GALLAGHER
PRECISION POLYURETHANE MOLDING

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Great Products, On-Time

POLYURETHANE INJECTION MOLDING

From the very beginning, polyurethane has been the material of choice at Gallagher Corporation.

Since 1965, We have chosen polyurethane over other materials due to its versatility and outstanding engineering properties. Urethane elastomers can be molded out of either thermoset polyurethane or thermoplastic polyurethane (TPU).

The thermoset materials are cast in low-pressure molds while the TPU materials are well suited for polyurethane injection molding. Whether a urethane is thermoset or thermoplastic, each type will have the same basic advantages of outstanding abrasion resistance and high load bearing ability.



There are several factors that go into the determination of whether a part should be processed as a polyurethane casting or polyurethane injection molding.

Traditionally, polyurethane injection molding has been reserved for high-volume production while casting is better suited for low- to mid-volume production. However, these rules of thumb aren't always the case. We have specialized in developing the most efficient manufacturing process for high-volume urethane casting in the USA and we are well positioned for low- to mid-volume polyurethane injection molding.

Better guidelines, besides annual production volumes, exist for making the determination for casting or polyurethane injection molding TPU. One of the most tell-tale signs to help an engineer decide between polyurethane injection molding and polyurethane casting is part design.

Parts with both thick and thin wall sections are better suited for polyurethane casting. Parts with thick wall sections are difficult to injection mold because the thick sections will result in *sink* marks on the finished part. If a part absolutely requires thick sections, it's better to use the polyurethane casting process.

Another clue for deciding between polyurethane casting and polyurethane injection molding is overall part size. Very large parts -- greater than 5 pounds or with a wall thickness greater than 0.25 inches -- are more easily cast than injection molded.

When parts are injection molded, molten material is injected into a part cavity at high pressure. This is one of the biggest advantages of polyurethane injection molding. High-pressure allows the TPU to completely fill the closed mold cavity. The result is near net shape or net shape parts directly out of the mold.

With the polyurethane casting process, post processing steps such as machining are often needed to reach net shape.

Tooling costs are typically higher for injection molds than for cast tooling. This is because the injection tooling needs to be very robust to handle the high internal cavity pressures.



A great advantage to both TPU and urethane castings is their ability to bond to other materials such as metal. In both processes metals are carefully prepped and coated with a chemical primer. The primer reacts with the base metal to form a strong chemical bond. The primer will also react when it comes in contact with the hot urethane of the cast polyurethane or injection molded TPU. The end result is a urethane bond between the primer and the base metal which is incredibly strong.

Polyurethane bond integrity is vital for components such as wheels and rollers. A bonded elastomer is able to withstand higher loading than an un-bonded elastomer.

Polyurethane bonding to something like a metal plate also simplifies design details such as mounting and part orientation.

Urethanes are outstanding materials that produce exceptionally durable goods. The fact that parts may be produced by urethane casting or urethane injection molding adds to their versatility.

The decision between polyurethane casting and polyurethane injection molding should be made carefully by taking the entire scope of the project into account. There are many advantages to each molding technique.

The experts at Gallagher Corporation have decades of experience with each process and would be delighted to speak with you at length about the specifics of your individual project.