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**Technical Bulletin**

TB-H11-ATMI

# Heat Up Schedules

## Schedule ATM-I

This schedule is intended as a general guide applicable for field installation bake out of:

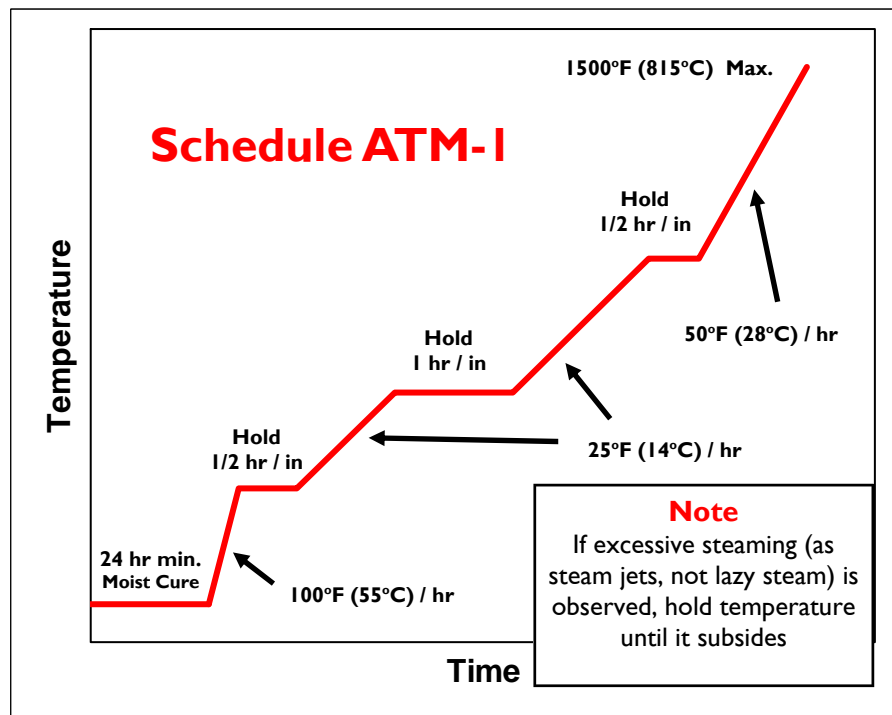
### **Plicast Al-Tuff & Plicast Al-Shield Castable Refractories Combined with Plibrico Phosphate Bonded Plastic Refractories**

#### Instructions

After the castable has moist cured 24 hrs, follow the heating rate shown on the chart to a maximum of 1500°F (815°C). The cool down rate (both initial and subsequent) and reheating rate should not exceed 200°F (110°C) per hour to minimize thermal stress. All hold times are for total refractory lining thickness.

#### Schedule ATM-I

- Ambient Moist Cure -24 hr
- Ambient to 400°F (205°C)  
@ 100°F (55°C) / hr
- Hold at 400°F (205°C)  
1/2 hr per 1 in (25mm)
- 400°F (205°C) to 650°F (345°C)  
@ 25°F (14°C) / hr
- Hold at 650°F (345°C)  
1 hr per 1 in (25mm)
- 650°F (345°C) to 1000°F (540°C)  
@ 25°F (14°C) / hr
- Hold at 1000°F (540°C)  
1/2 hr per 1 in (25mm)
- 1000°F (540°C) to 1500°F (815°C)  
@ 50°F (14°C) / hr
- Hold at 1500°F (815°C) -Max.  
1 hr per 1 in (25mm)



#### CAUTION / WARNING

This schedule assumes that heating for bake out is regulated and is applied in a controlled, uniform manner. Note that the target control temperatures are to be measured by thermocouple placement on or within 1/2 in. (12 mm) of the **hot face surface** of the refractory and must be monitored at multiple locations/areas on the refractory within the furnace/vessel. Care should be taken to not exceed the heating rates or cause excessive thermal gradients (>50°F (28°C)) throughout the furnace/vessel during bake out. The refractory during bake out must not be exposed to flame impingement or spot (radiant) heating and there should be sufficient combustion air circulation within the furnace/vessel and exhaust air venting from the furnace/vessel. This schedule also assumes that there is a path for the moisture driven through the refractory to escape the furnace/vessel such as weep holes, wicking and/or venting. Moisture driven and entrapped in the back up insulation is dangerous and may lead to spalls/explosions at elevated furnace temperatures. This is of special concern in floors/hearths. If the bake out is interrupted due to burner/power failure, care should be taken not to shock the refractory. If/when combustion is restored, the temperature in the furnace/vessel should be stabilized at the current temperature before proceeding. Heating should proceed from the point of the schedule corresponding to the current vessel temperature, not the temperature when interruption occurred. If excessive or high pressure steam is observed, at any time, hold the temperature until the steam / steam pressure subsides. Failure to take any of these parameters into account may result in lining damage or explosion. For questions, please consult your Plibrico representative or the Plibrico Technical or Engineering department.