



## Application analysis of PTFE coating

Fluorine resin coating was born as early as 1938, the earliest fluorine carbon coating is Dupont Teflon coating that is PTFE copolymer, this kind of material has unique excellent heat resistance, low temperature resistance, self-lubrication and chemical stability, etc., but this kind of coating requires a very high liquefaction temperature when used, the dispersion of the pigment is also poor, so the initial application range is narrow.

The properties of PTFE coating

**Non-stick:** Almost all of the material is not adhesive with its coating. Thin film also shows good non-sticking property.

**Heat resistance:** With excellent heat resistance and low temperature resistant characteristics. Resistant to high temperature to 300 °C in short time, generally between 240 °C ~ 260 °C can be used continuously, has significant thermal stability, it can work under freezing temperature and not brittle, not melt at high temperature.

**Sliding:** Low coefficient of friction. The friction coefficient changes when the load is sliding, but numerical only between 0.05 to 0.15.

**Moisture resistance:** Non-stick water and oil, it is also not easy to dip solution in production operation, if stick a small amount of dirt, very easy to clean with simple wipe. Short downtime, can save time and improve the work efficiency.

**Abrasion resistance:** Under high load, it has excellent abrasion resistance. Under a certain load, it has the dual advantages of abrasion resistance and non-adhesive.

**Corrosion resistance:** Almost not affected by drugs, can protect the parts from chemical corrosion.

The types of PTFE coating

PTFE coating is divided into several basic types of PTFE, FEP, PFA, ETFE:

**PTFE:** PTFE (polytetrafluoroethylene) non-stick coating can be used in 260 °C, maximum operating temperature is 290-300 °C, low friction coefficient, good abrasion resistance and excellent chemical stability.

**FEP:** FEP (fluorinated ethylene propylene copolymer) non-stick coating melt flow form non-porous membrane when baking, has excellent chemical stability, excellent non-stick properties.

**PFA:** PFA (fluorine alkylate) non-stick coating and FEP melt flow form non-porous membrane during baking. PFA has the advantage of continuous temperature 260 °C, has higher stronger toughness, especially suitable for use under the condition of high temperature resistant glue and chemical resistance field.

**ETFE:** ETFE is an ethylene copolymer about ethylene and tetrafluoroethylene, the resin





is the most tough fluorine polymer, can form a layer of highly durable coating has excellent chemical resistance, and can work continuously under 150 °C.

#### The applications of PTFE coating

Because PTFE coating has the above excellent performance, it has been used in non-stick pan, aviation, medical and other fields. Waterborne coatings are used in laser printers, such as fuser films. The coating on fuser film has good high temperature resistance, which is installed on the heating component, working temperature can reach 200 °C. Due to its surface tension generally only 31 ~ 34 dyne/cm, low surface energy, the contact angle is large, adhesive does not sufficiently wet the coating, thus cannot very good adhesion, so the coating with excellent non-stick properties, not easy to stick carbon powder, non stick dust scale, anti-fouling is good. PTFE coating swelling and dissolving are more difficult than an amorphous polymer, due to good chemical stability, it has excellent anti-corrosion property, good chemical inertness, paint film, acid, alkali, salt and other chemicals and a variety of chemical solvents, provide protection barrier for base material; Paint film surface toughness, high strength; Coating wear-resisting performance is excellent, print number of ordinary paper generally in more than 50000 pcs; Additionally, waterborne PTFE coating is a kind of environmental protection coating, less pollution to the environment and coating equipment easy to clean, the general defects such as impurities can be identified before baking and re-processing, to a certain extent improve product qualification rate; The pigment dispersion performance of waterborne PTFE coating is poor than solvent-based coating, easy to produce stratification; This type of coating baking temperature is higher, baking surface temperature is generally 360 ~ 400 °C. Because of PTFE high melting point, it need to introduce better affinity resin, on the basis of performance does not harm the resin itself to improve its adhesion, therefore appeared in the paint, coatings, primer, also have a paint. These varieties of form a complete set of coating is solved the above problems.

Appear on the market of coating with PTFE resin, it has excellent non-sticky, corrosion resistance, weathering resistance, low friction performance. Meanwhile, because of the existence of the hydrocarbon chain hydrocarbon composition of different functional groups and show some solubility, crosslinking, wetting, adhesion and flow property, it's important that it overcome the performance before cannot be cured at room temperature, therefore, it can be used as the preparation of building exterior wall coating resin. It is weather-resistant and self-cleaning when applied, and has a long life and does not fade and so on; At the same time it also apply to the anti corrosion of metal components, especially suitable for harsh





environment under the condition of acid and alkali resistant and corrosion resistant coating and various transport antioxidant tool shell coating, such as cars. Automobile industry has entered the stage of total higher steady development. Such kind of coatings in the automotive industry a wide range of applications, not only can provide more excellent performance, can also through modification, the measure such as recycling waste paint in a certain extent, reduce the pollutant emissions, reduce the pollution of the environment. Car sales are a fluorine resin paint in recent years, the excellent properties of PTFE resin is more and more cars make people attention, fully embodies its huge potential use value.

PTFE coating has been drawn increasingly attention by people, it is widely used in petroleum, chemical, mechanical, aviation, aerospace, nonferrous metals, electronics and other economic construction. In recent years, people through its modification, to broaden its scope of application, reducing the use of restrictions. Because of its non-stick, high and low temperature resistance and resistance to friction and corrosion, I believe that in the near future, it can be more extensive in the field play a more amazing role.

