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DuPont Permeation Guide

DUPONT
Tychem® Tyvek®

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Caution:

This information is based upon technical data that DuPont believes to be reliable on the date issued. It is subject to revision as additional knowledge and experience are gained. The information set forth herein reflects laboratory performance of fabrics, not complete garments, under controlled conditions. It is intended for informational use by persons having technical skill for evaluation under their specific end-use conditions, at their own discretion and risk.

It is the user's responsibility to determine the level of toxicity and the proper personal protective equipment needed. Anyone intending to use this information should first verify that the garment selected is suitable for the intended use. In many cases, seams and closures have shorter breakthrough times and higher permeation rates than the fabric. If fabric becomes torn, abraded or punctured, or if seams or closures fail, or if attached gloves, visors, etc. are damaged, end user should discontinue use of garment to avoid potential exposure to chemical.

Since conditions of use are outside our control, ***DuPont makes no warranties, express or implied, including, without limitation, no warranties of merchantability or fitness for a particular use and assume no liability in connection with any use of this information.***

This information is not intended as a license to operate under or a recommendation to infringe any patent, trademark or technical information of DuPont or others covering any material or its use.

Warning:

- Tychem® and Tyvek® fabrics should not be used around heat, flames, sparks or in potentially flammable or explosive environments. Only Tychem® ThermoPro, Tychem® Reflector® and Tychem® TK styles 600T/601T (with aluminized outer suit) garments are designed and tested to help reduce burn injury during escape from a flash fire. Users of Tychem® ThermoPro, Tychem® Reflector® and Tychem® TK styles 600T/601T (with aluminized outer suit) garments should not knowingly enter an explosive environment.

- Tychem® garments with attached socks must be worn inside protective outer footwear and are not suitable as outer footwear. These attached socks do not have adequate durability or slip resistance to be worn as the outer foot covering.

How to Use this Permeation Guide

To Find Permeation Test Results

1. Locate the desired chemical in the Chemical Index (Appendix).
   The Chemical Index is presented in two ways:
   - Alphabetical Index
   - Chemical Abstract System (CAS) Number Index

   For each chemical, the following information is listed:
   - Chemical name
   - CAS number
   - Chemical class and subclass number(s)
   - Synonyms, if applicable
2. Using the chemical name or CAS number, locate the class and subclass(es) of the chemical in the permeation index table.
3. Using the class and subclass, go to the chemical permeation data tables to locate the chemical. The range of fabrics is listed across the top of the table. If testing was done, the permeation data is reported.

Independent Testing

All testing reported in this guide was performed by a third party laboratory.

Permeation data for industrial chemicals is obtained per ASTM F739. Normalized breakthrough times (the time at which the permeation rate exceeds 0.1 ?g/cm?/min) are reported in minutes. All chemicals have been tested between approximately 20°C and 27°C unless otherwise stated. All chemicals have been tested at a concentration of greater than 95% unless otherwise stated.

Chemical warfare agents (Lewisite, Sarin, Soman, Sulfur Mustard, Tabun and VX Nerve Agent) have been tested at 22°C and 50% relative humidity per military standard MIL-STD-282. "Breakthrough time" for chemical warfare agents is defined as the time when the cumulative mass which permeated through the fabric exceeds the limit in MIL-STD-282 [either 1.25 or 4.0 ?g/cm?].

What is Permeation?

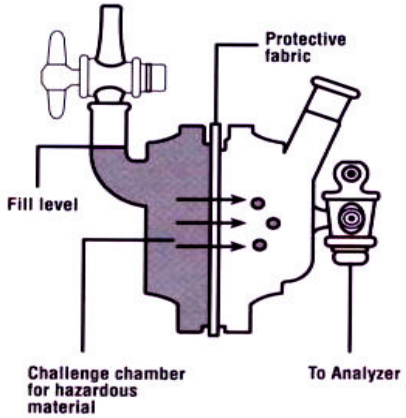
Permeation is the absorption, diffusion and desorption of a chemical through a barrier material at the molecular level. Penetration, on the other hand, is the bulk passage of a chemical through a pore or opening in the barrier material.

To help you understand the difference between these two mechanisms, consider this example. Have you ever opened a bottle of soda to find out that it was flat? There aren't any holes in the bottle. The liquid is still inside. Why is the soda flat? It's flat because the carbon dioxide that gives soda its fizz has permeated through the bottle over time. If you opened a fresh bottle of soda and did not replace the cap, the carbon dioxide would just escape out of the top of the bottle. That would be penetration.

Permeation tests are best suited for testing liquids and vapors.

How Permeation Tests Are Conducted

Other than for Chemical Warfare Agents, permeation tests are conducted following ASTM F739 "Test Method for Resistance of Protective Clothing Materials to Permeation by Liquids and Gases." A swatch of test fabric is inserted into a special test cell, with the outside surface of the fabric toward the challenge chamber, thus exposing it to a challenge chemical. The inside surface of the fabric is toward the sampling chamber. If the chemical moves through the fabric and is detected on the inside surface of the fabric, it is said to have permeated through the fabric.



ASTM F739 Test Cell

Definitions of Key Terms for ASTM F739

Breakthough time: In permeation testing, the actual breakthrough time is the length of time it takes for a challenge chemical to permeate the fabric being tested. It is measured from the point of initial contact of the challenge chemical with the outside surface of the fabric to the time that the challenge chemical is detected on the inside of the fabric. Sensitive analytical equipment is often used to measure the amount of chemical permeating the fabric.

Normalized, or sometimes called "standardized" breakthrough time, is a measure of the elapsed time from initial contact with the challenge chemical until the chemical permeates the fabric at a rate of 0.1 µg/cm²/min. This is defined in ASTM F739 test method. Normalized breakthrough times eliminate biased results due to differences in the sensitivity of the detection equipment and are thus the industry standard measure of breakthrough time. This DuPont Permeation Guide reports normalized breakthrough times using the 0.1 µg/cm²/min criteria.

A normalized breakthrough time of >480 minutes does not always mean that there was no chemical permeation; it means that the rate of permeation did not exceed 0.1 µg/cm²/min during the 8 hour test. If the permeation rate exceeds 0.1 µg/cm²/min in the first 10 minutes of testing, DuPont chooses to report the breakthrough time as "immediate" (imm.).

PLEASE NOTE: In Europe, normalized breakthrough times are based on a permeation rate of 1.0 µg/cm²/min. This is 10 times less sensitive than the basis used in North America.

Physical phase: The phase of the challenge chemical during the test: solid-S, liquid-L, gas-G.

