



## Teflon® NXT 70 Overview

DuPont™ Teflon® NXT 70 is a chemically modified polytetra-fluoroethylene polymer. When properly processed, Teflon® NXT 70 exhibits the superior properties typical of the fluoropolymer resins: nonaging characteristics, chemical inertness, heat resistance, toughness and flexibility, low coefficient of friction, nonstick characteristics, negligible moisture absorption, and weather resistance. In addition, this resin offers weldability, improved resistance to deformation under load, increased resistance to permeation of chemicals, and a higher dielectric breakdown voltage. This grade exhibits minimal sagging (typical of modified PTFE) in billets as large as 350 kg (800 lb).

### Typical End Products

Teflon® NXT 70 is a fine-cut resin designed for compression molding of blocks and sheets and for use as a base resin for compounds. It can be used for such applications as: seal rings, valve seats, bearing pads, linings, encapsulations, and as a base resin for filled compounds.

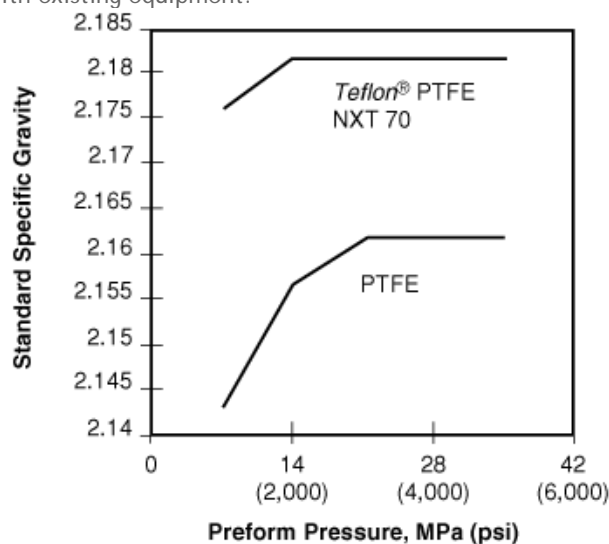
### FDA Compliance

Properly processed products (sintered at high temperatures common to the industry) made from Teflon® NXT 70 resin can qualify for use in contact with food in compliance with FDA regulation 21 CFR 177.1550.

### Processing

Teflon® NXT 70 may be converted by compression molding techniques. For instance, a preform is made at room temperature at the recommended pressure of 14 MPa (2,000 psi) and subsequently free sintered.

Of particular significance for sheet molding is the fact that maximum density after sintering is reached at lower pressures when compared with nonmodified granulars as shown in the chart to the right. This allows the production of larger sheets with existing equipment.



## Safety Precautions

WARNING!

VAPORS CAN BE LIBERATED, WHICH MAY BE HAZARDOUS IF INHALED. Before using Teflon®, 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® NXT 70, may cause flu-like symptoms (chills, fever, sore throat) that may not occur until several hours after exposure and that typically pass within about 36 to 48 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.

## Storage and Handling

Preforming is easiest when the resin is uniformly between 21-27°C (70-80°F). As temperature declines below this range, the resin will be increasingly difficult to mold without cracks and problems with condensed moisture. Higher temperatures inhibit flow and promote lumping. Storage conditions should be set accordingly.

Cleanliness is a critical requirement for successful use of Teflon® NXT 70. The white resin and high sintering temperatures cause even very small foreign particles to become visible in finished moldings. Keep resin drums closed and clean. Good housekeeping and careful handling are essential.

## Teflon® NXT Benefits

DuPont™ Teflon® NXT fluoropolymer resins open new opportunities for designing and engineering high-performance products. This new DuPont family of chemically modified granular PTFE materials delivers valuable new capabilities while retaining the exceptional chemical, thermal, antistick, and low-friction properties of conventional DuPont PTFE resin.

- New fabricating versatility with welding
- Improved permeation resistance
- Less creep
- Smoother, less porous surfaces
- Better high-voltage insulation



Teflon® NXT gives you two wide avenues for application development. You can improve the performance and reduce the cost of tried and true PTFE applications, and you can develop innovative new solutions for parts and products that are currently made of other materials.

## Weld it ... Form it

Bond parts by clamping them and putting them in oven under moderate pressure. Bond strength approaches that of the material itself. Use the new thermoforming capabilities to give new shape to your ideas. This tube was formed during molding by welding together sections of Teflon® NXT and conventional Teflon® PTFE. The more translucent

material is Teflon® NXT. When one end was flared under heat and pressure, the weld's strength and tenacity allowed it to be formed without separating.

## Reduce Permeation

Vessel linings, tubing, and other products made with Teflon® NXT show improved resistance to chemical permeation compared with standard PTFE. Parts made of Teflon® NXT have low micro-void content, slowing the transmigration of aggressive liquids and gases.

