

MATERIALS RESEARCH FURNACES, INC

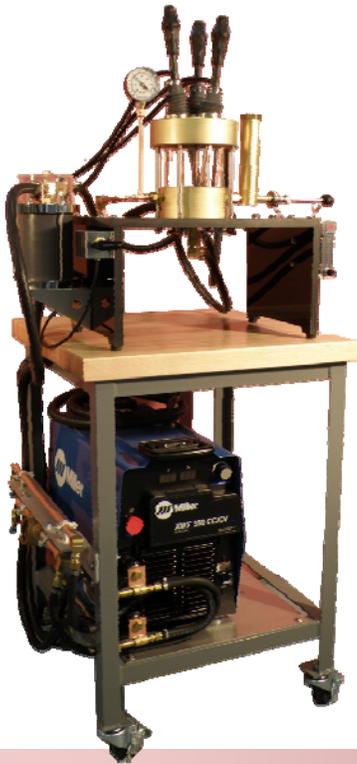
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Arc Melt Furnace- Tri Arc

MODEL TA-200

The TA-200 arc melt furnace is identical to our Model SA-200, with the exception that it is equipped with three stingers instead of one. Triple arcs allow a larger and more homogeneous melt. This Arc Melt Furnace can instantly reach temperatures over 3000 deg. C, and will cool down to room temperature in minutes. It is simple to operate, extremely reliable and has a low acquisition and operation cost. The available options such as load locks, splat rod, rotating hearth, crystal growing kit, oxygen monitor and more, make this furnace versatile and adaptable.



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

- Operating temperature: over 3000 Deg. C.
- Bottom loading configuration.
- 360° viewing through Pyrex glass between top and bottom brass base.
- Vacuum chamber construction
- Three copper stingers with tungsten electrode.
- Copper hearth plate 2.0" dia. (51mm dia.).
- Power supply: 350 Amp @ 60% DS, 14Kva.
- 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 50C (120F) during normal use.
- The chamber is rated for vacuum to 10^{-2} Torr (Mbar)
- The chamber top houses the stinger assemblies.
- Access to the furnace for loading and unloading is through the bottom cover.
- Clamps are provided to isolate and seal the bottom cover
- Vacuum and gas port is supplied.
- Three eye protection shields are provided, allowing arc viewing from three sides.



Tri-Arc melt chamber with optional crystal growing kit, rotating hearth, load lock, and oxygen monitor.



Tri-arc chamber with gas and vacuum system and optional load lock. The welding glasses have been removed for visibility.

2. Electrode stingers:

- The copper water-cooled stingers (cathode) with replaceable tungsten electrode provide the melting tips.
- Water-cooled power cables supply power to the stingers.
- 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 0.125" (3.2 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, Nitrogen, or non-flammable forming gas.
- 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 2CFM (56-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^{-1} Torr (Mbar) range can easily be attained

6. **Power Supply:**

- 350 Amp Power Supply @ 60% DS, 14 Kva, 240/380/460V/ 3 phase standard.
- Foot control provided for modulating power.
- Power cables, water-cooled.
- A resistor can is used to allow three simultaneous arcs
- Optional high frequency starter

7. **Water Cooling System:**

- Supplies cooling water to the various parts of the furnace including the main chamber, power cables, resistor can, etc.
- Water inlet and outlet manifold provided with water strainer

8. **Performance:**

- Maximum attainable temperature of arc is 3700°C
- Operating pressure: .14kg/cm sq. and 10^{-2} Torr (Mbar) vacuum.
- Outer shell temperature: less than 50°C.

