



## Teflon® Industrial Coatings

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### SELECTING DUPONT TEFLON® COATINGS

The choice of Teflon® Industrial coatings is wide and understanding a bit about the technologies involved makes the selection process easier. For any particular end use, there may be several Teflon Industrial Coatings that will perform well. Drawing on experience of a Licensed Industrial Applicator is a good way to identify the best Teflon coating for a given application. However, there is no substitute for testing in the actual end use in making a final selection. The types of Teflon coatings available are described in the following paragraphs.

**PTFE** coatings have the lowest coefficient of friction and highest temperature resistance of any of the Teflon coating systems. PTFE-based products can typically withstand temperatures of 550°F (290°C) on a continuous basis and up to 600°F (315°C) for brief periods. PTFE coatings are very good electrical insulators and are extremely non-wetting. They are inert to almost all chemicals, but are somewhat porous, and thus permeable to water vapor and other gases. The substrate must be able to withstand a cure temperature of at least 700°C to consider PTFE based coating.

**FEP** based Teflon coatings have superb release, and are frequently used as mold release coatings. They melt flow to smooth, non-porous films, and are thus more chemically resistant than PTFE coatings. FEP coatings have lower heat resistance than PTFE coatings (400°F/200°C), but also cure at lower temperatures. FEP coatings are extremely non-wetting and have a very low coefficient of friction.

**PFA** based coatings combine the high temperature resistance of PTFE coatings with the ability to achieve non-porous, chemical resistant films like FEP. Films can be built to 25 mils (640 microns) and are quite tough and abrasion resistant. Release and coefficient of friction are very good.

**ETFE** coatings offer extremely tough, abrasion resistant films with high tensile strength. Films up to 100 mils can be built, but ETFE is limited in temperature resistance (300°F/150°C) and provides only fair release compared to PTFE, PFA and FEP.

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Teflon-S® coatings are self-priming, one coat products. They are formulated with organic binders to improve adhesion without the use of primers, so they typically cure at lower temperatures than pure fluoropolymer dispersions. The fluoropolymer resin stratifies to the surface during the cure cycle, but because of the binder resins, certain properties of the pure fluoropolymers may be compromised, such as temperature resistance and release.

### PROCESSING

Teflon industrial may be applied to materials that can withstand the cure temperature of the coating.

#### TYPICAL FLUOROPOLYMER TOPCOAT

#### CURE TEMPERATURE

PTFE	750°F/400°C
PFA	700°F/370°C
FEP	650°F/340°C
ETFE	600°F/315°C
Teflon-S	350°-650°F/175°-340°C

Before application of Teflon Industrial Coatings, the substrate must be thoroughly cleaned and blasted to provide good adhesion. Generally, PTFE, PFA, FEP and ETFE topcoats (not Teflon-S) require a primer. More specific processing information is given on the Fact Sheet available for each product.

The coatings are generally spray applied and are available as powder and liquids.

### FOOD CONTACT

See product fact sheet for information on conformance to FDA regulations for food contact use.

## TECHNICAL DATA

Here are some general characteristics of resins used in TEFLON® Industrial Coatings as well as some general characteristics of TEFLON-S® coatings. Formulated coatings may deviate considerably from the resin.

PROPERTY	UNITS	RESIN		TYPE		FINISH		ASTM
		PTFE	FEP	PFA	ETFE	TEFLON-S®		
NON-STICK	—	E	E	VG	G	G		NONE
CHEMICAL RESISTANCE	—		E	E	VG	G		NONE
ABRASION RESISTANCE	—	F	G	VG	E	E		NONE
SALT SPRAY RESIST.	—	F	E	E	E	E		NONE
WATER ABSORPTION	percent	<0.01	<0.01	<0.03	<0.007	—		D570
COEF. OF FRIC. (Kinetic)	—	0.08	0.08	0.1	0.24	0.1-0.4		D1894
(Static)		.1	.2	.2	.4	.15 - .35		
SPECIFIC GRAVITY	none	2.20	2.15	2.15	1.70	—		
MELT POINT	deg. F	627	500	575	520	—		
HARDNESS	Shore D	60	55	60	75	60 - 90		D2240
MAX. CONTINUOUS	deg. C	290	204	260	150	150-260		NONE
USE TEMPERATURE	deg. F	550	400	500	300	300-500		
THERMAL CONDUCTIVITY	(BTU) (in)/ (ft <sup>2</sup> ) (hr) (°F)	1.70	1.35	1.30	1.55	—		DuPont Method
COEF. OF LINEAR THERMAL EXPANSION	in/in/ °F	5.5	5.4	7.6	5.0	—		D-696@70°-212°F
DIELECTRIC (short term strength 10 mil film)	volt/mil	1200	2000	2900	2000	Up to 1400		D149
SURFACE								
RESISTIVITY	ohm/sq.	1.0E18	1.0E18	1.0E18	1.0E17	—		D257
VOLUME								
RESISTIVITY	ohm cm	1.0E18	1.0E16	1.0E16	1.0E16	—		D257
TENSILE STRENGTH	MPa @ 23°C	20	23	25	45	20-80		D1708
ELONGATION AT BREAK	percent @ 23°C	300	325	300	300	1-150		D1708

The values shown in the table represent average experience and are not intended to be specifications.