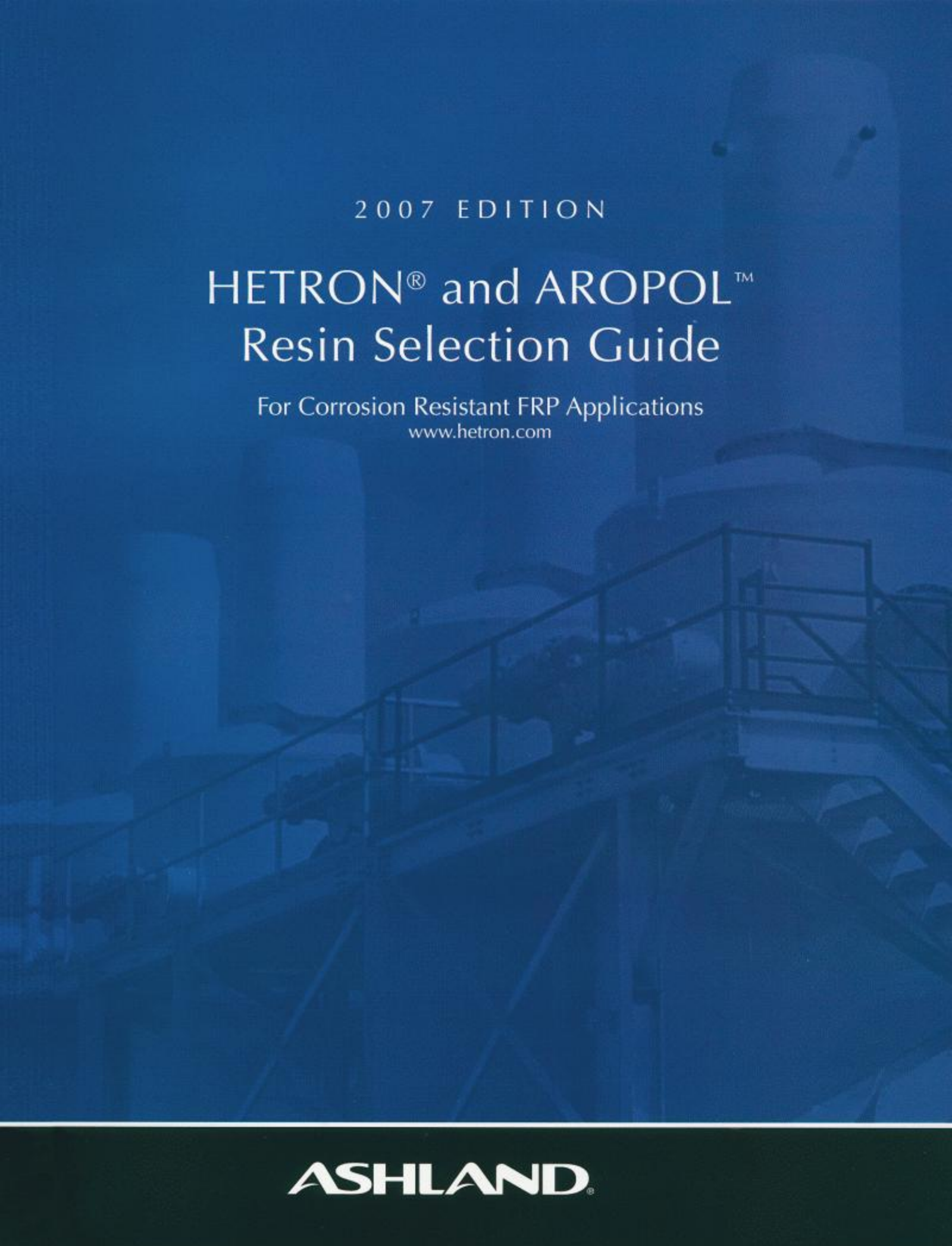




2007 EDITION

HETRON[®] and AROPOL[™] Resin Selection Guide

For Corrosion Resistant FRP Applications
www.hetron.com

ASHLAND[®]

We have a HETRON® and AROPOL™ Resin for your FRP Equipment Needs

Resin Series	Characteristics	Suggested Applications
HIGH PERFORMANCE EPOXY VINYL ESTER		
HETRON 942/35	High performance epoxy vinyl ester resin with improved resistance to hydrocarbon solvents and superior thermal properties.	Equipment requiring superior thermal properties to HETRON 922 resin or less than 35% styrene. Meets FDA regulation Title 21 CFR.177.2420.
HETRON 980/35	High performance epoxy vinyl ester resin formulated to provide maximum heat and corrosion resistance to strong oxidizing chemicals.	Equipment requiring maximum corrosion resistance to bleach chemicals.
HETRON FR998/35	Flame retardant epoxy vinyl ester resin. Class I (ASTM E84) without antimony additives. Improved resistance to hydrocarbon solvents and oxidizing media. Superior thermal properties.	Equipment requiring superior corrosion resistance and thermal properties to standard flame retardant epoxy vinyl ester resins. Flame retardant applications where translucency is required.
HETRON 970/35	Best solvent resistance of any styrenated epoxy vinyl ester resin. Improved thermal properties.	Equipment where maximum thermal properties or solvent resistance is required.
EPOXY VINYL ESTER		
HETRON 922 Series	Corrosion resistant to both strong acids and bases. Inherent toughness provides fabrication advantages and resistance to both impact and thermal shock damage.	Equipment where strong acids and bases are encountered. Meets FDA regulation Title 21 CFR.177.2420.
HETRON 922 HETRON 922L HETRON 922L-25	Medium viscosity version. Low viscosity version. Low viscosity, promoted version.	
HETRON FR992	Flame resistant version of HETRON 922 epoxy vinyl ester resin. Class I (ASTM E84) with the addition of 3% antimony trioxide.	Flame resistant equipment requiring the corrosion resistance and toughness of HETRON 922 resin.
HETRON 980	Superior corrosion resistance to HETRON 922 resin. Improved thermal properties.	Equipment requiring superior thermal properties and corrosion resistance to that of HETRON 922 resin.
CHLORENDIC POLYESTER		
HETRON 92 Series	Flame resistant resin providing good corrosion resistance to vapors.	Equipment handling corrosive fumes.
HETRON 92 HETRON 92FR	High viscosity version. Class I (ASTM E84) without antimony trioxide.	

Resin Series	Characteristics	Suggested Applications
HETRON 197 Series	Highly corrosion and heat resistant. Low flame spread can be achieved with appropriate version.	Equipment where maximum corrosion and heat resistance to wet chlorine and other oxidizing chemicals is desired. Not for caustic service.
HETRON 197	Medium viscosity, non-thixotropic, unpromoted version, Class II (ASTM E84) with the addition of 3-5% antimony trioxide.	
HETRON 197-3	Low viscosity, thixotropic, unpromoted version, Class II (ASTM E84) with the addition of 5% antimony trioxide.	
HETRON 197P	Low viscosity, thixotropic, promoted version, Class II (ASTM E84) with the addition of 5% antimony trioxide.	

FURFURYL ALCOHOL RESIN

HETRON 800	Excellent resistance to both organic solvents and aqueous systems. Not recommended for strong oxidizers.	Equipment requiring corrosion and heat resistance beyond the capabilities of standard FRP equipment. Requires special manufacturing and equipment handling techniques. Call our technical service line at 800-327-8720 or 614-790-4399 for proper resin usage and suggested applications.
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ISOPHTHALIC POLYESTER

HETRON 99P	Flame resistant resin providing moderate corrosion resistance, Class I (ASTM E84) with the addition of 3% antimony trioxide.	Equipment handling corrosive fumes. For process equipment enclosures.
AROPOL 7241 Series	Good corrosion resistance at moderate temperatures, including hydrocarbon solvent resistance.	General purpose corrosion resistant equipment. FDA versions are available.
AROPOL 7241	Low viscosity, unpromoted version.	
AROPOL 7241T-15	Thixotropic, low viscosity, promoted, FDA version.	
AROPOL 7241T-25	Thixotropic, low viscosity, promoted, FDA version.	
AROPOL 7334 Series	Resilient. Moderate heat and corrosion resistance.	General purpose corrosion resistant equipment. FDA versions are available.
AROPOL 7334	Low viscosity, unpromoted version.	
AROPOL 7334 T-15	Thixotropic, low viscosity, promoted, FDA version.	
AROPOL 7334 T-30	Thixotropic, low viscosity, promoted, FDA version.	

Consult Technical Data Sheets for each resin's cure system, physical properties, and flame spread capabilities. Consult this Resin Selection Guide for temperature and concentration limits for specific environments. For any clarification or specialty applications call our technical service line at (800) 327-8720 or (614) 790-4399.

ADVANTAGES

Fiberglass reinforced plastic (FRP) has been used for various types of equipment in the chemical processing industry since the early 1950s. Its use has continued to grow in pulp and paper, power, waste treatment, semi-conductor, metals refining, petrochemical, pharmaceutical, and other industries. Process vessels of all shapes and sizes, scrubbers, hoppers, hoods, ducts, fans, stacks, pipes, pumps, pump bases, valve bodies, elevator buckets, heat-exchanger shells and tube sheets, mist-eliminator blades, grating, floor coatings, and tank lining systems are just a few examples of products made of FRP.

The chief reason for the popularity of these materials is their excellent resistance to corrosion. When choosing the best material of construction, FRP is often chosen due to its:

- Corrosion resistance to a wide range of acids, bases, chlorides, solvents, and oxidizers
- Heat resistance
- Electrical and thermal insulation
- High strength-to-weight ratio

ALSO

- Low maintenance
- Requires no cathodic protection, rust-free
- Ease of repair

Industry must deal with many different corrosion environments. THAT'S WHY ASHLAND SPECIALTY CHEMICAL COMPANY PROVIDES FIVE DIFFERENT TYPES OF RESINS FOR FRP EQUIPMENT. The full range of resins is available through one source, Ashland Specialty Chemical Company, to provide the corrosion resistance required to handle the many different corrosion environments encountered by industry.

TESTING AND TECHNICAL SERVICE INFORMATION

Ashland's materials evaluation laboratory in Columbus, Ohio, constantly evaluates the performance of HETRON and AROPOL resin laminates for corrosive service both in the field and in the laboratory. Additional evaluations are currently being conducted. Standard test laminate kits are supplied by Ashland for exposure in your laboratory or under your actual field conditions in accordance with ASTM C581. After exposure, they can be returned to Ashland for physical and visual examination and evaluation. Subsequently, a report will be issued with our recommendations based on the test results.

When requesting resin recommendations for corrosion resistant FRP equipment applications, users or specifiers should be prepared to supply the following data:

- All chemicals to which the equipment will be exposed: feedstocks, intermediates, products and by-products, waste materials, and cleaning chemicals
- Normal operating concentrations of chemicals, maximum and minimum concentrations (including trace amounts)
- pH range of the system
- Normal operating temperatures of the equipment, maximum and minimum temperatures
- Duration of normal, maximum and upset operating temperatures
- Abrasion resistance and/or agitation requirements
- Equipment size
- Manufacturing methods
- Flame resistance requirements
- Thermal insulation requirements

For questions regarding any of the recommendations listed in this guide, for recommendations for a particular application not listed, or to request a test kit or additional literature, contact Technical Service Information at:

Phone: (800) 327-8720 or (614) 790-4399
FAX: (614) 790-6157
E-mail: hetron@ashland.com
Mail: Ashland Specialty Chemical Company
Composite Polymers Division
Box 2219
Columbus, Ohio 43216

INTERNET

For the most up-to-date corrosion information, product data sheets, and HETRON Newsletters, visit our web site at: **www.hetron.com**

INTRODUCTION

Liquid polyester and epoxy vinyl ester resins, as purchased from the resin supplier, are actually polymers dissolved in styrene monomer. The fabricator cures these resins to a solid state, reacting the polymer together with the styrene in the presence of glass reinforcements to produce a fiber reinforced rigid structure. The standards for these structures are defined by organizations such as ASTM and ASME.

The development and manufacture of HETRON and AROPOL polyester and epoxy vinyl ester resins has been a continuing process since 1954. They have been used to fabricate thousands of different types of corrosion resistant FRP equipment. Many versions of HETRON and AROPOL resins have been developed for ease of handling during hand lay-up, spray-up, filament winding, pultrusion, centrifugal casting, resin transfer molding and other methods of commercial fabrication.

BASIS FOR RECOMMENDATIONS MADE IN THIS GUIDE

Through our experience since 1955 with corrosion resistant resins, we have learned that several resin chemistries are required to satisfactorily handle the wide range of corrosive chemicals found throughout industry. No single resin can be expected to perform well in all environments. That is why Ashland makes all five generic types of resins.

Resin recommendations must be conservative, reliable, and firm. Recommendations are based on a variety of sources, including evaluations of actual field service performance, laboratory (ASTM C581) and field tests of FRP laminate construction, and the combined knowledge of an experienced staff. Much of the information in this guide is based on field experience and recommends the right resin for the job - not a resin for all jobs. This guide is updated periodically to make use of the most recent available data. This usually results in the addition of chemical environments and resins. It may also result in raising or lowering the temperature or concentration at which a particular resin is recommended.

Unless otherwise noted, the recommendations are based on ASTM C581 standard laminate construction utilizing glass surfacing mat and no additives or fillers. For press molded, pultruded and other parts fabricated without an ASTM C581 corrosion resistant liner, it is important to establish their corrosion resistance through testing. Synthetic surfacing mat is suggested for environments known to attack glass fiber reinforcement. Care must be taken with other resin types (HETRON 197 series) as some synthetic surfacing mat/environment combinations may result in reduced corrosion resistance. Fillers should never be used without corrosion testing a representative laminate. Additives such as antimony oxide for enhanced flame retardance should not be added to the corrosion barrier.

FDA APPLICATIONS

The Food and Drug Administration (FDA) does not approve specific resins, however, the agency does publish a list of acceptable raw materials which can be used to make resins. Raw materials used to manufacture AROPOL 7241T-15, AROPOL 7334T-15, HETRON 922, HETRON 942/35 and selected other resins are listed as acceptable under FDA Regulations 21 CFR.177.2420. Halogenated raw materials are not listed under FDA regulation 21 CFR.177.2420.

HOW TO USE THIS GUIDE

This Guide is a tabulation of the latest information regarding the resistance of HETRON and AROPOL resin-based FRP equipment under various corrosive operating conditions.

Special consideration should be given to fumes and splash and spill applications. In many cases where a recommendation for liquid service is given, that same resin can be used in fume service at temperatures and concentrations higher than that shown for the liquid. Tank lining applications also require special consideration due to the possibility of permeation by the corrosive material. However, extrapolations of this type must be made with caution and it is recommended that Technical Service Information be contacted at (800) 327-8720 or (614) 790-4399 for specific resin recommendations.

The following definitions will aid readers using this Guide.

Temperature - Temperature data is NOT necessarily the maximum service temperature. It is the upper temperature at which a resin has been tested, used or evaluated. A resin may be suitable for higher temperature operation but additional information or testing would be required in order to establish such performance.

A Dash (-) - Showing no tested temperature recommendation indicates that data is not available. It does not mean that the resin is unsuitable for that environment. Ashland recommends coupon testing for confirmation.

LS - Indicates that limited service life can be expected. This means that a greater than normally acceptable chemical attack will occur. FRP may be the most economical material of construction for this type of equipment but further study including life-cycle cost analysis comparisons with other materials of construction is recommended.

NR - Resin is not recommended.

EPOXY VINYL ESTER RESIN COMPOSITES

Bisphenol A based epoxy vinyl ester resins are methacrylated epoxy difunctional polyesters. Novolac modified epoxy vinyl ester resins have higher functionality. Vinyl esters are classified separately from polyesters due to their enhanced mechanical properties. They offer excellent physical strength and, in general, much better impact and thermal shock resistance than polyester resins. While the standard epoxy vinyl ester resins are limited to 220-250°F in most applications, other versions with higher-density crosslinking are suitable for temperatures above 250°F.

These resins exhibit excellent resistance to acids, alkalis, hypochlorites, and many solvents. They are also suitable for flakeglass and fiberglass reinforced linings, coatings, and monolithic topping for tanks, vats, floors, troughs, and similar applications.

HIGH PERFORMANCE EPOXY VINYL ESTER RESIN COMPOSITES

Manufactured under a patented process, these resins offer maximum corrosion and temperature resistance to acids, alkalis, hypochlorites, and many solvents. These products have been formulated for maximum performance with methyl ethyl ketone peroxides. It is well documented that these catalysts provide optimal cure and thus maximum corrosion resistance.

- **HETRON 942/35:** A bisphenol A epoxy vinyl ester resin with improved thermal properties, formulated with less than 35% styrene. Provides superior corrosion resistance to hydrocarbon solvents.

- **HETRON 980/35:** A phenolic novolac epoxy vinyl ester resin formulated with less than 35% styrene. Provides maximum heat and corrosion resistance to strong oxidizing chemicals.
- **HETRON FR998/35:** Highly flame retardant epoxy vinyl ester resin formulated with less than 35% styrene. Excellent thermal properties and superior corrosion resistance to hydrocarbon solvents and oxidizing media. See Table 7 for ASTM E84 flame spread values for this and other flame retardant resins.
- **HETRON 970/35:** Highly crosslinked novolac epoxy vinyl ester resin with superior solvent and acid resistance.

EPOXY VINYL ESTER RESIN COMPOSITES

These resins offer excellent corrosion resistance to acids, alkalis, and some solvents.

- **HETRON 922:** Provides excellent corrosion resistance up to 220°F.
- **HETRON FR992:** A flame retardant resin suitable for use to 220°F. HETRON FR992 is an excellent choice for applications requiring both chemical and flame resistance. See Table 7 for ASTM E84 flame spread values.
- **HETRON 980:** A novolac modified epoxy vinyl ester resin with excellent corrosion resistance to about 250°F. Can be used when organic chemicals such as benzyl chloride, chlorobenzene, phenol, and divinyl benzene are present.

TABLE 1-MECHANICAL PROPERTIES¹ OF HETRON AND AROPOL RESINS

RESIN		LAMINATES ² AT TEMPERATURES											
		TENSILE STRENGTH, psi						TENSILE MODULUS, x 10 ⁶ psi					
Temp. °F	-45	77	150	200	250	300	-45	77	150	200	250	300	
HETRON 942/35		22700	18000	19700	20600	22900	14800	1.32	1.70	1.54	1.56	1.58	0.81
HETRON 980/35		18600	14700	14300	15600	15400	16800	1.93	1.68	1.45	1.55	1.51	0.95
HETRON FR998/35 ³		17500	14300	14500	17300	20400	17600	1.80	1.65	1.65	1.50	1.50	1.20
HETRON 970/35		24600	18900	18500	19500	21100	21500	1.80	1.74	1.79	1.79	1.50	1.10
HETRON 922		17000	15900	21400	21400	17600	10800	1.30	1.49	1.33	1.21	0.93	0.70
HETRON FR992 ³		18500	17400	17000	20400	17300	13600	1.60	1.60	1.28	1.28	0.82	0.80
HETRON 980		14700	14300	20300	19200	16900	18300	1.87	1.56	1.46	1.09	0.99	1.04
HETRON 197-3 ³		20100	16300	14100	15300	15200	16300	1.18	1.41	1.42	1.43	1.21	1.28
AROPOL 7241T-15		24200	16000	19600	21800	19600	15200	2.22	1.80	1.66	1.83	1.26	1.09
AROPOL 7334		20200	14900	19000	19400	18000	16000	1.85	1.42	1.06	0.93	0.70	0.77
HETRON 800		15300	14700	14600	14100	12500	12300	1.28	1.47	1.31	1.05	1.05	1.06
HETRON 92FR ³		21200	17400	21200	18400	13200	11100	1.47	1.53	1.20	0.88	0.58	0.55
HETRON 99P ³		17600	15500	15500	18500	19000	16000	1.82	1.32	1.25	1.13	1.06	0.81

¹ Properties of production laminates will vary.

² Laminate sequence V M M Wr M Wr M. V=Veil M=Chopped Mat 1-1/2 oz/ft² Wr=Woven Roving 24 oz/yd², 1/4" thickness, post cured

³ Halogenated resins

CHLORENDIC POLYESTER RESIN COMPOSITES

Chlorendic resins are unsaturated, halogenated polyester resins. They are particularly well suited for equipment operating at elevated temperatures or in highly oxidizing environments such as hot, wet chlorine.

These resins are known for their ease of fabrication and are available in several user-friendly versions. They are particularly well suited for chimney liners, flue gas duct, chrome plating tanks, pickling tanks, and chlorine headers. Refer to Table 7 for specific flame spread values.

- **HETRON 197 Series:** These resins are particularly good for acidic and oxidizing environments. Fabricators may choose the thixotropic HETRON 197-3 resin or the thixotropic and promoted HETRON 197P.
- **HETRON 92 Series:** These resins combine the maximum flame retardancy and moderate chemical resistance that are often required for the types of gas and fume service encountered in hood and duct equipment. HETRON 92FR are thixotropic and promoted. HETRON 92 resin is suitable for compression molding.

ISOPHTHALIC POLYESTER RESIN COMPOSITES

Isophthalic polyester resins are a broad class of products of isophthalic acid, glycols, and maleic anhydride. The specific raw materials are selected to impart desired properties and corrosion resistance. These resins can be used for moderate corrosion resistance applications to a maximum temperature of 180°F. They exhibit good resistance to water, acids, weak bases, and hydrocarbons such as gasoline and oil.

- **AROPOL 7241 Series:** Generally used for aqueous environments. AROPOL 7241T-15 offers the best corrosion and heat resistance of the isophthalic resins. AROPOL 7241T-15 is the widest used resin and is manufactured from raw materials listed as acceptable in FDA regulation Title 21 CFR.177.2420.
- **AROPOL 7334T Series:** A higher elongation resin used for applications such as tank linings and filament winding small diameter piping where toughness is required. It has a maximum service temperature of 150°F.
- **HETRON 99P:** A flame retardant, brominated resin that provides moderate corrosion resistance for fume handling applications with flame retardant requirements such as hoods and ducts. See Table 7 for ASTM E84 flame spread values. Please consult HETRON Technical Service for other corrosion resistant flame retardant resins.

LAMINATES ² AT TEMPERATURES												CASTINGS ⁴						
FLEXURAL STRENGTH, psi						FLEXURAL MODULUS, x 10 ⁶ psi						TENSILE STRENGTH psi	TENSILE MODULUS x 10 ³ psi	ELONGATION BREAK %	FLEXURAL STRENGTH psi	FLEXURAL MODULUS x 10 ³ psi	HDT °F	BAR-COL HARD- NESS
-45	77	150	200	250	300	-45	77	150	200	250	300	77	77	77	77	77	---	77
29300	22100	24000	25400	25700	21800	1.42	1.02	0.98	0.96	0.87	0.87	13300	5.2	5.5	22100	5.3	250	45
19700	18400	19500	17400	18000	20000	1.04	1.02	0.92	0.88	0.87	0.75	12700	4.8	4.5	21800	5.1	270	45
28700	22800	22000	22700	21200	14700	1.20	1.05	0.90	0.90	0.90	0.60	13500	5.3	4.0	22000	5.7	275	40
30300	26500	28000	24400	21600	20000	1.12	1.17	1.14	1.00	0.87	0.75	11300	5.4	3.5	16100	5.6	300	45
23200	22400	23700	21800	11900	3300	1.04	0.90	0.89	0.81	0.55	0.04	12500	4.6	6.5	20500	5.0	221	30
24800	23900	24200	24400	19500	3100	1.16	1.03	1.07	0.96	0.79	0.07	13000	5.0	6.5	21000	5.2	227	35
21600	23500	19600	21300	20800	16900	1.14	1.01	0.99	0.89	0.83	0.70	13000	4.8	5.5	20000	5.0	250	35
23300	17900	18400	19900	20900	21200	1.12	0.99	0.89	0.87	0.75	0.87	5500	5.1	1.4	10000	5.5	284	40
32000	28300	29600	25500	11600	8000	1.20	1.11	1.03	0.95	0.44	0.51	9100	5.3	2.5	15200	5.9	210	40
28600	26100	24200	22000	12400	7700	1.22	1.08	0.87	0.73	0.53	0.39	12500	5.0	4.5	20000	5.4	201	40
32400	18000	21900	18600	17300	13100	1.06	1.11	0.93	0.84	0.72	0.66	5200	5.7	1.0	10500	5.8	212	45
22100	22600	28400	11600	4100	3700	1.15	1.08	1.13	0.54	0.12	0.17	8000	5.9	1.4	12000	6.0	180	45
26000	19200	19300	22500	13000	6400	1.30	0.94	1.03	0.95	0.56	0.29	7500	5.5	1.5	11500	5.9	199	45

⁴Non-reinforced, post cured

FURFURYL ALCOHOL RESIN COMPOSITE

Furfuryl alcohol resin is based on a furan polymer derivative of furfuryl alcohol. It exhibits excellent resistance to strong alkalis and acids containing chlorinated organics and is superior to polyesters and epoxy vinyl esters in solvent resistance. Furfuryl alcohol resin is suitable for use up to about 250°F for many corrosive applications. However, the furfuryl alcohol material is not suitable for oxidizing chemicals and should not be used for chromic or nitric acids, peroxides or hypochlorites.

Generally, the furfuryl alcohol resin is considered to be the best for all-around corrosion resistance. Fabrication and installation of equipment made with HETRON 800 resin requires special techniques that differ from those used with polyester and epoxy vinyl ester resins. Please contact HETRON Technical Service at (800) 327-8720 or (614) 790-4399 for assistance.

- **HETRON 800:** Requires the use of HETRON 803L-1 catalyst.

PHYSICAL PROPERTIES

The properties in this guide are typical values. These values, which vary from sample to sample, are based on tests conducted in our laboratories. Typical values should not be construed as a guaranteed analysis of any specific lot or as specification items.

Additional data on each individual resin including liquid properties and curing information is contained in the Technical Data Sheet for that resin. Ashland maintains Material Safety Data Sheets for all of its products. Material Safety Data Sheets contain health and safety information for assisting you in developing appropriate product handling procedures to protect your employees and customers. Our Material Safety Data Sheets should be read and understood by all of your employees before using Ashland's products in your facilities.

BARCOL HARDNESS

Barcol hardness values are taken as an indication of surface cure. ASTM standards indicate that FRP equipment should have a Barcol hardness of at least 90% of the manufacturer's published value for each resin. Experience indicates that Barcol hardness values are subject to a number of variables. In the case of a molded surface, these factors may be post cure, the curvature of a part or the use of one or more plies of synthetic surfacing veil. For non-molded resin surfaces, these factors may be paraffin wax, UV inhibitors, pigments, or other materials added to the resin. On a severely curved or irregular surface, an accurate Barcol hardness value may be impossible to obtain. In such cases, a flat sample using identical fabrication techniques should be monitored for cure during the manufacture of the actual part.

Experience indicates that Barcol hardness values of molded surfaces incorporating synthetic surfacing veil are less than the values of a comparable glass veil laminate. Reductions in Barcol hardness values of five units or more can be expected. Barcol hardness determination is used to check surface cure and is often accompanied by an acetone sensitivity test. The acetone sensitivity test is also valuable in judging cure when the use of the Barcol instrument is impractical. In this test, acetone solvent is liberally wiped over the test surface and allowed to evaporate. A tacky or soft surface during evaporation indicates under-cure.

THERMAL CONDUCTIVITY (K-VALUE)

The thermal conductivity of a glass reinforced laminate increases with glass content. The glass has a higher thermal conductivity than that of the resin. See Table 2 for thermal conductivity values.

TABLE 2
THERMAL CONDUCTIVITY
(TYPICAL K VALUES: BTU-IN/HR/FT²/°F)

Resin	Casting	Composite M/M	Composite M/Wr/M/Wr
% GLASS	0	25	40
HETRON 942/35	1.27	1.17	1.29
HETRON FR998/35	1.30	1.52	1.84
HETRON 980/35	1.46	1.67	1.97
HETRON 970/35	1.26	1.77	1.95
HETRON 922	1.28	1.37	1.50
HETRON FR992	1.24	1.46	1.73
HETRON 980	1.41	1.65	1.92
HETRON 197-3	1.01	1.08	1.29
AROPOL 7240	1.16	1.07	1.29
HETRON 800	1.52	1.23	1.60

M = Chopped Mat 1-1/2 oz/ft² Wr = Woven Roving 24 oz/yd²

GLASS CONTENT

Mechanical properties increase with greater reinforcement content. Laminate properties can be tailored by the choice of resin, type of reinforcement (chopped glass mat, unidirectional roving, woven roving, etc.), orientation of the reinforcement, and reinforcement content. Mechanical properties of these constructions can be predicted by micro mechanics (lamination schedule) and the actual properties confirmed by testing. See Table 3 for composite physical properties versus glass content.

THERMAL EXPANSION/CONTRACTION

The thermal expansion of a composite decreases with increasing reinforcement content. This property is dependent on the type of reinforcement (chopped glass mat, unidirectional roving, woven roving, etc.), the orientation of the reinforcement, and reinforcement content. See Table 4 for thermal expansion values.

TABLE 4
COEFFICIENT OF LINEAR THERMAL EXPANSION¹
(TYPICAL VALUES: x 10⁻⁵ in/in/°C)

		Laminate	Laminate /Wr
Glass content %	0	25	40
HETRON 942/35	6.48	3.03	2.15
HETRON FR998/35	5.04	2.75	2.01
HETRON 980/35	6.06	2.95	2.12
HETRON 970/35	5.14	2.86	1.83
HETRON 922	5.68	2.83	2.19
HETRON FR992	5.10	3.11	1.99
HETRON 980	6.08	3.03	1.72
HETRON 197-3	5.26	2.99	2.32
AROPOL 7241T-15	6.21	3.22	2.59
AROPOL 7334	5.85	-	-
HETRON 800	4.45	2.90	1.58
HETRON 92FR	5.72	-	-
HETRON 99P	5.54	-	-

¹Harrop Thermodilatometric analyzer from -30 to 30°C. The CLTE is linear from -30 to 100°C for the glass reinforced laminates.

M = Chopped Mat 1-1/2 oz/ft² Wr = Woven Roving 24 oz/yd²

TABLE 3
COMPOSITE PROPERTIES VERSUS GLASS CONTENT
(TYPICAL VALUES)

Resin	M/M	M/Wr/M/Wr/M
Glass content %	25	40
HETRON 942/35		
Tensile Strength, psi	12040	21320
Tensile Modulus, x 10 ⁶ psi	1.73	1.92
Flexural Strength, psi	20010	25970
Flexural Modulus, x 10 ⁶ psi	0.98	1.27
HETRON FR998/35		
Tensile Strength, psi	12050	23565
Tensile Modulus, x 10 ⁶ psi	1.16	1.77
Flexural Strength, psi	21010	51979
Flexural Modulus, x 10 ⁶ psi	0.79	1.55
HETRON 980/35		
Tensile Strength, psi	8395	25911
Tensile Modulus, x 10 ⁶ psi	0.97	1.92
Flexural Strength, psi	16353	54805
Flexural Modulus, x 10 ⁶ psi	0.81	1.52
HETRON 970/35		
Tensile Strength, psi	12319	27429
Tensile Modulus, x 10 ⁶ psi	1.17	2.05
Flexural Strength, psi	21805	60162
Flexural Modulus, x 10 ⁶ psi	0.92	1.62
HETRON 922		
Tensile Strength, psi	13220	18170
Tensile Modulus, x 10 ⁶ psi	0.86	1.57
Flexural Strength, psi	26890	37410
Flexural Modulus, x 10 ⁶ psi	0.99	1.51
HETRON FR992		
Tensile Strength, psi	11428	31434
Tensile Modulus, x 10 ⁶ psi	0.98	2.03
Flexural Strength, psi	19869	61029
Flexural Modulus, x 10 ⁶ psi	0.84	1.64
HETRON 980		
Tensile Strength, psi	11568	23948
Tensile Modulus, x 10 ⁶ psi	1.06	1.73
Flexural Strength, psi	18903	49485
Flexural Modulus, x 10 ⁶ psi	0.80	1.45
HETRON 197-3		
Tensile Strength, psi	11750	16960
Tensile Modulus, x 10 ⁶ psi	0.77	1.46
Flexural Strength, psi	15650	39730
Flexural Modulus, x 10 ⁶ psi	0.79	1.48
AROPOL 7241T-15		
Tensile Strength, psi	11100	16600
Tensile Modulus, x 10 ⁶ psi	1.10	1.72
Flexural Strength, psi	16390	23420
Flexural Modulus, x 10 ⁶ psi	0.96	1.24
HETRON 800		
Tensile Strength, psi	8970	19670
Tensile Modulus, x 10 ⁶ psi	0.79	1.34
Flexural Strength, psi	18250	32540
Flexural Modulus, x 10 ⁶ psi	0.95	1.34

M = Chopped Mat 1-1/2 oz/ft² Wr = Woven Roving 24 oz/yd²

VOLUMETRIC CURE SHRINKAGE

Liquid resin decreases in volume during cure due to polymerization shrinkage. The linear shrinkage of a glass reinforced laminate is dependent on the type of reinforcement (chopped glass, mat, unidirectional roving, woven roving, etc.), the orientation of the reinforcement, and reinforcement content. See Table 5 for typical volumetric shrinkage values.

**TABLE 5
VOLUMETRIC CURE SHRINKAGE OF CASTINGS
(TYPICAL VALUES)**

Resin	Density of Liquid (g/cm ³)	Density of Solid (g/cm ³)	Percent Shrinkage
HETRON 942/35	1.08	1.16	7.4
HETRON 980/35	1.08	1.17	8.3
HETRON 970/35	1.09	1.18	8.3
HETRON 922	1.04	1.14	9.6
HETRON FR992	1.14	1.24	8.8
HETRON 980	1.05	1.15	9.5
HETRON 197-3	1.14	1.24	8.1
AROPOL 7241T-15	1.07	1.17	9.3
AROPOL 7334	1.10	1.21	10.0
HETRON 800	1.21	1.28	5.8
HETRON 92FR	1.28	1.41	10.1
HETRON 99P	1.23	1.35	9.7

ELECTRICAL PROPERTIES

The cured resins have high dielectric constants and low dissipation factors. Dielectric constant is the ratio of the capacitance of a weakly conducting material to that of air. Dissipation factor is the loss of energy resulting when a polymeric material experiences molecular motion in an alternating electric field. See Table 6 for electrical properties of standard resin castings.

**TABLE 6
ELECTRICAL PROPERTIES OF CLEAR CASTINGS
(TYPICAL VALUES PER ASTM D150)**

Resin	Dielectric constant ¹	Dissipation factor	Average dielectric constant ²
HETRON 942/35	3.45	0.0050	3.38
HETRON FR998/35	4.05	0.0051	4.16
HETRON 980/35	3.48	0.0039	3.50
HETRON 970/35	3.63	0.0017	3.59
HETRON 922	3.34	0.0123	3.39
HETRON FR992	3.29	0.0128	3.21
HETRON 980	3.44	0.0055	3.34
HETRON 197-3	3.04	0.0156	2.94
AROPOL 7241	3.41	0.0035	3.43
AROPOL 7334	3.49	0.0106	3.37
HETRON 800	5.35	0.0253	4.94
HETRON 92FR	3.37	0.0201	3.27
HETRON 99P	3.39	-	3.28

1 = KHz 2 = Average of 1KHz 10KHz 100KHz and 1MHz

FLAME RESISTANCE

Many HETRON polyester and epoxy vinyl ester resins are based on halogenated intermediates. These unique chemical structures account for their excellent corrosion resistance and also make these HETRON resin composites inherently flame resistant. For increased flame resistance, antimony oxide can be added to many of these resins during fabrication. Antimony oxide is not effective when added to non-halogenated resins. ASTM E84 "Standard Method of Test for Surface Burning Characteristics of Building Materials" is commonly referred to as the "Tunnel Test." This Tunnel Test is the accepted standard for determining flame spread values.

Current industry practice requires materials of construction for ducts, hoods, and other fume handling equipment to have a flame spread rating of 25 or less (commonly referred to as Class I). See Table 7 for specific flame spread values.

Several other tests commonly used for classifying smoke and flame retardant properties of FRP equipment include ASTM E162 "Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source (Radiant Panel Test)," ASTM E662 "Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials (Smoke Chamber)," UL94 "Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances."

For more specific information on these and other flame resistance test results (UL94, oxygen index, cone calorimeter), contact your sales or technical service representative. Please consult HETRON Technical Service for low smoke alternatives.

**TABLE 7
FLAME SPREAD VALUES OF COMPOSITES¹
(TYPICAL VALUES PER ASTM E84)**

Resin type	Flame spread	Class ²
CONTROL:	0	I
Asbestos/Cement		
HETRON FR998/35 (no antimony trioxide required)	<25	I
HETRON FR992 (with 3% antimony trioxide)	<25	I
HETRON 197 Series (with 5% antimony trioxide)	30	II
HETRON 92FR (no antimony trioxide required)	<25	I
HETRON 99P (with 3% antimony trioxide)	<25	I
Control: Red Oak Lumber	100	III
Plywood	200	III
Non-Halogenated Resins	350-400	III

1= 1/8" thick laminates with approximately 30 percent chopped glass mat
2=Class I = 0 to 25 flame spread; Class II = > 25 to 75 flame spread;
Class III = > 75 flame spread per the ASTM E84 tunnel test.