Chemical Class & Subclass Listing*

100 Carboxylic acids
- 102 Aliphatic and Alicyclic, Unsubstituted
- 103 Aliphatic and Alicyclic, Substituted
- 104 Aliphatic and Alicyclic, Polybasic

110 Acid Halides, Carboxylic
- 111 Aliphatic and Alicyclic
- 112 Aromatic
- 113 Chloroformates

120 Aldehydes
- 121 Aliphatic and Alicyclic
- 122 Aromatic

130 Amides
- 132 Aliphatic and Alicyclic
- 135 Acrylamides

140 Amines
- 141 Aliphatic and Alicyclic, Primary
- 142 Aliphatic and Alicyclic, Secondary
- 143 Aliphatic and Alicyclic, Tertiary
- 145 Aromatic, Primary
- 146 Aromatic, Secondary and Tertiary
- 148 Aliphatic and Alicyclic Polyamines
- 149 Aromatic Polyamines

150 Hydroxylamines and Ketoximes

160 Anhydrides
- 161 Aliphatic and Alicyclic

210 Isocyanates
- 211 Aliphatic and Alicyclic
- 212 Aromatic

220 Carboxylic Esters
- 221 Formates
- 222 Acetates
- 223 Acrylates and Methacrylates
- 224 Aliphatic, Others

230 Non-Carboxylic Esters
- 233 Carbamates and Others

240 Ethers
- 241 Aliphatic and Alicyclic
- 242 Aromatic
- 244 Ketals and Acetals
- 245 Glycol Ethers
- 246 Vinylic

260 Halogen Compounds
- 261 Aliphatic and Alicyclic
- 263 Aromatic
- 264 Vinylic
- 265 Alylic
- 266 Benzylic

270 Heterocyclic Compounds
- 271 Nitrogen, Pyridines
- 274 Nitrogen, Others
- 275 Oxygen, Epoxides
- 277 Oxygen, Furans
- 278 Oxygen, Others

280 Hydrazines

290 Hydrocarbons
- 291 Aliphatic and Alicyclic, Saturated
- 292 Aromatic
- 293 Aromatic Polynuclear
- 294 Aliphatic and Alicyclic, Unsaturated
- 296 Polyenes

300 Peroxides

310 Hydroxylic Compounds (includes alcohols)
- 311 Aliphatic and Alicyclic, Primary
- 312 Aliphatic and Alicyclic,Secondary
- 313 Aliphatic and Alicyclic, Tertiary
- 314 Aliphatic and Alicyclic, Polyols
- 316 Aromatic, Phenols
- 318 Aromatic, Others

330 Elements

340 Inorganic Salts and Inorganic Salt Solutions
- 345 Inorganic Cyano Compounds

350 Inorganic Gases and Vapors

360 Inorganic Acid Halides
- 365 Inorganic Acid Oxides

370 Inorganic Acids

380 Inorganic Bases

390 Ketones
- 391 Aliphatic and Alicyclic

430 Nitriles
- 431 Aliphatic and Alicyclic
- 432 Aromatic

440 Nitro Compounds
- 441 Unsubstituted
- 442 Substituted

450 Nitroso Compounds

460 Organo-Phosphorus Compounds
- 462 Derivatives of Phosphorus-based acids

470 Organo-Metallic Compounds

480 Organo-Silicon Compounds

500 Sulfur Compounds
- 501 Thiols
- 502 Sulfides and Disulfides
- 503 Sulfones and Sulfoxides
- 504 Sulfonic Acids
- 505 Sulfonyl Chlorides
- 507 Sulfonates, Sulfates,and Sulfites
- 509 Other

550 Organic Salts and Organic Salt Solutions

590 Miscellaneous (Not classified)

*Partial list based on ASTM F1186. A complete copy of ASTM F1186 may be purchased from ASTM (www.astm.org).

ASTM F1001 List of Challenge Chemicals (Permeation Test Method ASTM F739)

Sub-class	Chemical Name	CAS Number	Phase	Normalized Breakthrough Time (Minutes)										
				Tyvek® 800J	Tychem® 2000 SFR	Tychem® 2000	Tychem® 4000	Tychem® 5000	Tychem® 6000	Tychem® 6000 FR	Tychem® 9000	Tychem® RESPONDER® CSM	Tychem® 10000	Tychem® 10000 FR
390	Acetone (>95%)	67-64-1	L			imm.	imm.	>480	>480	>480	>480	>480	>480	>480
430	Acetonitrile (>95%)	75-05-8	L			imm.	60	imm.	>480	>480	>480	>480	>480	>480
350 / 380	Ammonia (>95%)	7664-41-7	G			imm.	26	imm.	20	90	133	133	>480	>480
290	Butadiene, 1,3- (>95%, gas)	106-99-0	G			imm.	>480	>480	>480	>480	>480	>480	>480	>480
500	Carbon disulfide (>95%)	75-15-0	L			imm.	imm.	16	>480	>480	>480	>480	>480	>480
330 / 350	Chlorine (gas)	7782-50-5	G			imm.	>480	imm.	>480	>480	>480	>480	>480	>480
260	Dichloromethane (>95%)	75-09-2	L			imm.	imm.	imm.	imm.	imm.	>480	>480	>480	>480
140	Diethylamine (>95%)	109-89-7	L			imm.	15	>480	>480	>480	>480	>480	>480	>480
130	Dimethylformamide, N,N- (>95%)	68-12-2	L			imm.	90	>480	>480	>480	>480	>480	>480	>480
220	Ethyl acetate (>95%)	141-78-6	L			imm.	imm.	>480	>480	>480	>480	>480	>480	>480
270	Ethylene oxide (>95%, gas)	75-21-8	G			imm.	imm.	>480	126	>480	>480	>480	>480	>480
290	Hexane, n- (>95%)	110-54-3	L			imm.	imm.	>480	>480	>480	>480	>480	>480	>480
350	Hydrogen chloride (>95%, gas)	7647-01-0	G			imm.	>480	>480	>480	>480	>480	>480	>480	>480
310	Methanol (>95%)	67-56-1	L			imm.	>480	imm.	117	>480	185	>480	>480	>480
260	Methyl chloride (>95%, gas)	74-87-3	G			imm.	>480	>480	>480	>480	>480	>480	>480	>480
440	Nitrobenzene (>95%)	98-95-3	L			imm.	57	>480	>480	>480	>480	>480	>480	>480
380	Sodium hydroxide (50%)	1310-73-2	L	48	>480	>480	>480	>480	>480	>480	>480	>480	>480	>480
370	Sulfuric acid (>95%)	7664-93-9	L		>480	>480	>480	>480	>480	50	>480	>480	>480	>480
260	Tetrachloroethylene, 1,1,2,2- (>95%)	127-18-4	L			imm.	imm.	>480	>480	>480	>480	>480	>480	>480
240	Tetrahydrofuran (>95%)	109-99-9	L			imm.	imm.	>480	>480	>480	>480	>480	>480	>480
290	Toluene (>95%)	108-88-3	L			imm.	imm.	>480	>480	>480	>480	>480	>480	>480

> = greater than imm. = immediate (<10 minutes) {empty} = not tested L = Liquid G = Gas S = Solid

* Actual breakthrough time; normalized breakthrough time is not available.

