



Teflon®
fluoropolymers

Better Food Processing with Teflon®

- Nonstick performance
- Cuts downtime for cleaning
- Safeguards food purity
- Reduces chemical usage for cleaning
- 'Universal' chemical resistance



Cut Maintenance Costs, Increase Process Uptime and Efficiency With Teflon®



Fluid handling components with *Teflon*® reduce cleaning costs, maintain purity of virtually any food ingredient.
 Manufacturer: Entegris

You can bank on the nonstick performance, chemical inertness and exceptional purity of *Teflon*® fluoropolymer to keep your food processing equipment running smoothly... and more profitably

As an alternative to stainless steel, exotic alloys and many other polymers, the DuPont *Teflon*® family of fluoropolymers delivers more value and performance in food processing uses. Applications include linings for metal vessels, piping, pumps, and valves; pipe, hose and tubing; components for valves and pumps; and seals and gaskets

Components and linings made with *Teflon*® can help cut equipment maintenance costs, increase uptime, increase throughput, safeguard product purity and allow use of the same equipment to make a wider range of food products.

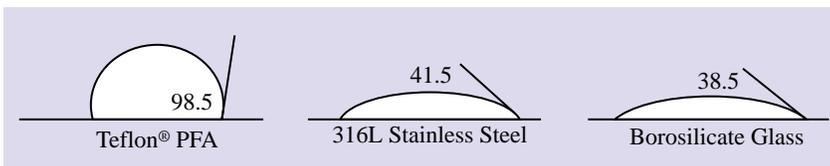
Cut maintenance costs

Nothing sticks very well to DuPont *Teflon*®, not even the stickiest food products and biomaterials. Surfaces of *Teflon*® are easy to clean, and they stay cleaner longer. The payoff: faster, easier cleaning and longer intervals between cleanings.

Fights biofilm buildup. Surfaces of *Teflon*® resist the onset of biological films because *Teflon*® is not easily wetted (see diagram below) and is not subject to biological or chemical attack. Bacteria are too large to gain a hiding place on smooth surface of *Teflon*® (see p. 3). And the table (below) shows

that accumulated biofilm is far easier to remove from *Teflon*® than from stainless steel and glass. With easier cleaning, there's a smaller volume of solution to dispose of, an environmental benefit.

Contact angles in degrees with water show *Teflon*® is far less wettable than stainless steel or glass.



Biofilm removal, percent, in virtually quiescent dilute sodium hypochlorite — reported by the BioProcess Technical Institute, University of Minnesota

Commercial substrate	K. pneumonia, %	S. Choleraisuis, %	E. Coli, %
Stainless steel (elec. Polished)	67	25	56
Polypropylene	67	75	75
Borosilicate glass	89	0	0
Silicone-coated glass	89	89	78
Polyvinylidene fluoride	89	89	89
<i>Teflon</i> ® PFA	99	99	98



Hose of *Teflon*® PTFE has overbraided stainless steel reinforcement for high-pressure applications. Manufacturer: Crane Resistoflex.

Resists cleaning agents. *Teflon*[®] is impervious to attack by the fastest-acting and strongest cleaning agents and solvents we've tested.

Steam cleanable. Many components made with *Teflon*[®] can be steam cleaned. For most plastics, that's out of the question.

No chemical attack

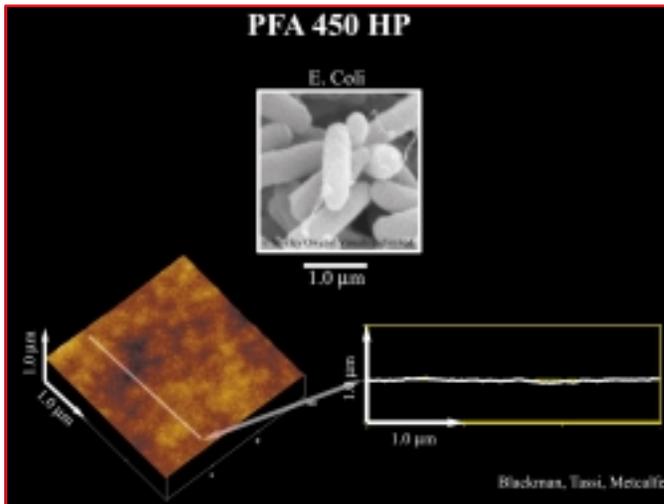
Foods don't react with *Teflon*[®], so there are no chemical interactions or corrosion to compromise taste or create contamination. The near-universal chemical resistance of *Teflon*[®] is a key reason for its broad use in fluid-handling components and vessels used in the chemical processing and semiconductor manufacturing industries.

