ELECTRONIC CODE OF FEDERAL REGULATIONS

e-CFR data is current as of May 19, 2017

Title 21 → Chapter I → Subchapter B → Part 175

Title 21: Food and Drugs

PART 175—INDIRECT FOOD ADDITIVES: ADHESIVES AND COMPONENTS OF COATINGS

Contents

AUTHORITY: 21 U.S.C. 321, 342, 348, 379e.

SOURCE: 42 FR 14534, Mar. 15, 1977, unless otherwise noted.

EDITORIAL NOTE: Nomenclature changes to part 175 appear at 61 FR 14482, Apr. 2, 1996, 66 FR 56035, Nov. 6, 2001, and 70 FR 72074, Dec. 1, 2005.

Back to Top

Subpart A [Reserved]

Back to Top

Subpart B—Substances for Use Only as Components of Adhesives

Back to Top

§175.105 Adhesives.

(a) Adhesives may be safely used as components of articles intended for use in packaging, transporting, or holding food in accordance with the following prescribed conditions:

(1) The adhesive is prepared from one or more of the optional substances named in paragraph (c) of this section, subject to any prescribed limitations.

(2) The adhesive is either separated from the food by a functional barrier or used subject to the following additional limitations:

(i) *In dry foods.* The quantity of adhesive that contacts packaged dry food shall not exceed the limits of good manufacturing practice.

(ii) *In fatty and aqueous foods.* (*a*) The quantity of adhesive that contacts packaged fatty and aqueous foods shall not exceed the trace amount at seams and at the edge exposure between packaging laminates that may occur within the

limits of good manufacturing practice.

(*b*) Under normal conditions of use the packaging seams or laminates will remain firmly bonded without visible separation.

(b) To assure safe usage of adhesives, the label of the finished adhesive container shall bear the statement “food-packaging adhesive”.

(c) Subject to any limitation prescribed in this section and in any other regulation promulgated under section 409 of the Act which prescribes safe conditions of use for substances that may be employed as constituents of adhesives, the optional substances used in the formulation of adhesives may include the following:

(1) Substances generally recognized as safe for use in food or food packaging.

(2) Substances permitted for use in adhesives by prior sanction or approval and employed under the specific conditions of use prescribed by such sanction or approval.

(3) Flavoring substances permitted for use in food by regulations in this part, provided that such flavoring substances are volatilized from the adhesives during the packaging fabrication process.

(4) Color additives approved for use in food.

(5) Substances permitted for use in adhesives by other regulations in this subchapter and substances named in this subparagraph: *Provided, however,* That any substance named in this paragraph and covered by a specific regulation in this subchapter, must meet any specifications in such regulation.

Substances	Limitations
Abietic acid	
Acetone	
Acetone-formaldehyde condensate (CAS Reg. No. 25619-09-4)	
Acetone-urea-formaldehyde resin	
N-Acetyl ethanolamine	
Acetyl tributyl citrate	
Acetyl triethyl citrate	
2-Acrylamido-2-methyl-propanesulfonic acid, homopolymer, sodium salt (CAS Reg. No. 35641-59-9)	
Albumin, blood	
(2-Alkenyl) succinic anhydrides in which the alkenyl groups are derived from olefins which contain not less than 78 percent C_{30} and higher groups (CAS Reg. No. 70983-55-0)	
4-[2-[2-2-(Alkoxy (C_{12}-C_{15}) ethoxy) ethoxy]ethyl] disodium sulfosuccinate	
1-Alkyl (C_6-C_{18}) amino-3-amino-propane monoacetate	
Alkylated (C_4 and/or C_8) phenols	
Alkyl (C_7-$C1_2$) benzene	
Alkyl (C_{10}-C_{20}) dimethylbenzyl ammonium chloride	
n-Alkyl(C_{12}, C_{14}, C_{16}, or C_{18}) dimethyl (ethylbenzyl) ammonium cyclohexylsulfamate	For use as preservative only.
Alkyl ketene dimers as described in §176.120 of this chapter	
Alkyl (C_7-C_{12}) naphthalene	
alpha Olefin sulfonate [alkyl group is in the range of C_{10}-C_{18} with not less than 50 percent C_{14}-C_{16}], ammonium, calcium, magnesium, potassium, and sodium salts	
2-[(2-aminoethyl)amino]ethanol (CAS Reg. No. 111-41-1)	
3-Aminopropanediol	For use only in the preparation of polyurethane resins.
Aluminum	
Aluminum acetate	
Aluminum di(2-ethylhexoate)	
Aluminum potassium silicate	
N-β-Aminoethyl-*gamma*-aminopropyl trimethoxysilane	
3-(Aminomethyl)-3,5,5-trimethylcyclohexylamine	
Aminomethylpropanol	
Ammonium benzoate	For use as preservative only.
Ammonium bifluoride	For use only as bonding agent for aluminum foil, stabilizer or preservative. Total fluoride from all sources not to exceed 1 percent by weight of the finished adhesive.
Ammonium borate	
Ammonium citrate	
Ammonium persulfate	

Ammonium polyacrylate	
Ammonium potassium hydrogen phosphate	
Ammonium silico-fluoride	For use only as bonding agent for aluminum foil, stabilizer, or preservative. Total fluoride from all sources not to exceed 1 percent by weight of the finished adhesive.
Ammonium sulfamate	
Ammonium thiocyanate	
Ammonium thiosulfate	
Amyl acetate	
Anhydroenneaheptitol	
Animal glue as described in §178.3120 of this chapter	
2-Anthraquinone sulfonic acid, sodium salt	For use only as polymerization-control agent.
Antimony oxide	
Asbestos	
Asphalt, paraffinic and naphthenic	
Azelaic acid	
Azo-*bis*-isobutyronitrile	
Balata rubber	
Barium acetate	
Barium peroxide	
Barium sulfate	
Bentonite	
Benzene (benzol)	
1,4-Benzenedicarboxylic acid, bis[2-(1,1-dimethylethyl)-6-[[3-(1,1-dimethylethyl)-2-hydroxy-5-methylphenyl]methyl]-4-methyl-phenyl]ester (CAS Reg. No. 57569-40-1)	For use as a stabilizer.
1,2-Benzisothiazolin-3-one (CAS Registry No. 2634-33-5)	For use as preservative only.
Benzothiazyldisulfide	
p-Benzoxyphenol	For use as preservative only.
Benzoyl peroxide	
Benzyl alcohol	
Benzyl benzoate	
Benzyl bromoacetate	For use as preservative only.
p-Benzyloxyphenol	Do.
BHA (butylated hydroxyanisole)	
BHT (butylated hydroxytoluene)	
Bicyclo[2.2.1]hept-2-ene-6-methyl acrylate	
2-Biphenyl diphenyl phosphate	
Bis(benzoate-*O*)(2-propanolato)aluminum (CAS Reg. No. 105442-85-1)	For use only as a reactant in the preparation of polyester resins.
1,2-Bis(3,5-di-*tert*-butyl-4-hydroxyhydrocinnamoyl)hy-drazine (CAS Reg. No. 32687-78-8)	For use at a level not to exceed 2 percent by weight of the adhesive.
1,3-Bis(2-benzothiazolylmercaptomethyl) urea	
4,4′-Bis(α,α-dimethylbenzyl)diphenylamine	
2,6-Bis(1,1-dimethylethyl)-4-(1-methylpropyl)phenol (CAS Reg. No. 17540-75-9)	For use as an antioxidant and/or stabilizer only.
2,6-Bis (1-methylheptadecyl)-*p*-cresol	
4-[[4, 6-Bis(octylthio)6-Bis(octylthio)6-Bis(octylthio)-*s*-triazin-2-yl]amino]-2,6-di-*tert*-butylphenol (CAS Reg. No. 991-84-4)	
Bis(tri-*n*-butyltin) oxide	For use as preservative only.
Bis(trichloromethyl)sulfone C.A. Registry No. 3064-70-8	Do.
Borax	
Boric acid	
2-Bromo-2-nitro-1, 3-propanediol (CAS Reg. No. 52-51-7)	For use only as an antibacterial preservative.
Butanedioic acid, sulfo-1,4-di-(C_9-C_{11} alkyl) ester, ammonium salt (also known as butanedioic acid, sulfo-1,4-diisodecyl ester, ammonium salt [CAS Reg. No. 144093-88-9]).	For use as a surface active agent in adhesives.
1,3-Butanediol	

1,4-Butanediol	
1,4-Butanediol modified with adipic acid	
Butoxy polyethylene polyproplyene glycol (molecular weight 900-4,200)	
Butyl acetate	
Butyl acetyl ricinoleate	
Butyl alcohol	
Butylated reaction product of *p*-cresol and dicyclopentadiene	As identified in §178.2010(b) of this chapter.
Butylated, styrenated cresols identified in §178.2010(b) of this chapter	
Butyl benzoate	
Butyl benzyl phthalate	
Butyldecyl phthalate	
1,3-Butylene glycoldiglycolic acid copolymer	
tert-Butyl hydroperoxide	
4,4′-Butylidenebis(6-*tert*-butyl-*m*-cresol)	
Butyl lactate	
Butyloctyl phthalate	
p-tert-Butylphenyl salicylate	
Butyl phthalate butyl glycolate	
p-tert-Butylpyrocatechol	For use only as polymerization-control agent.
Butyl ricinoleate	
Butyl rubber polymer	
Butyl stearate	
Butyl titanate, polymerized	
Butyraldehyde	
Calcium ethyl acetoacetate	
Calcium nitrate	
Calcium metasilicate	
Camphor	
Camphor fatty acid esters	
Candelilla wax	
epsilon-Caprolactam-(ethylene-ethyl acrylate) graft polymer	
Carbon black, channel process	
Carbon disulfide-1,1′-methylenedipiperidine reaction product	
Carbon tetrachloride	
Carboxymethylcellulose	
Castor oil, polyoxyethylated (4-84 moles ethylene oxide)	
Cellulose acetate butyrate	
Cellulose acetate propionate	
Ceresin wax (ozocerite)	
Cetyl alcohol	
Chloracetamide	
Chloral hydrate	
Chlorinated liquid *n*-paraffins with chain lengths of C_{10}-C_{17}, containing 40-70 percent chlorine by weight	
Chlorinated pyridine mixture with active ingredients consisting of 2,3,5,6-tetrachloro-4-(methylsulfonyl) pyridine, 2,3,5,6-tetrachloro-4-(methylsulfinyl) pyridine and pentachloropyridine	For use as preservative only.
Chlorinated rubber polymer (natural rubber polymer containing approximately 67 percent chlorine)	
1-(3-Chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride	For use as preservative only.
Chlorobenzene	
4-Chloro-3,5-dimethylphenol (*p*-chloro-*m*-xylenol)	For use as preservative only.
4-Chloro-3-methylphenol	Do.
5-Chloro-2-methyl-4-isothiazolin-3-one (CAS Reg. No. 26172-55-4) and 2-methyl-4-isothiazolin-3-one (CAS Reg. No. 2682-20-4) mixture at a ratio of 3 parts to 1 part, manufactured from methyl-3-mercaptopropionate (CAS Reg. No. 2935-90-2). The mixture may contain magnesium nitrate (CAS Reg. No. 10377-60-3) at a concentration equivalent to the isothiazolone active ingredients (weight/weight)	For use only as an antimicrobial agent in polymer latex emulsions.
Chloroform	
Chloroprene	
Chromium caseinate	
Chromium nitrate	
Chromium potassium sulfate	
Cobaltous acetate	
Coconut fatty acid amine salt of tetrachlorophenol	For use as preservative only.
Copal	
Copper 8-quinolinolate	For use as preservative only.
Coumarone-indene resin	
Cresyl diphenyl phosphate	
Cumene hydroperoxide	
Cyanoguanidine	
Cyclized rubber as identified in §176.170(b)(2) of this chapter	
Cyclohexane	
1,4-Cyclohexanedimethanoldibenzoate (CAS Reg. No. 35541-81-2)	

Cyclohexanol	
Cyclohexanone resin	
Cyclohexanone-formaldehyde condensate	
N-Cyclohexyl *p*-toluene sulfonamide	
(η^5-Cyclopentadienyl)-(η^6-isopropylbenzene)iron(II) hexafluorophosphate (CAS Reg. No. 32760-80-8)	For use only as a photoinitiator.
Damar	
Defoaming agents as described in §176.210 of this chapter	
Dehydroacetic acid	
Diacetone alcohol	
Diacetyl peroxide	
N,N′-Dialkoyl-4,4′-diaminodiphenylmethane mixtures where; the alkoyl groups are derived from marine fatty acids (C_{12}-C_{24})	
2,5-Di-*tert*-amylhydroquinone	
Diamines derived from dimerized vegetable oil acids	
Diaryl-*p*-phenylenediamine, where the aryl group may be phenyl, tolyl, or xylyl	
1,2-Dibromo-2,4-dicyanobutane (CAS Registry No. 3569-65-7)	For use as a preservative only.
2,2-Dibromo-3-nitrilopropionamide (CAS Reg. No. 10222-01-2).	For use as a preservative only.
Di(butoxyethyl) phthalate	
2,5-Di-*tert*-butylhydroquinone	
Dibutyl maleate	
2,6-Di-*tert*-butyl-4-methylphenol	For use as preservative only.
Di(C_7, C_9-alkyl)adipate	
Dibutyl phthalate	
Dibutyl sebacate	
Dibutyltin dilaurate for use only as a catalyst for polyurethane resins	
1,2-Dichloroethylene (mixed isomers)	
Dicumyl peroxide	
Dicyclohexyl phthalate	
Diethanolamine	
Diethanolamine condensed with animal or vegetable fatty acids	
Diethylamine	
Diethylene glycol	
Diethylene glycol adipic acid copolymer	
Diethylene glycol dibenzoate	
Diethylene glycol hydrogenated tallowate monoester	
Diethylene glycol laurate	
Diethylene glycol monobutyl ether	
Diethylene glycol monobutyl ether acetate	
Diethylene glycol monoethyl ether	
Diethylene glycol monoethyl ether acetate	
Diethylene glycol monomethyl ether	
Diethylene glycol monooleate	
Diethylene glycol monophenyl ether	
Diethylene glycol copolymer of adipic acid and phthalic anhydride	
Di(2-ethylhexyl) adipate	
Di(2-ethylhexyl)hexahydrophthalate	
Di(2-ethylhexyl)phthalate	
Diethyl oxalate	
Diethyl phthalate	
Dihexyl phthalate	
Dihydroabietylphthalate	
Di(2-hydroxy-5-*tert*-butylphenyl) sulfide	
2,2′-Dihydroxy-5,5′-dichlorodiphenylmethane (dichlorophene)	
4,5-Dihydroxy-2-imidazolidinone	
4-(Diiodomethylsulfonyl) toluene CA Registry No.: 20018-09-01	For use as an antifungal preservative only.
Diisobutyl adipate	
Diisobutyl ketone	
Diisobutylphenoxyethoxyethyl dimethyl benzyl ammonium chloride	
Diisobutyl phthalate	
Diisodecyl adipate	
Diisodecyl phthalate	
Diisooctyl phthalate	
Diisopropylbenzene hydroperoxide	
N,N-Dimethylcyclohexylamine dibutyldithiocarbamate	
Dimethyl formamide	
Dimethyl hexynol	
2,2-Dimethyl-1,3-propanediol dibenzoate	
Dimethyl octynediol	
N-(1,1-dimethyl-3-oxobutyl) acrylamide	
Dimethyl phthalate	
3,5-Dimethyl-1,3,5,2*H*-tetrahydrothiadiazine-2-thione	For use as preservative only.

Di-β-naphthyl-*p*-phenylenediamine	
4,6-Dinonyl-*o*-cresol	
Dinonylphenol	
Di-*n*-octyldecyl adipate	
Dioctyldiphenylamine	
Dioctylphthalate	
Dioctylsebacate	
Dioxane	
Dipentaerythritol pentastearate	
Dipentamethylene-thiuram-tetrasulfide	
Dipentene	
Dipentene resins	
Dipentene-*beta*-pinene-styrene resins	
Dipentene-styrene resin (CAS Registry No. 64536-06-7)	
Diphenyl-2-ethylhexyl phosphate	
Diphenyl, hydrogen ated	
N,N′-Diphenyl-*p*-phenylenediamine	
Diphenyl phthalate	
1,3-Diphenyl-2-thiourea	
Dipropylene glycol	
Dipropylene glycol dibenzoate	
Dipropylene glycol monomethyl ether	
Dipropylene glycol copolymer of adipic acid and phthalic anhydride	
Disodium cyanodithioimidocarbonate	
Disodium 4-isodecyl sulfosuccinate (CAS Reg. No. 37294-49-8)	
N,N′-Distearoylethylenediamine	
Distearyl thiodipropionate	
3,5-Di-*tert*-butyl-4-hydroxyhydrocinnamic acid triester with 1,3,5-tris(2-hydroxyethyl)-*s*-triazine-2,4,6(1*H,* 3*H,* 5*H*)-trione	For use as antioxidant only.
4,4′-Dithiodimorpholine	
n-Dodecylmercaptan	
tert-Dodecylmercaptan	
Dodecylphenoxybenzene-disulfonic acid and/or its calcium, magnesium, and sodium salts	
Elemi gum	
Epichlorohydrin-4,4′-isopropylidenediphenol resin	
Epichlorohydrin-4,4′-*sec*-butylidenediphenol resin	
Epichlorohydrin-4,4′-isopropylidene-di-o-cresol resin	
Epichlorohydrin-phenolformaldehyde resin	
Erucamide (erucylamide)	
Ethanolamine	
Ethoxylated primary linear alcohols of greater than 10 percent ethylene oxide by weight having molecular weights of 390 to 7,000 (CAS Reg. No. 97953-22-5)	
Ethoxypropanol butyl ether	
Ethyl alcohol (ethanol)	
5-Ethyl-1,3-diglycidyl-5-methylhydantoin (CAS Reg. No. 15336-82-0)	
Ethylene-acrylic acid-carbon monoxide copolymer (CAS Reg. No. 97756-27-9)	
Ethylene-acrylic acid copolymer, partial sodium salt containing no more than 20 percent acrylic acid by weight, and no more than 16 percent of the acrylic acid as the sodium salt (CAS Reg. No. 25750-82-7)	
Ethylenediamine	
Ethylenediaminetetra-acetic acid, calcium, ferric, potassium, or sodium salts, single or mixed	
Ethylene dichloride	
Ethylene glycol	
Ethylene glycol monobutyl ether	
Ethylene glycol monobutyl ether acetate	
Ethylene glycol monoethyl ether	
Ethylene glycol monoethyl ether acetate	
Ethylene glycol monoethyl ether ricinoleate	
Ethylene glycol monomethyl ether	
Ethylene glycol monophenyl ether	
Ethylene-carbon monoxide copolymer (CAS Reg. No. 25052-62-4) containing not more than 30 weight percent of the units derived from carbon monoxide	
Ethylene-maleic anhydride copolymer, ammonium or potassium salt	
Ethylene-methacrylic acid copolymer partial salts: Ammonium, calcium, magnesium, sodium, and/or zinc	
Ethylene-methacrylic acid-vinyl acetate copolymer partial salts: Ammonium, calcium, magnesium, sodium, and/or zinc	
Ethylene-octene-1 copolymers containing not less than 70 weight percent ethylene (CAS Reg. No. 26221-73-8)	
Ethylene-propylene-dicyclopentadiene copolymer rubber	
Ethylene, propylene, 1,4-hexadiene and 2,5-norbornadiene tetrapolymer	
Ethylene-vinyl acetate carbon monoxide terpolymer (CAS Registry No. 26337-35-9) containing not more than 15 weight percent of units derived from carbon monoxide	
2,2′-Ethylidenebis (4,6-di-*tert*-butylphenol) (CAS Reg. No. 35958-30-6)	
Ethyl-*p*-hydroxybenzoate	For use as preservative only.
Ethyl hydroxyethylcellulose	
Ethyl lactate	
2,2′-Ethylidenebis(4,6-di-*tert*-butylphenyl)fluorophosphonite (CAS Reg. No. 118337-09-0)	For use as an antioxidant and/or stabilizer only.
Ethyl phthalyl ethyl glycolate	
Ethyl-*p*-toluene sulfonamide	
Fats and oils derived from animal or vegetable sources, and the hydrogenated, sulfated, or sulfonated forms of such fats and oils	

