DuPont™ Zonyl® PTFE TE-3887

FLUOROADDITIVE RESIN

Aqueous Dispersion

Description

Zonyl® PTFE TE-3887 fluoropolymer resin is a negatively charged, hydrophobic colloid, containing approximately 60% (by total weight) of 0.05 to 0.5 µm polytetrafluoroethylene (PTFE) resin particles suspended in water. Seen as a milky white liquid, it also contains approximately 6% (by weight of PTFE) of a non-ionic wetting agent and stabilizer. Viscosity at room temperature is approximately 25 cP (mPa·s). Nominal pH is 10.5.

Unlike most other grades of PTFE dispersions, DuPont™ Zonyl® PTFE TE-3887 is based on low molecular weight PTFE. It is designed to be used as an additive in host systems in order to impart some of the unique properties of PTFE. The low molecular weight may make it unsuitable in some applications that require the physical properties of the high molecular weight grades.

When properly processed, the PTFE resin in Zonyl® PTFE TE-3887 exhibits the superior properties typical of the fluoropolymer resins: retention of properties after service at 260 °C (500 °F), useful properties at –240 °C (–400 °F), chemical inertness to nearly all industrial chemicals and solvents, and low friction and antistick surfaces. Dielectric properties are outstanding and stable with frequency and temperature. Refer to Table 1 for typical property data.

Typical uses and applications

- Additive for paints and coatings
  - Provides anti-stick surfaces
  - Reduces surface abrasion
  - Reduces internal friction, such that application is easier
  - Provides moisture protection
- De- molding
- Lubrication

The 0.2 µm (0.008 mil) average size particles are easy to disperse in waterborne systems.

Zonyl® PTFE TE-3887 can easily be mixed with other aqueous host carriers, or applied to surfaces or systems using conventional techniques such as spray, roll, dip or spin coating.

Typical processing temperatures are as follows: application at room temperature, drying at 110° to 120 °C, surfactant removal at 250° to 270 °C and eventually sintering (melting) at 360° to 380 °C. The exact settings will depend on the particular process conditions, such as speed and loadings, on the product architecture and the equipment used.

FDA compliance

Properly processed products (sintered at high temperatures common to the industry) made from Zonyl® PTFE TE-3887 resin can qualify for use in contact with food in compliance with FDA Regulation 21 CFR 177.1550 and the German BGA. Products made from unsintered dispersion do not comply.

Safety precautions

WARNING!
VAPORS CAN BE LIBERATED THAT MAY BE HAZARDOUS IF INHALED.

Before using Zonyl® PTFE TE-3887, 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 or the "Safe handling of Fluoropolymer dispersions" published by the APME. These documents are available from DuPont.

Open and use containers only in well-ventilated areas using local exhaust ventilation (LEV). Vapors and fumes liberated during hot pro-

cessing, or from smoking tobacco or cigarettes contaminated with Zonyl® PTFE TE-3887 fluoropolymer resin, 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.

Zonyl® PTFE TE-3887 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 Zonyl® PTFE TE-3887 will settle on prolonged standing 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 10.5 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 10.5. 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 (45–77 °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, are 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 DuPont™ Zonyl® PTFE TE-3887 Fluoroadditive Resin

Property	Test method*		Unit	Typical value
Solids content (% PTFE by weight)	ISO 12086	D 444	%	60
Density of dispersion (at 60% solids)	ISO 8962	D 4441	g/cm^3	1.50
Resin dry weight (at 60% solids)/liter dispersion		DuPont	g	900
Color				White
Dispersion particle size, average diameter	ISO 13321	DuPont	µm	0.210
pH of dispersion	ISO 976	E 70		10.5

Typical properties are not suitable for specification purposes.
Decimals are indicated by a period (.)
* ASTM unless otherwise specified.

Packaging

Zonyl® PTFE TE-3887 is packaged in 30-L (8-gal) nonreturnable drums and 1000-L (263 gal) recyclable containers.

Freight classification

Zonyl® PTFE TE-3887, when shipped by rail or express, is classified "Plastics, Synthetic, Liquid, NOIBN." Resin shipped by truck is classified "Plastics, Materials, Liquid, NOI."

For further information:

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