LEGGERA TECHNOLOGIES

COMPARISON SHEET · OCTOBER 2026

Thixomolding vs. Magnesium Die Casting

Eight factors side by side for engineers choosing how a magnesium part will be made. Every public figure is sourced.

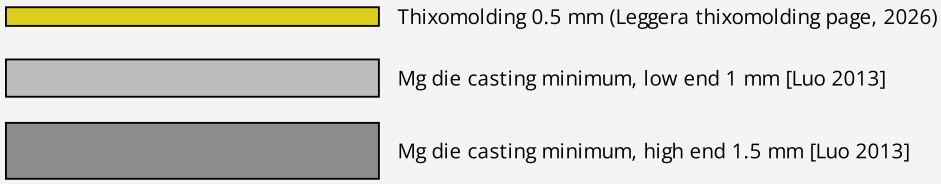
Short answer. Both processes make near-net-shape parts from the same magnesium alloys. Die casting injects fully molten metal and is faster per shot. Thixomolding injects a semi-solid slurry at a lower temperature, which gives lower porosity, thinner walls and longer mold life, with fewer steps after molding.

Factor	Thixomolding	Magnesium die casting
Melt state	Semi-solid slurry. Chips are heated to 560° to 600° C (Leggera thixomolding page, 2026), inside AM60B's 540° to 615° C melting range [1]. A machine maker gives 590° to 610° C [2].	Fully molten metal. Typical molding temperatures run 630° to 650° C hot chamber and 680° to 700° C cold chamber [2].
Porosity	Under 1.5% [3]. 50% lower than die cast (Leggera homepage, 2026).	1.5% to 4% in one hot-chamber AM60 study [4]. Porosity from entrapped gas is the process's "biggest drawback" [5].
Minimum wall	0.020 in. (0.5 mm) (Leggera thixomolding page, 2026). 0.5 to 0.6 mm [3].	1 to 1.5 mm for magnesium [5].
Tool life	Mold life rated 1, against 0.9 for hot chamber and 0.8 for cold chamber [3]. Molds can last 1,000,000 shots (Leggera homepage, 2026).	250,000 to 300,000 shots for a typical magnesium die [5].
Yield and scrap	No slag [3] and no dross or sludge [2].	About 40% to 60% of the metal becomes process scrap via the runner system and overflow [6]; die casters can reprocess virtually 100% of it, at an energy cost [7].
Part size limits	Set by the machine. Our two new 2,500-ton machines will let us mold parts as large as a cross car beam (Leggera, 2026). Machines of 3,000 to 4,000 tons have been launched [3].	Large castings are in serial production, such as a die-cast AM60 cross beam over 170 cm long [8].
Alloys	AZ91D, AM60B, AM50A [3]. Leggera publishes AM60B data (Leggera capabilities page, 2026).	The same alloys: AZ91D, AM50 and AM60 [7].
Typical cost drivers	Chip feedstock costs more than ingot [7]; cycles run about 1.2 to 1.25 times longer [3]; fewer steps after molding (Leggera process comparison, 2026).	Energy to melt the alloy and to remelt runner and overflow scrap, which typically adds 5% to 10% to material cost [7]; cover gas [5]; X-ray, straightening and more machining (Leggera process comparison, 2026).

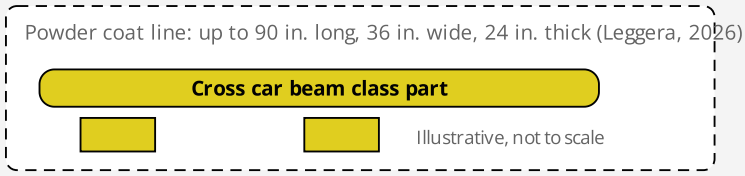
Figures credited to Leggera are published on leggeratech.com, or are Leggera's own statements for this sheet (Leggera, 2026). Numbered notes are public sources, listed on page 2. Studies use different alloys, parts and machines, so treat ranges as typical, not guaranteed for a given part.

Part envelope

A. Minimum wall, drawn to relative scale



B. Part envelope at Leggera



Molding: two 2,500-ton thixomolding machines
to mold parts as large as a cross car beam (Leggera, 2026)
Industry: machines of 3,000 to 4,000 tons [Huang 2025]

When die casting is the right call

- **Small parts at very high volume.** Hot-chamber machines make small parts at up to six per minute and a cold-chamber cycle takes around one minute (Luo 2013), against Leggera's 70 to 90 seconds (Leggera thixomolding page, 2026).
- **Piece price is the only measure.** Single-piece cost ratio of about 1:0.85 to 1:0.9 in die casting's favor (Huang 2025).
- **The part is already die cast and validated**, or it is aluminum or zinc: thixomolding is for magnesium alloys only (NADCA 2015).

When thixomolding wins

- **Thin-wall structural parts:** 0.5 mm walls, 0 draft possible (Leggera thixomolding page, 2026); 14.8 percent elongation in AM60B (Leggera capabilities page, 2026).
- **Housings and EMI-RFI shielded parts:** linear tolerances of ±0.001 in. per inch (Leggera thixomolding page, 2026).
- **Parts where porosity costs money:** no biscuit trimming, X-ray or straightening in Leggera's process flow (Leggera process comparison, 2026).
- **Large parts and long programs:** two new 2,500-ton machines (Leggera, 2026); molds that can last 1,000,000 shots (Leggera homepage, 2026); mold life rated longer than both die casting types (Huang 2025).

Sources

1. International Magnesium Association, accessed October 2026. www.intlmag.org/page/basics_phys_prop_ima
2. Japan Steel Works, a thixomolding machine maker, accessed October 2026. www.jsw.co.jp/en/product/business/mm_1600_mg02.html
3. Huang, Jiang and Wang, Journal of Magnesium and Alloys, 2025. www.sciencedirect.com/science/article/pii/S2213956725002798
4. Rzychoń and Kiełbus, Materials, December 2024. www.mdpi.com/1996-1944/17/24/6256
5. Luo, Journal of Magnesium and Alloys, 2013. www.sciencedirect.com/science/article/pii/S2213956713000030
6. International Magnesium Association, accessed October 2026. www.intlmag.org/page/design_synthesis_ima
7. NADCA, Product Design for Die Casting, 2015. cwmdiecast.com/wp-content/uploads/2020/06/Die-Casting-Prod-Design-NADCA-min.pdf
8. International Magnesium Association, accessed October 2026. www.intlmag.org/page/3d-parts-overview

About Leggera Technologies

Leggera Technologies is a magnesium thixomolding manufacturer in Holly and Orion Township, Michigan. Founded in 2014 by Nathan Sanko and Tom Darnell, the company produces large, thin-wall structural magnesium parts for automotive OEMs and Tier 1 suppliers, with battery trays in development, and provides in-house part design and engineering, machining, powder coating and assembly. It runs some of the world's largest magnesium thixomolding machines. Leggera Thixo Technologies, LLC, Orion Township, is IATF 16949 certified for injection molding of magnesium components and light assembly. Send a part print for a feasibility review: leggeratech.com/contact/.

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