Fatty acids derived from animal or vegetable fats and oils; and salts of such acids, single or mixed, as follows:	
Aluminum	
Ammonium	
Calcium	
Magnesium	
Potassium	
Sodium	
Zinc	
Ferric chloride	
Fluosilicic acid (hydrofluosilicic acid)	For use only as bonding agent for aluminum foil, stabilizer, or preservative. Total fluoride from all sources not to exceed 1 percent by weight of the finished adhesive.
Formaldehyde	
Formaldehyde *o*- and *p*-toluene sulfonamide	
Formamide	
Fumaratochromium (III) nitrate	
Furfural	
Furfuryl alcohol	
Fumaric acid	
gamma-Aminopropyltrimethoxysilane (CAS Reg. No. 13822-56-5)	
Glutaraldehyde	
Glycerides, di- and monoesters	
Glycerol polyoxypropylene triol, minimum average molecular weight 250 (CAS Reg. No. 25791-96-2)	For use only in the preparation of polyester and polyurethane resins in adhesives.
Glyceryl borate (glycol boriborate resin)	
Glyceryl ester of damar, copal, elemi, and sandarac	
Glyceryl monobutyl ricinoleate	
Glyceryl monohydroxy stearate	
Glyceryl monohydroxy tallowate	
Glyceryl polyoxypropylene triol (average molecular weight 1,000)	
Glyceryl tribenzoate	
Glycol diacetate	
Glyoxal	
Heptane	
Hexamethylenetetramine	
Hexane	
Hexanetriols	
Hexylene glycol	
Hydroabietyl alcohol	
Hydrocarbon resins (produced by polymerization of mixtures of mono- and di-unsaturated hydrocarbons of the aliphatic, alicyclic, and monobenzenoid type derived both from cracked petroleum and terpene stocks) (CAS Reg. No. 68239-99-6)	
Hydrocarbon resins (produced by the polymerization of styrene and *alpha*-methyl styrene), hydrogenated (CAS Reg. No. 68441-37-2)	
Hydrofluoric acid	For use only as bonding agent for aluminum foil, stabilizer, or preservative. Total fluoride from all sources not to exceed 1 percent by weight of the finished adhesive.
Hydrogen peroxide	
Hydrogenated dipentene resin (CAS Reg. No. 106168-39-2)	
Hydrogenated dipentene-styrene copolymer resin (CAS Reg. No. 106168-36-9)	
Hydrogenated-*beta*-pinene-*alpha*-pinene-dipentene copolymer resin (CAS Reg. No. 106168-37-0)	
a-Hydro-*omega*-hydroxypoly-(oxytetramethylene)	For use only in the preparation of polyurethane resins.
Hydroquinone	
Hydroquinone monobenzyl ether	
Hydroquinone monoethyl ether	
2(2′-Hydroxy-3′,5′ di-*tert*-amylphenyl) benzotriazole	
Hydroxyacetic acid	
7-Hydroxycoumarin	
Hydroxyethylcellulose	
2-Hydroxy-1-[4-(2-hydroxyethoxy)phenyl]-2-methyl-1-propanone(CAS Reg. No. 106797-53-9)	For use only as a photoinitiator at a level not to exceed 5

	percent by weight of the adhesive.
1-(2-Hydroxyethyl)-1-(4-chlorobutyl)-2 alkyl (C_6-C_{17}) imidazolinium chloride	
Hydroxyethyldiethylenetriamine	
β-Hydroxyethyl pyridinium 2-mercaptobenzothiazol	
Hydroxyethyl starch	
Hydroxyethylurea	
Hydroxylamine sulfate	
5-Hydroxymethoxymethyl-1-aza-3,7-dioxabicyclo[3.3.0]octane, 5-hydroxymethyl-1-aza-3,7-dioxabicyclo[3.3.0]octane, and 5-hydroxypoly-[methyleneoxy]methyl-1-aza-3,7-dioxabicyclo[3.3.0] octane mixture	For use only as an antibacterial preservative.
Hydroxypropyl methylcellulose	
2-(Hydroxymethyl)-2-methyl-1,3-propanediol tribenzoate	
2-Imidazolidinone	
3-Iodo-2-propynyl-N-butyl carbamate (CAS Reg. No. 55406-53-6)	For use only as an antifungal preservative.
Iodoform	For use only as polymerization-control agent.
Isoascorbic acid	
Isobutyl alcohol (isobutanol)	
Isobutylene-isoprene copolymer	
Isodecyl benzoate (CAS Reg. No. 131298-44-7)	
Isophorone	
Isopropanolamine (mono-, di-, tri-)	
Isopropyl acetate	
Isopropyl alcohol (isopropanol)	
Isopropyl-*m*- and *p*-cresol (thymol derived)	
4,4′-Isopropylidenediphenol	
4,4′-Isopropylidenediphenol, polybutylated mixture	For use as preservative only.
Isopropyl peroxydicarbonate	
p-Isopropoxy diphenylamine	
4,4′-Isopropylidene-bis(*p*-phenyleneoxy)-di-2-propanol	
Itaconic acid	
Japan wax	
Kerosene	
Lauroyl peroxide	
Lauroyl sulfate salts:	
Ammonium	
Magnesium	
Potassium	
Sodium	
Lauryl alcohol	
Lauryl pyridinium 5-chloro-2-mercaptobenzothiazole	
Lignin calcium sulfonate	
Lignin sodium sulfonate	
Linoleamide (linoleic acid amide)	
Magnesium fluoride	For use only as bonding agent for aluminum foil, stabilizer, or preservative. Total fluoride from all sources not to exceed 1 percent by weight of the finished adhesives.
Magnesium glycerophosphate	
Maleic acid	
Maleic anhydride-diisobutylene copolymer, ammonium or sodium salt	
Manganese acetate	
Marine oil fatty acid soaps, hydrogenated	
Melamine	
Melamine-formaldehyde copolymer	
2-Mercaptobenzothiazole	
2-Mercaptobenzothiazole and dimethyl dithiocarbamic acid mixture, sodium salt	For use as preservative only.
2-Mercaptobenzothiazole, sodium or zinc salt	For use as preservative only.
Methacrylate-chromic chloride complex, ethyl or methyl ester	
p-Menthane hydroperoxide	
Methyl acetate	
Methyl acetyl ricinoleate	
Methyl alcohol (methanol)	
Methylcellulose	
Methylene chloride	

4,4′-Methylenebis(2,6-di-*tert*-butylphenol)	
2,2-Methylenebis (4-ethyl-6-*tert*-butylphenol)	
2,2-Methylenebis (4-methyl-6-nonylphenol)	
2,2-Methylenebis (4-methyl-6-*tert*-butylphenol)	
Methyl ethyl ketone	
Methyl ethyl ketone-formaldehyde condensate	
2-Methylhexane	
1-Methyl-2-hydroxy-4-isopropyl benzene	
Methyl isobutyl ketone	
Methyl oleate	
Methyl oleate-palmitate mixture	
Methyl phthalyl ethyl glycolate	
Methyl ricinoleate	
Methyl salicylate	
a-Methylstyrene-vinyltoluene copolymer resins (molar ratio 1 *a* methylstyrene to 3 vinyltoluene)	
Methyl tallowate	
Mineral oil	
Monochloracetic acid	
Monooctyldiphenylamine	
Montan wax	
Morpholine	
Myristic acid-chromic chloride complex	
Myristyl alcohol	
Naphtha	
Naphthalene, monosulfonated	
Naphthalene sulfonic acid-formaldehyde condensate, sodium salt	
α-Naphthylamine	
α,α′,α″,α‴-Neopentane tetrayltetrakis [*omega*-hydroxypoly (oxypropylene) (1-2 moles)], average molecular weight 400	
Nitric acid	
μ-Nitrobiphenyl	
Nitrocellulose	
2-Nitropropane	
α-(*p*-Nonylphenyl)-*omega*-hydroxypoly (oxyethylene) mixture of dihydrogen phosphate and monohydrogen phosphate esters; the nonyl group is a propylene trimer isomer and the poly (oxyethylene) content averages 6-9 moles or 50 moles	
α(*p*-Nonylphenyl)-*omega*-hydroxypoly (oxyethylene) produced by the condensation of 1 mole of *p*-nonylphenol (nonyl group is a propylene trimer isomer) with an average of 1-40 moles of ethylene oxide	
α-(*p*-Nonylphenyl)-*omega*-hydroxypoly (oxyethylene) sulfate, ammonium salt: the nonyl group is a propylene trimer isomer and the poly (oxyethylene) content averages 9 or 30 moles	
endo-*cis*-5-Norbornene-2,3-dicarboxylic anhydride	
α-*cis*-9-Octadecenyl-*omega*-hydroxypoly (oxyethylene); the octadecenyl group is derived from oleyl alcohol and the poly (oxyethylene) content averages 20 moles	
Octadecyl 3,5-di-*tert*-butyl-4-hydroxyhydrocinnamate	
Octyl alcohol	
Octyldecyl phthalate	
Octylphenol	
Octylphenoxyethanols	
Octylphenoxypolyethoxy-polypropoxyethanol (13 moles of ethylene oxide and propylene oxide)	
Odorless light petroleum hydrocarbons	
Oleamide (oleic acid amide)	
Oleic acid, sulfated	
2,2′-Oxamidobis[ethyl 3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)propionate] (CAS Reg. No. 70331-94-1)	
Oxazoline	
α-(oxiranylmethyl)-ω-(oxiranylmethoxy)poly[oxy(methyl-1,2-ethanediyl)], (alternative name: epichlorohydrin-polypropylene glycol) (CAS Reg. No. 26142-30-3)	For use as a reactant in the preparation of epoxy-based resins.
2,2′-[oxybis[(methyl-2,1-ethanediyl)-oxymethylene]]bisoxirane, (alternative name: epichlorohydrin-dipropylene glycol) (CAS Reg. No. 41638-13-5)	For use as a reactant in the preparation of epoxy-based resins.
n-Oxydiethylene-benzothiazole	
Palmitamide (palmitic acid amide)	
Paraffin (C_{12}-C_{20}) sulfonate	
Paraformaldehyde	
Pentachlorophenol	
Pentaerythritol ester of maleic anhydride	
Pentaerythritol monostearate	For use as preservative only.
Pentaerythritol tetrabenzoate [CAS Registry No. 4196-86-5]	
Pentaerythritol tetrastearate	
2,4-Pentanedione	
Pentasodium diethylenetriaminepentaacetate (CAS Reg. No. 140-01-2)	
Perchloroethylene	
Petrolatum	
Petroleum hydrocarbon resin (cyclopentadiene type), hydrogenated	
Petroleum hydrocarbon resin (produced by the catalytic polymerization and subsequent hydrogenation of styrene, vinyltoluene, and indene types from distillates of cracked petroleum stocks)	
Petroleum hydrocarbon resins (produced by the homo-and copolymerization of dienes and olefins of the aliphatic, alicyclic, and monobenzenoid arylalkene types from distillates of cracked petroleum stocks)	
Phenol	For use as

	preservative only.
Phenol-coumarone-indene resin	
Phenolic resins as described in §175.300(b)(3)(vi)	
Phenothiazine	For use only as polymerization-control agent.
Phenyl-β-naphthylamine (free of β-naphthylamine)	
o-Phenylphenol	For use as preservative only.
o-Phthalic acid	
Pimaric acid	
Pine oil	
Piperazine	
Piperidinium pentamethylenedithiocarbamate	
Poly(acrylamide-[2-acrylamide-2-methylpropylsulfonate]-dimethylidiallyl ammonium chloride) sodium salt (CAS Reg. No. 72275-68-4)	
Polyamides derived from reaction of one or more of the following acids with one or more of the following amines:	
Acids:	
Azelaic acid	
Dimerized vegetable oil acids	
Amines:	
Bis(hexamethylene) triamine and higher homologues	
Diethylenetriamine	
Diphenylamine	
Ethylenediamine	
Hexamethylenediamine	
Poly(oxypropylene)diamine (weight average molecular weight 2010) (CAS Reg. No. 9046-10-0)	
Poly(oxypropylene)diamine (weight average molecular weight 440) (CAS Reg. No. 9046-10-0)	
Tetraethylenepentamine	
Triethylenetetramine	
Polybutene, hydrogenated	
Polybutylene glycol (molecular weight 1,000)	
Poly [2(diethylamino) ethyl methacrylate] phosphate	
Polyester of adipic acid, phthalic acid, and propylene glycol, terminated with butyl alcohol	
Polyester of diglycolic acid and propylene glycol containing ethylene glycol monobutyl ether as a chain stopper	
Polyester resins (including alkyd type), as the basic polymer, formed as esters when one or more of the following acids are made to react with one or more of the following alcohols:	
Acids:	
Azelaic acid	
Dimethyl 1,4-cyclohexanedicarboxylate (CAS Reg. No. 94-60-0)	
Dimethyl-5-sulfoisophthalic acid (CAS Reg. No. 50975-82-1) and/or its sodium salt (CAS Reg. No. 3965-55-7)	
Polybasic and monobasic acids identified in §175.300(b)(3)(vii)(*a*) and (*b*)	
5-sulfo-1,3-benzenedicarboxylic acid, monosodium salt (CAS Reg. No. 6362-79-4)	
Tetrahydrophthalic acid	
Alcohols:	
1,4-Cyclohexanedimethanol	
2,2-Dimethyl-1,3-propanediol	
1,6-Hexanediol (CAS Reg. No. 629-11-8)	
Polyhydric and monohydric alcohols identified in §175.300(b)(3)(vii)(*c*) and (*d*)	
Polyethyleneadipate modified with ethanolamine with the molar ratio of the amine to the adipic acid less than 0.1 to 1	For use only in the preparation of polyurethan resins.
Polyethylene glycol (molecular weight 200-6,000)	
Polyethylene glycol mono-isotridecyl ether sulfate, sodium salt (CAS Reg. No. 150413-26-6)	
Polyethyleneglycol alkyl(C_{10}-C_{12})ether sulfosuccinate, disodium salt (CAS Reg. No. 68954-91-6)	
Polyethylene, oxidized	
Polyethylene resins, carboxyl modified, identified in §177.1600 of this chapter	
Polyethylenimine	
Polyethylenimine-epichlorohydrin resins	
Poly(ethyloxazoline) (CAS Reg. No. 25805-17-8)	
Polyisoprene	
Polymeric esters of polyhydric alcohols and polycarboxylic acids prepared from glycerin and phthalic anhydride and modified with benzoic acid, castor oil, coconut oil, linseed oil, rosin, soybean oil, styrene, and vinyl toluene	
Polymers: Homopolymers and copolymers of the following monomers:	
Acrylamide	
Acrylic acid	
Acrylonitrile	
Allylmethacrylate (CAS Reg. No. 00096-05-09)	
Butadiene	
Butene	
N-tert-Butylacrylamide	
Butyl acrylate	
1,3-Butylene glycol dimethacrylate	
Butyl methacrylate	
Crotonic acid	
Decyl acrylate	
Diallyl fumarate	
Diallyl maleate	
Diallyl phthalate	
Dibutyl fumarate	

Dibutyl itaconate	
Dibutyl maleate	
Di(2-ethylhexyl) maleate	
Dimethyl-α-methylstyrene	
Dioctyl fumarate	
Dioctyl maleate	
Divinylbenzene	
Ethyl acrylate	
Ethylene	
Ethylene cyanohydrin	
2-Ethylhexyl acrylate	
Ethyl methacrylate	
Fatty acids, C_{10-13}-branched, vinyl esters (CAS Reg. No. 184785-38-4)	
Fumaric acid and/or its methyl, ethyl, propyl, butyl, amyl hexyl, heptyl and octyl esters	
Glycidyl methacrylate	
1-Hexene (CAS Reg. No. 592-41-6)	
2-Hydroxyethyl acrylate	
2-Hydroxyethyl methacrylate	
2-Hydroxypropyl methacrylate	
Isobutyl acrylate	
Isobutylene	
Itaconic acid	
Maleic acid, diester with 2-hydroxyethanesulfonic acid, sodium salt	
Maleic anhydride	
Methacrylic acid	
Methyl acrylate	
N,N'-Methylenebisacrylamide	
Methyl methacrylate	
N-Methylolacrylamide	
Methyl styrene	
-Methyl styrene	
Monoethyl maleate	
Monomethyl maleate	
Mono (2-ethylhexyl) maleate	
5-Norbornene-2 3-dicarboxylic acid, mono-*n*-butyl ester	
1-Octene (CAS Reg. No. 111-66-0)	
Propyl acrylate	
Propylene	
Styrene	
Triallyl cyanurate	
Vinyl acetate	
Vinyl alcohol (from alcoholysis or hydrolysis of vinyl acetate units)	
Vinyl butyrate	
Vinyl chloride	
Vinyl crotonate	
Vinyl ethyl ether	
Vinyl hexoate	
Vinylidene chloride	
Vinyl methyl ether	
Vinyl pelargonate	
Vinyl propionate	
Vinyl pyrrolidone	
Vinyl stearate	
Polyoxyalkylated-phenolic resin (phenolic resin obtained from formaldehyde plus butyl- and/or amylphenols, oxyalkylated with ethylene oxide and/or propylene oxide)	
Poly(oxycaproyl) diols and triols (minimum molecular weight 500)	
Polyoxyethylated (40 moles) tallow alcohol sulfate, sodium salt	
Polyoxyethylene (20 mol)—anhydrous lanolin adduct	
Polyoxyethylene (molecular weight 200) dibenzoate	
Polyoxyethylene (molecular weight 200-600) esters of fatty acids derived from animal or vegetable fats and oils (including tall oil)	
Polyoxyethylene (15 moles) ester of rosin	
Polyoxyethylene (4-5 moles) ether of phenol	
Polyoxyethylene (25 moles)—glycerol adduct	
Polyoxyethylene (40 moles) stearate	
Polyoxyethylene (5-15 moles) tridecyl alcohol	
Polyoxypropylene (3 moles) tridecyl alcohol sulfate	
Polyoxypropylene (20 moles) butyl ether	
Polyoxypropylene (40 moles) butyl ether	
Polyoxypropylene (20 moles) oleate butyl ether	
Polyoxypropylene-polyoxyethylene condensate (minimum molecular weight 1,900)	
Polypropylene glycol (minimum molecular weight 150)	
Polypropylene glycol (3-4 moles) triether with 2-ethyl-2-(hydroxymethyl)-1,3-propane-diol, average molecular weight 730	
Polypropylene glycol dibenzoate (CAS Reg. No. 72245-46-6)	For use as a plasticizer at levels not to exceed 20 percent by weight of the finished adhesive.
Polypropylene, noncrystalline	

