

## **The basic metal casting process**

The basic metal casting process involves creating a pattern and a mold, then pouring molten metal into the mold. You will then extract the solid metal casting and finish your piece. This process is customizable for different types of metal casting, along with shapes, sizes, and more.

### **Step 1: Create the pattern**

Before you make your mold, you must create a pattern to determine the mold's shape. The pattern can be a 3-dimensional model of your final cast. It may be shaped in wax, sand, plastic, or even wood. Some casters use molds made of plaster or silicone, which are materials that could not withstand a molten metal cast, but allow the caster to mass create wax multiples to use in expendable mold casting. When you are shaping your pattern, make sure you account for any anticipated shrinkage when the metal cools. Patterns may also be gated with sprues to allow the molten metal to flow into the mold.

### **Step 2: Make the mold**

After you have created a pattern, it is time to make your mold. As we mentioned above, you may choose to make a reusable mold, which is typically made from metal, or a single-use mold, which may be made from sand, plaster, or ceramic shell. Each of these methods for making molds are optimized for different casting metals and various levels of pattern complexity. If you are working with a wax or plastic pattern, you can burn out the pattern inside of a kiln.

### **Step 3: Choose the metallic alloy**

All metal castings are produced from either ferrous or non-ferrous alloys. Alloys are a mixture of elements that provide the best mechanical properties for the final cast's use. Ferrous alloys include steel, malleable iron, and gray iron. Non-ferrous alloys that are most commonly used in casting are aluminum, bronze, and copper. If you are working with precious metals in a jewelry studio, you may work with silver, copper, gold, and platinum.

### **Step 4: Melt the alloy**

Melting processes vary between alloys because each alloy will have a different melting temperature. Essentially, melting consists of placing the solid alloy in a crucible and heating it over an open flame or inside of a furnace.

### **Step 5: Pour into the mold**

Pour the molten metal into the mold cavity. If it is a small casting, you may simply pour from the crucible where the metal was heated directly into the mold. A larger casting may require a small team to support heating the metal inside of a furnace, and transferring the metal into a larger crucible or ladle before being poured into the mold.

Make sure to follow all recommended safety guidance when pouring molten metal. Make sure you wear protective clothing, including natural fiber clothing, long pants and sleeves, insulated gloves, and safety goggles. Work in a well-ventilated space to avoid any risks from dangerous fumes. Make sure you have a chemical fire extinguisher nearby and keep your walkway between the furnace and the mold clear. Allow the mold to solidify before moving onto the next step.

### **Step 6: Remove the casting from the mold.**

When the metal has cooled and solidified, you can remove it from the mold. If you cast into a single-use mold, you can break away the mold from the casting. If you used a plaster investment, you will want to quench the plaster in water after the metal has solidified. The water will help break away the mold. For reusable molds, you may use ejector pins to extract your casting.

### **Step 7: Finishing**

File and polish your solid metal cast! This may involve cleaning your cast metal object, like scrubbing away excess mold material in water, breaking off the casting gates with clippers for small objects, or even an angle grinder for large pieces