



## Low Volume CNC Machining Precision and Efficiency in Aluminum Manufacturing

Our Product Introduction

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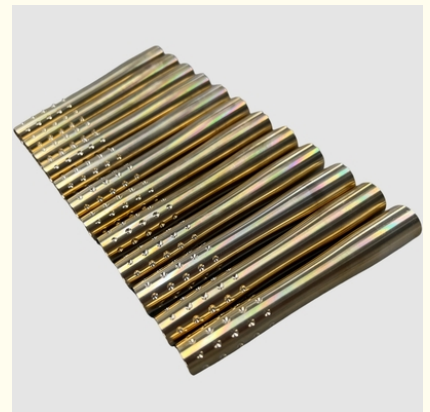
### Basic Information

- Place of Origin: China Shenzhen
- Brand Name: Aluminum, Stainless Steel, Brass, Titanium, Plastic
- Certification: Low Volume CNC Machining
- Model Number: Polishing, Anodizing, Painting, Chrome Plating, Silkscreen
- Minimum Order Quantity: 1 piece
- Price: USD 30 piece
- Packaging Details: Carton, Plywood Box
- Payment Terms: T/T, Paypal
- Supply Ability: 1 piece per day



### Product Specification

- Material: Aluminum, Stainless Steel, Brass, Titanium, Plastic
- Feature: Mechanical Metal Model
- Process: CNC Lathe, CNC Machining
- Payment: T/T
- Express Way: DHL/FEDEX/UPS And SF Express So On
- Technology: CNC
- Color: Black Color And Can Be Customized
- Inspection: CMM Equipment
- Highlight: **low volume cnc machining precision, precision low volume machining, Barana low volume machining**



## Product Description

Low Volume CNC Machining Precision and Efficiency in Aluminum Manufacturing

### What Is Low-Volume Manufacturing?

In terms of cost, low-volume manufacturing typically has higher per-unit costs compared to high-volume manufacturing. There are several factors that contribute to this cost difference:

Our precision CNC Machining services make complex finished parts and components as well as tools for plastic injection molding or pressure die casting. In addition, CNC manufacturing is used for secondary drilling, tapping, and milling operations on machined parts or parts from other processes.

**Tooling and Equipment Costs:** High-volume manufacturing often involves the use of specialized tooling and equipment that may require significant upfront investment. These costs are distributed over a large production volume, reducing the cost per unit. In low-volume manufacturing, the cost of tooling and equipment is spread over a smaller quantity of units, leading to higher per-unit costs.

CNC machine tools come in many specialized types to perform all kinds of operations on raw stock. However, CNC mills are the most common and versatile multi-axis machines that we use at Barana Rapid every day.



### Benefits of Aluminum CNC Machining:

**Lightweight:** Aluminum is known for its low density, making it an ideal choice for applications where weight reduction is crucial. CNC machining allows for the creation of lightweight aluminum components without compromising on strength or structural integrity.

Aluminum alloys are prized for their excellent strength-to-weight ratio, offering ample strength and structural integrity while maintaining a low weight for the final product. This characteristic renders them ideal for sectors like aerospace and automotive, where reducing weight without compromising strength is crucial.



**Efficiency and Automation:** High-volume manufacturing typically includes increased automation and refined production processes, resulting in enhanced efficiency and lower labor costs per unit. Conversely, low-volume manufacturing tends to involve more manual labor, longer setup times, and greater customization, which can result in higher labor costs per unit.

Aluminum alloys, such as 6061, are known for their excellent machinability. They can be readily shaped, cut, drilled, and milled with CNC machines, which facilitates efficient and cost-effective production processes.

## Materials for Custom CNC Machining Parts

A wide range of materials is available for CNC machines, offering versatility for rapid prototyping and custom production of intricate parts. We offer instant quotes for over 150 metals and plastics to meet your manufacturing requirements, allowing you to compare costs across various processed materials.

	<p><b>Aluminum</b></p> <p>Aluminum is a highly ductile metal, making it easy to machining. The material has a good strength-to-weight ratio and is available in many types for a range of applications.</p>	<p>Aluminum</p>	
		<p>Machinable Material Types</p>	<p>AL6061-T6,AL6063-T6,AL6082 AL7075-T6,AL5052-H32</p>
		<p>Lead Time</p>	<p>3 days</p>
		<p>Tolerances</p>	<p>±0. 01mm</p>
		<p>Max part size</p>	<p>200 x 80 x 100 cm</p>
	<p><b>Copper</b></p> <p>Copper displays excellent thermal conductivity, electrical conductivity and plasticity. It is also highly ductile, corrosion resistant and can be easily welded.</p>	<p>Copper</p>	
		<p>Wall Thickness</p>	<p>0. 75 mm</p>
		<p>Lead Time</p>	<p>3 days</p>
		<p>Tolerances</p>	<p>±0. 01mm</p>
		<p>Max part size</p>	<p>200 x 80 x 100 cm</p>
	<p><b>Brass</b></p> <p>Brass has desirable properties for a number of applications. It is low friction, has excellent electrical conductivity and has a golden (brass) appearance.</p>	<p>Brass</p>	
		<p>Wall Thickness</p>	<p>0. 75 mm</p>
		<p>Lead Time</p>	<p>3 days</p>
		<p>Tolerances</p>	<p>±0. 01mm</p>
		<p>Max part size</p>	<p>200 x 80 x 100 cm</p>
	<p><b>Stainless Steel</b></p> <p>Stainless steel, a low carbon steel, possesses numerous properties desirable for industrial applications. It typically comprises at least 10% chromium by weight.</p>	<p>Stainless Steel</p>	
		<p>Machinable Material Types</p>	<p>304 SS, 303 SS, 316 SS, SS 430F, 301 SS etc.</p>
		<p>Lead Time</p>	<p>3 days</p>
		<p>Tolerances</p>	<p>±0. 01mm</p>
		<p>Max part size</p>	<p>200 x 80 x 100 cm</p>
	<p><b>Titanium</b></p> <p>Titanium has a number of material properties that make it the ideal metal for demanding applications. These properties include excellent resistance</p>	<p>Titanium</p>	
		<p>Wall Thickness</p>	<p>0. 75 mm</p>
		<p>Lead Time</p>	<p>3 days</p>