Polysiloxanes:	
Diethyl polysiloxane	
Dihydrogen polysiloxane	
Dimethyl polysiloxane	
Diphenyl polysiloxane	
Ethyl hydrogen polysiloxane	
Ethyl phenyl polysiloxane	
Methyl ethyl polysiloxane	
Methyl hydrogen polysiloxane	
Methyl phenyl polysiloxane	
Phenyl hydrogen polysiloxane	
Polysorbate 60	
Polysorbate 80	
Polysorbate 20 (polyoxyethylene (20) sorbitan monolaurate)	
Polysorbate 40 (polyoxyethylene (20) sorbitan monopalmitate)	
Poly[styrene-co-disodium maleate-co-α-(*p*-nonyl-phenyl)-*omega*-(*p*-vinyl-benzyl)poly(oxyethylene)] terpolymer	
Polytetrafluoroethylene.	
Polyurethane resins produced by: (1) reacting diisocyanates with one or more of the polyols or polyesters named in this paragraph, or (2) reacting the chloroformate derivatives of one or more of the polyols or polyesters named in this paragraph with one or more of the polyamines named in this paragraph, or (3) reacting toluene diisocyanate or 4,4′ methylenebis(cyclohexylisocyanate) (CAS Reg. No. 5124-30-1) with: (i) one or more of the polyols or polyesters named in this paragraph and with either *N*-methyldiethanolamine (CAS Reg. No. 105-59-9) and dimethyl sulfate (CAS Reg. No. 77-78-1) or dimethylolpropionic acid (CAS Reg. No. 4767-03-7) and triethylamine (CAS Reg. No. 121-44-8), or (ii) a fumaric acid-modified polypropylene glycol or fumaric acid-modified tripropylene glycol), triethylamine (CAS Reg. No. 107-15-3), and ethylenediamine (CAS Reg. No. 121-44-8), or (4) reacting *meta*-tetramethylxylene diisocyanate (CAS Reg. No. 2778-42-9) with one or more of the polyols and polyesters listed in this paragraph and with dimethylolpropionic acid (CAS Reg. No. 4767-03-7) and triethylamine (CAS Reg. No. 121-44-8), *N*-methyldiethanolamine (CAS Reg. No. 105-59-9), 2-dimethylaminoethanol (CAS Reg. No. 108-01-0), 2-dimethylamino-2-methyl-1-propanol (CAS Reg. No. 7005-47-2), and/or 2-amino-2-methyl-1-propanol (CAS Reg. No. 124-68-5)	
Polyvinyl alcohol modified so as to contain not more than 3 weight percent of comonomer units derived from 1-alkenes having 12 to 20 carbon atoms	
Polyvinyl butyral	
Polyvinyl formal	
Potassium ferricyanide	For use only as polymerization-control agent.
Potassium *N*-methyldithiocarbamate	
Potassium pentachlorophenate	For use as preservative only.
Potassium permanganate	
Potassium persulfate	
Potassium phosphates (mono-, di-, tribasic)	
Potassium tripolyphosphate	
α, α′, α″-1,2,3-Propanetriyltris [*omega*-(2,3-epoxypropoxy) poly (oxypropylene) (24 moles)]	
β-Propiolactone	
Propyl alcohol (propanol)	
Propylene carbonate	
Propylene glycol and *p-p′*-isopropylidenediphenol diether	
Propylene glycol dibenzoate (CAS Reg. No. 19224-26-1)	For use as a plasticizer at levels not to exceed 20 percent by weight of the finished adhesive.
Propylene glycol esters of coconut fatty acids	
Propylene glycol monolaurate	
Propylene glycol monomethyl ether	
Propylene glycol monostearate	
α, α′, α″-[Propylidynetris (methylene)] tris [*omega*-hydroxypoly (oxypropylene) (1.5 moles minimum)], minimum molecular weight 400	
Quaternary ammonium chloride (hexadecyl, octadecyl derivative)	For use as preservative only.
Rosin (wood, gum, and tall oil rosin), rosin dimers, decarboxylated rosin (including rosin oil, disproportionated rosin, and these substances as modified by one or more of the following reactants:	
Alkyl (C_1-C_9) phenolformaldehyde	
Ammonia	
Ammonium caseinate-*p*-Cyclohexylphenolformaldehyde	
Diethylene glycol	
Dipentaerythritol	
Ethylene glycol	
Formaldehyde	
Fumaric acid	
Glycerin	
Hydrogen	
Isophthalic acid	
4,4′-Isopropylidenediphenol-epichlorohydrin (epoxy)	
4,4′-Isopropylidenediphenol-formaldehyde	
Maleic anhydride	
Methyl alcohol	
Pentaerythritol	
Phthalic anhydride	
Polyethylene glycol	
Phenol-formaldehyde	

Phenyl μ-cresol-formaldehyde	
p-Phenylphenol-formaldehyde	
Sulfuric acid	
Triethylene glycol	
Xylenol-formaldehyde	
Rosin salts (salts of wood, gum, and tall oil rosin, and the dimers thereof, decarboxylated rosin disproportionated rosin, hydrogenated rosin):	
Aluminum	
Ammonium	
Calcium	
Magnesium	
Potassium	
Sodium	
Zinc	
Rosin, gasoline-insoluble fraction	
Rubber hydrochloride polymer	
Rubber latex, natural	
Salicylic acid	For use as preservative only.
Sandarac	
Sebacic acid	
Shellac	
Silicon dioxide as defined in §172.480(a) of this chapter	
Sodium alkyl (C_2-$C_{13.5}$ aliphatic) benezenesulfonate	
Sodium aluminum pyrophosphate	
Sodium aluminum sulfate	
Sodium bisulfate	
Sodium calcium silicate	
Sodium capryl polyphosphate	
Sodium carboxymethylcellulose	
Sodium chlorate	
Sodium chlorite	
Sodium chromate	
Sodium decylsulfate	
Sodium dehydroacetate	For use as preservative only.
Sodium di-(2-ethylhexoate)	
Sodium di-(2-ethylhexyl) pyrophosphate	
Sodium dihexylsulfosuccinate	
Sodium dissobutylphenoxydiethoxyethyl sulfonate	
Sodium diisobutylphenoxymonoethoxyethyl sulfonate	
Sodium diisopropyl- and triisopropylnaphthalenesulfonate	
Sodium dimethyldithiocarbamate	
Sodium dioctylsulfosuccinate	
Sodium *n*-dodecylpolyethoxy (50 moles) sulfate	
Sodium ethylene ether of nonylphenol sulfate	
Sodium 2-ethylhexyl sulfate	
Sodium fluoride	For use only as bonding agent for aluminum foil, stabilizer, or preservative. Total fluoride for all sources not to exceed 1 percent by weight of the finished adhesive.
Sodium formaldehyde sulfoxylate	
Sodium formate	
Sodium heptadecylsulfate	
Sodium hypochlorite	
Sodium isododecylphenoxypolyethoxy (40 moles) sulfate	
Sodium *N*-lauroyl sarcosinate	
Sodium metaborate	
Sodium α-naphthalene sulfonate	
Sodium nitrate	
Sodium nitrite	
Sodium oleoyl isopropanolamide sulfosuccinate	
Sodium pentachlorophenate	For use as preservative only.
Sodium perborate	
Sodium persulfate	
Sodium μ-phenylphenate	For use as preservative only.
Sodium polyacrylate	
Sodium polymethacrylate	
Sodium polystyrene sulfonate	
Sodium salicylate	For use as

	preservative only.
Sodium salt of 1-hydroxy 2(1H)-pyridine thione	Do.
Sodium tetradecylsulfate	
Sodium thiocyanate	
Sodium bis-tridecylsulfosuccinate	
Sodium xylene sulfonate	
Sorbitan monooleate	
Sorbitan monostearate	
Soybean oil, epoxidized	
Spermaceti wax	
Sperm oil wax	
Stannous 2-ethylhexanoate	For use only as a catalyst for polyurethane resins.
Stannous stearate	
Starch hydrolysates	
Starch or starch modified by one or more of the treatments described in §§172.892 and 178.3520 of this chapter	
Starch, reacted with a urea-formaldehyde resin	
Starch, reacted with formaldehyde	
Stearamide (stearic acid amide)	
Stearic acid	
Stearic acid-chromic chloride complex	
Stearyl-cetyl alcohol, technical grade, approximately 65 percent-80 percent stearyl and 20 percent-35 percent cetyl	
Strontium salicylate	
Styrenated phenol	
Styrene block polymers with 1,3-butadiene	
Styrene-maleic anhydride copolymer, ammonium or potassium salt	
Styrene-maleic anhydride copolymer (partially methylated) sodium salt	
Styrene-methacrylic acid copolymer, potassium salt	
Sucrose acetate isobutyrate	
Sucrose benzoate	
Sucrose octaacetate	
2-sulfoethyl methacrylate (CAS Registry No. 10595-80-9)	For use at levels not to exceed 2 percent by weight of the dry adhesive.
α-Sulfo-omega-(dodecyloxy)poly (oxyethylene), ammonium salt	
Sulfonated octadecylene (sodium form)	
Sulfosuccinic acid 4-ester with polyethylene glycol dodecyl ether disodium salt (alcohol moiety produced by condensation of 1 mole of *n*-dodecyl alcohol and an average of 5-6 moles of ethylene oxide, Chemical Abstracts Service Registry No. 039354-45-5)	
Sulfosuccinic acid 4-ester with polyethylene glycol nonylphenyl ether, disodium salt (alcohol moiety produced by condensation of 1 mole of nonylphenol and an average of 9-10 moles of ethylene oxide) (CAS Reg. No. 9040-38-4)	
Sulfur	
Synthetic primary linear aliphatic alcohols whose weight average molecular weight is greater than 400 (CAS Reg. No. 71750-71-5)	
Synthetic wax polymer as described in §176.170(a)(5) of this chapter	
Tall oil	
Tall oil fatty acids, linoleic and oleic	
Tall oil fatty acid methyl ester	
Tall oil, methyl ester	
Tall oil pitch	
Tall oil soaps	
Tallow alcohol (hydrogenated)	
Tallow amine, secondary (hexadecyl, octadecyl), of hard tallow	
Tallow, blown (oxidized)	
Tallow, propylene glycol ester	
Terpene resins (α-and β-pinene) homopolymers, copolymers, and condensates with phenol, formaldehyde, coumarone, and/or indene	
Terphenyl	
Terphenyl, hydrogenated	
Terpineol	
Tetraethylene pentamine	
Tetraethylthiuram disulfide	
Tetrahydrofuran	
Tetrahydrofurfuryl alcohol	
Tetra-isopropyl titanate	
Tetrakis[methylene (3,5-di-*tert*-butyl-4-hydroxy-hydro-cinnamate)] methane	
α[*p*-(1,1,3,3-Tetramethylbutyl) phenyl]-*omega*-hydroxypoly-(oxyethylene) produced by the condensation of 1 mole of *p*-(1,1,3,3-tetramethylbutyl) phenol with an average of 1-40 moles of ethylene oxide	
α-[*p*-(1,1,3,3-Tetramethylbutyl) phenyl]-*omega*-hydroxy-poly(oxyethylene) mixture of dihydrogen phosphate and monohydrogen phosphate esters and their sodium, potassium, and ammonium salts having a poly(oxyethylene) content averaging 6-9 or 40 moles	
Tetramethyl decanediol	
Tetramethyl decynediol	
Tetramethyl decynediol plus 1-30 moles of ethylene oxide	
Tetramethylthiuram monosulfide	
Tetrasodium *N*-(1,2-dicarboxyethyl)*N*-octadecylsulfosuccinamate	
4,4′-Thiobis-6-*tert*-butyl-*m*-cresol	
Thiodiethylene-bis(3,5-di-*tert*-butyl-4-hydroxyhydrocinnamate)	
2,2′-(2,5-Thiophenediyl) bis[5-*tert*-butylbenzoxazole]	
Thiram	
Thymol	For use as

	preservative only.
Titanium dioxide	
Titanium dioxide-barium sulfate	
Titanium dioxide-calcium sulfate	
Titanium dioxide-magnesium silicate	
Toluene	
Toluene 2,4-diisocyanate	
Toluene 2,6-diisocyanate	
o- and *p*-Toluene ethyl sulfonamide	
o- and *p*-Toluene sulfonamide	
p-Toluene sulfonic acid	
p-(*p*'-Toluene-sulfonylamide)-diphenylamide	
Triazine-formaldehyde resins as described in §175.300(b)(3)(xiii)	
Tributoxyethyl phosphate	
Tributylcitrate	
Tri-*tert*-butyl-*p*-phenyl phenol	For use as preservative only.
Tributyl phosphate	
Tributyltin chloride complex of ethylene oxide condensate of dehydroabietylamine	For use as preservative only.
Tri-*n*-butyltin acetate	For use as preservative only.
Tri-*n*-butyltin neodecanoate	Do.
1,1,1-Trichloroethane	
1,1,2-Trichloroethane	
Trichloroethylene	
Tri-β-chloroethylphosphate	
Tridecyl alcohol	
Triethanolamine	
3-(Triethoxysilyl) propylamine	
Triethylene glycol	
Triethylene glycol dibenzoate	
Triethylene glycol di(2-ethylhexoate)	
Triethylene glycol polyester of benzoic acid and phthalic acid	
Triethylhexyl phosphate	
Triethylphosphate	
2,4,5-Trihydroxy butyrophenone	
Triisopropanolamine	
Trimethylol propane	
2,2,4-Trimethylpentanediol-1,3-diisobutyrate	
Trimeric aromatic amine resin from diphenylamine and acetone of molecular weight approximately 500	
Tri(nonylphenyl) phosphite-formaldehyde resins	As identified in §177.2600(c)(4)(iii) of this chapter. For use only as a stabilizer.
Triphenylphosphate	
Tripropylene glycol monomethyl ether	
1,3,5-Tris (3,5-di-*tert*-butyl-4-hydroxy-benzyl)-triazine-2,4,6 (1H,3H,5H)-trione	
Tris (*p*-tertiary butyl phenyl) phosphate	
Tris(2-methyl-4-hydroxy-5-*tert*-butyl-phenyl)butane	
Trisodium *N*-hydroxyethylethylenediaminetriacetate (CAS Reg. No. 139-89-9)	
Turpentine	
Urea-formaldehyde resins as described in §175.300(b)(3)(xii)	
Vegetable oil, sulfonated or sulfated, potassium salt	
Vinyl acetate-maleic anhydride copolymer, sodium salt	
Waxes, petroleum	
Wax, petroleum, chlorinated (40% to 70% chlorine)	
Waxes, synthetic paraffin (Fischer-Tropsch process)	
3-(2-Xenolyl)-1,2-epoxypropane	
Xylene	
Xylene (or toluene) alkylated with dicyclopentadiene	
Zein	
Zinc acetate	
Zinc ammonium chloride	
Zinc dibenzyl dithiocarbamate	
Zinc dibutyldithiocarbamate	
Zinc diethyldithiocarbamate	
Zinc di(2-ethylhexoate)	
Zinc formaldehyde sulfoxylate	
Zinc naphthenate and dehydroabietylamine mixture	
Zinc nitrate	
Zinc orthophosphate	
Zinc resinate	
Zinc sulfide	
Zineb (zinc ethylenebis-dithiocarbamate)	
Ziram (zinc dimethyldithiocarbamate)	

[42 FR 14534, Mar. 15, 1977; 42 FR 56728, Oct. 28, 1977]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting §175.105, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at *www.fdsys.gov.*

Back to Top

§175.125 Pressure-sensitive adhesives.

Pressure-sensitive adhesives may be safely used as the food-contact surface of labels and/or tapes applied to food, in accordance with the following prescribed conditions:

(a) Pressure-sensitive adhesives prepared from one or a mixture of two or more of the substances listed in this paragraph may be used as the food-contact surface of labels and/or tapes applied to poultry, dry food, and processed, frozen, dried, or partially dehydrated fruits or vegetables.

(1) Substances generally recognized as safe in food.

(2) Substances used in accordance with a prior sanction or approval.

(3) Color additives listed for use in or on food in parts 73 and 74 of this chapter.

(4) Substances identified in §172.615 of this chapter other than substances used in accordance with paragraph (a)(2) of this section.

(5) Polyethylene, oxidized; complying with the identity prescribed in §177.1620(a) of this chapter.

(6) 4-[[4, 6-Bis(octylthio)-*s*-triazin-2-yl]amino]-2,6-di-*tert*-butylphenol (CAS Reg. No. 991-84-4) as an antioxidant/stabilizer at a level not to exceed 1.5 percent by weight of the finished pressure-sensitive adhesive.

(7) 2,2′-(2,5-Thiophenediyl)-bis(5-*tert*-butylbenzoxazole) (CAS Reg. No. 7128-64-5) as an optical brightener at a level not to exceed 0.05 percent by weight of the finished pressure-sensitive adhesive.

(8) 2-Hydroxy-1-[4-(2-hydroxyethoxy) phenyl]-2-methyl-1-propanone (CAS Reg. No. 106797-53-9) as a photoinitiator at a level not to exceed 5 percent by weight of the pressure-sensitive adhesive.

(9) Butanedioic acid, sulfo-1,4-di-(C_9-C_{11} alkyl) ester, ammonium salt (also known as butanedioic acid sulfo-1, 4-diisodecyl ester, ammonium salt [CAS Reg. No. 144093-88-9]) as a surface active agent at a level not to exceed 3.0 percent by weight of the finished pressure-sensitive adhesive.

(b) Pressure-sensitive adhesives prepared from one or a mixture of two or more of the substances listed in this paragraph may be used as the food-contact surface of labels and/or tapes applied to raw fruit and raw vegetables.

(1) Substances listed in paragraphs (a)(1), (a)(2), (a)(3), (a)(5), (a)(6), (a)(7), (a)(8), and (a)(9) of this section, and those substances prescribed by paragraph (a)(4) of this section that are not identified in paragraph (b)(2) of this section.

(2) Substances identified in this subparagraph and subject to the limitations provided:

BHA.

BHT.

Butadiene-acrylonitrile copolymer.

Butadiene-acrylonitrile-styrene copolymer.

Butadiene-styrene copolymer.

Butyl rubber.

Butylated reaction product of *p*-cresol and dicyclopentadiene produced by reacting *p*-cresol and dicyclopentadiene in an approximate mole ratio of 1.5 to 1.0, respectively, followed by alkylation with isobutylene so that the butyl content of the final product is not less than 18 percent, for use at levels not to exceed 1.0 percent by weight of the adhesive formulation.

Chlorinated natural rubber.

Isobutylene-styrene copolymer.

Petrolatum.

Polybutene-1.

Polybutene, hydrogenated; complying with the identity prescribed under §178.3740(b) of this chapter.

Polyisobutylene.

cis-1,4-Polyisoprene.

Polystyrene.

Propyl gallate.

Rapeseed oil, vulcanized.

Rosins and rosin derivatives as provided in §178.3870 of this chapter.

Rubber hydrochloride.

Rubber (natural latex solids or crepe, smoked or unsmoked).

Terpene resins (α- and β-pinene), homopolymers, copolymers, and condensates with phenol, formaldehyde, coumarone, and/or indene.

Tetrasodium ethylenediaminetetraacetate.

Tri(mixed mono- and dinonylphenyl) phosphite (which may contain not more than 1 percent by weight of triisopropanolamine).

(c) Acrylonitrile copolymers identified in this section shall comply with the provisions of §180.22 of this chapter.

[42 FR 14534, Mar. 15, 1977, as amended at 42 FR 15674, Mar. 22, 1977; 48 FR 15617, Apr. 12, 1983; 63 FR 3464, Jan. 23, 1998; 63 FR 51528, Sept. 28, 1998; 64 FR 48291, Sept. 3, 1999]

Back to Top

Subpart C—Substances for Use as Components of Coatings

Back to Top

§175.210 Acrylate ester copolymer coating.

Acrylate ester copolymer coating may safely be used as a food-contact surface of articles intended for packaging and holding food, including heating of prepared food, subject to the provisions of this section:

(a) The acrylate ester copolymer is a fully polymerized copolymer of ethyl acrylate, methyl methacrylate, and methacrylic acid applied in emulsion form to molded virgin fiber and heat-cured to an insoluble resin.

(b) Optional substances used in the preparation of the polymer and in the preparation and application of the emulsion may include substances named in this paragraph, in an amount not to exceed that required to accomplish the desired technical effect and subject to any limitation prescribed: *Provided, however,* That any substance named in this paragraph and covered by a specific regulation in subchapter B of this chapter must meet any specifications in such regulation.

List of substances	Limitations
Aluminum stearate	
Ammonium lauryl sulfate	
Borax	Not to exceed the amount required as a preservative in emulsion defoamer.
Disodium hydrogen phosphate	Do.
Formaldehyde	
Glyceryl monostearate	
Methyl cellulose	
Mineral oil	
Paraffin wax	
Potassium hydroxide	
Potassium persulfate	
Tallow	
Tetrasodium pyrophosphate	
Titanium dioxide	

(c) The coating in the form in which it contacts food meets the following tests:

(1) An appropriate sample when exposed to distilled water at 212 °F for 30 minutes shall yield total chloroform-soluble extractables not to exceed 0.5 milligram per square inch.

