



## Functional Prototyping Low Volume Rapid Injection Molding With 3d Printed Molds

Our Product Introduction

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### Basic Information

- Place of Origin: China Shenzhen
- Brand Name: ABS, PC, PMMA, POM, PA, PTFE, PEEK
- Certification: Rapid Tooling
- Model Number: Polishing, Anodizing, Painting, Chrome Plating, Silkscreen
- Minimum Order Quantity: 1 piece
- Price: USD 30 piece
- Packaging Details: Carton, Plywood Box
- Delivery Time: 3 - 5 work days
- Payment Terms: T/T, Paypal
- Supply Ability: 1 piece per day



### Product Specification

- Mould Life: 300000-500000 Shots
- Appliance: Household Appliance
- Process: Rapid Injection Tooling
- Lead Time: Short Lead Time For Production
- Prototype Type: Functional/Appearance
- Surface Finish: Smooth And Polished
- Tooling Life: Shorter Tooling Life Compared To Traditional Methods
- Cost: Lower Than Traditional Tooling Methods
- Highlight: **Low Volume Rapid Injection Molding , rapid prototype injection moulding , rapid plastic injection mold**

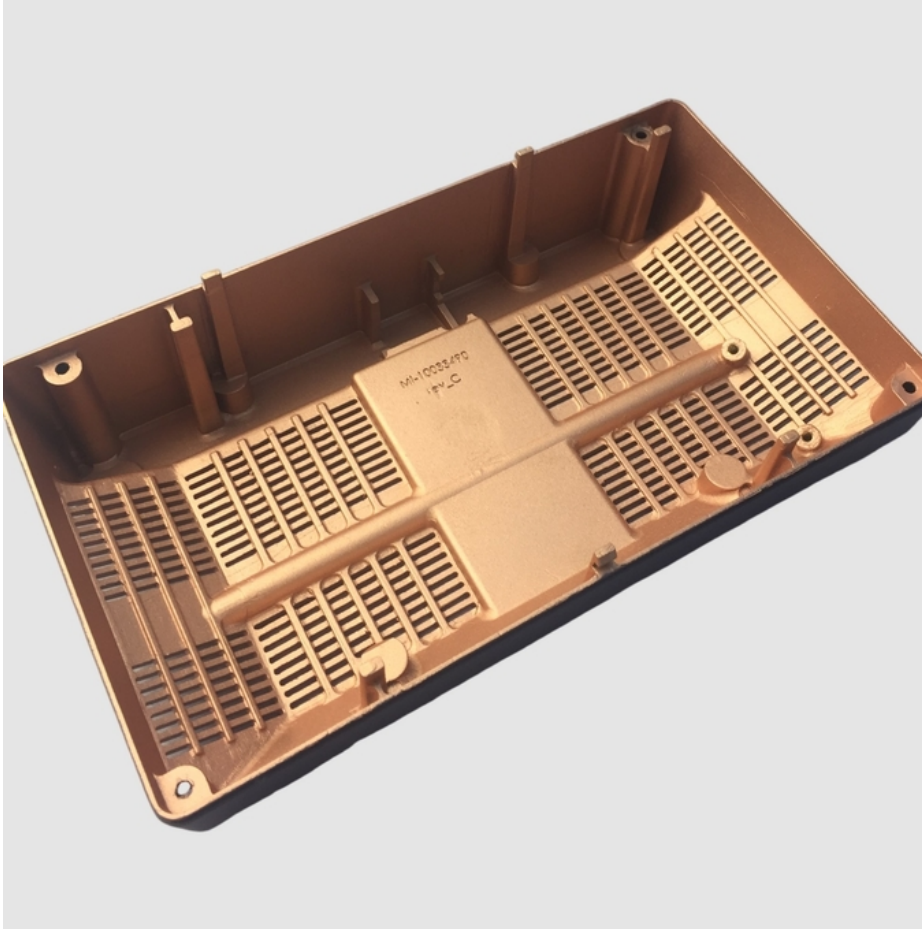


## Product Description

Rapid tooling and injection molding are two different processes used in the manufacturing of plastic parts, each with its own advantages and considerations. Here's a comparison between rapid tooling and injection molding:

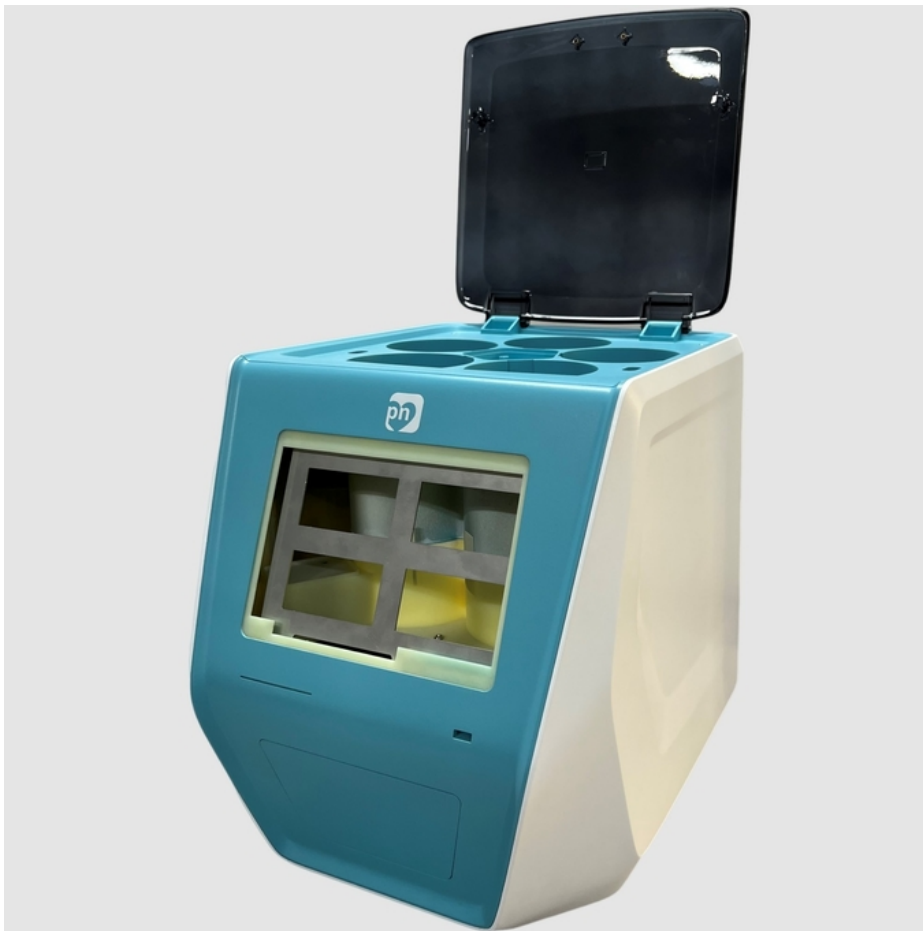
### Rapid Tooling:

Rapid tooling refers to the process of quickly producing tooling inserts or molds for the production of prototype or low-volume parts. It is primarily used for accelerating the initial stages of product development and testing. Rapid tooling methods include various techniques such as 3D printing, CNC machining, or soft tooling.



### Advantages of Rapid Tooling:

**Speed:** Rapid tooling allows for the rapid creation of tooling inserts or molds, significantly reducing the lead time compared to traditional tooling methods used in injection molding.



**Cost:** Rapid tooling can be more cost-effective for low-volume production or prototyping, as it eliminates the need for expensive and time-consuming traditional tooling.