LIST OF TRADEMARKS AND PRODUCT NAMES

AATREX	Twin Laboratories	G-61	Rohm & Haas
ADOGEN	Sherex Chemical Co.	GLASS CLEANER	Spartan Chemical Co., Inc.
AEROSOL	American Cyanamid Co.	GLOBRITE	Ashland Inc.
ALIPAL	GAF Corp.	GOLDEN-GLO	Spartan Chemical Co., Inc.
ALODINE	Henkel Corp.	HALSO 99	Occidental Chemical Corp.
AMCHEM	Henkel Corp.	IGEPAL	Rhone Poulenc
AMEREX	Ashland Inc.	IRGASOL	Ciba Specialty Chemicals
AMERGEL	Ashland Inc.	ISOCURE	Ashland Inc.
AMINE SALT SOLUTIONS, 73973 M-A, M-B, M-C.....	W.R. Grace Co., Dewey & Almy Div.	ISOPREP	Richardson Chemical Co.
AMSCO	Pure Oil Co.	JM-235, JM-271	Johns-Manville
ANTHIUM DIOXIDE	International Dioxide Inc.	KYMENE	Hercules, Inc.
APACHE	Diversey Corp.	LASSO	Monsanto Co.
ARMEEN	Akzo Nobel	LIX	Henkel Corp.
ARQUAD	Akzo Nobel	MAGNIFLOC	Cytec Technology
BENTEC	Diversey Corp.	MATAR	Ecolab
BENZOFLEX	Velsicol Chemical Corp.	MILOGARD	Novartis Corp.
BETZ SULFITE 3	Betz Laboratories Inc.	MULSOLINE	Dye & Chemical Co. of Canada, Ltd.
BICEP	Novartis Corp.	NEODOL	Shell Oil Co.
BIOCIDE	Ashland Inc.	OAKITE	Oakite Products, Inc.
BONDERITE	Henkel Corp.	OLIN	Olin Corp.
BOWL CLEANSE	Spartan Chemical Co., Inc.	190 D	BASF Wyandotte Corp.
BUILD	Colgate-Palmolive Co.	OPM-1, OPM-2	Olin Corp.
C-56	Occidental Chemical Corp.	PARCO	Henkel Corp.
CALGON	Calgon Corp.	PAX HYSPEED	Calgon Corp.
CARBITOL	Union Carbide Corp.	PD 64	Spartan Chemical Co., Inc.
CELLOSOLVE	Union Carbide Corp.	PEP SET	Ashland Inc.
CELL PUTTY	Rowe Products Co.	PLUS 5	Spartan Chemical Co., Inc.
CHEM-REZ	Ashland Inc.	POLYCO	Rohm & Haas
CHLOROTHENE	Dow Chemical Co.	POLYWET	Uniroyal Chemical Co.
CITREX	Peabody Engineered Systems	PRINCEP	Novartis Corp.
CLEANER 508	Quaker Chemical Co.	RAYLENE	Diversey Corp.
CWT	Ashland Inc.	RICHAMIDE	Richardson Chemical Co.
CYAF	Cytec Technology	RICHONATE	Richardson Chemical Co.
CYGON	American Cyanamid Co.	RJ-4	Ashland Inc.
DAREX	W.R. Grace Co., Dewey & Almy Div.	SANI-FRESH	Envair, Inc.
DAZAD	W.R. Grace Co.	SD-20	Spartan Chemical Co., Inc.
DEFOAMER	Ashland Inc.	SEQUESTRENE	Novartis Corp.
DFR-121	Arapahoe Chemicals	SKYDROL	Solutia, Inc.
DICROBE	Ecolab	SOFTENER B	Sherex Chemical Co.
DIVERSEY	Diversey Corp.	SP-181	Tretolite Div., Petrolite Corp.
DOWCLEN	Dow Chemical Co.	STACKFAS MASTIC	H.B. Fuller Co.
DREWFAX	Ashland Inc.	TELONE	Dow Chemical Co.
DREWSPERSE	Ashland Inc.	TERGITOL	Union Carbide Corp.
DUAL	Ciba Specialty Chemicals	TEXTON	Olin Corp.
DUREZ	Occidental Chemical Corp.	THERMOLIN	Olin Corp.
DW-875	Staley Chemical Co.	35-D	BASF Wyandotte Corp.
ELECTRASOL	Benckiser N.V.	TINOFIX QF	Ciba Specialty Chemicals
ELVASE	Union Carbide Corp.	U-3400,U-7001	Staley Chemical Co.
EP 52-A65	Ashland Inc.	ULTRAWET	Mach I, Inc.
EPTAM	Zeneca	VARIQUAT	Sherex Chemical Co.
ERIONAL	Ciba Specialty Chemicals	VARISOFT	Sherex Chemical Co.
EVA	Union Carbide Corp.	VAROX	R.T. Vanderbilt Co.
EXALT	Pennwalt Corp.	VARSOL	Exxon Corp.
FLUOROLUBES	Occidental Chemical Corp.	VIDDEN	Dow Chemical Co.
FREON	E.I. Dupont de Nemours & Co.	VIVO-ZYME	Soluble Nutrients, Inc.
FUSION	Buffalo Color Corp.	ZIMMITE	WZ Corp.

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT		High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		CONCENTRATION %	HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334
AATREX 4L	100	-	-	-	-	100/-	-	-	-	-/-	-/-
Acetaldehyde	100	NR	-	-	-	NR/NR	NR	NR	225	NR/NR	NR/-
Acetaldehyde (1% in air)		-	-	-	-	-/-	-	-	-	-/-	-/90
Acetaldehyde, Fumes (<40 lbs/cubic feet)		-	-	-	-	90/90	90	-	90	-/-	90/90
Acetic Acid	1	-	210	210	210	210/210	210	210	225	160/150	150/150
Acetic Acid	10	210	210	210	210	210/210	210	210	225	160/150	150/150
Acetic Acid	15	210	210	210	210	210/210	210	210	-	160/150	125/125
Acetic Acid	25	210	210	210	210	210/210	210	210	-	160/150	125/125
Acetic Acid	50	180	180	180	180	180/180	180	180	-	150/125	90/90
Acetic Acid	75	150	150	150	150	100/100	100	150	-	-/-	-/-
Acetic Acid (about 10% in hydrocarbon, liquid and vapor)		-	-	-	-	160/160	220	-	-	-/-	-/-
Acetic Acid (3-5% solids, pH 2-5)		-	-	-	-	165/165	165	165	165	-/-	-/-
Acetic Acid: Hydrochloric Acid	50 20	-	-	-	-	-/-	-	90	-	-/-	90/-
Acetic Acid: Hydrochloric Acid	50 18.5	-	-	-	-	-/-	-	85	-	-/-	85/85
Acetic Acid: Hydrogen Peroxide	95 1.5	-	-	-	-	-/-	-	90	-	-/-	90/90
Acetic Acid: Sodium Dichromate	70 30	-	-	-	-	-/-	-	160	-	-/-	-/-
Acetic Acid: Water (traces of sulfuric acid, methylene chloride, octyl alcohol, sodium chloride, and chlorobenzene)	1.3 48	-	-	-	-	NR/NR	-	150	-	150/NR	-/-
Acetic Acid, Glacial	100	NR	-	-	100	NR/NR	-	LS100	240	NR/NR	-/-
Acetic Acid, Vapor & Condensate	25	-	-	-	-	-/-	-	180	-	-/-	180/-
Acetic Anhydride	100	NR	-	-	100	NR/NR	-	100	225	NR/NR	-/-
Acetone	1	-	150	150	150	-/-	150	-	150	-/-	-/-
Acetone .Footnote 4	100	NR	NR	NR	NR	NR/NR	NR	NR	130	NR/NR	NR/NR
Acetone: Toluene	50 50	NR	NR	NR	NR	NR/NR	NR	-	90	-/-	-/-
Acetone: A68 Water	10 90	-	150	150	150	-/-	150	-	150	-/-	-/-
Acetonitrile	100	-	NR	NR	-	NR/NR	NR	NR	80	NR/NR	NR/NR
Acetophenone	100	-	NR	NR	-	NR/NR	NR	90	-	NR/NR	-/-
Acetyl Chloride	100	-	-	-	-	-/-	-	NR	180	-/-	NR/-
Acetylsalicylic Acid	100	-	-	-	-	-/-	-	-	225	-/-	-/-
Acid Rinse (photographic)		-	-	-	-	-/-	-	90	-	-/-	-/-
Acid Contaminated: Organic: Water	2 1.5 96.5	-	-	-	-	NR/NR	-	150	-	150/NR	-/-
Acidic Gaseous Atmosphere (sat'd, weak phosphoric acid, hydrofluoric acid, and sulfuric acid, etc., at 3600 fpm) .Footnote 1		-	-	-	-	-/-	-	90	-	-/-	-/-
Acrylamide	50	100	100	100	100	80/80	80	80	-	-/-	-/-
Acrylic Acid	10	100	100	100	-	100/100	100	100	-	100/100	-/-
Acrylic Acid	25	100	100	100	100	100/100	100	100	-	-/-	-/-
Acrylic Acid	100	-	-	-	100	-/-	-	NR	80	NR/NR	NR/NR
Acrylic Acid Dispersion: Acrylonitrile	98 2	-	-	-	-	-/-	-	90	-	-/-	-/-
Acrylic Acid Dispersion: Vinylidene Chloride	98 2	-	-	-	-	-/-	-	90	-	-/-	-/-
Acrylic Acid Emulsion		-	-	-	-	120/120	120	-	-	120/-	-/-
Acrylic Acid, Glacial	100	-	-	-	-	-/-	-	90	-	-/-	-/-
Acrylic Emulsions: Styrene Emulsions (DW-875, U-3400, and U-7001, all trademarks)		-	-	-	-	-/-	-	80	-	-/-	-/-
Acrylonitrile (latex dispersion)	2	-	-	-	-	NR/NR	NR	NR	225	NR/NR	NR/NR
Acrylonitrile (latex dispersion)	100	-	-	-	80	-/-	-	-	225	-/-	-/-
Acrylonitrile: 35D	2 98	-	-	-	-	-/-	-	90	-	-/-	-/-
Acrylonitrile: Acrylic Acid Dispersion	2 98	-	-	-	-	-/-	-	90	-	-/-	-/-
Activated Carbon Beds (water treatment)		210	-	-	210	-/-	-	200	-	-/-	-/-
ADOGEN 381: Xylene	25 75	-	-	-	-	-/-	-	100	-	-/-	-/-
ADOGEN 442	100	-	-	-	-	120/120	120	120	120	120/120	120/-
ADOGEN 448	100	-	-	-	-	120/120	120	120	120	120/120	120/-
AEROSOL (wetting agent)	100	-	-	-	-	-/-	-	90	-	-/-	90/-
Air: Hydrofluoric Acid, Fumes: Phosphorus Pentoxide, Fumes .Footnote 1		-	-	-	-	-/-	-	315	-	-/-	-/-
Air: Methyl Sulfide: Methanol (traces of water, hydrogen sulfide, mercaptan, acetone, turpentine)	85 2.5 6	-	-	-	-	-/-	-	165	-	-/-	-/-
Air, Humid (trace of sulfur fumes)		-	-	-	-	200/200	200	200	-	200/150	-/-
Alcohol (ethoxylated, pH 8.5, carbon12-carbon15) .Footnote 16	100	-	-	-	-	-/-	-	120	-	-/-	-/-
Algaecide (phenate based)	100	-	-	-	-	-/-	-	125	-	125/-	-/-
ALIPAL CO433	28	-	-	-	-	-/-	-	100	100	-/-	-/-
ALIPAL CO433 Polymer/Toluene Emulsion (blended together in water)		-	-	-	-	-/-	-	NR	100	-/-	NR/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Aliphatic Hydrocarbons	100	-	-	-	-	-/-	-	-	250	-/-	-/-
Aliphatic: Toluene: Aromatic (xylene = 3% of concentration)	6 86 5	-	-	-	-	-/-	-	-	-	90/-	-/-
Alkaline Soak Cleaner (10 oz/gal)	-	-	-	-	-	180/180	180	-	180	NR/NR	-/-
Alkanolamide Surfactant, Nonionic	55	-	-	-	-	-/-	-	120	-	-/-	-/-
Alkanolamide Surfactant	100	-	-	-	-	-/-	-	120	-	-/-	-/-
Alkyl Benzene Sulfonic Acid	92	180	-	-	180	-/180	180	100	-	-/-	-/-
Alkyl Ether Amine Oxide Surfactant, Nonionic	-	-	120	120	-	120/120	120	120	120	120/120	-/-
Alkylate (substituted benzene type, refinery)	-	-	-	-	-	-/-	-	90	-	90/-	-/-
Alkylate Sulfonates, Linear (conc.)	-	-	-	-	-	-/-	-	100	-	-/-	-/-
Allyl Chloride	100	80	-	-	80	NR/NR	80	-	90	-/-	-/-
Almond Oil	100	-	-	-	-	-/-	-	-	120	-/-	NR/-
ALODINE 401/45	-	-	-	-	-	-/-	-	120	-	-/-	-/-
Alpha Olefin Sulfonate	100	-	-	-	-	-/-	-	120	-	-/-	-/-
Alum (sat'd.)	-	250	250	250	250	210/210	250	250	-	180/150	250/250
Alum, Potassium	100	-	220	220	250	210/210	220	250	-	180/150	-/160
Aluminum (desmutter & deoxidizer)	-	-	-	-	-	-/-	-	90	-	-/-	-/-
Aluminum Bromide (sat'd.)	-	-	-	-	120	160/160	160	-	250	-/-	-/-
Aluminum Chloride	100	250	250	250	250	210/210	250	210	250	170/150	-/120
Aluminum Chloride: Fluosilicic Acid (slurry)	2	-	-	-	100	-/-	-	210	-	-/-	-/-
Aluminum Chlorohydrate	50	210	-	-	210	210/210	210	165	-	-/-	-/-
Aluminum Chlorohydroxide	50	210	-	-	210	210/210	210	-	-	170/150	-/-
Aluminum Citrate (sat'd.)	-	-	200	200	-	200/200	200	-	-	170/120	-/-
Aluminum Etchant (5 oz/gal, phosphate free)	-	-	-	-	-	165/165	165	-	165	165/-	-/-
Aluminum Fluoride	100	90	90	90	90	90/90	90	90	225	90/90	90/90
Aluminum Hardening Fixing Bath (photographic, fixing and rapid)	-	-	-	-	-	-/-	-	80	-	-/-	-/-
Aluminum Hydroxide (sat'd.)	20	NR	NR	NR	NR	180/180	200	-	225	-/-	-/-
Aluminum Hydroxide	-	NR	NR	NR	NR	180/180	200	-	225	150/150	-/-
Aluminum Nitrate (sat'd.)	-	180	180	180	180	180/180	180	-	-	160/140	-/-
Aluminum Oxide (wet with HCl, drying)	-	-	-	-	-	-/-	-	290	-	-/-	-/-
Aluminum Plating (sulfuric acid, sodium dichromate)	-	-	-	-	-	-/-	-	160	-	-/-	-/-
Aluminum Potassium Sulfate	100	250	250	250	250	210/210	220	210	-	180/150	180/160
Aluminum Reduction Plant, Fumes (roofing and siding)	-	-	-	-	-	-/-	-	-	-	-/-	130/-
Aluminum Sulfate	100	250	250	250	250	210/210	250	250	250	180/150	250/250
Aluminum Trichloride	40	-	-	-	-	180/180	210	210	-	-/-	-/-
AMCHEM 6-16: Nitric Acid	6 16	-	-	-	-	-/-	-	95	-	-/-	-/-
AMEREX 201	100	-	-	-	-	-/-	-	125	-	LS125/LS125	-/-
AMEREX 209	100	-	-	-	-	-/-	-	125	-	125/125	-/-
AMERGEL	100	-	-	-	-	-/-	-	LS90	-	-/-	-/-
Amine Salt Solutions (includes: 73973 M-A, M-B, and M-C, all trademarks)	-	-	-	-	-	-/-	-	85	-	-/-	-/-
Amine Salts: Quaternary Ammonium Salts: Organotin (blended)	100	-	150	150	150	125/125	125	125	-	LS125/LS125	-/-
Amine: Hydrochloric Acid	-	-	-	-	-	-/-	-	-	-	-/-	-/-
Aminoethanol, (2-)	100	-	-	-	-	-/-	-	85	-	-/-	-/-

¹ Synthetic surfacing veil generally used, use non-apertured synthetic veil with HETRON 197 series resins.

² Benzoic peroxide / dimethyl aniline cure system generally used.

³ Post-cure strongly recommended.

⁴ Solution may discolor.

⁵ Non-thixotropic resins preferred.

⁶ Acceptable as to odor and taste for AROPOL 7241T-15 type resin. Steamed 4 hours with atmospheric steam prior to exposure.

⁷ Three 3 hour exposures to 30% nitric acid at 100°F to stimulate cleaning.

⁸ C-veil only.

⁹ HETRON 197 series resins appear to be unsuitable under cyclic conditions with some crazing but are resistant under static conditions.

¹⁰ Dissolved solids, 1574-2183 ppm: PO₄, 0.25 ppm; total PO₄, 1.3 ppm; Cu, 0.7 ppm; Zn, 3.4 ppm; Fe, 1.8 ppm; CaCo₃, 450 ppm; NaCl, 527-702 ppm.

¹¹ No change in water at 0.1 ft.² laminate/gal. as in 20-30,000 gal. tank.

¹² AROPOL 7343 satisfactory.

¹³ Vol. 0.25% SO₂, 0.03% SO₃, 12.5% CO₂, 74.6% N₂, 4.9% O₂, 7.8% H₂O, fly ash, 5.0 gms/ft³; velocity 60fps.

¹⁴ Vol. 0.25% SO₂, 0.03% SO₃, 12.5% CO₂, 74.6% N₂, 4.9% O₂, 7.8% H₂O, fly ash, 1.2 gms/ft³; velocity 8fps.

¹⁵ Vol. 0.12% SO₂, 12% CO₂, 70% N₂, 5% O₂, 13.4% H₂O, 5.0 gms/ft³ of 1-2% H₂SO₄, 2-3000 ppm HCl, 10-20 ppm HF, rust water.

¹⁶ HETRON 197 resin is the preferred resin.

¹⁷ Lower than normally acceptable surface hardness can occur in service. Drying the surface can restore hardness.

¹⁸ Exposure of perchloric acid to organics can be dangerous. Evaluate fully before use.

¹⁹ HETRON FR992 at higher temperatures.

²⁰ Hydrogen peroxide suppliers must approve materials of construction.

²¹ Check with technical service for specific resin recommendation.

²² Double C-veil recommended.

²³ Double veil generally used, either double synthetic or synthetic backed by C-veil, use non-apertured veil backed by C-veil with HETRON 197.

²⁴ Abrasion resistant liner required.

²⁵ Carbon veil recommended at higher temperatures listed.

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT		TEMPERATURE (°F) FOR RESIN TYPES									
		High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
	CONCENTRATION %	HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Aminoethoxy Ethanol	100	-	-	-	-	NR/NR	-	NR	LS270	NR/NR	NR/-
Aminoethyl Piperazine	100	-	-	-	-	NR/NR	-	NR	110	NR/NR	-/-
Ammonia (trace of pyridine)	5	-	-	-	-	-/-	-	-	110	-/-	-/-
Ammonia Fortified Glass Cleaner (includes trademark glass cleaner)		-	100	100	-	100/100	100	100	100	-/-	-/-
Ammonia Process (stack gas scrubbing)		-	-	-	-	-/-	-	125	-	-/-	-/-
Ammonia: Ammonium Nitrate: Hydrofluosilicic Acid (nitric acid = 2.5% of concentration, traces of phosphoric & sulfuric acid, wet vapor)	15 5 2.5	-	-	-	-	-/-	-	250	-	-/-	-/-
Ammonia, Aqueous: Hydrochloric Acid, 12% (pH to 0.3)		-	-	-	-	180/180	180	180	-	-/-	-/-
Ammonia, Dry Vapors		100	100	100	100	100/100	180	90	100	90/-	90/90
Ammonia, Fumes: Nitric Acid Fumes		-	-	-	-	-/-	-	120	-	-/-	-/-
Ammonia, Vapor: Sulfur Dioxide, Vapor (by volume)	.02 .06	-	-	-	-	-/-	-	90	-	-/-	-/-
Ammonia, Wet Vapors		-	NR	NR	NR	100/100	150	NR	-	90/-	-/90
Ammonium Acetate	50	-	-	-	80	110/110	110	-	-	-/-	-/NR
Ammonium Acid Sulfite: Ammonium Sulfite: Ammonium Sulfate (solids = 2% of concentration)	19 7 5	-	-	-	-	-/-	-	90	-	-/-	-/-
Ammonium Acid Sulfite: Ammonium Sulfite: Ammonium Sulfate	18 3 5	-	-	-	-	-/-	-	115	-	-/-	-/-
Ammonium Acid Sulfite: Ammonium Sulfite: Ammonium Sulfate (solids = 2% of concentration)	20 5 5	-	-	-	-	-/-	-	115	-	-/-	-/-
Ammonium Acid Sulfite: Ammonium Sulfite: Ammonium Sulfate (solids = 3% of concentration, pH 6)	24 8 5	-	-	-	-	-/-	-	115	-	-/-	-/-
Ammonium Acid Sulfite: Ammonium Sulfite: Ammonium Sulfate (solids = 3% of concentration)	25 4 6	-	-	-	-	-/-	-	120	-	-/-	-/-
Ammonium Benzoate	100	-	-	-	-	180/180	180	-	-	-/-	-/-
Ammonium Bicarbonate	10	160	160	160	160	160/160	160	-	-	-/-	-/-
Ammonium Bicarbonate	15	-	160	160	160	160/160	160	130	-	130/NR	130/140
Ammonium Bicarbonate	20	-	160	160	160	160/160	160	-	-	120/NR	-/-
Ammonium Bicarbonate (sat'd.)		-	150	150	150	150/150	150	-	-	NR/NR	-/140
Ammonium Bisulfate: Sulfuric Acid: Surfactant	6 30 10	-	-	-	-	-/-	-	110	-	-/-	-/-
Ammonium Bisulfite Liquor (black liquor)		-	180	180	180	180/180	180	195	-	-/-	-/-
Ammonium Bromide (sat'd.)		-	-	-	160	-/-	-	-	225	-/-	-/-
Ammonium Carbonate	10	150	150	150	150	100/100	150	NR	180	NR/NR	NR/-
Ammonium Carbonate	30	150	150	150	150	100/100	100	-	-	NR/NR	-/-
Ammonium Carbonate (sat'd.)		150	-	-	150	150/150	150	-	225	NR/NR	-/120
Ammonium Chloride (sat'd.)		210	210	210	210	210/210	210	200	220	180/180	200/200
Ammonium Chloride: Ammonium Nitrate: Urea	2.5 20 38	-	-	-	-	-/-	-	90	-	-/-	-/-
Ammonium Chloride: Zinc Chloride: Sodium Chloride (zinc chloride plating bath, concentration in oz/gal, pH 4.8 - 5.2)	3 18 31	-	-	-	-	-/-	-	90	-	-/-	-/-
Ammonium Citrate (sat'd.)		150	150	150	150	150/150	150	-	-	120/-	-/-
Ammonium Fluoride	10	150	150	150	150	100/100	100	150	225	90/-	-/-
Ammonium Fluoride	100	150	150	150	150	150/150	150	-	-	-/-	-/-
Ammonium Fluoride: Ammonium Hydroxide: Ammonium Nitrate (concentrations in g/l, trace of organics)	62 165 2	-	-	-	-	NR/NR	-	80	-	-/-	-/-
Ammonium Hydroxide	1	180	NR	NR	NR	200/200	200	NR	150	LS90/NR	140/180
Ammonium Hydroxide	5	180	NR	NR	NR	180/180	180	NR	100	NR/NR	90/90
Ammonium Hydroxide	10	130	140	140	120	160/160	180	NR	100	NR/NR	90/90
Ammonium Hydroxide	20	150	NR	NR	NR	150/150	150	NR	NR	NR/NR	NR/NR
Ammonium Hydroxide	28	-	NR	NR	NR	125/125	125	NR	NR	NR/NR	-/-
Ammonium Hydroxide	30	77	77	77	77	-/-	-	NR	-	NR/NR	-/-
Ammonium Hydroxide Based Etchant Spent (copper, 18 oz/gal)		-	-	-	-	120/120	120	120	-	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Ammonium Hydroxide: Ammonium Fluoride: Ammonium Nitrate (concentrations in g/l, trace of organics) Footnote 1	165 62 2	-	-	-	-	NR/NR	-	80	-	-/-	-/-
Ammonium Lauryl Sulfate	100	-	-	-	120	130/130	130	130	-	130/-	-/-
Ammonium Metatungstate (pH 3.3) .	50	-	-	-	-	LS180/LS180	-	LS180	-	-/-	-/-
Ammonium Nitrate (sat'd.)		250	250	250	250	210/210	220	200	220	160/150	200/200
Ammonium Nitrate: Ammonia: Hydrofluosilicic Acid (nitric acid = 2.5% of concentration, traces of phosphoric & sulfuric acid, wet vapor) Footnote 1	5 15 2.5	-	-	-	-	-/-	-	250	-	-/-	-/-
Ammonium Nitrate: Ammonium Chloride: Urea	20 2.5 38	-	-	-	-	-/-	-	90	-	-/-	-/-
Ammonium Nitrate: Ammonium Fluoride: Ammonium Hydroxide (concentrations in g/l, trace of organics) Footnote 1	2 62 165	-	-	-	-	NR/NR	-	80	-	-/-	-/-
Ammonium Nitrate: Urea: Water . .	10 40 50	-	-	-	-	120/120	-	-	-	-/-	-/-
Ammonium Nitrate: Urea: Water . .	30 20 50	-	-	-	-	120/120	-	-	-	-/-	-/-
Ammonium Nitrate: Urea: Water . .	44 35 21	-	-	-	-	-/-	-	120	-	-/-	-/-
Ammonium Nitrate: Urea: Water (URAN fertilizer, ammonium nitrate composition)	44.3 35.4 20.3	150	-	-	120	-/-	-	120	-	-/-	-/-
Ammonium Orthophosphate (di-H) .		-	-	-	-	-/-	-	200	-	-/-	-/-
Ammonium Persulfate (sat'd.)		180	180	180	180	180/180	180	150	180	NR/NR	150/150
Ammonium Phosphate, di-basic (sat'd.)		210	210	210	210	210/210	210	150	180	NR/NR	150/150
Ammonium Phosphate (monobasic) Ammonium Salt	65	210	210	210	210	210/210	210	LS90	180	170/150	NR/NR
(primary alcohol glycol ether sulfate) Ammonium Sulfate: Ammonium Acid Sulfite: Ammonium Sulfite (solids = 2% of concentration)	5 19 7	-	-	-	-	-/-	-	90	-	-/-	-/-
Ammonium Sulfate (sat'd.)		250	220	220	250	210/210	220	220	220	170/140	200/200
Ammonium Sulfate: Ammonium Acid Sulfite: Ammonium Sulfite . .	5 18 3	-	-	-	-	-/-	-	115	-	-/-	-/-
Ammonium Sulfate: Ammonium Acid Sulfite: Ammonium Sulfite (solids = 2% of concentration)	5 20 5	-	-	-	-	-/-	-	115	-	-/-	-/-
Ammonium Sulfate: Ammonium Acid Sulfite: Ammonium Sulfite (solids = 3% of concentration, pH 6) .	5 24 8	-	-	-	-	-/-	-	115	-	-/-	-/-
Ammonium Sulfate: Ammonium Acid Sulfite: Ammonium Sulfite (solids = 3% of concentration)	6 25 4	-	-	-	-	-/-	-	120	-	-/-	-/-
Ammonium Sulfate: Diammonium Phosphate	10 10	-	-	-	-	-/-	-	-	-	90/90	-/-
Ammonium Sulfate: Ferric Sulfate .	10.5 20	-	-	-	-	-/-	-	180	-	-/-	180/-
Ammonium Sulfate: Manganese Sulfate (concentration in g/l, trace of sulfur dioxide)	125 12	-	-	-	-	-/-	-	100	-	-/-	-/-
Ammonium Sulfate: Manganese Sulfates (concentration in g/l, trace of sulfur dioxide)	158 13	-	125	125	-	125/125	125	125	-	125/125	125/125
Ammonium Sulfate: Sulfuric Acid: Manganese Sulfate (concentration in g/l, trace of sulfur dioxide)	125 30 13	-	-	-	-	-/-	-	100	-	-/-	-/-
Ammonium Sulfates: Manganese Sulfate: Sulfuric Acid (concentration in g/l, trace of sulfur dioxide)	135 13 40	-	-	-	-	-/-	-	125	-	125/125	125/-
Ammonium Sulfide (sat'd.)		-	120	120	120	120/120	120	120	250	-/-	-/-
Ammonium Sulfite	10	-	100	100	150	100/100	100	-	-	-/-	-/-
Ammonium Sulfite: Ammonium Acid Sulfite: Ammonium Sulfate (solids = 2% of concentration)	7 19 5	-	-	-	-	-/-	-	90	-	-/-	-/-
Ammonium Sulfite: Ammonium Acid Sulfite: Ammonium Sulfate . .	3 18 5	-	-	-	-	-/-	-	115	-	-/-	-/-
Ammonium Sulfite: Ammonium Acid Sulfite: Ammonium Sulfate (solids = 2% of concentration)	5 20 5	-	-	-	-	-/-	-	115	-	-/-	-/-
Ammonium Sulfite: Ammonium Acid Sulfite: Ammonium Sulfate (solids = 3% of concentration, pH 6) .	8 24 5	-	-	-	-	-/-	-	115	-	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT		High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service	
		CONCENTRATION %	HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Ammonium Sulfite: Ammonium Acid Sulfite: Ammonium Sulfate (solids = 3% of concentration)	4 25 6	-	-	-	-	-/-	-	120	-	-/-	-/-	-/-
Ammonium Thiocyanate	20	210	210	210	210	210/210	210	200	-	170/150	-/-	-/-
Ammonium Thiocyanate		-	120	120	120	120/120	120	180	-	120/120	-/120	-/120
Ammonium Thiocyanate: Ammonium Thiosulfate: Water (ammonium sulfate = 2.3% of concentration)	4 5.5 88	-	-	-	-	130/130	130	130	110	130/110	-/-	-/-
Ammonium Thiocyanate: Hydrochloric AcidFootnote 22		-	-	-	-	-/-	-	180	-	-/-	-/-	-/-
Ammonium Thiocyanate: Hydrochloric Acid: Methyl Isobutyl Ketone	15	-	-	-	-	-/-	-	200	-	-/-	-/-	-/-
Ammonium Thiosulfate	60	100	100	100	100	100/100	100	180	-	NR/NR	-/NR	-/NR
Ammonium Thiosulfate: Ammonium Thiocyanate: Water (ammonium sulfate = 2.3% of concentration)	5.5 4 88	-	-	-	-	130/130	130	130	110	130/110	-/-	-/-
Ammonium Tungstate (sat'd.)		-	-	-	-	-/-	-	250	-	-/-	-/-	-/-
AMSCO BKOH Solvent		-	-	-	-	100/100	100	100	-	100/100	-/-	-/-
Amyl Acetate	100	70	120	120	120	NR/NR	100	90	200	NR/NR	90/90	90/90
Amyl Acetate: Xylene	30 70	-	-	-	-	-/-	120	NR	120	-/-	-/-	-/-
Amyl Alcohol	100	180	200	200	210	120/120	200	200	200	100/NR	200/200	200/200
Amyl Chloride	100	120	120	120	120	NR/NR	120	LS120	-	NR/NR	NR/NR	NR/NR
Anaerobic Sewage		-	85	85	85	85/85	85	85	-	85/85	85/85	85/85
Aniline	100	NR	NR	NR	70	NR/NR	NR	NR	250	NR/NR	NR/-	NR/-
Aniline Hydrochloride	100	180	180	180	180	150/150	180	-	225	-/-	-/-	-/-
Aniline Hydrochloride: Hydrogen Bromide: Water (hydrochloric acid = 1.5% and bromine = 1% of concentration)	15 4.5 78	-	-	-	-	140/140	140	140	140	-/-	-/-	-/-
Aniline Sulfate (sat'd.)		210	210	210	210	210/210	220	200	-	NR/NR	200/150	200/150
Anionic Polyelectrolytes (blend)	100	-	-	-	-	-/-	-	125	-	LS125/NR	-/-	-/-
Anionic Surfactant	58	-	-	-	-	-/-	-	120	-	-/-	-/-	-/-
Anodizing Solution Sulfuric Acid		-	-	-	-	-/-	-	90	-	-/-	-/-	-/-
ANTHIUM DIOXIDE	13	-	-	-	-	-/-	-	100	-	-/-	-/-	-/-
Anthracene Oil	6	-	-	-	-	-/-	-	90	-	90/90	90/90	90/90
Anthraquinone Disulfonic Acid	1	-	-	-	-	150/150	150	150	-	150/-	-/-	-/-
Antimony Chloride (sat'd.)		-	-	-	-	-/-	-	-	225	-/-	-/-	-/-
Antimony Oxychloride (sat'd.)		-	-	-	-	-/-	-	-	225	-/-	-/-	-/-
Antimony Pentachloride	100	-	-	-	-	90/90	90	90	-	90/90	90/90	90/90
Antimony Trichloride (sat'd.)		-	220	220	-	200/200	220	200	-	160/150	200/180	200/180
Antimony Trioxide: Hydrochloric Acid: Sulfuric Acid	5 15 35	-	-	-	-	-/-	-	100	-	-/-	-/-	-/-
APACHE	50	-	-	-	-	-/-	-	150	-	-/-	-/-	-/-
Apple Acid	10	-	-	-	-	-/-	-	95	-	-/-	-/-	-/-
Aqua Regia (concentrated hydrochloric acid and nitric acid, 3:1)Footnote 22		-	NR	NR	-	NR/NR	NR	130	NR	NR/NR	-/-	-/-
Aqua Regia, Fumes (conc.)		-	-	-	-	-/-	-	90	NR	NR/NR	90/-	90/-
Aqueous Isopropanol: Dihydrogenated-Tallow Dimethyl Ammonium Chloride	25 75	-	-	-	-	120/120	120	120	120	120/120	120/-	120/-
Aqueous Isopropanol: Dimethyl Distearyl Ammonium Chloride	25 72	-	-	-	-	120/120	120	120	120	120/120	120/-	120/-
Aqueous Isopropanol: Quaternary Ammonium (dialkyl dimethyl type)	25 75	-	-	-	-	120/120	120	120	120	120/120	120/-	120/-
ARMEEN C (conc.)		-	-	-	-	-/-	-	120	120	NR/NR	-/-	-/-
ARMEEN DMCD (conc.)		-	-	-	-	-/-	-	120	120	120/120	-/-	-/-
Aromatic Solvent: Tributyl Phosphate	65 35	-	-	-	-	-/-	-	90	90	-/-	-/-	-/-
Aromatic Sulfonic Acid: Hydrochloric Acid: Sulfuric Acid (trace of chlorine)	25	-	-	-	-	-/-	-	80	-	-/-	-/-	-/-
Aromatic: Toluene: Aliphatic (xylene = 3% of concentration)	5 86 6	-	-	-	-	-/-	-	-	-	90/-	-/-	-/-
ARQUAD C/50 (conc.)		-	-	-	-	-/-	-	120	120	120/120	-/-	-/-
Arsenious Acid	100	100	100	100	100	90/90	90	-	-	-/-	-/-	-/-
Arsenious Acid (19° Baume')		-	180	180	180	180/180	180	180	-	90/-	180/180	180/180
Asphalt		-	-	-	-	-/-	-	-	-	195/-	-/-	-/-
Azelaic Acid (sat'd.)		-	-	-	-	-/-	-	90	-	-/-	-/-	-/-
Bactericide Phenate Based	100	-	-	-	-	125/125	125	125	-	125/125	-/-	-/-
Barium Acetate (sat'd.)		180	180	180	180	190/190	190	180	-	NR/NR	-/NR	-/NR
Barium Carbonate	100	250	250	250	250	210/210	220	200	-	LS180/NR	200/180	200/180
Barium Chloride	100	210	210	210	210	210/210	210	200	200	180/150	200/200	200/200

