

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.

This report has been prepared by PPI as a service of the industry. The information in this report is offered in good faith and believed to be accurate at the time of its preparation, but is offered without any warranty, expressed or implied, including WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Consult the manufacturer for more detailed information about the particular weathering package used for its piping products. Any reference to or testing of a particular proprietary product should not be construed as an endorsement by PPI, which do not endorse the proprietary products or processes of any manufacturer. The information in this report is offered for consideration by industry members in fulfilling their own compliance responsibilities. PPI assumes no responsibility for compliance with applicable laws and regulations.

PPI intends to revise this report from time to time, in response to comments and suggestions from users of the report. Please send suggestions of improvements to the address below. Information on other publications can be obtained by contacting PPI directly or visiting the web site.

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<sup>1</sup>, 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

---

<sup>1</sup> 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:

<u>Code</u>	<u>Meaning</u>	<u>Typical Result</u>
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	acrylonitrile-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 <sub>3</sub> 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 <sub>3</sub> CONH <sub>2</sub>	5%	120	---	140	---	140	---	---	140	---	---
Acetic Acid CH <sub>3</sub> 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 <sub>3</sub> CO) <sub>2</sub> 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 <sub>3</sub> COCH <sub>3</sub>						73		212	73	140	
	10%	---	---	---	---	---	---	R to 122	---	---	---
	100%	---	---	---	---	---	---	---	---	---	R to 73 C to 122
Acetophenone C <sub>6</sub> H <sub>5</sub> COCH <sub>3</sub>	---	N	---	120	--	73	---	R to 73	68	---	---
Acetyl Chloride CH <sub>3</sub> COCl	---	N	N	---	N	---	---	N	---	---	---
Acetylene HC=CH	gas 100%	73	N	73	N	73	C to 73	---	73	140	---
Acetonitrile	---	---	N	---	N	---	---	---	---	---	---
Acrylic Acid H <sub>2</sub> C:CHCOOH	97%	---	N	---	N	140	---	---	140	---	---
Acrylonitrile H <sub>2</sub> C:CHCN	---	---	N	---	N	140	---	---	140	---	---
Adipic Acid COOH(CH <sub>2</sub> ) <sub>4</sub> COOH	sat'd	---	180	140	140	140	73	R to 176	140	---	---
Allyl Alcohol CH <sub>2</sub> = CHCH <sub>2</sub> OH	96%	---	C to 73	140	R to 73	140	140	---	N	---	---
	--	---	N	---	N	C to 73	---	140	C to 73	---	---
Cl <sub>2</sub>	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 <sub>4</sub> (SO <sub>4</sub> ) <sub>2</sub> 12H <sub>2</sub> O											
Aluminum Chloride Aqueous AlCl <sub>3</sub>	sat'd	160	180	180	140	140	140	R to 212	140	---	---
Aluminum Fluoride Anhydrous AlF <sub>3</sub>	sat'd	160	180	180	73	140	140	R to 212	140	---	---
Aluminum Hydroxide AlO <sub>3</sub> O3H <sub>2</sub> O	sat'd	160	180	180	140	140	140	R to 212	140	---	N
Aluminum Nitrate Al(NO <sub>3</sub> ) <sub>3</sub> O9H <sub>2</sub> O	sat'd	---	180	180	140	140	140	R to 212	140	---	---
Aluminum Oxychloride	--	---	180	180	140	---	140	---	---	---	---
Aluminum Potassium Sulfate (Alum) AlK(SO <sub>4</sub> ) <sub>2</sub> o12H <sub>2</sub> O	sat'd	160	180	140	140	140	---	R to 212	140	---	---
Aluminum Sulfate (Alum) Al <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub>	sat'd 20%	160 ---	180 ---	140 ---	140 ---	140 ---	C to 73 ---	R to 212 ---	140 ---	194 ---	--- R to 73
Amonia Gas NH <sub>3</sub>	100%	N	N	140	140	140	140	---	140	140	---
Amonia Liquid NH <sub>3</sub>	100%	160	N	140	N	140	73	---	140	140	---
Amonia Acetate NH <sub>4</sub> (C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> )	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 <sub>4</sub> HF <sub>2</sub>	sat'd	---	180	180	140	---	140	---	140	---	---	
Amonium Bisulfide (NH <sub>4</sub> )HS	---	---	---	---	140	---	---	---	---	---	---	
Amonium Carbonate (NH <sub>4</sub> )HCO <sub>3</sub> o (NH <sub>4</sub> ) CO <sub>2</sub> NH <sub>2</sub>	sat'd	---	180	212	140	140	140	R to 248	140	---	---	
Amonium Chloride NH <sub>4</sub> Cl	sat'd	120	180	212	140	140	140	R to 212	140	---	---	
Amonium Dichromate (NH <sub>4</sub> ) <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>	--	---	73	---	73	---	---	---	---	---	---	
Amonium Fluoride NH <sub>4</sub> F	10%	120	180	212	140	140	---	R to 212	140	---	---	
	25%	120	180	212	C to 140	140	73	---	140	---	---	
Amonium Hydroxide NH <sub>4</sub> 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 <sub>4</sub> NO <sub>3</sub>	sat'd	120	180	212	140	140	140	R to 212	140	---	---	
Amonium Persulphate (NH <sub>4</sub> ) <sub>2</sub> S <sub>2</sub> O <sub>8</sub>	---	---	---	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 <sub>4</sub> H <sub>2</sub> PO <sub>4</sub>	all	120	180	212	140	140	140	R to 248	140	---	---
Amonium Sulfate (NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	Sat'd.	120	180	212	140	140	140	R to 212	140	---	---
	20%	---	---	---	---	---	---	---	---	---	R to 73
Amonium Sulfide (NH <sub>4</sub> ) <sub>2</sub> S	dilute	120	180	212	140	140	140	---	140	---	---
	Sat'd.	---	---	---	---	140	---	---	---	---	---
Amonium Thiocyanate NH <sub>4</sub> SCN	50-60%	120	180	212	140	140	140	R to 212	73	---	---
Amyl Acetate CH <sub>3</sub> COOC <sub>5</sub> H <sub>11</sub>	--		N	N	N	N	73	---	R to 122	73 194	C to ---
Amyl Alcohol C <sub>5</sub> H <sub>11</sub> OH	--	---	N	---	N	140	140	R to 212	R to 140	---	---
	100%	---	---	---	---	---	C to 140	---	---	---	---
n-Amyl Chloride CH <sub>3</sub> (CH <sub>2</sub> ) <sub>3</sub> CH <sub>2</sub> CL	--	N	N	N	N	C to 73	---	---	C to 73	---	---
Anisole		---	---	---	---	---	---	---	---	---	C to 73
