

PRODUCT INFORMATION

Model 5TA Tri-Arc Furnace

For Arc Crystal Growth & Other Material Preparation

Applications

- Czochralski Crystal Growth
- Melting Point Determination
- Freeze Purification
- Arc Casting
- "Splat" Cooling
- Powder Melting
- Annealing
- Crucible Welding
- Thermocouple Junction Welding
- Compound Synthesis

Features

- Ease of Operation
- Provision for Titanium Getter
- Compact and Portable
- Instant High Temperature
- Extremely Dependable and Versatile
- Extremely Pure Melts
- Low Initial Cost
- Variety of Hearth Configurations



Description

The Centorr Vacuum Industries Model 5TA Tri-Arc Furnace is a natural evolution of the Centorr Vacuum Industries Model 5SA Single Arc Furnace. The furnace system consists of the Tri-Arc Furnace, a Resistor box, a D.C. power supply and a set of water-cooled power cables to bring power and water to the furnace. Because of its simplicity, ease of access, and small volume, the furnace is easily purged. Work specimens are, therefore, quickly prepared with a very high degree of purity maintained from sample to sample.

Our Model 5TA Tri-Arc Furnace was developed for the scientist engaged in high temperature work requiring more elaborate apparatus than that normally used for arc melting applications. (For the everyday arc melting applications, see our data sheet on the Centorr Vacuum Industries Model 5SA Single Arc Furnace).

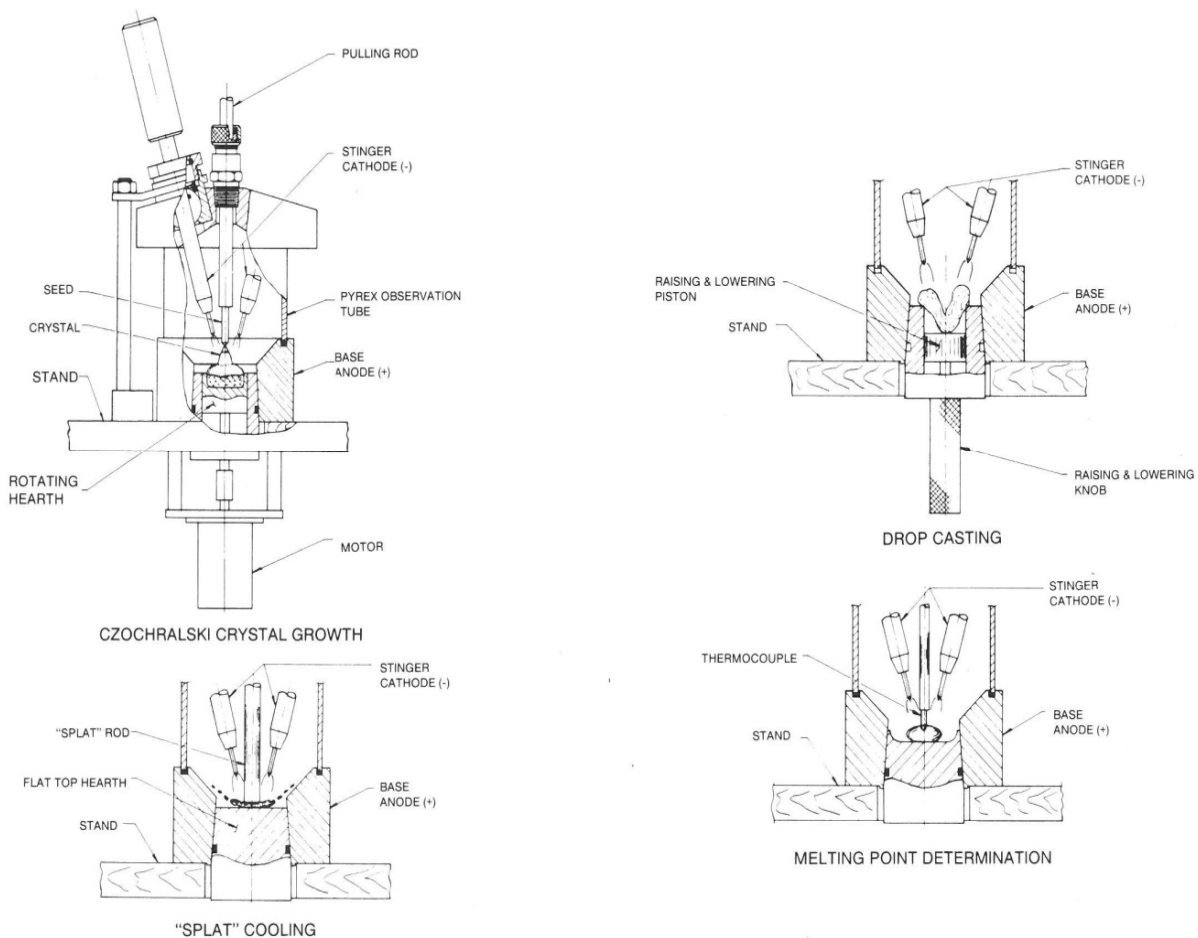
The three electrodes, equally displaced around the top of the furnace, allow access into the furnace along its central vertical axis for crystal pulling rods, splat rods, thermocouples, etc. Heating the specimen from the outside inward permits more even heating and maintains the specimen in a molten state longer.

