

# DuPont™ DryFilm

## coating & release systems

### DuPont™ DryFilm 2000/IPA Dispersion

DuPont™ DryFilm 2000/IPA dispersion is an extremely stable dry lubricant designed for specialized applications, such as blade-coating and grease thickening. In addition, the dispersion can be added to liquids (oils) and semisolid formulations to enhance lubricity, promote thickening, and retard fouling. The superior performance of DuPont™ DryFilm 2000/IPA dispersion in these applications is a result of the small size and uniformity of its particles and the fact that it has a higher molecular weight than DuPont™ DryFilm formulations. DuPont™ DryFilm 2000/IPA dispersion is listed in **Table 1**.

**Table 1**  
**DuPont™ DryFilm 2000/IPA Dispersion**

Product	Solvent
2000/IPA	Isopropyl Alcohol (IPA)

#### Dilution

The extendability of DuPont™ DryFilm 2000/IPA is a major asset, because it allows the user to customize the dispersion for ease of application and adequacy of coverage. DuPont™ DryFilm 2000/IPA dispersion can be extended with additional amounts of the base solvents.

DuPont™ DryFilm 2000/IPA is furnished as a dispersion at 20% solids by weight. **Table 2** is a dilution table showing the total parts DuPont™ DryFilm 2000/IPA dispersion and solvent required to achieve a range of final concentrations by weight.

#### Properties of Solvents

**Table 3** shows the properties of DuPont™ DryFilm 2000/IPA dispersion. Additional details are contained in the product's Material Safety Data Sheet (MSDS).

**Table 2**  
**DuPont™ DryFilm 2000/IPA Dispersion**

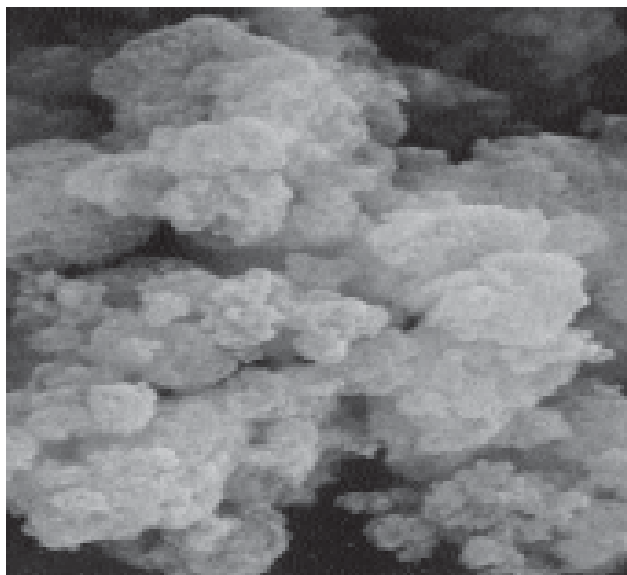
DuPont™ DryFilm 2000/IPA Dispersion	Dilution Table				
	Solvent	Solids wt%	Final Conc. wt%	Parts DuPont™ DryFilm 2000/IPA Dispersion	Parts Solvent
2000/IPA	IPA	20	10.0	1	1
			5.0	1	3
			2.5	1	8
			1.0	1	20

**Table 3**  
**Properties of Solvent**

Solvent	Isopropyl Alcohol (IPA)
Composition	CH <sub>3</sub> CH(OH)CH <sub>3</sub>
CAS#	67-63-0
Boiling Point	82°C (179.6°F)
Freezing Point	-89°C (-128.2°F)
Density (g/cc)	0.84 (25°C [77°F])
Vapor Pressure (20°C [68°F])	33 mmHg
Odor	Alcohol
Color	Colorless
Flash Point	11°C (52°F) TCC
Flammability—LEL	2.0%
Flammability—UEL	12.7%
Exposure Limits—AEL	400 ppm
Exposure Limits—PEL	8- and 12-hr TWA
	400 ppm
	8-hr TWA
Exposure Limits—TLV	400 ppm
	8-hr TWA
Exposure Limits—WEEL	500 ppm STEL
	—
TSCA Status	Listed
DOT	Flammable Liquid

Sources for additional amounts of solvents are shown in **Table 4**.

**The unique size and shape of the PTFE particles in DuPont™ DryFilm 2000/IPA dispersion produce greases that result in less wear, lower friction, and smaller temperature rises in use.**



**Table 4**  
**Sources of Solvents**

Isopropyl Alcohol	
Union Carbide	(800) 765-8368
Shell Oil Company	(713) 241-4819
Aldrich Chemical Co.	(414) 273-3850

### Application

DuPont™ DryFilm 2000/IPA dispersion is applied by any of several methods, including dipping, spraying, or brushing onto a prepared surface. After application, DuPont™ DryFilm 2000/IPA dispersion can be air dried or melt-coated.

For melt-coating, the heated surface should be heated to a temperature of 340–360°C (644–680°F); the temperature should be held for 5–10 min. A soft cloth should be used to remove residual solids from the metal surface.

