TR-19/2000
Thermoplastics Piping for the Transport of Chemicals

THERMOPLASTIC PIPING FOR THE TRANSPORT OF CHEMICALS

Foreword

This report was developed and published with the technical help and financial support of the members of the PPI (Plastics Pipe Institute, Inc.). The members have shown their interest in quality products by assisting independent standards-making and user organizations in the development of standards, and also by developing reports on an industry-wide basis to help engineers, code officials, specifying groups, and users.

The purpose of this technical report is to provide information on the transport of various chemicals using thermoplastic piping materials.

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The Plastics Pipe Institute
Toll Free: (888) 314-6774
http://www.plasticpipe.org

January 2000

CHEMICAL RESISTANCE IN GENERAL

Thermoplastic materials generally are resistant to attack from many chemicals which makes them suitable for use in many process applications. The suitability for use in a particular process piping application is a function of:

I. Material

A. The specific plastic material: ABS, CPVC, PP, PVC, PE, PB, PVDF, PEX[1], PA11, PK
B. The specific plastic material and its physical properties as identified by its cell classification according to the appropriate ASTM material specification.

II. Product and Joint System

A. Piping product dimensions, construction, and composition (layers, fillers, etc.).
B. Joining system. Heat fusion and solvent cementing do not introduce different materials into the system. Mechanical joints can introduce gaskets such as elastomers, or other thermoplastic or non-thermoplastic materials used as mechanical fitting components.
C. Other components and appurtenances in the piping system.

III. Use Conditions - *Internal and External*

A. Chemical or mixtures of chemicals, and their concentrations.
B. Operating temperature — maximum, minimum, and cyclical variations.
C. Operating pressure or applied stress — maximum, minimum and cyclical variations.
D. Life-cycle information — such as material cost, installation cost, desired service life, maintenance, repair and replacement costs, etc.

While the effect of each individual chemical is specific, some chemicals can be grouped into categories based on similar reactions. For example, water solutions of neutral inorganic salts generally have the same effect on thermoplastic piping materials as water alone, thus, sodium chloride, potassium alum, calcium chloride, copper sulfate, potassium sulfate and zinc chloride solutions have the same effect as water. However, at elevated temperatures and/or high concentrations, some oxidizing salt solutions may attack some specific plastic materials.

Further, with organic chemicals in a specific series such as alcohols, ketones, or acids, etc., as the molecular weight of the organic chemical series increases, the chemical resistance of a particular plastic material to members of the specific organic chemical series frequently also increases. Thus, while one type of

[1] Once cross-linked, PEX is no longer considered a thermoplastic material; however, it is included in this report as convenience for the reader.

polyvinyl chloride at 73 °F is not suitable for use with ethyl acetate, it is suitable for the higher molecular weight butyl acetate.

Generally, the resistance of a particular plastic to a specific chemical decreases with an increase in concentration. For example, at 73 °F polyethylene pipe can be used to carry 70% sulfuric acid but is not satisfactory for 95% sulfuric acid. In some cases, combinations of chemicals may have a synergistic effect on a thermoplastic material where individual chemicals do not. Lastly, the resistance of a particular plastic to a specific chemical generally decreases with temperature increase, with stress increase, and decreases with cyclical variations of temperature or applied stress.

TYPES OF CHEMICAL ATTACK ON PLASTICS

In general, chemicals that affect plastics do so in one of two ways. One effect is chemical solubility or permeation. The other is direct chemical attack.

In the case of solubility or permeation, physical properties may be affected, but the polymer molecule structure itself is not chemically changed, degraded or destroyed. In solubility or permeation, gas, vapor, or liquid molecules pass through the polymer, typically without damaging the plastic material itself. If the solvating chemical can be removed completely, the plastic is generally restored to its original condition. However, it is not always possible to remove a solvating chemical from the plastic, and in such cases, effects relating to chemical solvation may be permanent.

Sometimes the polymer itself may not be soluble, but it may contain a compounding ingredient that may be soluble in the chemical, and may be extracted from the polymer compound. This is rare because such extractable ingredients are either not used in pipe compounds, or they are chemically bonded to the molecular polymer matrix, and in such small amounts that they cannot be leached out to any significant extent.

Permeation may do little if any harm to the material, but it may have application-related effects. The permeating chemical may transfer into a fluid on the other side of the pipe. In general, thermoplastic pipes should not be used where a permeating chemical could compromise the purity of a fluid such as potable water inside the pipe, and in gas or vapor transmission service, there may be a very slight loss of contents through the pipe wall. Lastly, a permeating chemical may be entrained in the material and be released when heat fusion or solvent cement joining is performed. Heat fusion or solvent cement joining may be unreliable if performed on permeated pipes.

Direct chemical attack occurs when exposure to a chemical causes a chemical alteration of the polymer molecules by chain scission, crosslinking, oxidation, or substitution reactions. Direct chemical attack may cause profound, irreversible changes that cannot be restored by removal of the chemical. Examples of this

type of attack are 50% chromic acid at 140 °F on PVC, aqua regia on PVC at 73 °F, 95% sulfuric acid at 73 °F on PE and wet chlorine gas on PVC and PE. Direct chemical attack frequently causes a severe reduction of mechanical physical properties such as tensile strength, ductility, and impact resistance, and susceptibility to cracking from applied stress (stress cracking).

However, direct chemical attack is not always detrimental. For example, PEX materials are deliberately crosslinked using chemical or irradiation methods. While crosslinking enhances certain mechanical properties of PEX materials, it may preclude the use of heat fusion to join PEX piping.

The chemical resistance of the various plastic types varies greatly from one plastic material to another (i.e., PVC, ABS, PE, etc.), and also among different cell classifications of the same plastic type (e.g. PVC 1120 to PVC 2110, PE 1404 to PE 3408, etc.). There may also be slight variations among commercial products having the same cell classification.

The chemical resistance of plastic piping is basically a function of the chemical resistance of the thermoplastic material, and processing of the plastic in such a way that its full chemical resistance is developed. In general, the less compounding ingredients used the better the chemical resistance. Most plastic pipe compounds covered by current ASTM specifications and product standards use a minimum of compounding ingredients, except for the Type II PVC's and CAB plastics. The Type II PVC's contain impact modifiers which are less susceptible to chemical attack than monomeric plasticizers such as those used in PVC cable insulation, film and sheeting compounds, and in CAB plastics. Thermoplastic pipes with significant filler percentages may be susceptible to chemical attack where an unfilled material may be affected to a lesser degree or not at all.

Some newer piping products utilize a multi-layered (composite) construction, that is, the pipe wall is constructed of layers of different materials. Both thermoplastic and non-thermoplastic materials are used for the layers. Examples are PE/AL/PE, and PEX/AL/PEX pipes where there is a mid-wall aluminum layer. An all thermoplastic composite pipe has PVC, ABS, and PVC layers. Layered composite material pipes may have chemical resistance that differs from the chemical resistance of the individual materials.

Chemicals that attack plastics do so at a certain rate, some slowly and some more quickly. But usually, any chemical attack is increased when temperature or stress are increased, or when temperature or stress are varied. The particular rate must be taken into consideration in the life-cycle evaluation for a particular application. It has been observed in some chemical plants that while a particular application may have a relatively short service life, the overall life-cycle cost may be economically feasible and justifiable. Each combination of material cost, installation cost and service life must be evaluated and judged on its own merits.

CHEMICAL RESISTANCE DATA FOR THERMOPLASTIC PIPING IN *NON-PRESSURE* (GRAVITY-FLOW) APPLICATIONS and DATA TABLE

When thermoplastic pipes come into contact with chemical agents, it is important to know how the pipe may be affected. For gravity flow or non-pressure applications, where the pipe Is not subject to continuous internal pressure or thermal stress, chemical immersion test data may provide suitable information. The pipe manufacturer may have additional information on similar testing, or information on previous installations under similar field conditions.

I. A thermoplastic pipe that is subjected to several chemicals may or may not be affected by the chemical combination. Chemicals that individually do not have an effect may affect the pipe if combined with certain other chemicals. The listings that follow do not address chemical combinations.

II. Layered composite piping may have chemical resistance that differs from that of the individual materials in the layers. The listings that follow are not applicable to layered composite piping products.

III. The listings that follow are not applicable to composite piping products such as reinforced epoxy resin (fiberglass) pipes, or to thermoplastic pipes containing significant percentages of filler materials.

IV. The following chemical resistance information has been obtained from numerous sources. It is based primarily on plastic material test specimens that have been immersed in the chemical, and to a lesser degree, on field-experience. In most cases, detailed information on the test conditions (such as exposure time), and on test results (such as change in weight, change in volume, and change in strength) were not available. Therefore, this information is best used only for comparison of different thermoplastic materials.

V. Where no concentrations are given, the relatively pure material is indicated, except in the case of solids where saturated aqueous solutions are indicated.

NOTE: *Even though indicated as acceptable with certain temperature limitations, the use of PVC piping with liquid hydrocarbons such as gasoline and jet fuels, should be limited to short-term exposure such as secondary containment systems. This piping is not recommended for long-term exposure to liquid hydrocarbons.*

Resistance Codes

The following code is used in the data table:

Code	Meaning	Typical Result
140	Plastic type is generally resistant to temperature (°F) indicated by code.	Swelling < 3% or weight loss < 0.5% and elongation at break not significantly changed.
R to 73	Plastic type is generally resistant to temperature (°F) indicated by code and may have limited resistance at higher temperatures.	Swelling < 3% or weight loss < 0.5% and elongation at break not significantly changed.
C to 73	Plastic type has limited resistance to temperature (°F) indicated by code and may be suitable for some conditions.	Swelling 3-8% or weight loss 0.5-5% and/or elongation at break decreased by < 50%.
N	Plastic type is not resistant.	Swelling > 8% or weight loss > 5% and/or elongation at break decreased by > 50%.
—	Data not available.	

Plastic Materials Identification

ABS	acrilonitrile-butadiene-styrene
CPVC	chlorinated polyvinyl chloride
PP	polypropylene
PVC	polyvinyl chloride
PE	polyethylene
PB	polybutylene
PVDF	poly vinylidene fluoride
PEX	crosslinked polyethylene
PA11	polyamide 11
PK	polyketone

CHEMICALS THAT DO NOT NORMALLY AFFECT THE PROPERTIES OF AN UNSTRESSED THERMOPLASTIC MAY CAUSE COMPLETELY DIFFERENT BEHAVIOR (SUCH AS STRESS CRACKING) WHEN UNDER THERMAL OR MECHANICAL STRESS (SUCH AS CONSTANT INTERNAL PRESSURE OR FREQUENT THERMAL OR MECHANICAL STRESS CYCLES). UNSTRESSED IMMERSION TEST CHEMICAL RESISTANCE INFORMATION IS APPLICABLE ONLY WHEN THE THERMOPLASTIC PIPE WILL NOT BE SUBJECT TO MECHANICAL OR THERMAL STRESS THAT IS CONSTANT OR CYCLES FREQUENTLY.

WHEN THE PIPE WILL BE SUBJECT TO A CONTINUOUS APPLIED MECHANICAL OR THERMAL STRESS OR TO COMBINATIONS OF CHEMICALS, TESTING THAT DUPLICATES THE EXPECTED FIELD CONDITIONS AS CLOSELY AS POSSIBLE SHOULD BE PERFORMED ON REPRESENTATIVE SAMPLES OF THE PIPE PRODUCT TO PROPERLY EVALUATE PLASTIC PIPE FOR USE IN THIS APPLICATION.

