

TENITE™
cellulose acetate butyrate

Chemical resistance

Plastics made from wood pulp—a renewable resource

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Tenite™ cellulose acetate butyrate has been tested in contact with a number of materials, and the results are presented in this brochure.

Most tests were conducted by immersing injection molded specimens of Tenite™ cellulose acetate butyrate in a chemical for the period of time shown. Most figures given are the result of a single test, and the measured gains in weight and thickness are rounded to the nearest 0.1%. Unless stated otherwise, tests were conducted at 23°C (73°F) and solutions were aqueous, i.e., "Acid, acetic, 5%" indicates a 5% solution of acetic acid in water tested at 23°C. Unless other characteristics are specifically mentioned, the information given under "Observed condition of plastic" refers only to the appearance and feel of the plastic specimen.

The test results presented in this report are intended only as a guide for the general chemical resistance of Tenite™ cellulose acetate butyrate. In actual applications where chemical resistance is a concern, it is necessary to conduct testing with the specific chemical, reagent, and end-use article involved. No effort is made in this publication to account for specific chemicals or reagents that may no longer be commercially available or that may have been modified after test results were obtained.

Certain materials designated in this publication are generally unsatisfactory for use in contact with Tenite™ cellulose acetate butyrate. There is no implication that other materials are suited for use with Tenite.

Because results from tests conducted at different temperatures or for different time periods may be different from those shown in this report, users of Tenite™ cellulose acetate butyrate must be guided by their own tests, made under conditions equivalent to or representative of those to which the plastic will be subjected in actual service.

Reagent	Time exposed	Percent increase		Observed condition of plastic
		Weight	Thickness	
Chemicals				
Acids				
Acetic, 5%	1 year	3.6	2.1	Slightly softened
Acetic, 10%	2 months	5.2	2.4	Slightly softened
•Acetic, 30%	2 months	13.6	8.6	Softened and swollen
Boric, 5%	2 days	1.3	0.0	Unchanged
Chromic, 6%	8 days, 38°C (100°F)	2.0	0.1	Slightly stained
Citric, 10%	4 months, 60°C (140°F)	1.6	0.8	Slightly softened
Citric, 10%	1 year	1.4	0.6	Unchanged
•Citric, 60%	4 months, 60°C (140°F)	—	—	Surface attacked
Fluosilicic, 10%	2 months	4.5	1.2	Unchanged
Fluosilicic, 28%	2 months	4.7	3.6	Unchanged
Formic, 3%	20 days	—	—	Unchanged
Hydrochloric, 10%	1 year	0.9	0.5	Surface slightly attacked
•Hydrofluoric, 10%	1 month	10.3	5.5	Slightly swollen and softened
•Hydrofluoric, 48%		—	—	Dissolved
Lactic, 50%	2 days	1.6	0.5	Unchanged
•Nitric, 10%	8 months	—	—	Decomposed
Oleic	1 year	2.3	1.5	Unchanged
Phosphoric, 30%	2 months	1.3	0.8	Unchanged
Phosphoric, 50%	2 months	1.6	0.8	Unchanged
•Phosphoric, 75%	2 months	—	—	Partially decomposed
Pyrogallic, 4%	1 week	2.6	1.1	Stained yellow
Stearic	1 week	—	—	Unchanged
Sulfuric, 3%	1 year	1.6	1.0	Slightly discolored
Sulfuric, 10%	1 year	1.5	0.7	Slightly discolored
•Sulfuric, 20%	1 year	0.9	0.3	Slightly softened, surface attacked
•Sulfuric, 30%	1 year	-0.4	-0.3	Surface attacked
•Sulfuric, 94%		—	—	Disintegrated
Tannic, 10%	4 months, 38°C (100°F)	2.8	1.2	Unchanged
Trichloroacetic, 1%	1 month	3.3	0.5	Unchanged
•Trichloroacetic, 5%	1 month	9.3	3.1	Softened

