PLASTECH
COATINGS

Whitford Corporation Coatings

Plas-Tech is a member of Whitford Corporations "Quality Approved Coater" Program. Whitford is known to have "The most complete line of fluoropolymer coatings in the world" and we are expert applicators of their complete line.

Xylan®

The umbrella trademark for most of Whitfords products. Xylan is low-friction, wear-resistant composites of fluoropolymers and reinforcing binder resins. These coatings are applied with conventional spray and dip-spin techniques.

Dykor®

A specialty line of solutions and dispersions containing Kynar (PVDF). Because Dykor is unaffected by most chemicals and solvents it is typically used to protect metals from hostile environments.

Excalibur®

A preimium cookware coating utilizing arc-sprayed stainless steel to reinforce the coating. The longest lasting, most durable non-stick coating in the world.

In addition to these coatings we are experienced with many of the other specialty coating products made by Whitford, including:

- Xylar
- Quantum
- Xylac
- Ultralon
- Dykor Powders

Ten Benefits of Using a Whitford Coating:

1. Low friction: as low as 0.02.
2. Wear resistance: even under extreme pressures.
3. Corrosion and chemical resistance: in most environments.
4. Weather resistance: against sunlight, saltwater and road chemicals.
5. Wide temperature operating range: from -420° F to +550° F (-250° C to 285° C).
6. Flexible curing schedule: 300° F to 750° F.
7. Wide color range: available for most coatings.
8. Pliability: many Xylan coatings will bend freely and repeatedly without breaking.
9. Machinability: apply multiple coats of Xylan coating (most formulations) and machine to specification.
10. Excellent adhesion: to most metals, plastics, ceramics, wood. Even to itself (most formulations).

DUPONT TEFLON® INDUSTRIAL COATING SYSTEMS

DuPont Teflon® Industrial Coatings — DuPont Licensed Industrial Applicator
Teflon® is a registered trademark of DuPont.

PROFESSIONAL APPLICATORS OF HIGH PERFORMANCE COATINGS — PLASTECH COATINGS

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PLASTECH
COATINGS

West Chester, Pennsylvania

Coatings

Plas-Tech Coatings, Inc. has been professionally applying high performance fluoropolymer coatings since 1978. We are experienced applicators of various fluoropolymer coatings, including:

- DuPont Teflon®
- Whitford Xylan®
- Xylar®
- Ryton® (PPS)
- Emralon®
- Excalibur®
- Dykor®
- Kynar®
- Teflon-P®
- Ultralon®
- Halar®
- Silverstone Supra®
- Teflon-S®
- Sandstrom Products Co.
- Dip spin coatings

These coatings exhibit the following properties:

- Non-stick
- Corrosion resistance
- Unique electrical properties
- Low coefficient of friction
- High temperature resistance
- Cryogenic stability
- Non wetting
- Chemical resistance
- FDA compliant

Application

In most cases substrates are prepared for coating by degreasing and grit blasting. Coatings are then applied with either conventional spray guns, electrostatic powder equipment, or dip spin techniques. The coated products are then heat cured in carefully monitored custom ovens.

Military Specifications/Certification

Plas-Tech is experienced and knowledgeable in the application of coatings to Military specifications. We can certify to most company and military specifications.

Technical Knowledge

If you have a new application we can help you select the best coating for your product. If you have an existing application we can help select an improved coating, if desired, and provide you outstanding quality and service. Our engineers have over 70 years combined experience with fluoropolymer coatings.

Delivery

We recognize the need to get coated products back to our customers *Fast!* Most parts are finished within 2-3 business days after we receive them. Do you have an unreasonable delivery requirement? Let us know, we can probably accommodate your request. Nobody beats our turnaround and we do it without compromising quality.