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Acetaldehyde CH_3 CHO		---	N	140	N	C to 73	C to 73	---	C to 140	C to 176	R to 73
	Aq. Of 40%	---	N	---	C to 73	R to 73	---	N	R to 73	---	---
Acetamide CH_3 CONH2	5%	120	---	140	---	140	---	---	140	---	---
Acetic Acid CH_3 COOH	vapor	120	180	180	140	140	140	---	140	---	---
	5%	---	---	---	---	---	---	---	---	---	R to 176
	10%	---	---	---	---	---	---	R to 248	140	R to 176	---
	25%	N	180	180	140	140	140	---	140	---	---
	40%	---	---	---	---	---	---	R to 140	R to 176	---	---
	50%	---	---	---	---	---	---	R to 140	R to 176	C to 68	---
	60%	N	N	180	73	73	73	R to 104	73	---	---
	80%	---	---	---	---	---	---	R to 104	---	---	---
	85%	N	N	120	73	73	73	---	73	---	---
	glacial	N	N	120	73	73	73	R to 104	R to 68	---	---
Acetic Anhydride $(CH_3 CO)_2 O$	---	N	N	73	N	73	140	N	73	C to 68	---
Acetone	5%	N	N	73	N	C to	140	R to	C to	C to	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
$CH_3 COCH_3$						73		212	73	140	
	10%	---	---	---	---	---	---	R to 122	---	---	---
	100%	---	---	---	---	---	---	---	---	---	R to 73 C to 122
Acetophenone $C_6 H_5 COCH_3$	---	N	---	120	--	73	---	R to	73 68	---	---
Acetyl Chloride $CH_3 COCl$	---	N	N	---	N	---	---	N	---	---	---
Acetylene HC=CH	gas 100%	73	N	73	N	73	C to 73	---	73	140	---
Acetylnitrile	---	---	N	---	N	---	---	---	---	---	---
Acrylic Acid $H_2 C:CHCOOH$	97%	---	N	---	N	140	---	---	140	---	---
Acrylonitrile $H_2 C:CHCN$	---	---	N	---	N	140	---	---	140	---	---
Adipic Acid $COOH(CH_2)_4 COOH$	sat'd	---	180	140	140	140	73	R to 176	140	---	---
Allyl Alcohol $CH_2 = CHCH_2 OH$	96%	---	C to 73	140	R to 73	140	140	---	N	---	---
$CH_2 Cl$	--	---	N	---	N 73	C to	---	140	C to 73	---	---
	Liquid	---	---	---	---	---	---	R to 68	---	---	---
Aluminum Ammonium	sat'd	---	180	140	140	140	---	---	140	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Sulfate (Alum) $AlNH_4 (SO_4)_2 12H_2O$											
Aluminum Chloride Aqueous $AlCl_2$	sat'd	160	180	180	140	140	140	R to 212	140	---	---
Aluminum Fluoride Anhydrous AlF_3	sat'd	160	180	180	73	140	140	R to 212	140	---	---
Aluminum Hydroxide $AlO_3 O3H_2 O$	sat'd	160	180	180	140	140	140	R to 212	140	---	N
Aluminum Nitrate $Al(NO_3)_3 O9H_2 O$	sat'd	---	180	180	140	140	140	R to 212	140	---	---
Aluminum Oxychloride	--	---	180	180	140	---	140	---	---	---	---
Aluminum Potassium Sulfate (Alum) $AlK(SO_4)_2 o12H_2 O$	sat'd	160	180	140	140	140	---	R to 212	140	---	---
Aluminum Sulfate (Alum)	sat'd	160	180	140	140	140	C to 73	R to 212	140	194	---
$Al_2 (SO_4)_3$	20%	---	---	---	---	---	---	---	---	---	R to 73
Amonia Gas NH_3	100%	N	N	140	140	140	140	---	140	140	---
Amonia Liquid NH_3	100%	160	N	140	N	140	73	---	140	140	---
Amonia Acetate $NH4(C_2 H_3 O_2)$	sat'd	120	180	73	140	140	---	R to 212	140	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK	
Amonium Bifluoride $NH_4 HF_2$	sat'd	---	180	180	140	---	140	---	140	---	---	
Amonium Bisulfide $(NH_4)HS$	---	---	---	---	140	---	---	---	---	---	---	
Amonium Carbonate $(NH_4)HCO_3$o $(NH_4)\ CO_2\ NH_2$	sat'd	---	180	212	140	140	140	R to 248	140	---	---	
Amonium Chloride NH_4Cl	sat'd	120	180	212	140	140	140	R to 212	140	---	---	
Amonium Dichromate $(NH_4)_2Cr\ _2O_7$	--	---	73	---	73	---	---	---	---	---	---	
Amonium Fluoride $NH_4\ F$	10%	120	180	212	140	140	---	R to 212	140	---	---	
	25%	120	180	212	C to 140	140	73	---	140	---	---	
Amonium Hydroxide $NH_4\ OH$	10%	120	N	212	140	140	140	---	140	---	N	
	30%	---	---	---	---	R to 140	---	---	R to 140	---	---	
	Conc.	---	---	---	---	---	---	---	194	---	---	
Amonium sphate	Sat'd	--	-- 212	R to 140	R to 140	R to 140	R to 248	R to	R to 140	---	---	
Amonium Nitrate $NH_4\ NO_3$	sat'd	120	180	212	140	140	140	R to 212	140	---	---	
Amonium Persulphate $(NH_4\ )_2\ S_2\ O_8$	---		---	180	140	140	140	140	R to 212	140	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Amonium Phosphate (Monobasic) $NH_4 H_2 PO_4$	all	120	180	212	140	140	140	R to 248	140	---	---
Amonium Sulfate $(NH_4)_2 SO_4$	Sat'd.	120	180	212	140	140	140	R to 212	140	---	---
	20%	---	---	---	---	---	---	---	---	---	R to 73
Amonium Sulfide $(NH_4)_2 S$	dilute	120	180	212	140	140	140	---	140	---	---
	Sat'd.	---	---	---	---	140	---	---	---	---	---
Amonium Thiocyanate $NH_4 SCN$	50-60%	120	180	212	140	140	140	R to 212	73	---	---
Amyl Acetate $CH_3 COOC_5 H_{11}$	--		N	N	N	N	73	--- 122	R to	73 194	C to ---
Amyl Alcohol $C_5 H_{11} OH$	--	---	N	---	N	140	140	R to 212	R to 140	---	---
	100%	---	---	---	---	---	C to 140	---	---	---	---
n-Amyl Chloride $CH_3 (CH_2)_3 CH_2 CL$	--	N	N	N	N	C to 73	---	---	C to 73	---	---
Anisole		---	---	---	---	---	---	---	---	---	C to 73
Aniline I_2	--	N	N	---	N	73	C to 140	R to 68	C to	--- 140	N
Aniline Chlorohydrate	--	---	N	---	N	C to 73	N	---	C to 73	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Aniline Hydrochloride $C_6 H_5 NH_2$ oHCl	sat'd	---	N	---	N	140	N	---	140	---	---
Anthraquinone $C_6 H_5 (CO)_2 C_6H_5$	--	---	180	---	140	C to 73	C to 73	---	C to 73	---	---
Anthraquinone Sulfonic Acid $C_{14} H_7 O_2$ oSO$_3$ Ho$_3$ H $_2$O	--	---	180	73	140	140	C to 73	---	C to 73	---	---
Antifreeze		---	---	---	---	---	---	---	---		R to 73 C to 176
Antimony Trichloride $SbCl_3$	sat'd	---	180	140	140	140	140	R to 140	140	---	---
Aqua Regia (Nitrohydrochloric Acid)	--	N	R to 73	N	C to	N 73	N	C to	N 194	---	---
Arsenic Acid H_3 AsO$_4$ o1/2H $_2$O	80%	---	180	140	140	140	140	R to 248	140	---	---
Aryl Sulfonic Acid $C_6 H_5 SO_3 H$	--	---	180	---	140	73	---	---	73	---	---
Asphalt	--	---	N	73	N	73	140	---	73	---	---
Barium Carbonate $BaCO_3$	sat'd	120	180	140	140	140	140	R to 248	140	---	---
Barium Chloride $BaCl_2$ o2H$_2$O	sat'd	120	180	140	140	140	140	R to 212	140	194	---
Barium Hydroxide $Ba(OH)_2$	sat'd	73	180	140	140	140	140	---	R to 212	---	---
	10%	---	---	---	---	---	---	---	---	---	R to 73

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
	30%	---	---	---	---	R to 140	---	---	R to 140	---	---
Barium Nitrate $Ba(NO_3)_2$	sat'd	73	180	140	73	140	---	---	140	---	---
Barium Sulfate $BaSO_4$	sat'd	73	180	140	140	140	140	R to 212	140	---	---
Barium Sulfide BaS	sat'd	73	180	140	140	140	140	---	R to 248	---	---
Beer	--	120	180	180	140	R to 140	140	R to 248	R to 140	68	R to 73
Beet Sugar Liquors	--	---	180	180	140	73	140	---	73	---	---
Benzaldehyde C_6H_5CHO	10%	N	R to 73	73	R to 73	73	C to 73	---	73	R to 104	---
	99%	---	---	---	---	---	---	---	---	---	C to 73
Benzene C_6H_6	--	N	N	N	N	C to 120	N	C to 122	R to 68	---	---
Benzene Sulfonic Acid $C_6H_5SO_3H$	10%	---	180	180	140	R to 73	---	---	R to 73	---	---
	10%+	---	N	---	N	---	---	---	---	---	---
Benzoic Acid C_6H_5COOH	all	160	180	73	140	140	140	---	R to 248	---	---
Benzoyl Chloride	Sat. Sol.	---	---	---	---	---	---	C to 68	---	---	---
Benzyl Alcohol $C_6H_5CH_2OH$	--	---	N	120	N	140	---	R to 122	140	R to 68	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Benzyl Chloride		---	---	---	---	---	---	---	R to 140	---	---
Bismuth Carbonate $(BiO)_2$ CO	Sat'd.	---	180	180	140	140	140	---	140	---	---
Black Liquor	sat'd	---	180	140	140	120	140	---	120	---	---
Bleach	5% Active Cl_2	---	180	120	140	C to 140	---	---	C to 140	---	R to 73
	12% Active Cl_2	73	185	120	140	73	140	---	73	---	---
Borax Na_3 B_4 O_7 o10H_2O	sat'd	160	180	212	140	140	140	---	140	---	---
Boric Acid H_3 BO_3	Sat'd	160	180	212	140	140	140	R to 212	140	---	---
Brake Fluid	--	---	---	140	---	140	---	---	140	---	---
Brine	sat'd	---	180	140	140	140	140	---	140	---	---
Bromic Acid $HbrO_3$	Sat'd	---	180	N	140	N	140	R to 212	N	---	---
	10%	---	---	---	---	140	---	---	---	---	---
Bromine Br_2	Liquid	73	N	N	N	N	N	R to 248	N	N	---
	vapor 25%	---	180	N	140	N	---	---	N	---	---
Bromine Water	cold	---	180	N	140	N	C to	R to	N	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
	sat'd						73	176			
Bromobenzene $C_6 H_5 Br$	--	---	---	---	N	---	---	---	---	---	---
Bromotoluene $C_6 H_5 CH_2 B_2$	--	---	---	C	N	---	---	---	---	---	---
Butadiene	50%	---	180	N	140	73	---	---	73	---	---
H_2 C: CHHC: CH_2	Gas	---	---	---	---	---	---	R to 212	---	---	---
Butane	50%	---	180	140	140	140	N	---	140	---	---
$C_4 H_{10}$	Gas	---	---	---	---	---	---	R to 68	---	---	---
n-Butanol	Liquid	---	---	---	---	---	---	R to 140	---	---	R to 73
Butyl Acetate $CH_3 COOCH (CH_3) (C_2 H_5)$	100%	N	N	C to 73	N	C to 73	C to 73	C to 104	C to 73	R to 194	---
Butyl Alcohol $CH_3 (CH_2)_2 CH_2OH$	--	---	C to 73	180	140	140	140	---	140	C to 104	---
Butyl Cellosolve $HOCH_2 CH_2 OC_4 H_9$	--	---	N	---	73	---	---	---	---	---	---
n-Butyl Chloride $C_4 H_9 Cl$	--	N	N	---	---	---	---	---	---	---	---
Butyl Glycol	Liquid	---	---	---	---	---	---	R to 212	---	---	---
Butylene © $CH_3 CH:CHCH_3$	Liquid	---	---	N	140	120	---	---	120	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Butyl Phenol	--		---	N	C to	73	73	---	R to	---	---
C_4 H_9 C_6 H_9 OH					73				176		
Butyl Phthalate	--	---	N	180	---	---	---	R to	---	---	---
								140			
Butyl Stearate	--	---	---	---	73	---	---	---	---	---	---
Butynediol	--	---	---	---	73	---	---	----	---	---	---
$HOCH_2$ C:CCH $_2$OH											
Butyric Acid	--	N	N	180	73	73	73	---	73	---	---
CH_3 CH_2 CH_2 COOH	20%	---	---	---	---	---	---	R to	---	---	---
								212			
	Liquid	---	---	---	---	---	---	R to	73	---	---
								176			
Cadmium Cyanide	--	---	180	---	140	---	---	---	---	---	---
$Cd(CN)_2$											
Calcium Bisulfide	--	---	73	---	N	140	---	---	140	---	---
$Ca(HS)_2$ o6H $_2$O											
Calcium Bisulfite	--	---	180	180	140	N	140	---	N	---	---
$Ca(HSO_3)_2$	Sat'd	---	---	---	---	---	---	R to	---	---	---
								248			
Calcium Carbonate	Sat'd	---	180	180	140	140	140	R to	140	---	---
$CaCO_3$								248			
Calcium Chlorate	--	---	180	180	140	140	140	R to	140	---	---
$Ca(ClO_3)_2$ o2H_2 O								248			
Calcium Chloride	5%	---	---	---	---	---	---	---	---	---	R to 176
$CaCl_2$											
	Sat'd	120	180	180	140	140	140	R to	R to	R to	---
								248	176	194	