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Barium Hydroxide	10	150	160	160	NR	150/150	160	-	-	LS90/NR	NR/-
Barium Hydroxide (sat'd.)		150	150	150	NR	150/150	150	-	200	NR/NR	NR/-
Barium Sulfate	100	250	250	250	250	210/210	220	180	250	170/150	-/150
Barium Sulfide (sat'd.)		180	180	180	180	180/180	180	-	150	NR/NR	-/NR
Beer	100	120	NR	NR	NR	90/90	NR	NR	NR	90/90	NR/NR
Beer, Brewing Kettle Fumes		-	-	-	-	-/-	-	150	-	150/150	150/-
Beet Sugar Liquor		180	180	180	-	180/180	180	-	-	-/-	-/-
BENTEC	50	-	-	-	-	-/-	-	180	-	-/-	-/-
Benzal Chloride	100	-	-	-	-	NR/NR	-	-	250	NR/NR	-/-
Benzaldehyde	100	NR	-	-	70	NR/NR	-	NR	200	NR/NR	NR/NR
Benzene	1	-	100	100	100	NR/NR	100	90	150	LS90/NR	90/90
Benzene	100	NR	100	100	100	NR/NR	100	90	150	LS90/NR	90/90
Benzene Disulfonic Acid	100	-	-	-	-	-/-	-	195	-	-/-	-/-
Benzene Sulfonic Acid	30	-	220	220	150	210/210	220	200	200	150/NR	180/180
Benzene Sulfonic Acid (sat'd.)		-	220	220	-	210/210	220	100	200	NR/NR	90/90
Benzene Sulfonic Acid: Sulfuric Acid: Water	88 7 5	-	-	-	-	140/140	140	140	140	140/140	-/-
Benzene: Dimethylformamide: Water (tetrahydrofuran = 5% of concentration)	40 5 50	-	NR	NR	NR	NR/NR	NR	NR	90	NR/NR	NR/NR
Benzene Ethyl Benzene	33.5 66.5	80	-	-	100	-/-	-	100	-	-/-	-/-
Benzene: Hydrochloric Acid (wet) ..		80	-	-	-	-/-	-	90	-	-/-	90/-
Benzene, Vapor: Hydrogen Chloride, Vapor		-	-	-	-	-/-	-	85	-	-/-	-/-
Benzene, Vapors		80	-	-	120	-/-	-	90	90	90/90	90/-
Benzene, Vapors: Water, Vapors (trace of hydrochloric acid)		-	-	-	100	-/-	-	175	-	-/-	-/-
BENZOFLEX 9.88	100	-	-	-	-	120/120	120	120	120	120/120	-/-
Benzoic Acid (sat'd.)		210	210	210	210	210/210	210	250	250	170/150	250/250
Benzoic Anhydride	100	-	-	-	-	-/-	-	90	-	-/-	-/-
Benzotrichloride	100	-	-	-	-	NR/NR	-	-	250	NR/NR	NR/NR
Benzoyl Benzoic Acid (o-)	100	210	210	210	210	210/210	210	-	-	-/-	-/-
Benzoyl Chloride	100	-	-	-	-	NR/NR	-	NR	100	NR/NR	NR/-
Benzyl Alcohol	100	80	100	100	100	NR/NR	100	-	200	NR/NR	-/NR
Benzyl Benzoate	100	-	-	-	-	-/-	-	-	120	-/-	-/-
Benzyl Chloride	100	NR	80	80	80	NR/NR	80	NR	150	NR/NR	NR/-
BETZ SULFITE 3 (pH 5.5)		-	-	-	-	-/-	-	200	-	-/-	-/-
Bicarbonate: Chlorine Dioxide: Sodium Carbonate (pH 8)	5 3.7	-	-	-	-	-/-	-	100	-	-/-	-/-
BICEP	100	-	-	-	-	-/-	100	-	-	-/-	-/-
BIOCIDE 207	100	-	-	-	-	125/125	125	125	-	125/125	-/-
BIOCIDE 285	100	-	-	-	-	125/125	125	LS125	-	125/125	-/-
Biocide: Chlorophenol: Methylene Thiocyanate (blend)	100	-	-	-	-	125/125	125	LS125	-	125/125	-/-
Biocide Chlorphenate (organic sulfur type, blend)	100	-	-	-	-	125/125	125	125	-	125/125	-/-
BKOH AMSCO Solvent		-	-	-	-	100/100	100	100	-	100/100	-/-
Black Chrome Bath (chromic, acetic, barium, acetate)		-	-	-	-	-/-	-	115	-	-/-	-/-
Black Liquor (pH >7)		-	180	180	180	180/180	180	-	-	NR/NR	NR/-
Black Liquor (recovery furnace gases)		-	240	240	240	NR/NR	240	240	-	NR/NR	NR/NR
Black Liquor (room flooring, spills) ..		-	-	-	-	-/-	-	-	-	-/-	-/-
Bleach (ferricyanide with potassium bromide, used for photography)		-	80	80	-	-/-	-	80	-	-/-	-/-
Bleached Pulp		-	-	-	-	-/-	-	190	-	-/-	-/-
Blow Gas Absorber		-	-	-	-	120/120	120	-	-	-/-	-/-
BONDERITE 1303 (make-up and replenishing)		-	-	-	-	100/100	100	NR	-	-/-	-/-
BONDERITE 37,37S,39 . .Footnote 1		-	-	-	-	-/-	-	150	-	-/-	-/-
BONDERITE 721-SFootnote 1		-	-	-	-	-/-	-	85	-	-/-	-/-
BONDERITE 722-CFootnote 1		-	-	-	-	-/-	-	120	-	-/-	-/-
BONDERITE 73Footnote 1		-	-	-	-	-/-	-	185	-	-/-	-/-
BONDERITE K-710-O, 701-P		-	-	-	-	-/-	-	100	-	-/-	-/-
BONDERITE K-761 (pH 5-6)		-	-	-	-	-/-	-	120	-	-/-	-/-
Borax (sat'd.)		210	210	210	210	210/210	210	180	140	180/140	-/-
Bordeaux Mixture		-	-	-	-	-/-	-	140	-	-/-	-/-
Boric Acid (sat'd.)		210	220	220	210	210/210	220	200	200	180/150	-/180
Boric Acid: Nickel Chloride: Nickel Sulfate (concentration in oz/gal)	8 12 53	-	-	-	-	-/-	-	180	-	-/-	-/-
Boric Acid: Nickel Sulfate: Nickel Chloride (nickel plating, trace of brightener, concentration in oz/gal) ..	6 40 8	-	-	-	180	-/-	-	150	-	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT		High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		CONCENTRATION %	HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334
Boric Acid: Sodium Sulfate (sodium sulfate with traces of sulfuric acid, hydrogen peroxide, iron, and chloride, temperature cycled)Footnote 9	15 25	-	-	-	-	205/205	205	205	-	-/-	-/-
Bottle Washer Solution	10	-	-	-	-	170/170	170	-	-	-/-	-/-
BOWL CLEANSE, Mild		-	-	-	-	100/100	100	100	100	100/100	-/-
Brake Fluid	100	-	120	120	120	NR/NR	120	-	-	-/-	-/-
Brass Metal Plating (3% copper, 1% zinc, 5.6% sodium cyanides, 3% sodium carbonate)		180	180	180	180	180/180	180	180	-	-/-	-/-
Brew Kettle Fumes		-	-	-	-	-/-	-	150	-	150/150	150/-
Brighteners: Hydrochloric AcidFootnote 22	30 10	-	-	-	-	-/-	-	120	-	-/-	-/-
Brine (saturated in chlorine, 300-310 g/l, pH 2)		-	220	220	210	210/210	220	220	-	NR/NR	-/-
Brine (sat'd., sodium and potassium)		-	-	-	-	-/-	-	200	-	-/-	-/-
Brine, Dechlorinated (sat'd., traces of free chlorine, pH 2-3)		-	-	-	250	NR/NR	NR	200	-	-/-	-/-
Brine, Salt (sat'd.)		-	220	220	210	210/210	220	220	220	180/150	180/180
Bromine Water (sat'd.)		-	-	-	-	75/75	75	-	-	NR/NR	-/-
Bromine Water	5 95	-	-	-	-	180/180	200	-	-	-/-	-/-
Bromine, Dry Gas	100	100	100	100	100	90/90	100	140	-	NR/NR	140/-
Bromine, Wet Gas	100	100	90	90	100	90/90	90	90	-	NR/NR	90/90
Bronze Metal Plating (4% copper, 5% sodium cyanides, 3% sodium carbonate, 4.5% rochelle salts)		-	180	180	-	180/180	180	-	-	-/-	-/-
Brownstock (pulp mill, pH <12)Footnote 21	100	-	-	-	180	150/150	180	-	150	-/-	140/180
BUILD Detergent Solution (pH 9-10)		-	-	-	-	120/120	120	120	-	-/-	-/-
Butadiene Latex		-	-	-	-	-/-	-	-	-	80/-	-/-
Butoxyethanol, (2-)	100	100	-	-	100	-/-	-	85	-	-/-	-/-
Butoxyethoxyethanol, (2,2-)	100	100	-	-	100	-/-	-	85	-	-/-	-/-
Butyl Acetate	100	80	90	90	80	NR/NR	90	90	220	LS90/NR	90/90
Butyl Alcohol (includes normal, secondary and tertiary)	100	120	120	120	120	80/80	120	100	120	80/NR	-/190
Butyl Alcohol: Diisobutyl Ketone: Ethyl Hexylacetate	5 85 10	-	NR	NR	-	NR/NR	NR	80	100	-/-	-/-
Butyl CARBITOL (diethylene glycol monobutyl ether)	100	-	100	100	100	NR/NR	100	85	-	-/-	-/-
Butyl CELLOSOLVE	100	100	100	100	100	100/100	100	90	-	90/-	-/90
Butyl CELLOSOLVE: Monoethanolamine (alkaline film stripper)	57 30	-	-	-	-	NR/NR	-	NR	140	NR/NR	NR/-
Butyl Ether	100	-	-	-	-	80/80	80	80	285	80/-	80/-
Butyl Phthalate	100	-	-	-	-	-/-	-	100	-	-/-	-/-
Butylene Glycol	100	180	180	180	180	160/160	180	160	-	160/140	-/160
Butyric Acid	1	-	210	210	210	180/180	180	120	120	120/120	120/120
Butyric Acid	25	210	210	210	210	180/180	180	120	120	120/120	120/120
Butyric Acid	50	210	210	210	210	160/160	160	-	150	120/130	-/120
Butyric Acid	70	-	120	120	120	160/160	160	90	150	120/-	-/120
Butyric Acid	100	80	-	-	120	NR/NR	100	90	120	NR/NR	90/-
C-56	100	-	-	-	-	180/180	180	200	200	-/-	90/-
Cadmium Cyanide: Metal Plating (3% cadmium oxide, 10% sodium cyanide, 1.2% sodium hydroxide)		-	-	-	180	210/210	220	NR	-	NR/NR	-/-
Calcium Bisulfide (sat'd.)		-	-	-	-	-/-	-	-	-	160/-	-/-
Calcium Bisulfite (sat'd.)		-	180	180	180	180/180	180	-	225	170/110	-/170
Calcium Carbonate (sat'd.)		180	180	180	180	180/180	180	-	-	160/110	-/160
Calcium Carbonate, 90%: Magnesium Hydroxide, 10% (traces of nickel & iron hydroxides)	25	-	-	-	-	-/-	-	-	-	-/LS120	-/-
Calcium Chlorate (sat'd.)		250	250	250	250	210/210	220	250	-	150/120	250/180
Calcium Chloride (sat'd.)		250	250	250	250	210/210	220	250	250	180/150	250/250
Calcium Chloride: Phosphoric Acid	25 10	-	-	-	-	-/-	-	100	-	-/-	-/-
Calcium Chloride: Sodium Chloride: Magnesium Chloride	10 12 2	-	-	-	-	-/-	-	150	-	-/-	-/-
Calcium Hydroxide	15	180	NR	NR	NR	180/180	180	-	225	180/90	-/160
Calcium Hydroxide	25	180	NR	NR	NR	-/-	-	-	225	160/90	-/160
Calcium Hydroxide (sat'd.)		210	NR	NR	NR	-/-	-	175	225	-/-	-/160
Calcium Hydroxide	1	-	NR	NR	NR	180/180	180	-	225	180/90	-/160
Calcium Hypochlorite (sat'd.)Footnotes 2,19		180	160	160	150	160/160	160	120	NR	120/-	-/100
Calcium Nitrate (sat'd.)		210	220	220	210	210/210	220	-	220	180/150	-/180
Calcium Oxide (sat'd., lime slurry)		-	170	170	-	170/170	170	150	-	-/-	-/-
Calcium Sulfate (sat'd.)		250	250	250	250	210/210	220	250	250	180/150	250/200

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT		High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service	
		CONCENTRATION %	HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
CALGON (sat'd., sodium hexametaphosphate)			120	-	-	-	-/-	-	-	220	-/-	-/-
Camphene, Chlorinated 68%: Xylene	90 10		-	-	-	-	-/-	-	120	120	-/-	-/-
Can Cleaner, Acidic (sulfuric and hydrofluoric acids, aluminum and oil impurities, pH 1.2)Footnote 1			-	-	-	-	-/-	-	120	-	-/-	-/-
Can Treatment, Chrome-Free (pH 5-6)			-	-	-	-	-/-	-	120	-	-/-	-/-
Can Treatment, Chrome Phosphate (pH 2)			-	-	-	-	-/-	-	120	-	-/-	-/-
Canning Plant Waste			-	-	-	-	-/-	-	-	-	90/90	-/-
Capric Acid (sat'd.)			120	160	160	160	160/160	160	-	-	160/120	-/-
Caprylic Acid (sat'd., octanoic acid)			210	210	210	210	180/180	200	140	-	160/100	-160
Carbamide (sat'd.)			-	-	-	-	160/160	160	160	225	150/90	-/-
Carbon Beds (water treatments)			-	-	-	-	-/-	-	200	-	-/-	-/-
Carbon Dioxide (wet, acidic)	100		-	250	250	-	210/210	250	250	-	200/150	250/250
Carbon Dioxide: Nitrogen: Water (by volume, oxygen = 5% of concentration, trace of sulfur dioxide)	12 70 14		-	-	-	-	-/-	-	120	-	-/-	-/-
Carbon Dioxide: Oxygen: Nitrogen (traces of chlorine, water and sulfur dioxide)	1.5 21 2.5		-	-	-	-	-/-	-	200	-	-/-	-/-
Carbon Dioxide, 14% (recovery boiler, (Kraft), no contact evaporation, trace of sulfur dioxide, 19% by volume moisture, 37 fps)			-	-	-	-	NR/NR	-	340	-	NR/NR	-/-
Carbon Disulfide	100		NR	NR	NR	NR	NR/NR	NR	NR	90	NR/NR	NR/NR
Carbon Disulfide, Fumes (recovery fumes)			-	150	150	150	100/100	100	-	-	NR/NR	140/140
Carbon Monoxide Gas	100		350	-	-	350	210/210	250	250	160	200/160	160/200
Carbon Tetrachloride	100		180	180	180	180	LS90/150	150	125	225	LS90/NR	125/-
Carbon Tetrachloride, Vapor	100		200	200	200	200	90/150	150	140	225	90/90	140/90
Carbolic Acid (sat'd.)			-	-	-	-	160/160	160	160	-	160/130	160/160
Carbowax (polyethylene glycol)	100		-	-	-	180	100/100	120	-	-	-/-	-/-
Carboxymethyl Cellulose	10		150	150	150	150	150/150	180	-	-	-/-	-/-
Carpet Shampoo			-	-	-	-	100/100	100	100	-	LS100/NR	-/-
Castor Oil	100		160	120	120	160	75/75	120	-	-	-/-	-/-
Catalytic Refining Feed			-	-	-	-	-/-	-	-	-	90/-	-/-
Catechol	100		-	-	-	-	-/-	-	-	250	-/-	-/-
Caustic, 50%: Ethyl Acetate: Methylene Chloride	1 16 83		-	NR	NR	-	NR/NR	NR	NR	LS90	NR/NR	NR/NR
Caustic Spent, Phenolic (refinery, neutralized to pH 5-6)			-	130	130	-	130/130	130	130	130	130/-	-/-
Caustic Spent, Sulfidic (petrochemical, neutralized to pH 5-6)			-	130	130	-	130/130	130	130	130	130/-	-/-
CELL PUTTY 35	100		-	-	-	-	-/-	-	200	-	-/-	-/-
Cerous Nitrate (sat'd.)			-	90	90	-	90/90	90	90	90	-/-	-/-
Cheese Water			-	-	-	-	-/-	-	-	-	175/-	-/-
CHEM-REZ C-2006	100		-	-	-	-	-/-	-	100	100	-/-	-/-
CHEM-REZ C-2009	100		-	-	-	-	-/-	-	100	200	-/-	90/-
CHEM-REZ C-2075	100		-	-	-	-	-/-	-	100	100	-/-	-/-
China Clay, Slurry			-	-	-	-	-/-	-	80	-	-/-	-/-
Chloral (sat'd.)			-	-	-	-	-/-	-	-	225	-/-	-/-
Chlorate: Sulfuric Acid: Sodium Sulfite (methanol)			-	-	-	-	-/-	-	125	-	-/-	-/-
Chlorendic Anhydride	66		-	-	-	-	-/-	-	175	-	-/-	-/-
Chlorinated, 68%, Camphene: Xylene	90 10		-	-	-	-	-/-	-	120	120	-/-	-/-
Chlorinated Linseed Oil			-	-	-	-	-/-	-	90	-	-/-	-/-
Chlorinated Phenol Disinfectant			-	-	-	-	100/100	100	100	100	-/-	-/-
Chlorinated Pulp StockFootnote 21			180	200	200	200	-/-	-	90	-	-/-	-/-
Chlorinated Rubber Polymer Reaction (wet with carbon tetrachloride, liquid and vapor phases)			-	-	-	-	-/-	-	90	-	-/-	-/-
Chlorinated Washer (hoods and ducts)Footnote 21			200	200	200	200	-/-	200	150	-	-/-	-/-
Chlorinated Wax	100		180	180	180	180	180/180	200	-	-	-/-	-/-
Chlorine (scrubbed with lime slurry)Footnote 21			-	-	-	-	-/-	-	100	-	-/-	-/-
Chlorine Absorption . . .Footnote 21			-	-	-	-	-/-	-	120	-	-/-	-/-
Chlorine Dioxide (<1 g/l)Footnote 21			160	180	180	180	140/140	180	140	NR	NR/NR	NR/NR
Chlorine Dioxide (chilled liquid)Footnote 21			-	-	-	-	45/45	45	45	NR	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Chlorine Dioxide (process absorbers)Footnote 21		-	-	-	180	-/-	180	130	-	-/-	-/-
Chlorine Dioxide (process bleach towers)Footnote 21		-	180	180	180	-/-	180	180	-	-/-	-/-
Chlorine Dioxide (process generator covers)Footnote 21		-	-	-	180	-/-	180	180	-	-/-	-/-
Chlorine Dioxide (retention tower) . .		-	180	180	180	-/-	180	180	-	-/-	-/-
Chlorine Dioxide (washer, hoods and ducts)Footnote 21		-	180	180	180	-/-	180	140	-	-/-	-/-
Chlorine Dioxide (hooker single vessel process)Footnotes 2, 21		-	-	-	-	-/-	-	180	-	-/-	-/-
Chlorine Dioxide Generator (effluent R-2 system) . .Footnote 21		180	-	-	180	150/150	180	180	-	-/-	-/-
Chlorine Dioxide Generator (Olin type)Footnote 21		-	-	-	-	-/-	-	160	-	-/-	-/-
Chlorine Dioxide Generator (Solvay type)Footnote 21		-	-	-	-	-/-	-	145	-	-/-	-/-
Chlorine Dioxide Generator (spent acid)Footnote 21		-	-	-	-	-/-	-	130	-	-/-	-/-
Chlorine Dioxide: Sodium Carbonate: Bicarbonate (pH 8) . . .	5 3.7	-	-	-	-	-/-	-	100	-	-/-	-/-
Chlorine Dioxide: Sodium ChlorideFootnote 2	35 23	-	-	-	-	-/-	-	120	-	-/-	-/-
Chlorine Dioxide: Steam: ChlorineFootnote 21		-	180	180	180	-/-	180	150	-	-/-	-/-
Chlorine Dioxide, Fumes	5	160	180	180	180	140/140	180	120	NR	90/90	-/90
Chlorine Dioxide, Fumes	15	-	180	180	180	NR/NR	180	90	NR	NR/NR	-/-
Chlorine Gas (coolers & strippers) . .		-	-	-	-	NR/NR	-	300	NR	NR/NR	-/-
Chlorine Gas, Dry	100	250	250	250	250	180/180	250	300	225	180/100	-/200
Chlorine Gas, Wet	100	250	180	180	250	180/180	180	220	LS150	NR/NR	90/90
Chlorine Kill Tanks (caustic chlorine)		-	-	-	-	100/100	100	-	-	-/-	-/-
Chlorine Stripping		-	-	-	-	-/-	-	150	-	-/-	-/-
Chlorine Water (sat'd.)		200	210	210	210	180/180	180	200	-	NR/NR	195/125
Chlorine Water (gunk, wet chlorine) .		-	210	210	210	-/-	-	90	-	-/-	-/-
Chlorine: Hydrochloric Acid: Water (chlorinated organics)		-	-	-	-	NR/NR	-	80	-	-/-	-/-
Chlorine: Hydrogen Chloride (hydrogen chloride sat'd. with tetrachlorocyclopentane, carbon tetrachloride, trace of hexachlorocyclopentane)	35 65	-	-	-	-	-/-	-	125	-	-/-	-/-
Chlorine: Ozone (rendering fumes)Footnote 21		-	-	-	-	-/-	-	120	-	-/-	-/-
Chlorine: Steam: Chlorine DioxideFootnote 21		-	180	180	180	-/-	180	150	-	-/-	-/-
Chlorine, Fumes (cell plants, includes floors, walkways, roofing and siding)		-	-	-	-	120/120	120	120	-	-/-	90/90
Chlorine, Vapors: Phosphorus Oxychloride, Vapors: Hydrochloric Acid, Vapors (water vapors)		-	-	-	-	-/-	-	90	-	-/-	90/-
Chlorine, Vapors: Phosphorus Trichloride, Vapors: Hydrochloric Acid, Vapors (water vapors)	100	-	-	-	-	-/-	-	160	-	-/-	-/-
Chloroacetic Acid	1	-	120	120	120	120/120	120	90	-	90/NR	NR/NR
Chloroacetic Acid	25	100	100	100	100	100/100	100	90	-	NR/NR	NR/NR
Chloroacetic Acid	50	120	120	120	120	120/120	120	90	-	90/NR	NR/NR
Chlorobenzene	1	80	80	80	100	NR/NR	80	NR	250	NR/NR	NR/NR
Chlorobenzene	100	-	80	80	100	NR/NR	80	NR	250	NR/NR	NR/NR
ChlorofluorocarbonFootnote 1	100	-	-	-	-	-/-	-	160	-	-/-	160/-
Chloroform Alkaloids (hydrochloric acid, acetic acid and sodium chloride, water fume system)		-	-	-	-	-/-	-	90	-	-/-	-/-
Chloroform, Liquid (trichloromethane)	100	-	NR	NR	NR	NR/NR	NR	NR	140	NR/NR	NR/-
Chloroform, Vapor	100	-	-	-	-	NR/NR	-	NR	250	NR/NR	NR/-
Chloronaphthalene (chloromethane)	100	-	-	-	-	-/-	-	-	225	-/-	-/-
Chlorophenol, Biocide: Methylene Thiocyanate (blend)	100	-	-	-	-	125/125	125	LS125	-	125/125	-/-
Chlorosulfonic Acid	100	-	NR	NR	NR	NR/NR	NR	NR	80	NR/NR	NR/-
CHLOROTHENE N.U.	100	-	-	-	80	-/-	-	NR	80	-/-	-/-
Chlorotoluene, (o)	100	-	-	-	100	-/-	-	NR	-	-/-	NR/-
Chlorphenate, Biocide (organic sulfur type, blend)	100	-	-	-	-	125/125	125	125	-	125/125	-/-
Choline Chloride (reaction of trimethylamine, hydrochloric acid and ethylene oxide)		-	-	-	-	-/-	-	NR	-	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Chromate (zinc blend inhibitor, stabilized)	100	-	-	-	-	-/-	-	125	-	125/NR	-/-
Chrome Acid Plating Bath (vapor) ..		-	-	-	-	-/-	-	200	-	-/-	-/-
Chrome Anodizing Solution		-	-	-	-	-/-	-	150	-	-/-	-/-
Chrome Barrel Plating Fumes		-	-	-	-	-/-	-	-	-	-/-	120/-
Chrome Bath, Black (chromic acid, acetic acid and barium acetate)		-	-	-	-	-/-	-	115	-	-/-	-/-
Chrome Free Can Treatment (pH 6) ..		-	-	-	-	-/-	-	120	-	-/-	-/-
Chrome Phosphate (can treatment, pH 2)		-	-	-	-	-/-	-	120	-	-/-	-/-
Chrome Plating (liquid and vapors) ..	25	-	-	-	-	100/100	100	-	-	NR/NR	-/-
Chrome Reduction Process		-	-	-	-	-/-	-	220	-	-/-	-/-
Chrome Metal Plating (19% chromic acid with sodium fluosilicate and sulfate)		120	-	-	150	100/100	100	200	-	NR/NR	NR/-
Chrome, Hard (plating baths)		-	-	-	-	-/-	-	130	NR	-/-	-/-
Chromic Acid	1	100	150	150	180	100/100	150	200	NR	120/120	200/-
Chromic Acid	5	100	150	150	180	100/100	150	180	NR	120/120	200/-
Chromic Acid	10	100	150	150	150	100/100	150	180	NR	120/120	180/-
Chromic Acid	20	100	120	120	150	100/100	120	150	NR	120/120	150/-
Chromic Acid	30	NR	NR	NR	NR	NR/NR	NR	120	NR	NR/NR	100/-
Chromic Acid (HETRON 72 satisfactory to 140°F) ..	40	NR	NR	NR	NR	NR/NR	NR	90	NR	NR/NR	LS90/-
Chromic Acid (HETRON 72 satisfactory to 140°F) ..	50	NR	NR	NR	NR	NR/NR	NR	LS90	NR	NR/NR	NR/NR
Chromic Acid (sat'd.) ..		-	-	-	NR	NR/NR	NR	120	NR	NR/NR	NR/NR
Chromic Acid (trace of sodium fluoride, high agitation) ..	36	-	-	-	-	-/-	-	140	-	-/-	-/-
Chromic Acid (traces of sulfuric acid and hydrofluosilicic acid) ..	35.2	-	-	-	-	-/-	-	115	-	-/-	-/-
Chromic Acid Evaporator (55 oz/gal, vacuum, recovery units with 20% by volume concentrated sulfuric acid) ..		-	NR	NR	-	NR/NR	NR	160	NR	NR/NR	NR/NR
Chromic Acid: Hydrofluoric Acid:											
Nitric Acid	6 3 2	-	-	-	-	-/-	-	80	-	-/-	-/-
Chromic Acid: Hydrofluoric Acid:											
Phosphoric Acid ..	9 11 8	-	-	-	-	-/-	-	100	-	-/-	-/-
Chromic Acid: Nitric Acid:											
Hydrofluoric Acid ..	6 2 1.5	-	-	-	-	-/-	-	80	-	-/-	-/-
Chromic Acid: Phosphoric Acid:											
Hydrofluoric Acid ..	7 40 2	-	-	-	-	-/-	-	100	-	-/-	-/-
Chromic Acid: Sulfuric Acid											
.....	12.5 16	-	-	-	-	-/-	-	225	-	NR/NR	-/-
Chromic Acid: Sulfuric Acid											
.....	20 20	-	-	-	-	NR/NR	-	180	-	NR/NR	-/-
Chromic Acid: Sulfuric Acid											
.....	20 32	-	-	-	-	-/-	-	90	-	NR/NR	-/-
Chromic Acid: Sulfuric Acid											
.....	3 16	-	-	-	-	NR/NR	-	155	-	-/-	-/-
Chromic Acid: Sulfuric Acid											
(concentration in oz/gal) ..	33 .33	-	NR	NR	-	NR/NR	NR	140	-	NR/NR	-/-
Chromic Acid: Sulfuric Acid											
(concentration in oz/gal) ..	40 .4	-	NR	NR	-	NR/NR	NR	150	-	NR/NR	150/-
Chromic Acid: Sulfuric Acid											
(concentration in oz/gal) ..	53 .53	-	NR	NR	-	NR/NR	NR	180	-	NR/NR	-/-
Chromic Acid: Sulfuric Acid:											
Hydrofluosilicic Acid ..											
(concentration in oz/gal, chrome plating) ..	45 .3 .5	-	-	-	150	-/-	-	115	-	-/-	-/-
Chromic Acid, Intermittent											
.....	20	-	NR	NR	150	NR/NR	NR	200	NR	NR/NR	-/-
Chromic Acid, Vapor ..	20	100	150	150	180	100/100	150	180	NR	120/120	LS150/LS150
Chromic Chloride (sat'd.)		-	-	-	-	-/-	-	-	220	-/-	-/-
Chromic Oxide: Sulfuric Acid	2 80	-	-	-	-	-/-	-	165	-	-/-	NR/-
Chromic Sulfate	100	-	150	150	180	150/150	150	-	-	-/-	-/-
Chromium Hardening Bath ..											
(photographic fixing and stop bath) ..		-	-	-	-	-/-	-	80	-	-/-	-/-
Chromium Potassium Sulfate (sat'd.) ..		-	-	-	-	-/-	-	-	225	-/-	-/-
Chromous Sulfate (sat'd.)		-	-	-	-	150/150	150	150	-	170/140	-/-
Citric Acid (sat'd.)		210	220	220	210	210/210	220	200	-	180/150	270/200
Citric Acid: Lactic Acid (sat'd.)		-	-	-	-	-/-	-	150	-	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Clay, 20%: Potash Slurry, 20% (potash in sat'd brine)	40	-	-	-	-	-/-	-	80	-	-/-	-/-
Cleaner (disinfectant, PD 64 (Trademark))	100	-	-	-	-	100/100	100	100	100	-/-	-/-
CLEANER 508	100	-	-	-	-	-/-	-	160	-	-/-	-/-
Cleaner, Liquid (biodegradable all purpose)	10 90	-	-	-	-	100/100	100	100	-	100/100	-/-
Coal Water SlurryFootnote 24		-	-	-	-	-/-	-	80	-	-/-	-/-
Coal, Medium Sulfur (power plant scrubber particulate, pH 1.9 - 3.6, trace of chlorine, 300,000 ACFM gas, liquor, mist and fumes)		-	-	-	-	150/150	150	150	-	-/-	-/-
Coatings (sat'd., water reducible, acrylic spray liner (PPG Industries)) .		-	120	120	150	120/120	120	-	-	120/NR	-/-
Coatings (sat'd., water reducible, acrylic wet ink varnish (PPG Industries))		-	120	120	150	120/120	120	-	-	120/NR	-/-
Coatings (sat'd., water reducible, polyester white enamel (PPG Industries))		-	120	120	150	120/120	120	-	-	120/NR	-/-
Cobalt di (2 ethyl hexyl) Phosphate: Tri-m-butyl Phosphate: Livestock											
Spray Base (Shell's)	30 5 65	-	-	-	-	-/-	-	180	-	-/-	-/-
Cobalt Nitrate (sat'd.)		-	140	140	120	140/140	140	140	-	-/-	-/-
Cocamidopropyl Betaine	100	-	-	-	-	120/120	120	120	-	120/-	-/-
Cocamidopropyl Dimethylamine . . .	100	-	-	-	-	120/120	120	120	-	120/-	-/-
Coconut Fatty Acid (diethanol amide)	100	-	-	-	-	-/-	-	100	-	-/-	-/-
Coconut Oil	100	-	175	175	-	175/175	175	-	-	175/-	-/-
Cod Liver Oil	100	100	-	-	-	-/-	-	-	-	90/90	-/-
Coffee Roasting Fumes		-	-	-	-	-/-	-	-	-	-/-	150/-
Combustion Gases (particulate, cooling and washing with water)		-	-	-	-	-/-	-	100	-	-/-	100/-
Condensable Liquor (pulp and paper mill, pH 9)		-	-	-	-	130/130	130	90	-	-/-	-/-
Copper Acetate (sat'd.)		-	-	-	-	160/160	180	-	225	160/-	-/120
Copper Chloride (sat'd.)		250	250	250	250	210/210	220	250	250	180/150	250/250
Copper Chloride: Silver Nitrate	15 33	-	-	-	-	-/-	-	90	-	-/-	-/-
Copper Cyanide (sat'd.)		210	210	210	210	210/210	220	200	-	90/NR	200/90
Copper Cyanide Plating, Fumes		-	-	-	160	-/-	-	180	-	-/-	-/-
Copper Cyanide, Metal Plating (10.5% copper and 14% sodium cyanides, 6% rochelle salts)		160	180	180	160	180/180	180	NR	-	-/-	NR/-
Copper Cyanide: Potassium Hydroxide: Potassium Cyanide (concentration in oz/gal)	8 2 3	180	-	-	180	-/-	-	NR	-	-/-	-/-
Copper Electrolytic Cells		-	-	-	-	-/-	-	150	-	-/-	-/-
Copper Extractant (ion exchange oxime type)	100	-	-	-	-	-/-	-	115	-	-/-	-/-
Copper Leach Tanks		-	-	-	-	-/-	-	150	-	-/-	-/-
Copper Matte, Metal Plating (dipping bath, 30% iron chlorate, 19% hydrochloric acid)		200	200	200	200	200/200	200	180	-	-/-	-/-
Copper Nitrate (sat'd.)		210	220	220	210	210/210	220	140	-	160/140	140/160
Copper Oxide: Hydrobromic Acid (trace of bromine)	5 50	-	-	-	-	-/-	-	90	-	-/-	-/-
Copper Oxide: Lead: Sulfur (10% ferric oxide, 8% zinc sulfate, 3% bismuth sulfate dust)	18 25 25	-	-	-	-	-/-	-	200	-	-/-	-/-
Copper Oxychloride	20	-	-	-	-	-/-	-	-	-	NR/NR	140/-
Copper Oxychloride (sat'd.)		-	-	-	-	-/-	-	-	-	NR/NR	90/-
Copper Pellet Smelter, Fumes		-	-	-	-	-/-	-	300	-	-/-	-/-
Copper Pickle Bath (1 gal. sulfuric acid to 9 gal. water)		-	-	-	-	-/-	-	175	-	-/-	-/-
Copper Pickling Bath (10% ferric sulfate, 10% sulfuric acid)		-	-	-	-	210/210	210	220	-	-/-	-/-
Copper Salts: Nitric Acid (concentration in g/l)Footnote 3	190 15	-	-	-	-	-/-	-	150	-	-/-	150/-
Copper Salts: Nitric Acid (concentration in g/l)Footnote 3	190 20	-	-	-	-	-/-	-	180	-	-/-	-/-
Copper Salts: Sulfuric Acid (concentration in g/l)	31 21	-	-	-	-	-/-	-	150	-	-/-	-/-
Copper Salts: Sulfuric Acid (concentration in g/l)	31 33	-	-	-	-	-/-	-	180	-	-/-	-/-
Copper Salts: Sulfuric Acid: Nitric Acid (concentration in g/l) . . .	112 17 9.5	-	-	-	-	-/-	-	180	-	-/-	-/-
Copper Smelter Fumes		-	-	-	-	-/-	-	150	-	-/-	-/-
Copper Sulfate (sat'd.)		250	250	250	250	210/210	220	250	250	180/120	250/250