(2) An appropriate sample when exposed to *n*-heptane at 120 °F for 30 minutes shall yield total chloroform-soluble extractables not to exceed 0.5 milligram per square inch.

Back to Top

§175.230 Hot-melt strippable food coatings.

Hot-melt strippable food coatings may be safely applied to food, subject to the provisions of this section.

(a) The coatings are applied to and used as removable coatings for food.

(b) The coatings may be prepared, as mixtures, from the following substances:

(1) Substances generally recognized as safe in food.

(2) Substances identified in this subparagraph.

List of substances	Limitations
Acetylated monoglycerides	Complying with 172.828 of this chapter.
Cellulose acetate butyrate	
Cellulose acetate propionate	
Mineral oil, white	For use only as a component of hot-melt strippable food coatings applied to frozen meats and complying with §172.878 of this chapter.

Back to Top

§175.250 Paraffin (synthetic).

Synthetic paraffin may be safely used as an impregnant in, coating on, or component of coatings on articles used in producing, manufacturing, packing, processing, preparing, treating, packaging, transporting, or holding food in accordance with the following prescribed conditions:

(a) The additive is synthesized by the Fischer-Tropsch process from carbon monoxide and hydrogen, which are catalytically converted to a mixture of paraffin hydrocarbons. Lower molecular-weight fractions are removed by distillation. The residue is hydrogenated and may be further treated by percolation through activated charcoal. This mixture can be fractionated into its components by a solvent separation method, using synthetic isoparaffinic petroleum hydrocarbons complying with §178.3530 of this chapter.

(b) Synthetic paraffin shall conform to the following specifications:

(1) *Congealing point.* There is no specification for the congealing point of synthetic paraffin components, except those components that have a congealing point below 50 °C when used in contact with food Types III, IVA, V, VIIA, and IX identified in table 1 of §176.170(c) of this chapter and under conditions of use E, F, and G described in table 2 of §176.170(c) of this chapter shall be limited to a concentration not exceeding 15 percent by weight of the finished coating. The congealing point shall be determined by ASTM method D938-71 (Reapproved 1981), “Standard Test Method for Congealing Point of Petroleum Waxes, Including Petrolatum,” which is incorporated by reference. Copies may be obtained from the American Society for Testing Materials, 100 Barr Harbor Dr., West Conshohocken, Philadelphia, PA 19428-2959, or may be examined at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.*

(2) *Oil content.* The substance has an oil content not exceeding 2.5 percent as determined by ASTM method D721-56T, “Tentative Method of Test for Oil Content of Petroleum Waxes” (Revised 1956), which is incorporated by reference. See paragraph (b)(1) of this section for availability of the incorporation by reference.

(3) *Absorptivity.* The substance has an absorptivity at 290 millimicrons in decahydronaphthalene at 88 °C not exceeding 0.01 as determined by ASTM method E131-81a, “Standard Definitions of Terms and Symbols Relating to Molecular-Spectroscopy,” which is incorporated by reference. See paragraph (b)(1) of this section for availability of the incorporation by reference.

(c) The provisions of this section are not applicable to synthetic paraffin used in food-packaging adhesives complying with §175.105.

[42 FR 14534, Mar. 15, 1977, as amended at 47 FR 11839, Mar. 19, 1982; 49 FR 10106, Mar. 19, 1984; 51 FR 47010, Dec. 30, 1986; 60 FR 39645, Aug. 3, 1995]

Back to Top

§175.260 Partial phosphoric acid esters of polyester resins.

Partial phosphoric acid esters of polyester resins identified in this section and applied on aluminum may be safely used as food-contact coatings, in accordance with the following prescribed conditions:

(a) For the purpose of this section, partial phosphoric acid esters of polyester resins are prepared by the reaction of trimellitic anhydride with 2,2-dimethyl-1,3-propanediol followed by reaction of the resin thus produced with phosphoric acid anhydride to produce a resin having an acid number of 81 to 98 and a phosphorus content of 4.05 to 4.65 percent by weight.

(b) The coating is chemically bonded to the metal and cured at temperatures exceeding 450 °F.

(c) The finished food-contact coating, when extracted with the solvent or solvents characterizing the type of food and under the conditions of time and temperature characterizing the conditions of its intended use, as determined from tables 1 and 2 of §175.300(d), yields total extractives in each extracting solvent not to exceed 0.3 milligrams per square inch of food-contact surface, as determined by the methods described in §175.300(e), and the coating yields 2,2-dimethyl-1,3-propanediol in each extracting solvent not to exceed 0.3 micrograms per square inch of food-contact surface. In testing the finished food-contact articles, a separate test sample is to be used for each required extracting solvent.

Back to Top

§175.270 Poly(vinyl fluoride) resins.

Poly(vinyl fluoride) resins identified in this section may be safely used as components of food-contact coatings for containers having a capacity of not less than 5 gallons, subject to the provisions of this section.

(a) For the purpose of this section, poly(vinyl fluoride) resins consist of basic resins produced by the polymerization of vinyl fluoride.

(b) The poly(vinyl fluoride) basic resins have an intrinsic viscosity of not less than 0.75 deciliter per gram as determined by ASTM method D1243-79, "Standard Test Method for Dilute Solution Viscosity of Vinyl Chloride Polymers," which is incorporated by reference. Copies may be obtained from the American Society for Testing Materials, 100 Barr Harbor Dr., West Conshohocken, Philadelphia, PA 19428-2959, or may be examined at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.*

(1) *Solvent. N,N*-Dimethylacetamide, technical grade.

(2) *Solution.* Powdered resin and solvent are heated at 120 °C until the resin is dissolved.

(3) *Temperature.* Flow times of the solvent and solution are determined at 110 °C.

(4) *Viscometer.* Cannon-Ubbelohde size 50 semimicro dilution viscometer (or equivalent).

(5) *Calculation.* The calculation method used is that described in appendix X 1.3 (ASTM method D1243-79, "Standard Test Method for Dilute Solution Viscosity of Vinyl Chloride Polymers," which is incorporated by reference; see paragraph (b) of this section for availability of the incorporation by reference) with the reduced viscosity determined for three concentration levels not greater than 0.5 gram per deciliter and extrapolated to zero concentration for intrinsic viscosity. The following formula is used for determining reduced viscosity:

$$\text{Reduced viscosity in terms of deciliters per gram} = \frac{t - to}{to \times c}$$

View or download PDF

where:

t = Solution efflux time.

to = Solvent efflux time.

c = Concentration of solution in terms of grams per deciliter.

[42 FR 14534, Mar. 15, 1977, as amended at 47 FR 11839, Mar. 19, 1982; 49 FR 10107, Mar. 19, 1984]

Back to Top

§175.300 Resinous and polymeric coatings.

Resinous and polymeric coatings may be safely used as the food-contact surface of articles intended for use in producing, manufacturing, packing, processing, preparing, treating, packaging, transporting, or holding food, in accordance with the following prescribed conditions:

(a) The coating is applied as a continuous film or enamel over a metal substrate, or the coating is intended for repeated food-contact use and is applied to any suitable substrate as a continuous film or enamel that serves as a functional barrier between the food and the substrate. The coating is characterized by one or more of the following descriptions:

(1) Coatings cured by oxidation.

(2) Coatings cured by polymerization, condensation, and/or cross-linking without oxidation.

(3) Coatings prepared from prepolymerized substances.

(b) The coatings are formulated from optional substances that may include:

(1) Substances generally recognized as safe in food.

(2) Substances the use of which is permitted by regulations in this part or which are permitted by prior sanction or approval and employed under the specific conditions, if any, of the prior sanction or approval.

(3) Any substance employed in the production of resinous and polymeric coatings that is the subject of a regulation in subchapter B of this chapter and conforms with any specification in such regulation. Substances named in this paragraph (b)(3) and further identified as required:

(i) Drying oils, including the triglycerides or fatty acids derived therefrom:

Beechnut.

Candlenut.

Castor (including dehydrated).

Chinawood (tung).

Coconut.

Corn.

Cottonseed.

Fish (refined).

Hempseed.

Linseed.

Oiticica.

Perilla.

Poppyseed.

Pumpkinseed.

Safflower.

Sesame.

Soybean.

Sunflower.

Tall oil.

Walnut.

The oils may be raw, heat-bodied, or blown. They may be refined by filtration, degumming, acid or alkali washing, bleaching, distillation, partial dehydration, partial polymerization, or solvent extraction, or modified by combination with maleic anhydride.

(ii) Reconstituted oils from triglycerides or fatty acids derived from the oils listed in paragraph (b)(3)(i) of this section to form esters with:

Butylene glycol.

Ethylene glycol.

Pentaerythritol.

Polyethylene glycol.

Polypropylene glycol.

Propylene glycol.

Sorbitol.

Trimethylol ethane.

Trimethylol propane.

(iii) Synthetic drying oils, as the basic polymer:

Butadiene and methylstyrene copolymer.

Butadiene and styrene copolymer, blown or unblown.

Maleic anhydride adduct of butadiene styrene.

Polybutadiene.

(iv) Natural fossil resins, as the basic resin:

Copal.

Damar.

Elemi.

Gilsonite.

Glycerol ester of damar, copal, elemi, and sandarac.

Sandarac.

Shellac.

Utah coal resin.

(v) Rosins and rosin derivatives, with or without modification by polymerization, isomerization, incidental decarboxylation, and/or hydrogenation, as follows:

(*a*) Rosins, refined to color grade of K or paler:

Gum rosin.

Tall oil rosin.

Wood rosin.

(*b*) Rosin esters formed by reacting rosin (paragraph (b)(3)(v)(*a*) of this section) with:

4,4′-*sec*-Butylidenediphenol-epichlorohydrin (epoxy).

Diethylene glycol.

Ethylene glycol.

Glycerol.

4,4′-Isopropylidenediphenol-epichlorohydrin (epoxy).

Methyl alcohol.

Pentaerythritol.

(*c*) Rosin esters (paragraph (b)(3)(v)(*b*) of this section) modified by reaction with:

Maleic anhydride.

o-, m-, and *p*-substituted phenol-formaldehydes listed in paragraph (b)(3)(vi) of this section.

Phenol-formaldehyde.

(*d*) Rosin salts:

Calcium resinate (limed rosin).

Zinc resinate.

(vi) Phenolic resins as the basic polymer formed by reaction of phenols with formaldehyde:

(*a*) Phenolic resins formed by reaction of formaldehyde with:

Alkylated (methyl, ethyl, propyl, isopropyl, butyl) phenols.

p-*tert*-Amylphenol.

4,4′-*sec*-Butylidenediphenol.

p-*tert*-Butylphenol.

o-, m-, and *p*-Cresol.

p-Cyclohexylphenol.

4,4′-Isopropylidenediphenol.

p-Nonylphenol.

p-Octylphenol.

3-Pentadecyl phenol mixture obtained from cashew nut shell liquid.

Phenol.

Phenyl *o*-cresol.

p-Phenylphenol.

Xylenol.

(*b*) Adjunct for phenolic resins: Aluminum butylate.

(vii) Polyester resins (including alkyd-type), as the basic polymers, formed as esters of acids listed in paragraph (b)(3)(vii) (*a*) and (*b*) of this section by reaction with alcohols in paragraph (b)(3)(vii) (*c*) and (*d*) of this section.

(*a*) Polybasic acids:

Adipic.

1,4-cyclohexanedicarboxylic (CAS Reg. No. 1076-97-7).

Dimerized fatty acids derived from oils listed in paragraph (b)(3)(i) of this section.

Fumaric.

Isophthalic.

Maleic.

2,6-Naphthalenedicarboxylic.

2,6-Naphthalenedicarboxylic, dimethyl ester.

Orthophthalic.

Sebacic.

Terephthalic.

Terpene-maleic acid adduct.

Trimellitic.

(*b*) Monobasic acids:

Benzoic acid.

4,4-Bis(4′-hydroxyphenyl)-pentanoic acid.

tert-Butyl benzoic acid.

Fatty acids derived from oils listed in paragraph (b)(3)(i) of this section.

Rosins listed in paragraph (b)(3)(v)(*a*) of this section, for use only as reactants in oil-based or fatty acid-based alkyd resins.

(*c*) Polyhydric alcohols:

Butylene glycol.

Diethylene glycol.

2,2-Dimethyl-1,3-propanediol for use only in forming polyester resins for coatings intended for use in contact with non-alcoholic foods.

Ethylene glycol.

Glycerol.

Mannitol.

α-Methyl glucoside.

Pentaerythritol.

Propylene glycol.

Sorbitol.

Triethylene glycol, for use as a component in polyester resins for coatings not exceeding a coating weight of 4 milligrams per square inch and that are intended for contact under conditions of use D, E, F or G described in table 2 of paragraph (d) of this section with alcoholic beverages containing less than 8 percent alcohol.

Trimethylol ethane.

Trimethylol propane.

(*d*) Monohydric alcohols:

Cetyl alcohol.

Decyl alcohol.

Lauryl alcohol.

Myristyl alcohol.

Octyl alcohol.

Stearyl alcohol.

(*e*) Catalysts:

Dibutyltin oxide (CAS Reg. No. 818-08-6), not to exceed 0.2 percent of the polyester resin.

Hydroxybutyltin oxide (CAS Reg. No. 2273-43-0), not to exceed 0.2 percent of the polyester resin.

Monobutyltin tris(2-ethylhexoate) (CAS Reg. No. 23850-94-4), not to exceed 0.2 percent of the polyester resin.

(viii) Epoxy resins, catalysts, and adjuncts:

(*a*) Epoxy resins, as the basic polymer:

(Alkoxy C_{10}-C_{16})-2,3-epoxypropane, in which the alkyl groups are even numbered and consist of a maximum of 1 percent C_{10} carbon atoms and a minimum of 48 percent C_{12} carbon atoms and a minimum of 18 percent C_{14} carbon atoms, for use only in coatings that are intended for contact with dry bulk foods at room temperature.

4,4′-*sec*-Butylidenediphenol-epichlorohydrin.

4,4′-*sec*-Butylidenediphenol-epichlorohydrin reacted with one or more of the drying oils or fatty acids listed in paragraph (b)(3)(i) of this section.

4,4′-*sec*-Butylidenediphenol-epichlorohydrin chemically treated with one or more of the following substances:

Allyl ether of mono-, di-, or trimethylol phenol.

4,4′-*sec*-Butylidenediphenol-formaldehyde.

4,4′-Isopropylidenediphenol-formaldehyde.

Melamine-formaldehyde.

Phenol-formaldehyde.

Urea-formaldehyde.

Epoxidized polybutadiene.

Glycidyl ethers formed by reacting phenolnovolak resins with epichlorohydrin.

4,4′-Isopropylidenediphenol-epichlorohydrin.

4,4′-Isopropylidenediphenol-epichlorohydrin reacted with one or more of the drying oils or fatty acids listed in paragraph (b)(3)(i) of this section.

4,4′-Isopropylidenediphenol-epichlorohydrin chemically treated with one or more of the following substances:

Allyl ether of mono-, di-, or trimethylol phenol.

4,4′-*sec*-Butylidenediphenol-formaldehyde.

4,4′-Isopropylidenediphenol-formaldehyde.

Melamine-formaldehyde.

2,2′-[(1-methylethylidene)bis[4,1-phenyleneoxy[1-(butoxymethyl)-2,1-ethanediyl]oxymethylene]]bisoxirane, CAS Reg. No. 71033-08-4, for use only in coatings intended for contact with bulk dry foods at temperatures below 100 °F.

Phenol-formaldehyde.

Urea-formaldehyde.

(*b*) Catalysts and cross-linking agents for epoxy resins:

3-(Aminomethyl)-3,5,5-trimethylcyclohexylamine reacted with phenol and formaldehyde in a ratio of 2.6:1.0:2.0, for use only in coatings intended for repeated use in contact with foods only of the types identified in paragraph (d) of this section, table 1, under Category I and Category VIII, at temperatures not exceeding 88 °C (190 °F).

N-*Beta*-(aminoethyl)-*gamma*-aminopropyltrimethoxysilane (CAS Reg. No. 1760-24-3), for use only in coatings at a level not to exceed 1.3 percent by weight of the resin when such coatings are intended for repeated use in contact with foods only of the types identified in paragraph (d) of this section, table 1, under Types I, II, and III, under conditions of use C, D, E, or F as described in table 2 of paragraph (d) of this section; or when such coatings are intended for repeated use in contact with foods of the types identified in paragraph (d) of this section, table 1, under Types V, VI, VII, and VIII, under conditions of use E or F as described in table 2 of paragraph (d) of this section. Use shall be limited to coatings for tanks of capacity greater than 530,000 gallons.

Benzyl alcohol (CAS Reg. No. 100-51-6), for use only in coatings at a level not to exceed 4 percent by weight of the resin when such coatings are intended for repeated use in contact with foods only of the types identified in paragraph (d) of this section, table 1, under Types I, II, and III, under conditions of use C, D, E, or F as described in table 2 of paragraph (d) of this section; or when such coatings are intended for repeated use in contact with foods of the types identified in paragraph (d) of this section, table 1, under Types V, VI, VII, and VIII, under conditions of use E or F as described in table 2 of paragraph (d) of this section. Use shall be limited to coatings for tanks of capacity greater than 530,000 gallons.

Catalysts and cross-linking agents for epoxy resins:

3-Aminomethyl-3,5,5-trimethylcyclohexylamine (CAS Reg. No. 2855-0913-092).

Cyanoguanidine.

Dibutyl phthalate, for use only in coatings for containers having a capacity of 1,000 gallons or more when such containers are intended for repeated use in contact with alcoholic beverages containing up to 8 percent of alcohol by volume.

3-Diethylaminopropylamine (CAS Reg. No. 104-78-9), for use in coatings at a level not to exceed 6 percent by weight of the resin when such coatings are intended for repeated use in contact with foods only of the types identified in paragraph (d) of this

section, table 1, under Types I, II, and III, under conditions of use C, D, E, or F as described in table 2 of paragraph (d) of this section; or when such coatings are intended for repeated use in contact with foods of the types identified in paragraph (d) of this section, table 1, under Types V, VI, VII, and VIII, under conditions of use E or F as described in table 2 of paragraph (d) of this section. Use shall be limited to coatings for tanks of capacity greater than 530,000 gallons.

Diethylenetriamine.

Diphenylamine.

Ethylenediamine.

Isophthalyl dihydrazide for use only in coatings subject to the provisions of paragraph (c) (3) or (4) of this section.

4,4′-Methylenedianiline, for use only in coatings for containers having a capacity of 1,000 gallons or more when such containers are intended for repeated use in contact with alcoholic beverages containing up to 8 percent of alcohol by volume.

N-Oleyl-1,3-propanediamine with not more than 10 percent by weight of diethylaminoethanol.

3-Pentadecenyl phenol mixture (obtained from cashew nutshell liquid) reacted with formaldehyde and ethylenediamine in a ratio of 1:2:2 (CAS Reg. No. 68413-28-5).

Polyamine produced when 1 mole of the chlorohydrin diether of polyethylene glycol 400 is made to react under dehydrohalogenating conditions with 2 moles of *N*-octadecyltrimethylenediamine for use only in coatings that are subject to the provisions of paragraph (c) (3) or (4) of this section and that contact food at temperatures not to exceed room temperature.

Polyethylenepolyamine (CAS Reg. No. 68131-73-7), for use only in coatings intended for repeated use in contact with food, at temperatures not to exceed 180 °F (82 °C).

Salicylic acid, for use only in coatings for containers having a capacity of 1,000 gallons or more when such containers are intended for repeated use in contact with alcoholic beverages containing up to 8 percent of alcohol by volume.

