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Technical Bulletin

TB-H11-CL

Heat Up Schedules

Schedule CL (Linear)

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

Plicast HyMOR, Plicast Super HyMOR and Plicast HyREZIST Castable Refractories

Instructions

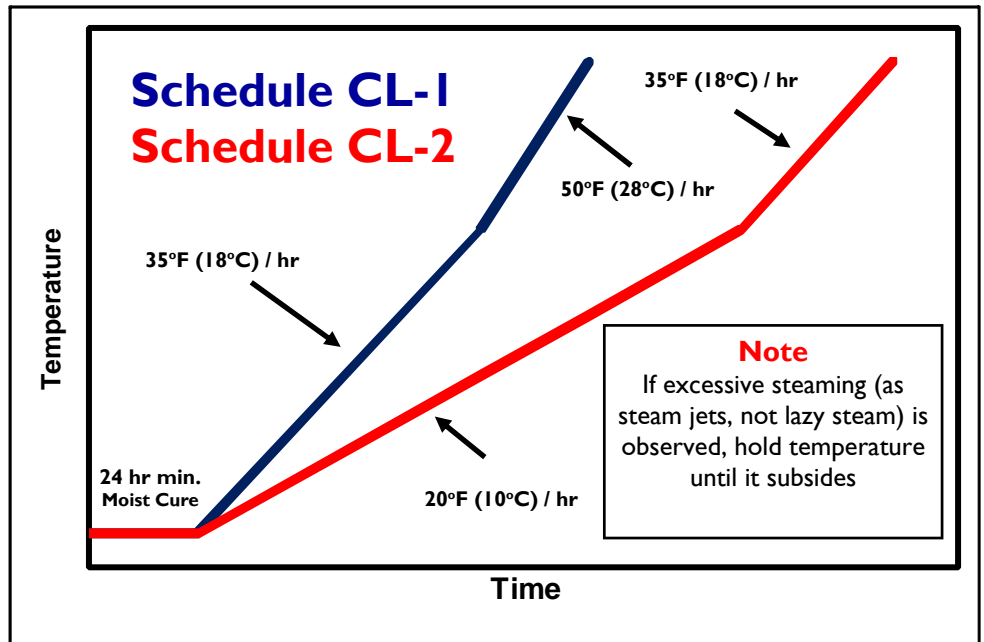
After the castable is installed, a 24 hr moist curing period is recommended. After curing, follow the heating rate shown on the chart. Use Schedule **CL-1** for *total* refractory lining thicknesses up to 12" (300mm). Use Schedule **CL-2** for *total* lining thicknesses greater than 12" (300mm). The cool down rate (both initial and subsequent) and reheating rate should not exceed 200°F (110°C) per hour to minimize thermal stress. This schedule is especially suitable for heating complex furnace arrangements where uniform heating and temperature holds in different furnace zones or areas are not achievable. The temperature ramp increase at 1000°F should be based on the furnace zone or area with **lowest measured temperature**.

Schedule CL-1

- Ambient Moist Cure -24 hr
- Ambient to 1000°F (540°C)
@ 35°F (19°C) / hr
- 1000°F (540°C) to 1500°F (815°C)
@ 50°F (28°C) / hr
- Hold at Operating
1 hr per 1 in (25mm)

Schedule CL-2

- Ambient Moist Cure -24 hr
- Ambient to 1000°F (540°C)
@ 20°F (10°C) / hr
- 1000°F (540°C) to 1500°F (815°C)
@ 35°F (19°C) / hr
- Hold at Operating
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.