** Solid tested, vapor phase permeation measured.

Chemical Permeation Data Tables

Class	Sub-Class	Chemical Name	CAS	Phase	Breakthrough Time (Minutes)										
					Tyvek® 800J	Tychem® 2000 SFR	Tychem® 2000	Tychem® 4000	Tychem® 5000	Tychem® 6000	Tychem® 6000 FR	Tychem® 9000	Tychem® RESPONDER® CSM	Tychem® 10000	Tychem® 10000 FR
100 Carboxylic acids															
	102 Aliphatic and Alicyclic, Unsubstituted														
		Acetic acid (10%)	64-19-7	L	imm										
		Acetic acid (2%)	64-19-7	L	imm										
		Acetic acid (30%)	64-19-7	L	imm										
		Acetic acid (5%)	64-19-7	L	imm										
		Acetic acid (>95%)	64-19-7	L			imm.	>480	84	>480	>480	339	>480	>480	>480
		Acrylic acid (>95%)	79-10-7	L			imm.	>480		>480	>480	270	>480	>480	270
		Formic acid (30%)	64-18-6	L											
		Formic acid (>95%)	64-18-6	L			imm.	>480	>480	260	260	>480	>480	>480	>480
		Methacrylic acid (>95%)	79-41-4	L						>480	>480	>480	>480	>480	>480
	103 Aliphatic and Alicyclic, Substituted														
		Chloroacetic acid (70%-80%)	79-11-8	L			370	>480	>480	>480	>480	>480	>480	>480	>480
		Chloroacetic acid (>95%)	79-11-8	L								>480	>480	>480	>480
		Glycolic acid (sat. sol. in water)	79-14-1	L								>480	>480	>480	>480
		Thioglycolic acid (>95%)	68-11-1	L					>480	>480	>480	>480	>480	>480	>480
		Trichloroacetic acid (>95%)	76-03-9	L						>480	>480				
		Trifluoroacetic acid (>95%)	76-05-1	L				>480		>480	>480		>480		
	104 Aliphatic and Alicyclic, Polybasic														
		Citric acid (50% in water)	77-92-9	L					>480						
		Oxalic acid (10.5%)	144-62-7	L								>480	>480	>480	>480
		Oxalic acid (sat.sol. in water)	144-62-7	L					>480						
110 Acid Halides, Carboxylic															
	110 Acid Halides, Carboxylic - All														
		Perfluoro-2-propoxy propionyl fluoride (>95%)	2062-98-8	L								>480	>480	>480	>480
	111 Aliphatic and Alicyclic														
		Acetyl chloride (>95%)	75-36-5	L				63	>480	>480	>480	181	181	>480	181
		Acryloyl Chloride (>95%)	814-68-6	L				imm.	55	334	334				
		Chloroacetyl chloride (>95%)	79-04-9	L				120	77			160	160	160	160
		Dichloroacetyl chloride (>95%)	79-36-7	L						160	160	100	100	>480	100
	112 Aromatic														
		Benzoyl chloride (>95%)	98-88-4	L					>480	>480	>480	>480	>480	>480	>480
	113 Chloroformates														
		Benzyl chloroformate (>95%)	501-53-1	L					>480						
		Methyl chloroformate (>95%)	79-22-1	L								>480	>480	>480	>480
120 Aldehydes															
	121 Aliphatic and Alicyclic														
		Acetaldehyde (>95%)	75-07-0	L						imm.	>480	>480	>480	>480	>480
		Acrolein (>95%)	107-02-8	L				24	178	63	63	>480	>480	>480	>480

Chemical Permeation Data Tables

Class	Sub-Class	Chemical Name	CAS	Phase	Breakthrough Time (Minutes)										
					Tyvek® 800J	Tychem® 2000 SFR	Tychem® 2000	Tychem® 4000	Tychem® 5000	Tychem® 6000	Tychem® 6000 FR	Tychem® 9000	Tychem® RESPONDER® CSM	Tychem® 10000	Tychem® 10000 FR
		Acrolein (>95%, 10 g/m² coverage)	107-02-8	L						>480	>480				
		Butyraldehyde, n- (>95%)	123-72-8	L			imm.	41		>480		>480	>480	>480	>480
		Formaldehyde (100 ppm)	50-00-0	G								>480	>480	>480	>480
		Formalin (3.7% Formaldehyde, 1.0-1.5% Methanol)	mixture	L			>480								
		Formalin (37% Formaldehyde, 10-15% Methanol)	mixture	L			imm.	>480	>480	>480	>480	>480	>480	>480	>480
		Gluteraldehyde (5% in water)	111-30-8	L			>480					>480	>480	>480	>480
		Gluteraldehyde (50%)	111-30-8	L				>480		170	170	>480	>480	>480	>480
		trans-Crotonaldehyde (>95%)	123-73-9	L				34				>480	>480	>480	>480
	122 Aromatic														
		Furfural (>95%)	98-01-1	L				227	>480	>480	>480	>480	>480	>480	>480
130 Amides															
	132 Aliphatic and Alicyclic														
		Dimethylacetamide, N,N- (8% in water)	127-19-5	L		>480	>480								
		Dimethylacetamide, N,N- (>95%)	127-19-5	L		imm		96	>480	>480	>480	>480	>480	>480	>480
		Dimethylformamide, N,N- (>95%)	68-12-2	L			imm.	90	>480	>480	>480	>480	>480	>480	>480
		Methyl-2-pyrrolidone, N- (>95%)	872-50-4	L				>480		>480	>480	>480	>480	>480	>480
		Methylformamide, N- (>95%)	123-39-7	L					>480	>480	>480				
	135 Acrylamides														
		Acrylamide (50% in water)	79-06-1	L				>480		>480	>480	>480	>480	>480	>480
140 Amines															
	141 Aliphatic and Alicyclic, Primary														
		Butylamine, n- (>95%)	109-73-9	L					>480	200	200	>480	>480	>480	>480
		Butylamine, tert- (>95%)	75-64-9	L								>480	>480	>480	>480
		Diisopropylethylamine (DIPEA)	7087-68-5	L					>480		>480				
		Ethanolamine (>95%)	141-43-5	L					>480	>480	>480	>480	>480	>480	>480
		Ethylamine (>95% at 15° C)	75-04-7	L								361	361	>480	361
		Isopropylamine (>95%)	75-31-0	L					15	>480	>480	>480	>480	>480	>480
		Methylamine (40% in water)	74-89-5	L					140			261	261	261	261
		Methylamine (50% in water)	74-89-5	L								232	232	232	232
		Methylamine (>95%)	74-89-5	G						>480	>480	105	105	>480	105
		Propylamine, n- (>95%)	107-10-8	L					100						
	142 Aliphatic and Alicyclic, Secondary														
		Diethanolamine (>95%)	111-42-2	L					>480						
		Diethylamine (>95%)	109-89-7	L			imm.	15	>480	>480	>480	>480	>480	>480	>480
		Dimethylamine (>95%)	124-40-3	G					>480	>480	>480			>480	
		Hexamethyldisilazane (>95%)	999-97-3	L				>480				>480	>480	>480	>480
		Methylbenzylamine (>95%)	103-67-3	L						>480					
		Morpholine (>95%)	110-91-8	L				158				>480	>480	>480	>480
		N-Methylmorpholine (NMM)	109-02-4	L					>480		>480				