Salicylic acid (CAS Reg. No. 69-72-7), for use only in coatings at a level not to exceed 0.35 percent by weight of the resin when such coatings are intended for repeated use in contact with foods only of the types identified in paragraph (d) of this section, table 1, under Types I, II, and III, under conditions of use C, D, E, or F as described in table 2 of paragraph (d) of this section; or when such coatings are intended for repeated use in contact with foods of the types identified in paragraph (d) of this section, table 1, under Types V, VI, VII, and VIII, under conditions of use E or F as described in table 2 of paragraph (d) of this section. Use shall be limited to coatings for tanks of capacity greater than 530,000 gallons.

Stannous 2-ethylhexanoate for use only as a catalyst at a level not to exceed 1 percent by weight of the resin used in coatings that are intended for contact with food under conditions of use D, E, F, and G described in table 2 of paragraph (d) of this section.

Styrene oxide, for use only in coatings for containers having a capacity of 1,000 gallons or more when such containers are intended for repeated use in contact with alcoholic beverages containing up to 8 percent of alcohol by volume.

Tetraethylenepentamine.

Tetraethylenepentamine reacted with equimolar quantities of fatty acids.

Tri(dimethylaminomethyl) phenol and its salts prepared from the fatty acid moieties of the salts listed in paragraph (b)(3)(xxii)(*b*) of this section, for use only in coatings subject to the provisions of paragraph (c) (3) or (4) of this section.

Triethylenetetramine.

Trimellitic anhydride (CAS Reg. No. 552-30-7) for use only as a cross-linking agent at a level not to exceed 15 percent by weight of the resin in contact with food under all conditions of use, except that resins intended for use with foods containing more than 8 percent alcohol must contact such food only under conditions of use D, E, F, and G described in table 2 of paragraph (d) of this section.

Trimellitic anhydride adducts of ethylene glycol and glycerol, prepared by the reaction of 1 mole of trimellitic anhydride with 0.4-0.6 mole of ethylene glycol and 0.04-0.12 mole of glycerol, for use only as a cross-linking agent at a level not to exceed 10 percent by weight of the cured coating, provided that the cured coating only contacts food containing not more than 8 percent alcohol.

Meta-Xylylenediamine (1,3-benzenedimethanamine, CAS Reg. No. 1477-55-0), for use only in coatings at a level not to exceed 3 percent by weight of the resin when such coatings are intended for repeated use in contact with foods only of the types identified in paragraph (d) of this section, table 1, under Types I, II, and III, under conditions of use C, D, E or F as described in table 2 of paragraph (d) of this section; or when such coatings are intended for repeated use in contact with foods of the types identified in paragraph (d) of this section, table 1, under Types V, VI, VII, and VIII, under conditions of use E or F as described in table 2 of paragraph (d) of this section. Use shall be limited to coatings for tanks of capacity greater than 530,000 gallons.

Para-Xylylenediamine (1,4 benzenedimethanamine, CAS Reg. No. 539-48-0), for use only in coatings at a level not to exceed 0.6 percent by weight of the resin when such coatings are intended for repeated use in contact with foods only of the types identified in paragraph (d) of this section, table 1, under Types I, II, III, under conditions of use C, D, E, or F as described in table 2 of paragraph (d) of this section; or when such coatings are intended for repeated use in contact with foods of the types identified in paragraph (d) of this section, table 1, under Types V, VI, VII, and VIII, under conditions of use E and F as described in table 2 of paragraph (d) of this section. Use shall be limited to coatings for tanks of capacity greater than 530,000 gallons.

(*c*) Adjuncts for epoxy resins:

Aluminum butylate.

Benzoic acid, for use as a component in epoxy resins for coatings not exceeding a coating weight of 4 milligrams per square inch and that are intended for contact under conditions of use D, E, F or G described in table 2 of paragraph (d) of this section with alcoholic beverages containing less than 8 percent alcohol.

Polyamides from dimerized vegetable oils and the amine catalysts listed in paragraph (b)(3)(viii)(*b*) of this section, as the basic polymer.

Silane coupled silica, prepared from the reaction of microcrystalline quartz with *N-beta-*(*N*-vinylbenzylamino) ethyl-*gamma*-aminopropyltrimethoxy silane, monohydrogen chloride, for use only in coatings intended for repeated use in contact with foods only of the types identified in paragraph (d) of this section, table 1, under Category I and Category VIII, at temperatures not exceeding 88 °C (190 °F).

Succinic anhydride, for use as a component in epoxy resins for coatings not exceeding a coating weight of 4 milligrams per square inch, and that are intended for contact under conditions of use D, E, F or G described in table 2 of paragraph (d) of this section with alcoholic beverages containing less than 8 percent alcohol.

(ix) Coumarone-indene resin, as the basic polymer.

(x) Petroleum hydrocarbon resin (cyclopentadiene type), as the basic polymer.

(xi) Terpene resins, as the basic polymer, from one or more of the following:

Dipentene.

Hydrogenated dipentene resin (CAS Reg. No. 106168-39-2). For use only with coatings in contact with acidic and aqueous foods.

Hydrogenated-*beta*-pinene-*alpha*-pinene-dipentene copolymer resin (CAS Reg. No. 106168-37-0). For use only with coatings in contact with acidic and aqueous foods.

α-Pinene.

β-Pinene.

(xii) Urea-formaldehyde, resins and their curing catalyst:

(*a*) Urea-formaldehyde resins, as the basic polymer:

Urea-formaldehyde.

Urea-formaldehyde chemically modified with methyl, ethyl, propyl, isopropyl, butyl, or isobutyl alcohol.

Urea-formaldehyde chemically modified with one or more of the amine catalysts listed in paragraph (b)(3)(viii)(*b*) of this section.

(*b*) Curing (cross-linking) catalyst for urea-formaldehyde resins:

Dodecyl benzenesulfonic acid (C.A. Registry No. 27176-87-0).

(xiii) Triazine-formaldehyde resins and their curing catalyst:

(*a*) Triazine-formaldehyde resins, as the basic polymer:

Benzoguanamine-formaldehyde.

Melamine-formaldehyde.

Melamine-formaldehyde chemically modified with one or more of the following amine catalysts:

Amine catalysts listed in paragraph (b)(3)(viii)(*b*) of this section.

Dimethylamine-2-methyl-1-propanol.

Methylpropanolamine.

Triethanolamine.

Melamine-formaldehyde chemically modified with methyl, ethyl, propyl, isopropyl, butyl, or isobutyl alcohol.

(*b*) Curing (cross-linking) catalyst for triazine-formaldehyde resins:

Dodecyl benzenesulfonic acid (C.A. Registry No. 27176-87-0).

(xiv) Modifiers (for oils and alkyds, including polyesters), as the basic polymer:

Butyl methacrylate.

Cyclopentadiene.

Methyl, ethyl, butyl, or octyl esters of acrylic acid.

Methyl methacrylate.

Styrene.

Vinyl toluene.

(xv) Vinyl resinous substance, as the basic polymers:

Polyvinyl acetate.

Polyvinyl alcohol.

Polyvinyl butyral.

Polyvinyl chloride.

Polyvinyl formal.

Polyvinylidene chloride.

Polyvinyl pyrrolidone.

Polyvinyl stearate.

Vinyl chloride-acetate-2,3-epoxypropyl methacrylate copolymers containing not more than 10 weight percent of total polymer units derived from 2,3-epoxypropyl methacrylate and not more than 0.1 weight percent of unreacted 2,3-epoxypropyl methacrylate monomer for use in coatings for containers.

Vinyl chloride-acetate, hydroxyl-modified copolymer.

Vinyl chloride-acetate, hydroxyl-modified copolymer, reacted with trimellitic anhydride.

Vinyl chloride copolymerized with acrylamide and ethylene in such a manner that the finished copolymers have a minimum weight average molecular weight of 30,000 and contain not more than 3.5 weight percent of total polymer units derived from acrylamide; the acrylamide portion may or may not be subsequently partially hydrolyzed.

Vinyl chloride copolymerized with one or more of the following substances:

Acrylonitrile.

Fumaric acid and/or its methyl, ethyl, propyl, butyl, amyl, hexyl, heptyl, or octyl esters.

Maleic acid and/or its methyl, ethyl, propyl, butyl, amyl, hexyl, heptyl, or octyl esters.

5-Norbornene-2,3-dicarboxylic acid, mono-*n*-butyl ester; for use such that the finished vinyl chloride copolymers contain not more than 4 weight percent of total polymer units derived from this comonomer.

Vinyl acetate.

Vinylidene chloride.

Vinyl chloride-vinylidene chloride-2,3-epoxypropyl methacrylate copolymers containing not more than 10 weight percent of total polymer units derived from 2,3-epoxypropyl methacrylate and not more than 0.05 weight percent of unreacted 2,3-epoxypropyl methacrylate monomer based on polymer solids for use only in coatings for containers intended for contact with foods under conditions B, C, D, E, F, G, or H described in table 2 of paragraph (d) of this section.

(xvi) Cellulosics, as the basic polymer:

Carboxymethylcellulose.

Cellulose acetate.

Cellulose acetate-butyrate.

Cellulose acetate-propionate.

Ethylcellulose.

Ethyl hydroxyethylcellulose.

Hydroxyethylcellulose.

Hydroxypropyl methylcellulose.

Methylcellulose.

Nitrocellulose.

(xvii) Styrene polymers, as the basic polymer:

Polystyrene.

α-Methyl styrene polymer.

Styrene copolymerized with one or more of the following:

Acrylonitrile.

α-Methylstyrene.

(xviii) Polyethylene and its copolymers as the basic polymer:

Ethylene-ethyl acrylate copolymer.

Ethylene-isobutyl acrylate copolymers containing no more than 35 weight percent of total polymer units derived from isobutyl acrylate.

Ethylene-vinyl acetate copolymer.

Polyethylene.

(xix) Polypropylene as the basic polymer:

Polypropylene.

Maleic anhydride adduct of polypropylene The polypropylene used in the manufacture of the adduct complies with §177.1520(c), item 1.1; and the adduct has a maximum combined maleic anhydride content of 0.8 percent and a minimum intrinsic viscosity of 0.9, determined at 135 °C on a 0.1 percent solution of the modified polypropylene in decahydronaphthalene as determined by a method titled “Method for Determination of Intrinsic Viscosity of Maleic Anhydride Adduct of Polypropylene,” which is incorporated by reference. Copies are available from the Center for Food Safety and Applied Nutrition (HFS-200), Food and Drug Administration, 5001 Campus Dr., College Park, MD 20740, or available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.*

(xx) Acrylics and their copolymers, as the basic polymer:

Acrylamide with ethylacrylate and/or styrene and/or methacrylic acid, subsequently reacted with formaldehyde and butanol.

Acrylic acid and the following esters thereof:

Ethyl.

Methyl.

Butyl acrylate-styrene-methacrylic acid-hydroxyethyl methacrylate copolymers containing no more than 20 weight percent of total polymer units derived from methacrylic acid and containing no more than 7 weight percent of total polymer units derived from hydroxyethyl methacrylate; for use only in coatings that are applied by electrodeposition to metal substrates.

Butyl acrylate-styrene-methacrylic acid-hydroxypropyl methacrylate copolymers containing no more than 20 weight percent of total polymer units derived from methacrylic acid and containing no more than 7 weight percent of total polymer units derived from hydroxypropyl methacrylate; for use only in coatings that are applied by electrodeposition to metal substrates and that are intended for contact, under condition of use D, E, F, or G described in table 2 of paragraph (d) of this section, with food containing no more than 8 percent of alcohol.

Ethyl acrylate-styrene-methacrylic acid copolymers for use only as modifiers for epoxy resins listed in paragraph (b)(3)(viii)(*a*) of this section.

Ethyl acrylate-methyl methacrylate-styrene-methacrylic acid copolymers for use only as modifiers for epoxy resins listed in paragraph (b)(3)(viii)(*a*) of this section.

2-Ethylhexyl acrylate-ethyl acrylate copolymers prepared by copolymerization of 2-ethylhexyl acrylate and ethyl acrylate in a 7/3 weight ratio and having a number average molecular weight range of 5,800 to 6,500 and a refractive index, n_{D25}° (40 percent in 2,2,4-trimethyl pentane) of 1.4130-1.4190; for use as a modifier for nylon resins complying with §177.1500 of this chapter and for phenolic and epoxy resins listed in paragraph (b)(3) (vi) and (viii) of this section, respectively, at a level not to exceed 1.5 percent of the coating.

2-Ethylhexyl acrylate-methyl methacrylate-acrylic acid copolymers for use only as modifiers for epoxy resins listed in paragraph (b)(3)(viii) of this section.

Methacrylic acid and the following esters thereof:

Butyl.

Ethyl.

Methyl.

Methacrylic acid or its ethyl and methyl esters copolymerized with one or more of the following:

Acrylic acid.

Ethyl acrylate.

Methyl acrylate.

n-Butyl acrylate-styrene-methacrylic acid-hydroxyethyl methacrylate copolymers containing no more than 2 weight percent of total polymer units derived from methacrylic acid and containing no more than 9.5 weight percent of total polymer units derived from hydroxyethyl methacrylate; for use only in coatings in contact with dry food (food type VIII in table 1 of paragraph (d) of this section). 2-(Dimethylamino) ethanol (C.A.S. Registry No. 108-01-0) may be employed as an optional adjuvant substance limited to no more than 2 weight percent based on polymer solids in the coating emulsion.

Styrene polymers made by the polymerization of any combination of styrene or alpha methyl styrene with acrylic acid, methacrylic acid, 2-ethyl hexyl acrylate, methyl methacrylate, and butyl acrylate. The styrene and alpha methyl styrene, individually, may constitute from 0 to 80 weight percent of the polymer. The other monomers, individually, may be from 0 to 40 weight percent of the polymer. The polymer number average molecular weight (M_n) shall be at least 2,000 (as determined by gel permeation chromatography). The acid number of the polymer shall be less than 250. The monomer content shall be less than 0.5 percent. The polymers are for use only in contact with food of Types IV-A, V, VII in table 1 of paragraph (d) of this section, under use conditions E through G in table 2 of paragraph (d), and with food of Type VIII without use temperature restriction.

(xxi) Elastomers, as the basic polymer:

Butadiene-acrylonitrile copolymer.

Butadiene-acrylonitrile-styrene copolymer.

Butadiene-styrene copolymer.

Butyl rubber.

Chlorinated rubber.

2-Chloro-1,3-butadiene (neoprene).

Natural rubber (natural latex or natural latex solids, smoked or unsmoked).

Polyisobutylene.

Rubber hydrochloride.

Styrene-isobutylene copolymer.

(xxii) Driers made by reaction of a metal from paragraph (b)(3)(xxii)(*a*) of this section with acid, to form the salt listed in paragraph (b)(3)(xxii)(*b*) of this section:

(*a*) Metals:

Aluminum.

Calcium.

Cerium.

Cobalt.

Iron.

Lithium.

Magnesium.

Manganese.

Zinc.

Zirconium.

(*b*) Salts:

Caprate.

Caprylate.

Isodecanoate.

Linoleate.

Naphthenate.

Neodecanoate.

Octoate (2-ethylhexoate).

Oleate.

Palmitate.

Resinate.

Ricinoleate.

Soyate.

Stearate.

Tallate.

(xxiii) Waxes:

Paraffin, Type I.

Paraffin, Type II.

Polyethylene.

Sperm oil.

Spermaceti.

(xxiv) Plasticizers:

Acetyl tributyl citrate.

Acetyl triethyl citrate.

Butyl phthalyl butyl glycolate.

Butyl stearate.

p-tert-Butyl phenyl salicylate.

Dibutyl sebacate.

Diethyl phthalate.

Diisobutyl adipate.

Diisooctyl phthalate.

Epoxidized soybean oil (iodine number maximum 14; oxirane oxygen content 6% minimum), as the basic polymer.

Ethyl phthalyl ethyl glycolate.

2-Ethylhexyl diphenyl phosphate.

di-2-Ethylhexyl phthalate.

Glycerol.

Glyceryl monooleate.

Glyceryl triacetate.

Monoisopropyl citrate.

Propylene glycol.

Sorbitol.

Mono-, di-, and tristearyl citrate.

Triethyl citrate.

Triethylene glycol.

3-(2-Xenolyl)-1,2-epoxypropane.

(xxv) Release agents, as the basic polymer, when applicable:

N,N'-Dioleoylethylenediamine (CAS Reg. No. 110-31-6) for use only in ionomeric resins complying with §177.1330 of this chapter and in ethylene vinyl acetate copolymers complying with §177.1350 of this chapter at a level not to exceed 0.0085 milligram per square centimeter (0.055 milligram per square inch) in the finished food-contact article.

N,N'-Distearoyl ethylenediamine.

Linoleic acid amide.

Oleic acid amide.

Palmitic acid amide.

Petrolatum.

Polyethylene wax.

Polyoxyethylene glycol monooleate (mol. wt. of the polyoxyethylene glycol moiety greater than 300).

Polytetrafluoroethylene.

Silicones (not less than 300 centistokes viscosity): Dimethylpolysiloxanes and/or methylphenylpolysiloxanes. The methylphenylpolysiloxanes contain not more than 2.0 percent by weight of cyclosiloxanes having up to and including 4 siloxy units.

Silicones (not less than 100 centistokes viscosity): Dimethylpolysiloxanes and/or methylphenylpolysiloxanes limited to use only on metal substrates. The methylphenylpolysiloxanes contain not more than 2.0 percent by weight of cyclosiloxanes having up to and including 4 siloxy units.

(xxvi) Colorants used in accordance with §178.3297 of this chapter.

(xxvii) Surface lubricants:

Cottonseed oil and other edible oils.

Dibutyl sebacate.

Dioctyl sebacate.

Glyceryl monostearate.

Lanolin.

Mineral oil, white.

Palm oil.

Paraffin, Type I.

Paraffin, Type II.

Petrolatum.

Stearic acid.

(xxviii) Silicones and their curing catalysts:

(*a*) Silicones as the basic polymer:

Siloxane resins originating from methyl hydrogen polysiloxane, dimethyl polysiloxane, and methylphenyl polysiloxane.

Siloxane resins originating from the platinum-catalyzed reaction product of vinyl-containing dimethylpolysiloxane (CAS Reg. No. 68083-18-1 and CAS Reg. No. 68083-19-2) with methylhydrogen polysiloxane (CAS Reg. No. 63148-57-2) and dimethylmethylhydrogen polysiloxane (CAS Reg. No. 68037-59-2), where the platinum content does not exceed 150 parts per million. The following substances may be used as optional polymerization inhibitors:

3,5-Dimethyl-1-hexyne-3-ol (CAS Reg. No. 107-54-0), at a level not to exceed 0.53 weight-percent;

1-Ethynylcyclohexene (CAS Reg. No. 931-49-7), at a level not to exceed 0.64 weight-percent;

Bis(methoxymethyl)ethyl maleate (CAS Reg. No. 102054-10-4), at a level not to exceed 1.0 weight-percent;

Methylvinyl cyclosiloxane (CAS Reg. No. 68082-23-5); and

Tetramethyltetravinylcyclotetrasiloxane (CAS Reg. No. 2554-06-5).

(*b*) Curing (cross-linking) catalysts for silicones (the maximum amount of tin catalyst used shall be that required to effect optimum cure but shall not exceed 1 part of tin per 100 parts of siloxane resins solids):

Dibutyltin dilaurate.

Stannous oleate.

Tetrabutyl titanate.

(xxix) Surface active agents:

Ethylene oxide adduct of 2,4,7,9-tetramethyl-5-decyn-4,7-diol (CAS Reg. No. 9014-85-1).

Poly[2-(diethylamino) ethyl methacrylate] phosphate (minimum intrinsic viscosity in water at 25 °C is not less than 9.0 deciliters per gram as determined by ASTM method D1243-79, “Standard Test Method for Dilute Solution Viscosity of Vinyl Chloride Polymers,” which is incorporated by reference (Copies may be obtained from the American Society for Testing Materials, 100 Barr Harbor Dr., West Conshohocken, Philadelphia, PA 19428-2959, or may be examined at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.*), for use only as a suspending agent in the manufacture of vinyl chloride copolymers and limited to use at levels not to exceed 0.1 percent by weight of the copolymers.