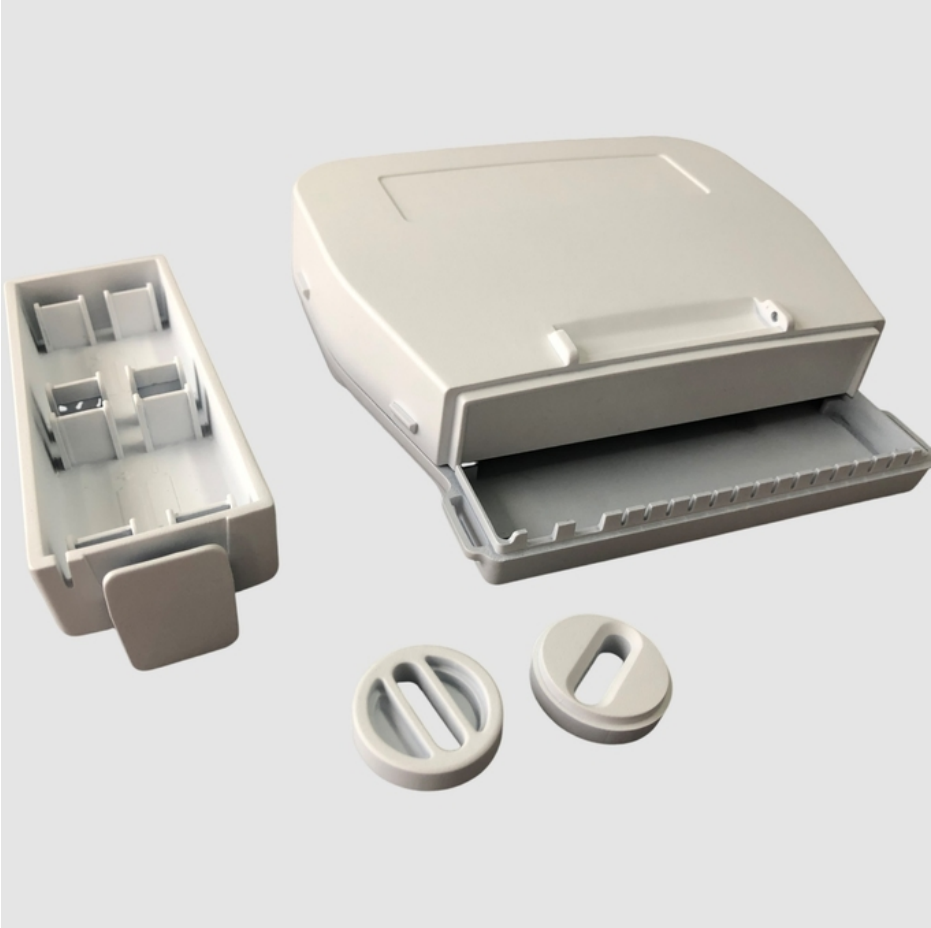
**Design Flexibility:** Rapid tooling methods allow for easier modifications and iterations of the tooling design, making it suitable for quick design adjustments during the prototyping phase.



Evaluation: Rapid tooling enables the production of functional prototypes that closely resemble the final product, allowing for thorough testing and evaluation before committing to mass production.

Injection Molding:  
Injection molding is a widely used manufacturing process for high-volume production of plastic parts. It involves injecting molten plastic into a mold cavity, allowing it to cool and solidify before ejecting the finished part. Injection molding typically requires the creation of custom steel or aluminum molds.


Advantages of Injection Molding:  
Production Efficiency: Injection molding is highly efficient for large-scale production, enabling the creation of high volumes of identical parts with minimal variation.

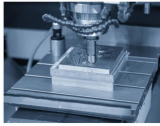







Material Selection: Injection molding supports a wide range of thermoplastic and thermosetting materials, allowing for the production of parts with diverse properties and characteristics.

Surface Quality: Injection molding can achieve high-quality surface finishes and intricate details, making it suitable for parts requiring a Class-A finish.

Cost-effectiveness (for high volumes): Once the molds are created, the per-part cost decreases significantly for high-volume production compared to rapid tooling methods.

Our Low-volume Manufacturing Capabilities			
Barana Rapid has over ten years of low-volume manufacturing services and a robust supply chain. It can produce various parts for you and provide high-quality low-volume manufacturing services. At the same time, we have an experienced team to assist customers in optimizing designs, selecting appropriate processes, reducing costs, and realizing rapid mass production.			
	CNC Machining  CNC machining is used to control a wide range of complex machinery. It is a computerized manufacturing process that uses pre-programmed software and codes to control the movement of production equipment.	Type	Tolerance
		Linear dimension	±0.025mm-±0.001inch
		Hole Diameters	±0.025mm-±0.001inch
		Shaft Diameters	±0.025mm-±0.001inch
		Part size limit	950 * 550 * 480 mm(37.0 * 21.5 * 18.5 inch)
		Standard capabilities	Description
		Mold cavity tolerances	±0.05 mm

