Fiberglass fabric coated with silicone rubber

Silicone coated fiberglass fabric is a kind of new material, which with performance of high strength and high temperature resistance, and it is widely used in electrical insulation, fabric expansion joints, etc. Silicone rubber is a linear molecular structure of high molecular weight polyorganosiloxane, the filler is white carbon black.

Characteristic of fiberglass

Fiberglass, as a kind of artificial inorganic fiber, which with some special properties compared with other fiber skeleton material.

Tensile strength and elongation

Strength of fiberglass is extremely high, more than other fibers and metals, while its modulus is very high, with good resistance to deformation, and the breaking elongation is less than 4%.

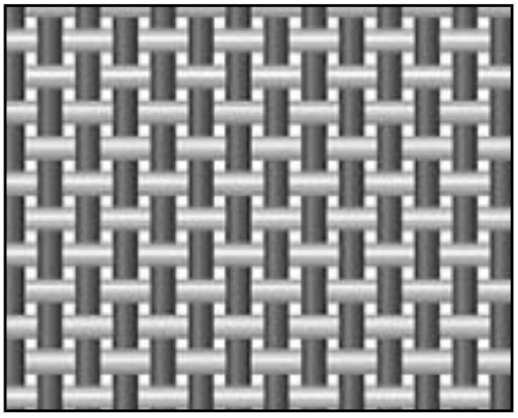
Long-term creep
In the long-term load conditions, the fiberglass does not creep, so the rubber composite products can maintain long-term performance.

Thermal stability
The melting point of fiberglass is above 1000 ℃, as a skeleton material, it can maintain stable performance in high temperature environment.

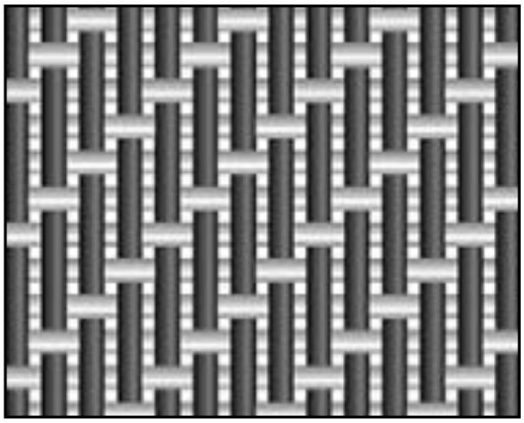
Physical and chemical stability
The main component of fiberglass Glass fiber is silicate, besides hydrofluoric acid, phosphoric acid, it is free from other acids, oils and organic solvents.

The style of fiberglass fabric
Fiberglass is treated by impregnating compound in the drawing process , and getting the softness, so it is easy to weave.

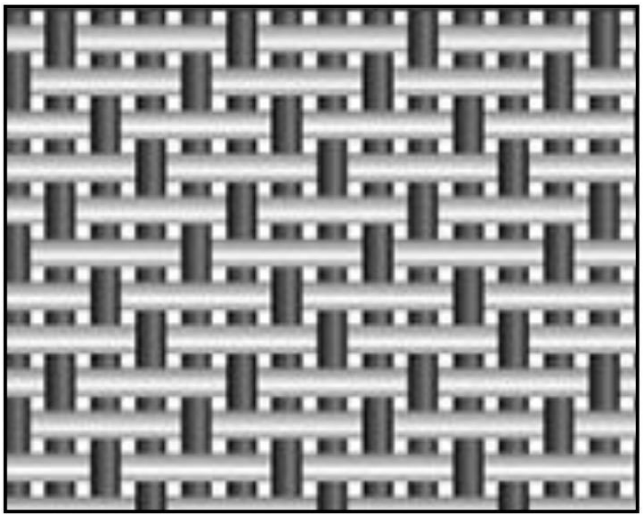
Generally, fiberglass should have certain construction to give full play to its performance. Fiberglass fabric is divided into woven fabrics and knitted fabrics. As a skeleton material, woven fabric is usually used. The basic form of woven fabric, there are three kinds:
Plain weave, warp and weft yarn every interval of a yarn on an intertwined, the fabric is firm. As shown on the below picture.



Twill weave, there are organizations on the warp point or weft point of the composition of the oblique lines, the fabric surface is twill weave which weaved by warp and weft yarn, and the fabric is with poor fastness, but the surface is soft. As shown on the below picture.

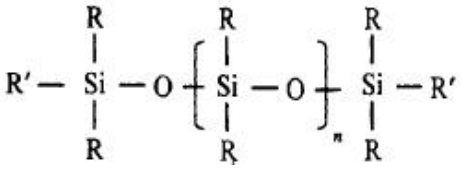


Satin weave, adjacent two separate organizations on the warp points are far, all the distribution of a single point of organization law, the fabric is smooth, full of shiny, soft texture. As shown on the below picture.



As the skeleton material, plain weave is used mostly, twill weave is also used, satin weave is used rarely.