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Calcium Hydroxide $Ca(OH)_2$	--	160	180	180	140	140	140	---	140	---	---
	2%	---	---	---	---	---	---	---	---	---	R to 73
	30%	---	---	---	---	R to 140	---	---	R to 140	---	---
Calcium Hypochlorite $Ca(OCl)_2$	30%	160	180	140	140	140	140	---	140	---	---
	Sat'd	---	---	---	---	---	---	C to 212	---	---	---
Calcium Nitrate $Ca(NO_3)_2$	--	---	180	180	140	140	140	---	140	---	---
	50%	---	---	---	---	140	---	R to 212	140	---	---
	Sat'd	---	---	---	---	---	---	R to 176	---	---	---
Calciuim Oxide CaO	--	---	180	---	140	140	---	---	140	---	---
Calcium Sulfate $CaSO_4$	--	100	180	180	140	140	140	R to 212	140	---	---
Calcium Hydrogen Sulphide	>10%	---	---	---	---	---	---	R to 248	---	---	---
Camphor $C_{10} H_{16} O$	--	N	---	73	73	73	---	---	73	---	---
Cane Sugar Liquors $C_{12} H_{22} O_{11}$	--	---	180	180	140	140	150	---	140	---	---
Carbitol	--	---	N	---	73	---	---	---	---	---	---
Carbon Dioxide	Dry	160	180	140	140	140	---	R to	140	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
CO_2	100%							212			
Carbon Dioxide CO_2	Wet	160	180	140	140	140	140	---	140	---	---
Carbon Disulfide CS_2	--	N	N	N	N	C to 140	---	---	R to 68	R to 104	---
Carbon Monoxide CO	Gas	---	180	180	140	140	140	R to 140	140	---	---
Carbon Tetrachloride CCL_4	--	N	N	N	73	C to 73	N	C to 212	C to 68	N	R to 73
Carbonic Acid $H_2 CO_3$	Sat'd ---	185	180	140	140	140	---	---	140	---	---
Castor Oil	--	---	C to 180	140	140	73	140	---	73	---	---
Caustic Potash KOH	50%	160	180	180	140	140	73	---	140	---	---
Caustic Soda NaOH (Sodium Hydroxide)	40%	160	180	180	140	140	73	---	140	---	---
Cellosolve $ClCH_2 COOH$	--	---	N	73	73	C to 120	140	---	C to 120	---	---
Cellosolve Acetate $CH_3 COOCH_2 CH_2 OC_2 H_5$	--	---	N	73	73	---	---	---	---	---	---
Chloral Hydrate $CCL_3 CH (OH)_2$	All	---	180	C to 73	140	120	140	---	120	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Chloramine	Dilute	---	N	73	73	73	---	---	73	---	---
NH_2 Cl											
Chloric Acid	10%	---	180	73	140	73	---	---	73	---	---
$HCLO_3$ o7H_2 O	20%	---	185	73	140	73	---	---	73	---	---
Chlorine Gas	0-20	N	C to	N	C to	C to	---	R to	C to	---	---
(Moisture Content)	PPM		73		73	73		212	73		
	20-50	N	N	N	N	C to	---	---	C to	---	---
	PPM					73			73		
	50+	N	N	N	N	C to	---	N	C to	---	---
	PPM					73			73		
Chlorine	Liquid	N	N	N	N	N	---	---	N	---	N
Chlorinated Water	10	---	180	180	140	140	140	---	140	---	---
	PPM										
Chlorinated Water	Sat'd	---	180	180	140	C to	140	R to	C to	---	---
						120		212	120		
Chloroacetic Acid	50%	N	180	C to	140	120	N	---	120	---	---
CH_2 ClCOOH					73						
	>10%	---	---	---	---	---	---	R to	---	---	---
								140			
Chloroacetyl Chloride	--	---	---	---	73	---	---	---	---	---	---
$ClCH_2$ COCl											
Chlorobenzene	Dry	N	N	73	N	C to	N	---	C to	---	---
C_6 H_5 Cl						75			75		
	Liquid	---	---	---	---	---	---	R to	R to	C to	---
								140	68	176	
Chlorobenzyl Chloride	--	---	N	---	N	C to	---	---	C to	---	---
ClC_6 H_4 CH_2 Cl						120			120		

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK	
Chloroethanol	Liquid		---	---	---	---	---	N	R to 122	---	---	---
Chloroform	Dry	N	N	N	N	C to 75	C to 73	---	C to 75	---	---	
$CHCl_3$	Liquid	---	---	---	---	---	---	R to 212	N	---	C to 73	
Chloromethane	Gas	---	---	---	---	---	---	R to 212	---	---	---	
Chloropicrin	--	---	---	---	N	73	---	---	73	---	---	
$CCL_3\ NO_2$												
Chlorosulfonic Acid	--	---	73	N	73	C to 120	N	---	C to 120	---	---	
$ClSO_2\ OH$	50%	---	---	---	---	---	---	R to 68	---	---	---	
	100%	---	---	---	---	N	---	---	N	---	---	
Chromic Acid	Sat'd	---	---	---	---	---	---	R to 212	---	---	---	
$H_2\ CrO_4$	10%	73	180	140	140	73	140	R to 212	73	N	---	
	20%	---	---	---	---	---	---	R to 212	---	---	---	
	25%	---	---	---	---	---	---	R to 212	---	---	---	
	30%	N	180	73	140	73	140	R to 212	73	---	---	
	40%	N	180	73	140	73	73	R to 212	73	---	---	
	50%	N	C to 140	73	N	73	N	R to 212	73	---	---	

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Chromium Potassium Sulfate $CrK(SO_4)_2$ o12H_2 O	>10%	---	---	---	---	---	---	R to 212	---	---	---
	--	-	--	73	---	73	---	---	73	---	---
	Sat'd	---	---	---	---	---	R to 212	---	---	---	---
Citric Acid C_6 H_8 O_7	Sat'd	160	180	140	140	140	140	R to 248	140	C to 140	---
Coconut Oil	--	---	C to 180	73	140	73	140	R to 248	73	---	---
Cod Liver Oil	Work Sol.	---	---	---	---	---	---	R to 248	---	---	---
Coffee	--	---	180	140	140	140	---	---	140	---	---
Coke Oven Gas	--	---	---	73	140	140	---	---	140	---	---
Copper Acetate $Cu(C_2$ H_3 O_2 $)_2$ oH_2 O	Sat'd	---	73	73	73	---	---	---	---	---	---
Copper Carbonate $CuCO_3$	Sat'd	---	180	---	140	140	---	---	140	---	---
Copper Chloride $CuCl_2$	Sat'd	73	180	140	140	140	140	---	140	---	---
Copper Cyanide $Cu(CN)_2$	Sat'd	---	180	---	140	140	140	R to 212	140	---	---
Copper Fluoride CuF_2 o2H_2 O	2%	---	180	73	140	140	140	---	140	---	---
Copper Nitrate	30%	---	180	140	140	140	140	---	---	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
$Cu(NO_3)_2$ o3H_2 O	50%	---	---	---	---	---	---	R to 212	---	---	---
Copper Sulfate $CuSO_4$ o5H_2 O	Sat'd	120	180	120	140	140	140	R to 212	140	R to 194	---
Corn Oil	--	---	C to 180	73	140	120	---	---	120	---	---
Corn Syrup	--	---	185	140	140	140	---	---	140	---	---
Cottonseed Oil	--	120	C to 180	140	140	R to 140	140	---	R to 140	---	---
Creosote	--	---	N	73	N	140	---	---	140	---	---
Cresol CH_3 C_6 H_4 OH	90%	N	N	R to 73	N	73	N	R to 68	73	---	---
Cresylic Acid	50%	---	180	---	140	C to 73	N	---	C to 73	---	---
Croton Aldehyde CH_3 CH:CHCHO	--	---	N	C to 73	N	---	---	---	---	---	---
	Liquid	---	---	---	---	---	---	R to 104	--	---	---
Crude Oil	--	---	C to 180	140	140	C to 120	C to 73	R to 212	C to 120	R to 140	---
Cupric Chloride	20%	---	---	---	---	---	---	---	---	---	R to 73
Cupric Fluoride CuF_2	--	---	180	---	140	140	---	---	140	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Cupric Sulfate $CuSO_4$ o5H_2 O	Sat'd	100	180	73	140	140	---	---	---	---	---
Cuprous Chloride CuCl	Sat'd	70	180	---	140	140	---	---	140	---	---
Cyclohexane C_6 H_{12}	--	73	N	N	N	N	---	R to 248	N	C to 140	---
Cyclohexanol C_6 H_{11} OH	--	C to 120	N	140	N	73	C to 73	R to 104	73	---	---
Cyclohexanone C_6 H_{10} O	-- Liquid	N	N	73	N	120	N	N	C to 176	C to 140	---
Detergents (Heavy Duty)	--	---	C to 180	180	140	R to 140	---	---	R to 140	---	R to 73
Dextrin (Starch Gum)	Sat'd	---	180	140	140	140	140	---	140	---	---
Dextrose	Sat'd	---	180	140	140	140	140	---	140	---	---
Diacetone Alcohol CH_3 $COCH_2$ $C(CH_3)_2$ OH	--	---	N	120	N	---	---	---	---	C to 140	---
Dibutoxyethyl Pthalate C_6 H_4 $(COOO_2$ H_2 OC_4 $H_9)_2$	--		---	N	---	N	---	---	---	---	--- ---
n-Dibutyl Ether C_4 H_9 OC_4 H_9	--	---	---	---	---	73	---	---	73	---	---
Dibutyl Phthalate C_6 H_4 $(COOC_4$ $H_9)_2$	--	N	N	73	N	73	---	---	73	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Dibutyl Sebacate	--	---	---	73	73	73	---	---	73	---	---
$C_4 H_9 OCO (CH_2)_8 OCOC_4 H_9$											
Dichloroacetic Acid	50%	---	---	---	---	---	---	R to 176	---	---	---
Dichlorobenzene	--	N	N	C to 73	N	C to 120	---	---	C to 120	---	R to 73
$C_6 H_4 Cl_2$	Liquid	---	---	---	---	---	---	R to 140	---	---	---
Dichloroethylene	--	---	N	C to 73	N	C to 120	---	---	C to 120	---	---
$C_2 H_2Cl_2$	Liquid	---	---	---	---	---	---	R to 248	---	---	---
Diesel Fuels	--	---	C to 180	140	140	73	C to 73	R to 212	73	---	---
Diethanolamine	Solid	---	---	---	---	---	---	N	---	---	---
	20%	---	---	---	---	---	---	---	R to 194	---	---
Diethylamine	--	N	N	---	N	C to 120	N	N	C to 120	---	---
$C_4 H_{10} NH$											
Diethyl Ether	--	N	N	73	73	C to 140	---	---	C to 140	140	---
$C_4 H_{10} O$											
Diglycolic Acid	Sat'd	---	180	140	140	140	140	---	140	---	---
$O(CH_2 COOH)_2$	10%	---	---	---	---	---	---	R to 140	---	---	---
Dimethylamine	--	---	---	73	140	73	N	N	73	---	---
$(CH_3)_2 NH$											

