

## **Metallurgical industry** **- Design and Construction of Pushing Steel** **Continuous Heating Furnace**

### **Overview:**

The push-steel continuous heating furnace is a thermal equipment that reheats blooming billets (plates, large billets, small billets) or continuous casting billets to the temperature required for hot rolling. The furnace body is generally elongated, and the temperature of each section along the length of the furnace is fixed. The billet is pushed into the furnace by a pusher, and it moves along the bottom slide and slides out from the furnace end after being heated (or pushed out from the side wall outlet). According to the thermal system, the temperature system and the hearth shape, the heating furnace can be divided into two-stage, three-stage and multi-point heating. The heating furnace does not maintain a stable working condition all the time. When the furnace is turned on, shut down, or the furnace condition is adjusted, there is still a certain percentage of heat storage loss. However, ceramic fiber has the advantages of fast heating, fast cooling, operational sensitivity, and flexibility, which are important to the computer-controlled production. In addition, the structure of the furnace body can be simplified, the weight of the furnace can be reduced, the construction progress can be accelerated, and the construction costs of the furnace can be cut down.

### **Two-stage push-steel heating furnace:**

Along the length of the furnace body, the furnace is divided into preheating and

heating sections, and the furnace combustion chamber is divided into a furnace end combustion chamber and a waist combustion chamber fueled by coal. The discharging method is side discharging, the effective length of the furnace is about 20000mm, the inner width of the furnace is 3700mm, and the dome thickness is about 230mm. The furnace temperature in the preheating section of the furnace is 800~1100°C, and CCEWOOL ceramic fiber can be used as the wall lining material. The back lining of the heating section can use CCEWOOL ceramic fiber products.

### **Three-stage push-steel heating furnace:**

The furnace can be divided into three temperature zones: preheating, heating, and soaking. There are usually three heating points, namely upper heating, lower heating, and soaking zone heating. The preheating section uses waste flue gas as the heat source at the temperature of 850~950°C, not exceeding 1050°C. The temperature of the heating section is kept at 1320~1380°C, and the soaking section is kept at 1250~1300°C.

### **Determining lining materials:**

According to the temperature distribution and ambient atmosphere in the heating furnace and the characteristics of high-temp ceramic fiber products, the lining of the preheating section of the push-steel heating furnace selects CCEWOOL high-aluminum and high-purity ceramic fiber products, and the insulation lining uses CCEWOOL standard and ordinary ceramic fiber products; the soaking section can use CCEWOOL high aluminum and high purity ceramic fiber products.

### **Determining insulation thickness:**

The insulation layer's thickness of the preheating section is 220~230mm, the thickness of the insulation layer of the heating section is 40~60mm, and the

furnace top backing is 30~100mm.

## **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.