



# **Metal Spinning: A Complete Guide**

# What Is Metal Spinning?

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Metal spinning—also referred to as metal turning or spin forming—is a forming process in which a flat metal disc is turned into a hollow component with a circular cross-section. The flat metal disc—i.e., the blank—is fixed to a spinning lathe. While it spins, a roller tool presses it against a mandrel, creating the desired interior form. The resulting component can take on a variety of basic shapes, including cones, cylinders, hemispheres, shells, and venturis. In any case, it is highly accurate with a compressed grain structure and smooth surface, both of which minimize the need for additional finishing.

## History of Metal Spinning

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The process of metal spinning can be traced back as far as the Ancient Egyptian era when soft metals were spun on early lathes by human power. Since then, the technique has made significant strides due to the advancement of power generation technology (e.g., steam power, hydroelectric power, and electric motors). These technological improvements provide today's metal spinning professionals with the power and speed they need to produce quality parts and products from various materials.

Metal spinning is typically associated with projects involving low production volumes since the process comes with a steep learning curve. While the process steps and equipment requirements are relatively basic, operators usually have to undergo considerable training to acquire the skills needed to perform/use them properly. However, in recent years, new technology has been developed and adopted that has made it much easier to manufacture spun metal components.

# The Metal Spinning Process

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Traditionally, the metal spinning process begins by mounting the mandrel chuck to the lathe's headstock. Next, the blank is fixed in place by moving a follower block attached to the tailstock of the lathe. The lathe's lever arms have a support system consisting of a tool rest and pin that provides them with the leverage required to apply adequate pressure to the blank against the forming tool. The lever arms can be adjusted incrementally as the blank is reduced to its final form. Each pass of the roller across the surface of the blank gradually forms the workpiece. Multiple passes are generally necessary to achieve the desired shape.

In the past, each step of this process was performed manually. However, technological advancements have allowed the process to be largely automated. As a result, manufacturers can experience better process repeatability, which is ideal for projects involving high-volume production runs.

## Key Terms and Operations to Better Understand the Metal Spinning Process

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While metal spinning relies on fundamental manufacturing concepts, its various nuances can be difficult to fully comprehend for people who are unfamiliar with it. Below, we highlight some key terms and operations to help readers better understand the metal spinning process.



**Preforms.** Preforms are blanks that are already formed in the general shape of the desired component, which helps reduce processing time and costs for final spinning operations. They are made through spinning or other forming operations.

**Conventional spinning.** Conventional spinning operations typically involve stretching the blank across a series of passes, which causes the material to thin out. However, the thinning out can be minimized if necessary.

**Shear spinning.** Shear spinning is a metal spinning variation that produces the desired component in a single pass. It is used to create conical or cylindrical pieces with a specific material thickness.

**Edge treatment.** Edge treatment operations involve finishing the edges of spun parts to improve functionality or appearance. Types of finished edges include straight edges, folded edges, and rolled/curled edges.

# Machines and Tools for Metal Spinning Operations

The metal spinning process utilizes many different machines and tools depending on the exact requirements and restrictions of the manufacturing project. Let's take a closer look at some of the most widely used ones.

## Metal Spinning Machines

The machines used in metal spinning operations are known as lathes. They can be classified into three main categories, each of which is suitable for different part and production needs.

- ▶ **Manual spinning lathes.** These lathes require a skilled operator to manually press the tool against the workpiece. They are used for blanks ranging in diameter from 1 inch to 72 inches.
- ▶ **Power-assisted spinning lathes.** These lathes rely on both human force and hydraulic force to shape the workpiece. They are necessary when forming stronger materials, such as stainless steel.
- ▶ **Automatic spinning lathes.** These lathes use computer numerical control (CNC) or programmable numerical control (PNC) technology to automate operations. They are highly effective for high-volume production projects due to their accuracy and precision.



## Metal Spinning Tools

The tools used in metal spinning operations can be made from a variety of materials (e.g., wood, plastic, and steel) depending on the project's design requirements. They can also be grouped into three main categories based on design:

- ▶ **Male tools.** The most common spinning tools are male. They replicate the interior form of the desired part. During spinning operations, the blank is formed around the tool's exterior as the tool presses into the blank.
- ▶ **Female tools.** Female spinning tools replicate the exterior form of the desired part. During spinning operations, the tool presses into and surrounds the blank, shaping the blank with its interior.
- ▶ **Collapsible or segmented tools.** These spinning tools have a removable center core that can hold the outside of the tool in place during spinning operations. They are suitable for components with variable diameters. They require assembly and disassembly for each new piece.



# Common Materials Used for Metal Spinning

The metal spinning process accommodates a wide range of materials, including, but not limited to, the following:

- ▶ **Aluminum.** This metal is durable, lightweight, and malleable. Due to its natural corrosion resistance, it is ideal for use in wet or abrasive environments. It is frequently used to produce components with deeply intricate features.
- ▶ **Brass.** This highly formable metal is responsive to numerous finishing processes and suitable for cold or hot working processes, depending on its zinc content. Its attractive color makes it a popular choice for decorative applications.
- ▶ **Cold rolled steel.** This metal is suitable for applications where high technical precision and/or aesthetics are critical. Since it is shaped at lower temperatures, it exhibits enhanced hardness, tension resistance, and deformation resistance.
- ▶ **Copper.** This metal is also popular for decorative furnishings due to its attractive color. It is easy to work, non-magnetic, thermally and electrically conductive, corrosion resistant, ductile, antimicrobial, and recyclable. Common applications include lighting, plumbing, cookware, musical instruments, and more.
- ▶ **Stainless steel.** This metal is known for its corrosion resistance, strength, and longevity, all of which make it suitable for exposed exterior applications.



# Why Partner With Metal Craft Spinning and Stamping?

Metal spinning is a highly versatile manufacturing process. However, it requires a significant amount of training to perform properly, which leads to many companies avoiding it for their manufacturing projects.

At Metal Craft Spinning and Stamping, we have mastered the metal spinning process and adapted it using the most technologically advanced processes. As a result, we can produce metal spun parts and products from a range of durable materials in prototype, low, or high volumes. Our hand and CNC lathe operations serve customers in a range of industries, including:



**Architecture**



**Commercial lighting**



**General industrial**



**HVAC**

**Injection molding**



**Roofing**



**Sanitation**



Whatever your specific needs are, we will work with you to meet and/or exceed your project goals. To learn more about our metal spinning capabilities, **contact us** today. To discuss your project specifications with one of our team members, **request a quote**.





## About Us

Metal Craft Spinning and Stamping was incorporated in 1969 and specializes in the manufacturing of metal components of all shapes and sizes. Our department is highly skilled in the ancient trade of hand metal spinning as well as automatic metal spinning utilized with state-of-the-art CNC machines. A number of hydraulic presses and hydroforming machines have been acquired, complimenting our metal spinning capabilities.

Metal Craft Spinning and Stamping commits itself to exceed the expectations of our customers with quality products and on-time delivery through continuous improvements and customer collaboration.

Do you have any questions?

[Contact Us NOW >](#)

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