Chemical Permeation Data Tables

Class	Sub-Class	Chemical Name	CAS	Phase	Breakthrough Time (Minutes)										
					Tyvek® 800J	Tychem® 2000 SFR	Tychem® 2000	Tychem® 4000	Tychem® 5000	Tychem® 6000	Tychem® 6000 FR	Tychem® 9000	Tychem® RESPONDER® CSM	Tychem® 10000	Tychem® 10000 FR
	143	**Aliphatic and Alicyclic, Tertiary**													
		Tributylamine	102-82-9	L					>480		>480				
		Triethylamine (>95%)	121-44-8	L				22				>480	>480	>480	>480
		Trimethylamine (>95%, gas)	75-50-3	G										>480	
		Tripropylamine (>95%)	102-69-2	L								>480	>480	>480	>480
	145	**Aromatic, Primary**													
		Aminodiphenyl, 4- (1 mg/ml in methanol)	92-67-1	L						>480	>480				
		Aniline (>95%)	62-53-3	L			imm.	>480	320	>480	>480	>480	>480	>480	>480
		Aniline, 4-trifluoromethoxy (>95%)	461-82-5	L						>480					
		Benzidine (25% in methanol)	92-87-5	L								>480	>480	>480	>480
		Benzidine (75% in methanol)	92-87-5	L										>480	
		Chloroaniline, p-	106-47-8	S								>480	>480**	>480	>480
		Chloroaniline, p- (>95% at 70° C)	106-47-8	L				imm.		imm.	imm.	344	344	344	344
		Dichloroaniline, 3,4- (>95%, liquid, 70° C)	95-76-1	L				imm.				284	284	284	284
		Dichloroaniline, 3,4- (solid)	95-76-1	S								>480	>480**	>480	>480
		Diethyl-m-toluidine crude (>95%)	91-67-8	L				>480					>480		
		Methylene dianiline, 4,4'- (15% in MEK)	101-77-9	L								>480	>480	>480	>480
		Methylene dianiline, 4,4'- (sat. sol. in methanol)	101-77-9	L										>480	
		Toluidine, m- (>95%)	108-44-1	L				>480					>480		
		Toluidine, o- (>95%)	95-53-4	L			imm.	>480		>480	>480	>480	>480	>480	>480
		Xylidin, 2,4- (>95%)	95-68-1	L						>480					
	146	**Aromatic, Secondary and Tertiary**													
		Diethylaniline (>95%)	91-66-7	L					>480			>480		>480	>480
		Diethylaniline crude (>95%)	91-66-7	L				>480					>480		
		Dimethylaniline, N,N- (>95%)	121-69-7	L					imm.	>480	>480	>480	>480	>480	>480
	148	**Aliphatic and Alicyclic Polyamines**													
		Aminoethylethanolamine (60%)	111-41-1	L				>480	>480	>480	>480	>480	>480	>480	>480
		Aminoethylethanolamine (>95%)	111-41-1	L				imm.	>480	>480	>480	>480	>480	>480	>480
		Aminoethylpiperazine (>95%)	140-31-8	L				>480	>480	>480	>480	>480	>480	>480	>480
		Diethylenetriamine (>95%)	111-40-0	L				321	>480	>480	>480	>480	>480	>480	>480
		Dytek® A (>95%)	15520-10-2	L					>480	>480	>480				
		Ethylenediamine (>95%)	107-15-3	L			>480	>480	>480	>480	>480	>480	>480	>480	>480
		Hexamethylenediamine, 1,6- (>95% at 45° C)	124-09-4	L						>480	>480	>480	>480	>480	>480
		Hexamethylenediamine, 1,6- (>95% at 50° C)	124-09-4	L				80	45				80		
		Methylene bis-cyclohexane diamine, 4,4'- (>95%)	1761-71-3	L				>480		>480	>480		>480		
		Tetraethylenepentamine (>95%)	112-57-2	L				>480	>480	>480	>480	>480	>480	>480	>480
		Tetramethylethylenediamine (TMEDA)	110-18-9	L					>480		>480				
	149	**Aromatic Polyamines**													
		Benzidine (25% in methanol)	92-87-5	L								>480	>480	>480	>480

Chemical Permeation Data Tables

Class	Sub-Class	Chemical Name	CAS	Phase	Breakthrough Time (Minutes)										
					Tyvek® 800J	Tychem® 2000 SFR	Tychem® 2000	Tychem® 4000	Tychem® 5000	Tychem® 6000	Tychem® 6000 FR	Tychem® 9000	Tychem® RESPONDER® CSM	Tychem® 10000	Tychem® 10000 FR
		Benzidine (75% in methanol)	92-87-5	L										>480	
		Methylene bis (o-chloroaniline), 4,4'- (sat. sol. in methanol)	101-14-4	L				>480				>480	>480	>480	>480
		Methylene dianiline, 4,4'- (15% in MEK)	101-77-9	L								>480	>480	>480	>480
		Methylene dianiline, 4,4'- (sat. sol. in methanol)	101-77-9	L										>480	
150 Hydroxylamines and Ketoximes															
	150 Hydroxylamines and Ketoximes - All														
		Methyl ethyl ketoxime (>95%)	96-29-7	L				>480		>480	>480	>480	>480	>480	>480
160 Anhydrides															
	161 Aliphatic and Alicyclic														
		Acetic anhydride (>95%)	108-24-7	L				48	>480	>480		>480	>480	>480	>480
210 Isocyanates															
	211 Aliphatic and Alicyclic														
		Cyclohexyl isocyanate (>95%)	3173-53-3	L				54					54		
		Hexamethylene diisocyanate (>95%)	822-06-0	L			>480	>480	>480	>480	>480	>480	>480	>480	>480
		Hexamethylene diisocyanate in DuPont Activator 193S (>95%)	mixture	L			>480								
		Hexamethylene diisocyanate in DuPont Activator 4505S (>95%)	mixture	L			>480								
		Hexamethylene diisocyanate in DuPont Activator 4507S (>95%)	mixture	L			>480								
		Methyl isocyanate (>95%)	624-83-9	L				imm.	12	imm.	imm.	>480	>480	>480	>480
	212 Aromatic														
		Methylene diphenyl isocyanate	101-68-8	S								>480	>480**	>480	>480
		Methylene diphenyl isocyanate (>95% at 50° C)	101-68-8	L			>480	>480	>480	>480	>480	>480	>480	>480	>480
		Paraphenylene diisocyanate (PPDI) crude (>95%)	104-49-4	L								>480	>480	>480	>480
		Polymethylene polyphenyl-polyisocyanate (>95%)	9016-87-9	L			>480	>480	>480	>480	>480	>480	>480	>480	>480
		Toluene-1,3-diisocyanate (>95%)	26471-62-5	L								>480	>480	>480	>480
		Toluene-2,4-diisocyanate (80%)	584-84-9	L				>480	>480	>480	>480	>480	>480	>480	>480
		Toluene-2,4-diisocyanate (>95%)	584-84-9	L			imm.	>480	>480	>480	>480	>480	>480	>480	>480
220 Carboxylic Esters															
	221 Formates														
		Methyl formate (>95%)	107-31-3	L											>480
	222 Acetates														
		Amyl acetate, n- (>95%)	628-63-7	L					>480	>480	>480	>480	>480	>480	
		Butyl acetate, n- (>95%)	123-86-4	L					>480	>480	>480	>480	>480	>480	>480
		Ethyl acetate (>95%)	141-78-6	L			imm.	imm.	>480	>480	>480	>480	>480	>480	>480
		Norbornene-2-yl acetate, 5- (>95%)	6143-29-9	L										>480	
		Vinyl acetate (>95%)	108-05-4	L				82	>480	>480	>480	>480	>480	>480	>480
	223 Acrylates and Methacrylates														
		Butyl acrylate, n- (>95%)	141-32-2	L							>480	51	51	>480	51
		Diketene Acetone (>95%)	5394-63-8	L						>480					