Reagent	Time exposed	Percent increase		Observed condition of plastic
		Weight	Thickness	
Alcohols, monohydric				
<i>n</i> -Amyl	2 days	3.1	3.0	Unchanged
• <i>tert</i> -Amyl	2 days	14.0	11.3	Softened, tacky
• <i>n</i> -Butyl	2 days	6.5	7.2	Swollen
• <i>sec</i> -Butyl	2 days	7.2	10.7	Swollen
• <i>tert</i> -Butyl	2 days	3.6	3.3	Slightly softened
•Diacetone		—	—	Dissolved
•Ethyl (denatured)	2 days	23.0	24.7	Softened
•Ethyl, 50%	1 week	13.4	11.6	Softened
•2-Ethylhexyl	1 week	—	—	Swollen
•Isoamyl	2 days	2.0	2.1	Very slightly softened
•Isopropyl	2 days	23.4	25.1	Softened, tacky
•Methyl		—	—	Dissolved
Methyl, 5%	1 year	2.0	1.2	Slightly softened
• <i>n</i> -Propyl	2 days	15.0	4.4	Slightly softened
•Tetrahydrofurfuryl		—	—	Dissolved
Alcohols, dihydric and trihydric				
•Diethylene glycol	2 months	8.2	6.1	Softened
2-Ethyl hexanediol-1,3	2 days, 38°C (100°F)	—	—	Unchanged
Ethylene glycol	1 year	4.2	2.1	Unchanged
Glycerin	1 year	0.0	0.4	Unchanged
Propylene glycol	2 days	0.4	0.0	Unchanged
•Triethylene glycol	2 months	8.6	6.7	Softened
Bases				
•Ammonium hydroxide, 10%	2 months	21.9	12.9	Softened
Calcium hydroxide, saturated solution	1 week	1.7	0.7	Unchanged
Sodium hydroxide, 1%	1 year	1.0	0.6	Unchanged
•Sodium hydroxide, 10%	8 months	3.2	2.2	Brittle
Trimethylbenzyl ammonium hydroxide, 5%	17 days	1.1	0.0	Unchanged

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Reagent	Time exposed	Percent increase		Observed condition of plastic
		Weight	Thickness	
Esters				
• <i>n</i> -Butyl acetate		—	—	Dissolved
• <i>sec</i> -Butyl acetate		—	—	Dissolved
Di-2-Ethylhexyl adipate	1 year	0.9	0.3	Unchanged
Di-2-Ethylhexyl phthalate	1 month, 50°C (122°F)	Small gain		
•Ethyl acetate		—	—	Dissolved
•Ethyl lactate		—	—	Dissolved
•Ethyl propionate		—	—	Dissolved
•Ethylene glycol monoethyl ether acetate		—	—	Dissolved
•Ethylene glycol monomethyl ether acetate		—	—	Dissolved
•Isoamyl acetate		—	—	Dissolved
•Isobutyl acetate		—	—	Dissolved
•Isopropyl acetate		—	—	Dissolved
•Methyl acetate		—	—	Dissolved
• <i>n</i> -Propyl acetate		—	—	Dissolved
Ethers				
•Dichlorodiethyl ether		—	—	Dissolved
•Diethyl ether	2 days	46.0	50.0	Considerably swollen
Di-Isopropyl ether	2 days	0.8	1.1	Unchanged
Ether-alcohols				
•Ethylene glycol monoethyl ether		—	—	Dissolved
•Ethylene glycol monomethyl ether		—	—	Dissolved
Hydrocarbons				
Gas, natural, aromatic-free	1 year	—	—	Showed slight decrease in tensile strength and increase in impact strength
Gas, natural, 5% aromatic content	23 days	—	—	Showed slight decrease in tensile strength and increase in impact strength
Heptane	1 year	1.6	2.5	Unchanged
Hexane	1 week	—	—	Unchanged
Propane, gas	2 months	0.3	0.6	Unchanged
Propane, liquid	2 months	1.4	4.6	Unchanged
•Toluene	2 days	39.3	54.9	Softened
•Xylene	1 week	41.5	33.2	Softened

Reagent	Time exposed	Percent increase		Observed condition of plastic
		Weight	Thickness	
Hydrocarbons, halogenated				
•Carbon tetrachloride	2 days	14.8	6.8	Surface slightly softened
•Chlorobenzene		—	—	Dissolved
•Chlorobromomethane		—	—	Dissolved
•Chloroform		—	—	Dissolved
•o-Dichlorobenzene	3 days	—	—	Softened and swollen
•p-Dichlorobenzene	3 days	11.1	11.7	Swollen
•Ethylene chloride		—	—	Dissolved
•Methylene chloride		—	—	Dissolved
•Propylene chloride		—	—	Dissolved
•s-Tetrabromoethane	3 days	—	—	Softened, swollen, and tacky
•Tetrachloroethane		—	—	Dissolved
•Tetrachloroethylene	12 days	—	—	Badly swollen
•Trichloroethylene	1 day	—	—	Badly swollen
Ketones				
•Acetone		—	—	Dissolved
•Cyclohexanone		—	—	Dissolved
•Diisopropyl ketone		—	—	Dissolved
•Methyl ethyl ketone		—	—	Dissolved
•Methyl n-butyl ketone		—	—	Dissolved
•Methyl isobutyl ketone		—	—	Dissolved
•Phorone		—	—	Dissolved