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Dimethyl Formamide	--	N	N	180	N	120	---	---	120	---	C to 73
$HCOH(CH_3)_2$	Liquid		---	---	---	---	---	---	N	---	---
Dimethylhydrazine	--	---	---	---	N	---	---	---	---	---	---
$(CH_3)_2 NNH_2$											
Dimethyl Phthalate	--	---	N	---	---	C to	---	---	C to	---	---
$OOC_9 H_{19})$					73				73		
Dioctyl Phthalate	--	N	N	C to	N	73	C to	---	73	140	---
$C_6 H_4 (COOC_8 H_{17})_2$				73			73				
Dioxane	--	--	N	C to	N	140	---	---	140	---	---
$O:(CH_2)_4:O$				140							
	Liquid	---	---	---	---	---	---	C to 68	---	---	---
Diphenyl Oxide	Sat'd	---	---	---	---	73	---	---	73	---	---
$(C_6 H_5)_2 O$											
Disodium Phosphate	--	---	180	140	140	140	140	---	140	---	---
$Na_2 HPO_4$											
Dishwashing Liquid (Cascade)		---	---	---	---	---	---	---	---	---	R to 73
Dow Therm A	--	---	---	---	N	---	---	---	---	---	---
Ethanol	40%	---	---	---	---	---	---	R to 68	---	---	---
	95%	---	---	---	---	---	---	R to 122	R to 140	---	---
	Liquid	---	---	---	---	---	---	R to 122	R to 140	---	R to 176
Ether	--	N	N	C to	N	73	N	---	73	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
ROR				73							
Ethyl Acetate	--	N	N	C to	N	73	C to	---	73	140	R to 73
$CH_3 COOC_2 H_5$				140			73				C to 176
	Liquid	---	---	---	---	---	---	C to	---	---	---
								68			
Ethyl Acetoacetate	--	N	N	---	N	---	---	---	---	---	---
$CH_3 COCH_2 COOC_2 H_5$											
Ethyl Acrylate	--	---	N	---	N	---	---	---	---	---	---
$CH_2 :CHOOC_2 H_5$											
Ethyl Alcohol	--	---	C to	140	140	140	140	---	140	C to	R to 176
(Ethanol)			140							104	
$C_2 H_5 OH$											
Ethyl Benzene	--	---	---	C to	N	C to	---	---	---	---	---
$C_6 H_5 C_2 H_5$				73		73					
Ethyl Chloride	Dry	---	N	C to	N	C to	---	---	C to	---	---
$C_2 H_5 Cl$				73		73			73		
	Gas	---	---	---	---	---	---	R to	---	---	---
								212			
Ethyl Chloroacetate	--	---	---	---	N	---	---	---	---	---	---
$CCH_2 ClCO_2 C_2 H_5$											
Ethyl Ether	Liquid	---	N	N	N	N	N	R to	R to	---	---
$(C_2 H_5)_2 O$								122	68		
Ethylene Bromide	Dry	---	N	---	N	---	N	---	---	---	---
$BrCH_2 CH_2 Br$											
Ethylene Chloride	Dry	N	N	C to	N	C to	---	---	C to	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
$ClCH_2\ CH_2\ CL$				73		140			140		
Ethylene Chlorohydrin	--	---	N	73	N	---	N	---	---	---	---
$ClCH_2\ CH_2\ OH$	Liquid	---	---	---	---	---	---	C to 68	---	---	---
Ethylene Diamine $NH_2\ CH_2\ CH_2\ NH_2$	--	N	---	73	N	140	---	---	140	---	---
Ethylene Dichloride $C_2\ H_4\ Cl_2$	Dry	N	N	C to 140	N	C to 73	140	---	C to 73	---	---
Ethylene Glycol $CH_2\ OHCH_2\ OH$	Liquid	73	C to 180	212	140	140	140	R to 212	R to 212	---	C to 176
Ethylene Oxide $CH_2\ CH_2\ O$	--	---	N	C to 73	N	73	---	---	73	C to 140	---
2-Ethylhexanol $CH_3\ (CH_2\ )_3\ CHC_2\ H_5\ CH_2\ OH$	--	---	---	---	---	73	---	---	73	---	---
Fatty Acids R-COOH	--	160	73	120	140	120	150	---	120	194	---
Ferric Chloride (Aqueous) $FeCl_3$	Sat'd	120	180	140	140	140	150	R to 212	140	---	---
Ferric Hydroxide $Fe(OH)_3$	Sat'd	160	180	140	140	140	---	---	140	---	---
Ferric Nitrate $Fe(NO_3\ )_3\ 9H_2\ O$	Sat'd	160	180	140	140	140	140	R to 212	140	---	---
Ferric Sulfate	--	160	180	140	140	140	140	---	140	---	---
$Fe_2\ (SO_4\ )_3$	Sat'd	---	---	---	---	---	---	R to	---	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
								212			
Ferrous Chloride $FeCl_2$	Sat'd	160	180	140	140	140	140	R to 212	140	---	---
Ferrous Hydroxide $Fe(OH)_2$	Sat'd	160	180	140	140	140	---	---	140	---	---
Ferrous Nitrate $Fe(NO_3)_2$	--	160	180	140	140	140	---	---	140	---	---
Ferrous Hydroxide $Fe(OH)_2$	Sat'd	160	180	140	140	140	---	---	140	---	---
Ferrous Nitrate $Fe(NO_3)_2$	--	160	180	140	140	140	---	---	140	---	---
Ferrous Sulfate $FeSO_4$	--	160	180	140	140	140	140	---	140	---	---
	20%	---	---	---	---	---	---	---	---	---	R to 73
	Sat'd	---	---	---	---	---	---	R to 212	---	---	---
Ferrous Chloride $FeCl_2$	Sat'd	160	180	140	140	140	140	R to 212	140	---	---
Fish Oil	---	---	180	180	140	140	140	---	140	---	---
Fluoboric Acid HBF_4	---	73	73	140	140	140	---	---	140	---	---
	Solid	---	---	---	---	---	---	R to 104	---	---	---
Fluorine Gas (Dry) F_2	100%	---	73	N	73	C to 73	C to 73	---	C to 73	N	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Fluorine Gas (Wet) F_2	--	N	73	N	73	N	N	---	N	N	---
Fluosilicic Acid H_2SiF_6	25%	---	---	---	---	---	---	R to 212	---	---	---
	30%	---	R to 140	140	140	140	---	R to 212	---	---	---
	40%	---	---	---	---	---	---	R to 140	---	---	---
	50%	---	73	73	140	140	140	R to 212	--	---	---
	Sat'd	---	---	---	---	---	---	R to 212	---	---	---
Formaldehyde HCHO	Dilute	160	73	140	140	140	140	R to 176	---	C to 104	---
	35%	160	C to 73	140	140	140	140	---	140	---	---
	37%	160	C to 73	140	140	140	140	R to 212	140	---	---
	50%	---	C to 73	---	140	140	140	---	140	---	---
Formic Acid HCOOH	--	N	C to 73	140	73	140	150	---	140	---	---
	10%	---	---	---	---	---	---	R to 212	R to 140	N	N
	40%	---	---	---	---	---	---	R to 212	R to 140	---	---
	50%	---	---	---	---	---	---	R to 176	R to 140	---	---
	85%	---	---	---	---	---	---	R to 212	---	---	---
	100%	---	---	---	---	140	---	---	140	---	---
Freon 11 CCl_3F	100%	N	73	N	140	73	---	---	73	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Freon 12	100%	---	73	73	140	73	---	---	73	68	---
CCl_2F_2	Work. Sol.	---	---	---	---	---	---	R to 212	R to 68	---	---
Freon 21	100%	---	---	N	N	C to 120	---	---	C to 120	---	---
$CHCl_2F$											
Freon 22	100%	---	73	73	N	C to 120	---	---	C to 120	68	---
$CHClF_2$											
Freon 113	100%	---	---	N	140	73	---	---	73	---	---
$C_2Cl_2F_3$											
Freon 114	100%	---	---	N	140	73	---	---	73	---	---
$C_2Cl_2F_4$											
Fructose	Sat'd	73	180	180	140	140	140	---	140	---	---
$C_6 H_{12} O_6$											
Fruit Juice	Work. Sol.	---	---	---	---	---	---	R to 212	---	104	---
Furfural	100%	N	N	N	N	C to 140	---	---	C to 140	C to 140	---
$C_4 H_3 OCHO$											
Gallic Acid	--	---	73	---	140	73	---	---	73	---	---
$C_6 H_2 (OH)_3 CO_2 HoH_2 O$											
Gasoline, Leaded*	--	N	N	N	140	73	N	---	73	---	---
Gasoline, Unleaded*	--	N	N	N	140	73	N	---	73	---	R to 176
Gasoline (Fuel)		---	---	---	---	---	---	R to 212	---	R to 160	---
Gasohol*	--	N	N	N	140	73	N	---	73	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Gasoline, Sour*	--	N	N	N	140	C to 73	N	---	C to 73	---	---
Gelatin	--	---	180	180	140	140	140	---	140	---	---
Glucose	--	120	180	212	140	140	140	---	140	---	---
$C_6 H_{12} O_6$ o$H_2 O$	10%	---	---	---	---	---	---	R to 248	---	---	---
Glue	--	---	---	140	140	140	---	---	140	---	---
Glycerine	--	140	180	212	140	140	140	---	140	---	---
$C_3 H_5 (OH)_3$	Liquid	---	---	---	---	---	---	R to 248	---	---	---
Glycol	--	---	C to 180	212	140	140	---	---	140	C to 140	---
$OHCH_2 CH_2 OH$											
Glycolic Acid	Sat'd	---	180	73	140	140	---	---	140	---	---
$OHCH_2 COOH$	10%	---	---	---	---	---	---	R to 212	---	---	---
	30%	---	---	---	---	---	---	R to 140	---	---	---
	65%	---	---	---	---	---	---	R to 212	---	---	---
Glyoxal CHCCHO	--	---	---	---	---	140	---	---	140	---	---
Grape Sugar	--	---	180	---	140	---	---	---	---	---	---
Grapefruit Juice	Work. Sol.	---	---	---	---	---	---	R to 122	---	---	---
Grease	--	---	---	---	---	---	---	---	---	194	---
Green Liquor	--	160	180	---	140	---	140	---	---	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Heptane (Type 1)	--	73	180	N	140	73	N	---	73	---	---
$C_7 H_{16}$	Liquid	---	---	---	---	---	---	R to 212	C to 176	---	---
n-Hexane	--	C	73	73	73	---	---	---	---	---	---
$C_6 H_{14}$	Liquid	---	---	---	---	---	---	R to 176	---	---	R to 73
Hexanol, Tertiary Type I $CH_3 (CH_2)_4 CH_2 OH$	--	---	180	---	140	140	140	---	140	---	---
Hydraulic Oil (Petroleum)	--	---	---	---	73	73	---	---	73	---	---
Hydrazine $H_2 NNH_2$	--	---	N	73	N	---	---	---	---	---	---
Hydrobromic Acid Hbr	20%	73	73	140	140	140	140	R to 212	140	---	---
	50%	N	---	120	---	140	---	R to 140	140	---	---
	66%	---	---	---	---	---	---	R to 212	---	---	---
Hydrochloric Acid Hcl	1%	---	---	---	---	---	---	---	---	---	R to 176
	10%	C to 120	180	140	140	140	140	R to 212	R to 212	C to 104	N
	20%	---	---	---	---	---	---	R to 212	R to 212	---	---
	30%	C to 73	180	140	140	140	140	R to 212	R to 140	---	---
	Conc.	---	---	---	---	---	---	---	R to 140	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Hydrocyanic Acid	--	160	180	73	140	140	140	---	140	---	---
HCN	Sat'd	---	---	---	---	---	---	R to 248	---	---	---
	10%	---	---	---	---	---	---	R to 248	---	---	---
Hydrofluoric Acid	Dilute	73	73	180	73	140	140	R to 212	140	---	---
HF	30%	N	73	140	73	140	140	---	140	---	---
	40%	---	---	---	---	---	---	R to 212	---	---	---
	50%	N	N	73	73	120	140	R to 212	120	---	---
	60%	---	---	---	---	140	---	R to 140	140	---	---
	70%	---	---	---	---	---	---	R to 212	---	---	---
	100%	N	N	C to 73	N	120	---	---	120	---	---
	Gas	---	---	---	---	---	---	R to 104	---	---	---
Hydrofluosilic Acid	50%	N	140	---	140	140	---	---	140	---	---
Hydrogen	Gas	---	73	140	140	140	140	R to 248	140	194	---
Hydrogen Cyanide	--	---	---	73	140	---	---	---	---	---	---
HCN											
Hydrogen Fluoride	--	---	C	73	N	---	---	---	---	---	---
Anhydrous											

