

General information of Coating

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What is Electroless Nickel Plating?

Electroless plating is the process of using an auto-catalytic chemical reaction to deposit a coating onto a wide range of substrates. Electroless nickel plating actually uses a solution that is a nickel phosphorous alloy and the plating solution composition can be tailored to suit a particular application.

It differs from traditional electroplating, as an electric current is not passed through either the component nor plating solution, in order to form a plated deposit.

Electroless nickel can be applied to wide range of substrates, aluminium and aluminium alloys, copper and copper alloys, ferrous and stainless metals, beryllium copper, zinc and titanium.

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Electroless plating is increasingly preferred over conventional electrolytic plating because of the uniformity of its deposit. It provides a highly accurate layer with no deviation in plating depth over the entire surface of a component, regardless of the complexity of its design. Components plated in electroless nickel possess an excellent combination of wear resistance, corrosion and chemical resistance.

How does Electroless Plating work?

Electroless nickel plating actually uses a solution that is a nickel phosphorous alloy and the plating solution composition can be tailored to suit a particular application.

High phosphorous electroless nickel offers a pore free barrier coating that protects the underlying substrate form attack and offers outstanding chemical resistance and corrosion protection.

Medium phosphorous electroless nickel is used where corrosion resistance is required in combination with wear resistance. The deposit can be post heat treated to provide hardness of deposit to a maximum of 1100Hv.

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Key Properties of Electroless Plating

- Corrosion Resistance
- Wear Resistance
- Uniform Deposit
- Hardness

What is PTFE ?

Polytetrafluoroethylene (PTFE) is a synthetic fluoropolymer containing numerous applications. [PTFE coating](#) has a very low coefficient of friction and is used as a [non stick coating](#) in various applications. It is also said to be a non reactive coating and hence, it is used in containers, pipe work for reactive and corrosive chemicals.

PTFE is a fluorocarbon solid. PTFE is available in aqueous based form. It is a high molecular weight compound consisting of carbon and fluorine. If PTFE is used as a lubricant, it can reduce friction, wear and energy consumption of machinery.

PTFE is a white solid at room temperature with a density of about 2.2g/cm square. The coefficient friction of plastics is usually 0.1 or less. It is known as the second lowest coefficient friction of solid materials. PTFE has excellent dielectric properties. It is truly ideal at high radio frequencies.

[PTFE coatings](#) and its variants have become a solution for many problems that are associated with modern manufacturing and material handling. PTFE coatings are ideal for food processing, food packaging, chemical protection and can also be used as a dry lubricant in place of oils. The ideal performance of PTFE coating will depends on its grade selection.

[PTFE industrial coatings](#) can be applied to steel, alloy, brass aluminum and some special materials like Inconel. For perfect adhesion, the substrate required abrading to secure a good bond between the PTFE and the material.

PTFE coated materials have the highest operating temperature of any fluoropolymer and can be operated at 260°C.

[PTFE coatings](#) can be used in a wide range of industries including electrical, mechanical, food processing, food packaging industries and even for some scientific and marine applications.

What is PFA?

PFA is abbreviated as **Perfluoroalkoxy Polymer Resin** is a type of fluoropolymer with the properties almost similar to that of Polytetrafluoroethylene (PTFE). But it is melted using conventional injection molding and screw extrusion techniques. [PFA coatings](#) share the useful properties of PTFE as coefficient of friction and non reactivity

but are easily formable.

PFA offer similar properties to that of FEP but is considered more of a premium resin. PFA coating is ideal when extended services are required in hostile environments involving chemical, thermal and mechanical stress.

Properties of PFA :

- High melting strength
- Stability at high processing temperatures
- Excellent crack resistance
- Excellent stress resistance
- Low coefficient of friction
- More than 10 times flex life of FEP

PFA coating is not degraded by systems that are commonly encountered in chemical processes. It is inert to strong mineral acids, inorganic bases, inorganic oxidizing agents, salty solutions including some organic compounds as organic acids, anhydrides, aromatics, aliphatic hydrocarbons, alcohols, aldehydes, esters, ethers, chloro carbons, fluorocarbons and some combinations of the above.

PFA coatings that are applied on carbon steel or stainless steel have a continuous service temperature ranging between -60°F to 400°F. A primer is compulsory before applying the PFA coating. There is a little bit of drawback for PFA coatings, if ones damaged, they cannot be repaired. Heat is required to cure the coating.

Electroless Nickel PTFE - The Niflor process

The Electroless Nickel PTFE coating was developed for customers who needed a hard, yet lubricous, uniform coating which would be accurately deposited. Sub micron particles of PTFE are added to the plating solution and are co-deposited with the electroless nickel; this ensures an even distribution of the PTFE particles throughout the plated layer. The amount of PTFE can be varied in the solution to give the performance characteristics required depending on the final application of the plated component. PTFE coating uses the electroless application method as conventional electroless nickel plating and therefore offers the advantages of highly accurate, uniform deposits available for a wide range of substrates.

Electroless Nickel / PTFE composite offers a coating which combines the low friction, release properties of PTFE with the functional wear resistant hardness of electroless nickel. The PTFE coatings self-lubricating properties make it an ideal surface treatment for components and assemblies that cannot use conventional lubricants.

*** The Above Data is compiled by Technical Team of Everest Blower Systems.