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Reagent	Time exposed	Percent increase		Observed condition of plastic
		Weight	Thickness	
Salts				
Aluminum acetate, basic, 33% water slurry	2 months	1.8	0.6	Unchanged
Aluminum chloride, 10%	2 months	1.5	0.7	Unchanged
Aluminum chloride, saturated solution	2 months	0.1	0.0	Unchanged
Aluminum sulfate, solid	3 months	1.7	1.1	Unchanged
Ammonium bifluoride, saturated solution	1 month	2.3	—	Slightly bleached
Ammonium chloride, saturated solution	1 month	2.1	0.8	Unchanged
Ammonium nitrate, solid	1 week	0.2	0.2	Unchanged
Ammonium nitrate, 10%	1 week	1.7	0.8	Unchanged
Ammonium sulfate, solid	1 year	0.1	0.6	Unchanged
Ammonium sulfate, 10%	1 year	1.3	0.5	Unchanged
Calcium chloride, 2.5%	1 year	1.5	0.9	Unchanged
Calcium chloride, 40%	2 months	0.4	0.0	Unchanged
Calcium hypochlorite, 6%	1 year	6.0	-3.8	Softened and cracked
Calcium hypochlorite, 30%	13 days	0.8	0.0	Unchanged
Calcium phosphate, monobasic, solid	1 year	1.7	0.5	Unchanged
Calcium phosphate, dibasic, solid	1 year	-0.6	0.6	Unchanged
Calcium phosphate, tribasic, solid	1 year	-0.6	0.6	Unchanged
Calcium sulfate (gypsum), solid	1 year	-0.1	0.6	Unchanged
Copper sulfate (cupric), 10%	2 months	1.7	0.6	Unchanged
Copper sulfate, saturated solution	2 months	1.7	0.9	Unchanged
Cuprous chloride, solid	1 week	1.5	—	Unchanged
Ferric ammonium sulfate, solid	1 week, 38°C (100°F), 80% RH	0.3	—	Unchanged
Ferric chloride, 5%	2 months	2.0	0.8	Unchanged
Ferric chloride, 20%	2 months	1.7	1.0	Unchanged
Ferric chloride, 40%	2 months	1.3	0.4	Unchanged
Ferric chloride, saturated solution	1 month	0.9	0.3	Unchanged
Lithium bromide, solid	1 week	-0.7	0.0	Unchanged
Lithium bromide, 50%	1 week	0.0	0.0	Unchanged
Magnesium carbonate, 2.5%	2 days	1.6	1.0	Unchanged
Potassium aluminum sulfate (alum), 21%	4 months, 38°C (100°F)	1.9	0.8	Unchanged
Potassium bromide, 3%	3 days, 38°C (100°F)	1.3	—	Unchanged
Potassium chloride, solid	1 year	0.1	0.5	Unchanged
Potassium chloride, 10%	1 year	1.7	0.4	Unchanged
Potassium chrome alum, 10%	3 days, 38°C (100°F)	1.3	—	Unchanged
Potassium cyanide, 10%	2 months	1.4	0.3	Slightly discolored (brown)
Potassium cyanide, saturated solution	2 months	0.5	0.0	Slightly discolored (brown)
Potassium ferricyanide, 10%	4 days	—	—	Unchanged
Potassium sulfate, solid	1 year	0.1	0.6	Unchanged
Potassium sulfate, 10%	1 year	1.4	0.4	Unchanged
Silver nitrate, 2.5%	2 days	1.5	0.0	Unchanged
Sodium acetate, 3%	3 days, 38°C (100°F)	1.3	—	Unchanged

Reagent	Time exposed	Percent increase		Observed condition of plastic
		Weight	Thickness	
Salts, continued				
Sodium aluminum sulfate, solid	1 week	1.6	0.4	Unchanged
Sodium bicarbonate, 2.5%	2 days	1.7	0.5	Unchanged
Sodium bisulfate, solid	1 week, 38°C (100°F), 80% RH	0.1	—	Unchanged
Sodium bisulfate, 1%	3 days, 38°C (100°F)	1.3	—	Unchanged
Sodium bisulfite, 20%	1 week	2.1	0.8	Unchanged
Sodium borate, 2.5%	2 days	1.5	0.5	Unchanged
Sodium carbonate, solid	1 week, 38°C (100°F), 80% RH	3.9	—	Unchanged
Sodium carbonate, 2.5%	1 year	1.3	0.9	Unchanged
Sodium carbonate, 6%	3 days, 38°C (100°F)	1.2	—	Unchanged
Sodium carbonate, 10%	1 year	—	—	Unchanged
Sodium chloride, 2.5%	1 year	—	—	Unchanged
Sodium chloride, 10%	1 year	1.3	0.5	Unchanged
Sodium chloride, saturated solution	2 months	0.8	0.3	Unchanged
Sodium chloride, saturated solution	2 months, 60°C (140°F)	0.9	0.9	Unchanged
Sodium chromate, saturated solution	1 week	0.6	0.2	Unchanged
Sodium cyanide, 10%	2 months	1.0	0.3	Unchanged
Sodium cyanide, saturated solution	2 months	-0.2	-0.4	Unchanged
Sodium ferrocyanide, solid	1 week	0.8	—	Unchanged
Sodium fluoride, 4%	1 month	2.5	—	Unchanged
Sodium hypochlorite, 30%	13 days	1.1	-2.1	Unchanged
Sodium nitrate, solid	2 months	0.1	0.1	Unchanged
Sodium nitrate, 10%	1 year	1.2	0.4	Unchanged
Sodium nitrate, saturated solution	2 months	0.9	0.4	Unchanged
Sodium silicate, solid	2 months	0.3	0.2	Unchanged
Sodium silicate, saturated solution	2 months	1.2	0.1	Unchanged
Sodium sulfite, 10%	1 week	2.1	0.9	Unchanged
Sodium thiosulfate, 20%	13 days	1.1	0.0	Unchanged
Sodium thiosulfate, 24%	3 days, 38°C (100°F)	1.2	—	Unchanged
Tetra (2-Ethylbutyl) silicate	1 month, 50°C (122°F)	-0.7	-0.1	Unchanged
Trimethyl benzyl ammonium chloride, 5%	17 days	1.1	0.1	Unchanged
Zinc chloride (hydrous salt)	1 week	0.5	0.0	Unchanged
Zinc chloride, saturated solution	1 week	1.4	0.8	Slightly etched
Zinc oxide, solid	1 week	—	—	Unchanged