Quality - Dependability - Knowledge - Service

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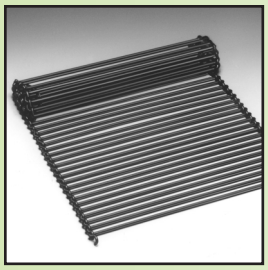
PLASTECH
COATINGS

DuPont Teflon® Industrial Coatings

Teflon® PTFE fluropolymer resin was first discovered in 1938 by DuPont chemist Roy Plunkett. Since that time DuPont has developed a versatile line of industrial coatings that carry the Teflon® trademark. DuPont Telfon® industrial coatings have gained acceptance in a wide range of applications. Many Teflon® coatings are FDA compliant and can be used for food contact applications.

DuPont Teflon® industrial coatings can be used on aluminum, carbon steel, stainless steel, steel alloys, brass, magnesium, and other metals, as well as on non-metallics. Such as glass, fiberglass, some rubber and plastics. Optimum adhesion is obtained by roughening the surface prior to application of the coating, Thermal processing is then required to cure the coated product.

Outstanding Properties of Teflon® Coatings:



NON-STICK

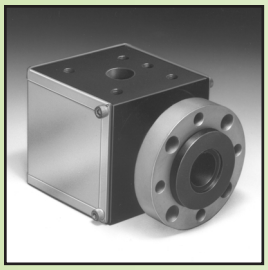
Very few substances will permanently adhere to a Teflon® coated surface. While tacky materials may show some temporary adhesion, almost all substances release easily.

Teflon® coating on belts in the food industry prevents build-up of cooking residue and allows easy clean-up.

NON-WETTING

Since Teflon® surfaces are both oleophobic and hydrophobic, they are not readily wet. Clean-up is easier, more thorough and in many cases self-cleaning.

Because it is non-wetting, laboratory glass ware such as beakers, test tubes, stirrers, etc., are frequently coated with Teflon® to prevent cross-contamination.



TEMPERATURE STABILITY

The combination of extreme low and extreme high temperature stability (-450°F to + 550°F) favors the use of Teflon® over a wider temperature range than any other organic coating material.

Teflon® coated extrusion dies that permit higher extrusion rates and better surface finish are an example of a high temperature application where other coatings cannot be used.

LOW COEFFICIENT OF FRICTION

The coefficient of friction of Teflon® is in the range of 0.03 - 0.15, depending on the load, sliding speed and particular Teflon® finish used.

Threaded plugs that must be removed and re-inserted frequently are coated with Teflon® for permanent lubrication to prevent galling and permit re-sealing.

CHEMICAL RESISTANCE

Teflon® is unaffected by most chemical environments. The only chemicals known to affect Teflon® finishes are certain alkali metals and most highly reactive fluorinating agents.

Metal seals coated with Teflon® show improved sealing properties because of the conformability of Teflon® Coating.

New Teflon® coating compounds have been developed that can be applied to elastomer "O" rings

UNIQUE ELECTRICAL PROPERTIES

Over a wide range of frequencies, Teflon® has high dielectric strength, a low dissipation factor, and very high surface resistivity. By special techniques, it can even be made conductive enough to be used as an anti-static coating.

Strain relief straps for the computer industry are coated with Teflon® because of its high dielectric properties and attractive appearance.

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PLASTECH
COATINGS

DuPont Teflon® Industrial Coatings

What is Teflon®?

Teflon® is DuPont's registered trademark for its non-stick coatings. Teflon® coatings are specially formulated finishes that are based on PTFE, PFA, FEP, and ETFE fluorocarbon resins. Teflon-S® is a related family of fluorocarbon coatings containing binding resins which provide increased hardness and abrasion resistance or other desirable properties.

Teflon® PTFE

PTFE (Polytetrafluoroethylene) nonstick coatings are two-coat (primer/topcoat) systems. These products have the highest operating temperature of any fluoropolymer (290° C/550° F), an extremely low coefficient of friction, good abrasion resistance and good chemical resistance.

Teflon® FEP

FEP (Fluorinated Ethylene Propylene copolymer) nonstick coatings melt and flow during baking to provide non-porous films. These coatings provide excellent chemical resistance. In addition to low friction, FEP coatings have excellent nonstick properties. Maximum use temperature is 205° C/400° F.

