



Lighter. Stronger. More Durable.

**Mg**-nify your value with

# Magnesium



## Automotive Success

*Tier 1 automotive lighting manufacturer has selected GTI to supply cutting-edge Mg components for LED headlamp*

According to sources, "Replacing Aluminum structures and heat sinks with Magnesium reduced weight by 50% weight plus it provided the improved strength to make this LED headlamp possible and a crucial competitive advantage for our Company. Heat dissipation with Magnesium heat sinks was superior. Vastly reducing the 'carbon footprint' in manufacturing using Mg and eliminating need to protect for corrosion was a bonus."

## Common Applications

*Proven material in Automotive Applications*

Automotive manufacturers use Mg for many components to save weight and improve strength. From transmission housings to seat frames to steering wheels, Mg is used throughout the vehicle.

OEMs have employed Magnesium for pick-up truck tailgates. Tailgate weights have been reduced 50% by using Magnesium super-structure, Aluminum skin, and plastic trim as opposed to Aluminum and Steel.

- Lighting Systems
- Rear & Side Mirrors
- Under hood components
- Steering Wheels
- Seat Frames

Global industry is being challenged to reduce product weight without jeopardizing integrity more than ever before. OEMs are choosing Magnesium to meet these challenges for components and assemblies. Magnesium has been used for years in automotive applications such as steering wheels, brackets, convertible top structural components, and seat frames, and is gaining significant momentum for other components.

Why? Magnesium is *30% lighter than aluminum and twice the strength at the same thickness*, while at the same time achieving cost parity with Aluminum.

Magnesium's mechanical properties are quite similar to Aluminum, allowing engineers to modify existing designs to achieve significant weight reductions and strengthening. GTI offers full technical design services to assist in-house engineering in part design and tool optimization.

## Lighter + Stronger + Complex Geometries = Better products

- Thixomolding Magnesium provides the flexibility of plastic injection molding with the strength of die casting, resulting in stronger parts with complex shapes and part consolidation opportunities.
- 2x longer tool life than aluminum die casting = 200% ROI increase.
- Numerous Coating Options – both decorative and protective.
- Excellent machinability.

	<b>Mg</b> AZ91D	<b>Al</b> A380D	<b>Steel</b> 1018
<b>Density</b> (psi)	<b>0.0653</b>	<b>0.0989</b>	<b>0.284</b>
<b>Modulus</b> (ksi)	<b>6,500</b>	<b>10,500</b>	<b>29,000</b>
<b>TYS</b> (psi)	<b>23,000</b>	<b>23,000</b>	<b>45,000</b>
<b>10 Day Salt Spray</b> (mils/yr)	<b>4</b>	<b>13</b>	<b>30</b>



## Molding Options

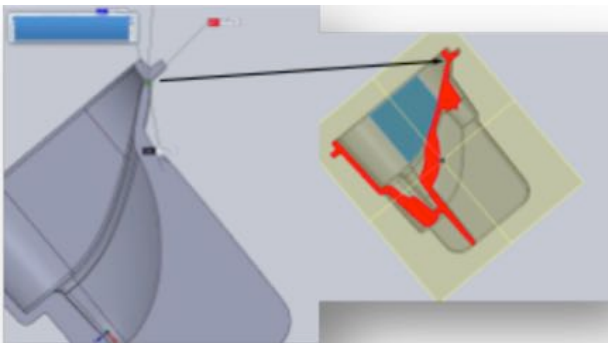
Magnesium offers two molding options: High Pressure Die Casting and Thixomolding. Each process has its advantages, however which process to design for depends on a variety of technical, commercial, and program factors.

GTI advises our clients on which process is the most suitable for each part, including supply chain.



## Design & Supply Chain Consulting

- On average 75% of an engineered component's cost is incurred during the design process. GTI Manufacturing works closely with its client's program management, industrial designers, mechanical engineers, and procurement staff. We provide Advanced Manufacturing Engineering, Design Guidance, Supply Chain Development and Full Life Cycle management.
- Our comprehensive Technical and Commercial Analysis provides our partners with the lowest costs and highest yielding components.
- Our Full Life Cycle approach is end-to-end from initial concepts to supply chain and program management.



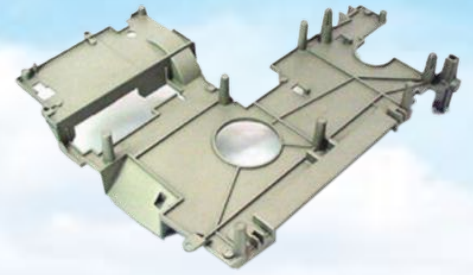
*GTI provides comprehensive design analysis to ensure high yield designs analysis.*

### DESIGN NOTE

#### Sample Design Review

##### Transition Area Wall Thickness

This wall section is 1.3 mm along the base of the part from the outside flange to the internal geometry cavity. Please consider adjusting the radii shape, tangent points, etc., to maintain a 2.0 mm wall thickness through this transition area. Depending on the gate location, this thin wall section will seriously inhibit the flow into the part of the back flange.



## USA Engineering Global Supply Chain

GTI's team is based in the USA and has launched 200+ tools. We leverage our experience and global supply chain to offer customers the best in engineering, program management, and pricing.

## Prototyping

Prototyping is an important aspect of new product development. GTI has a full complement of prototyping options to meet your needs and will identify the best process for your project and manage it to a successful conclusion.

## Secondary Processes

GTI evaluates a part and its related assembly to identify the best coating and fastening solutions and carries this through full production.

## Other Services

- Aluminum Die Casting
- CNC Machining
- Powdered Metal
- Metal Injection Molding
- Assembly
- Prototyping
- Liquid Metal
- 3D Printing

## Contact Us

For more information on our services please visit us at [www.gitmfg.com](http://www.gitmfg.com)