Aniline I <sub>2</sub>	--	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
	30%	---	---	---	---	R to 140	---	---	R to 140	---	---
Barium Nitrate Ba(NO <sub>3</sub> ) <sub>2</sub>	sat'd	73	180	140	73	140	---	---	140	---	---
Barium Sulfate BaSO <sub>4</sub>	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 <sub>6</sub> H <sub>5</sub> CHO	10%	N	R to 73	73	R to 73	73	C to 73	---	73	R to 104	---
	99%	---	---	---	---	---	---	---	---	---	C to 73
Benzene C <sub>6</sub> H <sub>6</sub>	--	N	N	N	N	C to 120	N	C to 122	R to 68	---	---
Benzene Sulfonic Acid C <sub>6</sub> H <sub>5</sub> SO <sub>3</sub> H	10%	---	180	180	140	R to 73	---	---	R to 73	---	---
	10%+	---	N	---	N	---	---	---	---	---	---
Benzoic Acid C <sub>6</sub> H <sub>5</sub> COOH	all	160	180	73	140	140	140	---	R to 248	---	---
Benzoyl Chloride	Sat. Sol.	---	---	---	---	---	---	C to 68	---	---	---
Benzyl Alcohol C <sub>6</sub> H <sub>5</sub> CH <sub>2</sub> OH	--	---	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) <sub>2</sub> CO	Sat'd.	---	180	180	140	140	140	---	140	---	---
Black Liquor	sat'd	---	180	140	140	120	140	---	120	---	---
Bleach	5% Active Cl <sub>2</sub>	---	180	120	140	C to 140	---	---	C to 140	---	R to 73
	12% Active Cl <sub>2</sub>	73	185	120	140	73	140	---	73	---	---
Borax Na <sub>3</sub> B <sub>4</sub> O <sub>7</sub> o10H <sub>2</sub> O	sat'd	160	180	212	140	140	140	---	140	---	---
Boric Acid H <sub>3</sub> BO <sub>3</sub>	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 <sub>3</sub>	Sat'd	---	180	N	140	N	140	R to 212	N	---	---
	10%	---	---	---	---	140	---	---	---	---	---
Bromine Br <sub>2</sub>	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 <sub>6</sub> H <sub>5</sub> Br	--	---	---	---	N	---	---	---	---	---	---
Bromotoluene C <sub>6</sub> H <sub>5</sub> CH <sub>2</sub> B <sub>2</sub>	--	---	---	C	N	---	---	---	---	---	---
Butadiene H <sub>2</sub> C: CHHC: CH <sub>2</sub>	50% Gas	---	180	N	140	73	---	---	73	---	---
		---	---	---	---	---	---	R to 212	---	---	---
Butane C <sub>4</sub> H <sub>10</sub>	50% Gas	---	180	140	140	140	N	---	140	---	---
		---	---	---	---	---	---	R to 68	---	---	---
n-Butanol	Liquid	---	---	---	---	---	---	R to 140	---	---	R to 73
Butyl Acetate CH <sub>3</sub> COOCH (CH <sub>3</sub> ) (C <sub>2</sub> H <sub>5</sub> )	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 <sub>3</sub> (CH <sub>2</sub> ) <sub>2</sub> CH <sub>2</sub> OH	--	---	C to 73	180	140	140	140	---	140	C to 104	---
Butyl Cellosolve HOCH <sub>2</sub> CH <sub>2</sub> OC <sub>4</sub> H <sub>9</sub>	--	---	N	---	73	---	---	---	---	---	---
n-Butyl Chloride C <sub>4</sub> H <sub>9</sub> Cl	--	N	N	---	---	---	---	---	---	---	---
Butyl Glycol	Liquid	---	---	---	---	---	---	R to 212	---	---	---
Butylene © CH <sub>3</sub> CH:CHCH <sub>3</sub>	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 C <sub>4</sub> H <sub>9</sub> C <sub>6</sub> H <sub>9</sub> OH	--		---	N	C to 73	73	73	---	R to 176	---	---
Butyl Phthalate	--	---	N	180	---	---	---	R to 140	---	---	---
Butyl Stearate	--	---	---	---	73	---	---	---	---	---	---
Butynediol HOCH <sub>2</sub> C:CCH <sub>2</sub> OH	--	---	---	---	73	---	---	---	---	---	---
Butyric Acid CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> COOH	-- 20%  Liquid	N ---	N ---	180 ---	73 ---	73 ---	73 ---	---	73 R to 212 R to 176	---	---
Cadmium Cyanide Cd(CN) <sub>2</sub>	--	---	180	---	140	---	---	---	---	---	---
Calcium Bisulfide Ca(HS) <sub>2</sub> o6H <sub>2</sub> O	--	---	73	---	N	140	---	---	140	---	---
Calcium Bisulfite Ca(HSO <sub>3</sub> ) <sub>2</sub>	-- Sat'd	---	180	180	140	N	140	---	N	---	---
Calcium Carbonate CaCO <sub>3</sub>	Sat'd	---	180	180	140	140	140	R to 248	140	---	---
Calcium Chlorate Ca(ClO <sub>3</sub> ) <sub>2</sub> o2H <sub>2</sub> O	--	---	180	180	140	140	140	R to 248	140	---	---
Calcium Chloride CaCl <sub>2</sub>	5%  Sat'd	---	---	---	---	---	---	---	---	---	R to 176
		120	180	180	140	140	140	R to 248	R to 176	R to 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) <sub>2</sub>	--	160	180	180	140	140	140	---	140	---	---
	2%	---	---	---	---	---	---	---	---	---	R to 73
	30%	---	---	---	---	R to 140	---	---	R to 140	---	---
Calcium Hypochlorite Ca(OCl) <sub>2</sub>	30% Sat'd	160 ---	180 ---	140 ---	140 ---	140 ---	140 ---	---	140 ---	---	---
								C to 212			
Calcium Nitrate Ca(NO <sub>3</sub> ) <sub>2</sub>	-- 50% Sat'd	---	180 ---	180 ---	140 ---	140 140 ---	140 ---	---	140 140 ---	---	---
								R to 212			
								R to 176			
Calcium Oxide CaO	--	---	180	---	140	140	---	---	140	---	---
Calcium Sulfate CaSO <sub>4</sub>	--	100	180	180	140	140	140	R to 212	140	---	---
Calcium Hydrogen Sulphide	>10%	---	---	---	---	---	---	R to 248	---	---	---
Camphor C <sub>10</sub> H <sub>16</sub> O	--	N	---	73	73	73	---	---	73	---	---
Cane Sugar Liquors C <sub>12</sub> H <sub>22</sub> O <sub>11</sub>	--	---	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 <sub>2</sub>	100%							212			
Carbon Dioxide CO <sub>2</sub>	Wet	160	180	140	140	140	140	---	140	---	---
Carbon Disulfide CS <sub>2</sub>	--	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 <sub>4</sub>	--	N	N	N	73	C to 73	N	C to 212	C to 68	N	R to 73
Carbonic Acid H <sub>2</sub> CO <sub>3</sub>	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 <sub>2</sub> COOH	--	---	N	73	73	C to 120	140	---	C to 120	---	---
Cellosolve Acetate CH <sub>3</sub> COOCH <sub>2</sub> CH <sub>2</sub> OC <sub>2</sub> H <sub>5</sub>	--	---	N	73	73	---	---	---	---	---	---
Chloral Hydrate CCL <sub>3</sub> CH (OH) <sub>2</sub>	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 NH <sub>2</sub> Cl	Dilute	---	N	73	73	73	---	---	73	---	---
Chloric Acid HClO <sub>3</sub> o7H <sub>2</sub> O	10%	---	180	73	140	73	---	---	73	---	---
	20%	---	185	73	140	73	---	---	73	---	---
Chlorine Gas (Moisture Content)	0-20 PPM	N	C to 73	N	C to 73	C to 73	---	R to 212	C to 73	---	---
	20-50 PPM	N	N	N	N	C to 73	---	---	C to 73	---	---
	50+ PPM	N	N	N	N	C to 73	---	N	C to 73	---	---
