



Teflon® FEP 121A

fluoropolymer resin

Aqueous Dispersion

Brand

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Description

Teflon® FEP 121A fluoropolymer resin (formerly called TE-9535) is a colloid containing approximately 54% (by total weight) of 0.1 to 0.30 µm fluorinated ethylene propylene (FEP) particles suspended in water. It also contains approximately 6% (by weight of FEP resin) of volatile, nonionic, and anionic wetting agents. Color is off-white and nominal pH is 9.5. Viscosity at room temperature is approximately 25 cP.

Teflon® 121A is a general-purpose dispersion. It can be used to impart some of the unique properties of *Teflon*® FEP resin to end products that would be difficult to make using traditional melt extrusion processes. It can be used to coat or impregnate porous structures or to make thin films. It can be coated and melt bonded to polytetrafluoroethylene (PTFE) resin or used as a hot melt adhesive.

Teflon® FEP 121A is an improved version of *Teflon*® FEP 120. It utilizes the same base resin as *Teflon*® FEP 120 and has the same excellent wetting characteristics. It has been improved to reduce the rate of sedimentation and thus prolong the storage life.

The *Teflon*® FEP resin in *Teflon*® 121A is a true thermoplastic, providing superior properties typical of the fluoropolymer resins: retention of properties after service at 204°C (400°F), useful properties at -240°C (-400°F), chemical inertness to nearly all

industrial chemicals and solvents, and excellent dielectric properties. Refer to **Table 1** for typical property data.

Typical End Products

Teflon® FEP 121A is suitable for many end products, including: heat-sealable top coatings for PTFE-coated fabrics used for belting, circuit boards, or electrical insulation; cast film for capacitors or chemical barriers; and as a hot melt adhesive for bonding molded PTFE or FEP parts to themselves or to each other.

FDA Compliance

Properly processed products (sintered or melted at high temperatures common to the industry) made from *Teflon*® FEP 121A can qualify for use in contact with food in compliance with FDA Regulation 21 CFR 177.1550. Products made from unsintered dispersion do not comply.

Processing

Conventional dip or flow techniques can be used for coating or impregnating other products with *Teflon*® FEP 121A. The resin particles can be consolidated by heat into a coherent matrix or coating or left as particles to influence the properties of a finished product.

Dip coating can be used to apply resin continuously to uncoated woven fabrics or fabrics already coated with PTFE. Successive passes must be used to build up thickness slowly, without cracks. Each coating layer is usually dried to remove water (typically at 107°C [225°F]), baked to remove wetting agents (typically at 250°C [482°F]), sometimes calendared, and finally heated above the crystalline melting point of the resin particles (approximately 265°C [509°F]). Glass, PTFE, *Nomex*® aramid fiber, *Kevlar*® aramid fiber, or other high-temperature resistant substrates must be used.

Products utilizing entrained FEP resin particles only for their lubricating or hydrophobic properties are dried and baked, but not heated above the crystalline melting point of the particles. The dispersion wets internal surfaces and promotes penetration of the extremely small particles.

Other solid or liquid ingredients can be added to *Teflon*[®] FEP 121A to provide specific processing or finished product behavior.

Safety Precautions

WARNING!

VAPORS CAN BE LIBERATED THAT MAY BE HAZARDOUS IF INHALED.

Before using *Teflon*[®] FEP 121A, read the Material Safety Data Sheet and the detailed information in the "Guide to the Safe Handling of Fluoropolymer Resins," latest edition, published by the Fluoropolymers Division of The Society of the Plastics Industry—available from DuPont.

Open and use containers only in well-ventilated areas using local exhaust ventilation (LEV). Vapors and fumes liberated during hot processing, or from smoking tobacco or cigarettes contaminated with *Teflon*[®] FEP 121A, may cause flu-like symptoms (chills, fever, sore throat) that may not occur until several hours after exposure and pass within about 24 hours. Vapors and fumes liberated during hot processing should be exhausted completely from the work area; contamination of tobacco with polymers should be avoided. Mixtures with some finely divided metals, such as magnesium or aluminum, can be flammable or explosive under some conditions.

Teflon[®] FEP 121A contains additives in the aqueous phase that are irritants. In case of skin contact, flush with water immediately. In case of eye contact, flush with water immediately and get medical help.

Storage and Handling

The dispersion particles in *Teflon*[®] FEP 121A fluoropolymer will settle on prolonged standing (six-month shelf life) or on heating above 66°C (150°F). They usually can be redispersed by mild agitation. Drums may be rolled or the product stirred gently just prior to use. The dispersion must be protected from freezing, which will cause irreversible settling.

Ammonium hydroxide is used by DuPont to set pH to approximately 10 at the time of shipment. High ambient temperatures can deplete the ammonia level and reduce the pH. Declining pH eventually favors bacterial growth, which causes odor and scum. The pH should be measured and maintained between 9.5 and 10.

Both very high and very low temperatures may be detrimental. Dispersions must not be allowed to freeze. The optimum storage temperature range is 7–24°C (45–75°F), with temperatures low in the range preferred. Storage at 7–32°C (45–90°F) is acceptable within nominal shelf life for standard dispersions. If dispersions are to be stored for extended periods beyond their nominal shelf life, low-temperature storage is especially desirable because the particles are harder at lower temperatures and, therefore, less likely to stick together as they settle.

High-speed stirring, pumping, or any other violent agitation must be avoided to minimize sheared particles or coagulation and to minimize foaming. Ideally, the dispersion should be conveyed by gravity from storage to processing stations.

Storage and handling areas should be clean. Keep dispersion drums closed and clean to avoid both contamination and coagulation by drying at the liquid surface. High processing temperatures will cause even very small foreign particles to become visible or to make defects in finished products. Good housekeeping and careful handling are essential.

Table 1
Typical Property Data for *Teflon*[®] FEP Fluoropolymer Resin Dispersion Grade 121A

Property	ASTM Standard	Unit	Value
Percent FEP Resin Solids	—	%	54
Weight of FEP Resin Solids	—	kg/m ³ (lb/gal)	760 6.3
Specific Gravity of Dispersion	—	—	1.41
Average Dispersion Particle Size	—	μm	0.18
pH of Dispersion	E70	—	9.5
Viscosity of Dispersion (at 24°C [76°F])	D2196	cP (Pa sec)	25 (0.025)
Melting Temperature of FEP Resin	D2116	°C (°F)	260 (500)

Note: Typical properties are not suitable for specification purposes.

Packaging

Teflon[®] FEP 121A is packaged in 19- and 114-L (5- and 30-gal) nonreturnable drums.

Freight Classification

Teflon[®] FEP 121A, when shipped by rail or express, is classified “Plastics, Synthetic, Liquid, NOIBN.” Resin shipped by truck is classified “Plastics, Materials, Liquid, NOI.”

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