You're sure it's pure

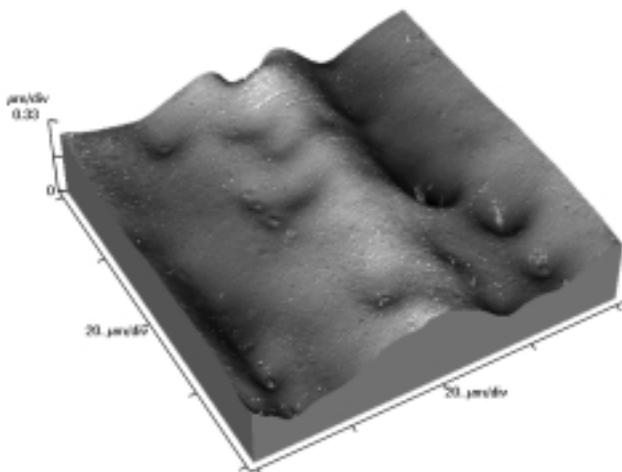
Teflon[®] adds essentially nothing to foods and takes nothing away. With extremely low extractables and reactivity plus high purity, *Teflon*[®] meets a wide range of regulatory requirements. Unlike some other polymers, *Teflon*[®] contains no additives to compromise flavor or contaminate products.

And *Teflon*[®] doesn't absorb dilute solutions of benzoic acid and other common food preservatives, which can be a problem with handling preservatives with silicone rubber and PVC tubing.

Most grades of *Teflon*[®] PTFE and *Teflon*[®] FEP may be used in food contact applications in compliance with the U.S. Federal Food and Drug Administration's (FDA) Regulation 21 CFR 177.1550. *Teflon*[®] PFA 440 HP and 450 HP also comply. The U.S. Department of Agriculture accepts grades of *Teflon*[®] that comply with this FDA regulation as components of materials in direct contact with meat or poultry food products prepared under Federal inspection. For detailed information, call DuPont at (302) 999-3543 and ask for a copy of our bulletin about DuPont fluoropolymers used in applications regulated by the Food and Drug Administration, H-22779-5.



E. coli and other bacteria are too large to lodge in tiny asperities on smooth, non-reactive surfaces (at left) of *Teflon*[®] PFA HP.



Electropolished stainless steel can have pits that harbor biofilm and is much more wettable by aqueous media than *Teflon*[®]



Vessel linings of *Teflon*[®] resist biofilm buildup and are readily cleaned.

Wide range of equipment

Valves, piping, tubing and other standard fluid handling components made with *Teflon*[®] are available off-the-shelf from many manufacturers.

Custom-designed vessels and other components can be made by several methods. Depending on the resin type, *Teflon*[®] can be melt extruded, rotationally molded, injection molded or formed by compression and sintering to produce a wide variety of shapes and structures.

Teflon[®] finishes can be applied to metal substrates for anti-stick performance and easy cleaning, and belts impregnated with *Teflon*[®] offer similar benefits.

We're ready to help

The DuPont team is eager to help you gain the benefits of *Teflon*[®] in your food processing operation. In the U.S., call 302-999-3543. In other countries, contact the nearest location listed below. For instant product information, visit www.teflon.com on the Web.

For more information on Fluoroproducts:

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CAUTION: Do not use in medical applications involving permanent implantation in the human body. For other medical applications, see "DuPont Medical Caution Statement," H-50102.

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