	to corrosion, chemicals and extreme temperatures. The metal also has an excellent strength-to-weight ratio.	Tolerances	±0.01mm	
		Max part size	200 x 80 x 100 cm	
	Plastics	Plastics		
	Plastics are a highly favored material for CNC machining due to their vast variety, comparatively low cost, and the significantly reduced time required for machining. We offer a comprehensive range of common plastics for CNC machining services.	Machinable Material Types	Buff ABS, Black ABS, Clear ABS, 94V0 flame retarding ABS, ABS+PC, Black Polycarbonate, Transparent Polycarbonate, Acrylic, NYLON 6, NYLON 66, PA6+30%GF, HDPE, POM, PP, PP+20%GF, PE, TEFLON, PPS, PEEK, PPO, PPE, PEI	
		Lead Time	3 days	
		Tolerances	±0.01mm	
		Max part size	200 x 80 x 100 cm	

### Choosing the Right Rapid Prototyping Technique

**Material costs** vary between low-volume and high-volume manufacturing. In high-volume production, the benefits of bulk purchasing, negotiating lower material prices, and securing long-term supplier contracts can significantly reduce the cost per unit, unlike in low-volume manufacturing.

**Efficiency and Automation:** High-volume manufacturing often involves greater automation and optimized production processes, leading to higher efficiency and reduced labor costs per unit. Low-volume manufacturing may require more manual labor, setup time, and customization, leading to higher labor costs per unit.

**Heat Treatable:** Aluminum alloy 6061 is heat treatable, which means it can be strengthened through heat treatment processes such as solution heat treatment and aging. This allows for further enhancing the mechanical properties of the machined parts, including increased strength and hardness, while maintaining good machinability.

**Versatility:** Aluminum alloy 6061 is highly versatile and can be used in a wide range of applications. It is suitable for machining complex parts with intricate designs, making it a preferred choice for CNC machining processes. It can be easily formed, welded, and joined, providing flexibility in manufacturing and assembly.

Metal	Aluminum 1050	AL 1050
Metal	Aluminum 1060	AL 1060
Metal	Aluminum 2024	AL 2024
Metal	Aluminum 5052-H11	AL 5052-H11
Metal	Aluminum 5083	AL 5083
Metal	Aluminum 6061	AL 6061
Metal	Aluminum 6082	AL 6082
Metal	Aluminum Bronze	AL + Br
Metal	Aluminum QC 10	AL QC 10
Metal	Brass	Cu + Zn
Metal	Copper	Cu
Metal	Copper Beryllium	Cu + Be
Metal	Copper Chrome	Cu + Cr
Metal	Magnesium	Mg
Metal	Magnesium Alloy	
Metal	Steel Stainless 303	SS303
Metal	Steel Stainless 304	SS 304
Metal	Steel Stainless 316	SS 316
Metal	Steel Stainless 410	SS 410
Metal	Steel Stainless 431	SS 431
Metal	Steel Stainless 440	SS 440
Metal	Steel Stainless 630	SS 630
Metal	Steel 1040	SS 1040
Metal	Steel 45	SS 45
Metal	Steel D2	SS D2
Metal	Titanium	Ti
Metal	Titanium Alloy	



### **How To Process Low-Volume Manufacturing**

Success in low volume manufacturing hinges on the strategic production of small product batches, which may vary from a handful to tens of thousands. The main objective is to reduce expenses associated with tooling, labor, and materials, while not sacrificing the speed of production or the quality of the product. Achieving this balance involves optimizing processes and choosing cost-effective resources. Low volume manufacturing is ideal for specialized or custom products, as it allows for quick market introduction and design adaptability, all while cutting down on overhead costs.

In the realm of raw materials, low-volume manufacturing exhibits distinct preferences. Metals such as steel, aluminum, brass, and copper are chosen for their durability and resistance to wear, while plastics like ABS, nylon, and polycarbonate are selected for their lightweight, adaptability, and cost-effectiveness.



