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May 1, 1955

PLIBRICO SPECIFICATIONS HH-1
FOR
HORIZONTAL HEATERS

A. GENERAL

1. The refractory linings shall in general be made up of two (2) components to provide both an insulation backing and a refractory surface.
2. The insulating portion of the lining shall be made up of block insulation. The thickness of this component shall be dependent upon the hot face temperature of the refractory surface, the desired cold face shell temperature and the insulating properties of the refractory component.
3. The installation of the refractory material shall be under the direct supervision of an authorized factory representative who has been accredited by the manufacturer in writing.
4. All materials must be guaranteed to conform to these specifications as to quality and all workmanship must be guaranteed against defects for a period of one (1) year after completion.

B. REFRACTORY WALLS

1. Furnace-Radiant Zone (tube protected).

High heat duty castable refractory or high temperature insulating castable refractory, having a service temperature limit above the maximum anticipated furnace temperatures shall be used. Block insulation of suitable thickness shall be placed between the refractory material and the outside steel enclosure. The minimum refractory thickness shall be 4½".

2. Furnace-Radiant Zone (no tube protection).

High heat duty or super duty plastic refractory shall be used having a service temperature limit above the maximum anticipated furnace temperature. Block insulation of suitable thickness shall be placed between the refractory and the outside enclosure. The minimum refractory thickness shall be 8".

3. Convection Section Walls.

Moderate heat duty castable refractories shall be used for temperatures up to 1500 degrees F., and high heat duty castable refractories shall be used for temperatures above 1500 degrees F. Insulating castable refractory materials of the proper service temperature range may also be used. Block insulation of suitable thickness shall be placed between the refractory materials and the outside structure. The minimum refractory thickness shall be 4½".

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4. Floor.

The floor shall consist of 5" of No. 1 firebrick or high heat duty castable refractory placed on top of 4½" of high temperature insulating castable refractory. placed on top of 4½" of high temperature insulating castable refractory.

5. Burner Cones.

Super duty air setting plastic refractory or in cases of extreme temperature slagging conditions, 60% alumina super duty air setting plastic refractory shall be used for the burner cones.

6. Roofs -- Flat -- Furnace (radiant zone) tube protected.

High heat duty or high temperature insulating castable refractory shall be used. A minimum refractory thickness shall be 7".

7. Roof -- Flat -- Furnace (radiant zone) no tube protection.

Super duty plastic refractory or high heat duty castable refractory with suitable service temperature limits shall be used. The minimum refractory thickness will be 8".

8. Roof -- Flat -- Convection Zone.

Moderate heat duty, high heat duty, or insulating castable refractories shall be used depending upon service temperature limits of the material and anticipated temperatures. The minimum refractory thickness will be 7".

9. Bridgewalls.

The face of the bridgewall exposed to the furnace shall be 9" of high heat duty or super duty plastic refractory. The rear facing of the bridgewall shall be 7" minimum thickness of moderate heat duty castable refractory material.

C. CONSTRUCTION

1. All vertical refractory walls over 6'0" high shall be sectionally supported and securely anchored back to the exterior wall structure. All plastic refractory anchors shall provide for free movement of the refractory material both horizontally and vertically while effectively preventing its bulging away from the exterior wall structure.
2. The anchors for all castable refractory walls may be of solid or semi flexible design. Mild steel or cast iron may be used for furnace temperatures up to 2,000 degrees F. For furnace temperatures above 2000 degrees F., chrome nickel alloy anchors must be used, having an alloy content of not less than 18% chrome, and 8% nickel.
3. All anchors for plastic refractory materials shall be installed on centers not exceeding 18". For furnace temperatures up to 2000 degrees F., the plastic refractory anchors shall be constructed of cast iron.
4. For furnace temperatures exceeding 2,000 degrees F., the plastic refractory anchors shall be chrome-nickel alloy steel capable of sustaining their load at

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a maximum metal temperature of 1500 degrees F., with a factor of safety of not less than four and shall show no appreciable signs of oxidation at temperatures up to 2000 degrees F.

5. Anchors of pre-fired refractory shapes will not be acceptable for this work. All sectionally supporting fixtures for the plastic firebrick walls shall be of *chrome nickel* alloy steel having the same property as outlined above for the refractory anchors. Pre-fired refractory shapes will not be acceptable for use as sectionalizing supports. Sectionalizing supports shall be placed on centers not greater than 18" horizontally and shall be of such overall area as to be not less than 25% of the cross section area of the refractory linings which they support. Sectionalizing supports shall be spaced not more than 54" vertically. These supports shall in all cases be anchored back to the exterior wall structure in such a way as to transmit the load of the refractory back to this structure.
6. All flat arches shall be suspended from chrome-nickel alloy fixtures capable of sustaining their load at a maximum metal temperature of 1500 degrees F., with a factor of safety of four and shall show no appreciable sign of oxidation at temperatures up to 2,000 degrees F.

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