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT		High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		CONCENTRATION %	HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334
Copper Sulfate: Sulfuric Acid	5 18	-	120	120	-	120/120	120	150	-	120/120	150/150
Copper Metal Plating (45% copper fluoboric acid, 19% copper sulfate, 8% sulfuric acid)Footnote 1		180	180	180	180	180/180	180	180	-	-/-	-/-
Copper: Sodium Persulfate (concentration in g/l, trace of sulfuric acid)	30 3	-	-	-	-	165/165	-	165	-	-/-	-/-
Copper: Sulfuric Acid: Iron (5 g/l zinc slurry/thickener)	80 10 10	-	-	-	-	-/-	-	180	-	-/-	-/-
Corn Oil	100	210	210	210	210	150/150	200	-	-	120/120	-/-
Corn Starch		210	210	210	-	210/210	220	-	-	120/120	-/-
Corn Sugar	100	230	210	210	-	210/210	220	-	-	120/120	-/-
Corn Syrup (crude acidic, decolorizing)	100	-	-	-	-	120/120	120.	100	-	120/120	-/-
Cottonseed Oil	100	210	210	210	210	150/150	200	100	-	100/100	100/-
Cresol, Fumes	100	-	-	-	-	-/-	-	90	90	NR/NR	-/NR
Cresols, Mixture	100	-	-	-	-	-/-	-	-	150	NR/NR	-/NR
Cresylic Acid: Sodium Hydroxide . .	12 5	-	-	-	-	180/180	180	-	-	-/-	-/-
Cresylic Acid, Fumes	100	-	-	-	-	-/-	-	80	-	NR/NR	-/NR
Cresylics (water, neutral oils, mercaptans, hydrogen sulfide and waste liquor, pH 5 - 6)		-	-	-	-	-/-	-	130	130	130/-	-/-
Crude Sulfate: Turpentine		-	-	-	-	100/100	100	LS100	NR	100/NR	LS100/-
Cupric Chloride: Hydrochloric Acid (monel and nickel, cleaning baths) . .		-	-	-	-	-/-	-	180	-	-/-	-/-
Cupric Sulfate (cupric sulfate-0.1M, traces of ammonia, ammonia sulfate and sodium chloride)		-	195	195	-	195/195	195	LS195	-	-/-	NR/-
Cupric Sulfate: Ferric Sulfate: Sulfuric Acid	10 10 20	-	-	-	-	-/-	-	180	-	-/-	-/-
Cutback Diluent, Refinery		-	-	-	-	-/-	-	-	-	90/-	-/-
CWT 102	100	-	-	-	-	-/-	-	125	-	125/125	-/-
Cyaf 5101		-	-	-	-	-/-	-	-	-	90/90	-/-
Cyanide, Fumes: Ozone, Fumes (20 lbs/day at 2% oxygen)Footnote 21		-	-	-	-	-/-	-	90	-	-/-	-/-
Cyanoacetic Acid: Methyl Isobutyl Ketone (0.8 sulfuric acid in saturated sodium chloride)	8 60	-	-	-	-	-/-	-	LS100	-	-/-	-/-
Cyanuric Chloride (scrubbed with 5.25% sodium hydroxide)		-	-	-	-	-/-	-	NR	-	-/-	-/-
Cyclohexane	1	-	150	150	150	120/120	150	140	150	120/NR	140/-
Cyclohexane	100	-	150	150	150	120/120	150	140	150	120/NR	140/-
Cyclohexane, Vapor		-	-	-	-	180/180	180	175	-	175/-	175/175
Cyclohexanone	100	-	-	-	-	-/-	-	-	100	NR/NR	-/-
Cyclo-Octadiene	100	-	-	-	-	-/-	-	100	-	-/-	-/-
CYGON 400	4	-	-	-	-	NR/NR	-	150	150	-/-	-/-
CYGON 400	100	-	-	-	-	NR/NR	NR	NR	150	-/-	NR/-
DAREX 45		-	-	-	-	-/-	-	180	-	-/-	-/-
DAZAD 30		-	-	-	-	-/-	-	180	-	-/-	-/-
DDT, Insecticide Solution	3	-	-	-	-	-/-	-	-	-	-/-	140/-
Decanol	100	-	-	-	180	-/-	-	-	-	160/160	-/-
DEFOAMER, L-917B	100	-	-	-	-	140/140	140	140	-	-/-	-/-
DEFOAMER, L-880, 21-905	100	-	-	-	-	140/140	140	-	-	-/-	-/-
Desulfurizer, Feed/Refinery		-	-	-	-	-/-	-	-	-	90/-	-/-
Detergent (pH 8)	3	-	-	-	-	-/-	-	-	-	-/-	180/-
Detergent (dimethyl benzyl N-alkyl with 23% hydrochloric acid, 25% phosphoric acid and inerts)		-	-	-	-	100/100	100	100	100	-/-	-/-
Detergent (ELECTRASOL, trademark)	5	-	-	-	150	150/150	150	-	-	-/-	-/-
Detergent (ULTRAWET 45DS, biodegradable)	100	-	-	-	-	-/-	-	130	-	-/-	-/-
Detergent (ULTRAWET 60K, biodegradable)	100	-	-	-	-	-/-	-	150	-	-/-	-/-
Detergent (ULTRAWET 60L, biodegradable)	100	-	-	-	-	-/-	-	100	-	-/-	-/-
Detergent (sat'd., PAX HYSPEED, trademark)		-	-	-	-	-/-	-	140	-	-/-	-/-
Detergent (dimethyl benzyl N-alkyl type, hydrochloric acid, 23%, inerts, 77%)		-	-	-	-	100/100	100	100	100	-/-	-/-
Detergent (dimethyl benzyl N-alkyl type, phosphoric acid, 25%, inerts, 75%)		-	-	-	-	100/100	100	100	100	-/-	-/-
Detergent, Alcohols	100	-	-	-	180	120/120	180	-	-	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Detergent, Dishwashing Liquid (biodegradable)		-	-	-	-	100/100	100	100	-	100/100	-/-
Detergents, Germicidal (conc.)		-	-	-	-	-/-	-	100	100	-/-	100/-
Detergent, Germicidal (DICROBE NN)		-	-	-	-	-/-	-	100	-	-/-	-/-
Detergent, Germicidal (MATAR, Trademark, conc.)		-	-	-	-	-/-	-	100	-	-/-	-/-
Detergents, Organic		-	100	100	200	100/100	100	100	100	NR/NR	-/-
Detergent, Organic (pH 10-11)	100	180	-	-	180	-/-	-	NR	180	-/-	160/-
Detergent, Organic (pH 12)		180	-	-	-	-/-	-	-	-	NR/NR	-/-
Detergent Solution (BUILD, pH 9 -10, 10-12% solids)		-	-	-	-	120/120	120	120	-	-/-	-/-
Detergent Solution (CASCADE)	5	180	-	-	180	210/210	220	210	-	-/-	210/-
Detergents, Sulfated		-	-	-	-	-/-	-	-	-	180/-	-/-
Detergents, Sulfated (concentrations = 1 - 50%)		-	180	180	180	210/210	220	200	-	180/100	200/-
Detergents, Sulfonated		-	-	-	-	210/210	220	-	-	160/100	-/-
Detergents, Sulfonated (sodium hydroxide, sodium tripolyphosphate, hypochlorite and bisulfite fumes) ...		-	-	-	180	210/210	220	190	-	-/-	-/-
Detergents, Sulfonated, Fumes (neutralization fumes)		-	-	-	180	210/210	220	190	-	-/-	-/-
Developers, Photographic (including color, moderately alkaline)		-	-	-	-	-/-	-	80	-	-/-	-/-
DFR-121		-	-	-	-	100/100	100	100	NR	100/100	-/-
Diallylphthalate	100	210	210	210	210	180/180	210	-	210	160/130	-/-
Diammonium Phosphate	65	210	-	-	210	NR/NR	-	LS225	-	-/-	-/-
Diammonium Phosphate Vapor		-	-	-	-	-/-	-	-	-	-/-	90/90
Diammonium Phosphate: Ammonium Sulfate	10 10	-	-	-	-	-/-	-	-	-	90/90	-/-
Dibasic Acids	80	-	-	-	-	-/-	195	-	-	NR/NR	-/-
Dibromopropanol (2, 3-)	100	-	-	-	100	NR/NR	NR	-	105	-/-	-/-
Dibromopropyl Phosphate	100	-	-	-	-	-/-	-	-	105	-/-	-/-
Dibutyl Ether	100	210	210	210	210	80/80	150	80	-	80/-	80/80
Dibutyl Phthalate	100	180	200	200	210	150/150	200	90	200	90/90	-/-
Dibutyl Sebacate	100	150	-	-	150	210/210	210	-	-	-/-	-/-
Dicalcium Phosphate, Gas (liquid scrubbing, pH 3 - 4)		-	-	-	-	-/-	-	300	300	-/-	-/-
Dichloro-(2)-Propylphosphate	100	-	-	-	-	-/-	-	-	105	-/-	-/-
Dichloro-(2,6)-Aniline-(4)-: Hydrochloric Acid	32	-	-	-	-	LS170/LS170	-	LS170	170	LS170/NR	-/-
Dichlorobenzene	1	-	120	120	120	NR/NR	100	NR	220	NR/NR	NR/-
Dichlorobenzene	100	100	120	120	120	NR/NR	100	NR	220	NR/NR	NR/-
Dichlorobenzene (o-)	100	-	-	-	-	NR/NR	100	LS120	-	NR/NR	NR/-
Dichloroethane (1,2-)	100	-	-	-	80	NR/NR	-	NR	150	NR/NR	NR/-
Dichloroisopropyl Phosphate	100	-	-	-	-	-/-	-	-	105	-/-	-/-
Dichloronitrobenzene (2,4-) (trace of nitric acid and water)	100	-	-	-	-	-/-	-	-	230	-/-	-/-
Dichlorophenol	1	-	-	-	-	NR/NR	-	NR	140	NR/NR	NR/-
Dichlorophenol	100	-	-	-	-	NR/NR	-	NR	140	NR/NR	NR/-
Dichlorophenoxyacetic Acid	2	-	-	-	120	-/-	-	-	-	-/-	140/140
Dichloropropane	100	80	NR	NR	100	NR/NR	NR	NR	-	NR/NR	NR/-
Dichloropropane: Dichloropropene		-	NR	NR	80	NR/NR	NR	NR	-	-/-	-/-
Dichloropropene	100	NR	NR	NR	80	NR/NR	NR	NR	-	NR/NR	NR/-
Dichloropropene: Dichloropropane		-	NR	NR	80	NR/NR	NR	NR	-	-/-	-/-
Dichloropropionic Acid	100	80	NR	NR	80	NR/NR	NR	-	-	-/-	-/-
Dichromate Bleach: Sulfuric Acid (photographic)		-	-	-	-	-/-	-	80	-	-/-	-/-
Dicoco Dimethyl Ammonium Chloride		-	-	-	-	120/120	120	120	120	120/120	120/-
Dicoco Dimethyl Quaternary	75	-	-	-	-	120/120	120	120	120	120/120	120/-
Dicyclopentadiene	100	-	-	-	-	-/-	-	100	-	-/-	-/-
Diesel Fuel	100	210	200	200	210	175/175	200	175	-	175/140	175/100
Diesel Fuel, Premium		-	-	-	-	-/-	-	-	-	90/-	-/-
Diethanolamine	30	-	120	120	120	80/80	120	110	-	90/-	-/-
Diethanolamine	100	120	120	120	120	80/80	120	110	150	-/-	-90
Diethyl Benzene	100	150	150	150	150	80/80	120	120	150	NR/NR	-/-
Diethyl Carbonate	100	80	-	-	100	NR/NR	NR	-	280	-/-	-/-
Diethyl Ketone	100	NR	80	80	80	NR/NR	NR	-	215	NR/NR	-/-
Diethyl Sulfate	100	120	100	100	120	NR/NR	100	100	-	-/-	-/-
Diethylamine	100	-	-	-	-	NR/NR	NR	-	225	-/-	-/-
Diethylene Glycol	100	-	210	210	210	210/210	210	250	225	180/150	250/250
Diethylene Glycol Monoethyl Ether	100	-	-	-	-	-/-	-	-	225	-/-	-/-
Diethylene Glycol N-butyl Ether	100	-	-	-	-	90/90	90	85	-	-/-	-/-
Diethylene Imide Oxide	10	-	-	-	-	-/-	-	100	-	-/-	-/-
Diethylene Triamine ... Footnote 3	100	-	-	-	-	-/-	-	NR	100	-/-	NR/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT		High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		CONCENTRATION %	HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334
Diethylene Triamine: Sodium Hydroxide: Water (ethylenediamine, 10% of concentration)	10 10 70	-	-	-	-	-/-	-	-	140	-/-	-/-
Diethylhexyl Phosphoric Acid (in kerosene)	20	180	-	-	180	120/120	150	-	-	-/-	-/-
Digester Blow Down, Vapors	100	-	-	-	-	-/-	-	220	-	-/-	NR/-
Digester Room, Pulp Mill (floors and spills)		-	-	-	90	90/90	90	-	-	-/-	-/-
Diglycolamine		-	-	-	-	NR/NR	-	NR	LS270	-/-	NR/-
Diglycolamine (saturated with carbon dioxide and hydrogen sulfide)	100	-	-	-	-	NR/NR	-	NR	LS270	NR/NR	NR/-
Dihydrogenated-Tallow Dimethyl Ammonium Chloride: Aqueous Isopropanol	75 25	-	-	-	-	120/120	120	120	120	120/120	120/-
Diisobutyl Ketone: Butyl Alcohol: Ethyl Hexylacetate	85 5 10	-	NR	NR	-	NR/NR	NR	80	100	-/-	-/-
Diisobutyl Phthalate	100	150	150	150	150	100/100	150	90	-	-/-	-/-
Diisobutylene	100	100	100	100	100	90/90	100	100	-	-/-	-/-
Diisopropanolamine	100	120	120	120	150	80/80	120	-	-	-/-	-/-
Dimethyl Acetamide	70	-	-	-	-	-/-	-	150	-	-/-	NR/-
Dimethyl Aniline	100	-	-	-	-	-/-	-	-	225	-/-	-/-
Dimethyl Distearyl Ammonium Chloride: Aqueous Isopropanol ...	72 25	-	-	-	-	120/120	120	120	120	120/120	120/-
Dimethyl Distearyl Quaternary (in isopropanol)		-	-	-	-	120/120	120	120	-	120/120	120/-
Dimethyl Distearyl Quaternary (in neutral organic solvent)		-	-	-	-	190/190	190	190	190	190/150	190/-
Dimethyl Formamide	7.2	-	-	-	NR	-/-	-	100	90	-/-	-/-
Dimethyl Formamide	30	-	-	-	NR	NR/NR	-	90	90	NR/NR	-/-
Dimethyl Formamide	100	NR	NR	NR	NR	NR/NR	NR	NR	LS90	NR/NR	-/-
Dimethyl Morpholine	100	80	-	-	120	NR/NR	100	LS120	-	NR/NR	NR/-
Dimethyl Phthalate	100	180	-	-	180	120/120	150	-	225	NR/NR	-/NR
Dimethyl Sulfate	100	-	-	-	-	-/-	-	-	200	-/-	-/-
Dimethyl Tin Dichloride	50	-	-	-	-	-/-	-	80	80	-/-	-/-
Dimethylamine	4	-	-	-	-	-/-	-	130	-	-/-	-/-
Dimethylformamide: Benzene: Water (tetrahydrofuran = 5% of concentration)	5 40 50	-	NR	NR	NR	NR/NR	NR	NR	90	NR/NR	NR/NR
Diocetyl Phthalate	100	210	150	150	210	120/120	150	-	-	NR/NR	-/NR
Dioxane	1	-	-	-	-	NR/NR	NR	-	125	-/-	-/-
Dioxane	100	-	-	-	-	NR/NR	NR	-	125	-/-	-/-
Diphenyl Ether	100	120	120	120	120	80/80	120	-	-	NR/NR	NR/NR
Diphenyl Methane Diisocyanate ...	100	-	-	-	-	-/-	-	-	-	120/120	-/-
Diphenyl Oxide	100	120	120	120	120	80/80	120	-	-	NR/NR	NR/NR
Dipropylene Glycol	100	210	210	210	210	180/180	210	-	-	160/120	160/160
Dipropylene Glycol Dibenzoate	100	-	-	-	-	120/120	120	120	120	120/120	-/-
Disinfectant (chlorinated phenol type)		-	-	-	-	100/100	100	100	-	-/-	-/-
Disinfectant, Cleaner (PD 64, trademark)		-	-	-	-	100/100	100	100	100	-/-	-/-
Dispersant, Anionic (blend)	100	-	-	-	-	-/-	-	125	100	125/125	-/-
Dispersant, Nonionic (blend)	100	-	-	-	-	-/-	-	125	-	LS125/NR	-/-
Dispersing Agents	100	-	-	-	-	-/-	-	125	-	125/125	-/-
Di-Syston (1 to 10 dilution)		-	-	-	-	-/-	-	120	120	-/-	-/-
DIVERSEY 514 (14 oz/gal) Footnote 1		-	-	-	-	-/-	-	80	-	-/-	-/-
DIVERSEY 808 (5.3 oz/gal) Footnote 1		-	-	-	-	-/-	-	140	-	-/-	-/-
Divinyl Benzene	100	120	-	-	120	NR/NR	120	90	-	NR/NR	-/-
Dodecane	100	-	120	120	120	80/80	120	-	-	-/-	-/-
Dodecene	100	180	180	180	180	-/-	-	90	-	NR/NR	NR/NR
Dodecene (trace of hydrochloric acid)	100	-	-	-	-	-/-	-	120	-	NR/NR	-/-
Dodecyl Alcohol	100	-	-	-	-	150/150	180	100	-	-/-	-/-
Dodecylbenzene Sulfonic Acid	100	200	-	-	210	210/210	220	-	-	-/-	-/-
Dodecylbenzene Sulfonic Acid: Sulfuric Acid: Water (oil = 1% of concentration)	85 10 4	150	150	150	150	-/-	-	150	-	-/-	150/-
Dolomite Kiln Gases (wet)		-	-	-	-	-/-	-	150	-	-/-	-/-
DOWCLEN EC	100	120	-	-	-	-/-	-	80	120	-/-	-/-
DREWFAX 260	100	-	-	-	-	-/-	-	140	-	-/-	-/-
DREWFAX 335	100	-	-	-	-	-/-	-	140	-	-/-	-/-
DREWFAX 339	100	-	-	-	-	-/-	-	LS90	-	-/-	-/-
DREWSPERSE 732 (also DREWSPERSE 734 & 780)	100	-	-	-	-	-/-	-	125	-	125/125	-/-
DREWSPERSE 738 (also DREWSPERSE 741 & 735)	100	-	-	-	-	-/-	-	125	-	LS125/NR	-/-
DUAL 8E	100	-	-	-	-	-/-	100	-	-	-/-	-/-
Dye Plant Water Treatment (pH 2 - 3)		-	-	-	-	-/-	-	180	-	-/-	-/-
Electronics Plant Waste		-	-	-	-	90/90	90	-	-	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	High Performance Epoxy Vinyl Ester Resins					Epoxy Vinyl Ester Resins					Fume Service
	CONCENTRATION %	HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Electrostatic Precipitator Fumes: Sulfate (traces of carbonate, fluorides and bicarbonates)Footnote 1	3	-	-	-	-	185/185	185	185	-	-/-	-/-
ELVASE		-	-	-	-	100/100	100	100	100	100/100	-/-
Emulsifier, Oil and Grease (alkanolamide type)	100	-	-	-	-	-/-	-	120	-	-/-	-/-
EP 52-A65	100	-	-	-	-	90/90	90	90	90	90/90	-/-
EPTAM (conc., herbicide) .Footnote 4		-	-	-	-	-/-	-	120	120	-/-	-/-
ERIONAL NW	100	-	-	-	-	90/90	90	90	-	-/-	-/-
Esters, Fatty Acid	100	180	180	180	180	180/180	180	120	-	180/150	-/-
Etchant, Spent: Ammonium Hydroxide Based (copper = 18 oz/gal)		-	-	-	-	120/120	120	120	-	-/-	-/-
Etchant, Fresh (composed of 50% ammonium hydroxide)		-	-	-	-	120/120	120	120	-	-/-	-/-
Ethanol (see ethyl alcohol)		-	-	-	-	-/-	-	-	-	-/-	-/-
Ethanolamine	100	NR			80	NR/NR	90	90	150	NR/NR	-/-
Ethoxylated Alcohol (pH 8.5, C(12)-C(15))	100	-	-	-	-	-/-	-	120	-	-/-	-/-
Ethoxylated Nonyl Phenol	100	-	-	-	100	-/-	-	100	-	-/-	-/-
Ethyl Acetate	1	NR	NR	NR	70	NR/NR	NR	NR	125	NR/NR	NR/NR
Ethyl Acetate	100	-	NR	NR	70	NR/NR	NR	NR	125	NR/NR	NR/NR
Ethyl Acetate: Methylene Chloride: Caustic 50%	16 83 1	-	NR	NR	-	NR/NR	NR	NR	LS90	NR/NR	NR/NR
Ethyl Acetoacetate (sat'd.)		-	-	-	-	-/-	-	80	-	-/-	-/-
Ethyl Acrylate	100	-	NR	NR	NR	NR/NR	NR	-	80	-/-	-/-
Ethyl AlcoholFootnote 17	1	-	150	150	150	150/150	150	-	150	-/-	-/-
Ethyl AlcoholFootnote 17	15	80	150	150	150	150/150	150	-	150	-/-	-/-
Ethyl AlcoholFootnote 17	50	80	150	150	150	100/100	150	150	100	90/-	150/-
Ethyl AlcoholFootnote 17	100	80	100	100	100	NR/NR	100	100	100	NR/NR	-/-
Ethyl Amine	100	-	-	-	-	-/-	-	-	200	-/-	-/-
Ethyl Benzene	1	-	120	120	120	NR/NR	100	NR	-	NR/NR	NR/NR
Ethyl Benzene	100	100	-	-	120	NR/NR	100	NR	-	NR/NR	NR/NR
Ethyl Benzene: Benzene	66.5 33.5	80	-	-	100	-/-	-	100	-	-/-	-/-
Ethyl Bromide	100	NR	NR	NR	NR	NR/NR	NR	NR	200	NR/NR	NR/NR
Ethyl Chloride	100	80	80	80	80	NR/NR	NR	90	220	NR/NR	90/-
Ethyl Chloroformate	100	-	-	-	-	-/-	-	80	-	-/-	-/-
Ethyl Ether	100	NR	-	-	NR	NR/NR	-	NR	90	NR/NR	NR/NR
Ethyl Hexylacetate: Butyl Alcohol: Diisobutyl Ketone	10 5 85	-	NR	NR	-	NR/NR	NR	80	100	-/-	-/-
Ethyl Silicate	100	-	-	-	-	-/-	-	100	-	-/-	-/-
Ethyl Sulfate	100	100	100	100	100	80/80	100	100	225	-/-	-/-
Ethyl Sulfuric Acid		-	-	-	-	-/-	-	-	225	-/-	-/-
Ethylene Chloride (also called ethylene dichloride)	100	NR	NR	NR	80	NR/NR	NR	NR	100	NR/NR	NR/-
Ethylene Chlorohydrin	100	100	100	100	100	NR/NR	100	200	-	NR/NR	200/-
Ethylene Diamine	100	-	-	-	-	-/-	-	-	100	-/-	NR/-
Ethylene Dibromide	100	NR	-	-	-	NR/NR	-	NR	85	NR/NR	NR/NR
Ethylene Disulfonic Acid (sat'd.)		-	-	-	-	-/-	-	-	225	-/-	-/-
Ethylene Glycol	100	210	210	210	210	210/210	210	250	250	180/150	250/250
Ethylene Glycol Monobutyl Ether	100	150	150	150	150	150/150	150	90	-	90/-	-90
Ethylene Oxide	100	NR	-	-	-	-/-	-	-	250	-/-	-/-
Ethylene Tetrachloride	100	-	-	-	-	-/-	-	-	250	-/-	-/-
Ethylenediaminetetraacetic Acid (EDTA)	38	-	100	100	100	90/90	90	90	-	-/-	-/-
Ethylenediaminetetraacetic Acid (EDTA)	100	-	100	100	100	80/80	100	-	-	-/-	-/-
EVA		-	-	-	-	100/100	100	100	100	100/100	-/-
EXALT		-	-	-	-	80/80	80	-	-	-/-	-/-
Exxon Latex (blended in water with a trace of ALIPAL CO433)	62	-	-	-	-	-/-	-	100	100	-/-	-/-
Fat Splitting Exhaust Gas		-	-	-	-	-/-	-	-	-	195/-	-/-
Fatty Acid: Sulfuric Acid	5	-	-	-	-	100/100	100	-	-	-/-	-/-
Fatty Acid, Alkanolamide		-	-	-	-	-/-	-	100	-	-/-	-/-
Fatty Acids (sat'd.)		250	250	250	250	210/210	220	250	250	180/150	250/250
Fatty Nitrogen Compounds: Xylene	25 75	-	-	-	-	-/-	-	100	-	-/-	-/-
FCU Feed		-	-	-	-	-/-	-	-	-	90/-	-/-
Ferric Acetate (sat'd.)		180	-	-	180	180/180	180	-	-	-/-	-/-
Ferric Chloride (sat'd.)		210	220	220	210	210/210	220	250	250	180/150	250/250
Ferric Chloride (traces of ferrous chloride and hydrochloric acid)	48	210	-	-	180	180/180	-	165	-	-/-	-/-
Ferric Chloride Mist: Hydrocarbons		-	-	-	-	-/-	-	250	-	-/-	-/-
Ferric Chloride: Hydrochloric Acid	29 18.5	-	-	-	180	180/180	-	180	-	-/-	-/-
Ferric Nitrate (sat'd.)		210	220	220	210	210/210	220	250	250	180/150	250/250
Ferric Sulfate (sat'd.)		210	220	220	210	210/210	220	200	225	180/150	200/200
Ferric Sulfate: Ammonium Sulfate	20 10.5	-	-	-	-	-/-	-	180	-	-/-	180/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Ferric Sulfate: Cupric Sulfate: Sulfuric Acid	10 10 20	-	-	-	-	-/-	-	180	-	-/-	-/-
Ferric Sulfate: Hydrochloric Acid (monel & nickel cleaning baths)		-	-	-	-	-/-	-	180	-	-/-	-/-
Ferricyanide Bleach: Potassium Bromide (photography)		-	-	-	-	-/-	-	80	-	-/-	-/-
Ferrous Chloride (sat'd.)		210	220	220	210	210/210	220	220	-	160/140	220/220
Ferrous Nitrate (sat'd.)		210	220	220	210	210/210	220	220	-	160/140	160/160
Ferrous Sulfate (sat'd.)		210	220	220	210	210/210	220	220	-	180/150	220/220
Ferrous Sulfate: Sulfate	16 15	-	-	-	-	-/-	-	-	-	-/-	-/-
Fertilizer Fumes		-	-	-	-	150/150	150	-	-	-/-	150/100
Fertilizer Solution, 10-34-0		-	-	-	150	150/150	150	-	-	80/80	-/-
Fertilizer Solution, 8-8-8		150	-	-	120	120/120	150	-	-	-/-	-/-
Fertilizer Solution, Nitrogen, 28		-	-	-	150	150/150	150	-	-	80/80	-/-
Fire Retardant Liquid Formulation: Osmose Company Premix	50 100	-	-	-	-	-/-	-	-	-	80/-	-/-
Fish Oil and Meal Exhaust Gas		-	-	-	-	175/175	175	175	175	175/-	-/-
Fish Tanks		-	-	-	-	-/-	-	-	-	90/90	-/-
Fixing Baths (photography)		-	-	-	-	-/-	-	80	-	-/-	-/-
Floor Wax Polymers		-	-	-	-	-/-	-	80	-	-/-	-/-
Flue Gas		-	-	-	340	-/-	-	340	-	NR/NR	180/180
Flue Gas		-	-	-	350	NR/NR	NR	280	-	NR/NR	180/180
Flue Gas (recovery boiler)		-	-	-	340	NR/NR	-	350	-	NR/NR	-/-
Flue Gas Scrubbing (ammonia neutralization)		-	-	-	-	-/-	-	125	-	-/-	-/-
Flue Gas, Chemical Incinerator		-	-	-	-	-/-	-	300	-	-/-	-/-
Flue Gas, Coal Fired		-	-	-	-	NR/NR	-	340	NR	NR/NR	180/180
Flue Gas, Garbage Incinerator		-	-	-	-	-/-	-	180	-	-/-	-/-
Flue Gas, Hog Fuel (trace of hydrochloric acid, pH 3.7 - 7)		-	-	-	-	-/-	-	155	NR	-/-	-/-
Flue Gas, Wet		210	-	-	210	-/-	-	140	-	-/-	180/180
Fluoboric Acid	10	210	220	220	210	210/210	220	265	-	-/-	265/180
Fluoboric Acid (sat'd.)		210	200	200	210	180/180	200	-	200	90/90	-/90
Fluoride Mist and Fumes: Magnesium Oxide		-	-	-	-	-/-	-	-	-	-/-	150/-
Fluoride Salts: Hydrochloric Acid	30 10	120	-	-	-	-/-	-	120	-	-/-	-/-
Fluorides: Methyl Isobutyl Ketone: Hydrofluoric Acid (concentrations in g/l)	300 40	-	-	-	-	-/-	-	80	-	-/-	-/-
Fluorides: Methyl Isobutyl Ketone: Sulfuric Acid (concentrations in g/l)	200 500	-	-	-	-	-/-	-	80	-	-/-	-/-
Fluorine Gas	100	80	-	-	80	250/250	250	-	LS265	NR/NR	-/-
Fluorine Scrubber (recover, fluoro-silicic acid)		-	-	-	-	-/-	-	160	-	-/-	-/-
Fluorine: Phosphoric Acid: Silicone Dioxide	1.2 54 2	-	-	-	-	-/-	-	175	-	-/-	-/-
Fluorine: Phosphorus Pentoxide	1.5 1.5	-	-	-	-	200/200	200	85	-	-/-	-/-
FLUOROLUBES (oils and greases)	100	-	-	-	-	90/90	90	90	-	90/90	90/-
Fluoro-silicic Acid: Phosphoric Acid: Sulfuric Acid (gypsum slurry cooler)	5 28 5	-	-	-	-	-/-	-	190	-	-/-	-/-
Fluoro-silicic Acid	1	-	180	180	180	150/150	150	180	200	100/-	100/100
Fluoro-silicic Acid	10	180	180	180	180	150/150	150	180	200	100/-	100/100
Fluoro-silicic Acid	25	100	100	100	100	120/120	120	180	200	90/90	-/90
Fluoro-silicic Acid	35	100	100	100	100	100/100	100	160	200	NR/NR	NR/NR
Fluoro-silicic Acid (sat'd.)		-	100	100	100	100/100	100	100	200	-/-	-/-
Fluoro-silicic Acid Fumes, Wet		180	180	180	180	150/150	200	150	-	-/-	-/-
Fluoro-silicic Acid: Aluminum Chloride (slurry)	2	-	-	-	100	-/-	-	210	-	-/-	-/-
Fly Ash Slurry		150	150	150	150	-/-	-	90	-	90/90	-/-
Formaldehyde	25	150	150	150	150	150/150	150	200	225	150/120	200/200
Formaldehyde	37	150	150	150	150	150/150	150	150	225	90/90	-/90
Formaldehyde	44	150	150	150	150	90/90	90	150	225	90/90	-/90
Formaldehyde	52	150	150	150	150	150/150	150	150	150	-/-	-/90
Formamide	100	-	-	-	-	100/100	100	100	LS100	100/-	-/-
Formic Acid	1	-	180	180	180	180/180	180	200	225	150/90	200/200
Formic Acid	10	180	180	180	180	180/180	180	200	225	150/90	200/200
Formic Acid	25	-	120	120	120	120/120	120	140	160	120/-	90/90
Formic Acid	50	-	120	120	120	120/120	120	100	120	NR/NR	90/90

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Formic Acid	90	-	120	120	120	-/-	120	100	100	-/-	-/-
Formic Acid	100	-	100	100	100	-/-	-	100	100	NR/NR	NR/NR
Formic Acid, 60%: Organics, Unknown (sat'd.)	50 50	-	-	-	-	-/-	-	40	-	-/-	-/-
Formic Acid, Vapor	10	-	-	-	-	-/-	-	195	-	-/-	195/-
Fossil Fuel, Sulfur Dioxide Removal (limestone injection mist after scrubber, pH 2 - 12)		-	-	-	-	-/-	-	140	-	-/-	-/-
Fourdrinier Drying Section Fumes		-	-	-	-	-/-	-	130	-	-/-	130/90
Fourdrinier Liquor		-	-	-	-	-/-	-	120	-	-/-	-/-
Freon 2	100	-	-	-	100	75/75	75	-	100	-/-	-/-
Fruit Juices		-	-	-	-	-/-	-	-	-	90/-	-/-
Fuel Oil, #1 and #2	100	-	170	170	170	170/170	170	170	170	170/130	170/-
Fuel Oil, Naval, MIL-F-859A	100	-	-	-	-	-/-	-	175	-	-/-	175/-
Fumigant, VIDDEN D (conc.)		-	-	-	-	-/-	-	NR	120	-/-	-/-
Fumigant, Soil (sat'd.)		-	-	-	-	-/-	-	NR	120	-/-	NR/-
Fumigants (conc.)		-	-	-	-	-/-	-	NR	120	NR/NR	NR/-
Fungicide, Phenate Based	100	-	-	-	-	-/-	-	125	-	125/125	90/-
Fungus, 95% Relative Humidity (MIL E-5272C, Aspergillus Flavus (10836), Chaetomium Globosum (6205), Memenoniella Echinata (9597), Penicillium Citrinum (9849))		-	-	-	-	-/-	-	85	-	85/85	85/-
Furfural	5	-	150	150	150	120/120	150	90	225	-/-	90/90
Furfural	10	-	-	-	120	100/120	-	-	225	-/-	-/-
Furfural	100	NR	NR	NR	NR	NR/NR	NR	-	225	NR/NR	NR/-
Furfuryl Alcohol	100	NR	-	-	80	-/-	-	100	225	-/-	-/-
Furnace Oil	100	-	-	-	-	-/-	-	-	-	90/-	-/-
G-61	100	-	-	-	-	-/-	-	125	-	-/-	-/-
Gallic Acid (sat'd.)		-	-	-	100	-/-	-	80	250	-/-	-/-
Gallotannin	100	-	-	-	-	-/-	-	200	-	-/-	-/-
Galvanizing Line Fumes		-	-	-	-	-/-	-	200	-	-/-	-/-
Garbage Incinerator (water scrubber and fumes)		-	-	-	-	-/-	-	180	-	-/-	-/-
Gas Oil (dirty, refinery)		-	-	-	-	-/-	-	-	-	90/-	-/-
Gasohol (contact laboratory for specific gasohol blend)	100	-	-	-	-	-/-	-	-	-	-/-	-/-
Gasoline (contact laboratory for specific gasoline)	100	-	-	-	-	-/-	-	-	-	-/-	-/-
Gelatin		-	-	-	-	-/-	-	-	-	100/NR	-/-
GLOBRITE 15		-	-	-	-	180/180	180	160	-	160/100	-/-
GLOBRITE X-200		-	-	-	-	100/100	100	100	100	100/100	-/-
Gluconic Acid	50	-	-	-	-	100/100	125	125	-	125/125	-/120
Glucose	100	250	250	250	250	210/210	220	180	-	180/150	180/180
Glycerine	100	210	-	-	210	210/210	220	200	250	180/150	200/200
Glycerine (in salt saturated water)	70	-	-	-	-	-/-	-	240	-	-/-	-/-
Glycerol Dibromohydrin	100	-	-	-	-	-/-	-	-	105	-/-	-/-
Glycerol Dichlorohydrin	100	-	-	-	-	-/-	-	-	125	-/-	-/-
Glycerol Monochlorohydrin	100	-	-	-	-	-/-	-	-	125	-/-	-/-
Glycolic Acid	35	-	200	200	200	180/180	200	140	200	140/120	140/140
Glycolic Acid	70	100	100	100	100	100/100	100	100	200	100/100	120/120
Glyoxal	40	100	-	-	100	80/80	80	-	-	-/-	-/-
Glyoxylic Acid	25	-	-	-	-	LS215/LS215	-	NR	NR	NR/NR	NR/-
Gold Pickling (with sulfuric acid)	25	-	150	150	150	150/150	150	150	-	150/-	-/-
Gold Plating (pH 4.4)		-	-	-	-	-/-	-	-	-	-/-	-/-
Gold Metal Plating (23% potassium ferrocyanide with potassium gold cyanide and sodium cyanide)		100	200	200	100	200/200	200	200	-	-/-	-/-
GOLDEN-GLO		-	100	100	-	100/100	100	100	-	100/100	-/-
Green Liquor (pulp mill)		180	180	180	180	180/180	180	NR	-	NR/NR	NR/-
Gypsum Slurry Cooler (fertilizer plant)		-	-	-	-	-/-	-	190	-	-/-	-/-
Gypsum Slurry: Phosphoric Acid, 1% (trace of hydrogen fluoride)		-	-	-	-	-/-	-	100	-	-/-	-/-
HALSO 99	100	-	-	-	-	NR/NR	-	NR	90	NR/NR	NR/NR
Heptane (traces of hydrochloric acid, water and other heavy organics)		-	-	-	-	-/-	-	210	-	-/-	-/-
Heptane, normal	100	210	200	200	210	200/200	200	200	250	200/-	90/120
Heptane, Vapor and Condensate	100	-	210	210	210	120/120	120	120	-	-/-	120/120
Herbicide Powder and Fumes		-	-	-	-	-/-	-	100	-	-/-	-/-
Herbicide, Liquid	10	-	-	-	120	-/-	-	120	120	80/NR	-/-
Hexachlorocyclopentadiene	100	-	-	-	-	180/180	180	200	200	NR/NR	80/-
Hexachlorocyclopentadiene (high purity)	100	-	-	-	-	-/-	-	90	-	-/-	90/-

TEMPERATURE (°F) FOR RESIN TYPES

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		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Hexachloroendomethylene (hexachloroendomethylene tetrahydrophthalic anhydride, wet) . .	100	-	-	-	-	-/-	-	80	-	-/-	80/-
Hexamethylenetetramine	28	-	-	-	120	-/-	-	80	-	-/-	80/-
Hexane	100	160	160	160	160	160/160	160	160	160	160/160	-/-
Hexylene Glycol Ammonium Chloride		-	120	120	-	120/120	120	120	120	120/120	120/-
Humid Air (trace of sulfur fumes) . . .		-	-	-	-	200/200	200	200	-	200/150	-/-
Hydraulic Fluid (Ashland)	100	-	-	-	180	-/-	-	250	-	-/-	-/-
Hydraulic Fluid (SKYDROL 500) . . .	100	-	-	-	180	150/150	180	180	-	130/100	-/-
Hydrazine	10	-	-	-	NR	-/-	-	100	-	-/-	-/-
Hydrazine	70	NR	NR	NR	NR	NR/NR	NR	NR	LS100	NR/NR	NR/-
Hydrazine Sulfate (sat'd.)		-	-	-	-	-/-	-	-	225	-/-	-/-
Hydriodic Acid	58	-	-	-	150	-/-	-	-	250	NR/NR	-/-
Hydrobromic Acid	1	180	220	220	220	210/210	220	200	-	160/100	-160
Hydrobromic Acid	18	180	200	200	200	200/200	200	200	-	160/100	-160
Hydrobromic Acid	25	160	160	160	160	160/160	160	200	NR	160/-	-/-
Hydrobromic Acid	48	-	220	220	220	210/210	220	200	-	160/100	-160
Hydrobromic Acid: Copper Oxide (trace of bromine)	50 5	-	-	-	-	-/-	-	90	-	-/-	-/-
Hydrobromic Acid, Fumes	100	-	-	-	-	-/-	-	290	-	-/-	-/-
Hydrocarbon Alkylation		-	-	-	-	-/-	-	120	-	-/-	-/-
Hydrocarbons: Ferric Chloride Mist		-	-	-	-	-/-	-	250	-	-/-	-/-
Hydrochloric Acid (muriatic acid)											
Footnote 22	1	210	220	220	230	210/210	220	230	230	160/120	210/210
Hydrochloric Acid	5	210	220	220	230	210/210	220	230	230	160/120	210/210
Hydrochloric Acid	10	210	220	220	230	210/210	220	230	230	160/120	210/210
Hydrochloric Acid	15	210	220	220	230	210/210	220	230	230	160/120	210/210
Hydrochloric Acid	20	200	200	200	230	200/200	200	230	180	120/NR	210/210
Hydrochloric Acid	25	180	180	180	180	180/180	180	180	150	120/NR	150/150
Hydrochloric Acid	32	150	150	150	180	150/150	150	180	150	NR/NR	100/100
Hydrochloric Acid	36	125	125	125	160	125/125	125	150	125	NR/NR	210/210
Hydrochloric Acid	37	100	100	100	125	100/100	100	100	NR	NR/NR	210/210
Hydrochloric Acid (traces of octyl, decyl, butyl, and phosphorous chlorides, also phenol and phosphorous trichloride) Footnote 22	37	-	-	-	-	-/-	-	100	-	-/-	-/-
Hydrochloric Acid (trace of 2,6 dichloro-4-nitroaniline) .	32	-	-	-	-	-/-	-	170	-	NR/NR	-/-
Hydrochloric Acid (trace of 2,6 dichloro-4-aniline)	32	-	-	-	-	LS170/LS170	-	LS170	-	LS170/LS170	-/-
Hydrochloric Acid (trace of acetone)		-	-	-	-	120/120	120	-	-	-/-	-/-
Hydrochloric Acid (conc., traces of aqua regia and phenol) Footnote 22		-	-	-	-	-/-	-	80	-	-/-	-/-
Hydrochloric Acid (free chlorine) . . .	100	230	230	230	230	-/-	-	200	NR	-/-	200/-
Hydrochloric Acid (traces of chlorotoluene and toluene)	30	-	-	-	-	-/-	-	140	-	-/-	-/-
Hydrochloric Acid (traces of cresylic acid and phenol)	32	-	-	-	-	NR/NR	-	LS175	-	LS175/LS175	NR/-
Hydrochloric Acid (trace of organics)	36	-	-	-	-	NR/NR	NR	80	-	80/80	-/-
Hydrochloric Acid (with sat'd. ferrous chloride)	15	-	-	-	-	-/-	-	240	-	-/-	NR/-
Hydrochloric Acid: Acetic Acid	20 50	-	-	-	-	-/-	-	90	-	-/-	90/-
Hydrochloric Acid: Acetic Acid	18.5 50	-	-	-	-	-/-	-	85	-	-/-	85/85
Hydrochloric Acid: Amine											
Footnote 22	1.1 2.9	-	-	-	-	200/200	200	200	-	-/-	-/-
Hydrochloric Acid: Ammonium Thiocyanate		-	-	-	-	-/-	-	180	-	-/-	-/-
Hydrochloric Acid: Aromatic Sulfonic Acid: Sulfuric Acid (trace of chlorine)	25	-	-	-	-	-/-	-	80	-	-/-	-/-
Hydrochloric Acid: Benzene (wet) . .		80	-	-	-	-/-	-	90	-	-/-	90/-
Hydrochloric Acid: Brighteners											
Footnote 22	10 30	-	-	-	-	-/-	-	120	-	-/-	-/-
Hydrochloric Acid: Chlorine: Water (chlorinated organics)		-	-	-	-	NR/NR	-	80	-	-/-	-/-
Hydrochloric Acid: Cupric Chloride (monel & nickel cleaning baths)		-	-	-	-	-/-	-	180	-	-/-	-/-
Hydrochloric Acid: Dichloro-(2,6)-Aniline-(4)-	32	-	-	-	-	LS170/LS170	-	LS170	170	LS170/NR	-/-
Hydrochloric Acid: Ferric Chloride . .	18.5 29	-	-	-	180	180/180	-	180	-	-/-	-/-
Hydrochloric Acid: Ferric Sulfate (monel & nickel cleaning baths)		-	-	-	-	-/-	-	180	-	-/-	-/-
Hydrochloric Acid: Fluoride Salts											
Footnote 1	10 30	120	-	-	-	-/-	-	120	-	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Hydrochloric Acid: Hydrofluoric Acid (trace of HAI 75 inhibitor) .Footnote 1	12 3	-	-	-	-	150/150	150	-	-	-/-	-/-
Hydrochloric Acid: Hydrofluoric Acid: Nitric AcidFootnote 1	77 13 10	-	-	-	-	-/-	-	100	-	-/-	-/-
Hydrochloric Acid: Inerts (traces of alkyl dimethyl benzyl ammonium chloride and tributyl tin chloride/ethylene oxide/amine)	23 77	-	-	-	-	100/100	100	100	100	-/-	-/-
Hydrochloric Acid: Methyl Isobutyl Ketone: Ammonium Thiocyanate	15	-	-	-	-	-/-	-	200	-	-/-	-/-
Hydrochloric Acid: Methylamino Ether: Methanol (traces of isobutyronitrile and impurities)	23 74 2	-	-	-	-	-/-	-	80	80	-/-	-/-
Hydrochloric Acid: Nitric AcidFootnote 3	10 10	-	-	-	-	200/200	200	200	-	NR/NR	-/-
Hydrochloric Acid: Nitric AcidFootnote 22	20 5	-	-	-	-	-/-	-	210	-	-/-	-/-
Hydrochloric Acid: Nitric Acid: Sulfuric AcidFootnote 3	30 12 20	-	-	-	-	-/-	-	90	-	-/-	-/-
Hydrochloric Acid: Phosphoric Acid (saturated with phosphorous)	9 15	-	-	-	-	-/-	-	220	-	-/-	-/-
Hydrochloric Acid: Phosphoric Acid (saturated with chlorine)	9 15	210	210	210	210	-/-	-	220	-	-/-	-/-
Hydrochloric Acid: Phosphoric Acid: Hydrofluoric Acid (concentration in ppm) . .Footnote 1	1 85 500	-	-	-	-	-/-	-	230	-	NR/NR	-/-
Hydrochloric Acid: Phosphorus Acid	2 70	-	180	180	-	180/180	180	180	-	120/-	-/-
Hydrochloric Acid: Pigment Slurry: Water (trace of sodium chloride)	3 8 88	-	-	-	-	-/-	-	200	-	-/-	NR/-
Hydrochloric Acid: Silicone Oil	21 79	-	-	-	-	-/-	-	195	-	-/-	-/-
Hydrochloric Acid: Sodium Chloride (saturated with sodium chloride)	5	-	210	210	-	210/210	210	-	-	-/-	-/-
Hydrochloric Acid: Sulfuric Acid	14 45	-	-	-	-	-/-	-	140	-	-/-	-/-
Hydrochloric Acid: Sulfuric Acid (iron and steel cleaning bath)	9 23	-	210	210	210	200/200	200	180	-	-/-	-/-
Hydrochloric Acid: Sulfuric Acid: Antimony Trioxide	15 35 5	-	-	-	-	-/-	-	100	-	-/-	-/-
Hydrochloric Acid: Sulfuric Acid: Water (nitric acid = 10% of concentration)	30 20 40	-	-	-	-	-/-	-	90	-	-/-	-/-
Hydrochloric Acid: Terephthalic Acid: Water (dimethylformamide = 7% of concentration)	28 14 51	-	-	-	-	-/-	-	100	100	-/-	-/-
Hydrochloric Acid: Trimethylamine	37 100	-	-	-	-	-/-	-	130	-	-/-	-/-
Hydrochloric Acid: Trimethylamine (ethylene oxide reaction)		-	-	-	-	-/-	-	NR	-	-/-	-/-
Hydrochloric Acid, 10% (HCl 10% by volume with ferric and ferrous chlorides, pH 1)	10	-	-	-	-	-/-	-	120	-	-/-	-/-
Hydrochloric Acid, 12%: Ammonia, Aqueous (pH to 0.3)		-	-	-	-	180/180	180	180	-	-/-	-/-
Hydrochloric Acid, 28%: Xylene (hydrochloric acid with inhibitor)	50 50	-	-	-	-	75/75	75	-	-	-/-	-/-
Hydrochloric Acid, 32%: Methyl Alcohol (inhibitor)	44 56	-	-	-	-	75/75	75	-	-	-/-	-/-
Hydrochloric Acid, 33% (trace of amine)Footnote 22	98.8	-	-	-	-	-/-	-	80	-	-/-	-/-
Hydrochloric Acid, Fumes (pickling tank covers)	30	-	-	-	-	-/-	-	215	-	-/-	-/-
Hydrochloric Acid, Fumes: Sulfur Dioxide, Fumes: Sulfur Trioxide, Fumes (sulfuric acid, caustic and water fumes)		-	-	-	-	-/-	-	190	-	-/-	-/-
Hydrochloric Acid, VaporFootnote 22	32	210	210	210	210	210/210	-	225	-	-/-	-/-
Hydrochloric Acid, Vapor: Methyl Alcohol, Vapor: Water, VaporFootnote 17	2 93 5	-	-	-	-	NR/NR	NR	LS150	100	-/-	-/-
Hydrochloric Acid, Vapors: Chlorine, Vapors: Phosphorus Oxychloride, Vapors (water vapors)		-	-	-	-	-/-	-	90	-	-/-	90/-
Hydrochloric Acid, Vapors: Chlorine, Vapors: Phosphorus Trichloride, Vapors (water vapors)	100	-	-	-	-	-/-	-	160	-	-/-	-/-
Hydrocyanic Acid (sat'd.)		210	150	150	210	150/150	150	200	-	100/-	200/200