Teflon-S® One Coat

These solvent-based liquid coatings are formulated with special blends of fluoropolymers and other high-performance resins to improve toughness and abrasion resistance. Because the film components stratify during baking, most of the fluoropolymer properties (such as low friction and nonstick character) are retained. The resins provide adhesion and abrasion resistance. These products can sometimes be applied to smooth, clean metal. Bake requirements vary, depending on the specific coating, from 165° C/325° F to 370° C/700° F.

Teflon® ETFE

ETFE is a copolymer of Ethylene and Tetrafluoroethylene, and is also sold under the Tefzel® trademark. Although not fully fluorinated, ETFE has excellent chemical resistance and can operate continuously at 150° C/300° F. this resin is the toughest of the fluoropolymers and can be applied at film builds up to 1,000 micrometers (40 mils) to provide a highly durable finish.

Teflon® PFA

Like FEP, PFA (Perfluoroalkoxy) nonstick coatings melt and flow during baking to provide non-porous films. PFA offers the additional benefits of higher continuous use temperature (260° C/500° F), film thicknesses up to 1,000 micrometers (40 mils) and greater toughness than PTFE or FEP. This combination of properties makes PFA an excellent choice for a wide variety of uses, especially those involving chemical resistance.

Silverstone SUPRA®

Silverstone® is a specialty line of superior nonstick finishes produced by DuPont. Silverstone® coatings are three-coat (primer/midcoat/topcoat) systems formulated with PTFE and PFA. Characteristics of Silverstone® coatings are similar to other PTFE coatings, however durability is greatly increased. A ceramic reinforced version with higher scratch and abrasion resistance is also available. Maximum continuous use

DuPont Licensed Industrial Applicator

In 1981, just three years after opening our doors, Plas-Tech Coatings was selected by DuPont to be one of their licensed Industrial Applicators (LIA). Criteria to become an LIA include providing quality workmanship and having extensive knowledge and experience in recommending and applying Teflon® industrial coatings. As an LIA Plas-Tech maintains a broad range of Teflon® coatings in inventory.

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PLASTECH
COATINGS

Typical Properties

Mechanical Properties

Property	ASTM Standard	Unit	Teflon® PTFE	Teflon® FEP	Teflon® PFA	Teflon® ETFE
Specific Gravity	D792		2.15	2.15	2.15	1.76
Tensile Strength	D1457, D1708, D638	MPa	21-35	23	25	40-47
		psi	3,000-5,000	3,400	3,600	5,800-6,700
Elongation	D1457, D1708, D638	%	300-500	325	300	150-300
Flexural Modulus	D790	MPa	500	600	600	1,200
		psi	72,000	85,000	85,000	170,000
Folding Endurance	D2176	(MIT)	$>10^6$	5-80 x 10^3	10-500 x 10^3	10-27 x 10^3
		cycles				
Impact Strength	D256	J/m	189	No break	No break	No break
		ft·lb/in	3.5			
Hardness	D2240	Shore D	50-65	56	60	72
		pencil	HB	HB		
Abrasion Resistance						
• Bell Abrasion (1)		g/µm	85			
• Sliding Arm (2)		mg	7.9-9.7	11.1-15.2		13.4
• Tabor Abrasion (3)		mg	12	14.8		
Scratch Resistance						
scratch master						
• initial (4)		kg	5.7-7.0	5.1-11.4		
• complete (5)		kg	7.3-10.7	8.5-13.2		
Coefficient of Friction	D1894					
• static			0.12-0.15	0.12-0.20	0.2	0.24-0.50
• dynamic			0.05-0.10	0.08-0.3		0.3-0.4
Contact Angle						
• water		degree	104° - 111°	95°-105°	104°-111°	90° - 100°

Notes:

1. Bell Abrasion Tester: grams abrasive/micrometers
2. Sliding Arm Test: 1,000 cycles, 500 gr load, 400 Emery paper, 35.5 sq. cm surface
3. Tabor Abrasion: Cs 17 wheel, 1 kg load, 1,000 cycles, weight loss in mg
4. Scratch Master: initial = first sign of substrate
5. Scratch Master: complete = total removal of film
6. Salt Spray Resistance: 5% NaCl @ 35°C/95°F, hours to failure
7. Detergent Resistance: hours to failure
8. Dielectric Strength: 100 micrometers film

The values shown in this table represent average experiences from numerous testing sources and are not intended to be specifications. These values will vary depending upon the individual compositions of the primers and topcoats and the systems used. For further information on the properties of these coating systems, and examples of how they have led to the development of new products, increased production rates and resultant cost savings, you should consult DuPont or a Licensed Industrial Applicator.

All technical advice, application suggestions, recommendations and services are rendered by the Seller gratis. They are based on technical data which the Seller believes to be reliable and are intended for use by persons having skill and know-how, at their own discretion and risk. Seller assumes no responsibility for results obtained or damages incurred for their use by Buyer in whole or in part. Such technical advice, application suggestions, recommendations or services are not to be taken as a license to operate under, or intended to suggest infringement of, any existing patent.

DUPONT TEFLON® INDUSTRIAL COATING SYSTEMS

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Thermal Properties

Property	ASTM Standard	Unit	Teflon® PTFE	Teflon® FEP	Teflon® PFA	Teflon® ETFE
Melting Point	D3418	°C	327	260	305	267
		°F	621	500	582	512
Cure Temperature		°C	380-430	360-390	380-400	300-325
		°F	715-805	680-735	715-750	575-615
Max. Use Temperature						
• Continuous		°C	290	205	260	150
		°F	550	400	500	300
• Intermittent		°C	315	230	290	200
		°F	600	450	550	390
Flame Rating**	UL94		V0	V0	V0	V0
Limiting Oxygen Index	D2863	%	>95	>95	>95	30-36
Heat of Combustion	D240	MJ/kg	5.1	5.1	5.3	13.7
		Btu/lb	2,200	2,200	2,300	5,900
Thermal Conductivity		Btu·in/h·ft²·°F	1.7	1.4	1.3	1.65
		W/m-k	0.25	0.20	0.19	0.24

Chemical Properties

Property	ASTM Standard	Unit	Teflon® PTFE	Teflon® FEP	Teflon® PFA	Teflon® ETFE
Chemical/Solvent Resistance	D543		Excellent	Excellent	Excellent	Excellent
Water Absorption, 24 h	D570	%	<0.01	<0.01	<0.03	<0.03
Salt Spray Resistance (6)	B-117					
• on aluminum		Hours	744+	744+	1000	1000
• on steel		Hours	192			
Detergent Resistance (7)						
• on aluminum		Hours	264	744		
• on grit-blasted aluminum		Hours	624	600		
• on grit-blasted steel		Hours	24	480		
Weather Resistance	Florida Exposure	Years Unaffected	20	20	10	15

Electrical Properties

Property	ASTM Standard	Unit	Teflon® PTFE	Teflon® FEP	Teflon® PFA	Teflon® ETFE
Dielectric Constant	D150	1 MHz	2.1	2.1	2.1	2.6
Dielectric Strength (8)	D149	V/µm	18	53	80	79
Dissipation Factor	D150	1 MHz	<0.0001	0.0006	0.0001	0.007
Arc Resistance	D495	sec	>300	>300	>180	122
Volume Resistivity	D257	ohm·cm	$>10^{18}$	$>10^{18}$	$>10^{18}$	$>10^{17}$
Surface Resistivity	D257	ohm/sq	$>10^{18}$	$>10^{16}$	$>10^{17}$	$>10^{15}$

** Statements regarding behavior in a flame situation are not intended to reflect hazards presented by this or any other material when under actual fire conditions.