Chemical Permeation Data Tables

Class	Sub-Class	Chemical Name	CAS	Phase	Breakthrough Time (Minutes)										
					Tyvek® 800J	Tychem® 2000 SFR	Tychem® 2000	Tychem® 4000	Tychem® 5000	Tychem® 6000	Tychem® 6000 FR	Tychem® 9000	Tychem® RESPONDER® CSM	Tychem® 10000	Tychem® 10000 FR
		Ethyl acrylate (>95%)	140-88-5	L								14	14	>480	14
		Ethyl methyacrylate (>95%)	97-63-2	L					>480	>480	>480				
		Ethylene glycol acrylate (>95%)	818-61-1	L					>480						
		Methyl acrylate (>95%)	96-33-3	L						>480	>480	>480	>480	>480	>480
		Methyl methacrylate (>95%)	80-62-6	L				23		70	70	>480	>480	>480	>480
	224 Aliphatic, Others														
		Dimethylmaleate (>95%)	624-48-6	L				>480	>480				>480		
	226 Benzoates and Phthalates														
		Diethylhexyl phthalate (>95%)	117-81-7	L						>480	>480	>480	>480	>480	>480
		Methyl salicylate (>95%)	119-36-8	L			imm.	>480					>480		
230 Non-Carboxylic Esters															
	233 Carbamates and Others														
		Methomyl (29% in water)	16752-77-5	L								>480	>480	>480	>480
240 Ethers															
	240 Ethers - All														
		Perfluoro-2-propoxy propionyl fluoride (>95%)	2062-98-8	L								>480	>480	>480	>480
	241 Aliphatic and Alicyclic														
		Butyl ether, n- (>95%)	142-96-1	L					>480	196	196	>480	>480	>480	>480
		Chloromethyl methyl ether (>95%)	107-30-2	L						37	37	>480	>480	>480	>480
		Dichloroethyl ether (>95%)	111-44-4	L					>480	>480	>480	>480	>480	>480	>480
		Dimethyl ether (>95%)	115-10-6	G										>480	
		Ethyl ether (>95%)	60-29-7	L				imm.	>480	>480	>480	>480	>480	>480	>480
		Methyl tert-butyl ether (>95%)	1634-04-4	L				>480	>480	>480	>480	>480	>480	>480	>480
		Tetrahydrofuran (>95%)	109-99-9	L			imm.	imm.	>480	>480	>480	>480	>480	>480	>480
	242 Aromatic														
		Aniline, 4-trifluoromethoxy (>95%)	461-82-5	L						>480					
	244 Ketals and Acetals														
		Diketene Acetone (>95%)	5394-63-8	L						>480					
	245 Glycol Ethers														
		(2-Ethoxyethoxy)-ethanol, 2- (>95%)	111-90-0	L				>480					>480		
		2-(2-Butoxyethoxy)-ethanol (>95%)	112-34-5	L						>480					
		Butyl Cellosolve® (>95%)	111-76-2	L				>480		>480			>480		
		Ethyl Cellosolve® (>95%)	110-80-5	L				>480	>480	>480	>480	>480	>480	>480	>480
		Ethyl Cellosolve® acetate (>95%)	111-15-9	L				238	>480	>480	>480	>480	>480	>480	>480
		Methyl Cellosolve® (>95%)	109-86-4	L				>480	405	>480	>480	>480	>480	>480	>480
		Methyl Cellosolve® acetate (>95%)	110-49-6	L				>480	>480	>480	>480	>480	>480	>480	>480
		Polyethylene glycol dimethyl ether (>95%)	24991-55-7	L							>480				
260 Halogen Compounds															
	260 Halogen Compounds - All														

Chemical Permeation Data Tables

Class	Sub-Class	Chemical Name	CAS	Phase	Breakthrough Time (Minutes)										
					Tyvek® 800J	Tychem® 2000 SFR	Tychem® 2000	Tychem® 4000	Tychem® 5000	Tychem® 6000	Tychem® 6000 FR	Tychem® 9000	Tychem® RESPONDER® CSM	Tychem® 10000	Tychem® 10000 FR
		Perfluoro-2-propoxy propionyl fluoride (>95%)	2062-98-8	L								>480	>480	>480	>480
	261	**Aliphatic and Alicyclic**													
		Carbon tetrachloride (>95%)	56-23-5	L					>480	11	11	>480	>480	>480	>480
		Chlordane (44%)	57-74-9	L					>480						
		Chlordane (>95%)	57-74-9	L								>480	>480	>480	>480
		Chloroethanol, 2- (>95%)	107-07-3	L			imm.		>480	>480	>480	>480	>480	>480	>480
		Chloroform (>95%)	67-66-3	L			imm.	imm.	imm.	imm.	imm.	>480	>480	>480	>480
		Chloropicrin (>95%)	76-06-2	L						>480	>480				
		Dibromo-3-chloropropane, 1,2- (>95%)	96-12-8	L					>480						
		Dichloroacetone (>95% at 40° C)	534-07-6	L										>480	
		Dichloroacetone (>95% at 45° C)	534-07-6	L						>480	>480				
		Dichloroethyl ether (>95%)	111-44-4	L					>480	>480	>480	>480	>480	>480	>480
		Dichloromethane (>95%)	75-09-2	L			imm.	imm.	imm.	imm.	imm.	>480	>480	>480	>480
		Dichloropropene, 1,3- (>95%)	542-75-6	L				imm.	imm.	25	25		imm.		
		Dichloropropene, 2,3- (>95%)	78-88-6	L						25	25	>480	>480	>480	>480
		Diiodo-1,1,2,2-tetrafluorobutane, 1,4- (>95%)	755-95-3	L								>480	>480	>480	>480
		Epichlorohydrin (>95%)	106-89-8	L				15	67	372	372	>480	>480	>480	>480
		Ethyl chloride (>95%)	75-00-3	L										>480	
		Ethylene dibromide (>95%)	106-93-4	L					>480	288	288	>480	>480	>480	>480
		Ethylene dichloride (>95%)	107-06-2	L				imm.	>480	93	93	>480	>480	>480	>480
		Hexafluoroethane (>95%)	76-16-4	G								>480	>480	>480	>480
		Hexafluoroisobutylene (>95%)	382-10-5	G								>480	>480	>480	>480
		Lindane (sat. sol. in acetone)	58-89-9	L								>480	>480	>480	>480
		Lindane (sat. sol. in methanol)	58-89-9	L										>480	
		Methyl bromide (>95%)	74-83-9	G				>480				>480	>480	>480	>480
		Methyl chloride (>95%, gas)	74-87-3	G			imm.	>480	>480	>480	>480	>480	>480	>480	>480
		Methyl chloride (>95%, liquid, -70° C)	74-87-3	L										>180	
		Methyl fluoride (>95%)	593-53-3	G								>480	>480	>480	>480
		Methyl iodide (>95%)	74-88-4	L				imm.		296	296	>480	>480	>480	>480
		Methylene bromide (>95%)	74-95-3	L					40	imm.	imm.				
		Propylbromide, n- (>95%)	106-94-5	L				12	>480				12		
		Propylene dichloride (>95%)	78-87-5	L								>480	>480	>480	>480
		Tetrachloroethane, 1,1,2,2- (>95%)	79-34-5	L				98	>480	>480	>480	>480	>480	>480	>480
		Tetrafluoroethane, 1,1,1,2- (>95%)	811-97-2	L				>480					>480		
		Tetrafluoromethane (>95%)	75-73-0	G								>480	>480	>480	>480
		Trichloro-1,2,2-trifluoroethane, 1,1,2- (>95%)	76-13-1	G					>480			>480	>480	>480	>480
		Trichloroacetone, 1,1,3- (>95%)	921-03-9	L						>480	>480				
		Trichloroethane, 1,1,1- (>95%)	71-55-6	L					>480		>480	>480	>480	>480	>480
		Trichloroethane, 1,1,2- (>95%)	79-00-5	L						232		>480	>480	>480	>480

