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Fluoropolymer Coatings

PTFE * FEP * ETFE * PVDF * PFA * ECTFE * Microceratuff Coating

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Powder Coating

Powder Coating is a beautiful, tough, flexible, extremely durable finish we can apply to almost any part, able to withstand the baking process ranging in temperature from 135°C to 470°C. we offer over 675 different colours and four basic types of powder from which to choose.

Powder coating is a type of coating that is applied as a free-flowing, dry powder. The main difference between a conventional liquid paint and a powder coating is that the powder coating does not require a solvent to keep the binder and filler parts in a liquid suspension form. The coating is typically applied electrostatically and is then cured under heat to allow it to flow and form a "skin". The powder may be a thermoplastic or a thermoset polymer. It is usually used to create a hard finish that is tougher than conventional paint. Powder coating is mainly used for coating of metals, such as household appliances, aluminium extrusions, and automobile and bicycle parts. Newer technologies allow other materials, such as MDF (medium-density fibreboard), to be powder coated using different methods.

We are equipped to furnish you the finest powder coating service on appliances, Roll bars, Running Boards, Furniture, Equipments etc.

There are several advantages of powder coating over conventional liquid coatings:

1. Powder coatings emit zero or near zero volatile organic compounds (VOC).
2. Powder coatings can produce much thicker coatings than conventional liquid coatings without running or sagging.
3. Powder coating overspray can be recycled and thus it is possible to achieve nearly 100% use of the coating.
4. Powder coating production lines produce less hazardous waste than conventional liquid coatings.
5. Capital equipment and operating costs for a powder line are generally less than for conventional liquid lines.
6. Powder coated items generally have fewer appearance differences between horizontally coated surfaces and vertically coated surfaces than liquid coated items.
7. A wide range of specialty effects is easily accomplished which would be impossible to achieve with other coating processes.

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Fluoropolymer Coatings

Fluoropolymer coatings are blends of high performance resins and Fluoropolymer lubricants. Most of the useful properties of Fluoropolymer are due to fluorine, the most electro-negative element and the most reactive non- metal. Its atomic radius is the smallest next to hydrogen, and it forms extremely strong bonds with other elements. When reacted with Carbon in Fluoropolymer, the extremely strong, tight bond produces an extraordinary combination of properties. These single coat thin films provide excellent corrosion and chemical resistance. Other benefits of Fluoropolymer coatings include reduced friction, resistance to galling, non stick, non wetting, electrical resistance and abrasion resistance. Fluoropolymer coatings are applied to fasteners and various OEM components to provide a longer life before replacement

Advantages of Fluoropolymer Coatings

Chemical Resistance : Exhibits excellent chemical resistance even under stress and is stable against most chemicals.

Electrical Properties : Exhibits excellent insulation and stable dielectric properties at a wide range of temperatures.

Heat Resistance : Can be used within a wide temperature range.

High Weather Resistance : No deterioration or change in properties as a result of direct sunlight, wing and rain or exposure to exhaust gases. Suitable for outdoor use over long periods.

Non-flammability/Safety : Meets UL specification 94V-0 and is odourless and non-toxic.

Non-Stick : Suitable for a wide range of applications.

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Polytetrafluoro Ethylene (PTFE) Coatings

PTFE (Polytetrafluoro Ethylene) **coatings** are two-coat (primer/topcoat) systems that has a successful application as non-stick coatings. PTFE non-stick coated products has highest operating temperature among any fluoropolymer, very low coefficient of friction, excellent abrasion resistance, and great chemical resistance. PTFE coatings can withstand a maximum of 600°F. The surface has a high lubricity property. PTFE coating is typically applied to a thickness of 1-2 mils.