In terms of processing methods, technologies such as additive manufacturing (3D printing), CNC machining, and rapid tooling are advantageous for low-volume production due to their reduced costs and faster lead times. Moreover, low-volume manufacturing ensures the quality of the end product by cost-effectively producing high-quality parts, and it permits extensive customization to fulfill specific customer needs.

Clients frequently worry that low-volume manufacturing may affect the quality or precision compared to mass production. Nevertheless, we guarantee that our small-scale orders receive the same level of attention, using identical materials, equipment, and strict quality control protocols.

How do we manage this? Our expertise lies in high-mix, low-volume production, with scalable systems capable of handling anything from a single piece to several million. A reliable supply chain provides a consistent supply of materials, removing the restrictions of minimum order quantities. Moreover, our digital manufacturing platform unifies all machinery into a cohesive network, facilitating quick and effective distribution of resources among workstations, thus ensuring prompt processing of even the most intricate orders.

CNC Machining Tolerances and Standards		
Barana Rapid offers precision CNC machining services, making it your perfect partner for creating precise machined prototypes and parts. Our standard CNC machining tolerances are ISO 2768-f for metals and ISO 2768-m for plastics. Additionally, we can meet specific tolerances provided they are clearly stated in your drawings.		
Standards	CNC Milling	CNC Turning
Maximum Part Size	2000x1500x600 mm	200x500 mm
Minimum Part Size	4x4 mm 0.1*0.4 in	2x2 mm 0.079x0.079 in
Minimum Feature Size	Φ 0.50 mm Φ 0.00197 in	Φ 0.50 mm Φ 0.00197 in
Standar Tolerances	Metals: ISO 2768-f Plastics: ISO 2768-m	Metals: ISO 2768-f Plastics: ISO 2768-m
Hole Diameters	+/- 0.025 mm +/- 0.001 in.	+/- 0.025 mm +/- 0.001 in.
Linear Dimension	+/- 0.025 mm +/- 0.001 in	+/- 0.025 mm +/- 0.001 in
Edge Condition	Sharp corner will be removed in the form of a chamfer or radius. The size of the chamfer, or resulting radii, must be indicated on the drawing.	

Shaft Diameters	+/- 0.025 mm +/- 0.001 in.	+/- 0.025 mm +/- 0.001 in.
Threads and Tapped Holes	Diameter: $\Phi$ 1.5-5 mm, depth: 3 $\times$ diameter Diameter: $\Phi$ 5 mm or more, depth: 4-6 $\times$ diameter	Diameter: $\Phi$ 1.5-5 mm, depth: 3 $\times$ diameter Diameter: $\Phi$ 5 mm or more, depth: 4-6 $\times$ diameter
Types of Thread	Barana Rapid can produce threads of any specification and size required by our customers.	
Text	Minimum width of 0.5 mm, depth of 0.1 mm	Barana Rapid can use laser marking to create standard text for CNC turned parts.
Lead Time	3 business days	3 business days

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

Precise measurement, inspection, and testing are essential to guarantee the conformity of your components. We conduct multiple inspections at each stage of the product development process, from the verification of incoming materials to the final 3D scanning. You will be provided with comprehensive digital files and Certificates of Compliance to help you achieve your regulatory and performance objectives.

### Inspections and Reviews at Every Production Stage

To maintain quality throughout the entire process, Star Rapid offers the following inspection and review services:

Thorough verification of incoming materials

Design for manufacturing reviews with every quote

Contract reviews following the receipt of purchase orders

First article and in-process inspections

Final inspections and testing, complete with detailed reports and necessary certifications



Visual inspection



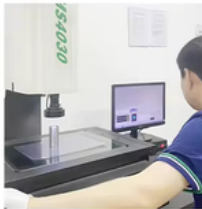
Touch test



Dimension inspection



High gauge



2D image measuring equipment



Hardness tester

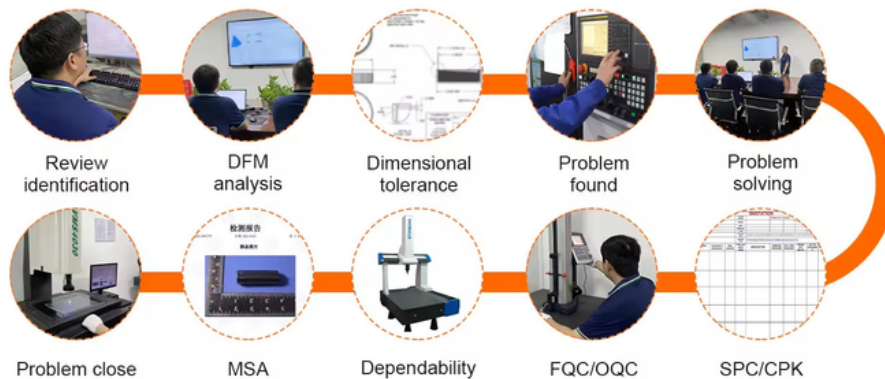


Tensile tester




Salt-spray testing machine


### Quality Inspection



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