### Melt-Coating for Improved Adhesion

Adhesion of DuPont™ DryFilm dispersion coatings can be improved by melting the deposited solids. After the dilute dispersions are applied and the solvent is allowed to evaporate at room temperature, the surface can be heated to cure.

The proper fusion temperature for DryFilm 2000/IPA is 340–360°C (644–680°F). Note that these are the recommended temperatures for the coated surface itself.

- Measure the surface temperature directly with a thermocouple. You may observe a change in coating appearance, which may alter initially from an opaque white to a darker, translucent look and then appear clear and wet.
- Maintain the temperature of the coated surfaces (not the temperature of the ambient air) at the correct temperature for 5–10 min.
- If a white residue is left on the metal surface, buff with a soft cloth.
- In melt-coating DuPont™ DryFilm dispersions, provide adequate ventilation and observe all the precautions outlined in the section titled “Safe Handling and Storage.”

## Product Description

DuPont™ DryFilm 2000/IPA dispersion is a fluoro-telomer, a highly fluorinated substance with a low molecular weight. The functional ingredient is polytetrafluoroethylene, or PTFE, which has an extremely low coefficient of friction and, thus, imparts high lubricity and excellent nonstick properties.

Because of the chemical stability of PTFE, DuPont™ DryFilm 2000/IPA dispersion is resistant to attack by nitric acid, hydrochloric acid, sodium hydroxide, and alcoholic potassium hydroxide in most applications. It is also extremely stable thermally and can be heated above its melting point before appreciable decomposition begins. DuPont™ DryFilm 2000/IPA dispersion is essentially insoluble in all nonfluorinated solvents. Typical properties of DuPont™ DryFilm 2000/IPA dispersion are shown in **Table 5**.

**Table 5**  
**DuPont™ DryFilm 2000/IPA Dispersion**  
**Typical Properties**

	2000/IPA Dispersion
Solids, wt%	20
Melting Point	323°C (613.4°F)
Telomer Solids	
Molecular Weight	40,000
Density, g/cc	2.16
Particle Size, µm	
Average Bulk	4–12
Primary Particle	<0.2
Dispersion	
Volatiles, %	80
Odor	Alcohol
Form	Fluid Dispersion
Color	Translucent
Density, g/cc (lb/gal)	0.99 (8.3)
Solvent	IPA

## Safe Handling and Storage

### General Practices

Overheating polymers, including those in the PTFE polymer in DuPont™ DryFilm RA and 2000/IPA fluorotelomer dispersions, may liberate potentially hazardous vapors and particulate material. Heating DuPont™ DryFilm RA or 2000/IPA dispersion products above 290°C (554°F) may produce a fine particulate material upon condensation. When heated above their thermal decomposition temperature (350°C [662°F] for RA and 400°C [752°F] for 2000/IPA), oxidation of the polymers may occur, producing acid gases, such as carbon fluoride, hydrogen fluoride, and fine particulate decomposition products. See “Safe Handling of Heated DuPont™ DryFilm Dispersions” for further details. Further precautions are contained in the Material Safety Data Sheets (MSDS) for DuPont™ DryFilm 2000/IPA, and the appropriate solvents can be consulted for more detailed information.

### Medical Applications

DuPont™ DryFilm dispersion products have not been designed for medical applications involving permanent implantation in the human body or permanent contact with internal body fluids or tissues.

DuPont has developed some DuPont™ DryFilm dispersion materials under specific contracts that expressly acknowledge use in temporary or brief implantations in the human body or contact with internal body fluids or tissues. Unless such a contract is furnished, DuPont™ DryFilm dispersion products should not be used in such applications.

DuPont makes no representation, promise, express warranty, or implied warranty concerning the suitability of any DuPont™ DryFilm dispersion formulation or product for use in implantation in the human body or in contact with internal body fluids or tissues.

---

**For more information or technical assistance, call:**

**(800) 441-9503**

**or visit us on the Web:**

**[www.dupont.com/releasesystems](http://www.dupont.com/releasesystems)**

---

Or call the Coating & Release Systems hotline in the **United States** at (800) 441-9503

**Canada** at 800-263-5924, E-mail: [products@can.dupont.com](mailto:products@can.dupont.com)

**Europe, Mideast, and Africa** at +32.3.543.1267, E-mail: [lubricants@lux.dupont.com](mailto:lubricants@lux.dupont.com)

**Asia/Pacific—Including India** at 886-2-2514-4434, E-mail: [release.systems@usa.dupont.com](mailto:release.systems@usa.dupont.com)

**Mexico and Central America** at 011-52-55-5722-1150, E-mail: [ceac@mex.dupont.com](mailto:ceac@mex.dupont.com)

**South America—All Countries** at 55-11-4166-8601, E-mail: [produtos.brasil@bra.dupont.com](mailto:produtos.brasil@bra.dupont.com)

---

The information set forth herein is furnished free of charge and is based on technical data that DuPont believes to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Because conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information. Nothing herein is to be taken as a license to operate under or a recommendation to infringe any patents.

The DuPont oval logo, DuPont™, and The miracles of science® are trademarks or registered trademarks of DuPont.

Copyright © 2003 E.I. du Pont de Nemours and Company. All rights reserved.