Chlorine	Liquid	N	N	N	N	N	---	---	N	---	N
Chlorinated Water	10 PPM	---	180	180	140	140	140	---	140	---	---
Chlorinated Water	Sat'd	---	180	180	140	C to 120	140	R to 212	C to 120	---	---
Chloroacetic Acid CH <sub>2</sub> ClCOOH	50%	N	180	C to	140 73	120	N	---	120	---	---
	>10%	---	---	---	---	---	---	R to 140	---	---	---
Chloroacetyl Chloride -- ClCH <sub>2</sub> COCl		---	---	---	73	---	---	---	---	---	---
Chlorobenzene C <sub>6</sub> H <sub>5</sub> Cl	Dry	N	N	73	N	C to 75	N	---	C to 75	---	---
	Liquid	---	---	---	---	---	---	R to 140	R to 68	C to 176	---
Chlorobenzyl Chloride-- ClC <sub>6</sub> H <sub>4</sub> CH <sub>2</sub> Cl		---	N	---	N	C to 120	---	---	C to 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 122	R to	---	---	---
Chloroform CHCl <sub>3</sub>	Dry	N	N	N	N	C to 75	C to 73	---	C to 75	---	---	
	Liquid	---	---	---	---	---	---	R to 212	N	---	C to 73	
Chloromethane	Gas	---	---	---	---	---	---	R to 212	---	---	---	
Chloropicrin CCL <sub>3</sub> NO <sub>2</sub>	--	---	---	---	N	73	---	---	73	---	---	
Chlorosulfonic Acid ClSO <sub>2</sub> OH	--	---	73	N	73	C to 120	N	---	C to 120	---	---	
	50%	---	---	---	---	---	---	R to 68	---	---	---	
	100%	---	---	---	---	N	---	---	N	---	---	
Chromic Acid H <sub>2</sub> CrO <sub>4</sub>	Sat'd	---	---	---	---	---	---	R to 212	---	---	---	
	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	>10%	---	---	---	---	---	---	R to	---	---	---
Potassium Sulfate								212			
CrK(SO <sub>4</sub> ) <sub>2</sub> o12H <sub>2</sub> O	--	-	--	73	---	73	---	---	73	---	---
	Sat'd	---	---	---	---	---	R to	---	---	---	---
							212				
Citric Acid	Sat'd	160	180	140	140	140	140	R to	140	C to	---
C <sub>6</sub> H <sub>8</sub> O <sub>7</sub>								248		140	
Coconut Oil	--	---	C to	73	140	73	140	R to	73	---	---
			180					248			
Cod Liver Oil	Work Sol.	---	---	---	---	---	---	R to	---	---	---
								248			
Coffee	--	---	180	140	140	140	---	---	140	---	---
Coke Oven Gas	--	---	---	73	140	140	---	---	140	---	---
Copper Acetate	Sat'd	---	73	73	73	---	---	---	---	---	---
Cu(C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> ) <sub>2</sub> oH <sub>2</sub> O											
Copper Carbonate	Sat'd	---	180	---	140	140	---	---	140	---	---
CuCO <sub>3</sub>											
Copper Chloride	Sat'd	73	180	140	140	140	140	---	140	---	---
CuCl <sub>2</sub>											
Copper Cyanide	Sat'd	---	180	---	140	140	140	R to	140	---	---
Cu(CN) <sub>2</sub>								212			
Copper Fluoride	2%	---	180	73	140	140	140	---	140	---	---
CuF <sub>2</sub> o2H <sub>2</sub> O											
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 <sub>3</sub> ) <sub>2</sub> · 3H <sub>2</sub> O	50%	---	---	---	---	---	---	R to 212	---	---	---
Copper Sulfate CuSO <sub>4</sub> · 5H <sub>2</sub> 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 <sub>3</sub> C <sub>6</sub> H <sub>4</sub> 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 <sub>3</sub> CH:CHCHO	-- Liquid	---	N	C to 73	N	---	---	---	---	---	---
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 <sub>2</sub>	--	---	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 <sub>4</sub> o5H <sub>2</sub> O	Sat'd	100	180	73	140	140	---	---	---	---	---
Cuprous Chloride CuCl	Sat'd	70	180	---	140	140	---	---	140	---	---
Cyclohexane C <sub>6</sub> H <sub>12</sub>	--	73	N	N	N	N	---	R to 248	N	C to 140	---
Cyclohexanol C <sub>6</sub> H <sub>11</sub> OH	--	C to 120	N	140	N	73	C to 73	R to 104	73	---	---
Cyclohexanone C <sub>6</sub> H <sub>10</sub> 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 <sub>3</sub> COCH <sub>2</sub> C(CH <sub>3</sub> ) <sub>2</sub> OH	--	---	N	120	N	---	---	---	---	C to 140	---
Dibutoxyethyl Pthalate C <sub>6</sub> H <sub>4</sub> (COO <sub>2</sub> H <sub>2</sub> OC <sub>4</sub> H <sub>9</sub> ) <sub>2</sub>	--	---	---	N	---	N	---	---	---	---	---
n-Dibutyl Ether C <sub>4</sub> H <sub>9</sub> OC <sub>4</sub> H <sub>9</sub>	--	---	---	---	---	73	---	---	73	---	---
Dibutyl Phthalate C <sub>6</sub> H <sub>4</sub> (COOC <sub>4</sub> H <sub>9</sub> ) <sub>2</sub>	--	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 C <sub>4</sub> H <sub>9</sub> OCO (CH <sub>2</sub> ) <sub>8</sub> OCOC <sub>4</sub> H <sub>9</sub>	--	---	---	73	73	73	---	---	73	---	---
Dichloroacetic Acid	50%	---	---	---	---	---	---	R to 176	---	---	---
Dichlorobenzene C <sub>6</sub> H <sub>4</sub> Cl <sub>2</sub>	--  Liquid	N  ---	N  ---	C to 73  ---	N  ---	C to 120  ---	---	---	C to 120  ---	---	R to 73  ---
Dichloroethylene C <sub>2</sub> H <sub>2</sub> Cl <sub>2</sub>	--  Liquid	---	N  ---	C to 73  ---	N  ---	C to 120  ---	---	---	C to 120  ---	---	---
Diesel Fuels	--	---	C to 180	140	140	73	C to 73	R to 212	73	---	---
Diethanolamine	Solid 20%	---	---	---	---	---	---	N  ---	---	---	---
Diethylamine C <sub>4</sub> H <sub>10</sub> NH	--	N	N	---	N	C to 120	N	N	C to 120	---	---
Diethyl Ether C <sub>4</sub> H <sub>10</sub> O	--	N	N	73	73	C to 140	---	---	C to 140	140	---
Diglycolic Acid O(CH <sub>2</sub> COOH) <sub>2</sub>	Sat'd 10%	---	180	140	140	140	140	---	140	---	---
Dimethylamine (CH <sub>3</sub> ) <sub>2</sub> NH	--	---	---	73	140	73	N	N	73	---	---

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 <sub>3</sub> ) <sub>2</sub>	Liquid		---	---	---	---	---	---	N	---	---
Dimethylhydrazine	--	---	---	---	N	---	---	---	---	---	---
(CH <sub>3</sub> ) <sub>2</sub> NNH <sub>2</sub>											
Dimethyl Phthalate	--	---	N	---	---	C to 73	---	---	C to 73	---	---
∩OC <sub>9</sub> H <sub>19</sub> )											
Diethyl Phthalate	--	N	N	C to 73	N	73	C to 73	---	73	140	---
C <sub>6</sub> H <sub>4</sub> (COOC <sub>8</sub> H <sub>17</sub> ) <sub>2</sub>											
Dioxane	--	--	N	C to 140	N	140	---	---	140	---	---
O:(CH <sub>2</sub> ) <sub>4</sub> :O											
	Liquid	---	---	---	---	---	---	C to 68	---	---	---
Diphenyl Oxide	Sat'd	---	---	---	---	73	---	---	73	---	---
(C <sub>6</sub> H <sub>5</sub> ) <sub>2</sub> O											
Disodium Phosphate	--	---	180	140	140	140	140	---	140	---	---