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Reagent	Time exposed	Percent increase		Observed condition of plastic
		Weight	Thickness	
Miscellaneous chemicals and gases				
Ammoniated mercury	1 week, 60°C (140°F)	—	—	Unchanged
•Aniline		—	—	Dissolved
•Benzaldehyde		—	—	Dissolved
•Butadiene-1,3, liquid	6 months	19.3	26.4	Swollen and softened
Butadiene-1,3, gas	1 month	2.7	2.3	Unchanged
•Carbon disulfide	1 week	25.8	1.6	Softened and swollen
•Carbon disulfide, saturated atmosphere	2 days	17.4	11.8	Warped
•Chlorine, dry	1 week	8.8	2.2	Crazed and brittle
•Chlorine, moist	1 week	7.8	0.1	Crazed and brittle
•Chlorine, saturated solution	1 week	—	—	Considerably softened and swollen
•1,4-Dioxane		—	—	Dissolved
Ethylene oxide, gas	10 minutes, 41°C (105°F)	—	—	Unchanged
•Ethylene oxide, gas	1 day	20.9	25.6	Swollen and softened
Formaldehyde, 4%	10 min per day for 5 days	0.2	—	Unchanged
•Formaldehyde, 35%	2 months	13.0	6.7	Swollen and softened
•Furfural		—	—	Dissolved
Hydrogen peroxide, 3%	1 year	1.7	1.1	Unchanged
Hydrogen peroxide, 5%	2 days	1.4	1.3	Unchanged
Hydrogen sulfide, dry	2 months	2.3	0.8	Unchanged
Hydrogen sulfide, moist	2 months	3.0	1.7	Unchanged
Hydrogen sulfide, saturated solution	2 months	5.9	2.3	Unchanged
Hydroquinone, 20 g per gallon	1 week	2.4	1.0	Slightly stained yellow
•Methyl methacrylate monomer		—	—	Dissolved
•Nitrobenzene		—	—	Dissolved
Ozone, 0.05–0.15 ppm	45 days (outdoors)	—	—	Unchanged
Ozone, 0.7 ppm	45 days, 49°C (120°F)	—	—	Yellowed
•Phenol	1 week	—	—	Decomposed
•Styrene monomer		—	—	Dissolved
Sulfur, solid	1 week	—	—	Unchanged
•Sulfur dioxide, dry	2 months	19.4	8.6	Swollen, slightly warped
•Sulfur dioxide, moist	2 months	31.9	10.2	Considerably swollen and warped
•Sulfur dioxide, saturated	2 months	23.2	18.1	Swollen and warped
•Sulfur dioxide in Hydrocarbons		—	—	Dissolved
•Sulfur dioxide and hydrocarbon vapor	2 months	19.2	11.5	Swollen
•Titanium tetrachloride	3 days	—	—	Very brittle
Trinitrotoluene (TNT), water slurry	4 weeks	—	—	Stained

Reagent	Time exposed	Percent increase		Observed condition of plastic
		Weight	Thickness	

