



Ceramic sleeve lined pipe

The ceramic sleeves lined pipe as a whole part, and then assemble it into the steel pipe with our high-strength-temperature-resistant epoxy adhesive.

In the electric power, metallurgy, chemical industry, mining, cement, paper-making and other industries, because the conveying medium for conveying equipment wear-resistant requirements are relatively high, ordinary steel pipe cannot meet the actual use needs, which requires better wear-resistant conveying equipment.

During the pipeline transportation process, the scouring and wear of the air and powder mixture is serious, especially the elbow, because the airflow changes

the flow direction on the side of the elbow, the outer side of the elbow is worn very seriously. In view of this working condition, our company recommends the use of ceramic sleeve lined pipes.

This kind of pipeline is composed of three layers of steel parts, viscose and ceramics. The steel parts are made of 304 stainless steel pipes. The ceramics are adhered to the inner wall of the steel parts with high-strength viscose. After heating and curing, a firm anti-wear layer is formed. The temperature is below 150°C. It does not age or fall off for long-term operation in a high-quality environment. Its life span is more than 4-5 times that of ordinary pipelines.

Layer structure

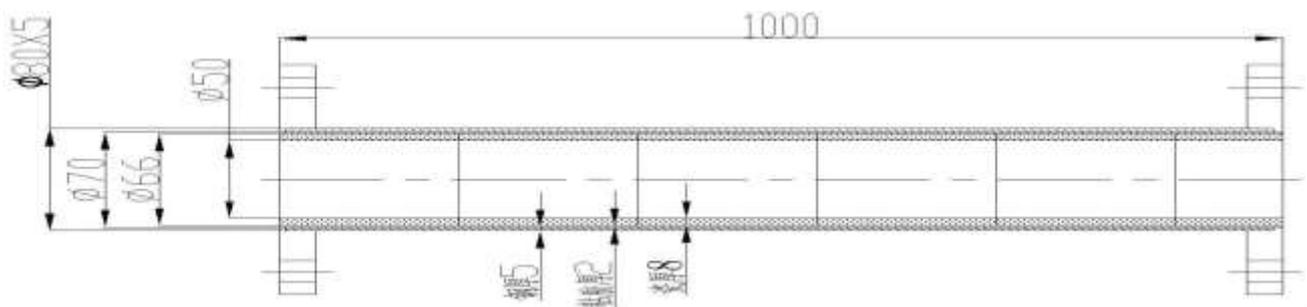
The pipe consists of three layers: smooth ceramic lining (compact corundum), ceramic and metal transition layer and the outer steel pipe.

Item	thickness	material	features
Steel tube	3-5mm	304 stainless steels	High strength, smooth inside
Viscose	2-3mm	Epoxy resin	Long-term operation at 150 °C high temperature does not age, good thermal expansion, strong adhesion
Ceramic	7-10mm	92-95% alumina ceramics	High density, super wear resistance, good toughness



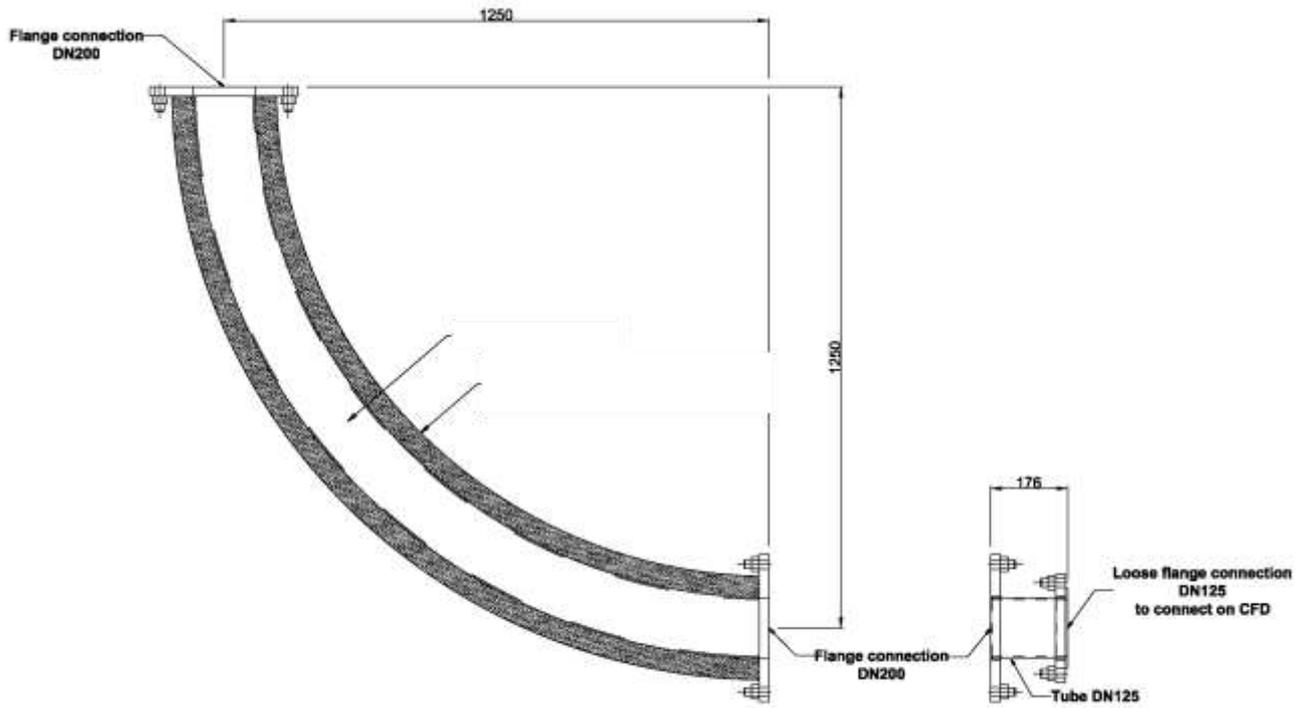


Diagram



Ceramic 8mm + steel 5mm + glue 2mm





Advantages

Advantages of wear abrasion stainless ceramic pipes 95% alumina ceramic sleeve lined pipes, elbows and t pipes have been largely applied in lithium battery material conveying system in recently years.