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Hydrogen Peroxide $H_2 O_2$	3%	---	---	---	---	---	---	---	---	---	R to 73
	10%	---	---	---	---	---	---	R to 212	---	---	---
	30%	---	---	---	---	---	---	R to 212	---	C to 104	---
	50%	---	180	73	140	140	N	R to	140	---	---
	90%	---	180	C to 73	140	73	N	---	73	---	---
Hydrogen Phosphide (Type I) PH3	--	---	73	---	140	140	140	---	140	---	---
Hydrogen Sulfide $H_2 S$	Dry	---	180	150	140	140	140	R to 248	140	---	---
	Wet	---	180	---	140	140	---	---	140	---	---
Hydrogen Sulfite H_2SO_3	10%	---	---	---	---	140	---	R to 248	140	---	---
Hydroquinone $C_6 H_4 (OH)_2$	Sat'd	---	180	---	140	140	140	---	---	140	---
Hydroxylamine Sulfate $(NH_2 OH)oH_2 SO_4$	--	---	180	---	140	140	---	---	140	---	---
Hypochlorous Acid HOCl	10%	73	180	73	140	140	140	---	140	---	---
	70%	---	---	---	---	---	---	R to 212	---	---	---
Inks	--	---	---	140	---	140	---	---	140	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Iodine I_2	10%	N	73	73	N	C to 120	N	R to 176	C to 120	---	---
Isobutyl Alcohol $(CH_3)_2 CHCH_2 OH$	--	C to 73	C to 73	73	---	140	---	---	140	---	---
Isooctane $(CH_3)_3 CCH_2 CH(CH_3)2$	--	---	---	C to 73	---	73	---	---	73	---	---
	Liquid	---	---	---	---	---	---	R to 212	---	---	---
Isopropyl Acetate $CH_3 COOCH(CH_3)_2$	--	N	N	---	---	73	---	---	73	---	---
Isopropyl Alcohol $(CH_3)_2 CHOH$	--	---	C to 180	212	140	140	140	C to 212	140	---	R to 73
Isopropyl Ether $(CH_3)_2 CHOCH(CH_3)_2$	--	---	N	C to 73	N 73	73	---	---	73	---	---
JP-4 Fuel*	--	---	C to 73	C to 73	140	73	---	---	73	---	---
JP-5 Fuel*	--	---	C to 73	C to 73	140	73	---	---	73	---	---
Kerosene*	--	73	73	C to 140	140	C to 140	C to 73	---	C to 140	---	---
Ketchup	--	---	---	---	73	---	---	---	---	---	---
Ketones	--	N	N	C to 73	N	73	---	---	73	---	---
	Work Sol		---	---	---	---	---	---	R to	---	---
								302			
Kraft Liquors	--	73	180	---	140	120	140	---	120	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Lactic Acid CH_3 CHOHCOOH	10%	---	---	---	---	---	---	R to 140	---	---	---
	20%	---	---	---	---	---	---	---	---	---	R to 73
	25%	73	180	212	140	140	140	---	140	---	---
	80%	N	C to 180	140	73	140	---	---	140	---	---
	Liquid	---	---	---	---	---	---	R to 212	---	R to 194	---
Lard Oil	--	---	C to 180	---	140	C to 120	73	---	C to 120	---	---
Latex	--	---	---	140	---	140	---	---	140	---	---
Lauric Acid CH_3 $(CH_2)_{10}$ COOH	--	---	180	140	140	120	---	---	120	---	---
Lauryl Chloride (Type I) C_{12} H_{25} Cl	--	---	73	---	140	120	73	R to 248	120	---	---
Lead Acetate $Pb(C_2 H_3 O_2)$ o3H_2 O	Sat'd	---	180	180	140	140	140	R to 212	140	---	---
Lead Chloride $PBCl_2$	--	---	180	140	140	120	---	---	120	---	---
Lead Nitrate $PB(NO_3)_2$	Sat'd	---	180	140	140	120	---	---	120	---	---
Lead Sulfate $PbSO_4$	--	---	180	140	140	120	---	---	120	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Lead Tetraethyl		---	---	---	---	---	---	R to 212	---	---	---
Lemon Oil	--	---	N	C to 73	---	---	---	---	---	---	---
Lemon Juice		---	---	---	---	C to 140	---	---	C to 140	---	---
Ligroin	--	---	---	140	---	---	---	---	---	---	---
Lime Slurry	--	---	---	---	---	140	---	---	140	---	---
Lime Sulfur	--	---	73	73	73	120	140	---	120	---	---
Linoleic Acid $CH_3 (CH_2)_4 HC: CHCH_2 CH: CH(CH_2)_7 COOH$	--	---	180	180	140	---	73	---	---	---	---
Linoleic Oil (Type I)	--	---	---	---	140	---	73	---	---	---	---
Linseed Oil	--	73	C to 180	140	140	R to 73	73	R to 248	R to 73	194	---
Liqueurs	--	---	---	140	140	120	140	---	120	---	---
Lithium Bromide LiBr	--	---	---	140	140	140	---	---	140	---	---
Lithium Chloride LiCl	--	---	---	140	140	120	---	---	120	---	---
Lithium Hydroxide LiOH	--	---	---	140	---	120	---	---	120	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Lubricating Oil (ASTM #1)	--	---	180	C to 140	140	73	140	R to 248	73	---	---
Lubricating Oil (ASTM #2)	--	---	180	C to 140	140	73	140	---	73	---	---
Lubricating Oil (ASTM #3)	--	---	180	C to 140	140	73	140	---	73	---	---
Magnesium Carbonate $MgCO_2$	--	120	180	212	140	140	140	R to 212	140	---	---
Magnesium Chloride MgCl2	Sat'd	120	180	140	140	140	140	R to 140	140	---	---
	50%	---	---	---	---	---	---	R to 212	----	194	---
Magnesium Citrate $MgHC_6\ H_5\ O_7\ o5H_2\ O$	--	---	180	---	140	140	---	---	140	---	---
Magnesium Hydroxide $Mg(OH)_2$	Sat'd	160	180	180	140	140	140	R to 212	140	---	---
Magnesium Nitrate $Mg(NO_3)_2\ o2H_2\ O$	--	160	180	212	140	140	140	R to 248	140	---	---
Magnesium Oxide MgO	--	160	---	---	---	---	---	---	---	---	---
Magnesium Sulfate $MgSO_4\ o7H_2\ O$	--	160	180	212	140	140	140	R to 212	140	---	---
Maleic Acid HOOCCH:CHCOOH	Sat'd	160	180	140	140	140	140	R to 140	140	---	---
	50%	---	---	---	---	---	---	R to	---	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
	10%	---	---	---	---	---	---	212 R to 140	---	---	---
Malic Acid $COOHCH_2$ $CH(OH)COOH$	--	---	180	140	140	140	140	---	140	---	---
Manganese Sulfate $MnSO_4$ $o4H_2$ O	--	---	180	180	140	140	---	---	140	---	---
Margarine	Work. Sol.	---	---	---	---	---	---	R to 248	---	---	---
Mercuric Chloride	--	---	180	180	140	140	140	---	140	---	---
$HgCl_2$	Sat'd	--	---	---	---	---	---	R to 212	---	---	---
Mercuric Cyanide $Hg(CN)_2$	Sat'd	---	180	140	140	140	140	R to 212	140	---	---
Mercuric Sulfate $HgSO_4$	Sat'd	---	180	140	140	140	---	---	140	---	---
Mercurous Nitrate $HgNO_3$ $o2H_2$ O	Sat'd	---	180	140	140	140	140	---	140	---	---
	10%	---	---	---	---	---	---	R to 212	---	---	---
Mercury Hg	Liquid	---	180	140	140	140	140	R to 248	140	194	---
Methane CH_4	--	N	73	73	140	140	---	---	140	140	---
Methanol (Methyl Alcohol)	--	---	N	180	140	R to 140	140	---	R to 140	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
CH_3 OH	5%	---	---	---	---	---	---	R to 140	---	---	---
	Liquid	---	---	---	---	---	---	C to 176	R to 140	---	R to 176
Methoxyethyl Oleate $CH_3 OCH_2 CH_2 OOCC_{17} H_{33}$	--	---	---	---	73	---	---	---	---	---	---
Methyl Acetate $CH_3 CO_2 CH_3$	--	N	N	140	N	C to 120	---	---	C to 120	---	---
Methyl Acrylate CH_2 :$CHOOCH_3$	Tech Pure	---	---	---	---	140	---	---	140	---	---
Methyl Amine $CH_2 NH_3$	--	---	N	N	N	---	---	---	---	---	---
Methyl Bromide $CH_3 Br$	--	---	N	N	N	C to 73	---	---	C to 73	R to 68	---
Methyl Butyl Ketone	Liquid	---	---	---	---	---	---	C to 122	---	---	---
Methyl Cellosolve $HOCH_2 CH_2 OCH_3$	--	---	N	73	N	C to 120	---	---	C to 120	---	---
Methyl Chloride $CH_3 Cl$	Dry	N	N	N	N	C to 120	N	---	C to 120	R to 68	---
Methyl Chloroform $CH_3 Ccl$	--	N	N	C to 73	N	C to 120	---	---	C to 120	---	---
Methyl Ethyl Ketone (MEK) $CH_3 COC_2 H_5$	100%	N	N	73	N	N	73	C to 68	R to 140	C to 140	R to 73 C to 176

