

BRONZE SCULPTURES

Bronze is made by melting copper and tin and mixing them together. Copper by itself would be too soft to make sculptures from, and tin is much too brittle and breaks easily. By mixing a little bit of tin into the copper it becomes bronze, which is much harder and much less brittle.

Bronze sculpture casting is an ancient technique. The ancient Greeks and the Chinese mastered the art of the "Cire Perdue" (lost wax bronze sculpture) process. This method was revived in the Renaissance period and has been used extensively ever since.

Very few Greek sculptures have survived unfortunately, as the sculptures were melted down and the bronze metal used for other purposes. Bronze metal resists exposure better than stone, and was the preferred medium of Greek sculptors for their extensive art of public sculpture. Bronze metal can also be cast in solid or hammered forms, and in carved or incised forms.

PATINA FINISHES

Integral to the completed bronze sculpture is the patina finish it is given, this finish is as important to the sculptor as the bronze sculpture itself. Bronze sculptures can be given a variety of patina finishes from a classic silver, gold or bronze finishes to black or copper, and a wide variety of green finishes. These finishes range from a metal like appearance to a marble like appearance and the skill of applying the various chemicals to give each different finish is considered to be an art form in itself.

LOST WAX CASTING PROCESS

STEP 1 - Making the mold from an original work of art:

This step is by far the most critical as all the detail which appears on the original sculpture must be captured in this mold. The mold (depending on the size of the sculpture) is cut into sections for casting.

STEP 2 - Making the wax casting:

Molten wax is poured into the mold to form layers of wax. This wax model is an exact duplicate of the original casting.

STEP 3 - Chasing the wax:

The wax is pulled from the mold and hand chased (re-detailed) by a skilled artisan. Although the artist reproduces the original artwork in wax, each piece may be slightly different from the next.

STEP 4 - Spruing:

Wax rods (gates) and pouring cups are attached to the wax casting in specific positions to ensure a full pour.

STEP 5 - Casting the ceramic mold (Investment casting):

In a temperature controlled environment of 22 deg Celsius, the wax casting is dipped into an investment liquid several times. On the first dip a fine powder is applied. On the next dip a coarse ceramic sand is applied. This step is repeated several times, each time increasing the coarseness of the material to create the ceramic mold. Between each dip the ceramic layer must cure (dry) before another layer can be applied.

STEP 6 - Burn-out:

The ceramic shell is placed in a kiln and fired. The shell bakes and the wax is melted from the shell, this is where the term "lost wax" originates from.

STEP 7 - Casting:

The ceramic shell (mold) is removed from the kiln and immediately the molten bronze is poured into the shell. At the time of pouring, the bronze is over 1000 deg Celsius.

**STEP 8 - Break-Outs:**

After the casting has cooled for several hours the shell is carefully broken away, leaving the unfinished bronze.

STEP 9 - Sandblasting:

Any fragments of the ceramic shell are removed by sandblasting. The sculpture is also carefully inspected at this point.

STEP 10 - Assembly and chasing:

At this time all the pieces of the sculpture are welded together, and all the weld-marks are chased and re-detailed.

STEP 11 - Glass beading and polishing:

Glass beading is similar to sandblasting, using extremely fine glass to ensure an even bronze surface. The raw bronze sculpture is now hand polished in preparation for the patina.

STEP 12 - Patinas and waxing:

The bronze is first heated and then the patina chemical is applied by hand to the sculpture. At last the sculpture is ready to be waxed; the wax is applied with heat to ensure a lustrous patina finish.