Commercial and natural products

Aeronautical and automotive items

Gasolines				
• Amoco™ regular	1 year	7.7	5.5	Swollen and stained yellow
• Amoco™ premium	1 year	18.4	9.5	Swollen
Aviation 100 octane (Standard Oil Company)	1 year	3.0	3.2	Slightly discolored
• Exxon™ extra	1 year	13.9	9.8	Swollen and stained pink
• Exxon™ regular	1 year	5.2	5.8	Swollen and stained pink
• Shell™ high-test	1 year	11.9	7.5	Swollen and stained pink
• Shell™ regular	1 year	9.9	8.1	Swollen and stained yellow
• Texaco Fire Chief™	1 year	9.7	7.0	Swollen and stained yellow
• Texaco Sky Chief™	1 year	15.0	12.1	Swollen and stained pink
Hydraulic fluids				
• Delco Super 9™ brake fluid	1 week	—	—	Swollen and softened
DuPont No. 7™ heavy-duty brake fluid (VV-B-860)	Screwdriver handle dipped in fluid and allowed to stand 3 days passed torsional requirement of Federal Specification GGG-S-121d.			
• Indian Head™ brake fluid	1 week	—	—	Swollen and stained
• Skydrol™ hydraulic fluid		—	—	Dissolved
• Skydrol 500™ hydraulic fluid		—	—	Dissolved
• Wagner 21-B™ brake fluid	1 week	—	—	Swollen and softened
Jet propulsion fuel 1A	8 months	3.4	3.0	Unchanged
Jet propulsion fuel 3	8 months	3.9	3.2	Unchanged
Jet propulsion fuel 4	8 months	3.4	3.2	Unchanged
Jet propulsion fuel 5	8 months	0.3	0.3	Unchanged
Kerosene	1 week	0.4	1.3	Unchanged
Oils				
Aeroshell™ no. 2	2 months	0.3	0.0	Unchanged
Aeroshell™ no. 12	1 year	0.6	0.3	Unchanged
Aeroshell™ turbine oil no. 300	3 days, 49°C (120°F)	0.0	0.0	
Bearing™ guard oil	4 weeks	0.0	—	Unchanged
Duo-Drive™ oil	4 weeks, 50°C (122°F)	—	—	Unchanged
Houghton Safe™ 1120 lubricating oil	1 week	<1	<1	Unchanged
MIL-L-7808 oil	Screwdriver handle dipped in oil and allowed to stand 3 days passed torsional requirement of Federal Specification GGG-S-121d.			
Puro™ HD, SAE 10	6 months	-0.1	—	Unchanged
Shell™ diala oil AX	2 months	-0.1	0.0	Unchanged
STP™	2 weeks	-0.2	0.1	

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Reagent	Time exposed	Percent increase		Observed condition of plastic
		Weight	Thickness	

Aeronautical and automotive items, continued

Oils, continued				
Texaco™ no. 50, 1692 low-temperature oil, MIL-L-644B	4 weeks, 50°C (122°F)	0.0	0.2	
Winsorlube™	30 minutes, 66°C (150°F)	—	—	Unchanged
Zerolene™ oil	5 weeks, 60°C (140°F)	-1.1	-0.1	Unchanged

Nonautomotive greases and oils

Essential oils				
• Bitter almonds		—	—	Dissolved
• Citronella	2 days	6.1	4.2	Slightly softened
• Eucalyptus	2 days	0.5	1.0	Slightly softened
• Lavender	2 days	0.9	0.5	Unchanged
• Lemon	2 days	0.4	0.0	Unchanged
• Palmarosa	2 days	5.4	4.5	Slightly softened
• Pennyroyal		—	—	Dissolved
• Spearmint		—	—	Dissolved
• Sweet orange	2 days	0.3	0.9	Unchanged
• Terpineol	2 days	0.6	0.0	Unchanged
• Thyme		—	—	Dissolved
• Turpentine	1 year	99.2	62.6	Softened, swollen, surface attacked
• Vanilla (imitation)	2 days	11.8	9.7	Unchanged
• Wintergreen		—	—	Dissolved
Fuel oil #1	1 week	—	—	Unchanged
Fuel oil #2	1 week	—	—	Unchanged
Heavy machine oil	1 day	—	—	Unchanged
Light machine oil	1 day	—	—	Unchanged
Linseed oil	1 month	—	—	Unchanged
Mineral oil	4 months	-0.4	-0.2	Unchanged
Neatsfoot oil	6 weeks	—	—	Unchanged
NO-OX-ID™ grease	3 days, 60°C (140°F)	—	—	Slightly stained
Pine bath oil	1 week	3.9	3.1	Unchanged
Dow-Corning #200™ silicone oil	3 months	0.8	0.2	Unchanged
Silicone grease no. 44 (Dow)	10 days, 71°C (160°F)	—	—	Stained yellow, properties unaffected
Sour crude oil	6 months	6.4	2.2	Unchanged
Soya oil	1 week	—	—	Unchanged
Sperm oil	1 week	-0.8	0.0	Unchanged
Sperm oil	1 week, 90°C (194°F)	-0.5	0.0	Unchanged
Transformer oil, G.E. no. 10-C	1 week, 82°C (180°F)	-0.9	0.2	Unchanged
Pyranol™ transformer oil	1 week, 25°C (77°F)	-0.9	0.0	Unchanged
Pyranol™ transformer oil	1 week, 90°C (194°F)	-0.7	0.0	Unchanged
Wesson™ oil	1 week	0.2	3.6	Unchanged
3-in-1 oil	2 days	0.1	0.0	Unchanged

