ETFE
Powder
C&F

Techyours™
Industrial Coatings

Description

Everflon™ Ethylene tetrafluoroethylene (ETFE) is a thermoplastic copolymer derived from the polymerization of ethylene and tetrafluoroethylene monomers. These materials are extremely tough and abrasion-resistant having excellent chemical resistance and continuous operating temperatures up to 150°C (300°F). ETFE is also an excellent electrical insulator and has good nonstick and lowfriction properties.

Techyours™ high-build JP40 ETFE coating represents a new, improved formulation of ETFE resin. Using appropriate product combinations, coating systems are now available for use in a wide variety of applications ranging from thin-film systems (75–250 µm [3–10 mil]) for service involving abrasion resistance or mild chemical service, to thick-film systems (up to 2000 µm [80 mil]) for linings where excellent chemical protection is required. Thick-film ETFE coatings have been improved for application in thicker films per coat. The application technique involves a spray-and-bake procedure whereby multiple coats, sprayed and baked individually, are used to achieve the desired final film thickness. The resulting finish is tough, seamless, and without pinholes—perfect for applications in harsh chemical environments. The relative chemical inertness of ETFE also makes it ideal for applications where maintaining product purity is critical.

Features of Techyours™ ETFE JP40 coating powder

Based on a modified ETFE (Ethylene-tetrafluoroethylene), Techyours™ETFE is designed to give uniform thick or thin, film coatings. Techyours™ ETFE coating should be considered for a broad range of applications where the high performance thermal, chemical or electrical properties of a fluoropolymer with outstanding mechanical toughness are needed.

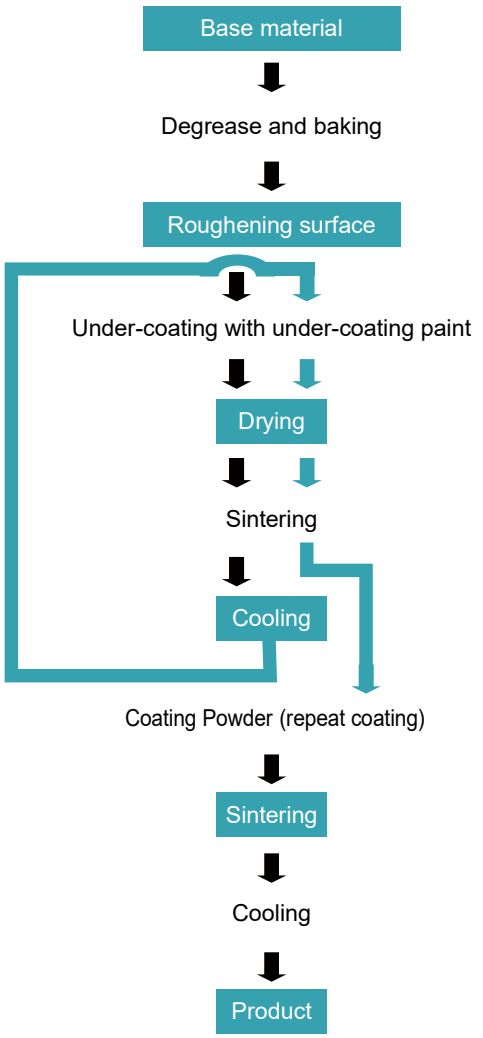
Typical Property Data for Techyours™ ETFE Powders

Properties	JP40 Topcoat	DQ40 Primer
Color	Clear	Primer
Melt Flow Rate	6-30	6-30
Coverage,m^2/kg (ft^2/lb)	22.4(1629)	22.4 (1629)
Particle size,Average, μm	20~40	20~40
Bulk Density, g/ml	0.75	0.75
Density, kg/l (lbs/gal)	1.76 (14.6)	1.76 (14.6)
Maximum In-Use Temperature, °C (°F)	150 (300)	150 (300)

Characteristics of Techyours™ ETFE coating film

ITEM	Unit	Data
Specific gravity	g/ml	1.7
Hardness	Shore	D70
Tensile strength	MPa	>35
Elongation	%	>400