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PLASTECH
COATINGS

Halar® ECTFE

Halar® ECTFE is a melt processable fluoropolymer offering a unique combination of properties credited to its chemical structure- a 1:1 alternating copolymer of ethylene and chlorotrifluoroethylene. Halar® coatings provide outstanding chemical resistance. It is resistant to strong mineral and oxidizing acids, alkalis, metal etchants, liquid oxygen, and essentially all organic solvents except hot amines. Halar® coatings provide good electrical properties, a broad use temperature range from cryogenic to 300°F (150°C), and meets the requirements of UL-94V-O vertical flame test in thicknesses as low as 7 mils (0.18 mm). It is a tough material with excellent impact strength.

Halar® Properties

Barrier Properties
Excellent- 10 to 100 times better than those of PTFE or FEP to oxygen, carbon dioxide, chlorine gas, or hydrochloric acid.

Electrical Properties
The dielectric constant of Halar® is low and stable across a broad temperature and frequency range. The dielectric strength is 80 kV/mm (2000 V/mil) in .025 mm (1mil) thickness.

Machinability
Similar to Nylon 6

Thermal Properties
Halar® is UL certified for use in non-load bearing applications requiring continuous service at temperatures to 150°C (300°F).

Water Absorption
Less than 0.1%.

Surface Smoothness
Halar® is distinguished from all other fluoropolymers by its exceptional surface smoothness. Halar® exhibits extraordinary smoothness as measured by SEM and AFM analytical methods. A very important benefit of this surface property was demonstrated in biofilm testing. The formation of biorganic films and bacterial colonies was significantly reduced on process surfaces of Halar® versus electropolished stainless steel and PVDF.

Chemical Resistance
Resists a wide variety of corrosive chemicals and organic solvents, including strong acids, chlorine, and aqueous caustics.

Mechanical Properties
Halar® possesses excellent mechanical properties over a wide range of temperatures from cryogenic to 150°C (300°F). It has Nylon-like durability and provides excellent impact resistance at ambient and subambient temperatures. Halar® has good tensile, flexural, and wear-related properties.

Purity
Static soak testing in Ultra-Pure Water and High Purity Chemicals show extremely low levels of metallic and organic extractables. Additional dynamic rinse data also validates Halar® as a material suitable for high purity systems in the semiconductor, biotech, and pharmaceutical industries.

Hydrophobic
Halar® is not wetted by water, but oil and hydrocarbons readily spread on its surface.

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Halar® Applications

Chemical

Containers; diaphragms; protective linings/coatings for tanks, pumps, valves, pipes, scrubbing towers, reactors, thermocouple wells, centrifuge components; heat exchangers, ducting, unsupported pipe and tubing; tower packing; valve seats; filters; dust collectors; mist eliminators; closures; filter fabric; fittings; process system components.

Coatings

Agitators; centrifuges; containers; hoods; membranes; filters; pumps; vessels; reactors; piping systems; caustic collectors; semiconductor chemical storage tanks; electroplating equipment.

Cryogenic and Aerospace

Pump liners; seals; gaskets; valve seats; fittings; gaskets for liquid oxygen and other propellants; components for manned space vehicles and aircraft cabins, space suits.

Medical

Ausimont does not recommend the use of Halar® fluoropolymer for medical applications.

Custom Processing

Halar®-lined glove box for the processing of radioactive materials, high purity pharmaceuticals or semiconductor devices. Halar® fluoropolymer provides excellent chemical resistance, ease of fabrication, and easy cleaning.

Oil and Gas

Ideal material for use in the oil and gas industry due to its good mechanical properties and excellent chemical resistance to a wide variety of organic and inorganic chemicals, even at elevated temperatures. The tough, resistant Halar® fluoropolymer coating extends the life of many down hole components in harsh well environments.

Semiconductor/High Purity

Clean room, fire-safe plastics- Halar® and Clear Halar® ECTFE are approved materials for fire-safe wetbenches and wafer processing equipment. The use of these materials eliminates the need for fixed fire suppression in this equipment.

