CCEWOOL Thermomax Inc.
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Metallurgical - Pusher-Type Continuous Heating Furnace

The pusher-type continuous heating furnace is a thermal equipment used to reheat initial rolling materials (such as plates, large steel billets, small steel billets) or continuous casting billets to the required temperature for hot rolling. The furnace body is typically elongated, with fixed temperature zones along its length. Steel billets are pushed into the furnace using a pusher machine, move along the furnace's bottom track, are heated, and then exit the furnace either from the furnace end or through a side wall discharge port. Depending on the thermal system, temperature control, and furnace chamber shape, heating furnaces can be classified as two-stage, three-stage, or multi-point heating furnaces. Heating furnaces are not in a completely stable condition; there are still some heat storage losses during startup, shutdown, and furnace condition adjustments. Refractory fibers have advantages such as rapid heating and cooling, sensitivity to operation, and flexibility, making them essential for computerized control production. Additionally, they can simplify furnace structure, reduce furnace weight, accelerate construction progress, and lower furnace construction costs.

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Two-Stage Pusher-Type Heating Furnace

Along the length of the furnace body, it can be divided into two stages: preheating and heating. The furnace combustion chamber is divided into the furnace-end combustion chamber and the waist combustion chamber, and coal can be used as fuel. The discharge method is lateral, and the effective length of the furnace is approximately 20,000mm, with an internal width of 3,700mm and an arch thickness of around 230mm. The furnace temperature in the preheating section ranges from 800 to 1100°C and can use CCEWOOL refractory fiber as lining material. The back insulating layer in the heating section can also use CCEWOOL refractory fiber material.

Three-Stage Pusher-Type Heating Furnace

The furnace can be divided into three temperature zones: preheating, heating, and equalizing. Typically, three heating points are provided, including upper heating, lower heating, and equalizing section heating. The preheating section uses waste flue gas as the heat source, with temperatures ranging from 850 to 950°C, not exceeding 1050°C. The heating section maintains temperatures between 1320 and 1380°C, while the equalizing section stays at 1250 to 1300°C.

Determination of Lining Material:

Based on the temperature distribution inside the heating furnace and the environmental atmosphere, as well as the high-temperature characteristics of refractory fiber products, CCEWOOL high-alumina and high-purity products are selected for the lining of the preheating section, and CCEWOOL standard and regular products are used for the backing in the heating section. In the equalizing section, CCEWOOL high-alumina and high-purity products can be used for the insulating layer.

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Lining structure:

1. Preheating section

It adopts a composite fiber lining structure that is tiled and stacked. The tiled insulation layer is made of CCEWOOL ceramic fiber blankets, welded by heat-resistant stainless steel anchors during construction, and fastened by pressing in a quick card. The stacking working layers use angle iron folding blocks or hanging modules. The top of the furnace is tiled with two layers of CCEWOOL ceramic fiber blankets, and then stacked with the fiber components in the form of a single-hole hanging anchor structure.

2. Heating section

It adopts a lining structure of tiled ceramic fiber insulation products with the CCEWOOL ceramic fiber blankets, and the thermal insulation layer of the furnace top uses CCEWOOL ceramic fiber blankets or fiberboards.

3. Hot air duct

Ceramic fiber blankets can be used for thermal insulation wrapping or lining paving.

The form of fiber lining installation arrangement:

The lining of tiled ceramic fiber blankets is to spread and straighten the ceramic fiber blankets which are supplied in a roll shape, flatly press them on the furnace wall steel plate, quickly fix them by pressing into a quick card. The stacked ceramic fiber components are arranged in the same direction in sequence along the folding direction, and the ceramic fiber blankets of the same material between different rows are folded into a U-shape to compensate for the ceramic fiber shrinkage of the folded components under high temperature; the modules are arranged in a "parquet floor" arrangement.