

Specification for Tetra Arc Furnace

1. Tetra Arc Furnace suitable for melting very small to a few 10's of gms of metallic and ceramic samples in partial inert gas atmosphere. Provision for melting above 1 atm pressure is desirable. It should be possible to melt both low (e.g. Aluminum, Copper) and high melting point (for e.g. Tantalum, Osmium) materials
2. No of electrodes: 4 nos
 - (a) Water cooled
 - (b) Capable of producing arc without touching the hearth
 - (c) Provision of manipulating of electrodes from outside the chamber
3. Control Unit:
 - (a) Alarm and emergency stop for interruption in cooling water supply
 - (b) Operating temperature up to 3000°C and temperature control by arc current
 - (c) Arc current for melting: ~600 A (max.) and ~350A (continuous duty)
 - (d) Individual control of current through each electrode
 - (e) A remote control unit with output power switch and control of power for each electrode
4. Water cooled crystal puller rod with seed holder and motorized elevation and rotation mechanism:
 - (a) Minimum heat transfer from seed to puller rod
 - (b) Pulling speed ~ 0.01-10 cm/hr
 - (c) Fast elevation speed ~ 5 cm/min
 - (d) Rotation speed ~2-30rpm
 - (e) Stroke ~35cm
 - (f) Limiting switches
5. Water cooled copper hearth with motorized rotation mechanism
 - (a) Sample ~6 cm diameter and ~3 cm height
 - (b) Getter ~3 cm diameter and ~ 3cm height
 - (c) Sample hearth rotation ~ 0-50 rotation/minute
 - (d) Sample hearth lift ~ 5cm
6. Facility for manipulation of the sample without breaking furnace atmosphere
7. Chamber:
 - (a) Water cooled SS chamber
 - (b) With four viewing port fitted with analyzer and polarizer glass to adjust viewing brightness of the melt
 - (c) Quote for both motorized and manual lifting of chamber
8. Pumping system with control valve, gate valve, vacuum gauge and interconnecting tubes with back filling facility for inert gas and capable of providing vacuum of the order of 10^{-6} Torr
9. CCD camera with focusing and monitor unit for remote monitoring of arc melting/crystal growth
10. All the components must be suitable for 240V AC single phase or 440V AC 3 phase.
11. Give details of cooling water requirements
12. Supply a list of customers during last 10 years. Indenter will seek feedback from existing customers. This will be critical in selecting
13. Supply list of service agents
14. Optional:
 - (a) Quote, with specifications, for water chiller appropriate to operate the tetra-arc furnace
 - (b) Quote for spare electrodes 4 nos
 - (c) Provision for addition of material without breaking furnace atmosphere is desirable
 - (d) Quote also for gas purifier unit and purity monitor