outside of cost reductions, both material flexibility and sustainability add to the positive ROI of structural foam.

Structural Foam Molding vs. Rotational Molding

There are many molding processes out there, but they're not all created equal. Considering **structural foam molding** as an alternative to rotational molding can:

- Increase material options
- Reduce Production time
- Deliver precision wall thickness (+/-10% tolerances)

More Material Options

One of the primary benefits of structural foam is the robust material choices available. Most thermoplastics can be used in structural foam molding while rotational molding has a more limited subset of materials.

Reduce Production Time

Structural foam has a typical production range of 100 to 100,000+ parts while rotational molding volumes usually fall between 50 and 1,000 parts. This is attributed to a reduced production cycle with structural foam, which can be as high as a 15 to 1 ratio.

Precision Wall Thickness

Yet another benefit of structural foam over rotational molding is consistent wall thickness. Look at structural foam as "precision thickness" versus rotational molding as "gravity induced" placement of plastic.

Do you have an application you would like to explore as a structural foam process? Contact us and we will send you a sample kit including examples from above.