Na <sub>2</sub> HPO <sub>4</sub>											
Dishwashing Liquid		---	---	---	---	---	---	---	---	---	R to 73
(Cascade)											
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 73	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 CH <sub>3</sub> COOC <sub>2</sub> H <sub>5</sub>	--  Liquid	N  ---	N  ---	C to 140  ---	N  ---	73  ---	C to 73  ---	---  C to 68	73  ---	140  ---	R to 73  C to 176  ---
Ethyl Acetoacetate CH <sub>3</sub> COCH <sub>2</sub> COOC <sub>2</sub> H <sub>5</sub>	--	N	N	---	N	---	---	---	---	---	---
Ethyl Acrylate CH <sub>2</sub> :CHOOC <sub>2</sub> H <sub>5</sub>	--	---	N	---	N	---	---	---	---	---	---
Ethyl Alcohol (Ethanol) C <sub>2</sub> H <sub>5</sub> OH	--	---	C to 140	140	140	140	140	---	140	C to 104	R to 176
Ethyl Benzene C <sub>6</sub> H <sub>5</sub> C <sub>2</sub> H <sub>5</sub>	--	---	---	C to 73	N	C to 73	---	---	---	---	---
Ethyl Chloride C <sub>2</sub> H <sub>5</sub> Cl	Dry  Gas	---	N  ---	C to 73  ---	N  ---	C to 73  ---	---	---	C to 73  R to 212	---	---
Ethyl Chloroacetate CCH <sub>2</sub> ClCO <sub>2</sub> C <sub>2</sub> H <sub>5</sub>	--	---	---	---	N	---	---	---	---	---	---
Ethyl Ether (C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub> O	Liquid	---	N	N	N	N	N	R to 122	R to 68	---	---
Ethylene Bromide BrCH <sub>2</sub> CH <sub>2</sub> Br	Dry	---	N	---	N	---	N	---	---	---	---
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
$\text{ClCH}_2\text{CH}_2\text{Cl}$				73		140			140		
Ethylene Chlorohydrin-- $\text{ClCH}_2\text{CH}_2\text{OH}$	Liquid	---	N	73	N	---	N	---	---	---	---
		---	---	---	---	---	---	C to 68	---	---	---
Ethylene Diamine $\text{NH}_2\text{CH}_2\text{CH}_2\text{NH}_2$	--	N	---	73	N	140	---	---	140	---	---
Ethylene Dichloride $\text{C}_2\text{H}_4\text{Cl}_2$	Dry	N	N	C to 140	N	C to 73	140	---	C to 73	---	---
Ethylene Glycol $\text{CH}_2\text{OHCH}_2\text{OH}$	Liquid	73	C to 180	212	140	140	140	R to 212	R to 212	---	C to 176
Ethylene Oxide $\text{CH}_2\text{CH}_2\text{O}$	--	---	N	C to 73	N	73	---	---	73	C to 140	---
2-Ethylhexanol $\text{CH}_3(\text{CH}_2)_3\text{CHCH}_2\text{H}_5\text{CH}_2\text{OH}$	--	---	---	---	---	73	---	---	73	---	---
Fatty Acids R-COOH	--	160	73	120	140	120	150	---	120	194	---
Ferric Chloride (Aqueous) $\text{FeCl}_3$	Sat'd	120	180	140	140	140	150	R to 212	140	---	---
Ferric Hydroxide $\text{Fe}(\text{OH})_3$	Sat'd	160	180	140	140	140	---	---	140	---	---
Ferric Nitrate $\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$	Sat'd	160	180	140	140	140	140	R to 212	140	---	---
Ferric Sulfate $\text{Fe}_2(\text{SO}_4)_3$	-- Sat'd	160 ---	180 ---	140 ---	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			
Ferrous Chloride FeCl <sub>2</sub>	Sat'd	160	180	140	140	140	140	R to 212	140	---	---
Ferrous Hydroxide Fe(OH) <sub>2</sub>	Sat'd	160	180	140	140	140	---	---	140	---	---
Ferrous Nitrate Fe(NO <sub>3</sub> ) <sub>2</sub>	--	160	180	140	140	140	---	---	140	---	---
Ferrous Hydroxide Fe(OH) <sub>2</sub>	Sat'd	160	180	140	140	140	---	---	140	---	---
Ferrous Nitrate Fe(NO <sub>3</sub> ) <sub>2</sub>	--	160	180	140	140	140	---	---	140	---	---
Ferrous Sulfate FeSO <sub>4</sub>	--	160	180	140	140	140	140	---	140	---	---
	20%	---	---	---	---	---	---	---	---	---	R to 73
	Sat'd	---	---	---	---	---	---	R to 212	---	---	---
Ferrous Chloride FeCl <sub>2</sub>	Sat'd	160	180	140	140	140	140	R to 212	140	---	---
Fish Oil	---	---	180	180	140	140	140	---	140	---	---
Fluoboric Acid HBF <sub>4</sub>	---	73	73	140	140	140	---	---	140	---	---
	Solid	---	---	---	---	---	---	R to 104	---	---	---
Fluorine Gas (Dry) F <sub>2</sub>	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 <sub>2</sub>	--	N	73	N	73	N	N	---	N	N	---
Fluosilicic Acid H <sub>2</sub> SiF <sub>6</sub>	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 <sub>3</sub> F	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 CCl <sub>2</sub> F <sub>2</sub>	100% Work. Sol.	---	73	73	140	73	---	---	73	68	---
		---	---	---	---	---	---	R to 212	R to 68	---	---
Freon 21 CHCl <sub>2</sub> F	100%	---	---	N	N	C to 120	---	---	C to 120	---	---
Freon 22 CHClF <sub>2</sub>	100%	---	73	73	N	C to 120	---	---	C to 120	68	---
Freon 113 C <sub>2</sub> Cl <sub>2</sub> F <sub>3</sub>	100%	---	---	N	140	73	---	---	73	---	---
Freon 114 C <sub>2</sub> Cl <sub>2</sub> F <sub>4</sub>	100%	---	---	N	140	73	---	---	73	---	---
Fructose C <sub>6</sub> H <sub>12</sub> O <sub>6</sub>	Sat'd	73	180	180	140	140	140	---	140	---	---
Fruit Juice	Work. Sol.	---	---	---	---	---	---	R to 212	---	104	---
Furfural C <sub>4</sub> H <sub>3</sub> OCHO	100%	N	N	N	N	C to 140	---	---	C to 140	C to 140	---
Gallic Acid C <sub>6</sub> H <sub>2</sub> (OH) <sub>3</sub> CO <sub>2</sub> HoH <sub>2</sub> O	--	---	73	---	140	73	---	---	73	---	---
Gasoline, Leaded*	--	N	N	N	140	73	N	---	73	---	---
Gasoline, Unleaded* Gasoline (Fuel)	--	N	N	N	140	73	N	---	73	---	R to 176
		---	---	---	---	---	---	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 <sub>6</sub> H <sub>12</sub> O <sub>6</sub> oH <sub>2</sub> O	10%	---	---	---	---	---	---	R to 248	---	---	---
Glue	--	---	---	140	140	140	---	---	140	---	---
Glycerine	--	140	180	212	140	140	140	---	140	---	---
C <sub>3</sub> H <sub>5</sub> (OH) <sub>3</sub>	Liquid	---	---	---	---	---	---	R to 248	---	---	---
Glycol	--	---	C to 180	212	140	140	---	---	140	C to 140	---
OHCH <sub>2</sub> CH <sub>2</sub> OH											
Glycolic Acid	Sat'd	---	180	73	140	140	---	---	140	---	---
OHCH <sub>2</sub> COOH	10%	---	---	---	---	---	---	R to 212	---	---	---
	30%	---	---	---	---	---	---	R to 140	---	---	---
	65%	---	---	---	---	---	---	R to 212	---	---	---
Glyoxal	--	---	---	---	---	140	---	---	140	---	---
CHCCHO											
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 <sub>7</sub> H <sub>16</sub>	Liquid	---	---	---	---	---	---	R to 212	C to 176	---	---
n-Hexane	--	C	73	73	73	---	---	---	---	---	---
C <sub>6</sub> H <sub>14</sub>	Liquid	---	---	---	---	---	---	R to 176	---	---	R to 73