Sodium dioctyl sulfosuccinate.

Sodium dodecylbenzenesulfonate

Sodium lauryl sulfate.

2,4,7,9-Tetramethyl-5-decyn-4,7-diol (C.A.S. Reg. No. 126-86-3), for use only in can coatings which are subsequently dried and cured at temperatures of at least 193 °C (380 °F) for 4 minutes.

(xxx) Antioxidants:

Butylated hydroxyanisole.

Butylated hydroxytoluene.

Gum guaiac.

Dilauryl thiodipropionate.

Nordihydroguaiaretic acid.

Propyl gallate.

Distearyl thiodipropionate.

Thiodipropionic acid.

2,4,5-Trihydroxybutyrophenone.

(xxxi) Can end cements (sealing compounds used for sealing can ends only): In addition to the substances listed in paragraph (b) of this section and those listed in §177.1210(b)(5) of this chapter, the following may be used:

Butadiene-styrene-divinylbenzene copolymer (CAS Reg. No. 26471-45-4) for use only at levels not to exceed 23.8 percent by weight of the cement solids in can end cements.

Butadiene-styrene-fumaric acid copolymer.

4,4′-Butylidenebis (6-*tert*-butyl-*m*-cresol).

Dibenzamido phenyl disulfide.

Di-β-naphthyl phenylenediamine.

Dipentamethylene thiuram tetrasulfide.

Isobutylene-isoprene-divinylbenzene copolymers for use only at levels not to exceed 15 percent by weight of the dry cement composition.

Naphthalene sulfonic acid-formaldehyde condensate, sodium salt, for use only at levels not to exceed 0.6 percent by weight of the cement solids in can end cements for containers having a capacity of not less than 5 gallons.

Sodium decylbenzene sulfonate.

Sodium nitrite for use only at levels not to exceed 0.3 percent by weight of the cement solids in can end cements for containers having a capacity of not less than 5 gallons.

Sodium pentachlorophenate for use as a preservative at 0.1 percent by weight in can-sealing compounds on containers having a capacity of 5 gallons or more.

Sodium phenylphenate.

Styrene-maleic anhydride resin, partial methyl and butyl (*sec*- or *iso*-) esters, for use only at levels not in excess of 3 percent of the cement solids in can end cement formulations.

Tetrasodium EDTA (tetrasodium ethylene-diaminetetraacetate).

Tri (mixed mono- and dinonylphenyl) phosphite.

Zinc dibutyldithiocarbamate.

(xxxii) Side seam cements: In addition to the substances listed in paragraph (b)(3) (i) to (xxx), inclusive, of this section, the following may be used.

p-tert-Butyl perbenzoate as a catalyst for epoxy resin.

epsilon-Caprolactam-(ethylene-ethyl acrylate) graft polymer.

Dicumyl peroxide for use only as polymerization catalyst.

4-(Diiodomethylsulfonyl) toluene (CAS Reg. No. 20018-09-1) for use as a preservative at a level not to exceed 0.3 percent by weight in can-sealing cements.

Diisodecyl phthalate for use only as plasticizer in side seam cements for containers intended for use in contact with food only of the types identified in paragraph (d) of this section, table 1, under Categories I, II, and VI.

4,4′-Bis(*alpha,alpha*-dimethylbenzyl)diphenylamine, CAS Reg. No. 10081-67-1.

Ethyl toluene sulfonamide.

N,N′-Hexamethylenebis(3,5-di-*tert*-butyl-4-hydroxyhydrocinnamide), CAS Reg. No. 23128-74-7.

Polyamides consisting of the following:

Copolymer of *omega*-laurolactam and *espilon*-caprolactam, CAS Reg. No. 25191-04-2 (Nylon 12/6).

Homopolymer of *omega*-aminododecanoic acid, CAS Reg. No. 24937-16-4.

Homopolymer of *omega*-laurolactam, CAS Reg. No. 25038-74-8 (Nylon 12).

Polyamides derived from the following acids and amines:

Acids:

Adipic.

Azelaic.

Sebacic.

Vegetable oil acids (with or without dimerization).

Amines:

Diethylenetriamine.

Diphenylamine.

Ethylenediamine.

Hexamethylenediamine.

Tetraethylenepentamine.

Triethylenetetramine.

Polypropylene glycol CAS Reg. No. 25322-69-4.

Sodium pentachlorophenate for use as a preservative at 0.1 percent by weight in can-sealing compounds on containers having a capacity of 5 gallons or more.

Tetrakis [methylene(3,5-di-*tert*-butyl-4-hydroxyhydrocinnamate)]methane, CAS Reg. No. 6683-19-8.

Toluene sulfonamide formaldehyde resin (basic polymer).

Triethylene glycol methacrylate for use only as polymerization cross-linking agent in side seam cements for containers intended for use in contact with food only of the types identified in paragraph (d) of this section, table 1, under Categories I, II, and VI.

Urea.

(xxxiii) Miscellaneous materials:

Ammonium citrate.

Ammonium potassium phosphate.

Bentonite, modified by reaction with benzyl dimethyl alkyl ammonium chloride, where the alkyl groups are derived from hydrogenated tallow (CAS Reg. No. 71011-24-0). For use only as a rheological agent in coatings intended to contact food under repeated use conditions.

Bentonite, modified by reaction with sodium stearate and benzyl dimethyl alkyl ammonium chloride, where the alkyl groups are derived from hydrogenated tallow (CAS Reg. No. 121888-68-4). For use as a rheological agent only in coatings intended to contact dry food under repeated-use conditions.

Calcium acetate.

Calcium ethyl acetoacetate.

Calcium glycerophosphate.

Calcium, sodium, and potassium oleates.

Calcium, sodium, and potassium ricinoleates.

Calcium, sodium, and potassium stearates.

Castor oil, hydrogenated.

Castor oil, hydrogenated polymer with ethylenediamine, 12-hydroxyoctadecanoic acid and sebacic acid (CAS Reg. No. 68604-06-8). The condensation product formed by the reaction of hydrogenated castor oil with polyamide derived from ethylenediamine, sebacic acid and 12-hydroxystearic acid, for use only in coatings at a level not to exceed 3.2 percent by weight of the resin when such coatings are intended for repeated use in contact with foods only of the types identified in paragraph (d) of this section, table 1, under Types I, II, and III, under conditions of use C, D, E, or F as described in table 2 of paragraph (d) of this section; or when such coatings are intended for repeated use in contact with foods of the types identified in paragraph (d) of this section, table 1, under Types V, VI, VII, and VIII, under conditions of use E or F as described in table 2 of paragraph (d) of this section. Use shall be limited to coatings for tanks of capacity greater than 530,000 gallons.

Castor oil, sulfated, sodium salt (CAS Reg. No. 68187-76-8), for use only in coatings for containers intended for repeated use.

Cetyl alcohol.

5-Chloro-2-methyl-4-isothiazolin-3-one (CAS Reg. No. 26172-55-4) and 2-methyl-4-isothiazolin-3-one (CAS Reg. No. 2682-20-4) mixture, at a ratio of 3 parts to 1 part, respectively, manufactured from methyl-3-mercaptopropionate (CAS Reg. No. 2935-90-2) and optionally containing magnesium nitrate (CAS Reg. No. 10377-60-3) at a concentration equivalent to the isothiazolone active ingredients (weight/weight). For use only as an antimicrobial agent in emulsion-based silicone coatings at a level not to exceed 50 milligrams per kilogram (based on isothiazolone active ingredient) in the coating formulations.

Cyclohexanone-formaldehyde resin produced when 1 mole of cyclohexanone is made to react with 1.65 moles of formaldehyde such that the finished resin has an average molecular weight of 600-610 as determined by ASTM method D2503-82, “Standard Test Method for Molecular Weight (Relative Molecular Mass) of Hydrocarbons by Thermoelectric Measurement of Vapor Pressure,” which is incorporated by reference. Copies may be obtained from the American Society for Testing Materials, 100 Barr Harbor Dr., West Conshohocken, Philadelphia, PA 19428-2959, or may be examined at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.* For use only in contact with nonalcoholic and nonfatty foods under conditions of use E, F, and G, described in table 2 of paragraph (d) this section.

Decyl alcohol.

1,2-Dibromo-2,4-dicyanobutane (CAS Reg No. 35691-65-7). For use as an antimicrobial agent at levels not to exceed 500 milligrams per kilogram in emulsion-based silicone coatings.

Disodium hydrogen phosphate.

Ethyl acetoacetate.

Hectorite, modified by reaction with a mixture of benzyl methyl dialkyl ammonium chloride and dimethyl dialkyl ammonium chloride, where the alkyl groups are derived from hydrogenated tallow (CAS Reg. No. 121888-67-3). For use as a rheological agent only in coatings intended to contact dry food under repeated-use conditions.

Lauryl alcohol.

Lecithin.

Magnesium, sodium, and potassium citrate.

Magnesium glycerophosphate.

Magnesium stearate.

Mono-, di-, and tricalcium phosphate.

Monodibutylamine pyrophosphate as sequestrant for iron.

Mono-, di-, and trimagnesium phosphate.

Myristyl alcohol.

Octyl alcohol.

Phosphoric acid.

Polybutene, hydrogenated; complying with the identity and limitations prescribed by §178.3740 of this chapter.

Poly(ethylene oxide).

Siloxanes and silicones, dimethyl, 3-hydroxypropyl group-terminated, diesters with poly(2-oxepanone), diacetates (CAS Reg. No. 116810-47-0) at a level not to exceed 0.025 weight percent of the finished coating having no greater than a 0.5 mil thickness for use as a component of polyester, epoxy, and acrylic coatings complying with paragraphs (b)(3)(vii), (viii), and (xx) of this section, respectively.

Silver chloride-coated titanium dioxide for use only as a preservative in latex emulsions at a level not to exceed 2.2 parts per million (based on silver ion concentration) in the dry coating.

Sodium pyrophosphate.

Stannous chloride.

Stannous stearate.

Stannous sulfate.

Stearyl alcohol.

2-Sulfoethyl methacrylate, sodium salt (CAS Reg. No. 1804-87-1). For use only in copolymer coatings on metal under conditions of use E, F, and G described in table 2 of paragraph (d) of this section, and limited to use at a level not to exceed 2.0 percent by weight of the dry copolymer coating.

Tetrasodium pyrophosphate.

Tridecyl alcohol produced from tetrapropylene by the oxo process, for use only as a processing aid in polyvinyl chloride resins.

Trimethylolpropane (CAS Reg. No. 77-99-6). For use as a pigment dispersant at levels not to exceed 0.45 percent by weight of the pigment.

Vinyl acetate-dibutyl maleate copolymers produced when vinyl acetate and dibutyl maleate are copolymerized with or without one of the monomers: Acrylic acid or glycidyl methacrylate. For use only in coatings for metal foil used in contact with foods that are dry solids with the surface containing no free fat or oil. The finished copolymers shall contain at least 50 weight-percent of polymer units derived from vinyl acetate and shall contain no more than 5 weight-percent of total polymer units derived from acrylic acid or glycidyl methacrylate.

(xxxiv) Polyamide resins derived from dimerized vegetable oil acids (containing not more than 20 percent of monomer acids) and ethylenediamine, as the basic resin, for use only in coatings that contact food at temperatures not to exceed room temperature.

(xxxv) Polyamide resins having a maximum acid value of 5 and a maximum amine value of 8.5 derived from dimerized vegetable oil acids (containing not more than 10 percent of monomer acids), ethylenediamine, and 4,4-bis (4-hydroxyphenyl) pentanoic acid (in an amount not to exceed 10 percent by weight of said polyamide resins); as the basic resin, for use only in coatings that contact food at temperatures not to exceed room temperature provided that the concentration of the polyamide resins in the finished food-contact coating does not exceed 5 milligrams per square inch of food-contact surface.

(xxxvi) Methacrylonitrile grafted polybutadiene copolymers containing no more than 41 weight percent of total polymer units derived from methacrylonitrile; for use only in coatings that are intended for contact, under conditions of use D, E, F, or G described in table 2 of paragraph (d) of this section, with food containing no more than 8 percent of alcohol.

(xxxvii) Polymeric resin as a coating component prepared from terephthalic acid, isophthalic acid, succinic anhydride, ethylene glycol, diethylene glycol, and 2,2-dimethyl-1,3-propanediol for use in contact with aqueous foods and alcoholic foods containing not more than 20 percent (by volume) of alcohol under conditions of use D, E, F, and G described in table 2 of §176.170 of this chapter. The resin shall contain no more than 30 weight percent of 2,2-dimethyl-1,3-propanediol.

(c) The coating in the finished form in which it is to contact food, when extracted with the solvent or solvents characterizing the type of food, and under conditions of time and temperature characterizing the conditions of its intended use as determined from tables 1 and 2 of paragraph (d) of this section, shall yield chloroform-soluble extractives, corrected for zinc extractives as zinc oleate, not to exceed the following:

(1) From a coating intended for or employed as a component of a container not to exceed 1 gallon and intended for one-time use, not to exceed 0.5 milligram per square inch nor to exceed that amount as milligrams per square inch that would equal 0.005 percent of the water capacity of the container, in milligrams, divided by the area of the food-contact surface of the container in square inches. From a fabricated container conforming with the description in this paragraph (c)

(1), the extractives shall not exceed 0.5 milligram per square inch of food-contact surface nor exceed 50 parts per million of the water capacity of the container as determined by the methods provided in paragraph (e) of this section.

(2) From a coating intended for or employed as a component of a container having a capacity in excess of 1 gallon and intended for one-time use, not to exceed 1.8 milligrams per square inch nor to exceed that amount as milligrams per square inch that would equal 0.005 percent of the water capacity of the container in milligrams, divided by the area of the food-contact surface of the container in square inches.

(3) From a coating intended for or employed as a component of a container for repeated use, not to exceed 18 milligrams per square inch nor to exceed that amount as milligrams per square inch that would equal 0.005 percent of the water capacity of the container in milligrams, divided by the area of the food-contact surface of the container in square inches.

(4) From coating intended for repeated use, and employed other than as a component of a container, not to exceed 18 milligrams per square inch of coated surface.

(d) Tables:

Table 1—Types of Food

I. Nonacid (pH above 5.0), aqueous products; may contain salt or sugar or both, and including oil-in-water emulsions of low- or high-fat content.

II. Acidic (pH 5.0 or below), aqueous products; may contain salt or sugar or both, and including oil-in-water emulsions of low- or high-fat content.

III. Aqueous, acid or nonacid products containing free oil or fat; may contain salt, and including water-in-oil emulsions of low- or high-fat content.

IV. Dairy products and modifications:

A. Water-in-oil emulsion, high- or low-fat.

B. Oil-in-water emulsion, high- or low-fat.

V. Low moisture fats and oils.

VI. Beverages:

A. Containing alcohol.

B. Nonalcoholic.

VII. Bakery products.

VIII. Dry solids (no end test required).

Table 2—Test Procedures for Determining Amount of Extractives From Resinous or Polymeric Coatings, Using Solvents Simulating Types of Foods and Beverages

Condition of use	Types of food (see Table 1)	Extractant		
		Water (time and temperature)	Heptane[1 2] (time and temperature)	8% alcohol (time and temperature)
A. High temperature heat-sterilized (e.g., over 212 °F)	I, IV-B	250 °F, 2 hr		
	III, IV-A, VII	do	150 °F, 2 hr	
B. Boiling water-sterilized	II	212 °F, 30 min		
	III, VII	do	120 °F, 30 min	
C. Hot filled or pasteurized above 150 °F	II, IV-B	Fill boiling, cool to 100 °F		
	III, IV-A	do	120 °F, 15 min	
	V		do	
D. Hot filled or pasteurized below 150 °F	II, IV-B, VI-B	150 °F, 2 hr		
	III, IV-A	do	100 °F, 30 min	
	V		do	
	VI-A			150 °F, 2 hr.
E. Room temperature filled and stored (no thermal treatment in the container)	II, IV-B, VI-B	120 °F, 24 hr		
	III, IV-A	do	70 °F, 30 min	
	V, VII		do	
	VI-A			120 °F, 24 hr.
F. Refrigerated storage (no thermal treatment in the container)	I, II, III, IV-A, IV-B, VI-B,VII	70 °F, 48 hr		
	VI-A			70 °F, 48 hr.
G. Frozen storage (no thermal treatment in the container)	I, II, III, IV-B, VII	70 °F, 24 hr		
H. Frozen storage: Ready-prepared foods intended to be reheated in container at time of use:				
1. Aqueous or oil in water emulsion of high or low fat	I, II, IV-B	212 °F, 30 min		
2. Aqueous, high or low free oil or fat	III, IV-A, VII	do	120 °F, 30 min	

[1] Heptane extractant not to be used on wax-lined containers.

[2] Heptane extractivity results must be divided by a factor of five in arriving at the extractivity for a food product.

(e) *Analytical methods*—(1) *Selection of extractability conditions.* First ascertain the type of food product (table 1, paragraph (d) of this section) that is being packed commercially in the test container and the normal conditions of thermal treatment used in packaging the type of food involved. Using table 2 (paragraph (d) of this section), select the food-simulating solvent or solvents (demineralized distilled water, heptane, and/or 8 percent ethyl alcohol) and the time-temperature exaggerations of the container-use conditions. Aqueous products (Types I, II, IV-B, and VI-B) require only a water-extractability test at the temperature and time conditions shown for the most severe "conditions of use." Aqueous products with free oil or fat, and water-oil emulsions (types III, IV-A, and VII) will require determinations of both water extractability and heptane extractability. Low-moisture fats and oils (type V with no free water) require only the heptane extractability. Alcoholic beverages (type VI-A) require only the 8 percent alcohol extractant. Having selected the appropriate extractant or extractants simulating various types of foods and beverages and the time-temperature exaggerations over normal use, follow the applicable extraction procedure. Adapt the procedure, when necessary, for containers having a capacity of over 1 gallon.

(2) *Selection of coated-container samples.* For consumer-sized containers up to 1 gallon, quadruplicate samples of representative containers (using for each replicate sample the number of containers nearest to an area of 180 square inches) should be selected from the lot to be examined.

(3) *Cleaning procedure preliminary to determining the amount of extractables from coated containers.* Quadruplicate samples of representative containers should be selected from the lot to be examined and must be carefully rinsed to remove extraneous material prior to the actual extraction procedure. Soda fountain pressure-type hot water rinsing equipment, consisting in its simplest form of a ⅛ -inch- ¼ -inch internal diameter metal tube attached to a hot water line and bent so as to direct a stream of water upward, may be used. Be sure hot water has reached a temperature of 190 °F-200 °F before starting to rinse the container. Invert the container over the top of the fountain and direct a strong stream of hot water against the bottom and all sides for 1 minute, drain, and allow to dry.

(4) *Exposure conditions*—(i) *Water* (*250 °F for 2 hours*), *simulating high-temperature heat sterilization.* Fill the container within ¼ -inch of the top with a measured volume of demineralized distilled water. Cover the container with clean aluminum foil and place the container on a rack in a pressure cooker. Add a small amount of demineralized distilled water to the pressure cooker, but do not allow the water to touch the bottom of the container. Close the cooker securely and start to heat over a suitable burner. When a steady stream of steam emerges from the vent, close the vent and allow the pressure to rise to 15 pounds per square inch (250 °F) and continue to maintain this pressure for 2 hours. Slowly release the pressure, open the pressure cooker when the pressure reads zero, and composite the water of each replicate immediately in a clean Pyrex flask or beaker. Proceed with the determination of the amount of extractives by the method described in paragraph (e)(5) of this section.

(ii) *Water* (*212 °F for 30 minutes*), *simulating boiling water sterilization.* Fill the container within ¼ -inch of the top with a measured volume of boiling, demineralized distilled water. Cover the container with clean aluminum foil and place the container on a rack in a pressure cooker in which a small amount of demineralized distilled water is boiling. Do not close the pressure vent, but operate at atmospheric pressure so that there is a continuous escape of a small amount of steam. Continue to heat for 30 minutes, then remove the test container and composite the contents of each replicate immediately in a clean Pyrex flask or beaker. Proceed with the determination of the amount of extractives by the method described in paragraph (e)(5) of this section.