This furnace consists of upper and lower water-cooled sections separated by a Pyrex observation tube. The observation tube serves as an insulator between the upper (negative) section, and the lower (positive) section, power and water are fed to each of these sections by water-cooled power cables. Penetrating the top section are three copper stinger rods which carry tungsten electrodes. Each rod is mounted into a swivel ball which allows angular as well as vertical movement. The bottom section contains a tapered opening which accepts a variety of copper hearths. Provision is made for attaching a mechanical pump for evacuation prior to backfilling if this is desired. Ports are provided for inert gas inlet and outlet.

To use this furnace, the work is placed in the cup of the hearth. The hearth is inserted into the tapered hole in the bottom of the furnace and clamped into position. The furnace is then purged either by a mechanical pump, followed by backfilling with inert gas such as argon or helium, or the unit is simply purged by a flow of inert gas. Once the system is purged and the desired power setting on the power supply is set, the electrodes are brought to a position near the edge of the material to be melted and an arc is struck. It is advisable to

move the stingers around and over the specimen in order to obtain a uniform and homogenous melt. The specimen is often turned over and re-melted. A small, separate cup is provided in the base of the furnace for melting a small piece of titanium prior to melting the specimen, to remove any possible impurity from the furnace cavity.

Due to the nature of the arc technique, temperatures in excess of 3500°C can be attained. Material such as molybdenum and tungsten are readily melted and non-conductors such as aluminum oxide are melted by surrounding the material by the arc plasma. The Tri-Arc Furnace is available with a variety of optional equipment. In addition to a compression fitting for the insertion of probes, etc., through the center of the top, there are also hearth options that include work raising, lowering and rotating devices.



Specifications	Equipment
<ul style="list-style-type: none"> • Operating Temperature: Greater than 3500°C (6332°F) • Time to Temperature: Instantaneous • Usable Hearth Diameter: 1 5/8" Dia. • Furnace Size: 8" Deep x 12" Wide x 17" High • Utility Requirements: <ul style="list-style-type: none"> Electrical – 400 amps, 80/40 volts, D.C. Water – 1 GPM @ 70°F and 50 PSI Inert Gas – 1 to 5 CFH – Argon or Helium 	<ul style="list-style-type: none"> • Tri-Arc Furnace • Water-Cooled Power Cables • 400 Amp D.C. Power Supply (100% Duty Cycle) • Load-Lock (optional) • Crystal Puller (optional) • Spares <ul style="list-style-type: none"> Replaceable Electrodes Extra Hearths