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Hydrofluoric Acid . .Footnotes 1, 23	1	150	150	150	150	150/150	150	150	NR	100/100	100/100
Hydrofluoric Acid . .Footnotes 1, 23	5	120	120	120	150	120/120	120	120	NR	LS80/100	100/100
Hydrofluoric Acid . .Footnotes 1, 23	10	100	100	100	100	100/100	100	100	NR	NR/100	100/100
Hydrofluoric Acid . .Footnotes 1, 23	15	90	90	90	90	90/90	90	90	NR	NR/100	NR/100
Hydrofluoric Acid . .Footnotes 1, 23	20	LS80	LS90	LS90	90	LS80/LS80	LS90	90	NR	NR/100	NR/100
Hydrofluoric Acid . .Footnotes 1, 23	22	NR	NR	NR	NR	NR/100	NR	90	NR	NR/100	NR/100
Hydrofluoric Acid . .Footnotes 1, 23	40	NR	NR	NR	NR	NR/100	NR	90	NR	NR/100	NR/100
Hydrofluoric Acid: Chromic Acid:											
Nitric AcidFootnotes 1,3	1.5 6 2	-	-	-	-	-/-	-	80	-	-/-	-/-
Hydrofluoric Acid: Chromic Acid:											
Nitric AcidFootnotes 1,3	3 6 2	-	-	-	-	-/-	-	80	-	-/-	-/-
Hydrofluoric Acid: Chromic Acid:											
Phosphoric Acid . .Footnotes 1,3	2 7 40	-	-	-	-	-/-	-	100	-	-/-	-/-
Hydrofluoric Acid: Chromic Acid:											
Phosphoric Acid . .Footnotes 1,3	11 9 8	-	-	-	-	-/-	-	100	-	-/-	-/-
Hydrofluoric Acid: Fluorides:											
Methyl Isobutyl Ketone (concentrations in g/l) . .Footnote 1	40 300	-	-	-	-	-/-	-	80	-	-/-	-/-
Hydrofluoric Acid: Hydrochloric Acid (trace of HAI 75 inhibitor) Footnote 1	3 12	-	-	-	-	150/150	150	-	-	-/-	-/-
Hydrofluoric Acid: Hydrochloric Acid:											
Nitric AcidFootnote 1	13 77 10	-	-	-	-	-/-	-	100	-	-/-	-/-
Hydrofluoric Acid: Hydrochloric Acid:											
Phosphoric Acid (concentrations in ppm)Footnote 1	500 1 85	-	-	-	-	-/-	-	230	-	NR/100	-/-
Hydrofluoric Acid: Nitric AcidFootnotes 1,3	2.5 7.5	-	-	-	-	-/-	-	165	-	-/-	-/-
Hydrofluoric Acid: Nitric AcidFootnotes 1,3	3 20	-	-	-	-	-/-	-	135	-	-/-	-/-
Hydrofluoric Acid: Nitric Acid (pickling solution) . . .Footnotes 1,3	3.5 20	-	-	-	-	100/100	100	100	-	-/-	-/-
Hydrofluoric Acid: Nitric AcidFootnotes 1,3	5 15	-	-	-	-	-/-	-	165	-	-/-	-/-
Hydrofluoric Acid: Sulfuric Acid: Sodium Dichromate (hydrochloric acid, 60% by volume) . .Footnote 1	20 28 3	-	-	-	-	-/-	-	120	-	-/-	-/-
Hydrofluoric Acid, Fumes: Air: Phosphorus Pentoxide, FumesFootnote 1		-	-	-	-	-/-	-	315	-	-/-	-/-
Hydrofluoric Acid, VaporsFootnotes 1,3	35	120	120	120	120	120/120	120	120	-	-/-	LS80/LS80
Hydrofluoric Acid, Vapors: Nitric Acid, Vapors . .Footnotes 1,3	5 35	-	-	-	-	-/-	-	200	-	-/-	-/-
Hydrofluosilicic Acid . . .Footnote 1	10	180	180	180	180	150/150	150	180	-	100/-	100/100
Hydrofluosilicic Acid . .Footnote 1	35	100	100	100	100	100/100	100	160	-	NR/100	NR/100
Hydrofluosilicic Acid: Ammonia: Ammonium Nitrate (nitric acid = 2.5% of concentration, traces of phosphoric & sulfuric acids, wet vapor)Footnote 1	2.5 15 5	-	-	-	-	-/-	-	250	-	-/-	-/-
Hydrofluosilicic Acid: Chromic Acid: Sulfuric Acid (concentrations in oz/gal, chrome plating)Footnotes 1,2	.5 45 .3	-	-	-	150	-/-	-	115	-	-/-	-/-
Hydrogen Bromide: Aniline Hydrochloride: Water (hydrochloric acid = 1.5% and bromine = 1% of concentration)Footnote 1	4.5 15 78	-	-	-	-	140/140	140	140	140	-/-	-/-
Hydrogen Bromide, DryFootnote 1	100	-	180	180	180	180/180	180	200	-	90/90	90/90
Hydrogen Bromide, WetFootnote 1	100	-	180	180	180	180/180	180	180	-	90/90	-/-
Hydrogen Chloride (chlorine, chlorine dioxide, chlorine monoxide, hydrogen, nitrogen, and oxygen)Footnote 1		-	-	-	-	-/-	-	90	-	-/-	-/-
Hydrogen Chloride Gas (chlorine upsets to 392°F)Footnote 1		-	-	-	-	-/-	-	350	-	-/-	-/-
Hydrogen Chloride Gas, Dry FumesFootnote 1	100	250	250	250	350	210/210	220	350	-	120/120	-/-
Hydrogen Chloride Gas, WetFootnote 1	100	220	220	220	220	210/210	220	230	-	120/120	120/120
Hydrogen Chloride: Chlorine (hydrogen chloride saturated with tetrachlorocyclopentane, carbon tetrachloride, trace of hexachlorocyclopentane)Footnote 1	65 35	-	-	-	-	-/-	-	125	-	-/-	-/-
Hydrogen Chloride, AbsorberFootnote 1	36	-	-	-	-	-/-	-	235	-	NR/100	-/-
Hydrogen Chloride, AnhydrousFootnote 1	100	-	-	-	-	-/-	-	250	-	90/90	250/250
Hydrogen Chloride, SteamFootnote 1		-	-	-	-	-/-	-	240	-	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT		High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service	
		CONCENTRATION %	HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Hydrogen Chloride, Vapor:			-	-	-	-	-/-	-	85	-	-/-	-/-
Benzene, Vapor			-	-	-	-	-/-	-	85	-	-/-	-/-
Hydrogen Fluoride, Vapor			-	-	-	180	-/-	-	95	-	-/-	95/95
Footnote 1		35	-	-	-	180	-/-	-	95	-	-/-	95/95
Hydrogen Fluoride, Wet			-	200	200	180	180/180	200	160	-	-/-	90/90
Footnote 1		12	-	200	200	180	180/180	200	160	-	-/-	90/90
Hydrogen Fluoride, Wet			-	-	-	90	90/90	90	-	-	90/90	90/90
Footnote 1		100	-	-	-	90	90/90	90	-	-	90/90	90/90
Hydrogen Iodide: Sulfuric Acid (concentration in g/l)		66 25	-	-	-	-	-/-	-	160	-	-/-	-/-
Hydrogen Iodide, Vapor:			-	-	-	-	-/-	-	150	-	-/-	150/-
Iodine, Vapor			-	-	-	-	-/-	-	150	-	-/-	150/-
Hydrogen Peroxide			-	150	150	150	150/150	150	210	-	150/NR	-/-
Footnotes 2,3,20,21		5	-	150	150	150	150/150	150	210	-	150/NR	-/-
Hydrogen Peroxide		30	100	150	150	150	100/100	100	-	-	-/-	-/-
Footnotes 2,20		35	-	-	-	-	105/105	-	105	NR	-/-	105/120
Hydrogen Peroxide		50	-	-	-	-	-/-	-	100	NR	NR/NR	100/-
Footnote 20		50	-	-	-	-	-/-	-	100	NR	NR/NR	100/-
Hydrogen Peroxide (with caustic bleach, pH <10.7)			-	-	-	-	150/150	150	100	-	90/90	-/-
Footnotes 2,20		1.5 95	-	-	-	-	-/-	-	90	-	-/-	90/90
Hydrogen Peroxide: Acetic Acid			-	-	-	-	-/-	-	90	-	-/-	90/90
Footnote 20		1.5 95	-	-	-	-	-/-	-	90	-	-/-	90/90
Hydrogen Peroxide: Sulfuric Acid (traces of zinc sulfate, sodium sulfide and oxygen)		2 1.5	-	210	210	-	210/210	210	-	-	-/-	-/-
Hydrogen Peroxide, Vapor & Condensate		5	-	-	-	-	-/-	-	120	-	-/-	120/-
Footnotes 2,20		5	-	-	-	-	-/-	-	120	-	-/-	120/-
Hydrogen Peroxide, Vapors			-	-	-	-	-/-	-	140	140	-/-	100/100
Footnotes 2,20		50	-	-	-	-	-/-	-	140	140	-/-	100/100
Hydrogen Sulfide		100	210	210	210	210	210/210	220	250	250	140/140	250/250
Hydrogen Sulfide (sewer gas)			-	-	-	-	90/90	90	90	90	90/90	90/-
Hydrogen Sulfide: Sulfur Dioxide:			-	-	-	-	-/-	-	100	NR	-/-	-/-
Sulfur (electrostatic precipitators)			-	-	-	-	-/-	-	280	-	-/-	-/-
Hydrogen Sulfide, Fumes, Wet			-	-	-	-	-/-	-	-	-	-/-	150/-
Hydrogen: Ozone			-	-	-	-	-/-	-	100	NR	-/-	-/-
Footnote 21		35	-	200	200	100	180/180	200	140	-	140/120	140/140
Hydroxyacetic Acid		70	100	100	100	100	100/100	100	100	-	120/120	120/120
Hydroxyacetic Acid			100	100	100	100	100/100	100	100	-	120/120	120/120
Hydroxyacetic Acid: Phosphoric Acid: Sulfuric Acid		29 51 20	-	-	-	-	-/-	-	245	-	-/-	-/-
Footnote 2		29 51 20	-	-	-	-	-/-	-	245	-	-/-	-/-
Hydroxylamine Acid Sulfate: Sulfuric Acid (sat'd. hydroxylamine acid sulfate)		70	-	-	-	-	-/-	-	125	-	-/-	-/-
Hydroxylammonium Acid Sulfate (also hydroxylamine acid sulfate)		90	-	-	-	-	-/-	-	210	-	-/-	-/-
Hydroxylammonium Acid Sulfate: Propionic Acid: Water		89 1 10	-	-	-	-	-/-	-	175	-	-/-	-/-
Hydroxylammonium Acid Sulfate: Sulfuric Acid		90 10	-	-	-	-	-/-	-	180	-	-/-	-/-
Hydroxylammonium Acid Sulfate: Sulfuric Acid: Water		11 75 14	-	-	-	-	-/-	-	100	-	-/-	-/-
Footnote 4		11 75 14	-	-	-	-	-/-	-	100	-	-/-	-/-
Hydroxylammonium Acid Sulfate: Sulfuric Acid: Water		20 60 20	-	-	-	-	-/-	-	100	-	-/-	-/-
Footnote 4		20 60 20	-	-	-	-	-/-	-	100	-	-/-	-/-
Hypochlorous Acid		10	-	-	-	-	150/150	150	105	NR	105/105	105/105
Hypochlorous Acid		20	-	-	-	-	120/120	120	90	NR	90/NR	90/90
Hypochlorous Acid (conc.)			-	-	-	-	90/90	90	90	NR	90/NR	90/90
Hypophosphoric Acid		50	-	100	100	-	100/100	100	-	-	-/-	-/-
Hypophosphorous Acid		50	120	90	90	120	90/90	90	115	115	-/-	-/-
IGEPAL CO-630		100	-	-	-	-	-/-	-	105	-	-/-	-/-
Iminoethyl Alcohol		100	-	-	-	-	-/-	-	110	-	-/-	-/-
Incinerator, Flue Gas Fumes			-	-	-	-	-/-	-	300	-	-/-	-/-
Footnote 21			-	-	-	-	-/-	-	300	-	-/-	-/-
Inerts: Hydrochloric Acid (traces of alkyl dimethyl benzyl ammonium chloride and tributyl tin chloride/ethylene oxide/amine)		77 23	-	-	-	-	100/100	100	100	100	-/-	-/-
Inerts: Isopropyl Alcohol: Sodium Xylene Sulfate (traces of potassium ricinoleate and o-phenylphenol)		67 10 10	-	-	-	-	100/100	100	100	100	-/-	-/-
Inerts: Phosphoric Acid (trace of alkyl dimethyl benzyl ammonium chloride)		75 25	-	100	100	-	100/100	100	100	100	-/-	-/-
Iodine Vapor		100	150	-	-	180	-/-	-	175	-	-/-	175/180
Iodine, Vapor: Hydrogen Iodide, Vapor			-	-	-	-	-/-	-	150	-	-/-	150/-
IRGASOL DA		100	-	-	-	-	90/90	90	90	-	-/-	-/-
Iron Perchloride		20	-	-	-	-	-/-	-	-	-	-/-	140/140

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Iron Metal Plating (45% iron chloride, 15% calcium chloride, 20% iron sulfate, 11% ammonia sulfate)		250	180	180	250	180/180	180	180	-	-/-	-/-
Iron: Sulfuric Acid: Copper (5 g/l zinc slurry/thickener)	10 10 80	-	-	-	-	-/-	-	180	-	-/-	-/-
Isoamyl Alcohol	100	120	120	120	120	100/100	120	-	265	-/-	-/-
ISOCURE 306,308,608	100	-	-	-	-	90/90	90	90	90	90/90	-/-
Iso-Decanol	100	120	180	180	180	180/180	180	150	180	160/-	-/-
ISOPREP 33 (5 oz/gal)		-	-	-	-	165/165	165	-	165	165/150	-/-
ISOPREP 44 (10 oz/gal)		-	-	-	-	180/180	180	-	180	NR/NR	-/-
Isopropyl Alcohol	10	120	120	120	120	80/80	100	160	150	130/80	-/-
Isopropyl Alcohol	100	120	120	120	120	80/80	100	90	150	80/NR	-/90
Isopropyl Alcohol: Sodium Xylene Sulfate: Inerts (traces of potassium ricinoleate and o-phenylphenol)	10 10 67	-	-	-	-	100/100	100	100	100	-/-	-/-
Isopropyl Amine	100	120	120	120	120	100/100	120	90	120	-/-	-/-
Isopropyl Palmitate	100	230	-	-	230	210/210	220	-	-	180/-	-/180
Itaconic Acid	25	120	210	210	120	120/120	210	95	-	-/-	-/-
Itaconic Acid (methylene succinic acid)	10	-	210	210	120	120/120	210	100	-	-/-	-/-
Jet Fuel A (recommendation same for Jet Fuel PFB)Footnote 21	100	-	-	-	-	-/-	-	-	-	90/-	-/-
Jet Fuel, JP-4Footnote 21	100	120	120	120	120	120/120	120	-	-	120/100	-/-
JM-235 & JM-271 (adhesives)Footnote 21	100	-	-	-	-	100/100	100	100	100	100/100	-/-
JP-9 Fuel, JP-10 FuelFootnote 21	100	-	-	-	-	-/-	-	-	-	80/80	-/-
Kaolin Slurry		-	-	-	-	-/-	-	80	-	80/80	-/-
Kerosene	100	180	180	180	180	175/175	175	180	-	175/150	175/120
Kerosene: Organics: Phosphoric Acid (isodecanol, 10%)	70 20 30	-	-	-	-	-/-	-	150	150	-/-	-/-
Kerosene: Xylene: Phosphoric Acid, 85%	33 33 33	-	-	-	-	-/-	-	100	-	-/-	-/-
Kerosene, Vapor and Condensate	100	-	-	-	-	-/-	-	120	-	-/-	120/120
Knotter, Fumes		-	-	-	-	-/-	-	180	-	-/-	-/-
KYMENE, Resin Solution	40	-	-	-	-	-/-	-	90	-	-/-	-/-
Lactic Acid	100	210	210	210	210	210/210	220	200	225	160/130	200/200
Lactic Acid: Citric Acid (sat'd.)		-	-	-	-	-/-	-	150	-	-/-	-/-
LASSO EC	100	-	-	-	-	80/80	100	80	80	-/-	-/-
LASSO Herbicide (1 to 10 dilution)Footnote 4		-	-	-	-	-/-	-	120	120	-/-	-/-
Latex, Acrylic	100	120	120	120	120	100/100	100	-	-	-/-	-/-
Latex, Dispersion in Water	100	-	120	120	120	100/100	100	100	100	-/-	-/-
Latex, Rubber	100	-	120	120	120	100/100	100	-	-	-/-	-/-
Latex, Vinyl	100	-	120	120	120	100/100	100	-	-	-/-	-/-
Lauric Acid (sat'd.)		-	-	-	-	210/210	220	-	-	160/130	-/-
Lauric/Myristic Monoethanolamide: Sodium Xylene Sulfonate (solution)		-	-	-	-	120/120	120	120	-	-/-	-/-
Lauryl Alcohol (n-dodecanol)	100	180	180	180	180	120/120	120	120	-	120/-	-/-
Lauryl Chloride	100	210	-	-	-	-/-	-	210	-	-/-	-/-
Lauryl Chloride, Crude, Acidic	100	210	-	-	-	-/-	-	210	-	-/-	-/-
Lauryl Mercaptan	100	150	-	-	150	-/-	-	120	-	-/-	-/-
Lauryl Pyridinium Chloride	10	-	-	-	-	-/-	-	155	-	-/-	-/-
Lead Acetate	100	230	230	230	230	210/210	220	160	-	160/-	160/160
Lead Chloride (sat'd.)		-	220	220	-	210/210	220	-	225	-/-	-/-
Lead Nitrate (sat'd.)		-	220	220	-	210/210	220	-	225	-/-	-/-
Lead Metal Plating (alkaline, 8% lead acetate, 20% sodium hydroxide)		-	-	-	-	180/180	180	NR	-	-/-	NR/NR
Lead Metal Plating (8% lead with fluoroboric and boric acids)Footnote 1		-	NR	NR	-	200/200	200	200	-	-/-	-/-
Lead Sulfur: Copper Oxide (10% ferric oxide, 8% zinc sulfate, 3% bismuth sulfate dust)	25 25 18	-	-	-	-	-/-	-	200	-	-/-	-/-
Levulinic Acid (sat'd., 4-oxopentanoic acid)		230	220	220	230	210/210	220	-	225	160/-	-/-
Light Gas Cycle Storage		-	-	-	-	-/-	-	-	-	90/-	-/-
Lignin: Spent Acid: Tall Oil, Crude (sulfuric acid = 1% of concentration, pH 3)	60 29 10	-	-	-	-	NR/NR	-	200	200	-/-	-/-
Ligno-Sulfonic Acid		-	-	-	-	-/-	-	90	-	-/-	-/-
Lime Kiln Stack Gases		-	-	-	-	-/-	-	300	-	-/-	-/-
Lime Slurry (sat'd.)		-	170	170	-	170/170	170	180	-	150/80	180/180
Lime, Thiosorbic (sat'd.)		-	-	-	-	-/-	-	150	-	-/-	-/-
Linear Alkylate Sulfonates (conc.)		-	-	-	-	-/-	-	100	-	-/-	-/-
Linoleic Acid	100	-	-	-	-	-/-	-	-	-	160/-	-/-
Linseed Oil	100	230	220	220	230	210/210	220	200	-	160/130	150/-
Linseed Oil, Chlorinated		-	-	-	-	-/-	-	90	-	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Liquid Cleaner (all purpose, biodegradable)	100	-	-	-	-	100/100	100	100	-	100/100	-/-
Lithium Bromide	100	210	220	220	250	210/210	220	180	-	-/-	-/-
Lithium Carbonate (sat'd.)		180	180	180	180	150/150	150	180	-	-/-	NR/-
Lithium Chloride	45	-	220	220	210	210/210	220	250	-	-/-	250/-
Lithium Chloride (sat'd.)		210	220	220	210	210/210	220	160	-	160/-	160/160
Lithium Chloride: Methyl Alcohol		-	-	-	-	-/-	-	100	-	-/-	-/-
Footnote 17	25 75	180	-	-	NR	150/150	150	NR	-	-/-	NR/-
Lithium Hydroxide (sat'd.)		-	220	220	-	210/210	220	200	-	-/-	-/-
Lithium Sulfate	100	-	-	-	-	-	-	-	-	-/-	-/-
Livestock Spray Base (Shell's): Cobalt di (2 ethyl hexyl) Phosphate: Tri-m-butyl Phosphate	65 30 5	-	-	-	-	-/-	-	180	-	-/-	-/-
LIX 64N	100	-	-	-	-	-/-	-	115	-	-/-	-/-
LPC	10	-	-	-	-	-/-	-	155	-	-/-	-/-
Magnesite Mill Spent Liquor		-	-	-	-	-/-	-	150	-	-/-	-/-
Magnesite Recovery Boiler Blow Down (acetic, sulfuric, sulfurous, formic acids, acetone)		-	-	-	-	-/-	-	210	-	NR/130	-/-
Magnesium Bicarbonate (sat'd.)		-	180	180	180	180/180	180	180	-	180/130	-/150
Magnesium Bisulfite	100	180	180	180	180	180/180	180	180	-	-/-	-/-
Magnesium Bisulfite Acid Liquor: Sulfur Dioxide (chlorides, pH 4.5 - 5)		-	-	-	-	-/-	-	180	-	-/-	-/-
Footnote 7	5	-	-	-	-	-/-	-	180	-	-/-	-/-
Magnesium Carbonate (sat'd.)		180	180	180	180	180/180	180	160	-	180/150	160/160
Magnesium Chloride (sat'd.)		250	250	250	250	210/210	220	220	220	180/150	220/220
Magnesium Chloride (hexahydrate, filter aid, activated carbon)	66	-	-	-	-	-/-	-	310	-	-/-	-/-
Magnesium Chloride: Calcium Chloride: Sodium Chloride	2 10 12	-	-	-	-	-/-	-	150	-	-/-	-/-
Magnesium Hydroxide (sat'd.)		210	NR	NR	NR	210/210	220	-	-	-NR	-/-
Magnesium Hydroxide, 10%: Calcium Carbonate, 90% (traces of nickel & iron hydroxides)	25	-	-	-	-	-/-	-	-	-	-LS120	-/-
Magnesium Nitrate (sat'd.)		210	210	210	210	160/160	160	-	-	160/130	-/160
Magnesium Oxide Acid (condensate)		-	-	-	-	-/-	-	160	-	-/-	-/-
Magnesium Oxide: Fluoride Mist and Fumes		-	-	-	-	-/-	-	-	-	-/-	150/-
Magnesium Sulfate (sat'd.)		250	250	250	250	210/210	220	200	250	180/150	200/200
MAGNIFLOC 509-C and 573-C	100	-	-	-	140	-/-	-	-	-	90/90	-/-
MAGNIFLOC E343	100	-	-	-	-	-/-	-	-	-	90/90	-/-
Maleic Acid	5	-	-	-	250	210/210	220	-	-	-/-	-/-
Maleic Acid (sat'd.)		250	250	250	250	180/180	180	200	200	160/100	200/-
Maleic Acid (traces of phthalic acid, fumaric acid, benzoic and quinone)	18	-	-	-	-	-/-	-	120	-	-/-	-/-
Maleic Anhydride	100	-	-	-	-	150/150	150	-	-	150/120	-/-
Maleic Residue		-	-	-	-	-/-	-	185	-	-/-	-/-
Malic Acid	10	-	250	250	250	-/-	-	95	-	-/-	-/-
Manganese Chloride (sat'd., also called manganous chloride)		210	-	-	210	-/-	-	-	225	-/-	-/-
Manganese Oxide (sat'd.)		-	-	-	-	-/-	-	-	225	-/-	-/-
Manganese Sulfate (sat'd., also called manganous sulfate)		210	220	220	210	210/210	220	-	225	-/-	-/-
Manganese Sulfate: Ammonium Sulfate (concentration in g/l, trace of sulfur dioxide)	12 125	-	-	-	-	-/-	-	100	-	-/-	-/-
Manganese Sulfate: Ammonium Sulfates: Sulfuric Acid (concentration in g/l, pH 5)	13 135 40	-	-	-	-	-/-	-	125	-	125/125	125/-
Manganese Sulfate: Sulfuric Acid	90 10	-	-	-	-	-/-	-	100	-	-/-	-/-
Manganese Sulfate: Sulfuric Acid (concentration in g/l)	50 28	-	-	-	-	-/-	-	200	-	-/-	-/-
Manganese Sulfate: Sulfuric Acid: Ammonium Sulfate (concentration in g/l, pH 9)	13 30 125	-	-	-	-	-/-	-	100	-	-/-	-/-
Manganese Sulfates: Ammonium Sulfate (concentration in g/l, pH 5)	13 158	-	125	125	-	125/125	125	125	-	125/125	125/125
Marine Fouling		-	-	-	-	-/-	-	100	-	-/-	100/-
MATAR Detergent, Germicidal (conc.)		-	-	-	-	-/-	-	100	-	-/-	-/-
Melamine Resin		-	-	-	120	-/-	-	80	-	-/-	-/-
Mercaptan, Aromatic	100	-	-	-	-	-/-	-	80	-	NR/130	-/-
Mercaptan, Organic (butanol, water, hydrogen sulfide)		-	-	-	-	-/-	-	-	-	-/-	125/-
Mercapto-Ethanol	100	-	-	-	-	-/-	-	80	80	-/-	-/-
Mercaptopropionic, Crude Acid	100	-	-	-	-	NR/130	-	NR	200	NR/130	NR/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT		High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service	
		CONCENTRATION %	HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Mercuric Chloride (sat'd.)		100	210	210	210	210	210/210	220	210	220	180/150	210/210
Mercurous Chloride (sat'd.)			210	210	210	210	210/210	220	210	-	180/130	210/210
Mercury			250	-	-	250	210/210	220	250	-	180/-	250/250
Metal Phosphate Salts (sat'd.)			-	-	-	-	-/-	-	80	-	-/-	-/-
Metal Phosphates (traces of hydrofluosilicic acid and hydrogen fluoride)Footnote 1		30	-	-	-	-	-/-	-	80	-	-/-	-/-
Metal Plating, Brass (3% copper, 1% zinc, 5.6% sodium cyanides, 3% sodium carbonate)			180	180	180	180	180/180	180	180	-	-/-	-/-
Metal Plating, Bronze (4% copper, 5% sodium cyanides, 3% sodium carbonate, 4.5% rochelle salts)			-	180	180	-	180/180	180	-	-	-/-	-/-
Metal Plating, Cadmium Cyanide (3% cadmium oxide, 10% sodium cyanide, 1.2% sodium hydroxide) . . .			-	-	-	180	210/210	220	NR	-	NR/NR	-/-
Metal Plating, Chrome (19% chromic acid with sodium fluosilicate and sulfate)Footnote 1			120	-	-	150	100/100	100	200	-	NR/NR	NR/-
Metal Plating, Copper (45% copper fluoboric acid, 19% copper sulfate, 8% sulfuric acid)Footnote 1			180	180	180	180	180/180	180	180	-	-/-	-/-
Metal Plating, Copper Cyanide (10.5% copper, 14% sodium cyanide, 6% rochelle salts)			160	180	180	160	180/180	180	NR	-	-/-	NR/-
Metal Plating, Gold (23% potassium ferrocyanide with potassium gold cyanide and sodium cyanide)			100	200	200	100	200/200	200	200	-	-/-	-/-
Metal Plating, Iron (45% iron chloride, 15% calcium chloride, 20% iron sulfate, 11% ammonia sulfate)			250	180	180	250	180/180	180	180	-	-/-	-/-
Metal Plating, Lead (alkaline, 8% lead acetate, 20% sodium hydroxide)			-	-	-	-	180/180	180	NR	-	-/-	NR/NR
Metal Plating, Lead (8% lead, with fluoboric and boric acids) Footnote 1			-	NR	NR	-	200/200	200	200	-	-/-	-/-
Metal Plating, Nickel (nickel sulfamate-50 oz/gal, magnesium chloride-3.5 oz/gal, boric acid-3 oz/gal, pH 3.7)			-	-	-	-	-/-	-	150	-	-/-	-/-
Metal Plating, Nickel (44% nickel sulfate, 4% ammonium chloride, 4% boric acid)			-	200	200	180	200/200	200	-	-	-/-	-/-
Metal Plating, Nickel (11% nickel sulfate, 2% nickel chloride, 1% boric acid)			-	200	200	180	200/200	200	200	-	-/-	-/-
Metal Plating, Nickel, Bright			-	-	-	-	-/-	-	180	-	-/-	-/-
Metal Plating, Silver (4% silver, 7% potassium cyanide, 5% sodium cyanide, 2% potassium carbonate) . .			-	180	180	180	200/200	200	NR	-	NR/NR	-/-
Metal Plating, Tin Fluoroborate (18% stannous fluoroborate, 7% tin, 9% fluoroboric acid, 2% boric acid)Footnote 1			-	210	210	210	200/200	200	200	-	-/-	-/-
Metal Plating, Zinc Cyanides (9% zinc cyanide, 4% sodium cyanide, 9% sodium hydroxide)		180	-	-	-	-	160/160	160	NR	-	-/-	NR/90
Metaphosphoric Acid		100	-	-	-	-	-/-	-	-	225	-/-	-/-
Methacrylic Acid		10	-	-	-	-	-/-	-	100	-	-/-	-/-
Methacrylic Acid, Glacial		100	-	-	-	-	-/-	-	90	-	-/-	-/-
Methanamide		100	-	100	100	-	LS100/LS100	LS100	100	100	100/LS100	-/-
Methane Sulfonic Acid		100	-	-	-	-	-/-	-	-	200	-/-	-/-
Methanol: Air: Methyl Sulfide (traces of water, hydrogen sulfide, mercaptan, acetone, turpentine)		6 85 2.5	-	-	-	-	-/-	-	165	-	-/-	-/-
Methanol: Hydrochloric Acid:												
Methylamino Ether (traces of isobutyronitrile and impurities)		2 23 74	-	-	-	-	-/-	-	80	80	-/-	-/-
Methyl Acetate		100	-	-	-	-	-/-	-	-	150	-/-	-/-
Methyl Acrylamide		48	-	-	-	-	-/-	-	90	-	-/-	-/-
Methyl AlcoholFootnote 17		100	NR	100	100	100	NR/NR	100	100	150	90/80	90/90
Methyl Alcohol (traces of hydrochloric acid and methyl chloride)Footnote 17		94	-	NR	NR	-	NR/NR	NR	100	-	-/-	-/-
Methyl Alcohol: Hydrochloric Acid, 32% (inhibitor)		56 44	-	-	-	-	75/75	75	-	-	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT		High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		CONCENTRATION %	HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334
Methyl Alcohol: Lithium ChlorideFootnote 17	75 25	-	-	-	-	-/-	-	100	-	-/-	-/-
Methyl Alcohol: Sodium Chlorate: Sulfuric Acid (sodium sulfate)		-	-	-	-	-/-	-	125	-	-/-	-/-
Methyl Alcohol: Water	80 20	-	100	100	100	NR/NR	100	100	150	90/80	90/90
Methyl Alcohol, 60%: Water (dissolved heavy organics, traces of heptane, hydrochloric acid and zinc chloride, two phases) ..Footnote 17		-	-	-	-	-/-	-	140	-	-/-	-/-
Methyl Alcohol, Vapor: Hydrochloric Acid, Vapor: Water, VaporFootnote 17	93 2 5	-	-	-	-	NR/NR	NR	LS150	100	-/-	-/-
Methyl Chloride (chloromethane) ...	100	-	NR	NR	NR	NR/NR	NR	40	NR	-/-	40/-
Methyl Chloroform	100	-	-	-	-	-/-	-	80	-	-/-	-/-
Methyl Cyclohexanol	100	-	-	-	-	-/-	-	-	200	-/-	-/-
Methyl Ethyl Ketone	100	NR	NR	NR	70	NR/NR	NR	NR	150	NR/NR	NR/NR
Methyl Ethyl Ketone: Sulfuric Acid, 50%	10 90	-	-	-	-	80/80	80	80	80	80/-	80/-
Methyl Isobutyl Ketone	100	NR	NR	NR	-	NR/NR	NR	NR	150	NR/NR	-/-
Methyl Isobutyl Ketone: Cyanoacetic Acid (0.8% sulfuric acid in saturated sodium chloride)	60 8	-	-	-	-	-/-	-	LS100	-	-/-	-/-
Methyl Isobutyl Ketone: Fluorides: Hydrofluoric Acid (concentration in g/l)Footnote 1	300 40	-	-	-	-	-/-	-	80	-	-/-	-/-
Methyl Isobutyl Ketone: Fluorides: Sulfuric Acid (concentrations in g/l)Footnote 1	200 500	-	-	-	-	-/-	-	80	-	-/-	-/-
Methyl Isobutyl Ketone: Hydrochloric Acid: Ammonium											
Thiocyanate	15	-	-	-	-	-/-	-	200	-	-/-	-/-
Methyl Phenol Fumes	100	-	-	-	-	-/-	-	80	-	-/-	-/-
Methyl Styrene	100	-	NR	NR	120	NR/NR	NR	NR	-	NR/NR	NR/-
Methyl Sulfate	100	-	-	-	-	-/-	-	-	200	-/-	-/-
Methyl Sulfide: Air: Methanol (traces of water, hydrogen sulfide, mercaptan, acetone, turpentine)	2.5 85 6	-	-	-	-	-/-	-	165	-	-/-	-/-
Methyl Sulfonic Acid	100	-	-	-	-	-/-	-	-	200	-/-	-/-
Methyl Tertiary Butyl Ether	100	-	-	-	-	-/-	80	-	80	80/-	-/-
Methylamino Ether: Hydrochloric Acid: Methanol (traces of isobutyronitrile and impurities)	74 23 2	-	-	-	-	-/-	-	80	80	-/-	-/-
Methylene Bisthiocyanate: Polychlorophenol (blend)		-	-	-	-	-/-	-	LS125	-	125/125	-/-
Methylene Chloride	100	NR	NR	NR	-	NR/NR	-	NR	LS90	NR/NR	NR/NR
Methylene Chloride: Ethyl Acetate: Caustic 50%	83 16 1	-	NR	NR	-	NR/NR	NR	NR	LS90	NR/NR	NR/NR
Methylene Succinic Acid	25	-	-	-	-	-/-	-	100	-	-/-	-/-
Methylene Thiocyanate: Biocide: Chlorophenol (blend)	100	-	-	-	-	125/125	125	LS125	-	125/125	-/-
Milk and Milk Products	100	-	NR	NR	NR	180/180	180	-	-	180/150	-/-
MILOGARD 4L	100	-	-	-	-	-/-	100	-	-	-/-	-/-
Mineral Oils	100	250	250	250	250	200/200	210	220	180	180/150	90/180
Mineral Spirits	100	220	250	250	280	220/220	220	280	250	180/-	-/-
Mineral Wool Slurry		-	-	-	-	-/-	-	90	-	-/-	-/-
Monochloroacetic Acid	50	-	-	-	NR	-/-	-	90	-	-/-	-/-
Monochlorobenzene	100	80	80	80	100	NR/NR	80	NR	250	NR/NR	NR/NR
Monochlorotoluene: Water	50 50	-	-	-	-	-/-	-	-	200	-/-	-/-
Monoethanolamine (also called ethanolamine)	100	-	80	80	120	NR/NR	80	80	150	NR/NR	-/-
Monoethanolamine (desulfurizing, sulfur dioxide and hydrogen sulfate) .	100	-	-	-	-	NR/NR	-	NR	270	NR/NR	NR/NR
Monoethanolamine Butyl CELLOSOLVE (alkaline film stripper)	30 57	-	-	-	-	NR/NR	-	NR	140	NR/NR	NR/-
Monohydroxysuccinic Acid	10	-	-	-	-	-/-	-	95	-	-/-	-/-
Monosodium Phosphate (pH 1-3) ..	10	-	-	-	-	-/-	-	200	-	-/-	-/-
Morpholine	10	-	-	-	80	-/-	-	100	150	-/-	-/-
Motor Oil	100	250	220	220	250	210/210	220	-	-	-/-	-/-
MULSOLINE 6000		-	-	-	-	-/-	-	150	-	-/-	-/-
Muriatic Acid (see hydrochloric acid)		-	-	-	-	-/-	-	-	-	-/-	-/-
Mustard (3% sodium chloride, 5% acetic acid)		-	-	-	-	-/-	-	-	-	160/-	-/-
Myristic Acid (tetradecanoic acid) ...	100	250	250	250	250	210/210	220	-	-	-/-	-/-
Naphtha	100	210	210	210	210	180/180	200	200	-	180/150	200/200
Naphthalene	100	210	210	210	210	180/180	200	90	210	150/120	90/130