(iii) *Water* (*from boiling to 100 °F*), *simulating hot fill or pasteurization above 150 °F.* Fill the container within ¼ -inch of the top with a measured volume of boiling, demineralized distilled water. Insert a thermometer in the water and allow the uncovered container to stand in a room at 70 °F-85 °F. When the temperature reads 100 °F, composite the water from each replicate immediately in a clean Pyrex flask or beaker. Proceed with the determination of the amount of extractives by the method described in paragraph (e)(5) of this section.

(iv) *Water* (*150° for 2 hours*), *simulating hot fill or pasteurization below 150 °F.* Preheat demineralized distilled water to 150 °F in a clean Pyrex flask. Fill the container within ¼ -inch of the top with a measured volume of the 150 °F water and cover with clean aluminum foil. Place the test container in an oven maintained at 150 °F. After 2 hours, remove the test container from the oven and immediately composite the water of each replicate in a clean Pyrex flask or beaker. Proceed with the determination of the amount of extractives by the method described in paragraph (e)(5) of this section.

(v) *Water* (*120 °F for 24 hours*), *simulating room temperature filling and storage.* Preheat demineralized distilled water to 120 °F in a clean Pyrex flask. Fill the container within ¼ -inch of the top with a measured volume of the 120 °F water and cover with clean aluminum foil. Place the test container in an incubator or oven maintained at 120 °F. After 24 hours, remove the test container from the incubator and immediately composite the water of each replicate in a clean Pyrex flask or beaker. Proceed with the determination of the amount of extractives by the method described in paragraph (e)(5) of this section.

(vi) *Water* (*70 °F for 48 hours*), *simulating refrigerated storage.* Bring demineralized distilled water to 70 °F in a clean Pyrex flask. Fill the container within ¼ -inch of the top with a measured volume of the 70 °F water, and cover with clean aluminum foil. Place the test container in a suitable room maintained at 70 °F. After 48 hours, immediately composite the water of each replicate in a clean Pyrex flask or beaker. Proceed with the determination of the amount of extractives by the method described in paragraph (e)(5) of this section.

(vii) *Water* (*70 °F for 24 hours*), *simulating frozen storage.* Bring demineralized distilled water to 70 °F in a clean Pyrex flask. Fill the container within ¼ -inch of the top with a measured volume of the 70 °F water and cover with clean aluminum foil. Place the container in a suitable room maintained at 70 °F. After 24 hours, immediately composite the water of each replicate in a clean Pyrex flask or beaker. Proceed with the determination of the amount of extractives by the method described in paragraph (e)(5) of this section.

(viii) *Water* (*212 °F for 30 minutes*), *simulating frozen foods reheated in the container.* Fill the container to within ¼ -inch of the top with a measured volume of boiling, demineralized distilled water. Cover the container with clean aluminum foil and place the container on a rack in a pressure cooker in which a small amount of demineralized distilled water is boiling. Do not close the pressure vent, but operate at atmospheric pressure so that there is a continuous escape of a small amount of steam. Continue to heat for 30 minutes, then remove the test container and composite the contents of each replicate immediately in a clean Pyrex flask or beaker. Proceed with the determination of the amount of extractives by the method described in paragraph (e)(5) of this section.

(ix) *Heptane* (*150 °F for 2 hours*) *simulating high-temperature heat sterilization for fatty foods only.* Preheat redistilled reagent-grade heptane (boiling point 208 °F) carefully in a clean Pyrex flask on a water bath or nonsparking hot plate in a well-ventilated hood to 150 °F. At the same time preheat a pressure cooker or equivalent to 150 °F in an incubator. This pressure cooker is to serve only as a container for the heptane-containing test package inside the incubator in order to minimize the danger of explosion. Fill the test container within ¼ -inch of the top with a measured volume of the 150 °F heptane and cover with clean aluminum foil. Place the test container in the preheated pressure cooker and then put the assembly into a 150 °F incubator. After 2 hours, remove the pressure cooker from the incubator, open the assembly, and immediately composite the heptane of each replicate in a clean Pyrex flask or beaker. Proceed with the determination of the amount of extractives by the method described in paragraph (e)(5) of this section.

(x) *Heptane* (*120 °F for 30 minutes*), *simulating boiling water sterilization of fatty foods only.* Preheat redistilled reagent-grade heptane (boiling point 208 °F) carefully in a clean Pyrex flask on a water bath or nonsparking hot plate in a well-ventilated hood to 120 °F. At the same time, preheat a pressure cooker or equivalent to 120 °F in an incubator. This pressure cooker is to serve only as a vented container for the heptane-containing test package inside the incubator in order to minimize the danger of explosion. Fill the test container within ¼ -inch of the top with a measured volume of the 120 °F heptane and cover with clean aluminum foil. Place the test container in the preheated pressure cooker and then put the assembly into a 120 °F incubator. After 30 minutes, remove the pressure cooker from the incubator, open the assembly, and immediately composite the heptane of each replicate in a clean Pyrex flask or beaker. Proceed with the determination of the amount of extractives by the method described in paragraph (e)(5) of this section.

(xi) *Heptane* (*120 °F for 15 minutes*), *simulating hot fill or pasteurization above 150 °F for fatty foods only.* Preheat redistilled reagent-grade heptane (boiling point 208 °F) carefully in a clean Pyrex flask on a water bath or nonsparking hot plate in a well-ventilated hood to 120 °F. At the same time, preheat a pressure cooker or equivalent to 120 °F in an incubator. This pressure cooker is to serve only as a container for the heptane-containing test package inside the incubator in order to minimize the danger of explosion. Fill the test container within ¼ -inch of the top with a measured volume of the 120 °F heptane and cover with clean aluminum foil. Place the test container in the preheated pressure cooker and then put the assembly into a 120 °F incubator. After 15 minutes, remove the pressure cooker from the incubator, open the assembly, and immediately composite the heptane of each replicate in a clean Pyrex flask or beaker. Proceed with the determination of the amount of extractives by the method described in paragraph (e)(5) of this section.

(xii) *Heptane* (*100 °F for 30 minutes*), *simulating hot fill or pasteurization below 150 °F for fatty foods only.* Preheat redistilled reagent-grade heptane (boiling point 208 °F) carefully in a clean Pyrex flask on a water bath or nonsparking hot plate in a well-ventilated hood to 100 °F. At the same time, preheat a pressure cooker or equivalent to 100 °F in an incubator. This pressure cooker is to serve only as a container for the heptane-containing test package inside the incubator in order to minimize the danger of explosion. Fill the test container within ¼ -inch of the top with a measured volume of the 100 °F heptane and cover with clean aluminum foil. Place the test container in the preheated pressure cooker and then put the assembly into a 100 °F incubator. After 30 minutes, remove the pressure cooker from the incubator, open the assembly and immediately composite the heptane of each replicate in a clean Pyrex flask or beaker. Proceed with the determination of the amount of extractives by the method described in paragraph (e)(5) of this section.

(xiii) *Heptane* (*70 °F for 30 minutes*), *simulating room temperature filling and storage of fatty foods only.* Fill the test container within ¼ -inch of the top with a measured volume of the 70 °F heptane and cover with clean aluminum foil. Place the test container in a suitable room maintained at 70 °F. After 30 minutes, composite the heptane of each replicate in a clean Pyrex flask or beaker. Proceed with the determination of the amount of extractives by the method described in paragraph (e)(5) of this section.

(xiv) *Heptane* (*120 °F for 30 minutes*), *simulating frozen fatty foods reheated in the container.* Preheat redistilled reagent-grade heptane (boiling point 208 °F) carefully in a clean Pyrex flask on a water bath or hot plate in a well-ventilated hood to 120 °F. At the same time, preheat a pressure cooker to 120 °F in an incubator. This pressure cooker is to serve only as a container for the heptane-containing test package inside the incubator in order to minimize the danger of explosion. Fill the test container within ¼ -inch of the top with a measured volume of the 120 °F heptane and cover with clean aluminum foil. Place the test container in the preheated pressure cooker and then put the assembly into a 120 °F incubator. After 30 minutes, remove the pressure cooker from the incubator, open the assembly and immediately composite the heptane from each replicate into a clean Pyrex flask. Proceed with the determination of the amount of extractives by the method described in paragraph (e)(5) of this section.

(xv) *Alcohol—8 percent* (*150 °F for 2 hours*), *simulating alcoholic beverages hot filled or pasteurized below 150 °F.* Preheat 8 percent (by volume) ethyl alcohol in demineralized distilled water to 150 °F in a clean Pyrex flask. Fill the test container with within ¼ -inch of the top with a measured volume of the 8 percent alcohol. Cover the container with clean aluminum foil and place in an oven maintained at 150 °F. After 2 hours, remove the container from the oven and immediately composite the alcohol from each replicate in a clean Pyrex flask. Proceed with the determination of the amount of extractives by the method described in paragraph (e)(5) of this section.

(xvi) *Alcohol—8 percent* (*120 °F for 24 hours*), *simulating alcoholic beverages room-temperature filled and stored.* Preheat 8 percent (by volume) ethyl alcohol in demineralized distilled water to 120 °F in a clean Pyrex flask. Fill the test container within ¼ -inch of the top with a measured volume of the 8 percent alcohol, cover the container with clean aluminum foil and place in an oven or incubator maintained at 120 °F. After 24 hours, remove the container from the oven or incubator and immediately composite the alcohol from each replicate into a clean Pyrex flask. Proceed with the determination of the amount of extractives by the method described in paragraph (e)(5) of this section.

(xvii) *Alcohol—8 percent* (*70 °F for 48 hours*), *simulating alcoholic beverages in refrigerated storage.* Bring 8 percent (by volume) ethyl alcohol in demineralized distilled water to 70 °F in a clean Pyrex flask. Fill the test container within ¼ -inch of the top with a measured volume of the 8 percent alcohol. Cover the container with clean aluminum foil. Place the test container in a suitable room maintained at 70 °F. After 48 hours, immediately composite the alcohol from each replicate into a clean Pyrex flask. Proceed with the determination of the amount of extractives by the method described in paragraph (e)(5) of this section.

NOTE: The tests specified in paragraph (e)(4) (i) through (xvii) of this section are applicable to flexible packages consisting of coated metal contacting food, in which case the closure end is double-folded and clamped with metal spring clips by which the package can be suspended.

(5) *Determination of amount of extractives*—(i) *Total residues.* Evaporate the food-simulating solvents from paragraph (e)(4) (i) to (xvii), inclusive, of this section to about 100 milliliters in the Pyrex flask and transfer to a clean, tared platinum dish, washing the flask three times with the solvent used in the extraction procedure, and evaporate to a few milliliters on a nonsparking low-temperature hotplate. The last few milliliters should be evaporated in an oven maintained at a temperature of 212 °F. Cool the platinum dish in a desiccator for 30 minutes and weigh the residue to the nearest 0.1 milligram (*e*). Calculate the extractives in milligrams per square inch and in parts per million for the particular size of container being tested and for the specific food-simulating solvent used.

(*a*) *Water and 8-percent alcohol.*

$$\text{Milligrams extractives per square inch} = \frac{e}{s}$$

View or download PDF

$$\textit{Extractives residue} = \frac{Ex = (e)(a)(1000)}{(c)(s)}$$

View or download PDF

(*b*) *Heptane.*

$$\text{Milligrams extractives per square inch} = \frac{e}{(s)(F)}$$

View or download PDF

$$\textit{Extractives residue} = \frac{Ex = (e)(a)(1000)}{(c)(s)(F)}$$

View or download PDF

where:

Ex = Extractives residue in ppm for any container size.

e = Milligrams extractives per sample tested.

a = Total coated area, including closure in square inches.

c = Water capacity of container, in grams.

s = Surface of coated area tested, in square inches.

F = Five, the ratio of the amount of extractives removed from a coated container by heptane under exaggerated time-temperature test conditions compared to the amount extracted by a fat or oil from a container tested under exaggerated conditions of thermal sterilization and use.

e' = Chloroform-soluble extractives residue.

ee′ = Zinc corrected chloroform-soluble extractive residue.

e′ or *ee′* is substituted for *e* in the above equations when necessary.

If when calculated by the equations in paragraph (e)(5)(i) (*a*) and (*b*) of this section, the concentration of extractives residue (*Ex*) exceeds 50 parts per million or the extractives in milligrams per square inch exceed the limitations prescribed in paragraph (c) of this section for the particular container size, proceed to paragraph (e)(5)(ii) of this section (method for determining the amount of chloroform-soluble extractives residue).

(ii) *Chloroform-soluble extractives residue.* Add 50 milliliters of chloroform (freshly distilled reagent grade or a grade having an established consistently low blank) to the dried and weighed residue, (*e*), in the platinum dish, obtained in paragraph (e)(5)(i) of this section. Warm carefully, and filter through Whatman No. 41 filter paper in a Pyrex funnel, collecting the filtrate in a clean, tared platinum dish. Repeat the chloroform extraction, washing the filter paper with this second portion of chloroform. Add this filtrate to the original filtrate and evaporate the total down to a few milliliters on a low-temperature hotplate. The last few milliliters should be evaporated in an oven maintained at 212 °F. Cool the platinum dish in a desiccator for 30 minutes and weigh to the nearest 0.1 milligram to get the chloroform-soluble extractives residue (*e′*). This *e′* is substituted for *e* in the equations in paragraph (e)(5)(i) (*a*) and (*b*) of this section. If the concentration of extractives (*Ex*) still exceeds 50 parts per million or the extractives in milligrams per square inch exceed the limitations prescribed in paragraph (c) of this section for the particular container size, proceed as follows to correct for zinc extractives (“C” enamels only): Ash the residue in the platinum dish by heating gently over a Meeker-type burner to destroy organic matter and hold at red heat for about 1 minute. Cool in the air for 3 minutes, and place the platinum dish in the desiccator for 30 minutes and weigh to the nearest 0.1 milligram. Analyze this ash for zinc by standard Association of Official Agricultural Chemists methods or equivalent. Calculate the zinc in the ash as zinc oleate, and subtract from the weight of chloroform-soluble extractives residue (*e′*) to obtain the zinc-corrected chloroform-soluble extractives residue (*ee′*). This *ee′* is substituted for *e* in the formulas in paragraph (e)(5)(i) (*a*) and (*b*) of this section. To comply with the limitations in paragraph (c) of this section, the chloroform-soluble extractives residue (but after correction for the zinc extractives in case of “C” enamels) must not exceed 50 parts per million and must not exceed in milligrams per square inch the limitations for the particular article as prescribed in paragraph (c) of this section.

(f) *Equipment and reagent requirements*—(1) *Equipment.*

Rinsing equipment, soda fountain pressure-type hot water, consisting in simplest form of a $\frac{1}{8}$ -inch- $\frac{1}{4}$ -inch inside diameter metal tube attached to a hot water line delivering 190 °F-200 °F water and bent so as to direct a stream of water upward.

Pressure cooker, 21-quart capacity with pressure gage, safety release, and removable rack, 12.5 inches inside diameter × 11 inches inside height, 20 pounds per square inch safe operating pressure.

Oven, mechanical convection, range to include 120 °F-212 °F explosion-proof, inside dimensions (minimum), 19″ × 19″ × 19″, constant temperature to ±2 °F (water bath may be substituted).

Incubator, inside dimensions (minimum) 19″ × 19″ × 19″ for use at 100 °F±2 °F explosion proof (water bath may be substituted).

Constant-temperature room or chamber 70 °F±2 °F minimum inside dimensions 19″ × 19″ × 19″.

Hot plate, nonsparking (explosion proof), top 12″ × 20″, 2,500 watts, with temperature control.

Platinum dish, 100-milliliter capacity minimum.

All glass, Pyrex or equivalent.

(2) *Reagents.*

Water, all water used in extraction procedure should be freshly demineralized (deionized) distilled water.

Heptane, reagent grade, freshly redistilled before use, using only material boiling at 208 °F.

Alcohol, 8 percent (by volume), prepared from undenatured 95 percent ethyl alcohol diluted with demineralized or distilled water.

Chloroform, reagent grade, freshly redistilled before use, or a grade having an established, consistently low blank.

Filter paper, Whatman No. 41 or equivalent.

(g) In accordance with good manufacturing practice, finished coatings intended for repeated food-contact use shall be thoroughly cleansed prior to their first use in contact with food.

(h) Acrylonitrile copolymers identified in this section shall comply with the provisions of §180.22 of this chapter.

(i) Epoxy resins derived by the reaction of 4,4′-isopropylidenediphenol and epichlorohydrin, as described in paragraph (b)(3)(viii)(*a*) of this section, may be used in accordance with this section except as coatings in packaging for powdered and liquid infant formula.

[42 FR 14534, Mar. 15, 1977]

Editorial Note: For Federal Register citations affecting §175.300, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at *www.fdsys.gov.*

Back to Top

§175.320 Resinous and polymeric coatings for polyolefin films.

Resinous and polymeric coatings may be safely used as the food-contact surface of articles intended for use in producing, manufacturing, packing, processing, preparing, treating, packaging, transporting, or holding food, in accordance with the following prescribed conditions:

(a) The coating is applied as a continuous film over one or both sides of a base film produced from one or more of the basic olefin polymers complying with §177.1520 of this chapter. The base polyolefin film may contain optional adjuvant substances permitted for use in polyolefin film by applicable regulations in parts 170 through 189 of this chapter.

(b) The coatings are formulated from optional substances which are:

(1) Substances generally recognized as safe for use in or on food.

(2) Substances the use of which is permitted under applicable regulations in parts 170 through 189 of this chapter, by prior sanctions, or approvals.