Hexanol, Tertiary Type I	--	---	180	---	140	140	140	---	140	---	---
CH <sub>3</sub> (CH <sub>2</sub> ) <sub>4</sub> CH <sub>2</sub> OH											
Hydraulic Oil (Petroleum)	--	---	---	---	73	73	---	---	73	---	---
Hydrazine	--	---	N	73	N	---	---	---	---	---	---
H <sub>2</sub> NNH <sub>2</sub>											
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
Hydrogen Peroxide H <sub>2</sub> O <sub>2</sub>	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) PH <sub>3</sub>	--	---	73	---	140	140	140	---	140	---	---
Hydrogen Sulfide H <sub>2</sub> S	Dry	---	180	150	140	140	140	R to 248	140	---	---
	Wet	---	180	---	140	140	---	---	140	---	---
Hydrogen Sulfite H <sub>2</sub> SO <sub>3</sub>	10%	---	---	---	---	140	---	R to 248	140	---	---
Hydroquinone C <sub>6</sub> H <sub>4</sub> (OH) <sub>2</sub>	Sat'd	---	180	---	140	140	140	---	---	140	---
Hydroxylamine Sulfate (NH <sub>2</sub> OH)oH <sub>2</sub> SO <sub>4</sub>	--	---	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 <sub>2</sub>	10%	N	73	73	N	C to 120	N	R to 176	C to 120	---	---
Isobutyl Alcohol (CH <sub>3</sub> ) <sub>2</sub> CHCH <sub>2</sub> OH	--	C to 73	C to 73	73	---	140	---	---	140	---	---
Isooctane (CH <sub>3</sub> ) <sub>3</sub> CCH <sub>2</sub> CH(CH <sub>3</sub> ) <sub>2</sub>	-- Liquid	---	---	C to 73	---	73	---	---	73	---	---
Isopropyl Acetate CH <sub>3</sub> COOCH(CH <sub>3</sub> ) <sub>2</sub>	--	N	N	---	---	73	---	---	73	---	---
Isopropyl Alcohol (CH <sub>3</sub> ) <sub>2</sub> CHOH	--	---	C to 180	212	140	140	140	C to 212	140	---	R to 73
Isopropyl Ether (CH <sub>3</sub> ) <sub>2</sub> CHOCH(CH <sub>3</sub> ) <sub>2</sub>	--	---	N	C to	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	-- Work Sol	N	N	C to 73	N	73	---	---	73	---	---
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 <sub>3</sub> 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 <sub>3</sub> (CH <sub>2</sub> ) <sub>10</sub> COOH	--	---	180	140	140	120	---	---	120	---	---
Lauryl Chloride (Type I) C <sub>12</sub> H <sub>25</sub> Cl	--	---	73	---	140	120	73	R to 248	120	---	---
Lead Acetate Pb(C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> ) o3H <sub>2</sub> O	Sat'd	---	180	180	140	140	140	R to 212	140	---	---
Lead Chloride PbCl <sub>2</sub>	--	---	180	140	140	120	---	---	120	---	---
Lead Nitrate PB(NO <sub>3</sub> ) <sub>2</sub>	Sat'd	---	180	140	140	120	---	---	120	---	---
Lead Sulfate PbSO <sub>4</sub>	--	---	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 <sub>3</sub> (CH <sub>2</sub> ) <sub>4</sub> HC: CHCH <sub>2</sub> CH: CH(CH <sub>2</sub> ) <sub>7</sub> 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 <sub>2</sub>	--	120	180	212	140	140	140	R to 212	140	---	---
Magnesium Chloride MgCl <sub>2</sub>	Sat'd	120	180	140	140	140	140	R to 140	140	---	---
	50%	---	---	---	---	---	---	R to 212	---	194	---
Magnesium Citrate MgHC <sub>6</sub> H <sub>5</sub> O <sub>7</sub> ·0.5H <sub>2</sub> O	--	---	180	---	140	140	---	---	140	---	---
Magnesium Hydroxide Mg(OH) <sub>2</sub>	Sat'd	160	180	180	140	140	140	R to 212	140	---	---
Magnesium Nitrate Mg(NO <sub>3</sub> ) <sub>2</sub> ·0.2H <sub>2</sub> O	--	160	180	212	140	140	140	R to 248	140	---	---
Magnesium Oxide MgO	--	160	---	---	---	---	---	---	---	---	---
Magnesium Sulfate MgSO <sub>4</sub> ·0.7H <sub>2</sub> 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 <sub>2</sub> CH(OH)COOH	--	---	180	140	140	140	140	---	140	---	---
Manganese Sulfate MnSO <sub>4</sub> o4H <sub>2</sub> O	--	---	180	180	140	140	---	---	140	---	---
Margarine	Work. Sol.	---	---	---	---	---	---	R to 248	---	---	---
Mercuric Chloride HgCl <sub>2</sub>	-- Sat'd	---	180	180	140	140	140	---	140	---	---
Mercuric Cyanide Hg(CN) <sub>2</sub>	Sat'd	---	180	140	140	140	140	R to 212	140	---	---
Mercuric Sulfate HgSO <sub>4</sub>	Sat'd	---	180	140	140	140	---	---	140	---	---
Mercurous Nitrate HgNO <sub>3</sub> o2H <sub>2</sub> O	Sat'd  10%	---	180	140	140	140	140	---	140	---	---
		---	---	---	---	---	---	R to 212	---	---	---
Mercury Hg	Liquid	---	180	140	140	140	140	R to 248	140	194	---
Methane CH <sub>4</sub>	--	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 <sub>3</sub> OH	5%	---	---	---	---	---	---	R to 140	---	---	---
	Liquid	---	---	---	---	---	---	C to 176	R to 140	---	R to 176
Methoxyethyl Oleate CH <sub>3</sub> OCH <sub>2</sub> CH <sub>2</sub> OOC C <sub>17</sub> H <sub>33</sub>	--	---	---	---	73	---	---	---	---	---	---
Methyl Acetate CH <sub>3</sub> CO <sub>2</sub> CH <sub>3</sub>	--	N	N	140	N	C to 120	---	---	C to 120	---	---
Methyl Acrylate CH <sub>2</sub> :CHOOCH <sub>3</sub>	Tech Pure	---	---	---	---	140	---	---	140	---	---
Methyl Amine CH <sub>2</sub> NH <sub>3</sub>	--	---	N	N	N	---	---	---	---	---	---
Methyl Bromide CH <sub>3</sub> Br	--	---	N	N	N	C to 73	---	---	C to 73	R to 68	---
Methyl Butyl Ketone	Liquid	---	---	---	---	---	---	C to 122	---	---	---
Methyl Cellosolve HOCH <sub>2</sub> CH <sub>2</sub> OCH <sub>3</sub>	--	---	N	73	N	C to 120	---	---	C to 120	---	---
Methyl Chloride CH <sub>3</sub> Cl	Dry	N	N	N	N	C to 120	N	---	C to 120	R to 68	---
Methyl Chloroform CH <sub>3</sub> Ccl	--	N	N	C to 73	N	C to 120	---	---	C to 120	---	---
Methyl Ethyl Ketone (MEK) CH <sub>3</sub> CO C <sub>2</sub> H <sub>5</sub>	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 <sub>3</sub> ) <sub>2</sub> CHCH <sub>2</sub> CH(CH <sub>3</sub> )OH	--	---	N	---	N	---	---	---	---	---	---
Methyl Isobutyl Ketone (CH <sub>3</sub> ) <sub>2</sub> CHCH <sub>2</sub> COCH <sub>3</sub>	--	N	N	73	N	73	---	---	73	---	---
Methyl Isopropyl Ketone CH <sub>3</sub> COCH(CH <sub>3</sub> ) <sub>2</sub>	--	---	N	---	N	73	---	---	73	---	---
Methyl Methacrylate CH <sub>2</sub> :C(CH <sub>3</sub> )COOH <sub>3</sub>	--	---	N	---	73	140	---	R to 68	140	---	---
Methyl Sulfate (CH <sub>3</sub> ) <sub>2</sub> SO <sub>4</sub>	---	---	73	C to 73	73	140	---	---	---	68	---