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT		High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		CONCENTRATION %	HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334
Naphthalene Sulfonic Acid	100	-	-	-	-	-/-	-	-	225	-/-	-/-
Naphthanol Sulfonic Acid	100	-	-	-	-	-/-	-	-	225	-/-	-/-
Naphthenic Acid (sat'd.)		-	-	-	-	-/-	-	-	-	180/-	-/-
Naphthoquinone (scrubbing with water)		-	-	-	-	-/-	-	150	-	-/-	-/-
Naphthoquinone (1,4) (sat'd.)		-	-	-	-	-/-	-	150	-	-/-	-/-
Naphthylamine Sulfonic Acid (sat'd.)		-	-	-	-	-/-	-	110	-	-/-	-/-
NEODOL 25-3S	100	-	-	-	-	-/-	-	120	-	-/-	-/-
Neopentyl Glycol	90	-	-	-	-	-/-	-	150	-	-/-	-/-
Nickel Chloride (sat'd.)		210	220	220	210	210/210	220	220	220	180/150	220/220
Nickel Chloride: Boric Acid: Nickel Sulfate (concentration: oz/gal)	12 8 53	-	-	-	-	-/-	-	180	-	-/-	-/-
Nickel Chloride: Nickel Sulfate: Boric Acid (nickel plating, trace of brightener, concentration in oz/gal)	8 40 6	-	-	-	180	-/-	-	150	-	-/-	-/-
Nickel Electrolyte (Inco Metals, purified)		-	-	-	-	-/-	-	-	-	-/-	-/-
Nickel Nitrate (sat'd.)		210	220	220	210	210/210	220	220	220	180/150	220/220
Nickel Soap Catalyst		-	-	-	-	-/-	-	90	-	-/-	-/-
Nickel Sulfate (sat'd.)		210	210	210	210	210/210	220	220	230	180/150	220/220
Nickel Sulfate: Boric Acid: Nickel Chloride (concentration in oz/gal)	53 8 12	-	-	-	-	-/-	-	180	-	-/-	-/-
Nickel Sulfate: Nickel Chloride: Boric Acid (nickel plating, trace of brightener, concentration in oz/gal)	40 8 6	-	-	-	180	-/-	-	150	-	-/-	-/-
Nickel, Metal Plating (nickel sulfamate-50 oz/gal, magnesium chloride-3.5 oz/gal, boric acid-3 oz/gal, pH 3.7)		-	-	-	-	-/-	-	150	-	-/-	-/-
Nickel, Metal Plating (44% nickel sulfate, 4% ammonium chloride, 4% boric acid)		-	200	200	180	200/200	200	-	-	-/-	-/-
Nickel, Metal Plating (11% nickel sulfate, 2% nickel chloride, 1% boric acid)		-	200	200	180	200/200	200	200	-	-/-	-/-
Nickel, Bright, Metal Plating		-	-	-	-	-/-	-	180	-	-/-	-/-
Nickel-Cobalt (solvent extraction circuit, 0.3 - 1.5 g/l fluorides, pH 1.8 - 4.5)Footnote 1		-	-	-	-	-/-	-	185	-	-/-	-/-
Nitrating Acid (spent and strong)Footnote 3		-	-	-	-	NR/NR	-	80	NR	NR/NR	NR/-
Nitric AcidFootnote 3	1	-	180	180	180	210/210	220	-	-	-/-	-/-
Nitric AcidFootnote 3	5	180	180	180	180	160/160	160	210	90	160/120	210/200
Nitric AcidFootnote 3	10	150	150	150	150	120/120	140	200	90	90/-	140/175
Nitric AcidFootnote 3	20	120	150	150	150	120/120	150	140	NR	NR/NR	-/-
Nitric AcidFootnote 3	28	-	-	-	100	100/100	130	-	NR	-/-	-/-
Nitric AcidFootnote 3	35	-	-	-	100	100/100	120	140	NR	NR/NR	-/-
Nitric AcidFootnote 3	40	NR	NR	NR	80	NR/NR	NR	120	NR	NR/NR	NR/-
Nitric AcidFootnote 3	50	NR	NR	NR	NR	NR/NR	NR	110	NR	NR/NR	NR/-
Nitric AcidFootnote 3	52.4	NR	NR	NR	NR	NR/NR	NR	110	NR	NR/NR	NR/-
Nitric Acid (0.5 oz/gal of wetting agent, concentration in oz/gal)Footnote 3	2	-	-	-	-	-/-	-	80	-	-/-	-/-
Nitric Acid, Fumes: Ammonia, FumesFootnote 3		-	-	-	-	-/-	-	120	-	-/-	-/-
Nitric Acid: AMCHEM 6-16	16 6	-	-	-	-	-/-	-	95	-	-/-	-/-
Nitric Acid: Chromic Acid: Hydrofluoric AcidFootnotes 1,3	2 6 1.5	-	-	-	-	-/-	-	80	-	-/-	-/-
Nitric Acid: Copper Salts (concentration in g/l)Footnote 3	15 190	-	-	-	-	-/-	-	150	-	-/-	150/-
Nitric Acid: Copper Salts (concentration in g/l)Footnote 3	20 190	-	-	-	-	-/-	-	180	-	-/-	-/-
Nitric Acid: Hydrochloric AcidFootnote 3	10 10	-	-	-	-	200/200	200	200	-	NR/NR	-/-
Nitric Acid: Hydrochloric AcidFootnote 22	5 20	-	-	-	-	-/-	-	210	-	-/-	-/-
Nitric Acid: Hydrochloric Acid: Hydrofluoric AcidFootnote 1	10 77 13	-	-	-	-	-/-	-	100	-	-/-	-/-
Nitric Acid: Hydrochloric Acid: Sulfuric AcidFootnote 3	12 30 20	-	-	-	-	-/-	-	90	-	-/-	-/-
Nitric Acid: Hydrofluoric AcidFootnotes 1,3	7.5 2.5	-	-	-	-	-/-	-	165	-	-/-	-/-
Nitric Acid: Hydrofluoric AcidFootnotes 1,3	20 3	-	-	-	-	-/-	-	135	-	-/-	-/-
Nitric Acid: Hydrofluoric Acid (pickling solution)Footnotes 1,3	20 3.5	-	-	-	-	100/100	100	100	-	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT		High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service	
		CONCENTRATION %	HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Nitric Acid: Hydrofluoric AcidFootnotes 1,3		15 5	-	-	-	-	-/-	-	165	-	-/-	-/-
Nitric Acid: Hydrofluoric Acid: Chromic AcidFootnotes 1,3		2 3 6	-	-	-	-	-/-	-	80	-	-/-	-/-
Nitric Acid: Phosphoric AcidFootnote 3		4 80	-	-	-	-	-/-	-	200	-	-/-	-/-
Nitric Acid: Phosphoric Acid: Sulfuric Acid (trace of non-ionic surfactant)Footnote 3		20 11 5	-	-	-	-	80/80	80	-	-	-/-	-/-
Nitric Acid: Sulfuric AcidFootnote 3		5 20	-	-	-	-	-/-	-	210	-	NR/NR	-/-
Nitric Acid: Sulfuric AcidFootnote 3		15 15	-	-	-	-	-/-	-	180	-	-/-	-/-
Nitric Acid: Sulfuric Acid: Copper Salts (concentration in g/l)		9.5 17 112	-	-	-	-	-/-	-	180	-	-/-	-/-
Nitric Acid: Sulfuric Acid: Sodium Dichromate (concentration in g/l, trace of chromic sulfate)Footnote 3		3.8 7.8 25	-	-	-	-	-/-	-	180	-	-/-	-/-
Nitric Acid, 34%: Phosphoric Acid, 85% (concentration by volume)Footnote 3		4 7	-	-	-	-	-/-	-	120	-	-/-	-/-
Nitric Acid, 70%: Sulfuric Acid, 70% (pickling acid)Footnote 3		10.5 51	-	-	-	-	80/80	80	80	-	-/-	-/-
Nitric Acid, VaporFootnote 3		10	-	180	180	180	160/160	180	175	-	-/-	175/-
Nitric Acid, VaporFootnote 3		20	-	-	-	180	-/-	-	-	-	-/-	LS150/-
Nitric Acid, VaporFootnote 3		24	-	-	-	180	-/-	-	-	NR	NR/NR	-/-
Nitric Acid, VaporFootnote 3		35	-	180	180	180	160/160	180	200	-	-/-	-/-
Nitric Acid, VaporFootnote 3		48	-	-	-	180	-/-	-	-	NR	NR/NR	-/-
Nitric Acid, VaporFootnote 3		60	-	180	180	180	160/160	180	-	-	-/-	95/95
Nitric Acid, Vapor and CondensateFootnote 3		5	-	-	-	-	-/-	-	180	-	-/-	-/-
Nitric Acid, Vapor: Phosphoric Acid, VaporFootnote 3		5 95	-	-	-	-	-/-	-	200	-	-/-	200/-
Nitric Acid, Vapors: Hydrofluoric Acid, VaporsFootnotes 1,3		35 5	-	-	-	-	-/-	-	200	-	-/-	-/-
Nitric-Dinitro-Toluene, Fumes: Sulfuric Acid, FumesFootnote 3		100	-	-	-	-	-/-	-	-	200	NR/NR	-/-
Nitrobenzene		100	80	NR	NR	100	NR/NR	NR	-	225	NR/NR	-/-
Nitrogen		100	-	-	-	-	-/-	-	-	-	180/-	-/-
Nitrogen: Carbon Dioxide: Water (by volume, oxygen = 5% of concentration, trace of sulfur dioxide)		70 12 14	-	-	-	-	-/-	-	120	-	-/-	-/-
Nitrogen: Oxygen		50 50	-	-	-	-	-/-	-	85	-	-/-	-/-
Nitrogen: Oxygen: Carbon Dioxide (traces of chlorine, water, and sulfur dioxide)		2.5 21 1.5	-	-	-	-	-/-	-	200	-	-/-	-/-
Nitrogen: Sulfur Dioxide: Oxygen (traces of 80% sulfuric acid)		79 7 15	-	-	-	-	-/-	-	175	-	-/-	-/-
Nitromethane		100	-	-	-	-	-/-	-	90	-	-/-	-/-
Nitromethane, (tris- hydroxymethyl): Water (trace of formaldehyde, pH 3)		51 49	-	-	-	-	120/120	120	120	-	-/-	-/-
Nitrophenol		100	-	-	-	-	-/-	-	-	225	NR/NR	-/-
Nitrotoluene (p-): Sulfonic Acid		24	-	-	-	-	-/-	-	200	-	-/-	NR/-
Nitrous Acid		10	-	-	-	-	-/-	-	90	-	120/-	90/90
Nitrous Acid		100	-	-	-	-	-/-	-	-	-	120/-	-/-
Nonandioic Acid (sat'd.)		100	-	-	-	-	-/-	-	90	-	-/-	-/-
Nonyl Phenol (monoalkyl phenol)		100	-	110	110	-	110/110	110	110	110	110/110	-/-
Nonylphenoxytriethanol Sulfate (sodium salt)		28	-	-	-	-	-/-	-	100	100	-/-	-/-
Nuclear Waste (water, low level ion exchange)Footnote 21			-	-	-	-	-/-	-	90	-	-/-	-/-
Nuclear Waste Solution (ammonium nitrate and fluoride)Footnotes 1,21			-	100	100	-	100/100	-	100	-	-/-	-/-
Nuclear, Rad WasteFootnote 21			-	-	-	-	-/-	-	100	-	-/-	-/-
Nut Oil, Ground		100	-	-	-	-	-/-	-	-	-	90/90	140/-
OAKITE Stripper SA (conc.)			-	-	-	180	-/-	-	NR	-	-/-	NR/-
Octanoic Acid (sat'd.)		100	210	200	200	210	180/180	200	140	-	160/100	-/-
Oil, Crude (sweet and sour)			250	210	210	250	210/210	210	210	-	180/150	-/-
Oil, Crude (storage tank bottoms)			-	210	210	-	200/200	210	-	-	130/110	-/-
Oil, Crude, B		100	-	-	-	-	-/-	-	-	-	90/90	-/-
Oil, Furnace		100	-	-	-	-	-/-	-	-	-	90/-	-/-
Oil, Heating		100	-	-	-	-	-/-	-	-	-	90/-	-/-
Oil, Low Sulfur Crude		100	-	-	-	-	-/-	-	-	-	120/-	-/-
Oil, Medium Sulfur Crude		100	-	-	-	-	-/-	-	-	-	90/-	-/-
Oil, Mid-Continent Sweet		100	-	-	-	-	-/-	-	-	-	90/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Oil, Oxidized Petroleum Heavy Bottoms (7.8 lbs/gal with about 10% acetic acid)		-	160	160	-	160/160	160	-	-	-/-	-/-
Oil, Refinery Waste Effluent		-	-	-	-	-/-	-	90	-	-/-	-/-
Oil, Slop, Refinery		-	-	-	-	-/-	-	-	-	90/-	-/-
Oil, Sour Crude, Wyoming		-	210	210	-	210/210	210	-	-	210/150	-/-
Oil, Transformer	100	-	210	210	210	210/210	210	220	-	90/90	-/-
Oil, Waste (various ketones and aromatics)		-	-	-	-	NR/NR	-	-	90	-/-	-/-
Oil, Water Separation		-	-	-	-	-/-	-	90	-	90/90	90/-
Oil, West Texas (sour and sweet)		-	-	-	-	-/-	-	-	-	90/-	-/-
Oils (animal, mineral or vegetable)	100	-	200	200	-	200/200	200	-	250	120/90	-/-
Olefin (alpha) Sulfonate	100	-	-	-	-	-/-	-	120	-	-/-	-/-
Oleic Acid	100	210	210	210	200	200/200	210	200	225	180/130	200/200
Oleoparathion	3	-	-	-	-	-/-	-	-	-	-/-	140/-
Oligomeric Dispersant	100	-	-	-	-	130/130	130	130	-	130/130	130/-
OLIN 58981		-	-	-	-	-/-	-	120	-	-/-	-/-
Olive Oil	100	250	250	250	250	200/200	210	140	-	180/130	140/-
OPM-1 and OPM-2		-	-	-	-	-/-	-	180	-	-/-	-/-
Ore-Smelting Furnace Gas (wet with dust, 40% sodium, 23% cadmium, 6% lead, 21% boron, 8% zinc and other oxides)		-	-	-	-	NR/NR	-	350	-	NR/NR	-/-
Organic, (Alkyl Benzene): Sulfuric Acid	1.5 2 96.5	-	-	-	-	NR/NR	-	150	-	150/NR	-/-
Organic Contaminants: Acid: Water Organics (fluorinated, chlorinated acids neutralized with lime, effluent)	2 75	-	-	-	-	-/-	-	160	-	-/-	-/-
Organics: Kerosene: Phosphoric Acid (10% isodecanol)	20 70 30	-	-	-	-	-/-	-	150	150	-/-	-/-
Organics, Unknown: Formic Acid, 60% (saturated with sodium chloride)	50 50	-	-	-	-	-/-	-	40	-	-/-	-/-
Organotin: Amine Salts: Quaternary Ammonium Salts (blended)	100	-	150	150	150	125/125	125	125	-	LS125/LS125	-/-
Osmose Company Premix: Fire Retardant Liquid Formulation	100 50	-	-	-	-	-/-	-	-	-	80/-	-/-
Oxalic Acid	100	120	220	220	210	210/210	220	220	200	180/140	220/220
Oxidizing Gases	100	-	-	-	-	-/-	-	90	-	-/-	90/90
Oxygen: Carbon Dioxide: Nitrogen (traces of chlorine, water and sulfur dioxide)	21 1.5 2.5	-	-	-	-	-/-	-	200	-	-/-	-/-
Oxygen: Nitrogen	50 50	-	-	-	-	-/-	-	85	-	-/-	-/-
Oxygen: Sulfur Dioxide: Nitrogen (traces of 80% sulfuric acid)	15 7 79	-	-	-	-	-/-	-	175	-	-/-	-/-
Ozone (dry vapor)	3	-	-	-	-	-/-	-	140	-	-/-	-/-
Ozone (wet, sewage treatment, concentration in ppm)		-	-	-	-	-/-	-	100	NR	-/-	-/-
Ozone Treatment (condominium waste, 4 lbs/day @ 2% ozone)		-	-	-	-	-/-	-	90	-	-/-	-/-
Ozone: Chlorine (rendering fumes)		-	-	-	-	-/-	-	120	-	-/-	-/-
Ozone: Hydrogen		-	-	-	-	-/-	-	100	NR	-/-	-/-
Ozone, Fumes: Cyanide, Fumes (20 lbs/day @ 2% ozone)		-	-	-	-	-/-	-	90	-	-/-	-/-
Palmitic Acid (hexadecanoic acid, sat'd.)		250	250	250	250	210/210	220	-	-	160/160	140/160
Paper Machine, Fumes (pH<8)		-	90	90	-	90/90	90	90	-	-/-	90/90
Paper Mill Liquor		-	-	-	-	-/-	-	-	-	180/120	-/-
Parathion, Wet		-	-	-	-	-/-	-	-	-	-/-	140/-
PARCO 450/45 (hydrogen fluoride present, pH 1)		-	-	-	-	-/-	-	120	-	-/-	-/-
PARCO Cleaner 550R	100	-	-	-	-	-/-	-	110	-	-/-	-/-
Paraffin Wax	100	-	-	-	-	-/-	-	-	220	-/-	-/-
Peanut Oil	100	180	180	180	-	180/180	180	-	-	175/-	-/-
Peel Oil	100	-	-	-	-	-/-	-	-	-	120/120	-/-
Pentachloroethene	100	-	-	-	-	-/-	-	-	225	-/-	-/-
PEP SET 1505 and 2590	100	-	-	-	-	90/90	90	90	90	90/90	-/-
Perchloric Acid	5	-	180	180	150	180/180	180	85	-	NR/NR	-/-
Perchloric Acid	10	150	-	-	150	150/150	150	85	-	NR/NR	-/-
Perchloric Acid	30	100	-	-	100	80/80	80	85	-	NR/NR	-/-
Perchloric Acid	70	-	-	-	-	-/-	-	85	-	NR/NR	-/-
Perchloroethylene	100	120	100	100	120	80/80	100	100	250	NR/NR	90/NR
Perchloroethylene, Vapor & Condensate	100	-	-	-	-	-/-	-	120	-	-/-	120/NR

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT		High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		CONCENTRATION %	HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334
Petroleum Ether	100	-	-	-	-	-/-	-	-	-	-/-	90/-
Petroleum Oil & Waxes (water emulsion)	1	-	-	-	-	-/-	-	140	-	-/-	-/-
Phenol (also called carbolic acid) . . .	2	-	100	100	120	80/80	100	180	180	NR/NR	-/-
Phenol	5	-	80	80	120	NR/NR	80	180	180	NR/NR	-/-
Phenol	10	-	-	-	120	-/-	-	100	180	NR/NR	NR/-
Phenol	15	-	NR	NR	90	NR/NR	NR	LS90	120	NR/NR	NR/NR
Phenol	85	-	-	-	70	NR/NR	-	NR	90	NR/NR	NR/-
Phenol	100	-	NR	NR	-	NR/NR	NR	NR	LS120	NR/NR	NR/-
Phenol, Fumes		-	NR	NR	NR	NR/NR	NR	-	220	-/-	-/-
Phenol Sulfonic Acid (sat'd.)		-	-	-	-	-/-	-	110	-	NR/NR	-/-
Phenolic Resin (urea modified, DUREZ 24942, pH 7- 8)		-	-	-	-	-/-	-	90	-	-/-	-/-
Phenolic: Caustic, Spent (refinery, neutralized to pH 5 - 6)		-	130	130	-	130/130	130	130	130	130/-	-/-
Phenols (some sulfates, hydrogen sulfide, water and waste liquor, pH 5-6)		-	-	-	-	130/130	130	130	130	130/-	-/-
Phenyl Carbinol	100	-	-	-	-	-/-	-	-	120	-/-	-/-
Phenyl Ether	100	-	-	-	-	-/-	-	-	200	-/-	-/-
Phosphate Salts	25	-	-	-	-	90/90	90	90	-	90/90	90/90
Phosphate: Phosphoric Acid Waste Liquor (pH 1- 3)	10	-	-	-	-	-/-	-	200	-	-/-	-/-
Phosphonitrilic Chloride, Vapors (chlorine, hydrochloric acid, benzene and water vapors)		-	-	-	-	-/-	-	120	-	-/-	-/-
Phosphoric Acid	85	210	210	210	210	210/210	220	250	250	160/150	220/220
Phosphoric Acid	100	210	210	210	210	210/210	220	250	-	90/NR	-/-
Phosphoric Acid (super-phosphoric acid)	105	-	210	210	220	210/210	220	250	-	90/NR	-/-
Phosphoric Acid (traces of sulfuric acid with silica tetrafluoride)Footnote 1	60	-	-	-	-	-/-	-	310	-	-/-	-/-
Phosphoric Acid Plant Tailings		-	-	-	-	-/-	-	-	-	-/-	100/-
Phosphoric Acid Waste Liquor:											
Phosphate (pH 1- 3)	10	-	-	-	-	-/-	-	200	-	-/-	-/-
Phosphoric Acid: Calcium Chloride	10 25	-	-	-	-	-/-	-	100	-	-/-	-/-
Phosphoric Acid: Chromic Acid: Hydrofluoric Acid . . .Footnotes 1,3	40 7 2	-	-	-	-	-/-	-	100	-	-/-	-/-
Phosphoric Acid: Fluorine: Silicone DioxideFootnote 1	54 1.2 2	-	-	-	-	-/-	-	175	-	-/-	-/-
Phosphoric Acid: Fluorosilicic Acid: Sulfuric Acid (gypsum slurry cooler)Footnote 1	28 5 5	-	-	-	-	-/-	-	190	-	-/-	-/-
Phosphoric Acid: Hydrochloric Acid (saturated with phosphorous)	15 9	-	-	-	-	-/-	-	220	-	-/-	-/-
Phosphoric Acid: Hydrochloric Acid (saturated with chlorine)	15 9	210	210	210	210	-/-	-	220	-	-/-	-/-
Phosphoric Acid: Hydrochloric Acid: Hydrofluoric Acid (concentration in ppm) . .Footnote 1	85 1 500	-	-	-	-	-/-	-	230	-	NR/NR	-/-
Phosphoric Acid: Hydrofluoric Acid: Chromic AcidFootnotes 1,3	8 11 9	-	-	-	-	-/-	-	100	-	-/-	-/-
Phosphoric Acid: Hydroxyacetic Acid: Sulfuric Acid . . .Footnote 2	51 29 20	-	-	-	-	-/-	-	245	-	-/-	-/-
Phosphoric Acid: Inerts (trace of alkyl dimethyl benzyl ammonium chloride)	25 75	-	100	100	-	100/100	100	100	100	-/-	-/-
Phosphoric Acid: Kerosene: Organics (10% isodecanol)	30 70 20	-	-	-	-	-/-	-	150	150	-/-	-/-
Phosphoric Acid: Nitric AcidFootnote 3	80 4	-	-	-	-	-/-	-	200	-	-/-	-/-
Phosphoric Acid: Nitric Acid: Sulfuric Acid (trace of non-ionic surfactant)Footnote 3	11 20 5	-	-	-	-	80/80	80	-	-	-/-	-/-
Phosphoric Acid: Polyvinyl Alcohol	8 92	-	-	-	-	-/-	-	90	-	-/-	-/-
Phosphoric Acid: Sodium Hydroxide (phosphate mix)		-	NR	NR	-	170/170	170	-	-	-/-	-/-
Phosphoric Acid: Sodium Hydroxide (phosphoric acid with polyvinyl alcohol, alternately)	8 30	-	NR	NR	-	210/210	210	210	-	-/-	-/-
Phosphoric Acid: Sodium Phosphate (scrap liquor, pH 1-3)		-	-	-	-	-/-	-	200	-	-/-	-/-
Phosphoric Acid: Sulfuric Acid	20 10	-	-	-	-	-/-	-	160	-	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Phosphoric Acid: Sulfuric Acid: Water (2% sodium hydroxide, trace of trisodium phosphate)	14 2 82	-	-	-	-	-/-	-	100	-	-/-	-/-
Phosphoric Acid: Sulfuric Acid: Water (2% sodium hydroxide, trace of trisodium phosphate)	20 2.5 75	-	-	-	-	-/-	-	100	-	-/-	-/-
Phosphoric Acid, 1%: Gypsum Slurry (trace of hydrogen fluoride)Footnote 1		-	-	-	-	-/-	-	100	-	-/-	-/-
Phosphoric Acid, 28%, Fumes (reactor, traces of fluorides and ammonia)Footnote 1		-	-	-	-	-/-	-	250	-	-/-	-/-
Phosphoric Acid, 85%: Kerosene: Xylene	33 33 33	-	-	-	-	-/-	-	100	-	-/-	-/-
Phosphoric Acid, 85%: Nitric Acid, 34% (concentration by volume)Footnote 3	7 4	-	-	-	-	-/-	-	120	-	-/-	-/-
Phosphoric Acid, 85%: Sulfuric Acid, 93%	50 50	-	-	-	-	-/-	-	160	-	NR/NR	NR/NR
Phosphoric Acid, Vapor and Condensate	70	250	-	-	-	-/-	-	300	-	-/-	-/-
Phosphoric Acid, Vapor: Nitric Acid, Vapor	95 5	-	-	-	-	-/-	-	200	-	-/-	200/-
Phosphoric Acid, Wet Process (conc.)		-	-	-	-	-/-	-	195	-	-/-	-/-
Phosphorus Acid	70	100	100	100	100	100/100	100	-	-	-/-	-/-
Phosphorus Acid (conc.)		-	-	-	-	-/-	-	225	-	-/-	-/-
Phosphorus Acid: Hydrochloric Acid	70 2	-	180	180	-	180/180	180	180	-	120/-	-/-
Phosphorus OxychlorideFootnote 4	100	-	NR	NR	-	NR/NR	NR	80	NR	80/80	NR/-
Phosphorus Oxychloride, Vapors: Chlorine, Vapors: Hydrochloric Acid, Vapors (water vapors)		-	-	-	-	-/-	-	90	-	-/-	90/-
Phosphorus Pentoxide: FluorineFootnote 1	1.5 1.5	-	-	-	-	200/200	200	85	-	-/-	-/-
Phosphorus Pentoxide, Fumes: Air: Hydrofluoric Acid, FumesFootnote 1		-	-	-	-	-/-	-	315	-	-/-	-/-
Phosphorus Sesquisulfide	100	-	-	-	-	-/-	-	160	-	-/-	-/-
Phosphorus Trichloride .Footnote 4	100	NR	NR	NR	NR	NR/NR	NR	NR	100	90/NR	NR/NR
Phosphorus Trichloride, Vapors: Chlorine, Vapors: Hydrochloric Acid, Vapors (water vapors)	100	-	-	-	-	-/-	-	160	-	-/-	-/-
Photographic Film Dryer		-	-	-	-	-/-	-	-	-	-/-	90/-
Photographic Processing Chemicals		-	-	-	-	-/-	-	80	-	-/-	-/-
Phthalic Acid	100	210	210	210	210	210/210	220	-	225	-/-	-/-
Phthalic Anhydride (sat'd.)		-	-	-	-	210/210	220	100	-	150/100	100/150
Picric Acid (alcoholic)	10	NR	100	100	100	100/100	100	100	-	NR/NR	100/100
Picric Acid (sat'd.)		NR	-	-	-	-/-	-	-	165	NR/NR	-/-
Pigment Slurry: Hydrochloric Acid: Water (trace of sodium chloride)	8 3 88	-	-	-	-	-/-	-	200	-	-/-	NR/-
PLUS 5		-	-	-	-	100/100	100	100	-	LS100/NR	-/-
Polyacrylamide (pH 12)	40	-	-	-	100	-/-	-	NR	-	-/-	-/-
Polyacrylamide Emulsion	100	-	-	-	-	-/-	-	-	-	90/-	-/-
Polychlorocyclohexane Sulfide	1	-	-	-	-	-/-	-	-	-	-/-	140/140
Polychlorophenolate Organosulfur (blend)	100	-	-	-	-	-/-	-	125	-	125/125	-/-
Polychlorophenates (alcohol and amines blended)	100	-	-	-	-	-/-	-	125	-	125/125	-/-
Polychlorophenol: Methylene Bisthiocyanate (blend)		-	-	-	-	-/-	-	LS125	-	125/125	-/-
POLYCO 2631		-	-	-	-	-/-	-	110	-	-/-	-/-
Polyelectrolytes, Anionic	100	-	130	130	-	130/130	130	130	-	130/130	130/130
Polyethylene, Oxy Derivative, Surfactant	100	-	-	-	-	-/-	-	105	-	-/-	-/-
Polymer/Toluene Emulsion, ALIPAL CO433 (blended together in water)		-	-	-	-	-/-	-	NR	100	-/-	NR/-
Polymethylene Polyphenyl Isocyanate	100	-	-	-	-	-/-	-	-	-	120/120	-/-
Polyphosphoric Acid	115	210	210	210	210	210/210	220	-	-	-/-	-/-
Polyvinyl Acetate Emulsion		-	-	-	-	210/210	210	100	-	120/80	100/100
Polyvinyl Alcohol	10	100	180	180	120	180/180	180	-	-	120/120	-/-
Polyvinyl Alcohol	100	100	120	120	120	120/120	120	80	-	80/80	80/90
Polyvinyl Alcohol: Phosphoric Acid	92 8	-	-	-	-	-/-	-	90	-	-/-	-/-
Polyvinyl Chloride Latex (with 35 parts DOP)		120	120	120	120	120/120	120	110	-	-/-	-/-
Polyvinylidene Chloride Latex	100	-	-	-	-	-/-	-	-	-	80/-	80/90