Application Method



Coating Preparation	Homogenize powder before opening bag
Screen	60 mesh (approx. 250 µm) stainless steel or nylon. Insufficient screening can result in application defects.
Application	Use fluidized bed with or without vibration system (depends on powder quantity and particle size of the powder). On flat and/or conductive parts high voltage and higher amperage can be used. On insulated and complex parts amperage should be lowered. In some situations a fixed voltage may be more effective than using an automatic current control setting. The gun settings depend on the gun type and complexity of the part. Recommended general settings: • Product supply: 30%-50% • Air carrier: 3.0 Nm³/h • Fluidization bed: 0.3 Nm³/h • Electrode fluidization: flat jet 0.2 Nm³/h • Amperage: 10 µA • Voltage: 60 KV
Recommended Dry Film Thickness	25-60 µm (1.0-2.4 mil) per coat
Drying (metal temp.)	Powders can be applied dry on wet. Full coating system should be dried before final cure.
Curing (metal temp.)	20–30 min at 270–290 °C (520–555 °F). Prolonged exposure at or above the maximum bake temperature can cause browndiscoloration, polymer sagging, and blistering.
Multiple Coats	It may be necessary to decrease the application voltage after the first coat to avoid the formation of pits on the coating surface. Thesepits are caused by excessive charge and build. Apply clear topcoat (powder or liquid) as final layer.

Metal Surface Preparation

Best adhesion is obtained by thoroughly cleaning and then roughening the substrate. Cleaning is preferably done using a commercially available hot alkaline solution. Commercial solvent degreasing is an acceptable alternative, as long as appropriate health and safety precautions are taken. Solvent cleaning by hand is not recommended.

It is also the general consensus in the industry that a hightemperature burn-off prior to grit blasting provides improved performance of the final coating system.

Roughening is preferably done by grit blasting with aluminum oxide. New grit will give the best profile because it creates sharper peaks and valleys than can be obtained with old, rounded grit. The blast profile (surface roughness depth) should be at least 75–125 µm (3–5 mil) for intended coating thicknesses above 750 µm (30 mil). This profile can generally be achieved with coarse grit (10–20 mesh) using 620–690 kPa (90–100 psi) air pressure but surface properties of the part to be coated and design of the blasting equipment may require variations for optimal performance. For thin films a lower blast profile is adequate.

Primer Application

Techyours™ ETFE has inherently superior adhesion when compared to most other fluoropolymers, and has been used without a primer in avariety of applications. However, the ETFE primer approximately doubles the adhesive strength of the bond.

Powder Topcoat Application

Techyours™ ETFE Powder can be applied using any commercially available powder coating equipment. The powder is given an electrostatic charge, which results in an attraction to the grounded metal part. Use the maximum charging voltage that provides a good electrostatic attraction without repulsion. This voltage is usually in the 20–30 kV range, but varies with the specific equipment used. Adjust delivery air pressure to produce a cloud of powder that does not excessively blow past the part.

After the first coat is applied, the part becomes electrically insulated and subsequent coats are poorly attracted, leading to thin films per coat. Thus, after the first coat, the hot flocking method (applying the powder to a hot part, immediately after it is removed from the baking oven) is combined with the electrostatic application. The resulting film builds will vary, depending on the temperature of the part and its mass (ability to hold heat). Spraying a hot part will always yield thicker films per coat than spraying a cold part. It may be necessary to decrease the application voltage after the first coat to avoid the formation of pits on the coating surface. These pits are caused by excessive charge and build.

High Build Films

Use JP40X Clear Topcoat for all high-build applications where the intended final film thickness exceeds 635 µm (25 mil).

When using DQ40 primer, apply the first powder topcoat electrostatically to the cold part and then place into a warm oven, approximately 300 °F. Once the part reaches 300 °F then step up to the recommended bake temperature. Do not load a cold part into an oven set for final bake temperature. This will cause the surface of the first coat to see high temperature longer than it should. This is especially important on thick parts that take a long time to heat up.

The film build per coat during hot flocking application is typically 75–250 µm (3–10 mil). However, this is only a guideline. Hot flocking can yield highly variable builds per coat depending on the mass and size of the parts coated.

Baking

Adherence to the recommended bake schedules is crucial to final performance for the high-build systems.

These coatings have outstanding resistance to heat and are specially formulated to resist sagging in thick films, which is achieved by modifying the flowability of the molten material over time. The molten ETFE flows well initially, but the rate of flow decreases with increasing time. Insufficient dwell time in the molten state, therefore, can result in a film with pinholes. If encountered, this condition can be corrected by rebaking the part. Adjust the process time and/or temperature accordingly for

subsequent parts.

Prolonged exposure at or above the maximum bake temperature can cause brown discoloration, polymer sagging, and blistering.

Handling and Storage

Powders should be stored in closed plastic bags.

Powders may form lumps under prolonged storage; sieving through a coarse screen will restore the powder.

Powders should be usable for an indefinite period of time without caking or deteriorating if stored at optimal storage conditions: 18°C-27°C (65°F-80°F). Maximum storage temperature 40°C (105°F).

Transport conditions:5°C-40°C (40°F-105°F).

For safe storage conditions, please refer to safety data sheet.

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