Benefits of PTFE Coating:

1. **PTFE coating** is an ideal non-stick surface that makes your product a more convenient choice. PTFE coating is very effective and prevents frustrating sticking which is common in cooking products. Some consumers looks specifically for a non-stick **PTFE coating**, which makes your product even more appealing.
2. PTFE coating is **heat** and **water resistant**. The surface is easy to clean and water does not cause the industrial coating to become saturated. In most cases, the surface can be quickly wiped clean or even rinsed to remove any remaining debris in seconds. **PTFE coating** can also withstand temperatures of up to 600 °F (or 260 °C). This makes **PTFE Coating** great choice for a number of heat intensive applications.
3. Chemical resistance is a concern for some products. **PTFE coatings** are not affected by most chemicals found in its environment. If you are concerned about chemical contact, **PTFE is an excellent choice**.
4. The right coating can help your product exceed customer expectations, whether you sell directly to consumers or create parts and equipment for businesses and organizations. The most important step is choosing a product that will enhance your parts at an economical price. You can enhance the properties and capabilities of your parts and products with the help of a quality **PTFE coating**.

PTFE coating is available in aqueous based forms. PTFE coatings can provide the solution to many engineering questions particularly those relating to **non-stick** (release), low friction, chemical resistance and wear resistance, there are many other solutions that can be resolved by the application of **PTFE coatings.**

PHYSICAL	
Density (g/cm^3)	2.16
Water Absorption, 24 hrs (%)	< 0.01
MECHANICAL	
Tensile Strength (psi)	3,900
Tensile Elongation at Break (%)	300
Flexural Strength (psi)	No break
Folding Endurance (cycles)	> 10^6
Flexural Modulus (psi)	72,000
Hardness, Shore D	D50
IZOD Notched Impact (ft-lb/in)	3.5
THERMAL	
Melting Temp (°F / °C)	635 / 335
Max Operating Temp (°F / °C)	500 / 260
Flammability Rating	V-0
ELECTRICAL	
Dielectric Constant at 1 MHz	2.1
Dissipation Factor at 1 MHz	< 0.0002
Arc Resistance (sec)	< 300
Volume Resistivity (ohm-cm)at 50% RH	> 10^{18}

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PTFE COATED STUDS, BOLTS AND NUTS

PTFE coated fastener's provides great corrosion resistance, very low coefficient of friction, consistent tensioning and ease of installation and removal. Extensive testing and field use have proven that the future of coated fastener's lies with Fluoropolymer coatings. Previously hot dip, galvanized, cadium or zinc plated fastener's were considered the standard. But these coatings could not stand up to the corrosive atmospheres prevalent in many industries. The most widely used application is on B7 studs with 2H nuts.

Dramatic improvements in efficiency, life expectancy and corrosion resistance are claimed to be imparted to Nut and Bolt connectors by the application of a low friction PTFE coating. PTFE coated connectors have out-performed all others in aggressive any noticeable effect.

Technical Specifications

Use Temperatures	Working temp. range up to + 260°C
Corrosioin Resistance	Salt Spray (ASTM B117) up to 3,000 hrs (Nuts not frozen)
Pencil Hardness	5H – 6H (ASTM D3363-92A)
Kinetic Friction Coefficient	0.06 – 0.08
Thickness	Nominal 0.001" (1 mil)
Impact	160 in lb (ASTM D2794-93)
Adhesion	5B (ASTM D3359-95)
Elongation	35%-50%
Tensile Strength	4,000 psi
Operating Pressure	Up to 100,000 psi

PTFE coating on fastener's will have a uniform thickness of 20 ± 5 microns to 45± 5 microns thick.

Why to Coat Bolts with PTFE Coatings?

1. Cleaning and painting of bare steel bolts in the field is likely to be difficult, expensive, and in some cases, not feasible.
2. The plain bolts, after stuffing in the holes, are expected to sit out in the weather for an extended period of time and get dried out and rusty, making correct tightening difficult or impossible.
3. Release or retightening of the bolt within the foreseeable future is necessary.
4. Due to its unique benefits, Fluoropolymer Coating has been applied to various types and grades of fasteners. The water works industry takes advantage of the superior corrosion resistance properties by coating Hex-head bolts for underground service. Stainless steel fasteners, used in many different industries, are coated for lubricity and anti-galling.
5. Fluoropolymer coatings are extremely durable and not easily removed. However, during assembly of fasteners in the field, the coating can sometimes be damaged. With most other fluoropolymer coatings, this results in exposed bare metal that quickly begins to show corrosion and causes the coating to fail. Our metallic base coat ensures superior corrosion resistance and continues to provide protection even under the harshest conditions.