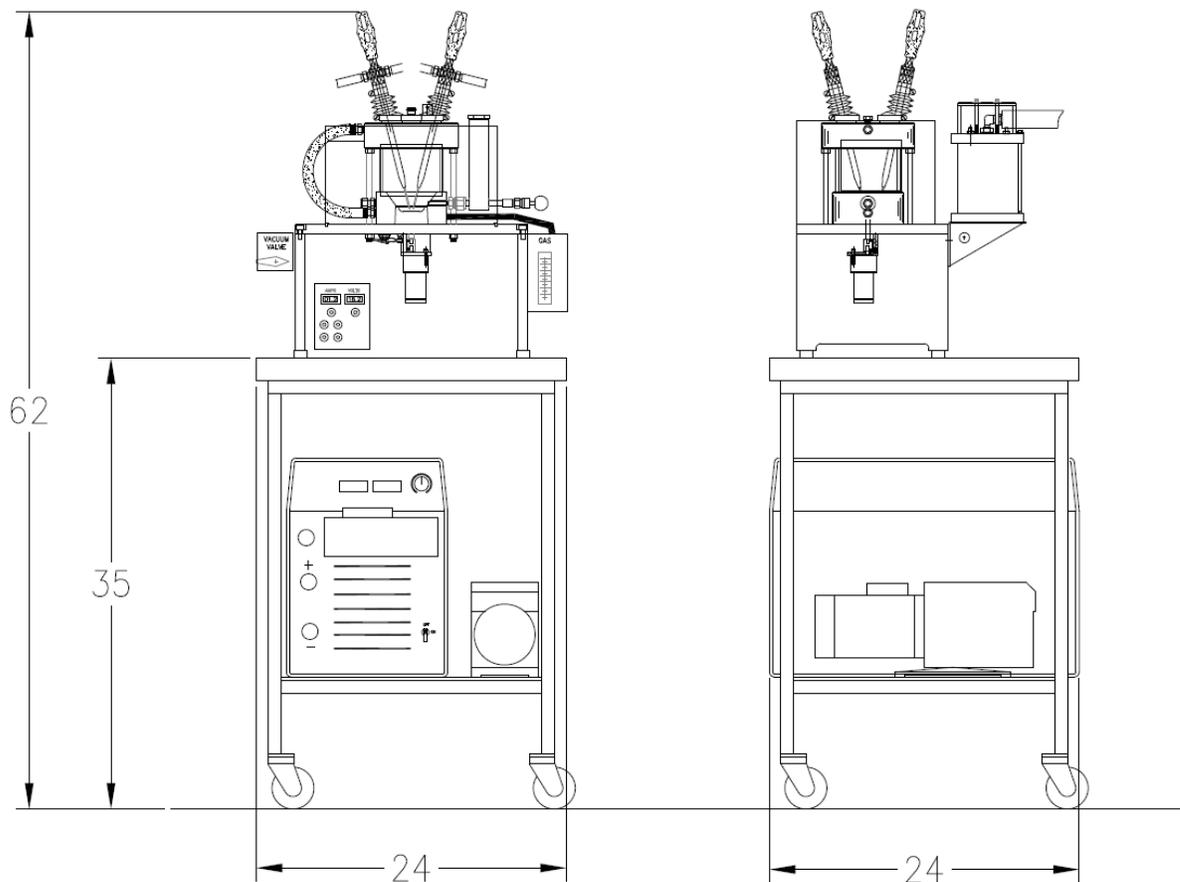
9. **Testing:** All equipment is fully tested prior to shipment. The customer is invited to inspect the equipment, witness pre-delivery inspection testing and receive training.

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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.

11. **Options & Accessories**

- Load Lock
- Splat Rod
- Oxygen Monitor
- Rotating Hearth
- Crystal Growing Kit
- High Vacuum System



*Dimensions in Inches.

Utilities

- **Electricity:** 15 Kva, 230/240/380/460V, Three phase, 50-60 Hz.
- **Water:** 7.5 LPM flow, inlet temperature 68F (20°C) at 40PSI (3.5 kg/cm²)
- **Gas:** Argon, Nitrogen or non-flammable forming gas, plant or bottle supply 40PSI (3.5 kg/cm²).

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