	<b>Plastic Injection Molding</b>  Plastic injection molding is the process of melting plastic resins (thermosetting/thermoplastic polymers) and injecting them under pressure into a mold cavity, where they fill and solidify to form the final product.	Standard lead time	15 business days or less
		Part to part repeatability	±0.1 mm
		Production grade	1-100,000 cycles
	<b>Sheet Metal Fabrication</b>  Sheet metal fabrication converts flat sheets of steel or aluminum into metal structures or products by cutting, stamping, folding, and assembling.	Dimension Detail	Description
		Edge to edge, single surface / Edge to hole, single surface / Hole to hole, single surface	±0.05 inch
		Bend to edge / hole, single surface	± 0.010 inch
		Edge to feature, multiple surface / Over formed part, multiple surface	± 0.030 inch
		Production grade	1-100,000 cycles
	<b>Vacuum Casting</b>  Vacuum casting is a manufacturing process where the material goes into a silicone mold with a vacuum to produce complex production parts.	Standard capabilities	Description
		Maximum build size	±0.025 mm-±0.001 inch
		Standard lead time	Up to 20 parts in 15 days or less
		Dimensional accuracy	±0.05 mm
		Layer thickness	1.5mm - 2.5mm
	<b>Die Casting</b>  Die casting is a process of manufacturing parts by pouring or forcing molten metal into steel modes to create various kinds of parts.	Standard capabilities	Description
		Maximum build size	±0.025 mm-±0.001 inch
		Standard lead time	Up to 20 parts in 15 days or less
		Dimensional accuracy	±0.05 mm
		Layer thickness	1.5mm - 2.5mm
	<b>Aluminum Extrusion</b>  Aluminum extrusion facilitates the manufacture of complex parts through the process of plastic deformation. Material is forced through a mold or orifice to achieve the desired shape.	Standard capabilities	Description
		Press sizes	450T - 3000T
		Standard lead time	2 weeks for small molds, 4 weeks for larger molds
		Minimum order volume	0.5 ton aluminum for smaller machines, 1.0 ton of 6063 aluminum for larger machines.
		Post-processing	Full service CNC cutting, threading, slotting, face milling, etc.
		Standard capabilities	Description

	3D Printing	Min. wall thickness	1.0 mm
	3D printing is a manufacturing process in which a three-dimensional part or object is created from a digital 3D or CAD model.	Layer height	50 – 300 µm
		Max. build size	250 * 250 * 250 mm (SLA), 420 * 500 * 420 mm (SLS), 500 * 500 * 500 mm (FDM)
		Tolerance	± 0.5% with a lower limit of ± 0.5 mm (± 0.020")

#### Considerations:

**Cost:** Rapid tooling is generally more cost-effective for low-volume production or prototyping, whereas injection molding becomes more economical for large-scale production.

**Lead Time:** Rapid tooling offers shorter lead times compared to the creation of custom steel or aluminum molds for injection molding.

**Design Changes:** Rapid tooling allows for easier design modifications, whereas changes in injection molding require the creation of new molds, which can be time-consuming and costly.

**Part Complexity:** Injection molding is better suited for complex parts with intricate details, while rapid tooling may have limitations in achieving certain design features.

In summary, rapid tooling is advantageous for fast prototyping and low-volume production, offering design flexibility and shorter lead times. Injection molding is ideal for high-volume production, providing cost-effectiveness, efficient production, and high-quality surface finishes. The choice between the two methods depends on factors such as production volume, cost considerations, lead time requirements, and the complexity of the parts being manufactured.

apid tooling, also known as rapid tooling manufacturing (RTM) or rapid tooling technology (RTT), is a process used to quickly produce tooling or molds for the manufacturing of parts or products. It is a bridge between rapid prototyping and traditional production methods, allowing for faster and more cost-effective production.

Our First Article Inspection Process				
When Barana Rapid receives your order requirements, we will carry out the first article inspection service. According to our company's regulations, Barana Rapid will provide the first article inspection service to ensure better completion of your machining project if the order demand reaches 3,000 US dollars or the minimum order quantity is 300 pieces.				
	Step 1	Step 2	Step 3	Step 4
Barana Rapid	Offer first article inspection We offer first article inspection services for batch production.	Draft contract We review the project and contact customers for detailed information.	Produce sample We produce sample parts according to the FAI agreement and deliver them to you.	Full-scale production The full-scale production starts and finishes production within lead time.
Client	Request inspection You request first article inspection for a project that meets our FAI requirements.	Sign contract You sign the FAI agreement provided by us and agree on our Terms and Conditions.	Receive sample You receive and examine the parts, inform us of full-scale production may begin.	Receive products You receive your prototypes or production parts on the required lead time.

The goal of rapid tooling is to reduce the time and cost associated with the production of tooling, which is typically a time-consuming and expensive process. Traditional tooling methods, such as CNC machining or EDM (Electrical Discharge Machining), often require a significant amount of time and investment to produce molds or dies for mass production. Rapid tooling utilizes various techniques and technologies to speed up the tooling process. Here are a few common methods used in rapid tooling:

**3D Printing:** Additive manufacturing technologies, such as selective laser sintering (SLS) or stereolithography (SLA), can be employed to 3D print molds or tooling inserts. 3D printing allows for the creation of complex geometries and quick iterations, reducing the lead time for tooling production.

