Arc Melt Furnace—Single Arc
MODEL SA-200

Arc melt furnaces provide a cost saving alternative to resistance or inductance heating furnaces for many applications. Rather than heaters or induction coils, an electric arc is used to heat up and/or melt parts. Our smallest Arc Melt Furnace can instantly reach temperatures over 3000C, and will cool down to room temperature in minutes. The SA-200 Arc Melt Furnace is simple to operate, extremely reliable and has a low acquisition and operation cost. The available options such as load locks, rotating hearth, and more, make this furnace versatile and adaptable.

MRF Model SA-200 bell jar arc melting furnace specifications:

- Operating temperature: over 3500 Deg. C.
- Bottom loading configuration.
- 360° viewing through Pyrex glass between top and bottom brass base.
- Vacuum chamber construction
- Copper stinger with tungsten electrode.
- Copper hearth plate 2.0” dia. (51mm dia.) usable.
- Power Supply: 300 Amp @ 60% DS, 15Kva.
- Water-cooled power cables
- Inert gas system with relief valve.
- Pumping system with roughing pump, vacuum gauge and valve.
- Low cost

Common Applications:
- Powder melting
- Creating alloys
- Metallic buttons
- Arc Casting
- Annealing
- Crucible welding
- Material densification
- High purity melts

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**Major system Components:**

1. **Furnace Chamber:**
   - The chamber consists of a brass bottom and top with a Pyrex viewing tube.
   - The chamber top and base are water-cooled to maintain a chamber temperature below 50°C (120°F) during normal use.
   - The chamber is rated for vacuum to $10^{-2}$ Torr (Mbar).
   - The chamber top houses the stinger assembly.
   - Access to the furnace for loading and unloading is through the bottom cover.
   - Clamps are provided to isolate and seal the chamber atmosphere.
   - Vacuum and gas port is supplied.
   - Three welding glasses are provided, allowing arc viewing from three sides.

2. **Electrode stingers:**
   - The copper water-cooled stinger (cathode) with replaceable tungsten electrode provides the melting tip.
   - A water-cooled power cable supplies power to the stinger.
   - A ball joint allows the stinger to move easily around the chamber.
   - The stinger is sealed and electrically isolated from the operator.
   - The stinger tip is a 0.093” (2.38 mm) dia. thoriated tungsten rod.

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3. **Hearth Plate:**
   - The hearth plate (anode) is copper and has an o-ring vacuum seal.
   - Cavity dimensions: 2.0” (51mm) diameter
   - Custom cavities in the bottom hearth plate are provided at no charge
   - An optional rotating hearth is available (1- 60RPM)

4. **Inert gas system:**
   - This furnace system was designed to operate in argon.
   - A pump-out followed by a gas backfill provides a fast way to remove all oxygen from the chamber.
   - The standard positive pressure for operation is .14 kg/cm sq (2PSIG).
   - A relief valve and a 30/30 compound gauge (30 PSIG x 30 in. Hg) are located on the chamber.

5. **Vacuum System:**
   - A 4CFM (113-LPM) evacuation pump is offered standard with a manual vacuum valve.
   - A back-to-atmosphere valve and vibration isolators are provided.
   - A vacuum level in the $10^{-2}$ Torr (Mbar) range can easily be attained.

6. **Power Supply:**
   - 300 Amp Power Supply @ 60% DS, 15 Kva, 230/380/460/575V, 3ph, 50-60Hz standard.
   - Foot control provided for modulating power.
   - Power cables, water-cooled.

7. **Water Cooling System:**
   - Supplies cooling water to the various parts of the furnace including the top and bottom flanges, power cables, and stinger rod.
   - Water inlet and outlet manifold provided with flow indicator.

8. **Performance:**
   - Maximum attainable temperature is above 3500°C
   - Operating pressure: 2PSI (.14kg/cm²) and $10^{-2}$ Torr (Mbar) vacuum.
   - Outer shell temperature: less than 50°C.

9. **Testing:** All equipment is fully tested prior to shipment. The customer is invited to inspect the equipment, witness pre-delivery inspection testing and receive training.

10. **Documentation:** Two sets of Installation and Operating Instructions, component manuals and assembly drawings are included with the equipment - one hard copy, one copy on CD.

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11. Options & Accessories

- Load Lock
- High Vacuum
- Oxygen Monitor
- Rotating Hearth
- Tri-arc (three stingers) (Model TA-200)

Utilities

- **Electricity**: 15 Kva, 208-240/380-460V/575V/ 3 ph / 50-60 Hz.
- **Water**: 7.5 LPM flow (2GPM), inlet temperature 68F (20°C) at 40PSI (3.5 kg/cm²)
- **Gas**: 10 LPM Argon at 40PSI (3.5 kg/cm²).

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