Reagent	Time exposed	Percent increase		Observed condition of plastic
		Weight	Thickness	
Household items				
•Air Wick™ odor neutralizer	2 months	12.6	12.4	Swollen and slightly softened
Bon Ami™ saturated solution	2 days	1.4	0.5	Unchanged
Borax, 2.5%	2 days	1.5	0.5	Unchanged
Bubble bath oil	1 week	1.7	0.5	Unchanged
Butter	3 days	—	—	Unchanged
Campbell's™ tomato juice	1 week	1.8	1.4	Unchanged
Carbolic acid, 5%	1 week	—	—	Decomposed
Catsup	1 week	—	—	Slightly discolored
Clorox™ solution	6 weeks	—	—	Unchanged
Coffee grounds	3 days	—	—	Unchanged
•Cologne sticks		—	—	Dissolved
Coty™ lipstick	42 days	—	—	Stained
Dole™ frozen pineapple juice concentrate	1 week	1.5	0.5	Unchanged
Dreft™ detergent, 5%	2 months	1.3	0.5	Unchanged
Hershey's™ chocolate syrup	1 week	1.3	0.5	Unchanged
Hind's Honey and Almond™ cream	1 week	1.2	1.5	Unchanged
Horseradish	3 days	—	—	Unchanged
Iced coffee	1 week	1.5	0.8	Stained
Iced tea	1 week	1.5	1.1	Unchanged
Insect repellent "6-12"	2 days, 38°C (100°F)	—	—	Unchanged
Joy™ detergent	2 months	3.5	4.1	Slightly warped
Joy™ detergent, 10%	2 months	1.7	0.8	Unchanged
Lard	3 days	—	—	Unchanged
Lava™ soap, saturated solution	2 days	1.4	0.0	Unchanged
Lemonade	1 week	1.6	1.0	Unchanged
Lemon juice	2 days	2.4	0.2	Unchanged
Lighter fluids				
AMR™	2 months	3.0	2.7	Unchanged
Energene™	2 months	1.4	3.2	Unchanged
Exxon™	2 months	1.8	1.3	Unchanged
Kwik-Lite™	2 days	0.4	0.0	Unchanged
Ronsonol™	1 year	0.3	1.0	Unchanged
Zippo™	2 months	2.2	2.1	Unchanged
Lyso™ disinfectant, 5 tablespoons per gallon of water	2 months	7.0	4.4	Slightly softened
•Malathion™ insecticide, 50% spray	1 week	8.7	4.5	Softened, swollen, surface pitted, cloudy when wet

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Reagent	Time exposed	Percent increase		Observed condition of plastic
		Weight	Thickness	
Household items, continued				
Mayonnaise	3 days	—	—	Unchanged
Milk	3 days	—	—	Unchanged
Minute Maid™ frozen concentrates				
Orange juice	1 week	1.5	0.6	Unchanged
Grapefruit juice	1 week	1.3	0.6	Unchanged
Lemonade	1 week	1.4	0.6	Unchanged
Tangerine juice	1 week	1.4	0.5	Unchanged
Mr. Clean™ detergent	1 year	3.4	2.7	Slightly yellowed
Mustard	11 days	2.3	0.5	Stained
O’Cedar™ furniture polish	2 days	0.1	0.5	Unchanged
Old Dutch™ cleanser, saturated solution	2 days	1.3	0.0	Unchanged
Oleomargarine	3 days	—	—	Unchanged
Peanut butter	3 days	—	—	Unchanged
Penicillin (powder)	1 week, 38°C (100°F), 80% RH	—	—	Unchanged
•Perfume	2 days	34.8	29.1	Swollen
Pine bath oil	1 week	3.9	3.1	Unchanged
Quinine	4 days, 49°C (120°F)	—	—	Unchanged
Stanley™ floor cleaner	1 week	1.8	0.1	Unchanged
Stokely’s™ orange juice	1 week	1.7	0.7	Unchanged
Temp™ cleaner	1 day	—	—	Unchanged
Tide™ detergent, 5%	2 months	1.6	0.2	Unchanged
Toni™ wave lotion	3 days	1.7	0.6	Slightly stained yellow
Toni™ wave lotion neutralizer (potassium bromate solution)	3 days	2.2	0.8	Unchanged
•Vicks™ decongestant	2 days, 50°C (122°F)	—	—	Swollen and stained
Vicks VapoRub™ salve	2 days	0.1	0.0	Unchanged
Vicks Va-Tro-Nol™ solution	2 days	0.1	0.0	Unchanged
•Vitalis™ hair tonic	3 days	—	33.9	Swollen and softened
Watkins™ fly spray	2 months	2.2	1.1	Unchanged
Welch’s™ frozen grape juice concentrate	1 week	1.3	0.5	Unchanged
Welch’s™ grape juice	1 week	1.5	0.6	Unchanged
Wesson™ oil	1 week	0.2	3.6	Unchanged
Wisk™ detergent	1 year	1.1	1.0	Discolored