**Soft Tooling:** Soft tooling involves using materials like silicone or epoxy to create molds or tooling inserts. These softer materials can be produced more quickly and cost-effectively compared to traditional metal tooling. Soft tooling is suitable for low- to medium-volume production runs.

**Rapid Injection Molding:** This technique combines rapid prototyping and injection molding processes. A 3D-printed or machined mold insert is used to create a limited number of parts through injection molding. It provides a faster and more economical way to produce small quantities of parts for testing, validation, or market launch.








**Direct Metal Tooling:** For metal parts, direct metal tooling techniques can be employed. These methods use additive manufacturing technologies, such as direct metal laser sintering (DMLS), to directly 3D print metal molds or tooling inserts.



This approach reduces the lead time and cost associated with traditional metal tooling production.

The specific choice of rapid tooling method depends on factors such as the desired production volume, part complexity, material requirements, and budget. Rapid tooling offers advantages such as faster time-to-market, reduced tooling costs, and the ability to iterate and refine designs more efficiently. However, it may have limitations in terms of production volume or material selection compared to traditional tooling methods.

It's important to note that rapid tooling is typically used for low- to medium-volume production or for the production of prototypes, bridge tooling, or short production runs. For high-volume production, traditional tooling methods are often more suitable due to their durability and cost-effectiveness over the long term.

Our Low-Volume Manufacturing Processes		
Barana Rapid has more than ten years of experience in small-batch manufacturing, an excellent team, and strong suppliers to meet all your small-batch manufacturing needs. Based on our many years of experience in small batch molding and excellent engineers, we will effectively execute all your projects involving small batch machining. This is due to the strong supply chain and advanced small-batch manufacturing equipment for different manufacturing technologies. You can rest assured that we will ensure the wholesale price is lower than that of our peers, strictly control the product quality standards, assist customers in optimizing the design, select the appropriate CNC processing technology, reduce costs, and achieve rapid mass production, to ensure that you will finally receive economic and high-precision products.		
CNC Machining		High-speed, automated cutting can precisely form different shapes to reflect your designs on the metal or plastic material for low volume cnc machining.
Plastic Injection Molding		Plastic injection molding can turn thermoplastic materials into specific plastic parts, whether it is mass production or low volume production.
Sheet Metal Fabrication		Sheet metal fabrication is a subtractive manufacturing process that can be applied for low volume manufacturing and prototyping of metal parts.
Vacuum casting		Vacuum casting is a custom manufacturing method used for the production of small series of functional plastic parts.
Die Casting		Die casting is a manufacturing process in which molten metal is poured or forced into steel molds, allowing for small volume production of quality metal injection molded parts with low cost.
Aluminum Extrusion		We support a variety of extrusion methods, such as aluminum and zinc extrusion, and more to meet your specific requirement of low volume manufacturing or mass production.
3D Printing		We offer a wide variety of 3D printing services, such as SLA 3D printing (Stereolithography) and SLS 3D printing (Selective Laser Sintering). Our engineers and project managers will collaborate with you to confirm your CAD designs, product functions, dimensional tolerances, etc.

#### What Separates Barana Rapid's Inspection Processes from the Rest?

Careful measurement, inspection and testing are necessary to ensure the conformance of your parts. We perform multiple inspections at every step of the product development journey, from incoming material verification to final 3D scanning. You will receive complete digital files and Certificates of Compliance so you can meet your own regulatory and performance goals.

#### An International Team with Unparalleled Experience

Quality inspection relies not only upon using advanced digital equipment but also having highly trained personnel with years of experience. As parts become more complex and tolerances more demanding for advanced applications, precision measurements conducted by professionals are the only way to ensure perfection.

#### Inspections and Review for Every Stage of Production

To ensure quality from start to finish, Barana Rapid provides the following inspection and review services:  
 Extensive incoming materials verification  
 Design for manufacturing reviews for all quotes provided  
 Contract reviews upon receipt of POs  
 First article and in-process inspections  
 Final inspections and testing with reports and certifications as required



Visual inspection



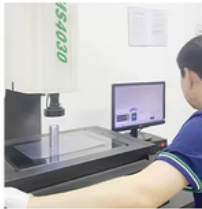
Touch test



Dimension inspection



High gauge



2D image measuring equipment



Hardness tester



Tensile tester



Salt-spray testing machine

## Quality Inspection



## Packing



Bubble bag



Bubble bags



Cartons



Customized packing as custom request



Carton



Pallet carton



Wooden case



Shipping