Chemical Permeation Data Tables

Class	Sub-Class	Chemical Name	CAS	Phase	Breakthrough Time (Minutes)										
					Tyvek® 800J	Tychem® 2000 SFR	Tychem® 2000	Tychem® 4000	Tychem® 5000	Tychem® 6000	Tychem® 6000 FR	Tychem® 9000	Tychem® RESPONDER® CSM	Tychem® 10000	Tychem® 10000 FR
		Trifluoroacetic acid (>95%)	76-05-1	L				>480		>480	>480		>480		
		Trifluoromethane (>95%)	75-46-7	G								>480	>480	>480	>480
	263 Aromatic														
		Benzotrichloride (>95%)	98-07-7	L					>480						
		Bromofluorobenzene, 4- (>95%)	460-00-4	L					>480	>480	>480	>480	>480	>480	>480
		Chloro-benzotrifluoride, 4- (>95%)	98-56-6	L					460						
		Chlorobenzene (>95%)	108-90-7	L				imm.	63	>480	>480	>480	>480	>480	>480
		Chlorobenzotrichloride, 4- (>95%)	5216-25-1	L					>480						
		Chlorophenol, 4- (sat. sol. in mathanol)	106-48-9	L								>480	>480	>480	>480
		Chlorotoluene, o- (>95%)	95-49-8	L				13		>480	>480	>480	>480	>480	>480
		Cyanuric chloride (20%, Toluene 80%)	108-77-0	L								>480	>480	>480	>480
		Dichloroaniline, 3,4- (>95%, liquid, 70° C)	95-76-1	L				imm.				284	284	284	284
		Dichloroaniline, 3,4- (solid)	95-76-1	S								>480	>480**	>480	>480
		Dichlorobenzene, 1,2- (>95%)	95-50-1	L				76	>480	>480		>480	>480	>480	>480
		Dichlorobenzene, 1,3- (>95%)	541-73-1	L				45	>480	>480		>480	>480	>480	>480
		Dichlorobenzene, 1,4 (50% solution in Ethanol)	106-46-7	L				>480	131	>480		>480	>480	>480	>480
		Fluorobenzene (>95%)	462-06-6	L				imm.	>480	>480	>480	>480	>480	>480	>480
		Nitrochlorobenzene, o-	88-73-3	S			15								
		Nitrochlorobenzene, p-	100-00-5	S			imm.								
		PCB (50% in trichlorobenzene)	mixture	L					>480			>480	>480	>480	>480
		PCB 1254 (50% in mineral oil)	mixture	L				>480					>480		
		PCB 1254 (90%)	11097-69-1	L			55	>480					>480		
		PCB gas condensate (>95%)	mixture	L						>480	>480				
		PCB in transformer oil (>95%)	mixture	L						>480	>480				
		Tetrachloro-bisphenol -A, 2,2',6,6'	79-95-8	S						>480	>480				
		Trichlorobenzene, 1,2,4- (>95%)	120-82-1	L			imm.	87	>480	>480	>480	>480	>480	>480	>480
	264 Vinylic														
		Chloroacrylonitrile, 2- (>95%)	920-37-6	L						>480	>480				
		Hexachlorobutadiene (>95%)	87-68-3	L								>480	>480	>480	>480
		Tetrachloroethylene, 1,1,2,2- (>95%)	127-18-4	L			imm.	imm.	>480	>480	>480	>480	>480	>480	>480
		Trichloroethylene (>95%)	79-01-6	L				imm.	>480	>480	>480	>480	>480	>480	>480
		Vinyl chloride (>95%)	75-01-4	G				>480	>480	>480	>480	>480	>480	>480	>480
		Vinylidene chloride (>95%)	75-35-4	L					170	>480	>480	>480	>480	>480	>480
		trans-1,4-Dichloro-2-butene (>95%)	110-57-6	L			75*								
	265 Alylic														
		Allyl chloride (>95%)	107-05-1	L				imm.	12	447	447	>480	>480	>480	>480
	266 Benzylic														
		Benzyl chloride (>95%)	100-44-7	L					>480	>480	>480	>480	>480	>480	>480
270 Heterocyclic Compounds															

Chemical Permeation Data Tables

Class	Sub-Class	Chemical Name	CAS	Phase	Breakthrough Time (Minutes)										
					Tyvek® 800J	Tychem® 2000 SFR	Tychem® 2000	Tychem® 4000	Tychem® 5000	Tychem® 6000	Tychem® 6000 FR	Tychem® 9000	Tychem® RESPONDER® CSM	Tychem® 10000	Tychem® 10000 FR
	271 Nitrogen, Pyridines														
		Aminopyridine, 2- (saturated solution)	504-29-0	L				>480					>480		
		Nicotine (>95%)	54-11-5	L					>480	>480	>480	>480	>480	>480	>480
		Picoline, 2- (>95%)	109-06-8	L					>480	>480	>480	>480	>480	>480	>480
		Picoline, 3- (>95%)	108-99-6	L					>480	>480	>480	>480	>480	>480	>480
		Pyridine (>95%)	110-86-1	L				31	>480	>480	>480	>480	>480	>480	>480
		Vinylpyridine, 4- (>95%)	100-43-6	L				15					15		
	274 Nitrogen, Others														
		Aminoethylpiperazine (>95%)	140-31-8	L				>480	>480	>480	>480	>480	>480	>480	>480
		Dichloro-6-isopropyl-S-triazine, 2,4- (22% in toluene)	30894-74-7	L								>480	>480	>480	>480
		Ethyleneimine (>95%)	151-56-4	L								59	59	>480	59
		Propylene imine (>95%)	75-55-8	L								150	150	150	150
		Pyrrolidine (>95%)	123-75-1	L						100	100	413	413	413	413
	275 Oxygen, Epoxides														
		Bisphenol-A diglycidyl ether (>95%)	1675-54-3	L				>480		>480	>480	>480	>480	>480	>480
		Epichlorohydrin (>95%)	106-89-8	L				15	67	372	372	>480	>480	>480	>480
		Ethylene oxide (>95%, gas)	75-21-8	G			imm.	imm.	>480	126	>480	>480	>480	>480	>480
		Ethylene oxide (>95%, liquid, -70° C)	75-21-8	L										>180	
		Ethylene oxide (>95%, liquid, 0° C)	75-21-8	L								>480	>480	>480	>480
		Ethylene oxide (>95%, liquid, 11° C)	75-21-8	L					18						
		Ethylene oxide mixture (10% in HCFC 124)	mixture	G										>480	
		Phenyl glycidyl ether (>95%)	122-60-1	L				>480					>480		
		Propylene oxide, 1,2- (>95%)	75-56-9	L					30	14	20	>480	>480	>480	>480
		Tetramethylethylene oxide (>95%)	5076-20-0	L										>480	
	277 Oxygen, Furans														
		Furfural (>95%)	98-01-1	L				227	>480	>480	>480	>480	>480	>480	>480
	278 Oxygen, Others														
		Diketene Acetone (>95%)	5394-63-8	L						>480					
		Dioxane, 1,4- (>95%)	123-91-1	L					>480	>480	>480	>480	>480	>480	>480
280 Hydrazines															
	280 Hydrazines - All														
		Dimethylhydrazine, 1,1- (>95%)	57-14-7	L				13				>480*	>480*	>480*	>480*
		Hydrazine (>95%)	302-01-2	L				>480		283	283	>480	>480	>480	>480
		Hydrazine hydrate (50%)	10217-52-4	L										>480	
		Hydrazine hydrate (85%)	10217-52-4	L								440	440	440	440
		Hydrazine hydrate (>95%)	10217-52-4	L											>480
		Methyl hydrazine (>95%)	60-34-4	L						283	283	>480	>480	>480	>480
290 Hydrocarbons															
	290 Hydrocarbons - All														