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Methyl Isobutyl Carbinol $(CH_3)_2 CHCH_2 CH(CH_3)OH$	--	---	N	---	N	---	---	---	---	---	---
Methyl Isobutyl Ketone $(CH_3)_2 CHCH_2 COCH_3$	--	N	N	73	N	73	---	---	73	---	---
Methyl Isopropyl Ketone $CH_3 COCH(CH_3)_2$	--	---	N	---	N	73	---	---	73	---	---
Methyl Methacrylate $CH_2 :C(CH_3)COOH_3$	--	---	N	---	73	140	---	R to 68	140	---	---
Methyl Sulfate $(CH_3)_2 SO_4$	---	---	73	C to 73	73	140	---	---	---	68	---
Methylene Bromide $CH_2 Br_2$	--	---	N	N	N	C to 120	---	---	C to 120	---	---
Methylene Chloride $CH_2 Cl_2$	100%	---	N	N	N	N	73	C to 104	N	---	C to 176
Methylene Chloro-bromide $CH_2 ClBr$	--	---	N	--	N	---	---	---	---	---	---
Methylene Iodide $CH_2 I_2$	--	---	N	N	N	C to 120	---	---	C to 120	---	---
Methysulfuric Acid $CH_3 HSO_4$	--	---	180	140	140	---	---	---	---	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Milk	--	160	180	212	140	140	140	R to 212	140	194	---
Mineral Oil	--	73	180	C to 140	140	R to 73	C to 73	R to 212	C to 176	---	---
Molasses	--	---	180	140	140	140	140	---	140	---	---
Monochloroacetic Acid CH_7 ClCOOH	50%	---	---	140	140	140	---	---	140	---	---
Monochlorobenzene C_6 H_5 Cl	Tech Pure	---	N	73	N	C to 120	---	---	C to 120	---	---
Monoethanolamine $HOCH_2$ CH_2 NH_2	--	---	---	---	N	---	---	---	---	---	---
Motor Oil	--	---	180	C to 140	140	R to 140	---	---	R to 140	---	---
Morpholine C_4 H_8 ONH	--	---	---	140	---	140	---	---	140	---	---
Mustard, Aqueous	Work. Sol.	---	---	---	---	---	---	R to 248	---	---	---
N-methyl Pyrrolidone	100%	---	---	---	---	---	---	---	---	---	C to 73
Naphtha	--	---	73	73	140	73	73	R to 122	C to 176	R to 140	---
Naphthalene C_{10} H $_8$	--	---	N	73	N	73	73	---	73	R to 194	---
Natural Gas	--	73	---	73	140	140	73	---	140	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Nickel Acetate $Ni(OOCH_3)_2$ o4H_2 O	--	---	---	73	---	140	---	---	140	---	---
Nickel Chloride $NiCl_2$	Sat'd	160	180	180	140	140	140	R to 212	140	---	---
Nickel Nitrate $Ni(NO_3)_2$ o6H_2 O	Sat'd	160	180	180	140	140	140	R to 248	140	---	---
Nickel Sulfate $NiSO_4$	Sat'd	160	180	180	140	140	140	R to 212	140	---	---
Nicotine C_{10} H_{14} N_2	--	---	180	---	140	140	140	---	140	---	---
Nicotinic Acid Csh_4 NCOOH	--	---	180	---	140	140	140	R to 212	140	---	---
Nitric Acid HNO_3	5%	---	---	---	---	---	---	R to 176	C to 140	N	---
	10%	C to 73	180	180	140	73	C to 73	R to 212	C to 140	---	---
	20%	---	---	---	---	---	---	R to 212	C to 140	---	---
	25%	---	---	---	---	---	---	R to 212	C to 140	---	---
	30%	N	R to 130	140	140	73	N	R to 212	C to 140	---	---
	35%	---	---	---	---	---	---	---	C to 140	---	---
	40%	N	R to 120	73	140	73	N	C to 248	140	---	---
	50%	N	110	N	100	C to 73	N	---	140	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
	65%	---	---	---	---	---	---	C to 248	---	---	---
	70%	N	100	N	73	C to 73	N	---	C to 73	---	---
	85%	---	---	---	---	---	---	N	---	---	---
	95%	---	---	---	---	---	N	---	---	---	---
	100%	N	N	N	N	N	N	---	N	---	---
Nitrobenzene $C_6H_5NO_2$	100%	N	N	C to 140	N	N	---	R to 122	N	---	---
Nitroglycerine $CH_2NO_3CHNO_3CH_2NO_3$	--	---	---	---	N	73	---	---	73	---	---
Nitroglycol	--	---	---	---	N	---	---	---	---	---	---
Nitrous Acid HNO_2	10%	---	180	C to 73	140	73	---	---	73	---	---
Nitrous Oxide N_2O	--	---	73	73	73	73	---	---	73	---	---
n-Octane CH_8H_{18}	--	---	C to 73	---	---	---	---	---	---	---	---
Oleic Acid $CH_3(CH_2)_7CH:CH(CH_2)_7COOH$	--	160	180	73	140	C to 140	150	R to 248	C to 140	R to 140	---
Oleum $xH_2SO_4oySO_3$	--	N	N	N	N	N	N	N	N	---	---
Olive Oil	--	160	C to 180	73	140	140	---	R to 248	R to 68	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Oxalic Acid	50%	160	180	140	140	140	140	---	140	---	---
$HOOCCOOHo2H_2O$	10%	---	---	---	---	---	---	R to 140	---	R to 140	---
	Sat'd	---	---	---	---	---	---	R to 122	---	---	---
Oxygen Gas O_2	--	160	180	N	140	140	---	R to 212	140	R to 140	---
Ozone O_3	--	---	180	C to 73	140	C to 120	---	---	C to 120	C to 68	---
	Sat'd	---	---	---	---	---	---	R to 68	---	---	---
Palm Oil	--	---	---	73	---	140	---	---	140	---	---
Palmitic Acid $CH_3 (CH_2)_{14} COOH$	10%	73	73	180	140	120	150	---	120	---	---
	70%	---	73	180	73	120	---	---	120	---	---
Paraffin $C_{36} H_{74}$	--	73	180	140	140	C to 140	---	R to 212	C to 140	---	---
Peanut Oil	--	---	C to 180	140	---	---	---	R to 248	---	---	---
n-Pentane $CH_3 (CH_2)_3 CH_3$	--	N	C to 180	N	C to 140	C to 120	---	---	C to 120	---	--
Peracetic Acid $CH_3 COOOH$	40%	N	---	73	73	---	---	---	---	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Perchloric Acid (Type I) $HclO_4$	10%	---	---	---	---	---	---	R to 212	---	---	---
	20%	---	---	---	---	---	---	R to 212	---	---	---
Perchloric Acid (Type I) $HclO_4$	15%	---	180	140	73	140	C to 73	---	140	---	---
Perchloric Acid (Type I) $HclO_4$	70%	73	180	C to 73	73	73	N	R to 212	73	---	---
Perchloroethylene $Cl_2 C:CCl_2$	--	N	C to 180	C to 73	C to 140	C to 120	---	C to 212	C to 120	C to 68	---
Perphosphate	--	---	73	140	73	---	---	---	---	---	---
Petroleum Ether		---	---	---	---	---	---	R to 212	---	---	---
Phenol $C_6 H_5 OH$	--	N	73	73	73	140	73	---	140	N	---
	5%	---	---	---	---	---	---	---	R to 248	---	---
	50%	---	---	---	---	---	---	R to 176	---	---	---
	Solid	---	---	---	---	---	---	C to 122	---	---	---
	90%	---	---	---	---	R to 140	---	---	R to 140	---	---
Phenylhydrazine $C_6 H_5 NHNH_2$	--	---	N	N	N	C to	--- 120	R to	C to 104	--- 120	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Phenylhydrazine Hlydrochloride	10%	---	---	---	---	---	---	R to 140	---	---	---
Phosphine	Gas	---	---	---	---	---	---	R to 104	---	---	---
Phosphoric Acid $H_3 PO_4$	10%	---	180	212	140	140	140	---	140	---	---
	50%	73	180	212	140	140	73	R to 212	140	C to 104	---
	75%	---	---	---	---	---	---	R to 212	---	---	---
	85%	---	180	212	140	73	---	C to 284	73	---	---
	98%	---	---	---	---	---	---	R to 212	---	---	---
Phosphoric Anhydride $P_2 O_5$	--	---	73	73	73	---	---	---	---	---	---
Phosphorous (Red)	--	---	---	---	73	140	---	---	140	---	---
Phosphorous (Yellow)	--	--	---	---	73	140	---	---	140	---	---
Phosphorous Oxychloride	Liquid	---	---	---	---	---	---	R to 68	---	---	---
Phosphorous Pentoxide $P_2 O_5$	--	---	73	73	73	140	---	---	140	---	---
Phosphorous Trichloride Pcl_3	--	--	N	73	N	120	C to 73	C to 122	120	---	---
Photographic Solutions	--	---	180	140	140	140	140	---	140	---	---
Phtalic Acid	--	---	---	140	C to	140	---	---	140	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
$C_6 H_4 (COOH)_2$					140						
	Susp.	---	---	---	---	---	---	R to 212	---	---	---
Picric Acid	10%	N	N	73	N	73	73	R to 212	73	C to 68	---
$C_6 H_2 (NO_2)_3 OH$											
	50%	---	---	---	---	---	---	R to 212	---	---	---
	Sat'd.	---	---	---	---	---	---	R to 212	---	---	---
Pine Oil	--	---	N	140	---	R to 73	---	---	R to 73	---	---
Plating Solutions (Brass)	--	---	180	140	140	140	C to 73	---	140	---	---
Plating Solutions (Cadmium)	--	---	180	140	140	140	C to 73	---	140	---	---
Plating Solutions (Chrome)	--	---	180	140	140	140	C to 73	---	140	---	---
Plating Solutions (Copper)	--	---	180	140	140	140	C to 73	---	140	---	---
Plating Solutions (Gold)	--	---	180	140	140	140	C to 73	---	140	---	---
Plating Solutions (Lead)	--	---	180	140	140	140	C to 73	---	140	---	---
Plating Solutions (Nickel)	--	---	180	140	140	140	C to 73	---	140	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Plating Solutions (Rhodium)	--	---	180	140	140	140	C to 73	---	140	---	---
Plating Solutions (Silver)	--	---	180	140	140	140	C to 73	---	140	---	---
Plating Solutions (Tin)	--	---	180	140	140	140	C to 73	---	140	---	---
Plating Solutions (Zinc)	--	---	180	140	140	140	C to 73	---	140	---	---
Potash (Aq) KOH	Sat'd	---	180	---	140	140	---	---	140	---	---
Potassium Alum ALK $(SO_4)_2$ o12H_2 O	--	---	180	---	140	140	---	---	140	---	---
Potassium Aluminum Sulphate	--	---	180	180	140	---	C to 73	---	---	---	---
Potassium Amyl Xanthate	--	---	---	---	73	---	---	---	---	---	---
Potassium Bicar-bonate $KHCO_3$	Sat'd	---	180	140	140	140	140	R to 212	140	---	---
Potassium Bi-chromate	Sat'd	---	180	140	140	---	C to 73	R to 212	---	---	---
$K_2 Cr_2 O_7$	40%	---	---	---	---	---	---	R to 212	---	---	---
Potassium Bisulfate $KHSO_4$	--	---	180	212	140	140	---	R to 212	140	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Potassium Borate $K_2 B_4 O_7 o5H_2 O$	--	--	180	140	140	140	140	R to 212	140	---	---
Potassium Bromate $KbrO_3$	--	---	180	212	140	140	140	R to 212	140	---	---
	10%	---	---	---	---	---	---	---	R to 212	---	---
Potassium Bromide Kbr	--	---	180	212	140	140	140	R to 248	140	---	---
Potassium Carbonate $K_2 CO_3$	--	73	180	180	140	140	140	N	140	---	---
Potassium Chlorate $KClO_3$ (Aqueous)	--	160	180	212	140	140	140	N	140	---	---
Potassium Chloride Kcl	--	160	180	212	140	140	140	R to 212	140	---	---
Potassium Chromate $K_2 CrO_4$	--	---	180	212	140	140	140	---	140	---	---
Potassium Cyanide KCN	--	---	180	180	140	140	140	R to 212	140	---	---
Potassium Dichromate $K_2 Cr_2 O_7$	Sat'd	--	180	180	140	140	140	---	140	---	---
Potassium Ethyl Xanthate $KS_2 COC_2 H_5$	--	---	---	---	73	---	---	---	---	---	---
Potassium	--	---	180	180	140	140	140	R to	140	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Ferricyanide $K_3 Fe(CN)_6$								248			
Potassium Ferroycanide $K_4 Fe(CN)_6$ o$3H_2$ O	--	---	180	180	140	140	---	R to 248	140	---	---
Potassium Fluoride KF	--	---	180	180	140	140	140	R to 212	140	---	---
Potassium Hydroxide KOH	4%	---	---	---	---	---	---	C to 104	---	---	---
	10%	---	---	---	---	---	---	R to 176	---	---	---
	20%	---	---	---	---	---	---	R to 176	---	---	---
	25%	160	180	212	140	R to 140	140	---	R to 140	---	---
	45%	---	---	---	---	---	---	---	---	---	R to 73
	50%	---	---	---	---	---	---	R to 176	---	C to 104	---
Potassium hydrogen Sulphite	10%	---	---	---	---	---	---	R to 140	---	---	---
	Sat'd	---	---	---	---	---	---	R to 212	---	---	---
Potassium Hyprochlorite KclO	-- 3%	160	180	---	140	120	---	---	120	---	---
			---	---	---	---	---	---	R to 212	---	---
Potassium Iodide KI	--	---	180	73	73	140	---	R to 212	140	---	---
Potassium Nitrate	--	160	180	140	140	140	140	---	140	C to	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
KNO_3	50%	---	---	---	---	---	---	R to 212	---	104	---
Potassium Orthophosphate	Sat'd	---	---	---	---	---	---	R to 212	---	---	---
Potassium Perborate	--	---	180	140	140	140	140	---	140	---	---
Potassium Perchlorate $KClO_4$	--	---	180	140	140	140	140	---	140	---	---
Potassium Permanganate	10%	---	180	73	140	140	140	R to 176	140	---	---
$KmnO_4$	20%	---	---	---	---	---	---	R to 212	---	---	---
	25%	---	180	73	73	140	---	---	140	---	---
	30%	---	---	---	---	---	---	R to 212	---	---	---
	Sat'd	---	---	---	---	---	---	R to 212	---	---	---
Potassium Persulfate $K_2 S_2 O_8$	--	---	180	140	140	140	140	R to 176	140	---	---
Potassium Sulfate $K_2 SO_4$	--	160	180	180	140	140	140	R to 212	140	194	---
Potassium Sulfide $K_2 S$	--	---	180	140	---	140	140	68	140	---	---
Potassium Sulfite $K_2 SO_3$ o2H_2 O	--	---	180	140	---	140	---	---	140	---	---
Propane $C_3 H_8$	--	---	73	73	140	140	73	R to 248	140	140	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Propargyl Alochol $HC:CCH_2$ OH	--	---	C to	140 180	140	140	140	---	140	---	---
Propionic Acid CH_3 CH_2 CO_2 H	--	N	N	140	---	140	---	R to 140	140	---	---
Propyl Alcohol (Type I) $CH_3CH_2CH_2OH$	--	73	C to 73	140	140	R to 140	140	R to 122	R to 140	---	---
Propylene Carbonate	100%	---	---	---	---	---	---	---	---	---	R to 73
Propylene Dichloride CH_3 $CHClCH_2$ Cl	100	---	N	N	N	N	---	---	N	---	---
Propylene Oxide CH_3 $CHCH_2$ O	--	---	N	73	N	140	---	---	140	---	---
Pyridine $N(CH)_4$ CH	--	---	N	C to 140	N	73	---	R to 68	73	C to 68	---
Pyrogallic Acid C_6 H_3 $(OH)_3$	--	---	---	---	73	--	--	---	---	---	---
Quinone C_6 H_4 O_2	--	---	---	140	---	140	---	---	140	---	---
Rayon Coagulating Bath	--	---	180	---	140	140	140	---	140	---	---
Salicylaldehyde C_6 H_4 OHCHO	--	---	---	73	N	120	---	---	120	---	---
Salicylic Acid C_6 H_4 (OH)(COOH)	--	---	---	140	140	140	---	212	R to	140	--- ---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK	
Selenic Acid Aq. $H_2 SeO_4$	--	---	180	---	140	140	140	---	140	---	---	
Silicic Acid SiO_2 onH_2 O	--	---	180	140	140	140	140	R to 212	140	---	---	
Silicone Oil	--	---	180	212	73	73	---	---	73	---	---	
Silver Acetate	Sat'd	---	---	---	---	---	---	R to 212	---	---	---	
Silver Chloride AgCl	--	160	180	140	140	---	---	---	---	---	---	
Silver Cyanide AgCN	--	---	180	180	140	140	140	R to 212	140	---	---	
Silver Nitrate $AgNO_3$	--	160	180	180	140	R to 140	C to 73	---	R to 140	---	---	
	50%	---	---	---	---	---	---	R to 212	---	---	---	
Silver Sulfate $Ag_2 SO_4$	--		160	180	140	140	140 73	C to	---	140	---	---
Soaps	--	73	180	140	140	R to 140	140	---	R to 140	---	---	
Sodium Acetate $NaC_2 H_3 O_2$	Sat'd	---	180	212	140	140	140	R to 212	140	---	---	
Sodium Alum $AlNa(SO_4)_2$ o$12H_2$ O	--	---	180	---	140	---	---	---	---	---	---	
Sodium Aluminate $Na_2 Al_2 O_3$	Sat'd	---	---	---	140	---	---	---	---	---	---	