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	High Performance Epoxy Vinyl Ester Resins					Epoxy Vinyl Ester Resins					Fume Service
	CONCENTRATION %	HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
POLYWET ND-2	100	-	-	-	-	130/130	130	130	-	130/130	130/-
Potash Mine Fumes		-	-	-	-	-/-	-	-	-	-/-	90/90
Potash Slurry, 20%: Clay, 20% (potash in saturated brine)	40	-	-	-	-	-/-	-	80	-	-/-	-/-
Potassium Aluminum Sulfate (sat'd.)		250	220	220	250	210/210	220	180	-	180/130	150/160
Potassium Bicarbonate	10	150	150	150	150	160/160	160	90	-	160/130	90/90
Potassium Bicarbonate (sat'd.)		-	-	-	180	160/160	160	-	-	140/-	-/90
Potassium Bromate	10	-	-	-	-	-/-	-	-	150	-/-	-/-
Potassium Bromide (sat'd.)		100	160	160	180	160/160	160	-	200	160/130	-/-
Potassium Bromide: Ferricyanide Bleach (photography)		-	-	-	-	-/-	-	80	-	-/-	-/-
Potassium Carbonate	10	150	180	180	180	180/180	180	110	200	90/-	90/90
Potassium Carbonate	25	150	180	180	180	180/180	180	110	200	90/-	90/90
Potassium Carbonate (sat'd.)		-	-	-	-	90/90	90	110	200	-/-	NR/90
Potassium Chloride	100	210	210	210	210	210/210	220	250	250	180/150	200/200
Potassium Chloride (sat'd., mercury grade)		-	-	-	-	-/-	-	180	-	-/-	-/-
Potassium Chloride (sat'd. in bromine and chlorine, pH 2-4)		-	-	-	-	-/-	-	190	-	-/-	-/-
Potassium Chloride, Vapors (wet)		-	-	-	-	-/-	-	90	-	-/-	90/-
Potassium Cyanide (sat'd.)		-	-	-	-	-/-	-	-	80	-/-	-/-
Potassium Cyanide: Copper Cyanide: Potassium Hydroxide (concentration in oz/gal)	3 8 2	180	-	-	180	-/-	-	NR	-	-/-	-/-
Potassium Dichromate	100	210	-	-	210	210/210	220	200	-	180/-	200/-
Potassium Ferricyanide (sat'd.)		210	210	210	210	210/210	220	-	180	180/150	-/200
Potassium Ferrocyanide (sat'd.)		210	210	210	210	210/210	220	200	200	180/150	200/200
Potassium Fluoride (sat'd.)Footnote 1		-	-	-	-	150/150	150	150	-	-/-	-/-
Potassium Hydroxide	10	150	NR	NR	NR	150/150	150	NR	200	NR/NR	NR/-
Potassium Hydroxide	25	150	NR	NR	NR	150/150	150	NR	200	NR/NR	NR/-
Potassium Hydroxide	45	180	NR	NR	NR	150/150	150	NR	200	NR/NR	NR/-
Potassium Hydroxide	50	-	NR	NR	NR	150/150	150	NR	150	NR/NR	-/-
Potassium Hydroxide (2 oz/gal)		-	NR	NR	NR	150/150	150	175	-	-/-	-/-
Potassium Hydroxide: Copper Cyanide: Potassium Cyanide (concentration in oz/gal)	2 8 3	180	-	-	180	-/-	-	NR	-	-/-	-/-
Potassium Nitrate	100	210	220	220	210	210/210	220	220	250	180/150	200/200
Potassium Oxalate (sat'd.)		150	-	-	-	-/-	-	-	225	-/-	-/-
Potassium Permanganate	100	210	220	220	210	210/210	220	150	-	125/NR	150/150
Potassium Persulfate	100	210	210	210	210	210/210	220	90	225	90/-	90/90
Potassium Pyrophosphate	100	150	150	150	150	100/100	100	100	-	-/-	-/-
Potassium Sulfate	100	210	210	210	210	210/210	220	220	250	180/150	200/200
Potassium: Sodium (depleted brines)	100	-	-	-	-	-/-	-	200	-	-/-	-/-
Power Plant Scrubber, Medium Sulfur Coal (pH < 8)		150	150	150	150	150/150	150	150	-	-/-	-/-
PRINCEP 4L	100	-	-	-	-	-/-	100	-	-	-/-	-/-
Propenoic Acid (see acrylic acid)		-	-	-	-	-/-	-	-	-	-/-	-/-
Propionic Acid	1	80	80	80	80	80/80	80	80	80	80/80	80/-
Propionic Acid	20	-	200	200	180	200/200	200	-	-	-/-	-/-
Propionic Acid	50	-	180	180	180	180/180	180	80	-	-/-	-/-
Propionic Acid	100	80	-	-	100	NR/NR	-	-	-	-/-	-/-
Propionic Acid: Hydroxylammonium Acid Sulfate: Water	1 89 10	-	-	-	-	-/-	-	175	-	-/-	-/-
Propylene Glycol	100	210	210	210	210	210/210	220	180	-	170/150	100/170
Pulp and Paper Mill (acidic waste)		-	-	-	-	-/-	-	-	-	-/-	-/-
.....Footnote 21		-	90	90	-	90/90	90	150	-	90/90	-/-
Pulp and Paper Mill (condensable liquor, pH 9)		-	130	130	-	130/130	130	130	-	-/-	-/-
.....Footnote 21		-	-	-	-	-/-	-	-	-	-/-	-/-
Pulp and Paper Mill, Fumes (includes bleach, digester or boiler fumes)		-	-	-	-	-/-	-	-	-	-/-	90/-
Pulp and Paper Mill, Gas (non-condensable)		-	-	-	-	-/-	-	165	-	-/-	-/-
.....Footnote 21		-	-	-	-	-/-	-	190	-	-/-	-/-
Pulp Stock (chlorinated, pH 4.5)		-	-	-	-	-/-	-	-	-	120/120	-/-
Pulp Stock, Fumes		-	-	-	-	-/-	-	-	-	-	-/-
Pulp, Bleached		-	-	-	-	-/-	-	190	-	-/-	-/-
PVC Latex (with 35 parts DOP)		-	-	-	-	-/-	-	-	-	-	-/-
.....Footnote 21		-	-	-	-	-/-	-	110	-	-/-	-/-
Quaternary (includes hexylene and methosulfate types)		-	-	-	-	120/120	120	120	120	120/120	120/-
Quaternary (dimethyl, distearyl in isopropanol)		-	-	-	-	120/120	120	120	-	120/120	120/-
Quaternary (dimethyl, distearyl in "neutral" organic solvent)		-	190	190	-	190/190	190	190	190	190/150	190/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Quaternary Ammonium Compound (in isopropanol, cationic)		-	-	-	-	120/120	120	120	120	120/120	120/-
Quaternary Ammonium Salts:											
Amine Salts: Organotin (blended)	100	-	150	150	150	125/125	125	125	-	LS125/LS125	-/-
Quaternary Ammonium: Aqueous											
Isopropanol (dialkyl dimethyl type)	75 25	-	-	-	-	120/120	120	120	120	120/120	120/-
Quaternary Softener (difatty complex)		-	-	-	-	120/120	120	120	80	120/120	120/-
R-2 Solutions (sat'd.)		-	-	-	-	-/-	-	180	-	-/-	-/-
Radiochemical Hoods (glove boxes)		-	-	-	-	-/-	-	-	-	-/-	90/-
RAYLENE	50	-	-	-	-	-/-	-	150	-	-/-	-/-
Rayon Spin Bath		-	-	-	140	150/150	150	180	-	-/-	170/-
Rayon Spin Bath, Fumes		-	-	-	-	-/-	-	LS200	LS200	-/-	NR/-
Rayon Spinning Fumes		-	-	-	140	-/-	-	140	-	-/-	140/100
Recovery Boiler, Blow Down (acetone and acetic, sulfuric, sulfurous and formic acids)		-	-	-	-	NR/NR	-	210	-	NR/NR	NR/-
Recovery Boiler, Kraft Type (no contact evaporation, trace of sulfur dioxide, 12-14% carbon dioxide, 19%, by volume, moisture, 37 fps)		-	-	-	-	NR/NR	-	340	-	NR/NR	-/-
Recovery Boiler, Stack Gases		-	-	-	-	NR/NR	NR	300	-	NR/NR	-/-
Red Liquor (ammonium bisulfite based)		-	180	180	180	150/150	165	150	-	-/-	-/-
Reformer Charge		-	-	-	-	-/-	-	-	-	90/-	-/-
Resorcinol	100	-	-	-	-	-/-	-	-	250	-/-	-/-
Rhodium Plating, Phosphate		-	-	-	-	-/-	-	120	-	-/-	-/-
RICHAMIDE CDA	100	-	-	-	-	-/-	-	120	-	-/-	-/-
RICHONATE 1850	100	-	-	-	-	-/-	-	120	-	-/-	-/-
RJ-4 Fuel	100	-	80	80	-	80/80	80	80	-	80/80	80/-
Salicylic Acid (sat'd.)		140	-	-	-	160/160	160	-	250	-/-	-/-
SANI-FRESH Soap Solution		-	-	-	-	-/-	-	120	-	-/-	-/-
Scrubber Sludge (30% calcium sulfate, 15% fly ash, pH 11)		-	-	-	-	120/120	120	NR	-	-/-	-/-
Scrubber Sludge (30% calcium sulfate, 15% fly ash, pH 5)		-	-	-	-	-/-	-	120	-	-/-	-/-
SD-20		-	-	-	-	100/100	100	100	-	100/100	-/-
Sea Water	100	-	200	200	210	210/210	210	180	-	180/150	-/-
Sea Water (1.75 x normal, pH 7.5)		-	-	-	-	-/-	-	180	-	-/-	-/-
Sea Water, Desalination (2.75 x normal, pH 7.5)		-	-	-	-	-/-	-	130	-	-/-	-/-
Selenious Acid	100	-	120	120	120	210/210	210	-	-	-/-	-/-
Septic System		-	-	-	-	90/90	90	90	90	90/90	90/90
Sequestering Agents	100	-	-	-	-	125/125	125	125	-	125/125	-/-
SEQUESTRENE 30A	100	-	-	-	-	90/90	90	-	-	-/-	-/-
Sewage Gas, Hydrogen Sulfide		90	90	90	90	90/90	-	90	90	90/90	90/-
Sewage Treatment		-	-	-	-	90/90	90	90	-	90/90	90/90
Sewage Treatment Fumes		-	-	-	-	90/90	90	90	-	90/90	-90
Sewage, Anaerobic		-	-	-	-	85/85	85	85	-	85/85	85/85
Sewage, Municipal (treated and untreated)		-	-	-	-	90/90	90	90	90	90/90	90/90
Sewage, Septic Tank		-	-	-	-	90/90	90	-	-	90/90	-/-
Shampoo, Carpet		-	-	-	-	100/100	100	100	-	LS100/NR	-/-
Shampoo, Liquid	100	-	-	-	-	-/-	-	120	-	-/-	-/-
Silicone Dioxide: Fluorine:											
Phosphoric AcidFootnote 1	2 1.2 54	-	-	-	-	-/-	-	175	-	-/-	-/-
Silicone Oil: Hydrochloric Acid	79 21	-	-	-	-	-/-	-	195	-	-/-	-/-
Silicone Tetrachloride	100	-	-	-	-	-/-	-	-	140	-/-	-/-
Silver Cyanide (sat'd.)		-	-	-	-	210/210	210	-	-	-/-	-/-
Silver Nitrate	100	-	210	210	210	210/210	210	220	-	180/150	200/200
Silver Nitrate: Copper Chloride	33 15	-	-	-	-	-/-	-	90	-	-/-	-/-
Silver Refining Cells		-	-	-	-	-/-	-	90	-	-/-	-/-
Silver, Metal Plating (4% silver, 7% potassium and 5% sodium cyanides, 2% potassium carbonate)		-	180	180	180	200/200	200	NR	-	NR/NR	-/-
Slimicide (polychlorophenolate-organosulfur, blend)	100	-	-	-	-	-/-	-	125	-	125/125	-/-
Slimicide (thiocyanate-poly-chlorophenol, blend)	100	-	-	-	-	-/-	-	LS125	-	125/125	-/-
Slimicide: Organotin: Amine		-	-	-	-	-/-	-	125	-	LS125/NR	-/-
Smelting Furnace (gas and dust, wet)		-	-	-	-	-/-	-	340	-	-/-	-/-
Smoke, Particulate (cooling and washing with water)		-	-	-	-	-/-	-	100	-	-/-	100/-
Soap Plant Fumes		-	-	-	-	90/90	90	90	90	90/90	90/100
Soap Solution		-	-	-	-	-/-	-	90	-	90/90	-/-
Soap Tower Exhaust Fumes		-	-	-	-	-/-	-	160	-	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Soda Ash: Sodium Carbonate (thickener fumes)		-	-	-	-	-/-	-	180	-	-/-	140/-
Sodium Acetate	100	-	210	210	210	210/210	220	200	225	150/-	200/150
Sodium Acid Sulfite	15	-	-	-	-	-/-	-	165	-	-/-	-/-
Sodium Alkyl Benzene Sulfonate ..	100	-	-	-	-	-/-	-	100	-	-/-	-/-
Sodium Alkyl Xanthate	100	-	-	-	-	150/150	150	-	-	-/-	-/-
Sodium Alkylaryl Sulfonate (pH 8) .	40	-	-	-	180	120/120	120	120	-	-/-	-/-
Sodium Aluminate (sat'd.)		-	-	-	120	160/160	160	NR	150	NR/NR	NR/NR
Sodium Ammonium Phosphate ...		-	-	-	-	-/-	-	200	-	-/-	-/-
Sodium Benzoate (sat'd.)		-	-	-	180	210/210	220	175	-	175/-	175/175
Sodium Bicarbonate	10	-	180	180	180	180/180	180	140	225	180/120	140/-
Sodium Bicarbonate (sat'd.)		-	180	180	180	160/160	160	140	225	140/-	140/140
Sodium Bicarbonate: Sodium Sulfate: Sodium Carbonate (0.1% fluoride fumes, electrostatic precipitator)	Footnotes 1,2										
Sodium Bichromate	.1 3 .5	-	-	-	-	185/185	185	185	-	-/-	-/-
Sodium Bichromate: Sulfuric Acid (sugar reaction product, pH 2.6) ...		-	-	-	-	-/-	-	-	-	-/-	-/90
Sodium Bisulfate	100	-	210	210	210	210/210	220	200	225	180/150	200/200
Sodium Bisulfide	15	-	140	140	-	140/140	140	160	140	-/-	-/-
Sodium Bisulfide	45	-	140	140	-	140/140	140	160	140	-/-	-/-
Sodium Bisulfide	65	-	-	-	-	-/-	-	160	-	-/-	-/-
Sodium Bisulfide: Sodium Hydroxide	15 15	-	-	-	-	140/140	140	-	140	NR/NR	-/-
Sodium Bisulfite (sat'd.)		-	220	220	210	210/210	220	200	225	180/90	200/200
Sodium Bisulfite: Sodium Sulfite (sat'd.)	50 50	-	-	-	-	-/-	-	150	-	-/-	-/-
Sodium Bisulfite: Sodium Sulfite: Sodium Sulfate	15 15 15	-	-	-	-	-/-	-	165	-	-/-	-/-
Sodium Borate (sat'd.)		-	220	220	210	210/210	220	170	140	180/140	170/170
Sodium Bromate	20	-	-	-	-	-/-	-	-	150	-/-	-/-
Sodium Bromide	100	-	220	220	210	210/210	220	250	-	180/150	220/220
Sodium Carbonate	2	-	180	180	180	180/180	180	160	160	150/-	120/-
Sodium Carbonate	10	-	180	180	180	180/180	180	160	160	LS160/NR	120/-
Sodium Carbonate	25	-	180	180	180	160/160	160	90	160	90/90	90/-
Sodium Carbonate	32	-	180	180	180	160/160	160	-	220	90/-	-/-
Sodium Carbonate (sat'd.)		-	180	180	180	160/160	160	90	225	-/-	180/90
Sodium Carbonate: Chlorine Dioxide: Bicarbonate (pH 8)	3.7 5	-	-	-	-	-/-	-	100	-	-/-	-/-
Sodium Carbonate: Soda Ash (thickener fumes)		-	-	-	-	-/-	-	180	-	-/-	140/-
Sodium Carbonate: Sodium Sulfate: Sodium Bicarbonate (0.1% fluoride fumes, electrostatic precipitator)	Footnotes 1,2										
Sodium Carbonate, Vapor & Condensate	10	-	-	-	-	-/-	-	180	-	-/-	180/180
Sodium Chlorate	90	-	220	220	210	210/210	220	200	-	130/130	-/-
Sodium Chlorate (sat'd.)		-	220	220	235	210/210	220	200	-	NR/NR	-/90
Sodium Chlorate: Sodium Chloride (concentration in M)	3.2 3.4	-	210	210	210	-/-	-	180	-	-/-	-/-
Sodium Chlorate: Sulfuric Acid (concentration in g/l, saturated with chlorine dioxide, traces of methyl alcohol)	Footnote 2										
Sodium Chlorate: Sulfuric Acid: Methyl Alcohol (sodium sulfate) ...	120 450	-	-	-	-	-/-	-	145	-	-/-	-/-
Sodium Chlorate, Vapors		-	-	-	-	-/-	-	125	-	-/-	-/-
Sodium Chloride (sat'd.)		-	220	220	-	210/210	220	250	250	180/150	200/200
Sodium Chloride (sat'd., pH 3)		-	210	210	-	210/210	210	210	-	-/-	-/-
Sodium Chloride (sat'd., pH 3.5) ...		-	-	-	-	-/-	-	165	-	-/-	-/-
Sodium Chloride (chlorine saturated, pH 10.5)		-	-	-	200	-/-	-	190	-	-/-	NR/-
Sodium Chloride (chlorine saturated, 300-310 g/l, pH 2)		-	-	-	-	-/-	-	210	-	-/-	-/-
Sodium Chloride (sat'd., saturated with chlorine, pH 2.5)		-	-	-	-	-/-	-	170	-	-/-	-/-
Sodium Chloride (sat'd., saturated with chlorine)		-	-	-	-	-/-	-	220	-	NR/NR	-/-
Sodium Chloride (sat'd., trace of chlorine, pH 11)		-	-	-	210	-/-	-	165	-	-/-	-/-
Sodium Chloride (sat'd., saturated with chlorine, pH 3)		-	-	-	-	-/-	-	210	-	NR/NR	-/-
Sodium Chloride: Calcium Chloride: Magnesium Chloride	12 10 2	-	-	-	-	-/-	-	150	-	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT		High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		CONCENTRATION %	HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334
Sodium Chloride: Chlorine DioxideFootnote 2	23 35	-	-	-	-	-/-	-	120	-	-/-	-/-
Sodium Chloride: Hydrochloric Acid (sat'd. sodium chloride)	5	-	210	210	-	210/210	210	-	-	-/-	-/-
Sodium Chloride: Sodium Chlorate (concentration in M)	3.4 3.2	-	210	210	210	-/-	-	180	-	-/-	-/-
Sodium Chloride: Sodium Hydroxide, Wet (chute, 100-150 tons/day)		-	-	-	-	-/-	-	90	-	-/-	-/-
Sodium Chloride: Sodium Nitrate: Sulfuric Acid	8 8 20	-	-	-	-	-/-	-	180	-	-/-	-/-
Sodium Chloride: Sulfuric Acid ...	8 12	-	-	-	-	-/-	-	210	-	-/-	-/-
Sodium Chloride: Zinc Chloride: Ammonium Chloride (zinc chloride plating bath, concentration in oz/gal, pH 4.8 - 5.2)	31 18 3	-	-	-	-	-/-	-	90	-	-/-	-/-
Sodium Chloride, Dechlorinated (sat'd. sodium chloride, traces of free chlorine, pH 2-3)	Footnote 8	-	-	-	-	NR/NR	-	200	-	-/-	-/-
Sodium Chloride, Mercury Grade (sat'd.)		-	-	-	-	-/-	-	180	-	-/-	-/-
Sodium Chloride, Vapor & Condensate (sat'd.)		-	-	-	-	-/-	-	180	-	-/-	180/180
Sodium Chlorite	2	-	220	220	150	210/210	220	210	-	-/-	-/-
Sodium Chlorite	25	-	220	220	150	210/210	220	175	-	-/-	175/175
Sodium Chlorite (sat'd.)		-	-	-	-	210/210	220	150	-	NR/NR	-/-
Sodium Chlorosulfonate (sat'd.) ...		-	-	-	-	-/-	-	-	225	-/-	-/-
Sodium Chromate (sat'd.)		-	220	220	210	210/210	220	180	-	-/-	-/-
Sodium Cumene Sulfonate	43	-	-	-	-	-/-	-	120	-	-/-	-/-
Sodium Cyanide	10	-	210	210	210	210/210	210	LS120	-	120/-	-/-
Sodium Cyanide	50	-	210	210	210	210/210	210	LS150	-	-/-	-/-
Sodium Cyanide (sat'd.)		-	210	210	210	210/210	210	LS160	225	100/-	-/100
Sodium Dichromate (sat'd.)		-	210	210	210	210/210	210	-	-	120/120	90/-
Sodium Dichromate: Acetic Acid ..	30 70	-	-	-	-	-/-	-	160	-	-/-	-/-
Sodium Dichromate: Hydrofluoric Acid: Sulfuric Acid (hydrochloric acid, 60% by volume)	Footnote 1	-	-	-	-	-/-	-	120	-	-/-	-/-
Sodium Dichromate: Nitric Acid: Sulfuric Acid (concentration in g/l, trace of chromic sulfate)	Footnote 3	-	-	-	-	-/-	-	180	-	-/-	-/-
Sodium Dichromate: Sulfuric Acid (concentration in oz/gal)	3 30	-	-	-	-	NR/NR	-	150	-	-/-	-/-
Sodium Dichromate: Sulfuric Acid (concentration in oz/gal)	4 32	-	-	-	-	NR/NR	-	160	-	-/-	-/-
Sodium Dichromate: Sulfuric Acid (concentration in oz/gal)	5 30	-	-	-	-	NR/NR	-	180	-	-/-	-/-
Sodium Dichromate: Sulfuric Acid (concentration in oz/gal)	5 42	-	-	-	-	NR/NR	-	160	-	-/-	-/-
Sodium Dichromate: Sulfuric Acid (concentration in g/l, saturated in chromic sulfate)	52 9	-	-	-	-	NR/NR	-	80	-	-/-	-/-
Sodium Diphosphate (sat'd.)		-	-	-	210	-/-	-	-	-	180/-	-/-
Sodium Dodecylbenzene Sulfonate (pH 8)	40	-	-	-	160	-/-	-	120	-	-/-	-/-
Sodium Ethoxysulfate	100	-	-	-	-	-/-	-	120	-	-/-	-/-
Sodium Ferricyanide (sat'd.)		-	-	-	210	210/210	220	250	-	180/150	220/220
Sodium Ferrocyanide (sat'd.)		-	-	-	210	210/210	220	180	-	180/150	-/220
Sodium Fluoride	Footnote 1	-	180	180	180	180/180	180	-	-	-/-	-/-
Sodium Fluoride (traces of potassium fluoride, sodium hydroxide and potassium hydroxide)	Footnote 1	-	-	-	-	180/180	180	NR	-	-/-	-/-
Sodium Fluoride: Sodium Chloride	Footnote 1	-	-	-	-	-/-	-	-	-	-/-	-/-
Sodium Fluorosilicate	1 20	-	-	-	120	150/150	150	-	-	-/-	-/-
Sodium Hexametaphosphate (sat'd.)	100	-	-	-	120	150/150	150	-	-	-/-	-/-
Sodium Hexametaphosphate (sat'd.)		-	150	150	150	150/150	150	150	150	-/-	-/-
Sodium Hydrogen Phosphate		-	-	-	-	-/-	-	200	-	-/-	-/-
Sodium Hydrosulfide	65	-	-	-	-	140/140	140	160	140	-/-	-/-
Sodium Hydrosulfide: Sodium Hydroxide	15 15	-	-	-	-	140/140	140	-	140	NR/NR	-/-
Sodium Hydroxide ...Footnote 25	0.5	120	180	180	180	180/180	180	NR	180	100/NR	140/180
Sodium Hydroxide ...Footnote 25	1	120	180	180	180	180/180	180	-	180	LS90/NR	140/180
Sodium Hydroxide ...Footnote 25	5	120	NR	NR	NR	160/160	160	NR	160	NR/NR	NR/180
Sodium Hydroxide ...Footnote 25	10	120	NR	NR	NR	160/160	160	NR	160	NR/NR	NR/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Sodium HydroxideFootnote 25	25	-	-	-	NR	150/150	140	NR	150	NR/NR	NR/-
Sodium HydroxideFootnote 25	50	120	180	180	180	200/200	180	NR	180	NR/NR	NR/-
Sodium Hydroxide (scrubbing chlorine, chlorine dioxide)Footnote 2	5	-	-	-	-	120/120	120	-	NR	NR/NR	-/-
Sodium Hydroxide (scrubbing chlorine blow gas)	20	-	-	-	-	LS120/LS120	LS120	-	NR	NR/NR	-/-
Sodium Hydroxide: Cresylic Acid . .	5 12	-	-	-	-	180/180	180	-	-	-/-	-/-
Sodium Hydroxide: Diethylene Triamine: Water (ethylenediamine, 10% of concentration)	10 10 70	-	-	-	-	-/-	-	-	140	-/-	-/-
Sodium Hydroxide: Phosphoric Acid		-	NR	NR	-	170/170	170	-	-	-/-	-/-
Sodium Hydroxide: Phosphoric Acid (phosphoric acid with polyvinyl alcohol, alternately)	30 8	-	NR	NR	-	210/210	210	210	-	-/-	-/-
Sodium Hydroxide: Sodium Bisulfide	15 15	-	-	-	-	140/140	140	-	140	NR/NR	-/-
Sodium Hydroxide: Sodium Hydrosulfide	15 15	-	-	-	-	140/140	140	-	140	NR/NR	-/-
Sodium Hydroxide: Sodium Thiosulfate: Sodium Sulfide	30 2 2	-	-	-	-	-/-	-	NR	160	NR/NR	NR/NR
Sodium Hydroxide: Sulfuric Acid, Paste (sulfide reduction process, sodium hydroxide - 10% exposure time, sulfuric acid - 90% exposure time) . . .	5 20	-	-	-	-	-/-	-	150	-	-/-	-/-
Sodium Hydroxide, Wet: Sodium Chloride (chute, 100-150 tons/day) .		-	-	-	-	-/-	-	90	-	-/-	-/-
Sodium Hypochlorite (stable)Footnotes 2,3,5,19	2	120	120	120	120	150/150	150	125	NR	-/NR	125/-
Sodium Hypochlorite (stable)Footnotes 2,3,5,19	5.25	120	120	120	120	150/150	150	125	NR	-/NR	125/NR
Sodium Hypochlorite (stable)Footnotes 2,3,5,19	10	120	120	120	120	150/150	150	120	NR	-/NR	100/NR
Sodium Hypochlorite (stable)Footnotes 2,3,5,19	15	-	NR	NR	NR	150/150	150	110	NR	NR/NR	NR/NR
Sodium Hypochlorite Bleach ReactorFootnote 2	6	-	NR	NR	NR	-/-	-	140	-	NR/NR	NR/-
Sodium Hypochlorite Reactor (10% excess sodium hydroxide) . . .	15	-	-	-	-	120/120	120	-	-	-/-	-/-
Sodium Hypochlorite Vapors (concentration above 5.25%)		-	-	-	-	150/150	150	-	140	-/-	150/-
Sodium Lauryl Sulfate	100	-	160	160	160	180/180	180	100	-	-/-	-/-
Sodium Meta-Arsenite	50	-	-	-	-	-/-	-	130	-	-/-	-/-
Sodium Methacrylate (pH 10-10.5) .	25	-	-	-	-	-/-	-	180	-	-/-	-/-
Sodium Monophosphate (sat'd.) . . .		-	210	210	210	210/210	220	-	-	180/150	-/150
Sodium Nitrate (sat'd.)		-	210	210	210	210/210	220	250	-	180/150	220/220
Sodium Nitrate: Sodium Chloride: Sulfuric Acid	8 8 20	-	-	-	-	-/-	-	180	-	-/-	-/-
Sodium Nitrite (sat'd.)		-	-	-	-	210/210	220	180	-	180/150	180/-
Sodium Oxalate (sat'd.)		-	-	-	210	-/-	-	-	225	-/-	-/-
Sodium Persulfate	20	-	-	-	-	120/120	120	-	-	-/-	-/-
Sodium Persulfate: Copper (concentration in g/l, trace of sulfuric acid)	3 30	-	-	-	-	165/165	-	165	-	-/-	-/-
Sodium Phosphate: Phosphoric Acid (scrap liquor, pH 1-3)		-	-	-	-	-/-	-	200	-	-/-	-/-
Sodium Phosphate, Mono (pH 1-3) .	10	-	-	-	210	-/-	-	200	-	-/-	-/-
Sodium Polyacrylate (pH 9-10.5) . . .	25	-	180	180	180	150/150	150	180	-	-/-	-/-
Sodium Potassium (depleted brines)	100	-	-	-	-	-/-	-	200	-	-/-	-/-
Sodium SilicateFootnote 1	6	-	210	210	210	210/210	220	160	160	90/NR	-/-
Sodium Silicate (pH 12) .Footnote 1		-	-	-	-	-/-	-	200	-	NR/NR	-/-
Sodium Sulfate	100	-	210	210	210	210/210	220	220	250	175/150	90/180
Sodium Sulfate: Boric Acid (sodium sulfate with traces of sulfuric acid, hydrogen peroxide, iron and chloride, temperature cycled)Footnote 9	25 15	-	-	-	-	205/205	205	205	-	-/-	-/-
Sodium Sulfate: Sodium Bisulfite: Sodium Sulfite	15 15 15	-	-	-	-	-/-	-	165	-	-/-	-/-
Sodium Sulfate: Sodium Carbonate: Sodium Bicarbonate (0.1% fluoride fumes, electrostatic precipitator)Footnote 2	3 5 1	-	-	-	-	185/185	185	185	-	-/-	-/-
Sodium Sulfate: Sodium Xylene: Sulfonate	2 40	-	-	-	-	-/-	-	150	-	-/-	NR/-
Sodium Sulfate: Sulfuric Acid	23 35	-	-	-	-	-/-	-	180	-	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT		High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service	
		CONCENTRATION %	HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Sodium Sulfate Sulfuric Acid (saturated with chlorine)		23 35	-	-	-	-	-/-	-	130	-	-/-	-/-
Sodium Sulfate: Sulfuric Acid (traces of carbon disulfide and hydrogen sulfide)		20 10	-	-	-	-	-/-	-	125	-	-/-	-/-
Sodium Sulfate: Sulfuric Acid (saturated in carbon disulfide)		5 3	-	-	-	-	-/-	-	140	-	-/-	-/-
Sodium Sulfate: Sulfuric Acid: Zinc Sulfate (saturated with hydrogen sulfite, traces of carbon sulfite and amines)		8 4 3	-	-	-	-	-/-	-	185	-	-/-	185/-
Sodium Sulfate: Sulfuric Acid: Zinc Sulfate		20 10 8	-	-	-	-	95/95	95	-	-	-/-	-/-
Sodium Sulfate: Sulfuric Acid: Zinc Sulfate		5 5 3	-	205	205	-	205/205	205	-	-	-/-	-/-
Sodium Sulfhydrylate		15	-	-	-	-	140/140	140	160	140	-/-	-/-
Sodium Sulfhydrylate		45	-	-	-	-	140/140	140	160	140	NR/NR	-/-
Sodium Sulfhydrylate		65	-	-	-	-	-/-	-	160	-	NR/NR	-/-
Sodium Sulfide		10	-	-	-	210	210/210	220	140	220	80/NR	90/-
Sodium Sulfide (sat'd.)			-	-	-	210	210/210	220	NR	220	NR/NR	NR/90
Sodium Sulfide: Sodium Thiosulfate: Sodium Hydroxide		2 2 30	-	-	-	-	-/-	-	NR	160	NR/NR	NR/NR
Sodium Sulfite		100	-	210	210	210	210/210	220	220	-	90/90	200/-
Sodium Sulfite: Sodium Bisulfite (sat'd.)		50 50	-	-	-	-	-/-	-	150	-	-/-	-/-
Sodium Sulfite: Sodium Bisulfite: Sodium Sulfate		15 15 15	-	-	-	-	-/-	-	165	-	-/-	-/-
Sodium Sulfite: Sulfuric Acid: Chlorate (methanol)			-	-	-	-	-/-	-	125	-	-/-	-/-
Sodium Tartrate (sat'd.)			-	-	-	210	-/-	-	-	225	-/-	-/-
Sodium Tetraborate (sat'd.)			-	180	180	180	200/200	200	180	200	180/150	-/180
Sodium Tetrachlorophenate		13	-	-	-	-	-/-	-	90	-	-/-	-/-
Sodium Thiocyanate		100	-	200	200	200	200/200	200	-	-	-/-	-/-
Sodium Thiosulfate		100	-	180	180	180	120/120	120	-	220	90/90	-/90
Sodium Thiosulfate: Sodium Hydroxide: Sodium Sulfide		2 30 2	-	-	-	-	-/-	-	NR	160	NR/NR	NR/NR
Sodium Tripolyphosphate (sat'd.)			-	210	210	210	210/210	210	125	-	125/80	-/125
Sodium Xylene Sulfate: Isopropyl Alcohol: Inerts (traces of potassium ricinoleate and o-phenylphenol)		10 10 67	-	-	-	-	100/100	100	100	100	-/-	-/-
Sodium Xylene Sulfonate		40	-	-	-	160	210/210	220	150	-	90/NR	-/-
Sodium Xylene Sulfonate: Lauric/Myristic Monoethanolamide (solution)			-	-	-	-	120/120	120	120	-	-/-	-/-
Sodium Xylene Sulfonate: Sodium Sulfate		40 2	-	-	-	-	-/-	-	150	-	-/-	NR/-
SOFTENER B			-	-	-	-	190/190	190	190	190	190/150	190/-
Soil (includes: acid soil, Bainbridge, GA; alkaline soil, Roswell, NM; clay soil)			-	-	-	-	90/90	90	90	-	90/90	90/-
Soil, Fumigant (dilute)			-	-	-	-	-/-	-	NR	120	NR/NR	NR/-
Solvent B KOH AMSCO			-	-	-	-	100/100	100	100	-	100/100	-/-
Sorbitol			-	150	150	180	150/150	150	-	-	-/-	-/180
Soya Oil		100	-	210	210	210	180/180	180	-	-	180/130	-/-
Soya Oil: Sulfuric Acid		90 10	-	-	-	-	-/-	-	300	-	-/-	-/-
Soybean Oil (epoxidized)		100	150	210	210	150	120/120	150	125	-	-/-	-/-
SP-181 (oil treating chemical)			-	-	-	-	-/-	-	-	-	80/-	-/-
Spent Acid (excess sulfuric acid, pH 1)		2	-	-	-	-	NR/NR	-	200	200	-/-	-/-
Spent Acid: Lignin: Tall Oil, Crude (sulfuric acid = 1% of concentration, pH 3)		29 60 10	-	-	-	-	NR/NR	-	200	200	-/-	-/-
Spent Acid: Tall Oil (lignin, pH 1)		2	-	-	-	-	NR/NR	-	200	200	-/-	-/-
Spent Acid: Tall Oil, Crude (lignin, pH 4.3)		2	-	-	-	-	NR/NR	-	200	200	-/-	-/-
STACKFAS MASTIC			-	-	-	-	-/-	-	100	-	-/-	-/-
Stainless Steel Pickle (sulfamic acid = 6 oz/gal, ferric sulfate = 0.1 oz/gal)			-	-	-	-	-/-	-	160	-	-/-	-/-
Stannic Chloride		100	-	180	180	210	180/180	180	180	225	180/100	90/180
Stannous Chloride		100	-	210	210	210	210/210	210	250	-	180/100	200/200
Starch			-	-	-	-	-/-	-	180	-	-/-	-/-
Starch Hydrolyzer			-	-	-	-	-/-	-	290	-	-/-	-/-
Starch, Digested, Neutralizer			-	-	-	-	-/-	-	250	-	-/-	-/-
Steam (traces of ammonia, phosphoric acid and fluorine)Footnote 2			-	-	-	-	-/-	-	140	-	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Steam (trace of ammonia)		-	-	-	220	-/-	-	210	-	-/-	-/-
Steam (sulfuric acid fumes = 0.05%)		-	-	-	220	-/-	-	300	-	-/-	-/-
Steam		-	220	220	220	210/210	220	220	-	150/150	100/100
Steam: Chlorine Dioxide: ChlorineFootnote 21		-	180	180	180	-/-	180	150	-	-/-	-/-
Steam: Sulfuric Acid (cyanuric acid tank, calcined urea)	16	-	-	-	-	-/-	-	210	-	210/NR	-/-
Stearic Acid	100	-	210	210	210	210/210	220	250	250	180/150	200/200
Styrene	100	-	80	80	120	NR/NR	80	NR	-	NR/NR	NR/NR
Styrene Emulsions:											
Acrylic Emulsions (DW-875, U-3400, and U-7001, all trademarks)		-	-	-	-	-/-	-	80	-	-/-	-/-
Succinonitrile	100	-	100	100	100	100/100	100	-	-	-/-	-/-
Sugar Beet, Liquor		-	180	180	180	180/180	180	-	-	-/-	-/-
Sugar Cane, Liquor	100	180	180	180	180	180/180	180	-	-	-/-	-/-
Sugar SolutionFootnote 6	60	-	210	210	210	210/210	210	-	-	90/90	-/-
Sulfamic Acid	15	210	210	210	210	210/210	210	160	-	160/100	-/160
Sulfanilic Acid	100	-	210	210	210	210/210	210	-	-	-/-	-/-
Sulfate Recovery Boiler Gases		-	-	-	-	-/-	-	300	-	-/-	-/-
Sulfate Salts: Sulfuric Acid (sulfates include metal salts, sodium, magnesium and zinc)	24 10	-	-	-	-	-/-	-	135	-	-/-	-/-
Sulfate Electrostatic Precipitator Fumes (traces of carbonate, fluorides and bicarbonates)Footnote 1	3	-	-	-	-	185/185	185	185	-	-/-	-/-
Sulfate: Ferrous Sulfate	15 16	-	-	-	-	-/-	-	-	-	-/-	-/-
Sulfide Anolyte: Nickel Sulfate: Nickel Chloride (electrorefining process, pH 1.5)		-	-	-	-	-/-	-	170	-	-/-	-/-
Sulfite Liquors		-	220	220	-	210/210	220	160	-	160/120	160/160
Sulfo-Isophthalic, (5-) Acid (sodium salt)	25	-	-	-	-	-/-	-	100	-	-/-	-/-
Sulfonated Aliphatics (hydrochloric acid, hydrogen sulfide and butanol)		-	-	-	-	-/-	-	140	-	-/-	-/-
Sulfonyl Chloride, Aromatic	100	-	-	-	-	-/-	-	80	-	NR/NR	-/-
Sulfophthalic Acid, (4-)	25	-	-	-	-	-/-	-	120	-	-/-	-/-
Sulfophthalic Acid, (4-): Sulfuric Acid	50 1.6	-	-	-	-	-/-	-	90	-	LS90/NR	-/-
Sulfur		-	-	-	300	-/-	-	-	-	-/-	-/200
Sulfur Burner (wet gas and gas cooler)		-	-	-	-	NR/-	-	350	-	NR/NR	-/-
Sulfur Chloride	100	-	NR	NR	-	NR/NR	NR	NR	225	NR/NR	NR/-
Sulfur Chloride, Vapor		-	-	-	200	NR/NR	-	-	-	NR/NR	-/-
Sulfur Coal (power plant scrubber, pH 1.9 - 3.6, includes mist, fumes and liquor)		-	-	-	-	-/-	-	150	-	-/-	-/-
Sulfur Dichloride	100	-	-	-	-	-/-	-	NR	100	NR/NR	NR/-
Sulfur Dichloride, Vapor		-	NR	NR	-	NR/NR	NR	-	80	NR/NR	-/-
Sulfur Dioxide (dry or wet)	100	-	250	250	250	210/210	250	250	250	180/150	200/-
Sulfur Dioxide (desulfurizing, hydrogen sulfide with monoethanolamine)	100	-	-	-	-	NR/NR	-	NR	270	NR/NR	NR/-
Sulfur Dioxide (ammonia scrubber process)		-	-	-	-	-/-	-	90	-	-/-	-/-
Sulfur Dioxide (trace of sulfur trioxide)	2	-	-	-	-	-/-	-	250	-	-/-	250/-
Sulfur Dioxide (saturated with water, hydrogen fluoride, hydrogen sulfide and sulfuric acid)Footnote 1		-	-	-	-	-/-	-	170	-	-/-	-/-
Sulfur Dioxide Burner Gas (wet)		-	-	-	350	NR/NR	-	350	-	NR/NR	-/-
Sulfur Dioxide Removal (sulfur dioxide removal by CITREX or Citrate Process)		-	-	-	-	-/-	-	140	-	-/-	-/-
Sulfur Dioxide Removal Fossil Fuel (limestone injection mist after scrubber, pH 2 -12)		-	-	-	-	-/-	-	140	-	-/-	-/-
Sulfur Dioxide: Magnesium Bisulfite Acid Liquor (chlorides, pH 4.5 - 5)Footnote 7	5	-	-	-	-	-/-	-	180	-	-/-	-/-
Sulfur Dioxide: Nitrogen: Oxygen (traces of 80% sulfuric acid)	7 79 15	-	-	-	-	-/-	-	175	-	-/-	-/-
Sulfur Dioxide: Sulfur: Hydrogen Sulfide (electrostatic precipitators)		-	-	-	-	-/-	-	280	-	-/-	-/-
Sulfur Dioxide, Fumes (pulp mill)		-	-	-	-	-/-	-	350	NR	-/-	-/-
Sulfur Dioxide, Fumes: Sulfur Trioxide, Fumes (water spray)		-	120	120	-	120/120	120	-	-	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT		High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		CONCENTRATION %	HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334
Sulfur Dioxide, Fumes: Sulfur Trioxide, Fumes		-	150	150	-	150/150	150	-	-	-/-	-/-
Sulfur Dioxide, Fumes: Sulfur Trioxide, Fumes: Hydrochloric Acid, Fumes (sulfuric acid, caustic and water fumes)		-	-	-	-	-/-	-	190	-	-/-	-/-
Sulfur Dioxide, Vapor: Ammonia, Vapor (by volume)	.06 .02	-	-	-	-	-/-	-	90	-	-/-	-/-
Sulfur Dioxide, Vaporization	100	-	-	-	-	-/-	-	140	-	-/-	-/-
Sulfur Fungicide		-	-	-	-	-/-	-	-	-	180/-	-/-
Sulfur Fungicide (wettable)	8	-	-	-	-	-/-	-	140	-	-/-	140/-
Sulfur Trioxide, Dry	100	-	-	-	300	210/210	220	90	-	NR/NR	90/-
Sulfur Trioxide, Fumes: Sulfur Dioxide, Fumes (water spray)		-	120	120	-	120/120	120	-	-	-/-	-/-
Sulfur Trioxide, Fumes: Sulfur Dioxide, Fumes		-	150	150	-	150/150	150	-	-	-/-	-/-
Sulfur Trioxide, Fumes: Sulfur Dioxide, Fumes: Hydrochloric Acid, Fumes (sulfuric acid, caustic and water fumes)		-	-	-	-	-/-	-	190	-	-/-	-/-
Sulfur Trioxide, Wet	100	-	-	-	-	NR/NR	-	90	-	NR/NR	90/-
Sulfur: Lead: Copper Oxide (10% ferric oxide, 8% zinc sulfate, 3% bismuth sulfate dust)	25 25 18	-	-	-	-	-/-	-	200	-	-/-	-/-
Sulfur: Sulfur Dioxide: Hydrogen Sulfide (electrostatic precipitators)		-	-	-	-	-/-	-	280	-	-/-	-/-
Sulfur, Molten (traces of hydrogen sulfide, sulfur dioxide, sulfur trioxide and water)	100	-	-	-	-	NR/NR	-	260	260	NR/NR	-/-
Sulfur, Molten	100	-	-	-	-	NR/NR	-	250	-	NR/NR	-/-
Sulfur, Molten, Vapors	100	-	-	-	-	-/-	-	300	-	-/-	-/-
Sulfuric Acid	1	210	220	220	220	210/210	220	220	210	180/150	210/210
Sulfuric Acid	5	210	220	220	220	210/210	220	220	210	180/150	210/210
Sulfuric Acid	25	210	220	220	220	210/210	220	220	210	150/120	200/200
Sulfuric Acid	50	200	200	200	200	200/200	200	200	200	120/NR	200/200
Sulfuric Acid	70	180	180	180	180	180/180	180	190	190	NR/NR	150/150
Sulfuric Acid	75	100	120	120	120	100/100	120	175	150	NR/NR	100/-
Sulfuric Acid	80	NR	NR	NR	NR	NR/NR	NR	150	100	NR/NR	NR/NR
Sulfuric Acid (heavy polymer, traces of iron and hydrocarbons)	60	-	-	-	-	-/-	-	80	-	-/-	-/-
Sulfuric Acid (xylene derivative, T-amine and alkaline metal salt)	20	-	-	-	-	100/100	100	100	100	100/NR	-/-
Sulfuric Acid (trace of dichlorides)	30	-	-	-	-	NR/NR	-	165	165	-/-	-/-
Sulfuric Acid (trace of dichlorides)	76	-	-	-	-	NR/NR	-	LS165	165	NR/NR	-/-
Sulfuric Acid (gold pickling)	25	-	150	150	-	150/150	150	150	-	150/-	-/-
Sulfuric Acid (with lime, used for treating waste oils, gear, cutting, etc.)	93	-	-	-	-	-/-	-	NR	180	NR/NR	NR/-
Sulfuric Acid (contaminated with manganese sulfate and manganese oxide)	10	-	-	-	-	-/-	-	210	-	-/-	-/-
Sulfuric Acid (trace of organics)	30	-	-	-	-	-/-	-	165	165	-/-	-/-
Sulfuric Acid (trace of organics)	76	-	-	-	-	NR/NR	-	165	165	-/-	-/-
Sulfuric Acid (waste pickle liquid)		-	-	-	-	LS200/LS200	-	200	-	NR/NR	-/-
Sulfuric Acid (2% excess sulfuric acid, spent acid, pH 1)		-	-	-	-	NR/NR	-	200	200	-/-	-/-
Sulfuric Acid (pickle liquid tank covers)	25	-	-	-	-	-/-	-	200	-	-/-	-/-
Sulfuric Acid Vapor	10	210	220	220	250	210/210	220	250	250	180/150	200/200
Sulfuric Acid Vapor	20	-	180	180	250	180/180	180	220	-	180/150	-/-
Sulfuric Acid Vapor	50	-	140	140	250	140/140	140	140	180	120/120	140/140
Sulfuric Acid Vapor	80	-	-	-	250	-/-	-	140	-	-/-	140/140
Sulfuric Acid Vapor (trace of nitric acid)	70	-	-	-	-	NR/NR	-	200	-	-/-	-/-
Sulfuric Acid: Ammonium Bisulfate: Surfactant	30 6 10	-	-	-	-	-/-	-	110	-	-/-	-/-
Sulfuric Acid Anodizing Solution		-	-	-	-	-/-	-	90	-	-/-	-/-
Sulfuric Acid: Aromatic Sulfonic Acid: Hydrochloric Acid (trace of chlorine)	25	-	-	-	-	-/-	-	80	-	-/-	-/-
Sulfuric Acid: Benzene Sulfonic Acid: Water	7 88 5	-	-	-	-	140/140	140	140	140	140/140	-/-
Sulfuric Acid: Chlorate: Sodium Sulfite (methanol)		-	-	-	-	-/-	-	125	-	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Sulfuric Acid: Chromic AcidFootnote 2	16 12.5	-	-	-	-	-/-	-	225	-	NR/NR	-/-
Sulfuric Acid: Chromic AcidFootnote 2	20 20	-	-	-	-	NR/NR	-	180	-	NR/NR	-/-
Sulfuric Acid: Chromic AcidFootnote 2	32 20	-	-	-	-	-/-	-	90	-	NR/NR	-/-
Sulfuric Acid: Chromic AcidFootnote 2	16 3	-	-	-	-	NR/NR	-	155	-	-/-	-/-
Sulfuric Acid: Chromic Acid (concentration in oz/gal) .Footnote 2	.33 33	-	NR	NR	-	NR/NR	NR	140	-	NR/NR	-/-
Sulfuric Acid: Chromic Acid (concentration in oz/gal) .Footnote 2	.4 40	-	NR	NR	-	NR/NR	NR	150	-	NR/NR	150/-
Sulfuric Acid: Chromic Acid (concentration in oz/gal) .Footnote 2	.53 53	-	NR	NR	-	NR/NR	NR	180	-	NR/NR	-/-
Sulfuric Acid: Chromic Acid: Hydrofluosilicic Acid (concentration in oz/gal, chrome plating)Footnotes 1,2	.3 45 .5	-	-	-	150	-/-	-	115	-	-/-	-/-
Sulfuric Acid: Chromic Oxide	80 2	-	-	-	-	-/-	-	165	-	-/-	NR/-
Sulfuric Acid: Copper Salts (concentration in g/l)Footnote 1	21 31	-	-	-	-	-/-	-	150	-	-/-	-/-
Sulfuric Acid: Copper Salts (concentration in g/l)Footnote 1	33 31	-	-	-	-	-/-	-	180	-	-/-	-/-
Sulfuric Acid: Copper Salts: Nitric Acid (concentration in g/l) ...	17 112 9.5	-	-	-	-	-/-	-	180	-	-/-	-/-
Sulfuric Acid: Copper Sulfate	18 5	-	120	120	-	120/120	120	150	-	120/120	150/150
Sulfuric Acid: Copper: Iron (5 g/l zinc slurry/thickener)	10 80 10	-	-	-	-	-/-	-	180	-	-/-	-/-
Sulfuric Acid: Dichromate Bleach (photographic)		-	-	-	-	-/-	-	80	-	-/-	-/-
Sulfuric Acid: Dodecylbenzene Sulfonic Acid: Water (oil = 1% of concentration)	10 85 4	150	150	150	150	-/-	-	150	-	-/-	150/-
Sulfuric Acid: Fatty Acid	5	-	-	-	-	100/100	100	-	-	-/-	-/-
Sulfuric Acid: Ferric Sulfate: Cupric Sulfate	20 10 10	-	-	-	-	-/-	-	180	-	-/-	-/-
Sulfuric Acid: Fluorides: Methyl Isobutyl Ketone (concentrations in g/l) ...Footnote 1	500 200	-	-	-	-	-/-	-	80	-	-/-	-/-
Sulfuric Acid: Fluorosilicic Acid: Phosphoric Acid (gypsum slurry cooler)Footnote 1	5 5 28	-	-	-	-	-/-	-	190	-	-/-	-/-
Sulfuric Acid: Hydrochloric Acid ..	45 14	-	-	-	-	-/-	-	140	-	-/-	-/-
Sulfuric Acid: Hydrochloric Acid (iron and steel cleaning bath)	23 9	-	210	210	210	200/200	200	180	-	-/-	-/-
Sulfuric Acid: Hydrochloric Acid: Antimony Trioxide	35 15 5	-	-	-	-	-/-	-	100	-	-/-	-/-
Sulfuric Acid: Hydrochloric Acid: Nitric AcidFootnote 3	20 30 12	-	-	-	-	-/-	-	90	-	-/-	-/-
Sulfuric Acid: Hydrochloric Acid: Water (nitric acid = 10% of concentration)	20 30 40	-	-	-	-	-/-	-	90	-	-/-	-/-
Sulfuric Acid: Hydrofluoric Acid: Sodium Dichromate (hydrochloric acid = 60% by volume) .Footnote 1	28 20 3	-	-	-	-	-/-	-	120	-	-/-	-/-
Sulfuric Acid: Hydrogen Iodide (concentration in g/l)	25 66	-	-	-	-	-/-	-	160	-	-/-	-/-
Sulfuric Acid: Hydrogen Peroxide (traces of zinc sulfate, sodium sulfide and oxygen)	1.5 2	-	210	210	-	210/210	210	-	-	-/-	-/-
Sulfuric Acid: Hydroxyacetic Acid: Phosphoric AcidFootnote 2	20 29 51	-	-	-	-	-/-	-	245	-	-/-	-/-
Sulfuric Acid: Hydroxylamine Acid Sulfate (saturated hydroxylamine acid sulfate)	70	-	-	-	-	-/-	-	125	-	-/-	-/-
Sulfuric Acid: Hydroxylammonium Acid Sulfate	10 90	-	-	-	-	-/-	-	180	-	-/-	-/-
Sulfuric Acid: Hydroxylammonium Acid Sulfate: Water ...Footnote 4	75 11 14	-	-	-	-	-/-	-	100	-	-/-	-/-
Sulfuric Acid: Hydroxylammonium Acid Sulfate: Water ...Footnote 4	60 20 20	-	-	-	-	-/-	-	100	-	-/-	-/-
Sulfuric Acid: Manganese Sulfate ..	10 90	-	-	-	-	-/-	-	100	-	-/-	-/-
Sulfuric Acid: Manganese Sulfate (concentration in g/l)	28 50	-	-	-	-	-/-	-	200	-	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT		High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		CONCENTRATION %	HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334
Sulfuric Acid: Manganese Sulfate: Ammonium Sulfate (concentration in g/l, pH 9)	30 13 125	-	-	-	-	-/-	-	100	-	-/-	-/-
Sulfuric Acid: Manganese Sulfate: Ammonium Sulfates (concentration in g/l, pH 5)	40 13 135	-	-	-	-	-/-	-	125	-	125/125	125/-
Sulfuric Acid: Nitric AcidFootnote 3	20 5	-	-	-	-	-/-	-	210	-	NR/NR	-/-
Sulfuric Acid: Nitric AcidFootnote 3	15 15	-	-	-	-	-/-	-	180	-	-/-	-/-
Sulfuric Acid: Nitric Acid Phosphoric Acid (trace of non-ionic surfactant)Footnote 3	5 20 11	-	-	-	-	80/80	80	-	-	-/-	-/-
Sulfuric Acid: Nitric Acid: Sodium Dichromate (concentration in g/l, trace of chromic sulfate) .Footnote 3	7.8 3.8 25	-	-	-	-	-/-	-	180	-	-/-	-/-
Sulfuric Acid, Organic (alkyl benzene)	75 2	-	-	-	-	-/-	-	160	-	-/-	-/-
Sulfuric Acid: Phosphoric Acid	10 20	-	-	-	-	-/-	-	160	-	-/-	-/-
Sulfuric Acid: Phosphoric Acid: Water (sodium hydroxide = 2% of concentration, trace of trisodium phosphate)	2 14 82	-	-	-	-	-/-	-	100	-	-/-	-/-
Sulfuric Acid: Phosphoric Acid: Water (sodium hydroxide = 2% of concentration, trace of trisodium phosphate)	2.5 20 75	-	-	-	-	-/-	-	100	-	-/-	-/-
Sulfuric Acid: Sodium Bichromate (sugar reaction product, pH 2.6) . . .		-	-	-	-	-/-	-	140	-	-/-	-/-
Sulfuric Acid: Sodium Chlorate (concentration in g/l, saturated with chlorine dioxide, traces of methyl alcohol)Footnote 2	450 120	-	-	-	-	-/-	-	145	-	-/-	-/-
Sulfuric Acid: Sodium Chlorate: Methyl Alcohol (sodium sulfate) . . .		-	-	-	-	-/-	-	125	-	-/-	-/-
Sulfuric Acid: Sodium Chloride . . .	12 8	-	-	-	-	-/-	-	210	-	-/-	-/-
Sulfuric Acid: Sodium Chloride: Sodium Nitrate	20 8 8	-	-	-	-	-/-	-	180	-	-/-	-/-
Sulfuric Acid: Sodium Dichromate (concentration in oz/gal)	30 3	-	-	-	-	NR/NR	-	150	-	-/-	-/-
Sulfuric Acid: Sodium Dichromate (concentration in oz/gal)	32 4	-	-	-	-	NR/NR	-	160	-	-/-	-/-
Sulfuric Acid: Sodium Dichromate (concentration in oz/gal)	30 5	-	-	-	-	NR/NR	-	180	-	-/-	-/-
Sulfuric Acid: Sodium Dichromate (concentration in oz/gal)	42 5	-	-	-	-	NR/NR	-	160	-	-/-	-/-
Sulfuric Acid: Sodium Dichromate (concentration in g/l, saturated in chromic sulfate)	9 52	-	-	-	-	NR/NR	-	80	-	-/-	-/-
Sulfuric Acid: Sodium Sulfate	35 23	-	-	-	-	-/-	-	180	-	-/-	-/-
Sulfuric Acid: Sodium Sulfate (saturated with chlorine)	35 23	-	-	-	-	-/-	-	130	-	-/-	-/-
Sulfuric Acid: Sodium Sulfate (traces of carbon disulfide and hydrogen sulfide)	10 20	-	-	-	-	-/-	-	125	-	-/-	-/-
Sulfuric Acid: Sodium Sulfate (saturated in carbon disulfide)	3 5	-	-	-	-	-/-	-	140	-	-/-	-/-
Sulfuric Acid: Sodium Sulfate: Zinc Sulfate (saturated with hydrogen sulfite, traces of carbon sulfite and amines)	4 8 3	-	-	-	-	-/-	-	185	-	-/-	185/-
Sulfuric Acid: Sodium Sulfate: Zinc Sulfate	10 20 8	-	-	-	-	95/95	95	-	-	-/-	-/-
Sulfuric Acid: Sodium Sulfate: Zinc Sulfate	5 5 3	-	205	205	-	205/205	205	-	-	-/-	-/-
Sulfuric Acid: Soya Oil	10 90	-	-	-	-	-/-	-	300	-	-/-	-/-
Sulfuric Acid: Steam (cyanuric acid tank, calcined urea) . .	16	-	-	-	-	-/-	-	210	-	210/NR	-/-
Sulfuric Acid: Sulfate Salts (sulfates include metal salts, sodium, magnesium and zinc)	10 24	-	-	-	-	-/-	-	135	-	-/-	-/-
Sulfuric Acid: Sulfophthalic Acid, (4-)	1.6 50	-	-	-	-	-/-	-	90	-	LS90/NR	-/-
Sulfuric Acid, 50%: Methyl Ethyl Ketone	90 10	-	-	-	-	80/80	80	80	80	80/-	80/-
Sulfuric Acid, 70%: Nitric Acid, 70% (pickling acid)Footnote 3	51 10.5	-	-	-	-	80/80	80	80	-	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Sulfuric Acid, 93%: Phosphoric Acid, 85%	50 50	-	-	-	-	-/-	-	160	-	NR/NR	NR/NR
Sulfuric Acid, Fumes (scrubber) ...	33	-	-	-	-	-/-	-	195	-	-/-	-/-
Sulfuric Acid, Fumes: Nitric-Dinitro-Toluene, Fumes		-	-	-	-	-/-	-	-	200	NR/NR	-/-
..... Footnote 3											
Sulfuric Acid, Paste: Sodium Hydroxide (sulfide reduction process, sodium hydroxide - 10% exposure time, sulfuric acid - 90% exposure time)	20 5	-	-	-	-	-/-	-	150	-	-/-	-/-
Sulfuric Acid, Waste (leaching, pH 2-5)		-	-	-	-	-/-	-	-	-	90/90	-/-
Sulfuric Acid, Waste (177 g/l with metal salts)		-	-	-	-	-/-	-	-	-	-/-	-/-
Sulfuric Evaporation (concentration up to 70%)	70	-	-	-	-	NR/NR	-	185	-	NR/NR	-/-
Sulfurous Acid	10	-	100	100	120	100/100	100	150	200	NR/NR	90/90
Sulfurous Acid (sat'd.)		-	-	-	-	-/-	-	90	-	-/-	-/-
Sulfurous Acid (acidic gas atmosphere, saturated and weak at 3600 fpm)		-	100	100	-	100/100	100	150	-	NR/NR	-/-
..... Footnote 1											
Sulfide Anolyte (nickel plating tank, pH 1.5)		-	-	-	-	-/-	-	150	-	-/-	-/-
Surfactant (nonyl phenoxytriethoxy ethanol type)	28	-	-	-	-	-/-	-	100	100	-/-	-/-
Surfactant (modified linear aliphatic polyether, nonionic)		-	-	-	-	NR/NR	-	120	-	-/-	-/-
Surfactant, Alkanolamide	100	-	-	-	-	-/-	-	120	-	-/-	-/-
Surfactant: Ammonium Bisulfate: Sulfuric Acid	10 6 30	-	-	-	-	-/-	-	110	-	-/-	-/-
Surfactant, Anionic	58	-	-	-	-	-/-	-	120	-	-/-	-/-
Surfactant, Nonionic: Alkanolamide	55	-	-	-	-	-/-	-	120	-	-/-	-/-
Surfactant, Nonionic: Alkyl Ether Amine Oxide (nonionic)		-	120	120	-	120/120	120	120	120	120/120	-/-
Surfactant, Nonionic, TERGITOL 15-S-9	100	-	-	-	-	-/-	-	100	-	-/-	-/-
Surfactant, Polyethylene, Oxy Derivative	100	-	-	-	-	-/-	-	105	-	-/-	-/-
Surfactants, Amide Type	100	-	-	-	-	-/-	-	120	-	-/-	-/-
Surfactants, Linear Primary Alcohol Type (also includes alcohol type-ethanol)	100	-	-	-	-	-/-	-	120	-	-/-	-/-
Sweetwater		180	180	180	-	180/180	180	-	-	-/-	-/-
Tall Oil		-	150	150	220	150/150	150	200	-	-/-	-/-
Tall Oil, Crude: Spent Acid (lignin, pH 4.3)	2	-	-	-	-	NR/NR	-	200	200	-/-	-/-
Tall Oil, Crude: Spent Acid: Lignin (sulfuric acid = 1% of concentration, pH 3)	10 29 60	-	-	-	-	NR/NR	-	200	200	-/-	-/-
Tall Oil: Spent Acid (lignin, pH 1) ...	2	-	-	-	-	NR/NR	-	200	200	-/-	-/-
Tannic Acid (sat'd.)		-	-	-	210	210/210	210	250	-	180/150	200/200
Tar Camphor	100	-	-	-	-	-/-	-	80	-	-/-	80/-
Tartaric Acid (sat'd.)		-	210	210	210	210/210	210	250	250	180/150	220/220
TELONE, Fumigant (conc.)		-	-	-	-	-/-	-	NR	120	-/-	-/-
..... Footnote 4											
Terephthalic Acid: Hydrochloric Acid: Water (dimethylformamide = 7% of concentration)	14 28 51	-	-	-	-	-/-	-	100	100	-/-	-/-
TERGITOL 15-S-9 Surfactant, Nonionic	100	-	-	-	-	-/-	-	100	-	-/-	-/-
Tetrachlorocyclopentane (saturated with chlorine, traces of hydrochloric acid, carbon tetrachloride, hexachlorocyclopentane)	100	-	-	-	-	-/-	-	160	-	-/-	-/-
Tetrachloroethene	100	-	-	-	120	-/-	-	-	225	-/-	-/-
Tetrachloroethylene (also called perchloroethylene)		-	-	-	-	-/-	-	-	-	-/-	-/-
Tetrachlorophenol (sodium salt) ...	13	-	-	-	-	-/-	-	90	-	-/-	-/-
Tetrachloropyridine	100	-	-	-	120	120/120	120	120	-	-/-	-/-
Tetrahydrofuran	100	-	-	-	-	-/-	-	-	100	-/-	-/-
Tetrahydrofuryl Alcohol	100	-	-	-	-	-/-	-	-	225	-/-	-/-
Tetrakis (Hydroxymethyl) Phosphonium Chloride (vapors, also hydrochloric acid and water vapors) ..		-	-	-	-	-/-	-	90	-	-/-	90/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT		High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		CONCENTRATION %	HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334
Tetrakis (Hydroxymethyl) Phosphonium Chloride	100	-	-	-	-	-/-	-	170	-	-/-	-/-
Tetrapotassium Pyrophosphate	60	-	-	-	150	100/100	100	125	-	90/NR	125/125
Tetrasodium Ethylenediamine Tetraacetate	100	-	-	-	-	150/150	150	-	-	-/-	-/-
Tetrasodium Pyrophosphate	5	-	-	-	-	150/150	150	125	-	125/-	-/125
Tetrasodium Pyrophosphate (sat'd.)		-	-	-	-	100/100	100	-	-	90/NR	-/125
TEXTONE Bleach		-	-	-	210	210/210	220	-	-	-/-	-/-
THERMOLIN RF-230	100	-	-	-	-	-/-	-	95	-	-/-	-/-
Thioglycol Acid	10	-	-	-	100	100/100	100	-	-	-/-	-/-
Thioglycol, Mono	100	-	-	-	-	-/-	-	80	80	-/-	-/-
Thionyl Chloride, Vapor	100	-	-	-	-	-/-	-	150	-	NR/NR	NR/-
Tin Fluoborate, Metal Plating (18% stannous fluoborate, 7% tin, 9% fluoboric acid, 2% boric acid)											
.....Footnote 1		-	210	210	210	200/200	200	200	-	-/-	-/-
TINOFIX QF	50	-	-	-	-	-/-	-	90	90	90/90	-/-
Titanium Chloride (sat'd.)		-	-	-	-	-/-	-	-	225	-/-	-/-
Titanium Sulfate (sat'd.)		-	-	-	-	-/-	-	-	225	-/-	-/-
Titanium Sulfate (reduction process)		-	-	-	-	-/-	-	80	-	-/-	-/-
Tobias Acid	100	-	210	210	210	210/210	210	-	-	-/-	-/-
Toluene	100	-	120	120	120	NR/NR	100	90	225	NR/NR	90/90
Toluene Diisocyanate (sat'd.)		-	-	-	-	80/80	80	150	-	NR/NR	-/NR
Toluene Sulfonic Acid	65	-	210	210	210	210/210	210	100	100	-/-	-/-
Toluene Sulfonic Acid	100	-	210	210	210	210/210	210	-	225	-/-	-/-
Toluene: Acetone	50 50	NR	NR	NR	NR	NR/NR	NR	-	90	-/-	-/-
Toluene: Aromatic: Aliphatic (xylene = 3% of concentration)	86 5 6	-	-	-	-	-/-	-	-	-	90/-	-/-
Toluene, Vapor	100	-	-	-	-	-/-	-	200	200	-/-	-/-
Toluene, Vapor & Condensate	100	-	-	-	-	-/-	-	120	120	-/-	120/-
Toluene, Vapor & Reflux	100	-	-	-	-	-/-	-	230	230	-/-	-/-
Toxaphene: Xylene	90 10	-	-	-	-	-/-	-	120	120	-/-	-/-
Transmission Fluid, Automatic	100	-	-	-	-	-/-	-	-	-	90/-	-/-
Tributyl Phosphate	100	-	150	150	140	-/-	150	-	-	150/NR	-/-
Tributyl Phosphate: Aromatic Solvent	35 65	-	-	-	-	-/-	-	90	90	-/-	-/-
Trichloroacetic Acid	50	-	210	210	210	210/210	210	200	-	90/-	200/-
Trichloroacetonitrile (traces of acetonitrile and hydrochloric acid)	100	-	-	-	-	-/-	-	85	85	-/-	-/-
Trichlorobenzene	100	-	-	-	-	NR/NR	-	NR	225	NR/NR	NR/-
Trichlorobenzene, Vapors (wet with hydrochloric acid)		-	-	-	-	-/-	-	210	-	-/-	-/-
Trichloroethane, (1,1,1-)	100	-	80	80	120	-/-	80	NR	120	NR/NR	NR/-
Trichloroethylene	100	-	NR	NR	NR	NR/NR	NR	NR	180	NR/NR	NR/-
Trichloroethylene, (1,1,2-)	100	-	NR	NR	NR	NR/NR	NR	NR	185	NR/NR	NR/-
Trichloroethylene, Fumes (22% hydrochloric acid, 10% chlorine, 9% oxygen, 6% carbon monoxide and 4% hydrogen)		-	-	-	-	-/-	-	-	175	-/-	175/-
Trichloroethylene, Vapors (hydrochloric acid, chlorine and water vapors)		-	-	-	-	-/-	-	120	-	-/-	120/-
Trichloromonofluoromethane											
.....Footnote 1	100	-	80	80	100	-/-	80	-	-	-/-	-/-
Tricresyl Phosphate	100	-	120	120	160	80/80	120	-	160	-/-	-/-
Tridecylbenzene Sulfonate (detergent based)		-	-	-	-	120/120	120	120	-	-/-	-/-
Triethanol Ammonium Lauryl Sulfate	100	-	-	-	-	-/-	-	80	-	NR/NR	-/-
Triethanolamine	100	-	150	150	150	150/150	150	-	-	-/-	-/-
Triethanolamine Linear Alkylate Sulfonate	60	-	-	-	-	-/-	-	100	-	-/-	-/-
Triethylamine	100	-	120	120	120	150/150	150	-	150	-/-	-/-
Triethylene Glycol	100	-	-	-	180	-/-	-	180	-	-/-	-/-
Trifluorovinyl Chloride (oils and greases)		-	-	-	-	-/-	-	90	-	-/-	90/-
Trihydroxybenzoic Acid (sat'd.)	100	-	-	-	-	-/-	-	80	250	-/-	-/-
Tri-m-butyl Phosphate: Cobalt di (2 ethyl hexyl) Phosphate: Livestock Spray Base (Shell's)	5 30 65	-	-	-	-	-/-	-	180	-	-/-	-/-
Trimethyl Borate (in methyl alcohol)											
.....Footnote 3	98	-	-	-	-	-/-	-	150	-	-/-	-/-
Trimethyl Carbinol	100	-	-	-	-	-/-	-	100	-	-/-	-/-
Trimethylamine Hydrochloride (pH 3 - 4)	100	-	-	-	-	130/130	130	130	-	130/-	-/-
Trimethylamine: Hydrochloric Acid	100 37	-	-	-	-	-/-	-	130	-	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Trimethylamine: Hydrochloric Acid (ethylene oxide reaction)		-	-	-	-	-/-	-	NR	-	-/-	-/-
Triphenyl Phosphate	100	-	100	100	-	100/100	100	120	-	90/NR	-/90
Trisodium Phosphate	25	-	250	250	250	210/210	210	150	-	-/-	-/-
Trisodium Phosphate (sat'd.)		-	250	250	250	210/210	210	90	-	NR/NR	90/-
Tuna Oil	100	-	-	-	-	160/160	160	-	-	160/120	-/-
Turpentine, Crude Sulfate		-	-	-	-	100/100	100	LS100	NR	100/NR	LS100/-
Turpentine, Pure Gum	100	-	-	-	-	90/90	100	120	-	90/-	-/90
Ultraformer Feed, Refinery (also includes heavy feed)		-	-	-	-	-/-	-	-	-	90/90	-/-
Ultraformer Feed, Xylene		-	-	-	-	-/-	-	90	-	-/-	-/-
Uranium Extraction		-	-	-	180	-/-	-	90	-	-/-	-/-
Uranium SX Units		-	-	-	-	90/90	90	90	-	-/-	-/-
Urea (sat'd.)		-	120	120	120	180/180	180	160	225	150/90	-/90
Urea: Ammonium Chloride:											
Ammonium Nitrate	38 2.5 20	-	-	-	-	-/-	-	90	-	-/-	-/-
Urea: Ammonium Nitrate: Water ...	40 10 50	-	-	-	-	120/120	-	-	-	-/-	-/-
Urea: Ammonium Nitrate: Water ...	20 30 50	-	-	-	-	120/120	-	-	-	-/-	-/-
Urea: Ammonium Nitrate: Water ...	35 44 21	-	-	-	-	-/-	-	120	-	-/-	-/-
Urea: Ammonium Nitrate: Water											
(URAN fertilizer, ammonium nitrate composition)	35.4 44.3 20.3	150	-	-	120	-/-	-	120	-	-/-	-/-
Urea-Formaldehyde Resin	100	-	-	-	120	-/-	-	80	-	-/-	-/-
Uric Acid (conc.)		-	-	-	-	-/-	-	-	225	-/-	-/-
Urotropine	28	-	-	-	-	-/-	-	80	-	-/-	80/-
Vanasol	1	-	-	-	-	80/80	80	80	-	80/-	-/-
VARIQUAT K-300		-	-	-	-	120/120	120	120	120	120/120	120/-
VARISOFT 222-90		-	-	-	-	120/120	120	120	120	120/120	120/-
VAROX 185E		-	-	-	-	120/120	120	120	120	120/120	-/-
VARSOL	100	-	-	-	-	200/200	200	200	-	200/NR	NR/-
Veneer Drying Fumes		-	-	-	-	-/-	-	300	-	-/-	-/-
VIDDEN D Fumigant (conc.)		-	-	-	-	-/-	-	NR	120	-/-	-/-
Footnote 4											
Vinegar	100	-	210	210	210	210/210	200	210	-	180/150	90/-
Vinyl Toluene	100	-	80	80	120	80/80	80	80	-	NR/NR	-/-
Vinylidene Chloride: 190D	2 98	-	-	-	-	-/-	-	90	-	-/-	-/-
Vinylidene Chloride:											
Acrylic Acid Dispersion	2 98	-	-	-	-	-/-	-	90	-	-/-	-/-
VIVO-ZYNE	100	-	-	-	-	-/-	-	-	-	100/100	-/-
Wash Solution (pH 13.6)		-	-	-	-	-/-	-	NR	-	-/-	NR/-
Waste Water Treatment		-	-	-	-	-/-	-	-	-	-/-	-/100
Waste, Organic, Vapors (water, hydrochloric acid and chlorine vapors)		-	-	-	180	-/-	-	175	-	-/-	-/-
Water (contaminated with aromatic solvents, hydrocarbon resins, organics, slightly acid to basic)		-	-	-	-	-/-	-	100	-	-/-	100/-
Water (pH 3, pH 7, pH 10)		-	-	-	-	-/-	-	125	-	90/90	-/-
Water (13,000 ppm acetic acid)		-	-	-	-	-/-	-	150	-	150/150	-/-
Water (3,000 ppm iso-octyl alcohol) ..		-	-	-	-	-/-	-	150	-	150/150	-/-
Water (100 ppm methylene chloride) ..		-	-	-	-	-/-	-	150	-	150/150	-/-
Water (saturated with 1.5 - 2.5% ozone in oxygen)		-	-	-	-	-/-	-	140	-	-/-	-/-
Water (50 ppm phenol)		-	-	-	120	-/-	-	90	-	-/-	-/-
Water (500 ppm sodium chloride) ...		-	-	-	-	-/-	-	150	-	150/150	-/-
Water (8,000 ppm chlorobenzene) ...		-	-	-	-	-/-	-	150	-	150/120	-/-
Water (pH 5 - 9 (1-13 at times) with hydrochloric acid, chlorine, benzoic acid, benzoyl, benzal, benzyl chlorides present)		-	-	-	-	-/-	-	120	-	-/-	-/-
Water Slurry: CoalFootnote 24	90 10	-	-	-	-	-/-	-	80	-	-/-	-/-
Water Treatment (dye plant, pH 2-3)		-	-	-	-	-/-	-	180	-	-/-	-/-
Water Treatment (softening and coagulating)		-	-	-	-	-/-	-	90	-	90/90	90/-
Water: Acetic Acid (traces of sulfuric acid, methylene chloride, octyl alcohol, sodium chloride and chlorobenzene)	48 1.3 90 10	-	-	-	-	NR/NR	-	150	-	150/NR	-/-
Water: Acetone	50 10 40	-	150	150	150	-/-	150	-	150	-/-	-/-
Water: Ammonium Nitrate: Urea ...	50 10 40	-	-	-	-	120/120	-	-	-	-/-	-/-
Water: Ammonium Nitrate: Urea ...	50 30 20	-	-	-	-	120/120	-	-	-	-/-	-/-
Water: Ammonium Nitrate: Urea ...	21 44 35	-	-	-	-	-/-	-	120	-	-/-	-/-
Water: Ammonium Nitrate: Urea (URAN fertilizer, ammonium nitrate composition)	20.3 44.3 35.4	150	-	-	120	-/-	-	120	-	-/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins					Fume Service
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Water: Ammonium Thiosulfate: Ammonium Thiocyanate (ammonium sulfate = 2.3% of concentration)	88 5.5 4	-	-	-	-	130/130	130	130	110	130/110	-/-
Water: Aniline Hydrochloride: Hydrogen Bromide (hydrochloric acid = 1.5% and bromine = 1% of concentration)	78 15 4.5	-	-	-	-	140/140	140	140	140	-/-	-/-
Water: Benzene Sulfonic Acid: Sulfuric Acid	5 88 7	-	-	-	-	140/140	140	140	140	140/140	-/-
Water: Benzene: Dimethylformamide (tetrahydrofuran = 5% of concentration)	50 40 5	-	NR	NR	NR	NR/NR	NR	NR	90	NR/NR	NR/NR
Water: Bromine	95 5	-	-	-	-	180/180	200	-	-	-/-	-/-
Water: Chlorine: Hydrochloric Acid (chlorinated organics)		-	-	-	-	NR/NR	-	80	-	-/-	-/-
Water: Diethylene Triamine: Sodium Hydroxide (ethylenediamine = 10% of concentration)	70 10 10	-	-	-	-	-/-	-	-	140	-/-	-/-
Water: Hydrochloric Acid: Sulfuric Acid (nitric acid = 10% of concentration)	40 30 20	-	-	-	-	-/-	-	90	-	-/-	-/-
Water: Hydrochloric Acid: Terephthalic Acid (dimethylformamide = 7% of concentration)	51 28 14	-	-	-	-	-/-	-	100	100	-/-	-/-
Water: Hydroxylammonium Acid Sulfate: Propionic Acid	10 89 1	-	-	-	-	-/-	-	175	-	-/-	-/-
Water: Hydroxylammonium Acid Sulfate: Sulfuric Acid .Footnote 4	14 11 75	-	-	-	-	-/-	-	100	-	-/-	-/-
Water: Hydroxylammonium Acid Sulfate: Sulfuric Acid .Footnote 4	20 20 60	-	-	-	-	-/-	-	100	-	-/-	-/-
Water: Methyl Alcohol	20 80	-	100	100	100	NR/NR	100	100	150	90/80	90/90
Water: Methyl Alcohol, 60% (dissolved heavy organics, traces of heptane, zinc chloride and hydrochloric acid. Organics - 2 phases) .Footnote 17	50 50	-	-	-	-	-/-	-	140	-	-/-	-/-
Water: Monochlorotoluene		-	-	-	-	-/-	-	-	200	-/-	-/-
Water: Nitrogen: Carbon Dioxide (by volume, oxygen = 5% of concentration, trace of sulfur dioxide)	14 70 12	-	-	-	-	-/-	-	120	-	-/-	-/-
Water: Nitromethane (tris- hydroxymethyl, trace of formaldehyde, pH 3)	49 51	-	-	-	-	120/120	120	120	-	-/-	-/-
Water: Organic Acid, Contaminated Water: Phosphoric Acid: Sulfuric Acid (sodium hydroxide = 2% of concentration, trace of trisodium phosphate)	96.5 1.5 2	-	-	-	-	NR/NR	-	150	-	150/NR	-/-
Water: Phosphoric Acid: Sulfuric Acid (sodium hydroxide = 2% of concentration, trace of trisodium phosphate)	82 14 2	-	-	-	-	-/-	-	100	-	-/-	-/-
Water: Phosphoric Acid: Sulfuric Acid (sodium hydroxide = 2% of concentration, trace of trisodium phosphate)	75 20 2.5	-	-	-	-	-/-	-	100	-	-/-	-/-
Water: Pigment Slurry: Hydrochloric Acid (trace of sodium chloride)	88 8 3	-	-	-	-	-/-	-	200	-	-/-	NR/-
Water: Sulfuric Acid: Dodecylbenzene Sulfonic Acid (oil = 1% of concentration)	4 10 85	150	150	150	150	-/-	-	150	-	-/-	150/-
Water, City (10 - 60 psi)	100	-	220	220	-	180/180	220	180	-	160/150	180/-
Water, Condensate (buffered)		-	-	-	-	-/-	-	100	-	-/-	-/-
Water, Condensate (zero hardness, pH 8.5 - 9.5)	100	-	-	-	-	LS200/LS200	-	200	-	-/-	-/-
Water, Condensate (geyser)		-	-	-	-	-/-	-	-	-	125/-	-/-
Water, Condensate		-	-	-	-	-/-	-	-	-	125/-	-/-
Water, Cooling (pH 5.5 - 7)		-	-	-	-	170/170	170	180	-	150/130	-/-
Water, Cooling (20 ppm of chromate)		-	-	-	-	180/180	180	180	-	180/160	-/-
Water, Cooling Tower		-	120	120	-	120/120	120	120	90	120/120	90/90
Water, Deionized .Footnote 6	100	180	220	220	180	180/180	220	180	-	150/120	-/-
Water, Deionized (high purity, 1.5 umho/cm)	100	-	90	90	90	90/90	90	-	-	90/NR	-/-
Water, Demineralized	100	180	220	220	180	210/210	220	210	-	180/120	100/100
Water, Distilled	100	180	220	220	220	200/200	220	210	200	160/140	160/-
Water, Geothermal		-	-	-	-	-/-	-	-	-	125/-	-/-