Methylene Bromide CH <sub>2</sub> Br <sub>2</sub>	--	---	N	N	N	C to 120	---	---	C to 120	---	---
Methylene Chloride CH <sub>2</sub> Cl <sub>2</sub>	100%	---	N	N	N	N	73	C to 104	N	---	C to 176
Methylene Chlorobromide CH <sub>2</sub> ClBr	--	---	N	--	N	---	---	---	---	---	---
Methylene Iodide CH <sub>2</sub> I <sub>2</sub>	--	---	N	N	N	C to 120	---	---	C to 120	---	---
Methysulfuric Acid CH <sub>3</sub> HSO <sub>4</sub>	--	---	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 <sub>3</sub> ClCOOH	50%	---	---	140	140	140	---	---	140	---	---
Monochlorobenzene C <sub>6</sub> H <sub>5</sub> Cl	Tech Pure	---	N	73	N	C to 120	---	---	C to 120	---	---
Monoethanolamine HOCH <sub>2</sub> CH <sub>2</sub> NH <sub>2</sub>	--	---	---	---	N	---	---	---	---	---	---
Motor Oil	--	---	180	C to 140	140	R to 140	---	---	R to 140	---	---
Morpholine C <sub>4</sub> H <sub>8</sub> 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 <sub>10</sub> H <sub>8</sub>	--	---	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 $Ni(OOCH_3)_2 \cdot 4H_2O$	--	---	---	73	---	140	---	---	140	---	---
Nickel Chloride $NiCl_2$	Sat'd	160	180	180	140	140	140	R to 212	140	---	---
Nickel Nitrate $Ni(NO_3)_2 \cdot 6H_2O$	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 $C_6H_5NO_2$	--	---	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 <sub>6</sub> H <sub>5</sub> NO <sub>2</sub>	100%	N	N	C to 140	N	N	---	R to 122	N	---	---
Nitroglycerine CH <sub>2</sub> NO <sub>3</sub> CHNO <sub>3</sub> CH <sub>2</sub> NO <sub>3</sub>	--	---	---	---	N	73	---	---	73	---	---
Nitroglycol	--	---	---	---	N	---	---	---	---	---	---
Nitrous Acid HNO <sub>2</sub>	10%	---	180	C to 73	140	73	---	---	73	---	---
Nitrous Oxide N <sub>2</sub> O	--	---	73	73	73	73	---	---	73	---	---
n-Octane CH <sub>8</sub> H <sub>18</sub>	--	---	C to 73	---	---	---	---	---	---	---	---
Oleic Acid CH <sub>3</sub> (CH <sub>2</sub> ) <sub>7</sub> CH: CH(CH <sub>2</sub> ) <sub>7</sub> COOH	--	160	180	73	140	C to 140	150	R to 248	C to 140	R to 140	---
Oleum x H <sub>2</sub> SO <sub>4</sub> oySO <sub>3</sub>	--	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	---	---
HOOC-COOH <sub>2</sub> H <sub>2</sub> O	10%	---	---	---	---	---	---	R to 140	---	R to 140	---
	Sat'd	---	---	---	---	---	---	R to 122	---	---	---
Oxygen Gas O <sub>2</sub>	--	160	180	N	140	140	---	R to 212	140	R to 140	---
Ozone O <sub>3</sub>	--	---	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 <sub>3</sub> (CH <sub>2</sub> ) <sub>14</sub> COOH	10%	73	73	180	140	120	150	---	120	---	---
	70%	---	73	180	73	120	---	---	120	---	---
Paraffin C <sub>36</sub> H <sub>74</sub>	--	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 <sub>3</sub> (CH <sub>2</sub> ) <sub>3</sub> CH <sub>3</sub>	--	N	C to 180	N	C to 140	C to 120	---	---	C to 120	---	--
Peracetic Acid CH <sub>3</sub> 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 <sub>4</sub>	10%	---	---	---	---	---	---	R to 212	---	---	---
Perchloric Acid (Type I) HClO <sub>4</sub>	20%	---	---	---	---	---	---	R to 212	---	---	---
Perchloric Acid (Type I) HClO <sub>4</sub>	15%	---	180	140	73	140	C to 73	---	140	---	---
Perchloric Acid (Type I) HClO <sub>4</sub>	70%	73	180	C to 73	73	73	N	R to 212	73	---	---
Perchloroethylene Cl <sub>2</sub> C:CCl <sub>2</sub>	--	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 <sub>6</sub> H <sub>5</sub> 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 <sub>6</sub> H <sub>5</sub> NHH <sub>2</sub>	--	---	N	N	N	C to	---	R to	C to	---	---
							120		104	120	

Plastics at Maximum Operating Temperature ( F)

Chemicals and Formula	Concentration	ABS	CPVC	PP	PVC	PE	PB	PVDF	PEX	PA 11	PK
Phenylhydrazine Hydrochloride	10%	---	---	---	---	---	---	R to 140	---	---	---
Phosphine	Gas	---	---	---	---	---	---	R to 104	---	---	---
Phosphoric Acid H <sub>3</sub> PO <sub>4</sub>	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 <sub>2</sub> O <sub>5</sub>		---	73	73	73	---	---	---	---	---	---
Phosphorous (Red)	--	---	---	---	73	140	---	---	140	---	---
Phosphorous (Yellow)-- Phosphorous Oxychloride	-- Liquid	-- ---	---	---	73	140	---	---	140	---	---
								R to 68			
Phosphorous Pentoxide P <sub>2</sub> O <sub>5</sub>	--	---	73	73	73	140	---	---	140	---	---
Phosphorous Trichloride Pcl <sub>3</sub>	--	--	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 <sub>6</sub> H <sub>4</sub> (COOH) <sub>2</sub>					140						
	Susp.	---	---	---	---	---	---	R to 212	---	---	---
Picric Acid C <sub>6</sub> H <sub>2</sub> (NO <sub>2</sub> ) <sub>3</sub> OH	10%	N	N	73	N	73	73	R to 212	73	C to 68	---
	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 <sub>4</sub> ) <sub>2</sub> o12H <sub>2</sub> O	--	---	180	---	140	140	---	---	140	---	---
Potassium Aluminum Sulphate	--	---	180	180	140	---	C to 73	---	---	---	---
Potassium Amyl Xanthate	--	---	---	---	73	---	---	---	---	---	---
Potassium Bicarbonate KHCO <sub>3</sub>	Sat'd	---	180	140	140	140	140	R to 212	140	---	---
Potassium Bichromate K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>	Sat'd 40%	---	180	140	140	---	C to 73	R to 212	---	---	---
Potassium Bisulfate KHSO <sub>4</sub>	--	---	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 <sub>2</sub> B <sub>4</sub> O <sub>7</sub> o5H <sub>2</sub> O	--	--	180	140	140	140	140	R to 212	140	---	---
Potassium Bromate KbrO <sub>3</sub>	--	---	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 <sub>2</sub> CO <sub>3</sub>	--	73	180	180	140	140	140	N	140	---	---
Potassium Chlorate KClO <sub>3</sub> (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 <sub>2</sub> CrO <sub>4</sub>	--	---	180	212	140	140	140	---	140	---	---
Potassium Cyanide KCN	--	---	180	180	140	140	140	R to 212	140	---	---
Potassium Dichromate K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>	Sat'd	--	180	180	140	140	140	---	140	---	---
Potassium Ethyl Xanthate KS <sub>2</sub> COC <sub>2</sub> H <sub>5</sub>	--	---	---	---	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 <sub>3</sub> Fe(CN) <sub>6</sub>								248			