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Sodium Benzoate	--	---	180	140	140	140	140	---	140	---	---
$C_6 H_5 COONa$	35%	---	---	---	---	---	---	R to 68	---	---	---
	50%	---	---	---	---	---	---	R to 212	---	---	---
Sodium Bicarbonate	--	73	180	212	140	140	140	R to 212	140	---	---
$NaHCO_3$											
Sodium Bichromate	Sat'd	---	180	---	140	---	---	---	---	---	---
$Na_2 Cr_2 O_7 o2H_2 O$	50%	---	---	---	---	---	---	R to 212	---	---	---
Sodium Bisulfate	--	73	180	140	140	140	140	---	140	---	---
$NaHSO_4$	50%	---	---	---	---	---	---	R to 212	---	---	---
Sodium Bisulfite	--	---	180	140	140	140	---	---	140	---	---
$NaHSO_3$											
Sodium Borate (Borax)	Sat'd	160	180	180	140	140	140	---	140	---	---
$Na_2 B_4 O_7 o10H_2 O$											
Sodium Bromide	Sat'd	120	180	140	140	140	140	---	140	---	---
NaBr	50%	---	---	---	---	---	---	R to 248	---	---	---
Sodium Carbonate	--	73	180	212	140	140	140	N	140	R to 140	---
$Na_2 CO_3$											
Sodium Chlorate	Sat'd	---	180	140	73	140	140	N	140	---	---
$NaClO_3$											

