# Bronze Casting Procedure

This playbook describes the steps involved in casting a bronze sculpture, from creating a wax model to the final bronze piece. It covers mold making, wax work, casting, and finishing.

### Step 1: Design Model

Begin with designing and sculpting a model of the final sculpture using clay or another material. This original model is the starting point for the casting process.

### Step 2: Make Mold

Create a mold of the original model using silicone rubber or plaster. The mold should capture all the details of the model and is usually made in multiple parts to allow for easy removal of the model.

### Step 3: Wax Replica

Pour molten wax into the mold to create a replica of the original model. Once the wax hardens, remove it from the mold. This wax replica is known as a 'wax pattern'.

### Step 4: Chase Wax

Refine the wax pattern by 'chasing', which is the process of cleaning up imperfections and adding details to the wax model that will appear in the final casting.

### Step 5: Sprue Wax

Attach wax rods, called 'sprues', to the wax model. These will create channels in the mold for molten bronze to flow into and for air and gases to escape.

### Step 6: Investment Mold

Create an investment mold by covering the sprued wax model with a heat-resistant material, such as plaster-based investment. Allow it to harden completely.

### Step 7: Burnout

Place the investment mold in a kiln to melt and burn out the wax, leaving a cavity in the shape of the sculpture. This step is called 'burnout' and prepares the mold for casting.

### Step 8: Bronze Pour

Heat bronze ingots to a molten state and carefully pour the metal into the preheated investment mold. The molten bronze fills the cavity where the wax was burned out.

### Step 9: Cool & Release

Allow the bronze to cool and solidify. Then, break away the investment material to release the rough bronze casting. The sprues will be also be attached to the casting.

### Step 10: Metal Chasing

Remove the sprues and refine the metal surface through a process called 'metal chasing'. Repair any imperfections and recreate any details that may have been lost during casting.

### Step 11: Patination

Apply chemical patinas to the surface of the bronze to achieve the desired color and finish. Heat and various chemicals are used to create a range of effects on the bronze.

### Step 12: Final Assembly

If the sculpture consists of multiple parts, weld these together and perform any necessary repairs or touch-ups to the seams and surfaces.

### Step 13: Finishing Touches

Apply waxes or sealants as required to protect the patina and complete the bronze sculpture. The piece is now finished and ready for display.

## General Notes

### Safety Precautions

Always observe appropriate safety protocols, such as wearing protective gear and working in a well-ventilated area, particularly during the pouring and patination stages.

### Environmental Concerns

Be conscientious of environmental impacts, particularly in the disposal of materials and use of chemicals during the patination process.