



Characteristics and Application of fabric expansion joint

Fabric expansion joints (fabric non-metallic expansion joints) as a kind of expansion joint, it has been in the international community for more than 30 years of history. Fabric expansion joints have some unparalleled characteristics to metal expansion joints, and the scope of its application is becoming increasingly expanded, which is one of the the expansion joints.

Characteristics of fabric expansion joints

Compared with the metal expansion joints, fabric expansion joints characteristics are: (1) Good flexibility and no impact on the equipment and system thrust, convenient for pipeline design and improvement of equipment and system security. (2) The unit length of absorption of displacement is large, which can absorb three-dimensional displacement, up to the effective length of 40%; (3) Simple to install, easy to replace, without the need for high-demand, no need to replace the lifting equipment and short required time. Meanwhile, after adaptation of pipe renovation and Pipeline foundation settlement caused by permanent misalignment in Medium or long term working. (4) Adaptability, any shape and arbitrary circumference can be made. (5) Good effect of Vibration isolation and near zero vibration transmission. (6) High temperature up to 1000°C or more. (7) Corrosion resistance, and as a result of thermal insulation measures to avoid the expansion joints on the surface of certain media condensation corrosion. (8) Soundproof and heat insulation.

The shortage of fabric expansion joints: (1) low pressure, pressure within 1 Kg . (2) Resistance to liquid medium technology is not mature.

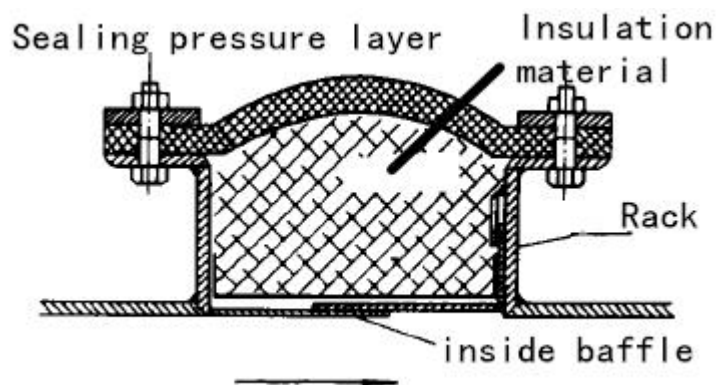
The basic structure of fabric expansion joint

According to the working conditions of fabric expansion joints, its basic structure consists of four parts (shown as the attached pic): The inside baffle (it can be





omitted some time), its role as a thermal insulation material bearing body and to avoid direct airflow scouring insulation material resulting in premature failure of fabric expansion joints; (2) Rack (it can be omitted for some structural forms and certain working conditions), on the one hand, which is associated with the smoke duct as part of fabric expansion joint, on the other hand, it is used as fixed bracket of fabric expansion joint. (3) Insulation material (medium temperature $\leq 150\text{ }^{\circ}\text{C}$ can be omitted), it is mainly isolated heat of the rumors to improve the rack and outer cover of the working conditions, at the same time, possessed noise reduction effect. (4) Sealing pressure layer (cover), its role is to seal and pressure resistance. Main structural forms of fabric expansion joint is relatively wide, which can be summarized and divided into A, B, C, D four forms from its characteristics



The structure of fabric expansion joint

1—inside baffle; 2—Rack; 3—Insulation material; 4— Sealing pressure layer

A type structure. High versatility, easy installation and replacement, good sealing performance, and large absorption displacement (axial and lateral). Two types, A2-type structure is mainly used to install the vertical pipe to prevent water corrosion at the flange.

B-type structure. Axial size is small, displacement amount absorbed per unit effective length is small. Installed in a vertical pipe at the flange is not easy to be waterlogging, and suitable for making negative pressure resistant type. At room temperature conditions, the rack can be omitted so that can reduce costs and





installation time. But the device starts frequently and the displacement of the large amount of cases, which be easy to fatigue damage. It is mainly used for the entrance and exit of draught fan. As a vibration damping device, such as for starting frequent and large displacement conditions, in order to avoid premature failure of the expansion joint, special measures should be taken.

C type structure. With a great absorption of lateral displacement and axial displacement of the capacity. At room temperature conditions, the rack can be omitted so that can reduce costs and installation time. However, it consumes more materials (expensive), large size, should not be made resistant to negative pressure type. Its sealing performance can match B type.

D-type structure. Which is a special structure, its basic characteristics and A-type structure the same, but compared with human-type structure the , installation of fabric of replacement time-consuming is too long. It is mainly used for internal replacement of non-metallic body of the occasion, which are not restricted with the surrounding space conditions reduce the workload of scaffolding system and so on.

The key research of fabric expansion joint

In recent years, Fabric expansion joints are in the direction towards high temperature and improve the life of the development. In the power industry, with the development of circulating fluidized bed boilers, the requirements of the expansion joint is higher, expansion of the circulating fluidized bed cyclone generally need to install expansion joints, and the working fluid temperature here has reached about 1000 °C . Therefore, high-temperature design of Fabric expansion joints is an important point. But the difficulty of high-temperature fabric expansion joints is less dependent on the choice of non – metallic materials (Resistant to more than 1000°C non-metallic materials is still quite a lot). The key is to take what kind of structure and make the metal frame at the lowest possible temperature. At the same time, the metal rack should take special structure to





reduce thermal stress. According to the success of the experience gained on the gas turbine, a fabric expansion joint of circulating fluidized bed has been designed and has been delivered, can be applied to metallurgical, chemical and other industries of high-temperature smoke duct.

The life of fabric expansion joints has been the focus of the majority of users. As a result of fabric expansion joints in the operation of the stress is less than the metal expansion joint. After adopting appropriate material and reasonable structure, its fatigue life should be better than the metal expansion joint. An important factor that directly affects life expectancy will be the aging of non-metallic materials, this requires further work on material selection. The specific life of the expansion joint may also have to be running time to prove. However, according to the unit on the use of non-metallic expansion joint understanding of the situation, there are many closing to metal expansion joint. Therefore, as long as the proper selection and reasonable process, fabric expansion joint life should be able to achieve the desired effect. It should be noted that the service life of fabric expansion joints and its structural design, selection, processing, installation are very closely related. Some products do not meet the expected life expectancy, most of these relate to this factors.

Application prospect of fabric expansion

As a result of fabric expansion joint has its own inherent characteristics, which are widely used increasingly in the gas turbine, thermal power, metallurgy, chemicals, building materials and other industries. Some of the equipment itself configure with non-metallic expansion joint, and will also further promote the development of fabric expansion joints. At present, the fabric expansion joints of the most popular using occasions is a large displacement at high temperature and low temperature vibration, such as gas turbine flue, circulating fluidized bed, entrance and exit of fan. In the low-temperature situations, as the fabric expansion joint benefit the design, installation, replacement. Compared with previous years, under the appropriate conditions, some design institutes, equipment





manufacturers and users select fabric expansion joints. With the fabric expansion joints put into operation and fabric expansion joints selection, design, process to further improve. The use of fabric expansion joints will be further expanded.