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Sodium Chloride	---	120	180	212	140	140	140	---	140	---	---
NaCl	Sat'd	---	---	---	---	---	---	R to 212	---	194	---
	10%	---	---	---	---	---	---	R to 212	---	---	R to 176
Sodium Chlorite	25%	---	180	73	N	140	---	---	140	---	---
$NaClO_2$											
Sodium Chromate	--	120	180	140	---	140	---	R to 176	140	---	---
$Na_2 CrO_4 o10H_2 O$											
Sodium Cyanide	--	---	180	180	140	140	140	R to 212	140	---	---
NaCN											
Sodium Dichromate	20%	---	180	180	140	140	140	---	140	---	---
$Na_2 Cr_2 O_7 o2H_2 O$											
Sodium Ferricyanide	Sat'd	---	180	140	140	140	140	---	140	---	---
$Na_3 Fe(CN)_6 o2H_2 O$											
Sodium Ferrocyanide	Sat'd	---	180	140	140	140	140	---	140	---	---
$Na_3 Fe(CN)_6 o10H_2 O$											
Sodium Fluoride	--	120	180	180	140	140	140	R to 212	140	---	---
NaF											
Sodium Hydrogen	50%	---	---	---	---	---	---	R to 212	---	---	---
Sulphite											
Sodium Hydroxide	1%	---	---	---	---	---	---	---	R to 140	---	---
NaOH											
	5%	---	---	---	---	---	---	C to 68	---	---	---
	15%	120	180	212	140	140	140	---	R to 140	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
	30%	120	180	212	140	R to 140	140	N	R to 140	---	---
	40%	---	---	---	---	---	---	---	R to 140	---	---
	50%	120	180	212	140	140	140	---	140	C to 104	---
	60%	---	---	---	---	---	---	---	R to 140	---	---
	70%	120	180	212	140	140	140	---	140	---	---
Sodium Hypochlorite	--	120	180	73	73	140	140	---	140	---	N
NaOClo5H_2 O	2% Cl	---	---	---	---	---	---	R to 212	---	---	---
	12.5% Cl	---	---	---	---	---	---	R to 68	---	---	---
Sodium Iodide NaI	--	---	180	---	140	---	---	---	---	---	---
Sodium Metaphosphate ($NaPO_3$)n	--	---	180	120	140	---	---	---	---	---	---
Sodium Nitrate $NaNO_3$	Sat'd	160	180	180	140	140	140	R to 212	140	---	---
Sodium Nitrite $NaNO_2$	--	160	180	73	140	140	140	R to 212	140	---	---
Sodium Palmitrate CH_3 (CH_2)$_{14}$ COONa	5%	---	180	140	140	---	---	---	---	---	---
Sodium Perborate $NaBO_2$ o3H_2 O	--	120	180	73	140	73	---	---	73	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Sodium Perchlorate $NaClO_4$	--	---	180	212	140	140	---	---	140	---	---
Sodium Peroxide $Na_2 O_2$	10%	---	180	---	140	140	---	---	140	---	---
Sodium Phosphate $NaH_2 PO_4$	Acid	120	180	212	140	140	140	R to 140	140	---	---
	Alkaline		120	180	212	140	140	---	140	---	---
	Neutral		120	180	212	140	140	---	R to 212	---	---
Sodium Silicate	--	---	180	140	140	140	140	---	140	---	---
$2Na_2 OoSiO_2$	10%	---	---	---	---	---	---	R to 140	---	---	---
	50%	---	---	---	---	---	---	R to 212	---	---	---
Sodium Sulfate Na_2SO_4	Sat'd	160	180	212	140	140	140	R to 212	---	---	---
	0.1%	---	---	---	---	---	---	R to 140	---	---	---
Sodium Sulfide Na_2S	Sat'd	160	180	212	140	140	140	---	140	C to 104	---
Sodium Sulfite Na_2SO_3	Sat'd	160	180	212	140	140	140	R to 212	140	---	---
Sodium Thiosulphate	--	---	180	180	140	140	140	---	140	---	---
$Na_2S_2O_3o5H_2O$	50%	---	---	---	---	---	---	R to 248	---	---	---
Sour Crude Oil	--	---	---	140	140	---	---	---	---	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Soybean Oil	--	---	---	73	---	140	---	---	140	---	---
Stannic Chloride $SnCl_4$	Sat'd	---	180	140	140	140	140	---	140	---	---
Stannous Chloride	15%	120	180	140	140	140	140	---	140	---	---
$SNCl_2$	Sat'd	---	---	---	---	140	---	---	140	---	---
Starch	--	---	180	140	140	140	---	---	140	---	---
Starch Solution	Sat'd	---	---	---	---	140	---	---	140	---	---
Stearic Acid $CH_3(CH_2)_{16}COOH$	--	---	180	73	140	120	150	---	120	C to 194	---
	100%	---	---	---	---	R to 120	---	---	R to 120	---	---
Stoddard's Solvent	--	---	N	---	N	73	140	---	73	---	---
Styrene $(C_6H_5CHCH_2)n$	--	---	---	73	---	C to 73	---	---	C to 73	R to 104	---
Succinic Acid $CO_2H(CH_2)_2CO_2H$	--	---	180	140	140	140	---	---	140	---	---
Sugar $C_6H_{12}O_6$	Aq.	---	180	---	140	140	---	---	140	---	---
Sulfamic Acid HSO_3NH_2	20%	--	N	180	N	---	---	---	---	---	---
Sulfate Liquors (Oil)	6%	---	180	140	140	---	---	---	---	---	---
Sulfite Liquors	6%	73	180	---	140	140	---	---	---	---	---
Sulfur	--	---	180	212	140	140	140	---	---	104	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
S											
Sulfur Chloride S_2Cl	--	---	---	C to 73	---	---	---	---	---	---	---
Sulfur Dioxide SO_2	Gas Dry	N	73	140	140	140	---	---	140	---	---
Sulfur Dioxide	Gas Wet	N	N	140	73	120	73	N	120	---	---
Sulfur Trioxide SO_3	Gas Dry	---	---	---	140	N	---	N	N	C to 68	---
Sulfur Trioxide SO_3	Gas	---	N	---	73	N	---	N	---	---	---
Sulfuric Acid H_2SO_4	5%	---	---	---	---	---	---	---	---	---	R to 73
	30%	120	180	180	140	140	140	R to 248	R to 140	---	N
	50%	73	180	140	140	120	C to 73	R to 212	R to 140	---	---
	60%	C to 73	180	73	140	120	C to 73	R to 248	---	---	---
	70%	C to 73	180	73	140	R to 120	C to 73	---	---	---	---
	80%	C to 73	180	73	140	R to 120	N	C to 248	---	---	---
	90%	C to 73	150	73	73	120	N	R to 212	---	---	---
	93%	N	140	C to 73	73	C to 73	N	---	---	---	---
	94% - 98%	N	130	C to 73	N	C to 73	N	C to 212	N	---	---
	100%	N	N	C to	N	C to	N	---	---	C to	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
				73		73				194	
Sulfurous Acid H_2SO_3	--	---	180	140	140	140	140	R to 212	140	---	---
Tall Oil	--	---	C to 180	180	140	120	---	---	120	---	---
Tannic Acid $C_{76}H_{52}O46$	10%	N	180	73	140	140	140	R to 212	140	---	---
	Sat'd	---	---	---	---	---	---	R to 212	---	---	---
Tanning Liquors	--	160	180	73	140	120	140	---	120	---	---
Tar	--	---	N	---	N	---	---	---	---	---	---
Tartaric Acid $HOOC(CHOH)_2COOH$	--	160	180	140	140	140	140	R to	140 248	---	---
	Sat'd	---	---	---	---	---	---	R to 248	R to 176	R to 194	---
Terpineol $C_{10}H_{17}OH$	--	---	---	---	C to 140	---	---	---	---	---	---
Tetrachloroethane $CHCl_2CHCl_2$	--	---	---	C to 73	C to 140	C to 120	---	---	C to 120	---	---
Tetrachloroethylene $Cl_2C:CCl_2$	--	N	N	C to 73	---	---	---	---	---	---	---
Tetraethyl Lead $Pb(C_2H_5)_4$	--	---	73	73	73	---	---	---	---	68	---
Tetrahydrofuran C_4H_8O	--	N	N	C to 73	N	C to 73	C to 73	C to 68	N	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Tetralin $C_{10}H_{12}$	--	---	N	N	N	N	---	---	N	---	---
Tetra Sodium Pyrophosphate N94Pzo$_7$o10H_2O	--	---	180	---	140	---	---	---	---	---	---
Thionyl Chloride $SOCl_2$	--	---	N	N	N	N	140	N	N	---	---
Thread Cutting Oils	--	---	73	73	73	---	---	---	---	---	---
Tin (II) Chloride		---	---	---	---	---	---	R to 212	---	---	---
Tin (IV) Chloride		---	---	---	---	---	---	R to 212	---	---	---
Titanium Tetrachloride $TiCl_4$	--	---	---	140	C to 73	120	---	---	120	---	---
Toluene (Toluol) $Ch_3C_6H_5$	--	N	N	C to 73	N	C to 120	N	---	C to 120	R to 140	R to 73
Tomato Juice	--	---	180	212	140	140	---	---	140	--	---
Transformer Oil	--	---	180	73	140	C to 120	---	---	C to 120	---	---
Transformer Oil DTE/30	--	---	180	---	140	R to 120	---	---	R to 120	---	---
Tributyl Citrate	--	---	---	C to 73	73	C to 120	---	---	C to 120	---	---
Tributyl Phosphate $(C_4H_9)PO_4$	--	---	N	C to 140	N	73	---	---	73	R to 194	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Trichloroacetic Acid	50%	---	---	140	140	140	---	R to	140	---	---
Ccl_3COOH								104			
	10%	---	---	---	---	140	---	---	140	---	---
Trichlorobenzene		---	---	---	---	---	---	R to	---	---	---
								140			
Trichloroethane		---	---	---	---	---	---	---	---	---	R to 122
Trichloroethylene	--	N	N	N	N	C to	N	R to	C to	C to	R to176
$CHCl:CCl_2$						120		176	68	68	
Triethanolamine	--	C to	73	140	73	73	73	C to	73	---	---
$(HOCH_2CH_2)_3N$		73						104			
Triethylamine	--	---	---	N	140	73	---	---	73	---	---
$(C_2H_5)_3N$											
Trimethylpropane	--	---	---	140	73	C to	---	---	C to	---	---
$(CH_2OH)_3C_3H_5$						120			120		
Trisodium Phosphate	--	73	180	140	140	140	140	---	140	---	---
$NaPO_4o12H_2O$											
Turpentine	--	N	N	N	140	C to	C to	---	C to	R to	---
						120	73		120	140	
Urea	--	---	180	180	140	140	140	---	140	---	---
$CO(NH_2)_2$	10%	---	---	---	---	---	---	R to	---	---	---
								212			
	Sat'd	---	---	---	---	---	---	R to	---	C to	---
								176		140	
Urine	--	160	180	180	140	140	140	---	140	---	---
Vaseline	--	---	N	140	N	120	---	---	120	---	---
(Petroleum Jelly)											

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Vegetable Oil	--	---	C to 180	140	140	R to 140	---	R to 248	R to 140	---	---
Vinegar	--	73	150	140	140	140	140	---	140	194	---
Vinyl Acetate $CH_3COOCH:CH_2$	--	---	N	73	N	140	---	C to 68	140	---	---
Water, Acid Mine H_2O	--	160	180	140	140	140	180	---	140	---	194
Water, Deionized H_2O	--	160	180	140	140	140	180	---	140	194	176
Water, Distilled H_2O	--	160	180	212	140	140	180	R to 248	140	194	---
Water, Potable H_2O	--	160	180	212	140	140	180	R to 248	140	194	---
Water, Salt H_2O	--	160	180	212	140	140	180	---	140	194	---
Water, Sea H_2O	--	160	180	212	140	140	180	R to 248	140	194	R to 176
Water, Soft H_2O	--	160	180	212	140	140	180	---	140	194	---
Water, Waste H_2O		73	180	212	140	140	180	---	140	194	---
Whiskey	--	---	180	140	140	140	140	R to 212	140	---	---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
White Liquor	--	73	180	---	140	---	---	---	---	---	---
Wine	--	73	180	140	140	140	140	R to 248	140	---	---
Wines and Spirits		---	---	---	---	---	---	R to 212	---	---	---
Xylene (Xylol) $C_6H_4(CH_3)_2$	--	N	N	N	N	N	N	C to 140	N	C to 194	---
Zinc Acetate $Zn(C_2H_3O_2)_2o2H_2O$	--	---	180	---	---	---	---	---	---	---	---
Zinc Carbonate $ZnCO_3$	--	---	180	140	---	140	---	R to 212	140	---	---
Zinc Chloride $ZnCl_2$	--	120	180	180	140	140	---	---	140	---	---
	50%	---	---	---	---	---	---	---	---	C to 73	---
	Sat'd	---	---	---	---	---	---	R to 212	---	---	---
Zinc Nitrate	--	160	180	180	140	140	140	---	140	---	---
$Zn(NO_3)_2o6H_2O$	Sat'd	---	---	---	---	---	---	R to 212	---	---	---
Zinc Oxide		---	---	---	---	---	---	R to 212	---	---	---
Zinc Stearate		---	---	---	---	---	---	R to 122	---	---	---
Zinc Sulfate $ZnSO_4o7H_2O$	-- Sat'd	160	180 ---	212 ---	140 ---	140 ---	140 ---	--- ---	140 R to	--- ---	--- ---

Plastics at Maximum Operating Temperature (F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
								212			