Potassium Ferrocyanide K <sub>4</sub> Fe(CN) <sub>6</sub> o3H <sub>2</sub> O	--	---	180	180	140	140	---	R to 248	140	---	---
Potassium Fluoride KF	--	---	180	180	140	140	140	R to 212	140	---	---
Potassium Hydroxide 4% KOH		---	---	---	---	---	---	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 Hydrochlorite 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 <sub>3</sub>	50%	---	---	---	---	---	---	R to 212	---	104	---
Potassium Orthophosphate	Sat'd	---	---	---	---	---	---	R to 212	---	---	---
Potassium Perborate	--	---	180	140	140	140	140	---	140	---	---
Potassium Perchlorate KClO <sub>4</sub>	--	---	180	140	140	140	140	---	140	---	---
Potassium Permanganate KmnO <sub>4</sub>	10%	---	180	73	140	140	140	R to 176	140	---	---
	20%	---	---	---	---	---	---	R to 212	---	---	---
	25%	---	180	73	73	140	---	---	140	---	---
	30%	---	---	---	---	---	---	R to 212	---	---	---
	Sat'd	---	---	---	---	---	---	R to 212	---	---	---
Potassium Persulfate K <sub>2</sub> S <sub>2</sub> O <sub>8</sub>	--	---	180	140	140	140	140	R to 176	140	---	---
Potassium Sulfate K <sub>2</sub> SO <sub>4</sub>	--	160	180	180	140	140	140	R to 212	140	194	---
Potassium Sulfide K <sub>2</sub> S	--	---	180	140	---	140	140	68	140	---	---
Potassium Sulfite K <sub>2</sub> SO <sub>3</sub> o2H <sub>2</sub> O	--	---	180	140	---	140	---	---	140	---	---
Propane C <sub>3</sub> H <sub>8</sub>	--	---	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 Alcohol HC:CCH <sub>2</sub> OH	--	---	C to	140 180	140	140	140	---	140	---	---
Propionic Acid CH <sub>3</sub> CH <sub>2</sub> CO <sub>2</sub> H	--	N	N	140	---	140	---	R to 140	140	---	---
Propyl Alcohol (Type I) CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> OH	--	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 <sub>3</sub> CHClCH <sub>2</sub> Cl	100	---	N	N	N	N	---	---	N	---	---
Propylene Oxide CH <sub>3</sub> CHCH <sub>2</sub> O	--	---	N	73	N	140	---	---	140	---	---
Pyridine N(CH) <sub>4</sub> CH	--	---	N	C to 140	N	73	---	R to 68	73	C to 68	---
Pyrogallic Acid C <sub>6</sub> H <sub>3</sub> (OH) <sub>3</sub>	--	---	---	---	73	--	--	---	---	---	---
Quinone C <sub>6</sub> H <sub>4</sub> O <sub>2</sub>	--	---	---	140	---	140	---	---	140	---	---
Rayon Coagulating Bath	--	---	180	---	140	140	140	---	140	---	---
Salicylaldehyde C <sub>6</sub> H <sub>4</sub> OHCHO	--	---	---	73	N	120	---	---	120	---	---
Salicylic Acid C <sub>6</sub> H <sub>4</sub> (OH)(COOH)	--	---	---	---	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	
Selenic Acid Aq. H <sub>2</sub> SeO <sub>4</sub>	--	---	180	---	140	140	140	---	140	---	---	
Silicic Acid SiO <sub>2</sub> onH <sub>2</sub> 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 <sub>3</sub>	--	160	180	180	140	R to 140	C to 73	---	R to 140	---	---	
	50%	---	---	---	---	---	---	R to 212	---	---	---	
Silver Sulfate Ag <sub>2</sub> SO <sub>4</sub>	--		160	180	140	140	140 73	C to	---	140	---	---
Soaps	--	73	180	140	140	R to 140	140	---	R to 140	---	---	
Sodium Acetate NaC <sub>2</sub> H <sub>3</sub> O <sub>2</sub>	Sat'd	---	180	212	140	140	140	R to 212	140	---	---	
Sodium Alum AlNa(SO <sub>4</sub> ) <sub>2</sub> o12H <sub>2</sub> O	--	---	180	---	140	---	---	---	---	---	---	
Sodium Aluminate Na <sub>2</sub> Al <sub>2</sub> O <sub>3</sub>	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 Chloride NaCl	---	120	180	212	140	140	140	---	140	---	---
	Sat'd	---	---	---	---	---	---	R to 212	---	194	---
	10%	---	---	---	---	---	---	R to 212	---	---	R to 176
Sodium Chlorite NaClO <sub>2</sub>	25%	---	180	73	N	140	---	---	140	---	---
Sodium Chromate Na <sub>2</sub> CrO <sub>4</sub> o10H <sub>2</sub> O	--	120	180	140	---	140	---	R to 176	140	---	---
Sodium Cyanide NaCN	--	---	180	180	140	140	140	R to 212	140	---	---
Sodium Dichromate Na <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> o2H <sub>2</sub> O	20%	---	180	180	140	140	140	---	140	---	---
Sodium Ferricyanide Na <sub>3</sub> Fe(CN) <sub>6</sub> o2H <sub>2</sub> O	Sat'd	---	180	140	140	140	140	---	140	---	---
Sodium Ferrocyanide Na <sub>3</sub> Fe(CN) <sub>6</sub> o10H <sub>2</sub> O	Sat'd	---	180	140	140	140	140	---	140	---	---
Sodium Fluoride NaF	--	120	180	180	140	140	140	R to 212	140	---	---
Sodium Hydrogen Sulphite	50%	---	---	---	---	---	---	R to 212	---	---	---
Sodium Hydroxide NaOH	1%	---	---	---	---	---	---	---	R to 140	---	---
	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
NaOCl <sub>o</sub> 5H <sub>2</sub> O	2% Cl	---	---	---	---	---	---	R to 212	---	---	---
	12.5% Cl	---	---	---	---	---	---	R to 68	---	---	---
Sodium Iodide NaI	--	---	180	---	140	---	---	---	---	---	---
Sodium Metaphosphate (NaPO <sub>3</sub> ) <sub>n</sub>	--	---	180	120	140	---	---	---	---	---	---
Sodium Nitrate NaNO <sub>3</sub>	Sat'd	160	180	180	140	140	140	R to 212	140	---	---
Sodium Nitrite NaNO <sub>2</sub>	--	160	180	73	140	140	140	R to 212	140	---	---
Sodium Palmitrate CH <sub>3</sub> (CH <sub>2</sub> ) <sub>14</sub> COONa	5%	---	180	140	140	---	---	---	---	---	---
Sodium Perborate NaBO <sub>2</sub> o3H <sub>2</sub> 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 <sub>4</sub>	--	---	180	212	140	140	---	---	140	---	---
Sodium Peroxide Na <sub>2</sub> O <sub>2</sub>	10%	---	180	---	140	140	---	---	140	---	---
Sodium Phosphate NaH <sub>2</sub> PO <sub>4</sub>	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 2Na <sub>2</sub> OoSiO <sub>2</sub>	--	---	180	140	140	140	140	---	140	---	---
	10%	---	---	---	---	---	---	R to 140	---	---	---
	50%	---	---	---	---	---	---	R to 212	---	---	---
Sodium Sulfate Na <sub>2</sub> SO <sub>4</sub>	Sat'd	160	180	212	140	140	140	R to 212	---	---	---
	0.1%	---	---	---	---	---	---	R to 140	---	---	---
Sodium Sulfide Na <sub>2</sub> S	Sat'd	160	180	212	140	140	140	---	140	C to 104	---
Sodium Sulfite Na <sub>2</sub> SO <sub>3</sub>	Sat'd	160	180	212	140	140	140	R to 212	140	---	---
