



## **Installation of fabric expansion joint in circulating fluidized bed boiler**

Fabric expansion joint is an important part of circulating fluidized bed boiler, its installation quality has directly impact on the circulating fluidized bed boiler seal, and thus affect the safe and stable operation of the boiler, so research on fabric expansion joint Installation is very important.

### **The structure and function of fabric expansion joint**

Fabric expansion joint, also named non-metallic compensator, the main function is to absorb the relative displacement of two parts with relative displacement and two with a relative displacement between the parts of the connection channel seal.

The fabric expansion joint consists of non-metallic cover, thermal insulation part, metal flange, rib plate, bolt and stainless steel mesh, ceramic fiber rope or pillow-shaped sealing material. The cover is made of heat-resistant rubber and glass cloth. Different parts of the fabric expansion joints, there are differences in the internal structure, such as the inside of the cover and a layer of PTFE insulation film, the insulation part of the aluminum silicate fire-resistant fiber felt or rock wool ceramic fiber cloth composition insulation, insulated by the aluminum silicate fire-resistant fiber mat, and covered with glass ceramic fiber cloth. The main design parameters of fabric expansion joint :

Design pressure: 0.1 MPa

Working pressure:  $\leq 0.1$ MPa

Working temperature: 900 °C (Short time temperature resistance 1000 °C)

Working medium: high temperature flue gas

The expansion direction of the fabric expansion joint in three-dimensional direction is different due to the working position of the non-metallic expansion joint. The design of fatigue life of the fabric expansion joint is about 3000 times.





The service life of fabric expansion joint is not only concern the material, but also the sealing structure design of the furnace side of the flue gas, and this is proved on the operating boiler.

### **Storage requirements for fabric expansion joints**

The storage environment of fabric expansion joint is the same with other boiler equipment, firstly, the ground should be flat, when putting the fabric expansion joint on the ground, the bottom The bottom that mat with sleepers symmetrically, do not contact with the ground to avoid rust corrosion. About the storage of fabric expansion joint, the same type part can be stacked together, different type part can not be stacked because of the flexibility of the fabric expansion joint. Though it is fixed with steel plate and bolt, the size of the stacked parts are different and lead to the distortion, the fabric expansion joint can not be revised finally.

Fabric expansion joints are mainly made of non-metallic materials, there is no hydrophobic function under un-working storage state. So it' s better to choose warehouse for the storage of the fabric expansion joints, if there is no warehouse, there should be good rain protection facilities. About the storage of the fabric expansion joint, should pay attention to fire and away from the fire operation area, be away from a place where corrosion of metal media to prevent the skin burning and corrosion of fabric expansion joint. Most fabric expansion joints work in the state of micro-positive pressure, the leakage and perforation of the cover will affect the normal operation of the boiler.

### **Installation position of fabric expansion joints in CFB boiler**

Due to the characteristics of circulating fluidized bed boiler, several large parts have each fixed expansion center, such as the hearth, tail shaft flue, cyclone separator, so the two connected parts should be connected with expansion joint. The service life of fabric expansion joint is generally about two to three years, the





price is relatively more favourable. Now fabric expansion joint is chosen for boiler, and the fabric expansion joint is installed in the exit of boiler, the entrance of cyclone separator, the exit of cyclone separator, the flue of the exit of cyclone separator and shaft flue entrance, etc. According to the different size of boiler, the quantity of different fabric expansion joint is also different.

### **The installation requirement of the fabric expansion joint**

In the early time of the fabric expansion joint, the supplier supply the goods dispersively, because of the large size of the fabric expansion joint, and it's not convenient to transport. In the subsequent installation, the user ask for the overall delivery, so it's easy to install, but also increase the difficulty of casting refractory.

Because the stiffness of the non-metallic expansion joint is poor, the fixed part of the fabric expansion joint can not be taken off during the installation, however, it can be taken off before the trial operation and after the installation. All the parts should be lifted from the installed time. When using steel wire rope to hoist, be sure that the place where the rope is wrapped with rubber or thin iron wrapped, to avoid the steel wire burr scraping the cover of the fabric expansion joint. The T-lifting lug can also be installed on the fabric expansion joint temporarily, this method can guarantee symmetry of lifting without damaging the cover.

Fabric expansion joints can absorb the expansion of the three-dimensional direction, the adsorbed expansion value is different from the different position of installation. So finding the installed part according the drawing at first, and mark the number for each part with the oil plant. Secondly, point out the working direction of the fabric expansion joint from the drawing, since the direction of smoke flowing has been considered in the fabric expansion joint.

There is metal or non-metallic package material on the cover during the delivery. Do not take off the package material from the cover during the installation,





because it is to protect the cover of fabric expansion joint. The welding beans from slag and welding , which is with high temperature, once it falls on the cover, it will burn the cover and lead to leakage.

Fabric expansion joint should be delivered reasonably without pry, in case of the damage of the cover. After the installation, be sure that do not damage the the fabric expansion joint when take off the fixed device. When cutting the inside fixed steel plates with the gas cutting torch, the worker must cut from the fixed plate of the weld, because the fixed steel plate is below the stainless steel wire mesh, and it is easily burned. When taking off the outside fixed device, it is not allowed to cut with the gas cutting torch, because the outside is the cover, and it cannot resist the high temperature. The outside fixed device is fixed with screws and nuts, so take the wrench to take the nuts off, remove the screw, and the fabric expansion joint is in free state.

### **Inspection of fabric expansion joints before operation**

After the installation of the boiler, and before the sub-trial operation, the fabric expansion joints should be with comprehensive inspection, mainly to check whether the temporary support fixed parts removed, otherwise it will affect the normal displacement of fabric expansion joints.

Check the fabric expansion joint furnace inside the pillow-shaped sealing material and the skin is intact, to avoid high-temperature flue gas from the internal channeling, burning fabric expansion joints. Check non-metallic gasket and the bolt is tightened to prevent the high-temperature materials from the sealing surface fall on the surface of the cover to damage. After inspection without problem, the boiler is ready to operate.

Sealing is very important for circulating fluidized bed boiler, and fabric expansion joint is relatively weak in the circulating fluidized bed boiler seal , so the





installation of fabric expansion joints in the process should be strictly controlled to ensure that the Installation quality for the circulating fluidized bed boiler seal and the boiler will have a good operation.