Comparative Permeation Rates for Teflon® NXT and Conventional PTFE							
Permeant	Specimen Thickness, mm (in)	Vapor		Liquid		Gas	
		PTFE	Teflon® NXT	PTFE	Teflon® NXT	PTFE	Teflon® NXT
Perchloroethylene	1 (0.04)	5.5	2	13	4	-	-
	2 (0.08)	1.4	0.1	0.019	0.005	-	-
	4 (0.16)	0.08	0.05	0.006	0	-	-
	5 (0.20)	0.055	0.050	-	-	-	-
Hexane	2 (0.08)	3.4	0.2	23.4	0	-	-
	5 (0.20)	0.045	0.015	-	-	-	-
MEK	2 (0.08)	36.3	23.3	49.4	34.2	-	-
	5 (0.20)	22.6	20.8	35.5	25.2	-	-
HCl, 20%	1 (0.04)	0.4	0.1	-	-	-	-
Helium	2 (0.08)	-	-	-	-	93	1
	5 (0.20)	-	-	-	-	0.18	0.12

## Fight Creep

You get more freedom in designing seals, gaskets, and other products, thanks to the improved creep resistance and increased stiffness of Teflon® NXT. Its advantages are particularly marked at elevated temperatures.

Typical Properties of Teflon® NXT and Conventional PTFE				
Property	Test Method	Unit	Teflon®	PTFE
			NXT	
Tensile Strength	ASTM D4894	MPa (psi)	31 (4,500)	34 (5,000)
Elongation at Break	ASTM D4894	%	450	375
Specific Gravity	ASTM D4894		2.17	2.16
Deformation Under Load (Creep), 23° C (73° F)	ASTM D695	%		
3.4 MPa (500 psi)			0.2	0.7
6.9 MPa (1,000 psi)			0.4	1.0
13.8 MPa (2,000 psi)			3.2	8.2
Deformation Under Load (Creep)-DMA	ASTM D695	%		

6.9 MPa (1,000 psi) at 25°C (77°F)			5.3	6.7
3.4 MPa (500 psi) at 100°C (212°F)			5.4	8.5
1.4 MPa (200 psi) at 200°C (392°F)			3.6	6.4
Void Content of Typical Parts	FTIR-Infrared spectroscopy	%	Compression Molded: 0-0.5	Compression Molded: 0-1.5
Dielectric Strength, 76.2 µm (0.003 in) Film	ASTM D149	kV/mm (V/0.001 in)	208 (5,200)	140 (3,500)
Weld Strength (Specimens Welded after Sintering)	ASTM D4894	%	66-87	

## Give Contaminants the Slip

Teflon® NXT provides molded or machined parts with smooth, glossy surfaces with low porosity. Component surfaces in, say, semiconductor equipment stay clean because there's virtually no place for contaminants to get a grip.

## Step Up the Voltage

Teflon® NXT allows superior high-voltage insulation, giving you new opportunities to improve performance and reduce the cost of electrical connectors, dielectric capacitor films, and other products.

## Chemical Process Industry

In the chemical process industry, new Teflon® NXT can significantly improve the performance of equipment linings, seals, gaskets, and other parts.

### All applications

The low permeation rate of Teflon® NXT allows you to extend equipment life and reduce maintenance costs and emissions. In some special cases, reduced lining thickness and weight are possible.

### Pipe linings

Teflon® NXT lets you reduce costs by replacing bolted flange joints with welded pipe sections. The bonded joints should minimize maintenance and emission monitoring. Cycling tests with steam and cold water have shown no fatigue or blistering of welded linings of Teflon® NXT.

### Vessel linings

Teflon® NXT allows you to join liner sections by welding without adhesive and to thermoform liner parts to fit vessel heads, nozzles, and manways. Glass fabric backing can be securely embedded in sheets to help attach linings to substrates.

## Gaskets and seals

Take advantage of the improved high-temperature stiffness and creep resistance of Teflon® NXT to design gaskets and seals that better resist deformation to help prevent leaks and allow extended maintenance intervals.



Gaskets and seal rings made of filled and reinforced compounds based on Teflon® NXT offers good stiffness and creep resistance at high temperatures.

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## Electrical and Electronics Industries

The higher dielectric strength, surface smoothness, and high temperature stiffness of Teflon® NXT allow you to improve existing applications for PTFE and develop new uses.

### Connectors

Manufacturers can increase voltage ratings for electrical connectors for demanding uses. Smoother surfaces resist performance-degrading soiling, and higher stiffness improves mechanical performance at elevated temperatures.

### Capacitor films

Dielectric films made from Teflon® NXT can withstand higher voltages than conventional PTFE material. Therefore, film thickness may be reduced to make smaller capacitors.

## Other Industries

The performance of unlubricated bearings, laboratory equipment, seal rings for hydraulic systems, antistick components for handling a range of materials, and many other parts and products now made of conventional PTFE can be improved with Teflon® NXT. We have grades of Teflon® NXT tailored to meet your specific needs, and we can help you gain their benefits.

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