Reagent	Time exposed	Percent increase		Observed condition of plastic
		Weight	Thickness	
Polymers and plastics				
Polycarbonate	3 days, 38°C (100°F), 80% RH	—	—	Unchanged
Polyurethane foam	3 days, 38°C (100°F), 80% RH	—	—	Unchanged
Vinyl Plastisol™(cured)	2 days, 60°C (140°F)	—	—	Softened and distorted
Vinyl plastic, semirigid	3 days, 38°C (100°F), 80% RH	—	—	Unchanged
Miscellaneous				
Amway™ L.O.C. detergent concentrate	30 days, 50°C (122°F)	—	—	Unchanged
•Bitumastic™ no. 50	3 days	32.6	24.9	Softened, swollen
Blood	1 week	—	—	Unchanged
Budweiser™ lager beer	1 week	2.7	0.8	Unchanged
Canada balsam	3 weeks	0.9	0.3	
•Carboseal™ gas anti-leak compound, liquid	2 months, 38°C (100°F)	26.9	23.2	Softened, swollen, and stained
•Carboseal™ gas anti-leak compound, vapor	2 months, 38°C (100°F)	9.6	8.8	Slightly stained
Caulking compound (average of five brands)	1 week	1.0	0.8	Unchanged
Chlordane, 20%	3 days	3.3	2.4	Unchanged
•Creosate	1 year	11.7	5.5	Softened
•2,4-D (amine type), undiluted (14% free acid)	4 months	5.0	3.6	Slightly swollen and softened
2,4-D, four tablespoons per gallon of water	4 months	1.5	7.6	Very slightly swollen
•End-O-Weed™ weed killer (ester type), undiluted (12.7% as free acid)	4 months	19.5	8.2	Softened, swollen, and discolored
•End-O-Weed™ weed killer, 4 tablespoons per gallon of water	4 months	3.5	1.3	Slightly softened and swollen
•Epoxy hardener		—	—	Dissolved
Epoxy resin	1 month, 50°C (122°F)	-0.1		
Fertilizer (20% disodium phosphate)	3 days, 38°C (100°F)	—	—	Stained yellow
Fertilizer, liquid	3 days	1.4	1.6	Unchanged
Fountain syrups				
Cherry	1 year	3.0	1.8	Unchanged
Cherry Smash™ concentrate	1 year	2.1	1.0	Unchanged
Coca-Cola™ concentrate	1 year	1.7	1.2	Stained slightly yellow
Grape	1 year	1.6	0.0	Unchanged
Lemon	1 year	3.3	1.1	Unchanged
Maple	1 year	1.3	0.1	Unchanged
Orange	1 year	3.4	1.4	Unchanged
Pepsi™	1 year	3.9	3.1	Unchanged
Pineapple	1 year	1.2	0.2	Unchanged
Root beer	1 year	5.0	1.2	Discolored and blistered
Strawberry	1 year	2.0	0.7	Unchanged
Vanilla	1 year	1.7	0.3	Unchanged

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Reagent	Time exposed	Percent increase		Observed condition of plastic
		Weight	Thickness	

Miscellaneous, continued

Gas odorizers				
• Pentalarm 86™ (concentrate)	1 week	—	—	Badly swollen
• Spotleak 1008™ (concentrate)	1 week	—	—	Badly swollen
• Spotleak 1009™ (concentrate)	1 week	—	—	Badly swollen
Inks				
• Carter's™ no. 10,856 ball point ink	10 days, 60°C (140°F)	10.4	6.1	Stained
• Carter's™ no. 10,856 ball point ink	2 months	12.9	7.0	Stained
• Carter's™ no. 4,715 ink	1 week	38.4	32.0	Softened
• Diagraph-Bradley™ stencil ink	1 week	60.7	30.5	Softened, stained
Parker™ superchrome ink	2 days, 38°C (100°F)	—	—	Slightly stained
Quick drying (Formulab, Inc., blue no. 353)	18 days	2.0	0.5	
Sanford's Dri-Line™ black marking ink	3 days	—	—	Stained
Sheaffer's™ skrip ink	1 month	4.1	2.4	Unchanged
Latex emulsion	1 year	1.1	0.3	Unchanged
Malaphos™ 25D insecticide	48 hours, 38°C (100°F), 80% RH	—	—	Surface etched
Mineral spirits	10 days	2.0	2.1	Unchanged
•Mortemoth™ insecticide, liquid	1 week	26.5	16.7	Softened and swollen
Naphtha, industrial	1 month	3.6	2.7	Unchanged
Orthocryl™ yarn size	3 days, 38°C (100°F)	1.8	0.7	Unchanged
Paint remover (CPC 400™)	Used as suggested by manufacturer			Distorted, surface attacked
Paints				
DuPont Dulux™ (outside yellow enamel, oil base)	1 week	2.9	2.5	Unchanged
Pittsburgh™ semi-gloss white (oil base)	1 week	0.8	0.6	Unchanged
Penetrox™ A lubricant	4 weeks, 50°C (122°F)	-0.9	-0.1	Unchanged
Photographic products (all Kodak™)				
Acid fixer	1 week	2.2	0.9	Unchanged
Developer D-72	1 week	2.2	0.9	Unchanged
Developer DK-50	1 week	2.3	0.8	Unchanged
Ektachrome™ processing kit no. E2:				
First developer	1 week	3.1	0.6	Stained yellow
Hardener	1 week	1.6	0.3	Unchanged
Color developer	1 week	1.6	0.8	Stained dark amber
Clearing and fixing solution	1 week	1.6	0.3	Unchanged
Bleach	1 week	1.5	0.3	Stained light amber
Stabilizer	1 week	2.3	0.3	Unchanged

