

## Cold Furnace Start-ups

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### General Heating Element Guidelines

- **1.** During initial start-up and after extended shut downs (maintenance periods, breakdowns, or holidays, Christmas Holiday Shut-Down, the control instrument may be manually controlled through the High Limit thermocouple within the element chamber. Maximum allowable increase per hour as sensed by the heating element control thermocouple should not exceed 500 F. per hour up to 1000 F, and only 100 F per hour thereafter until furnace operating temperature is obtained. Without careful control of element temperature, over-temperature conditions will occur, causing sagging, distortion, and rapid fatigue leading to melting.
- **2.** Use a high quality pyrometer, and be sure safe operating conditions are **NOT** exceeded. Make sure that the T/C's are functioning and in proper position at all times the equipment is in operation.
- **3.** Remember the greater the distance the T/C is from the element, the greater the lag time in temperature readings.
- **4.** Sometimes excessive temperature is caused by furnace control couple calling for heat too rapidly. Batch loaded furnaces with doors are the most likely type to have this condition. Controller must be set to specific rate to prevent overheating of elements.
- **5.** Turn off and secure disconnects (**LOCKOUT PROCEDURE**) for all power to the electrical devices being worked on. Wear safety glasses and insulating gloves.
- **6.** Heat generated by electric heating elements **will cause bolted terminal connections to expand and loosen. Retighten** connections after initial furnace start-ups or installation of new elements. Periodic tightening of buss bars, transformer lugs, and **element connections** will prevent downtime for equipment repair. **DO NOT** continue to operate the furnace if the terminal connectors are red hot. Tighten clamp and/clean contact.
- **7.** Proper grounding guards against shock when working on part of the system. It also prevents damage to sensitive electrical and computer equipment. We recommend ground connections be re-torqued once a year. Electrical ground connection is a **MUST**.
- **8. KEEP ELECTRICITY SAFE;** always cut power to elements before removing any safety cover. Terminal covers should be tagged **DANGER HIGH VOLTAGE**.
- **9.** Maintenance schedules for thermocouples is required for proper control of elements, we recommend they be replaced during furnace shut down for general maintenance.
- **10.** Procedures mentioned are merely recommendations to follow during installation and are not intended or implied as operating instructions regarding furnace equipment. Refer to furnace manufacturers operation manual.
- **11.** The furnace manufacturer and/or **OPERATOR** are solely responsible for handling, installation, and control of heating elements; they're cycling and furnace heat up time.

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