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FOOD GRADE COATING'S

Food grade coatings is of great advantage for industries where non-stick property is main criteria. Because of Non-stick properties, chemical powders do not stick to the tray. It is widely used in chemical, pharmaceutical industries and Consumer goods like cooking utensils.

Thickness **:** 25 to 100 Microns

Working Temp. **:** upto +250 °C

ROLLER COATING'S

This industrial grade of coatings are widely used in plastic industries, Textile Drying Rollers, and has excellent non-stick properties.

Thickness **:** 25 to 100 Microns

Working Temp. **:** from -50 C to +250 C

PTFE BONDED METALS PARTS

We can bond **PTFE** on any vessel or any plain plate of various sizes, with the thickness range of 0.2 mm to 6 mm. We do **PTFE** bonding also as per the customer's specifications.

Our **PTFE** bonding is backed by our **Test Certificate** for our customers satisfaction.

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Fluorinated Ethylene Propylene (FEP) Coatings

FEP (fluorinated ethylene propylene) is a copolymer of hexafluoropropylene and tetrafluoroethylene. FEP non-stick coatings provide smooth non-porous films. Because the coating is non-porous, FEP is chemically inert and has very low dielectric constant over a wide frequency range. FEP possesses high degree of stress crack resistance, very low coefficient of friction, exceptional dielectric properties, good heat resistance, retention of its properties at 400°F (204°C) with useful properties at -454°F (-270°C).

FEP has high transparency (with good transmittance of Ultraviolet and visible wavelengths.) It has long term weatherability and excellent resistance to ozone, sunlight and weather. FEP offers the lowest refractive index of all thermoplastics with low light reflection (the same as water.)

This coating is typically applied to a thickness of 1-2 mils.

PHYSICAL	
Density (g/cm³)	2.15
Water Absorption, 24 hrs (%)	< 0.01
MECHANICAL	
Tensile Strength (psi)	3,400
Tensile Elongation at Break (%)	325
Flexural Strength (psi)	No break
Folding Endurance (cycles)	5-80 x 10^3
Flexural Modulus (psi)	85,000
Hardness, Shore D	D56
IZOD Notched Impact (ft-lb/in)	--
THERMAL	
Melting Temp (°F / °C)	500 / 260
Max Operating Temp (°F / °C)	400 / 204
Flammability Rating	V-0
ELECTRICAL	
Dielectric Constant at 1 MHz	2.1
Dissipation Factor at 1 MHz	< 0.0007
Arc Resistance (sec)	< 300
Volume Resistivity (ohm-cm)at 50% RH	> 10^{18}

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Ethylene Tetrafluoroethylene (ETFE) Coatings

ETFE (ethylene tetrafluoroethylene) is a thermoplastic Fluoropolymer. ETFE was designed to have high corrosion resistance and strength over a wide temperature range. ETFE has a very high melting temperature, excellent chemical, electrical and high energy radiation resistance properties. ETFE has electrical properties and chemical resistance comparable to those of typical fluoropolymers such as polytetrafluoroethylene (PTFE) and tetrafluoroethylene-hexafluoropropylene copolymer (FEP), yet at the same time is characterized by improved mechanical properties and outstanding process ability.

ETFE film is self-cleaning (due to its nonstick surface) and recyclable. It is mostly used for roofs. In sheet form as commonly employed for architecture, it is able to stretch to three times its length without loss of elasticity. Employing heat welding, tears can be repaired with a patch or multiple sheets assembled into larger panels.

ETFE has an approximate tensile strength of 42 N/mm² (6100 psi), with a working temperature range of 89 K to 423 K (-185 °C to 150 °C or -300 °F to 300 °F).

Used widely in chemical industries. ETFE has excellent chemical resistance and can operate continuously at 149°C/300°F. This resin is the toughest of the fluoropolymers and can be applied at film builds up to 1 mm.

ETFE coating can replace glass lining for chemical processing vessel.