TEMPERATURE (°F) FOR RESIN TYPES

CHEMICAL ENVIRONMENT	CONCENTRATION %	High Performance Epoxy Vinyl Ester Resins				Epoxy Vinyl Ester Resins		Fume Service			
		HETRON 942/35	HETRON 980/35	HETRON FR998/35	HETRON 970/35	HETRON 922/FR992	HETRON 980	HETRON 197-3	HETRON 800	AROPOL 7241/7334	HETRON 92/99P
Water, Ground (Organic (1.310 ppm) contaminated, untreated, pH 6.7)Footnote 18		-	-	-	-	-/-	-	110	-	-/-	-/-
Water, Irrigation		-	90	90	-	90/90	90	90	90	90/90	90/-
Water, Light (FC195)	100	-	-	-	-	-/-	-	160	-	-/-	160/-
Water, Light (FC203)	100	-	-	-	-	NR/NR	-	120	-	120/120	NR/-
Water, Light (FC206A)	100	-	NR	NR	-	NR/NR	NR	120	-	120/120	NR/NR
Water, Steam Condensate	100	-	180	180	180	180/180	180	210	-	160/150	200/-
Water, Vapor & Condensate		-	-	-	-	-/-	-	210	-	-/-	180/-
Water, Vapor: Hydrochloric Acid, Vapor: Methyl Alcohol, VaporFootnote 17	5 2 93	-	-	-	-	NR/NR	NR	LS150	100	-/-	-/-
Water, Vapors: Benzene, Vapors (trace of hydrochloric acid)		-	-	-	100	-/-	-	175	-	-/-	-/-
Water, Waste (with solids, oils and grease, also trickling filters)		-	-	-	-	80/80	80	90	80	80/-	90/-
Water, Waste (with pine oil, kerosene, methoxychlor, malathion, xylene, detergents, chlorophyll, surface active agents and other oils)		-	-	-	-	80/80	80	80	80	80/-	-/-
Water, White		-	-	-	-	-/-	-	90	-	-/-	-/-
Water, White (splash and spills)		-	-	-	-	-/-	-	110	-	-/-	110/-
Water, Scrubber (incinerator)		-	-	-	-	-/-	-	180	-	-/-	-/-
Water-Oil Separation		-	-	-	-	-/-	-	90	-	90/90	90/-
Wax, Chlorinated	100	-	-	-	-	180/180	200	-	-	-/-	-/-
Whey		-	-	-	-	-/-	-	-	-	175/-	-/-
Whiskey		-	NR	NR	NR	80/80	80	-	-	-/-	-/-
White Liquor (pulp mill)		-	180	180	180	150/150	150	-	-	-/-	-/-
Wine (storage, fermentation and winery waste)Footnote 6		-	NR	NR	NR	-/-	-	-	-	90/-	-/-
Wire Pickling Fumes		-	-	-	-	-/-	-	140	-	-/-	-/-
Xylene	100	-	100	100	120	NR/NR	100	100	225	90/NR	NR/90
Xylene: ADOGEN 381	75 25	-	-	-	-	-/-	-	100	-	-/-	-/-
Xylene: Amyl Acetate	70 30	-	-	-	-	-/-	120	NR	120	-/-	-/-
Xylene: 68% Chlorinated Camphene	10 90	-	-	-	-	-/-	-	120	120	-/-	-/-
Xylene: Fatty Nitrogen Compounds	75 25	-	-	-	-	-/-	-	100	-	-/-	-/-
Xylene: Hydrochloric Acid, 28% (hydrochloric acid with inhibitor)	50 50	-	-	-	-	75/75	75	-	-	-/-	-/-
Xylene: Kerosene: Phosphoric Acid, 85%	33 33 33	-	-	-	-	-/-	-	100	-	-/-	-/-
Xylene: Toxaphene	10 90	-	-	-	-	-/-	-	120	120	-/-	-/-
ZIMMITE, Mud Remover	2	-	-	-	-	-/-	-	100	-	-/-	100/-
Zinc Casting Fumes		-	-	-	-	-/-	-	300	-	-/-	-/-
Zinc Chloride	70	-	-	-	-	-/-	-	250	-	-/-	-/-
Zinc Chloride (sat'd.)		-	210	210	310	210/210	210	265	-	180/150	200/200
Zinc Chloride: Sodium Chloride: Ammonium Chloride (zinc chloride plating bath, concentration in oz/gal, pH 4.8 - 5.2)	18 31 3	-	-	-	-	-/-	-	90	-	-/-	-/-
Zinc Cyanides, Metal Plating (9% zinc cyanide, 4% sodium cyanide, 9% sodium hydroxide)		-	-	-	-	160/160	160	NR	-	-/-	NR/90
Zinc Dimethyldithiocarbonate	3.5	-	-	-	-	-/-	-	-	-	-/-	140/-
Zinc Electrolytic Cells		-	-	-	150	-/-	-	140	-	-/-	-/-
Zinc FluoborateFootnote 1	50	-	210	210	-	210/210	210	-	-	-/-	-/-
Zinc Hydrosulfite (sat'd.)		-	-	-	-	-/-	-	160	-	-/-	160/160
Zinc Nitrate (sat'd.)		-	210	210	250	210/210	210	180	-	180/150	-/180
Zinc Phosphate		-	-	-	-	-/-	-	200	-	-/-	-/-
Zinc Sulfate	100	-	210	210	250	210/210	210	250	250	180/150	200/200
Zinc Sulfate: Sodium Sulfate: Sulfuric Acid (saturated with hydrogen sulfite, traces of carbon sulfite and amines)	3 8 4	-	-	-	-	-/-	-	185	-	-/-	185/-
Zinc Sulfate: Sulfuric Acid: Sodium Sulfate	8 10 20	-	-	-	-	95/95	95	-	-	-/-	-/-
Zinc Sulfate: Sulfuric Acid: Sodium Sulfate	3 5 5	-	205	205	-	205/205	205	-	-	-/-	-/-
Zinc Sulfite (sat'd.)		-	180	180	-	180/180	180	-	-	150/100	-/150
Zinc: Nickel Hydrophosphate: Hydrofluoric Acid: Fluosilicic Acid (sat'd.)Footnote 1		-	-	-	-	-/-	-	80	-	-/-	-/-

ppm	=	%
10,000		1.0
1,000		0.1
100		0.01

BAUMÉ	HYDROCHLORIC ACID %	NITRIC ACID %	PHOSPHORIC ACID %	SULFURIC ACID %	AMMONIA %
5	7.15		7.01	5.28	
10	14.83	12.86	13.70	10.77	0
16	24.57	20.69	21.30	17.53	10.28
19	29.65	24.82	25.80	21.07	15.28
22	35.21	29.07	30.00	24.61	21.60
24	39.41	31.94	34.00	27.10	25.50
30		41.30	40.20	34.60	
35		50.32	49.50	41.30	
40		61.38	55.00	48.10	
46		81.10	64.60	56.50	
48		91.35	66.00	59.20	
62			90.00	81.30	
62.5			96.00	90.60	

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Responsible Care*

Ashland has a strong commitment to our customers, our employees, and to the communities in which we operate and do business.

We believe in maintaining our operations in a totally safe and an environmentally responsible manner. We've focused our efforts on conserving resources and minimizing hazardous materials in both our working environment and at our customers'. In addition, we also participate in the industry's Responsible Care* initiative of the American Chemistry Council.



*Responsible Care is a Service Mark of the American Chemistry Council.

The Source for Composite Resins Solutions

Not only does Ashland manufacture resins for corrosion resistant and flame retardant composites, we also sell everything a fabricator needs to make a reinforced composites including materials, supplies and equipment.

Quality PlusSM

Batch to batch uniformity of Ashland's HETRON & AROPOL resin systems not only means easier molding but also consistent performance and quality.

Ashland adopted a continuous improvement process called Quality Plus in the early 1980s. Ashland became a quality leader in many industries we serve; continuous improvement has become an important part of every employee's training and thinking. Driven from the top down, this process still guides all of our operations and activities, and the way we do business.

Product Stewardship

In support of the Responsible Care initiative, we at Ashland work with our customers, suppliers and shippers to provide health, safety and environmental information. We will not manufacture or sell any product or use any raw material that cannot be developed, handled, stored, transported, used or disposed of safely.

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