Other successful applications include DI water high purity processing systems; chemical handling systems including unsupported and supported piping, tanks, and vessels. Factory Mutual Approved for fume and smoke exhaust ductwork with a longer service life than stainless steel. Powder coated surfaces of Halar® fluoropolymer exhibit extraordinary smoothness as measured by SEM and AFM analytical methods. Halar® ECTFE has superior chemical resistance and high temperature resistance up to 150°C (300°F).

Additional Halar® Information

- Excellent resistance to strong acids, such as sulfuric, nitric, hydrochloric, and hydrofluoric, over a wide temperature range.
- Easily handles powder-bleaching agents, such as sodium hypochlorite.
- Resists strong bases, such as sodium hydroxide, that would stress crack PVDF.
- Resists strong polar solvents, such as n-Methyl pyrrolidone and dimethylformamide that would dissolve PVDF.
- Not dissolved by any known solvent to 300°F.
- Best radiation resistance of all fluoropolymers.
- Ozone-resistant.
- Halar® is recommended for high purity fluid systems in semiconductor and other industries.

Halar® is a registered trademark of Ausimont.
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Typical Properties* of HALAR® ECTFE Fluoropolymer

Property	Units	Halar® Grade 6014
Mechanical Properties		
Tensile Strength @ 23°C (73°F)		
at yield	MPa (psi)	32 (4700)
at break		45 (6600)
Elongation		
at yield	%	5
at break		325
Impact Resistance		
Izod notched, 23°C (73°F)	J/m (ft-lbs/in)	No break
Izod notched, 40°C, (40°F)		48 (0.9)
Electrical Properties		
Dielectric Strength		
0.025 mm (1 mil) thick	kV/mm	80 (2000)
3.18 mm (125 mil) thick	(V/mil)	14 (350)
Dielectric Constant		
at 10^3 Hz	—	2.50
at 10^6 Hz		2.57
Dissipation Factor		
at 10^3 Hz	—	.0017
at 10^6 Hz		.017
Thermal Properties		
Melting Point, min.	°C (°F)	220 (428)
Brittleness Temperature	°C (°F)	<-76 (-105)
Maximum Service Temperature	°C (°F)	150 (300)
Other Properties		
Weathering Resistance 1000 hours in weather-o-meter	—	No change
Specific Gravity	—	1.68 ± .05
Moisture Absorption	%	<0.1

*Typical properties, not to be used for specification purposes

Chemical Resistance

Halar® fluoropolymer exhibits outstanding chemical resistance and excellent barrier properties. It is virtually unaffected by most corrosive chemicals commonly encountered in industry.

Among those substances that Halar® fluoropolymer is resistant to are strong mineral and oxidizing acids, alkalis, metal etchants, liquid oxygen and essentially all organic solvents except hot amines (e.g. aniline, dimethylamine).

Typical of fluoropolymers, Halar® is attacked by metallic sodium and potassium. Rate of attack is function of exposure time and temperature.

Halar® and other fluoropolymers can become slightly plasticized by contact with certain halogenated solvents, but this effect does not normally impair its usefulness. After contact ceases and the part is allowed to dry, the mechanical properties return to their original value, indicating that no chemical attack has occurred.

Halar® fluoropolymer is compatible with liquid oxygen (LOX) as measured by the National Aeronautics and Space Administration test MSFC-SPEC-106B. It is resistant to nitrogen tetroxide (NTO) and monomethylhydrazine (MMH).

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Chemical Resistance Data for Halar® ECTFE Fluoropolymer