The characteristics of silicone rubber
Silicone rubber is a linear molecular structure of high molecular weight polyorganosiloxane, the general formula is:



n represents the degree of polymerization, R' reprsents alkyl or hydroxyl, R represents methyl, R is typically methyl, ethyl, alkenyl, phenyl and trifluoropropyl groups. The introduction of the group depends on the desired properties of the silicone rubber, for example, introduction of a trifluoropropyl group in order to improve the oil resistance, and the introduction of phenylene group to improve the heat resistance.

As the polyorganosiloxane intermolecular force is small, the physical properties of the vulcanized raw rubber is poor, after adding reinforcing filler, it can improve its

physical properties greatly, such as reinforcement, the vulcanized rubber can be increased by 20 ~ 30 times. It should be stressed that the different filler quality affect the strength of silicone rubber significantly. The current main filler is white carbon black, one is obtained by the gas phase method, the other is obtained by the precipitation method, both are different in the electrical properties and thermal stability, and the quality of gas phase method white carbon black is better than precipitation method. At the same time, even with the same kind of white carbon black, the fineness of particles, the shape of particles, the size of surface area, the content of impurities and the value of different reinforcing effect and the performance of the compound and heat resistance are different. In addition, with the dosage of filler increases, the silicone rubber hardness also increases, the breaking elongation decreases, and its tensile strength has a maximum value.

Silicone coated fiberglass fabric coated with silicone rubber

From the viewpoint of the composite material, the fiberglass fabric / silicone rubber is composite material, the purpose of which is to get the physical and chemical characteristics of the composite. At present, there are two main composite technology: impregnating and calendering. Impregnation process , the solution is made of the silicone rubber with suitable dispersant, then fiberglass fabric impregnated with the silicone rubber solution, after drying and vulcanizing,

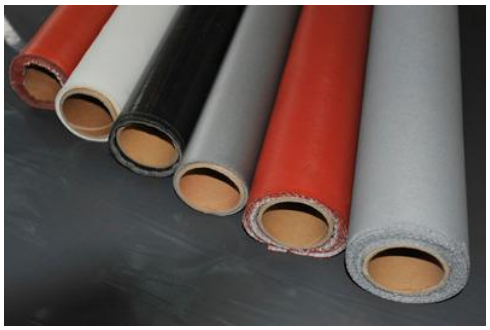
silicone rubber in the fabric surface to form a uniform and dense rubber layer, this process is for double sides coated thin fabric; the calendering process, with the calendering equipment, such as three-roll calendar, four-roll calendar, pressing the silicone rubber on the surface of fiberglass fabric directly, and vulcanizing under the action of pressure, The process is suitable for single or double-side coating treatment. No matter what kind of composite process, it is important that how both the glass fiber fabric and the silicone rubber can be well affinized. From a microscopic point of view, silicone rubber can spread out in the fiberglass surface, and the fiberglass fabric has good wetting property. To solve this problem, silicone rubber's physical adsorption on the surface of glass fiber should be much higher than the cohesion and strength of silicone rubber so on the one hand , is to reduce the cohesion strength of silicone rubber, that is, using appropriate dispersant organosiloxane molecules make the interaction weakened; On the other hand, strengthening the physical adsorption of silicone rubber and fiberglass surface, and using the coupling reagent (KH-550, KH560, KH-570 and KH-580, etc.) during the glass fiber drawing process. Forming an intermediate layer in the silicone rubber surface and the fiberglass, the intermediate layer is to get adhesion on the fiberglass surface, but also "tight" silicone rubber structure, so it is not prone to stratification, and it is better to solve the this problem.

Fiberglass fabric/ silicone rubber products application

Fiberglass/ silicone rubber products is a new kind of composite material, the rapid development of basic annual growth rate is 15% , mainly used in the following areas:

Electrical insulation

Silicone rubber coated fiberglass membrane material, with high electrical insulation level, and it can withstand high voltage load, can be made into insulating cloth and sleeving and other products.



(silicone rubber insulation fabric)

(silicone sleeving)

Fabric expansion joints

Fabric expansion joints, as a flexible connecting device, it can solve the thermal expansion and contraction of the pipeline damage, silicone rubber coated fiberglass membrane structure material as the substrate of flexible expansion joint , has a high temperature, corrosion resistance, anti-aging properties, and excellent flexibility and flexibility. Has been widely used in petroleum, chemical, cement, steel and energy and other fields, and has achieved good results.

Anti-corrosion

Silicone rubber coated fiberglass can be used as Inside and outside the coating of pipelines and storage tanks, with excellent performance, high temperature performance and high strength, it is an ideal anti-corrosion materials.

Other fields

Silicone rubber coated fiberglass membrane structural materials can be used in construction sealing materials, high temperature anti-corrosion conveyor belt and packaging materials and other fields.

If you want to know more about the product information, please fell free to contact us, silicone_cloth@outlook.com, we have a dedicated technical engineers to answer your questions, and we provide free sample service.