

**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1    Section 01 45 00 – Quality Control
- .2    Section 01 65 00 – Product Delivery Requirements
- .3    Section 10 12 00 – Custom Metal-Framed Glass Display Cases
- .4    Section 12 14 13 – Cut and Carved Stone Components
- .5    Section 12 56 85 – Assembly of Altar Structures

**1.2            REFERENCES**

- .1    Health Canada/Workplace Hazardous Materials Information System (WHMIS).
  - .1    Material Safety Data Sheets (MSDS) for any touch up work on site.
- .2    Mould Making – Lost Wax Casting Process.
  - .1    Model maker creates an original model from clay to create the sculpted design.
  - .2    Mould maker creates a mould from the clay model, usually consisting of a pliable inner mould and a rigid outer mould.
  - .3    The rigid outer moulds contain the softer inner mould which is the exact negative of the original model. The inner mould can be made of latex, polyurethane rubber or silicone and is supported by the outer mould. The outer mould can be made from plaster or fibreglass or other materials.
  - .4    Make mould in two or more pieces with keys between the sections during construction so that the mould can be put back together accurately.
  - .5    Pour molten wax into the finished mould and swish around until evenly coated about 3mm thickness to cover the inner surface of the mould. Repeat until desired thickness of the mould is completed. Turn mould upside down and allow wax layer to cool and harden.
  - .6    Remove wax from the mould and chase hollow wax copy by using a heated metal tool to rub out the marks the indicated the parting line where the pieces of the mould came together. Dress the wax to hide imperfections. Use registration marks to indicate exactly where moulds attach. Sprue the wax copy to provide pathways for molten bronze to flow into the mould and air to escape.
  - .7    Dip the sprued wax copy into a slurry of silica, then into a sand-like stucco with a controlled grain size. Allow the shell to dry and repeat process until at least a half-inch of coating covers the entire piece. Place the dry shell into a kiln and heat to harden the silica coating into a shell and the wax melts and runs out. Place shell into a tub filled with sand.
  - .8    Melt bronze in a crucible in a furnace and carefully pour into hot shell. After the shell has cooled, release the rough casting with a hammer or sand blasting method. Cut off the sprues to release the casting.
  - .9    Chase the casting until the signs of the casting process are removed. Fill any voids or pits in the bronze casting with new bronze weld, and remove any metal excess metal from the welds or flashing left over after from the casting with files, chasing tools, and/or rotary burrs.

### **1.3 ADMINISTRATIVE REQUIREMENTS**

- .1 Coordination.
  - .1 Coordinate the bronze casting with the work to produce bronze, stone and glass display case components to assemble altar structures.
  - .2 Review casting process with Departmental Representative at the foundry.
- .2 Pre-Installation Meetings.
  - .1 Organize and preside over pre-installation meeting with component fabricators and Departmental Representative.
- .3 Scheduling.
  - .1 Allow for foundry production of all bronze components.
  - .2 Coordinate work of this Section with schedule of delivery of completed components with Departmental Representative.
  - .3 Reference Sections:
    - .1 Section 01 65 00 – Product Delivery Requirements.
    - .2 Section 12 56 85 – Assembly of Altar Structure.

### **1.4 SUBMITTALS**

- .1 Product Data.
  - .1 Submit product data in accordance with Section 01 00 10 – General Instructions.
  - .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 00 10 – General Instructions.
- .2 Schedule.
  - .1 Submit schedule of shop fabrication review and approvals.
    - .1 Coordinate with foundry fabricator and Departmental Representative.
- .3 Mock-Ups.
  - .1 Submit mock-up of lost-wax casting process to Departmental Representative for review and approval.
  - .2 Submit mock-up in accordance with Section 01 45 00 – Quality Control.
- .4 Record Documentation.
  - .1 Submit record documentation in accordance with Section 01 00 10 – General Instructions.

### **1.5 QUALITY CONTROL**

- .1 Reference Sections:
  - .1 Section 01 45 00 – Quality Control.

## **Part 2 Products**

### **2.1 GOVERNMENT OWNED MATERIAL**

- .1 Departmental Representative to provide clay and wooden models for fabrication of bronze components legs, skirts and corner braces.

- .1 Retained by Departmental Representative.

## **2.2 MATERIALS**

- .1 Casting Metal: Silicon Bronze, UNS numbers C87800 in accordance with ASTM B176.

## **Part 3 Execution**

### **3.1 FOUNDRY FABRICATION**

- .1 Fabricate bronze components using Government owned clay models.
- .2 Fabricate bronze components using lost-wax casting process. Sand casting is not permitted.
- .3 Bronze legs.
  - .1 Cast with hollow base and top.
  - .2 Allow for internal welding of supports and tabs.
- .4 Provide clean castings, free from scale and shell, with sprues removed, in bright unfinished bronze. TIG weld any holes left through the production process.

### **3.2 PACKAGING, HANDLING AND TRANSPORT**

- .1 Brace, secure, protect, package and transport fabricated bronze components to maintain squareness and rigidity during shipment and installation in accordance with Section 01 65 00 – Product Delivery Requirements.

**END OF SECTION**