Chemical Name	Test Temp. °C	Retained Properties			
		Tensile Strength	Elongation	Weight Gain, %	Color Change
Mineral Acids					
Sulfuric Acid, 98%	121	I	I	0.7	3
Hydrochloric Acid, 37%	100	I	I	0.7	3
Chlorosulfonic Acid	50	I	I	4.3	3
Oxidizing Acids					
Nitric Acid, 50%	50	I	I	0.1	1
Chromic Acid, 30%	100	I	I	0.0	2
Inorganic Salts					
Ferric Chloride 55%	100	I	I	-0.1	1
Inorganic Bases					
Sodium Hydroxide, 50%	132	I	I	-0.2	2
Ammonium Hydroxide 30%	140	I	I	1.2	2
Halogens					
Chlorine Water, sat.	121	I	I	3.5	2
Solvents					
Aliphatics					
Hexane	149	A	I	2.7	2
Aromatics					
Benzene	66	A	I	4.2	1
Toluene	50	A	I	3.8	1
Functional Aromatics					
Aniline	100	I	I	2.5	3
Benzaldehyde	100	A	I	5.4	2
Chlorobenzene	50	I	I	4.8	1
Dimethyl Phthalate	100	I	I	2.5	2
Chlorinated Solvents					
Trichloroethylene 1,1,1	20	I	I	0.3	1
Chlorobenzene	50	I	I	4.8	1
Alcohols					
Methanol	50	I	I	0.4	1
Butanol n,	121	I	I	1.9	1
Ethers					
1,4 Dioxane	50	I	I	4.7	1
Tetrahydrofuran	50	A	I	4.3	1
Ketones					
Acetone	100	A	I	3.5	1
Methyl Ethyl Ketone	100	I	I	6.1	1
Methylisobutyl Ketone	100	I	I	5.7	1
Acid					
Acetic Acid	140	I	I	3.4	1
Esters					
Ethyl Acetate	50	I	I	3.4	1
Butyl Acetate	50	A	I	3.8	1
Dimethyl Phthalate	100	I	I	2.5	2
Amines					
Ethylene Diamine	20	I	I	0.3	2
Aniline	100	I	I	2.5	3
Classic Polymer Solvents					
Dimethyl Formamdide N, N	100	I	I	4.8	2
Dimethyl Sulfoxide	100	I	I	1.9	1

LEGEND:

RETAINED PROPERTIES:
I - Insignificant
A - Reduced 25-50%

COLOR CHANGE:
1 - no change
2 - any shade of tan
3 - brown or black

DUPONT TEFLON® INDUSTRIAL COATING SYSTEMS

DuPont Licensed Industrial Applicator
Teflon® Industrial Coatings
Teflon® is a registered trademark of DuPont.

PROFESSIONAL APPLICATORS OF HIGH PERFORMANCE COATINGS
PLASTECH COATINGS

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Mechanical Properties

Halar® fluoropolymer is a strong, highly impact-resistant material that retains its useful properties over a broad range of temperatures. Its low-temperature properties, especially those related to impact, are particularly outstanding. Information on the important mechanical properties is provided in the accompanying table. In addition to excellent impact properties, Halar® fluoropolymer is seen to have good tensile, flexural and wear-related properties.

Mechanical Properties of Halar® ECTFE Fluoropolymer

Property	Units/Test Method	Halar® Flouropolymer Typical Value
Modulus		
Tensile	MPa (psi)	1655 (2.40 x 10^5)
Flexural		1690 (2.45 x 10^5)
Flexural Strength	MPa (psi)	47 (6800)
Drop Weight [1]	ASTM D2444	
2.3 mm (90 mil) sheet	joules (lt-lb/ln.)	
@ 23°C		> 190 (>140)
@ -40°C		> 88 (> 65)
Drop Weight	ASTM D2444	
3/4 in. Schedule 80 pipe	joules (lt-lb/ln.)	
@ 23°C		190 (140) ductile
@ -40°C		270 (200) ductile
Hardness	ASTM D 785	
Rockwell		90
Shore D		75
Coefficient of Friction vs. Steel	———	
Static		0.19
Dynamic, 50 cm/sec.		0.19
Abrasion Resistance [2]	Taber (ASTM D1044)	
500 revs.		0.002
1000 revs		0.005
Armstrong [3]	ASTM D1242	
volume loss	cc	0.3

(1) Tup A per ASTM D2444, 4 in. diameter disc supported on 3 in. I.D. ring.
(2) CS-17 wheels; 500 gram load; abrasion wheels cleaned after every 25 cycles.
(3) 30-pound load.

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