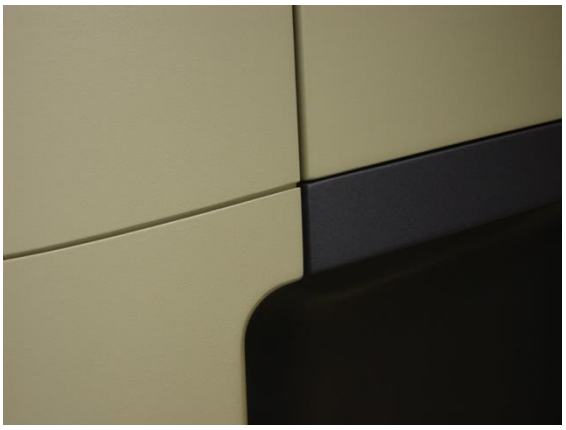
Midas Technical Support

Is Reaction Injection Moulding Suitable for my Project?

Why would you use RIM?

RIM is an ideal process for the manufacture of large parts, typically greater than A3 in size, and especially where parts need to fit together in multi-part assemblies where fitment and alignment is critical. Excellent fitment and control is possible due to the low pressure required to process the low viscosity of the materials and combined with the opportunity to use low cost tooling methods such as composite resin systems, can provide cost savings and market opportunity for new product development.

The images below provide an example of a large-scale, multiple panel assembly that fits accurately to its chassis framework and demonstrates that feature lines and panels are in perfect aligment. In order to achieve this it is important to work with your moulding supplier to ensure that the design is robust for manufacture and that you have run through a good program of 'DfM' before commiting to tooling.



How Are Reaction Injection Mouldings Made?

In order to process the material constituents, low-pressure meter mix equipment is used to separately pump the two liquids into the mixing head. Thompson (2011) provides a simple overview of the process in the image below. As soon as the two materials meet in the mixing head, the chemical reaction begins and the operator has a short period of time to fill the mould tool. This is typically referred to as the "material pot life", and ranges between 30 seconds and 3 minutes.

Tooling can be manufactured from a range of materials, depending on part size, geometry, and predicted annual volumes. For prototyping and low volume projects, tooling will typically be manufactured from polyurethane tooling board which offers good stability and allows for rapid machining. For projects requiring 10+ years' production, which also have complex features, composite materials and metal inserts are favoured.

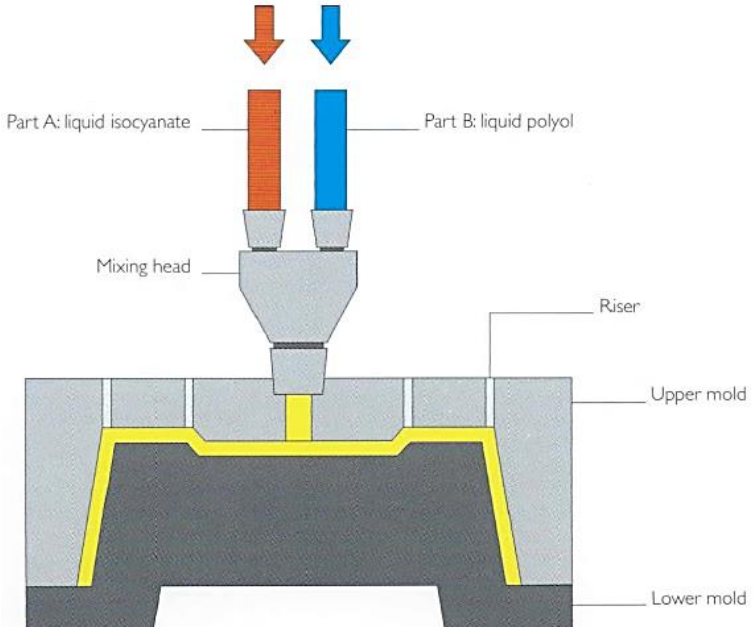


Illustration of RIM the Process (Thompson, 2011, pg. 15).

Where can RIM moulding be used?

RIM mouldings can be used across a variety of industries and sectors. From medical to marine, transportation, and everything in-between. These robust mouldings play a crucial role in industries where reliability and durability can be life-saving.

Polyurethane housings are used within the medical and scientific industries to provide parts for innovative cancer treatment, robotic surgery and laboratory testing equipment. These safety-conscious industries demand compliance against all regulatory standards as well as UL94 V0 flammability ratings and the option for EMC shielding. Electric vehicle charging units, personal dive units, and solar canopies on the other hand require robustness and UV stability so they can stand up to the rigors of external use. **RIM moulding** can create precision parts that offer structure and confidence when it counts.

How to Design for Reaction Injection Moulding

It is important to work closely with your chosen moulding company to make sure the design is robust for manufacture. Good communication allows for part optimisation, which can often lead to cost savings and improved quality and consistency.

Although reaction injection moulding is a forgiving process, it is sensible to follow standard casting guidelines wherever possible. These include maintaining a consistent wall section and checking parts have sufficient draft and strength radii to help flow and avoid stress fractures. Undercut features are typically created using loose cores that are manually operated, so understanding size and space requirements will make sure your tooling lasts.

Summary

- Parts as heavy as 30Kg can be manufactured as a single item thus reducing the need for multiple parts which can save tooling cost, assembly time and avoids fitment complications.
- Parts as small as 200mm square can be made or as large as 3m by 1.5m by 0.5m
- Cost-effective process for parts >0.5 m^2
- Low cost tooling means low risk which is ideal for start-up companies, new innovations and in uncertain market conditions
- Easy and low cost to modify tooling which again reduces risk and can avoid the need for costly prototype iterations
- Flexible ordering and small runs to match to your build rates
- Customisation with colours, multiple finishes, and screen printing
- All parts conform with UL94 V0 ratings and industry standards
- Free of charge DfM support and unlimited CAD feedback.
- Carbon Net-zero Manufacturing

If you are interested in understanding how rigid polyurethane can assist you with your product development then click here for more information or contact **Rachel Sparkhall at:**

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