Chemical Permeation Data Tables

Class	Sub-Class	Chemical Name	CAS	Phase	Breakthrough Time (Minutes)										
					Tyvek® 800J	Tychem® 2000 SFR	Tychem® 2000	Tychem® 4000	Tychem® 5000	Tychem® 6000	Tychem® 6000 FR	Tychem® 9000	Tychem® RESPONDER® CSM	Tychem® 10000	Tychem® 10000 FR
		Diethylbenzene (>95%)	25340-17-4	L				31		>480	>480	>480	>480	>480	>480
	291	**Aliphatic and Alicyclic, Saturated**													
		Cyclohexane (>95%)	110-82-7	L					>480	>480	>480	>480	>480	>480	>480
		Diesel automotive test fuel (>95%)	mixture	L			imm.								
		Diesel fuel (>95%)	68334-30-5	L				48	199	>480	>480	>480	>480	>480	>480
		Fuel oil (>95%)	68476-30-2	L			imm.	>480					>480		
		Gasoline (>95%)	86290-81-5	L				imm.	>480	30	30	>480	>480	>480	>480
		Gasoline, E-10 (>95%)	308066-70-8	L				16					16		
		Heptane (>95%)	142-82-5	L					>480						
		Hexane, n- (>95%)	110-54-3	L			imm.	imm.	>480	>480	>480	>480	>480	>480	>480
		JP-4 jet fuel (>95%)	50815-00-4	L				imm.				>480	>480	>480	>480
		JP-8 jet fuel (>95%)	94114-58-6	L				58				>480	>480	>480	>480
		Kerosene (>95%)	8008-20-6	L				58	>480	>480	>480	>480	>480	>480	>480
		Mineral oil (>95%)	8012-95-1	L				>480					>480		
		Mineral spirits (>95%)	64475-85-0	L			imm.	190				>480	>480	>480	>480
		Octane, n- (>95%)	111-65-9	L								>480	>480	>480	>480
		Propane (>95%)	74-98-6	G											>480
		Stoddard solvent (>95%)	8052-41-3	L								>480	>480	>480	>480
		VM&P Naphtha (>95%)	8030-30-6	L				imm				>480	>480	>480	>480
	292	**Aromatic**													
		Benzene (>95%)	71-43-2	L				imm.	>480	>480	>480	>480	>480	>480	>480
		Cumene (>95%)	98-82-8	L					364	>480	>480	>480	>480	>480	>480
		Ethyl benzene (>95%)	100-41-4	L				imm.	>480	>480	>480	>480	>480	>480	>480
		Styrene (>95%)	100-42-5	L				16	>480	>480	>480	>480	>480	>480	>480
		Toluene (>95%)	108-88-3	L			imm.	imm.	>480	>480	>480	>480	>480	>480	>480
		Xylene, mixed isomers (>95%)	1330-20-7	L					>480	>480	>480	>480	>480	>480	>480
		Xylene, o- (>95%)	95-47-6	L					>480						
	293	**Aromatic Polynuclear**													
		Anthracene (sat. sol. in toluene)	120-12-7	L					>480	>480	>480				
		Naphthalene	91-20-3	S					>480	>480	>480				
		Naphthalene (25% solution in Diethylene glycol dimethyl ether)	91-20-3	L				79	>480	>480		>480	>480	>480	>480
	294	**Aliphatic and Alicyclic, Unsaturated**													
		Crude oil (>95%)	8002-05-9	L			imm.	>480				>480	>480	>480	>480
	296	**Polyenes**													
		Butadiene, 1,3- (>95%, gas)	106-99-0	G			imm.	>480	>480	>480	>480	>480	>480	>480	>480
		Butadiene, 1,3- (>95%, liquid, 0° C)	106-99-0	L										>180	
		Cyclooctadiene (>95%)	1552-12-1	L					>480						
		d-Limonene (>95%)	5989-27-5	L					>480	>480	>480	>480	>480	>480	>480
300		**Peroxides**													