Sodium Thiosulphate Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> o5H <sub>2</sub> O	--	---	180	180	140	140	140	---	140	---	---
	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 <sub>4</sub>	Sat'd	---	180	140	140	140	140	---	140	---	---
Stannous Chloride SnCl <sub>2</sub>	15% Sat'd	120 ---	180 ---	140 ---	140 ---	140 140	140 ---	---	140 140	---	---
Starch	--	---	180	140	140	140	---	---	140	---	---
Starch Solution	Sat'd	---	---	---	---	140	---	---	140	---	---
Stearic Acid CH <sub>3</sub> (CH <sub>2</sub> ) <sub>16</sub> COOH	-- 100%	---	180 ---	73 ---	140 ---	120 R to 120	150 ---	---	120 R to 120	C to 194 ---	---
Stoddard's Solvent	--	---	N	---	N	73	140	---	73	---	---
Styrene (C <sub>6</sub> H <sub>5</sub> CHCH <sub>2</sub> ) <sub>n</sub>	--	---	---	73	---	C to 73	---	---	C to 73	R to 104	---
Succinic Acid CO <sub>2</sub> H(CH <sub>2</sub> ) <sub>2</sub> CO <sub>2</sub> H	--	---	180	140	140	140	---	---	140	---	---
Sugar C <sub>6</sub> H <sub>12</sub> O <sub>6</sub>	Aq.	---	180	---	140	140	---	---	140	---	---
Sulfamic Acid HSO <sub>3</sub> NH <sub>2</sub>	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
<b>S</b>											
Sulfur Chloride S <sub>2</sub> Cl	--	---	---	C to 73	---	---	---	---	---	---	---
Sulfur Dioxide SO <sub>2</sub>	Gas Dry	N	73	140	140	140	---	---	140	---	---
Sulfur Dioxide	Gas Wet	N	N	140	73	120	73	N	120	---	---
Sulfur Trioxide SO <sub>3</sub>	Gas Dry	---	---	---	140	N	---	N	N	C to 68	---
Sulfur Trioxide SO <sub>3</sub>	Gas	---	N	---	73	N	---	N	---	---	---
Sulfuric Acid H <sub>2</sub> SO <sub>4</sub>	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 <sub>2</sub> SO <sub>3</sub>	--	---	180	140	140	140	140	R to 212	140	---	---
Tall Oil	--	---	C to 180	180	140	120	---	---	120	---	---
Tannic Acid C <sub>76</sub> H <sub>52</sub> O <sub>46</sub>	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) <sub>2</sub> COOH	--	160	180	140	140	140	140	R to 248	140	---	---
	Sat'd	---	---	---	---	---	---	R to 248	R to 176	R to 194	---
Terpineol C <sub>10</sub> H <sub>17</sub> OH	--	---	---	---	C to 140	---	---	---	---	---	---
Tetrachloroethane CHCl <sub>2</sub> CHCl <sub>2</sub>	--	---	---	C to 73	C to 140	C to 120	---	---	C to 120	---	---
Tetrachloroethylene Cl <sub>2</sub> C:CCl <sub>2</sub>	--	N	N	C to 73	---	---	---	---	---	---	---
Tetraethyl Lead Pb(C <sub>2</sub> H <sub>5</sub> ) <sub>4</sub>	--	---	73	73	73	---	---	---	---	68	---
Tetrahydrofuran C <sub>4</sub> H <sub>8</sub> O	--	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 <sub>10</sub> H <sub>12</sub>	--	---	N	N	N	N	---	---	N	---	---
Tetra Sodium Pyrophosphate N <sub>9</sub> 4P <sub>2</sub> O <sub>7</sub> O <sub>10</sub> H <sub>2</sub> O	--	---	180	---	140	---	---	---	---	---	---
Thionyl Chloride SOCl <sub>2</sub>	--	---	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 <sub>4</sub>	--	---	---	140	C to 73	120	---	---	120	---	---
Toluene (Toluol) CH <sub>3</sub> C <sub>6</sub> H <sub>5</sub>	--	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 <sub>4</sub> H <sub>9</sub> )PO <sub>4</sub>	--	---	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 Ccl <sub>3</sub> COOH	50%	---	---	140	140	140	---	R to 104	140	---	---
	10%	---	---	---	---	140	---	---	140	---	---
Trichlorobenzene		---	---	---	---	---	---	R to 140	---	---	---
Trichloroethane		---	---	---	---	---	---	---	---	---	R to 122
Trichloroethylene CHCl:CCl <sub>2</sub>	--	N	N	N	N	C to 120	N	R to 176	C to 68	C to 68	R to 176
Triethanolamine (HOCH <sub>2</sub> CH <sub>2</sub> ) <sub>3</sub> N	--	C to 73	73	140	73	73	73	C to 104	73	---	---
Triethylamine (C <sub>2</sub> H <sub>5</sub> ) <sub>3</sub> N	--	---	---	N	140	73	---	---	73	---	---
Trimethylpropane (CH <sub>2</sub> OH) <sub>3</sub> C <sub>3</sub> H <sub>5</sub>	--	---	---	140	73	C to 120	---	---	C to 120	---	---
Trisodium Phosphate NaPO <sub>4</sub> 012H <sub>2</sub> O	--	73	180	140	140	140	140	---	140	---	---
Turpentine	--	N	N	N	140	C to 120	C to 73	---	C to 120	R to 140	---
Urea CO(NH <sub>2</sub> ) <sub>2</sub>	--	---	180	180	140	140	140	---	140	---	---
	10%	---	---	---	---	---	---	R to 212	---	---	---
	Sat'd	---	---	---	---	---	---	R to 176	---	C to 140	---
Urine	--	160	180	180	140	140	140	---	140	---	---
Vaseline (Petroleum Jelly)	--	---	N	140	N	120	---	---	120	---	---

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 <sub>3</sub> COOCH:CH <sub>2</sub>	--	---	N	73	N	140	---	C to 68	140	---	---
Water, Acid Mine H <sub>2</sub> O	--	160	180	140	140	140	180	---	140	---	194
Water, Deionized H <sub>2</sub> O	--	160	180	140	140	140	180	---	140	194	176
Water, Distilled H <sub>2</sub> O	--	160	180	212	140	140	180	R to 248	140	194	---
Water, Potable H <sub>2</sub> O	--	160	180	212	140	140	180	R to 248	140	194	---
Water, Salt H <sub>2</sub> O	--	160	180	212	140	140	180	---	140	194	---
Water, Sea H <sub>2</sub> O	--	160	180	212	140	140	180	R to 248	140	194	R to 176
Water, Soft H <sub>2</sub> O	--	160	180	212	140	140	180	---	140	194	---
Water, Waste H <sub>2</sub> O	--	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 <sub>6</sub> H <sub>4</sub> (CH <sub>3</sub> ) <sub>2</sub>	--	N	N	N	N	N	N	C to 140	N	C to 194	---	
Zinc Acetate Zn(C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> ) <sub>2</sub> o2H <sub>2</sub> O	--	---	180	---	---	---	---	---	---	---	---	
Zinc Carbonate ZnCO <sub>3</sub>	--	---	180	140	---	140	---	R to 212	140	---	---	
Zinc Chloride ZnCl <sub>2</sub>	--	120	180	180	140	140	---	---	140	---	---	
	50%	---	---	---	---	---	---	---	---	C to 73	---	
	Sat'd	---	---	---	---	---	---	R to 212	---	---	---	
Zinc Nitrate Zn(NO <sub>3</sub> ) <sub>2</sub> o6H <sub>2</sub> O	--	160	180	180	140	140	140	---	140	---	---	
	Sat'd	---	---	---	---	---	---	R to 212	---	---	---	
Zinc Oxide		---	---	---	---	---	---	R to 212	---	---	---	
Zinc Stearate		---	---	---	---	---	---	R to 122	---	---	---	
Zinc Sulfate ZnSO <sub>4</sub> o7H <sub>2</sub> O	--	160	180	212	140	140	140	---	140	---	---	
	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