- **Wear resistance:** under the same conditions, it is 4-5 times more wear-resistant than ordinary pipes;
- **Corrosion resistance:** ceramic lining can resist acid and alkali corrosion;
- **Resistant to medium temperature:** It can be operated at 150°C for a long time, and the general working conditions can be satisfied;
- **The inner and outer walls are smooth, and the air flow is unobstructed:** the smooth surface allows materials to pass freely without material hanging and blocking.
- **Easy to install:** Its density is 3.6g/cm³, less than half that of steel, 1/3 lighter than ordinary pipes, easy to handle, save manpower, easier and faster to install, and can easily erect higher pipes;
- **Reduced maintenance:** super abrasion resistance greatly reduces the frequency of maintenance and saves costs and labor costs, reduce the load of support and hanger equipment and save material cost;
- **High hardness:** Rockwell hardness is HRA82-85, the hardness is second only to diamond



What is ceramic pipe sleeve?

Recently 95% alumina ceramic sleeve lined pipes, elbows and T pipes have been largely applied in lithium battery material conveying system. The main raw material of wear resistant ceramic ring is a special kind of ceramic with Al_2O_3



as the and the rare metal oxide as the flux, which is melted by high temperature at 1700 °C. The big diameter ceramic sleeve is always a big problem for the ceramic tube manufacturers since it's very difficult to control the deformation rate of the ceramic sleeve after it's sintering. Also, it will



also need an advanced and big isostatic pressing machine to do this. So, it will not only express the company's production capability, but company's technology. Right now, our factory has owned both advantages which are wear



resistant ceramic pressing facilities and technologies.



95% alumina ceramic ring



Ceramic technical index

Item	index
Alumina content	≥95%
Density	≥3.6 /cm ³
Rockwell hardness	≥82 HRA
Compressive strength	≥850 MPa
Fracture toughness K _{IC}	≥5MPa·m ^{1/2}
Bending strength	≥320MPa
Thermal Conductivity	20W/m.k
Ceramic thickness	7-10mm

Adhesive technical indicators

Item	Data
Exterior	Milky white viscous fluid
Hardness (Shore-D)	80
Shear strength (Mpa)	15
Operating temperature range (°C)	-40~150



Features

The wear-resistant ceramics produced by our company are 95 alumina ceramics, using 95% high-quality alumina powder, formed by hot die casting, and then sintered at a high temperature of 1700 degrees to form a very dense sinter, which significantly improves the resistance of alumina ceramics abrasiveness.

For the convenience of customers, are to provide a more specific process is as follows:

1. Removing rust and decontamination process of outer-layer steel pipe;
2. Must be in strict accordance with the prescribed ratio, the binder a\b accurate measurement, with how many, must be stirred evenly, full stir-mixing must not be less than 4 times, such as adding a mixture of the embedded feed should be mixed with the binder and then add the mixture to stir up not less than 3 times;
3. The binder is applied evenly on the inner wall of the steel tube to ensure the thickness is not less than 0.5mm thickness. Then apply the binder on the outer surface of the ceramic ring to ensure the thickness between the 0.5mm-1mm. Also in the ceramic ring side (with the ceramic ring contact with the corresponding surface) Daub 0.5mm Adhesive, to ensure that after the installation of the ring and the seal between the ring;



4. After the installation of the ceramic ring in place, it is necessary to repair the gap between the assembled ceramic rings and mend the joints to ensure the sealing between the ring and the ring;
5. According to the NPT standard, we process the two pipe ends of male and female thread processing. The end of the pipe processing, and processing 1x45° groove, to prevent on-site installation in the process of cutting the hands of construction workers, do a good job of safety protection measures, thread processing, need to brush oil to protect the thread;
6. After installing the ceramic ring, check the internal surface of the ceramic ring of the formation, finishing in place, cannot move the position of the pipe, because the binder is not dry, vibration is easily caused by the displacement of ceramic rings, affect the use of the effect of cold weather in winter, binder drying time is longer, need to ensure more than 48 hours.



Painting:

After the ceramic ring in the pipe is installed and the thread is processed, the dirt outside the pipe is cleaned, and the outer surface of the pipe is treated with three layers of anti-corrosive paint to meet the export requirements.





Packaging:

Pipe fittings using steel skeleton packaging, and the two ends of the pipe with plastic head, to prevent dust and rain into the pipeline inside, to ensure the beauty of the product.







List of Core values

Professional, Reliable, Efficient

SUNNY STEEL ENTERPRISE LTD.

Phone:+86 21 3378 0199

Fax:+86 21 5107 9722

E-mail:sales@sunnysteel.com

Collect steel pipes and fittings