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Perfluoroalcoxy (PFA) Coatings

PFA (perfluoroalcoxy) is used extensively in the Chemical and Process Industry (CPI) due to its virtually universal chemical resistance even at high temperatures. PFA coating is virtually inert to chemicals even at elevated temperatures and pressures. They are not attacked by inorganic basis, strong minerals acids and inorganic oxidizing agents commonly used in the chemical industry. Moreover, they are not subject to chemical attack and will not demonstrate particle generation over time. PFA (perfluoroalkoxy) non-stick coating melt and flow during baking to provide non-porous films. PFA offers the additional benefits of higher continuous use temperature 260°C/500°F, film thickness up to 40 mils, and greater toughness than PTFE or FEP. This combination of properties makes PFA an excellent choice for a wide variety of uses Specific applications including protective coatings for pumps, valves, pipes scrubbing towers, reactors and heat exchangers.

PFA offers high melt strength, stability at high processing temperatures, excellent crack and stress resistance, a low coefficient of friction, and more than 10 times the Flex life of FEP.

It has high resistance to creep and retention of properties after service at 500°F (260°C), with useful properties at -320°F (-95°C).

PHYSICAL	
Density (g/cm³)	2.15
Water Absorption, 24 hrs (%)	< 0.03
MECHANICAL	
Tensile Strength (psi)	3,600
Tensile Elongation at Break (%)	300
Flexural Strength (psi)	No break
Folding Endurance (cycles)	5-500 x 10^3
Flexural Modulus (psi)	85,000
Hardness, Shore D	D60
IZOD Notched Impact (ft-lb/in)	--
THERMAL	
Melting Temp (°F / °C)	582 / 305
Max Operating Temp (°F / °C)	500 / 260
Flammability Rating	V-0
ELECTRICAL	
Dielectric Constant at 1 MHz	2.1
Dissipation Factor at 1 MHz	< 0.0001
Arc Resistance (sec)	< 180
Volume Resistivity (ohm-cm)at 50% RH	> 10^{18}

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Ethylene and Chlorotrifluoroethylene (ECTFE) Coatings

ECTFE is a melt-processable fluropolymer with a 1:1 alternating copolymer structure of ethylene and chlorotrifluoroethylene. ECTFE coatings have a unique combination of properties which includes excellent chemical resistance, good electrical properties, a broad-use temperature range, outstanding abrasion resistance, and excellent impact strength.

ECTFE Coatings resist a wide variety of corrosive chemicals and organic solvents, including strong acids, chlorine, and aqueous caustics.

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Microceratuff Coating

Microceratuff is a special process that provides extended life to metallic surfaces, If is designed for ultimate performance in high corrosion and high wear applications. Microceratuff impregnation improves the characteristics of metallic surfaces by increasing Lubricity while also reducing both Friction and Corrosion. The coated surface is extremely smooth to reduce friction, it is non-wettable and corrosion protection is significantly extended. The Wear Life of components is thus, increased by a significant amount. The use of Microceratuff increases performance and gives you the competitive edge.

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Typical Application for Fluoropolymer Coatings

1. Agitators
2. Bafffles
3. Coating Pans
4. Centrifuges
5. Coat Tanks
6. Column Sections
7. Conical Blenders
8. Conveyers
9. Cookers
10. Covers
11. Dip Tanks
12. Dip Pipes
13. Distillation Columns
14. Dryers
15. Dryer Trays
16. Drum Filters
17. Electrolytic Cells
18. Extension Pieces
19. Fans
20. Filter Housings
21. Fittings
22. Feeders
23. Flush Outlet Valves
24. Vessels
25. Heat Exchanger Coils
26. Hoppers
27. Bellows
28. Dip Tubes
29. Ducts
30. Fume Hoods
31. Gas Cylinders
32. Piping Systems
33. Plating Equipments
34. Probes
35. Impellers
36. ISO Containers
37. Kettles
38. Knockout Pots
39. Man way Covers
40. Mist Eliminators
41. Mixers
42. Mixing Equipment
43. Molds
44. Pipe Works
45. Pressure Filters
46. Protector Rings
47. Pumps
48. Reactor Vessels
49. Rollers
50. Rounders
51. Reducing Flanges
52. Scrubber Sections
53. Storage Tanks
54. Thermo Wells
55. Trays
56. Vaccum Filters
57. Valves
58. Venturis
59. Spargers
60. Storage Vessels
61. Tanks
62. Blenders