Reagent	Time exposed	Percent increase		Observed condition of plastic
		Weight	Thickness	
Miscellaneous, continued				
Refrigerants				
Freon™ 12, gas	1 month	0.9	0.2	Unchanged
• Freon™ 12, liquid	1 month	18.8	9.5	Slightly swollen
Freon™ 22, gas	1 month	4.3	1.2	Unchanged
• Freon™ 22, liquid		—	—	Dissolved
Freon™ 113 (S2 flow)	3 days	49.3	24.5	
Freon™ 113 (H3 flow)	3 days	0.5	0.2	
Freon™ 114, gas	1 month	0.8	0.0	Unchanged
Freon™ 114, liquid	1 month	7.8	2.4	Unchanged
Showersan™ disinfectant	12 days	1.9	1.2	Unchanged
Solvex™ maintenance scale retarder, 1/5 lb per gallon of water	1 month	1.6	0.6	Unchanged
Steel pickling bath	1 year	1.6	0.6	Unchanged
(3% sulfuric acid and 8% ferrous sulfate)	1 year, 60°C (140°F)	1.5	1.1	Slightly softened
Steel pickling bath	1 year	1.5	0.4	Unchanged
(8% sulfuric acid and 14% ferrous sulfate)	8 months, 71°C (160°F)	-5.9	-4.5	Softened
Stoddard™ solvent, liquid	3 days	0.5	0.0	Unchanged
Stoddard™ solvent, vapor	2 months, 38°C (100°F)	9.6	8.8	Slightly stained
Super market fly spray	1 week	0.5	0.4	Slightly stained
• Taxite™ paint and varnish remover		—	—	Dissolved
Toxaphene™ insecticide, 12% solution	3 days	3.1	1.6	Unchanged
Ultra Solvex™ descaling agent, 1/3 lb per gallon of water	1 month	1.7	0.5	Unchanged
Urine	1 week	1.5	0.4	Unchanged
Varsol No. 2™ solvent	1 week	1.1	0.9	Unchanged
Water, distilled	1 year	1.7	0.7	Unchanged
• Ortho Weed-B-Gon™ weed killer, (ester type), undiluted (13.8% as free acid)	1 month	13.4	6.6	Softened, swollen, discolored, and warped
Ortho Weed-B-Gon™ weed killer, 2 1/2 tablespoons per gallon of water	1 month	2.7	1.1	Softened, swollen, discolored, and warped
Wine (12% ethyl alcohol)	2 months	7.9	5.2	Unchanged

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**Eastman Chemical Company
Corporate Headquarters**

P.O. Box 431
Kingsport, TN 37662-5280 U.S.A.

Telephone:
U.S.A. and Canada, 800-EASTMAN (800-327-8626)
Other Locations, (1) 423-229-2000
Fax: (1) 423-229-1193

Eastman Chemical Latin America

9155 South Dadeland Blvd.
Suite 1116
Miami, FL 33156 U.S.A.

Telephone: (1) 305-671-2800
Fax: (1) 305-671-2805

Eastman Chemical B.V.

Fascinatio Boulevard 602-614
2909 VA Capelle aan den IJssel
The Netherlands

Telephone: (31) 10 2402 111
Fax: (31) 10 2402 100

**Eastman (Shanghai) Chemical
Commercial Company, Ltd. Jingan Branch**

1206, CITIC Square
No. 1168 Nanjing Road (W)
Shanghai 200041, P.R. China

Telephone: (86) 21 6120-8700
Fax: (86) 21 5213-5255

Eastman Chemical Japan Ltd.

MetLife Aoyama Building 5F
2-11-16 Minami Aoyama
Minato-ku, Tokyo 107-0062 Japan

Telephone: (81) 3-3475-9510
Fax: (81) 3-3475-9515

Eastman Chemical Asia Pacific Pte. Ltd.

#05-04 Winsland House
3 Killiney Road
Singapore 239519

Telephone: (65) 6831-3100
Fax: (65) 6732-4930

www.eastman.com

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