(3) Substances identified in this paragraph (b)(3) and subject to such limitations as are provided:

List of substances	Limitations
(i) Resins and polymers:	
Acrylic acid polymer and its ethyl or methyl esters	
Acrylamide copolymerized with ethyl acrylate and/or styrene and/or methacrylic acid, and the copolymer subsequently reacted with formaldehyde and butanol	
Butadiene-acrylonitrile copolymer	
Butadiene-acrylonitrile-styrene terpolymer	
Butyl rubber	
N,N′-Diphenyl-*p*-phenylenediamine	For use only as a polymerization inhibitor in 2-sulfoethyl methacrylate, sodium salt.
2-Ethylhexyl acrylate copolymerized with one or more of the following:	
Acrylonitrile	
Itaconic acid	
Methacrylonitrile	
Methyl acrylate	
Methyl methacrylate	
4,4′-Isopropylidenediphenolepichlorohydrin average molecular weight 900	
Melamine-formaldehyde as the basic polymer or chemically modified with methyl alcohol	
Methacrylic acid and its ethyl or methyl esters copolymerized with one or more of the following:	
Acrylic acid	
Ethyl acrylate	
Methyl acrylate	
α-Methyl styrene polymer	
α-Methylstyrene-vinyltoluene copolymer resins (molar ratio 1 α-methylstyrene to 3 vinyltoluene)	For use only in coatings that contact food under conditions of use D, E, F, or G described in table 2 of §176.170(c) of this chapter, provided that the concentration of α-methylstyrene-vinyltoluene copolymer resins in the finished food-contact coating does not exceed 1.0 milligram per square inch of food-contact surface.
Petroleum alicyclic hydrocarbon resins	As defined in §176.170 of this chapter. Blended with butyl rubber for use as a component of coatings on polyolefin fabric for bulk packaging of raw fruits and vegetables and used at a level not to exceed 30 percent by weight of the total coating solids.
Polyamide resins (CAS Reg. No. 68139-70-8), as the basic resin, derived from:	For use only in coatings for polypropylene films that contact food at temperatures not to exceed room temperature.
Dimerized vegetable oil or tall oil acids containing not more than 20 percent of monomer acids	
Azelaic acid (CAS Reg. No. 123-99-9) in an amount not to exceed 3.7 percent by weight of the polyamide resin	
Ethylenediamine (CAS Reg. No. 107-15-3)	
Piperazine (CAS Reg. No. 110-85-0) in an amount not to exceed 6.4 percent by weight of the polyamide resin	
Polyamide resins, derived from dimerized vegetable oil acids (containing not more than 20% of monomer acids) and ethylenediamine, as the basic resin	For use only in coatings for polyolefin films that contact food at temperatures not to exceed room temperature.
Polyamide resins having a maximum acid value of 5 and a maximum amine value of 8.5 derived from dimerized vegetable oil acids (containing not more than 10 percent of monomer acids), ethylenediamine, and 4,4-bis (4-hydroxyphenyl) pentanoic acids (in an amount not to exceed 10 percent by weight of said polyamide resins); as the basic resin	For use only in coatings that contact food at temperatures not to exceed room temperature provided that the concentration of the polyamide resins in the finished food-contact coating does not exceed 5 milligrams per square inch of food-contact surface.
Polyester resins formed by reaction of one or more of the following polybasic acids and monobasic acids with one or more of the following polyhydric alcohols:	
Polybasic acids:	
Adipic	
Azelaic	For use in forming polyester resins intended for use in coatings that contact food only of the type identified in §176.170(c) of this chapter, table 1, under Category VIII, and under conditions of use E,

	F, or G, described in table 2 of §176.170(c) of this chapter.
Dimerized fatty acids derived from:	
Animal, marine or vegetable fats and oils	
Tall oil	
Fumaric	
Isophthalic	
Maleic	
o-Phthalic	
Sebacic	
Terephthalic	
Trimellitic	
Monobasic acids:	
Fatty acids derived from:	
Animal, marine, or vegetable fats and oils	
Gum rosin	As defined in §178.3870 of this chapter. For use in forming polyester resins intended for use in coatings that contact food only of the type identified in §176.170(c) of this chapter, table 1, under Category VIII, and under conditions of use E, F, or G described in table 2 of §176.170(c) of this chapter.
Polyhydric alcohols:	
1,3-Butylene glycol	
Diethylene glycol	
2,2-Dimethyl-1,3-propanediol	
Dipropylene glycol	
Ethylene glycol	
Glycerol	
Mannitol	
α-Methyl glucoside	
Pentaerythritol	
Propylene glycol	
Sorbitol	
Trimethylol ethane	
Trimethylol propane	
Polyethylenimine	For use only as a primer subcoat to anchor epoxy surface coatings to the base sheet.
Polystyrene	
Polyvinyl acetate	
Polyvinyl chloride	
Siloxanes and silicones: platinum-catalyzed reaction product of vinyl-containing dimethylpolysiloxane (CAS Reg. No. 68083-18-1 and CAS Reg. No. 68083-19-2) with methylhydrogen polysiloxane (CAS Reg. No. 63148-57-2) and dimethylmethylhydrogen polysiloxane (CAS Reg. No. 68037-59-2). The following substances may be used as optional polymerization inhibitors:	Platinum content not to exceed 150 parts per million.
3,5-Dimethyl-1-hexyne-3-ol (CAS Reg. No. 107-54-0), at a level not to exceed 0.53 weight percent;	
1-Ethynylcyclohexene (CAS Reg. No. 931-49-7), at a level not to exceed 0.64 weight percent;	
Bis(methoxymethyl)ethyl maleate (CAS Reg. No. 102054-10-4), at a level not to exceed 1.0 weight percent;	
Methylvinyl cyclosiloxane (CAS Reg. No. 68082-23-5); and	
Tetramethyltetravinylcyclotetrasiloxane (CAS Reg. No. 2554-06-5).	
Siloxanes and silicones; platinum-catalyzed reaction product of vinyl-containing dimethylpolysiloxane (CAS Reg. Nos. 68083-19-2 and 68083-18-1), with methyl hydrogen polysiloxane (CAS Reg. No. 63148-57-2). Dimethyl maleate (CAS Reg. No. 624-48-6) and vinyl acetate (CAS Reg. No. 108-05-4) may be used as optional polymerization inhibitors	Platinum content not to exceed 100 parts per million. For use only as a surface coating under the following conditions: 1. In coatings for olefin polymers provided the coating contacts food only of the types identified in §176.170(c) of this chapter, table 1, under Types I, II, VI, and VII-B when used under conditions of use E, F, and G described in table 2 in §176.170(c) of this chapter. 2. In coatings for olefin polymers provided the coating contacts food only of the types identified in §176.170(c) of this chapter, table 1, under Types III, IV, V, VII-A, VIII, and IX when used under conditions of use A through H described in table 2 in §176.170(c) of this chapter.
Siloxanes and silicones; platinum-catalyzed reaction product of vinyl-containing dimethylpolysiloxane (CAS Reg. Nos. 68083-19-2 and 68083-18-1), with methyl hydrogen polysiloxane (CAS Reg. No. 63148-57-2). Dimethyl maleate (CAS Reg. No. 624-48-6), vinyl acetate (CAS Reg. No. 108-05-4), dibutyl maleate (CAS Reg. No. 105-76-0) and diallyl maleate (CAS Reg. No. 999-21-3) may be used as optional polymerization inhibitors. The polymer may also contain C_{16}-C_{18} olefins (CAS Reg. No. 68855-60-7) as a control release agent	Platinum content not to exceed 100 parts per million. For use only as a release coating for pressure sensitive adhesives.
Styrene copolymerized with one or more of the following:	
Acrylonitrile	
α-Methyl styrene	
Styrene polymers made by the polymerization of any combination of styrene or alpha methyl styrene with acrylic acid, methacrylic acid, 2-ethyl hexyl acrylate, methyl methacrylate, and butyl acrylate. The styrene and alpha methyl styrene, individually, may constitute from 0 to 80 weight percent of the polymer. The other monomers, individually, may be from 0 to 40 weight percent of the polymer. The polymer number average molecular weight (M_n) shall be at least 2,000 (as determined by gel permeation chromatography). The acid number of the polymer shall be less than 250. The monomer content shall be less than 0.5 percent	For use only in contact with foods of Types IV-A, V, and VII in table 1 of §176.170(c) of this chapter, under use conditions E through G in table 2 of §176.170(c), and with foods of Types VIII and IX without use temperature restriction.
Styrene-isobutylene copolymer	
Terpene resins consisting of polymers of α-pinene, β-pinene, and/or dipentene; acid value less than 5, saponification number less than 5, and color less than 4 on the Gardner scale as measured in 50 percent mineral spirits solution	
2-Sulfoethyl methacrylate, sodium salt Chemical Abstracts Service No. 1804-87-1]	For use only in copolymer coatings under conditions

	of use E, F, and G described in table 2 of §176.170(c) of this chapter and limited to use at a level not to exceed 2.0 percent by weight of the dry copolymer coating.
Vinyl chloride-acetate, hydroxyl-modified copolymer or maleic acid-modified copolymer	
Vinyl chloride copolymerized with one or more of the following:	
Acrylonitrile	
Vinyl acetate	
Vinylidene chloride	
Vinylidene chloride copolymerized with one or more of the following:	
Acrylic acid and its methyl, ethyl, propyl, butyl, or octyl esters	
Acrylonitrile	
Itaconic acid	
Methacrylic acid and its methyl, ethyl, propyl, butyl, or octyl esters	
Methacrylonitrile	
Vinyl chloride	
(ii) Plasticizers:	
Acetyl tributyl citrate	
Acetyl triethyl citrate	
Butyl phthalyl butyl glycolate	
Butyl stearate	
Dibutyl sebacate	
Diethyl phthalate	
2-Ethylhexyl diphenyl phosphate	
Ethyl phthalyl ethyl glycolate	
Glycerol monooleate	
Glycerol triacetate	
Triethyl citrate	
(iii) Adjuvants (release agents, waxes, and dispersants):	
Acetone	
Amides (unsubstituted) of fatty acids from vegetable or animal oils	
n-Butyl acetate	
n-Butyl alcohol	
Candelilla wax	
Carnauba wax	
5-Chloro-2-methyl-4-isothiazolin-3-one (CAS Reg. No. 26172-55-4) and 2-methyl-4-isothiazolin-3-one (CAS Reg. No. 2682-20-4) mixture, at a ratio of 3 parts to 1 part, respectively, manufactured from methyl-3-mercaptopropionate (CAS Reg. No. 2935-90-2) and optionally containing magnesium nitrate (CAS Reg. No. 10377-60-3) at a concentration equivalent to the isothiazolone active ingredients (weight/weight).	For use only as an antimicrobial agent in emulsion-based silicone coatings at a level not to exceed 50 milligrams per kilogram (based on isothiazolone active ingredient) in the coating formulation.
1,2-Dibromo-2,4-dicyanobutane (CAS Reg. No. 35691-65-7)	For use as an antimicrobial agent at levels not to exceed 500 milligrams per kilogram in emulsion-based silicone coating.
Ethyl acetate	
Fatty acids from vegetable or animal oils and their aluminum, ammonium, calcium, magnesium, and sodium salts	
Hexane	
Methyl ethyl ketone	
N,N'-Dioleoylethylenediamine (CAS Reg. No. 110-31-6)	For use only in ionomeric resins complying with §177.1330 of this chapter and in ethylene vinyl acetate copolymers complying with §177.1350 of this chapter at a level not to exceed 0.0085 milligram per square centimeter (0.055 milligram per square inch) in the finished food-contact article.
Petroleum waxes conforming to specifications included in a regulation in subchapter B of this chapter	
Polyvinyl alcohol, minimum viscosity of 4% aqueous solution at 20 °C of 4 centipoises and percent alcoholysis of 87-100	For use only as a dispersing agent at levels not to exceed 6% of total coating weight in coatings for pol-yolefin films provided the finished polyolefin films contact food only of the types identified in §176.170(c) of this chapter, table 1, under Types V, VIII, and IX.
Sodium dioctyl sulfosuccinate	
Sodium dodecylbenzenesulfonate	
Sodium lauryl sulfate	
Sorbitan and sorbitol esters of fatty acids from vegetable or animal oils	
Spermaceti wax	
Tetrahydrofuran	
Toluene	
(iv) Preservatives:	
Silver chloride-coated titanium dioxide	For use only as a preservative in latex emulsions at a level not to exceed 2.2 parts per million (based on silver ion concentration) in the dry coating.

(c) The coating in the finished form in which it is to contact food, when extracted with the solvent or solvents characterizing the type of food, and under conditions of time and temperature characterizing the conditions of its intended use as determined from tables 1 and 2 of §176.170(c) of this chapter, shall yield net chloroform-soluble extractives not to exceed 0.5 milligram per square inch of coated surface.

(d) Acrylonitrile copolymers identified in this section shall comply with the provisions of §180.22 of this chapter.

[42 FR 14534, Mar. 15, 1977, as amended at 43 FR 7206, Feb. 21, 1978; 45 FR 6541, Jan. 29, 1980; 47 FR 22512, May 25, 1982; 49 FR 36497, Sept. 18, 1984; 50 FR 47209, Nov. 15, 1985; 56 FR 49674, Oct. 1, 1991; 61 FR 14246, Apr. 1, 1996; 63 FR 71017, Dec. 23, 1998; 64 FR 2568, Jan. 15, 1999; 65 FR 6892, Feb. 11, 2000; 65 FR 37041, June 13, 2000]

Back to Top

§175.350 Vinyl acetate/crotonic acid copolymer.

A copolymer of vinyl acetate and crotonic acid may be safely used as a coating or as a component of a coating which is the food-contact surface of polyolefin films intended for packaging food, subject to the provisions of this section.

(a) The copolymer may contain added optional substances to impart desired properties.

(b) The quantity of any optional substance does not exceed the amount reasonably required to accomplish the intended physical or technical effect nor any limitations further provided.

(c) Any optional substance that is the subject of a regulation in parts 174, 175, 176, 177, 178, and §179.45 of this chapter conforms with any specifications in such regulation.

(d) Optional substances as provided in paragraph (a) of this section include:

(1) Substances generally recognized as safe in food.

(2) Substances subject to prior sanction or approval for uses with a copolymer of vinyl acetate and crotonic acid and used in accordance with such sanction or approval.

(3) Substances identified in this subparagraph and subject to such limitations as are provided:

List of substances	Limitations
Silica	
Japan wax	

(e) Copolymer of vinyl acetate and crotonic acid used as a coating or as a component of a coating conforming with the specifications of paragraph (e)(1) of this section are used as provided in paragraph (e)(2) of this section.

(1) *Specifications.* (i) The chloroform-soluble portion of the water extractives of the coated film obtained with distilled water at 120 °F for 24 hours does not exceed 0.5 milligram per square inch of coated surface.

(ii) The chloroform-soluble portion of the *n*-heptane extractives of the coated film obtained with *n*-heptane at 70 °F for 30 minutes does not exceed 0.5 milligram per square inch of coated surface.

(2) *Conditions of use.* The copolymer of vinyl acetate and crotonic acid is used as a coating or as a component of a coating for polyolefin films for packaging bakery products and confectionery.

Back to Top

§175.360 Vinylidene chloride copolymer coatings for nylon film.

Vinylidene chloride copolymer coatings identified in this section and applied on nylon film may be safely used as food-contact surfaces, in accordance with the following prescribed conditions:

(a) The coating is applied as a continuous film over one or both sides of a base film produced from nylon resins complying with §177.1500 of this chapter.

(b) The coatings are prepared from vinylidene chloride copolymers produced by copolymerizing vinylidene chloride with one or more of the monomers acrylic acid, acrylonitrile, ethyl acrylate, methacrylic acid, methyl acrylate, methyl methacrylate (CAS Reg. No. 80-62-6; maximum use level 6 weight percent) and 2-sulfoethyl methacrylate (CAS Reg. No. 10595-80-9; maximum use level 1 weight percent). The finished copolymers contain at least 50 weight percent of polymer units derived from vinylidene chloride. The finished coating produced from vinylidene chloride copolymers produced by copolymerizing vinylidene chloride with methyl methacrylate and/or 2-sulfoethyl methacrylate, or with methyl methacrylate and/or 2-sulfoethyl methacrylate together with one or more of the other monomers from this section, is restricted to use at or below room temperature.

(c) Optional adjuvant substances employed in the production of the coatings or added thereto to impart desired properties may include sodium dodecylbenzenesulfonate.

(d) The coating in the finished form in which it is to contact food, when extracted with the solvent or solvents characterizing the type of food, and under conditions of time and temperature characterizing the conditions of its intended use as determined from tables 1 and 2 of §176.170(c) of this chapter, shall yield net chloroform-soluble extractives not to exceed 0.5 milligram per square inch of coated surface when tested by the methods described in §176.170(d) of this chapter.

(e) Acrylonitrile copolymers identified in this section shall comply with the provisions of §180.22 of this chapter.

[42 FR 14534, Mar. 15, 1977, as amended at 43 FR 7206, Feb. 21, 1978; 45 FR 76998, Nov. 21, 1980; 47 FR 54430, Dec. 3, 1982]

Back to Top

§175.365 Vinylidene chloride copolymer coatings for polycarbonate film.

Vinylidene chloride copolymer coatings identified in this section and applied on polycarbonate film may be safely used as food-contact surfaces, in accordance with the following prescribed conditions:

(a) The coating is applied as a continuous film over one or both sides of a base film produced from polycarbonate resins complying with §177.1580 of this chapter.

(b) The coatings are prepared from vinylidene chloride copolymers produced by copolymerizing vinylidene chloride with acrylonitrile, methyl acrylate, and acrylic acid. The finished copolymers contain at least 50 weight-percent of polymer units derived from vinyldene chloride.

(c) Optional adjuvant substances employed in the production of the coatings or added thereto to impart desired properties may include sodium dodecylbenzenesulfonate in addition to substances described in §174.5(d) of this chapter.

(d) The coating in the finished form in which it is to contact food, when extracted with the solvent or solvents characterizing the type of food, and under the conditions of time and temperature characterizing the conditions of its intended use as determined from tables 1 and 2 of §176.170(c) of this chapter, shall yield net chloroform-soluble extractives in each extracting solvent not to exceed 0.5 milligram per square inch of coated surface as determined by the methods described in §176.170(d) of this chapter. In testing the finished food-contact articles, a separate test sample is to be used for each required extracting solvent.

(e) Acrylonitrile copolymers identified in this section shall comply with the provisons of §180.22 of this chapter.

Back to Top

§175.380 Xylene-formaldehyde resins condensed with 4,4′-isopropylidenediphenol-epichlorohydrin epoxy resins.

The resins identified in paragraph (a) of this section may be safely used as a food-contact coating for articles intended for use in contact with food, in accordance with the following prescribed conditions.

(a) The resins are produced by the condensation of xylene-formaldehyde resin and 4,4′-isopropylidenediphenol-epichlorohydrin epoxy resins, to which may have been added certain optional adjuvant substances required in the production of the resins or added to impart desired physical and technical properties. The optional adjuvant substances may include resins produced by the condensation of allyl ether of mono-, di-, or trimethylol phenol and capryl alcohol and also may include substances identified in §175.300(b)(3), with the exception of paragraph (b)(3) (xxxi) and (xxxii) of that section.

(b) The resins identified in paragraph (a) of this section may be used as a food-contact coating for articles intended for contact at temperatures not to exceed 160 °F with food of Types I, II, VI-A and B, and VIII described in table 1 of §176.170(c) of this chapter provided that the coating in the finished form in which it is to contact food meets the following extractives limitations when tested by the methods provided in §175.300(e):

(1) The coating when extracted with distilled water at 180 °F for 24 hours yields total extractives not to exceed 0.05 milligram per square inch of food-contact surface.

(2) The coating when extracted with 8 percent (by volume) ethyl alcohol in distilled water at 160 °F for 4 hours yields total extractives not to exceed 0.05 milligram per square inch of food-contact surface.

(c) The resins identified in paragraph (a) of this section may be used as a food-contact coating for articles intended for contact at temperatures not to exceed room temperature with food of Type VI-C described in table 1 of §176.170(c) of this chapter provided the coating in the finished form in which it is to contact food meets the following extractives limitations when tested by the methods provided in §175.300(e):

(1) The coating when extracted with distilled water at 180 °F for 24 hours yields total extractives not to exceed 0.05 milligram per square inch of food-contact surface.

(2) The coating when extracted with 50 percent (by volume) ethyl alcohol in distilled water at 180 °F for 24 hours yields total extractives not to exceed 0.05 milligram per square inch.

Back to Top

§175.390 Zinc-silicon dioxide matrix coatings.

Zinc-silicon dioxide matrix coatings may be safely used as the food-contact surface of articles intended for use in producing, manufacturing, packing, processing, preparing, treating, packaging, transporting, or holding food, subject to the provisions of this section;

(a) The coating is applied to a metal surface, cured, and washed with water to remove soluble substances.

(b) The coatings are formulated from optional substances which include:

(1) Substances generally recognized as safe.

(2) Substances for which safe conditions of use have been prescribed in §175.300.

(3) Substances identified in paragraph (c) of this section, subject to the limitations prescribed.

(c) The optional substances permitted are as follows:

List of substances	Limitations
Ethylene glycol	As a solvent removed by water washing.
Iron oxide	
Lithium hydroxide	Removed by water washing.
Methyl orange	As an acid-base indicator.
Potassium dichromate	Removed by water washing.
Silica gel	
Sodium silicate	
Zinc, as particulate metal	

(d) The coating in the finished form in which it is to contact food, when extracted with the solvent or solvents characterizing the type of food, and under the conditions of its intended use as shown in table 1 and 2 of §175.300(d) (using 20 percent alcohol as the solvent when the type of food contains approximately 20 percent alcohol) shall yield total extractives not to exceed those prescribed in §175.300(c)(3); lithium extractives not to exceed 0.025 milligram per square inch of surface; and chromium extractives not to exceed 0.05 microgram per square inch of surface.

(e) The coatings are used as food-contact surfaces for bulk reusable containers intended for storing, handling, and transporting food.

Back to Top