

## **Steel Industry** **- Design and construction of walking-type heating (heat treatment) furnaces**

### **Overview:**

The walking-type furnace is the preferred heating equipment for high-speed wires, bars, pipes, billets, etc., which usually consists of a preheating section, a heating section, and a soaking section. The temperature in the furnace is mostly between 1100 and 1350°C, and the fuel is mostly gas and light/heavy oil. When the furnace temperature in the heating section is lower than 1350°C and the flue gas flow rate in the furnace is less than 30m/s, it is recommended that the furnace walls above the burner and the furnace lining at the top of the furnace adopt a full-fiber structure (ceramic fiber modules or ceramic fiber spray paint structure) in order to obtain the best energy-saving insulation effects.

### **The application structure of furnace lining**

#### **Below the burner:**

Considering the corrosion by the oxide scale, the bottom of the walking-type heating furnace and the parts below the side wall burner usually adopt the lining structure of CCEWOOL ceramic fiberboards, lightweight insulation clay bricks, and castable.

### **Above the burner and at the top of the furnace:**

Considering the working conditions of the upper parts of the side wall burners on the walking-type heating furnace and combined with the lining structure design and application experience, the following structures can be adopted to achieve good technical and economic effects.

Structure 1: The structure of CCEWOOL ceramic fiber, fiber castable, and polycrystalline mullite fiber veneer blocks;

Structure 2: The insulation structure of tiled CCEWOOL ceramic fiber blankets, high aluminum modules, polycrystalline fiber veneer blocks

Structure 3: Many current walking-type furnaces adopt the structure of refractory bricks or refractory castable. However, after long term use, phenomena, such as the overheat of the furnace skin, large heat dissipation loss, and serious furnace plate deformation, often occur. The most direct and effective method for the energy-saving transformation of the furnace lining is to paste CCEWOOL fiber strips on the original furnace lining.

### **Flue:**

The flue adopts a composite lining structure of CCEWOOL 1260 ceramic fiber blankets and layers.

### **The blocking door of outlet:**

Heating furnaces where the heated parts (steel pipes, steel ingots, bars, wires, etc.) are frequently tapped generally do not have a mechanical furnace door, which can cause a large amount of radiant heat loss. For furnaces with longer

tapping intervals, the mechanical furnace door is often inconvenient to operate due to the sensitivity of the opening (lifting) mechanism.

However, a fire curtain can easily solve the above problems. The structure of the fire-blocking curtain is a composite structure with a fiber blanket sandwiched between two layers of fiber cloth. Different hot surface materials can be selected according to the temperature of the heating furnace. This product has many excellent characteristics, such as small size, light weight, simple structure, convenient installation, corrosion resistance, and stable physical and chemical properties at high temperatures. The application of this product successfully solves the defects of the original door of the heating furnace, for example, heavy structure, huge heat loss, and high maintenance rate.

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