Chemical Permeation Data Tables

Class	Sub-Class	Chemical Name	CAS	Phase	Breakthrough Time (Minutes)										
					Tyvek® 800J	Tychem® 2000 SFR	Tychem® 2000	Tychem® 4000	Tychem® 5000	Tychem® 6000	Tychem® 6000 FR	Tychem® 9000	Tychem® RESPONDER® CSM	Tychem® 10000	Tychem® 10000 FR
	300	**Peroxides - All**													
		Hydrogen peroxide (30%)	7722-84-1	L			>480	>480					>480	>480	
		Hydrogen peroxide (50%)	7722-84-1	L			>480		>480	>480	>480				
		Hydrogen peroxide (70%)	7722-84-1	L		>480	>480			>480		>480	>480	>480	>480
310		**Hydroxylic Compounds (includes alcohols)**													
	311	**Aliphatic and Alicyclic, Primary**													
		2-(2-Butoxyethoxy)-ethanol (>95%)	112-34-5	L						>480					
		Allyl alcohol (>95%)	107-18-6	L				>480	>480	>480	>480	>480	>480	>480	>480
		Aminoethylethanolamine (60%)	111-41-1	L				>480	>480	>480	>480	>480	>480	>480	>480
		Aminoethylethanolamine (>95%)	111-41-1	L				imm.	>480	>480	>480	>480	>480	>480	>480
		Butanol, n- (>95%)	71-36-3	L			imm.	>480	>480	>480	>480	>480	>480	>480	>480
		Ethanolamine (>95%)	141-43-5	L					>480	>480	>480	>480	>480	>480	>480
		Ethyl alcohol (>95%)	64-17-5	L	imm			>480	>480		>480		>480		
		Mercaptoethanol (>95%)	60-24-2	L						>480	>480			>480	
		Methanol (>95%)	67-56-1	L			imm.	>480	imm.	117	>480	185	>480	>480	>480
		Methyl Cellosolve® (>95%)	109-86-4	L				>480	405	>480	>480	>480	>480	>480	>480
		Pentanol, n- (>95%)	71-41-0	L					>480	>480	>480				
		Propargyl alcohol (>95%)	107-19-7	L						123	123			>480	
	312	**Aliphatic and Alicyclic,Secondary**													
		Benzyl alcohol (>95%)	100-51-6	L				>480		>480			>480		
		Isoamyl alcohol (>95%)	123-51-3	L				>480					>480		
		Isopropyl alcohol (70%)	67-63-0	L	imm		imm.	>480			>480				
		Isopropyl alcohol (>95%)	67-63-0	L	imm		imm.	>480	>480	>480	>480	>480	>480	>480	>480
	313	**Aliphatic and Alicyclic, Tertiary**													
		Acetone cyanohydrin (>95%)	75-86-5	L						>480	>480	>480	>480	>480	>480
		Butanol tert. (>95%)	75-65-0	L						205					
	314	**Aliphatic and Alicyclic, Polyols**													
		Chloro-1,2-propanediol, 3- (>95%)	96-24-2	L								>480	>480	>480	>480
		Ethylene glycol (>95%)	107-21-1	L	imm		>480	>480		>480	>480	>480	>480	>480	>480
	315	**Aliphatic and Alicyclic, Substituted**													
		Chloroethanol, 2- (>95%)	107-07-3	L			imm.		>480	>480	>480	>480	>480	>480	>480
		Trichloroethanol, 2,2,2- (>95%)	115-20-8	L				>480	>480	>480	>480	>480	>480	>480	>480
		Trifluoroethanol, 2,2,2- (>95%)	75-89-8	L			imm.					>480	>480	>480	>480
	316	**Aromatic, Phenols**													
		Chlorophenol, 4- (sat. sol. in mathanol)	106-48-9	L								>480	>480	>480	>480
		Creosote (>95%)	8001-58-9	L						>480	>480				
		Cresol, mixed isomers (>95%)	1319-77-3	L			40*	100		>480		>480	>480	>480	>480
		Cresol, o- (>95%)	95-48-7	L			37	>480	330	180	180		>480		
		Dinitrocresol (sat. sol. in methanol)	534-52-1	L								>480	>480	>480	>480

Chemical Permeation Data Tables

Class	Sub-Class	Chemical Name	CAS	Phase	Breakthrough Time (Minutes)										
					Tyvek® 800J	Tychem® 2000 SFR	Tychem® 2000	Tychem® 4000	Tychem® 5000	Tychem® 6000	Tychem® 6000 FR	Tychem® 9000	Tychem® RESPONDER® CSM	Tychem® 10000	Tychem® 10000 FR
		Nitrophenol, o- (>95% at 70° C)	88-75-5	L				imm.				208	208	208	208
		Nitrophenol, p- (>95% at 60° C)	100-02-7	L				imm.					imm.		
		Pentachlorophenol (sat. sol. in methanol)	87-86-5	L								>480	>480	>480	>480
		Phenol (85% at 45° C)	108-95-2	L								113	149	>480	>480
		Phenol (85%)	108-95-2	L			imm.	>480	341	>480	>480	>480	>480	>480	>480
		Phenol (>95% at 45° C)	108-95-2	L				44	17	25	25	101	101	>480	>480
		Phenol (>95% at 60° C)	108-95-2	L				imm.	imm.			25		125	87
		Tetrachloro-bisphenol -A, 2,2',6,6'	79-95-8	S						>480	>480				
		m-Cresol 55%, p-Cresol 30%, Phenol 15% (>95%)	mixture	L								>480	>480	>480	>480
	318 Aromatic, Others														
		Phenethyl alcohol, 2- (>95%)	60-12-8	L					>480						
		Phenylethanol, 1- (>95%)	98-85-1	L				>480	>480	>480		>480	>480	>480	>480
330 Elements															
	330 Elements - All														
		Bromine (>95%)	7726-95-6	L			imm.		imm.	imm.	imm.	imm.	imm.	15	imm.
		Bromine (>95%, 10 g/m² coverage)	7726-95-6	L										>480	
		Bromine (sat. vapor)	7726-95-6	G										40	
		Chlorine (>95%, liquid, -70° C)	7782-50-5	L					>480					>480	>480
		Chlorine (gas)	7782-50-5	G			imm.	>480	imm.	>480	>480	>480	>480	>480	>480
		Chlorine (gas, 20 ppm)	7782-50-5	G			>480*								
		Iodine	7553-56-2	S			>420*,**								
		Iodine (5% in carbon tetrachloride)	7553-56-2	L				>480					>480		
		Mercury (>95%)	7439-97-6	L			>480	>480	>480	>480	>480	>480	>480	>480	>480
340 Inorganic Salts and Inorganic Salt Solutions															
	340 Inorganic Salts and Inorganic Salt Solutions - All														
		Ammonium Bifluoride (saturated solution)	1341-49-7	L						>480					
		Ammonium chloride (sat. sol. in water)	12125-02-9	L					>480						
		Ammonium fluoride (40%)	12125-01-8	L								>480	>480	>480	>480
		Arsenic trichloride (>95%)	7784-34-1	L						38	38				
		Ferric chloride (50% w/w in water)	7705-08-0	L				>480					>480		
		Ferrous chloride (50% w/w in water)	7758-94-3	L				>480					>480		
		Lithium chloride (20%)	7447-41-8	L			>480								
		Mercuric chloride (sat. sol. in water)	7487-94-7	L				>480		>480	>480	>480*	>480*	>480*	>480*
		Potassium acetate (sat. sol. in water)	127-08-2	L				>480				>480*	>480*	>480*	>480*
		Potassium carbonate (>95%)	584-08-7	L					>480						
		Potassium chromate (sat. sol. in water)	7789-00-6	L				>480		>480	>480	>480*	>480*	>480*	>480*
		Potassium permanganate (>95%)	7722-64-7	L			>480								
		Sodium fluoride (sat. sol. in water)	7681-49-4	L				>480					>480		
		Sodium hypochlorite (15%)	7681-52-9	L	>480	>480	>480	>480	>480	>480	>480	>480	>480	>480	>480

Chemical Permeation Data Tables

Class	Sub-Class	Chemical Name	CAS	Phase	Breakthrough Time (Minutes)										
					Tyvek® 800J	Tychem® 2000 SFR	Tychem® 2000	Tychem® 4000	Tychem® 5000	Tychem® 6000	Tychem® 6000 FR	Tychem® 9000	Tychem® RESPONDER® CSM	Tychem® 10000	Tychem® 10000 FR
		Sodium hypochlorite (30%)	7681-52-9	L					>480	>480	>480				
		Sodium hypochlorite (6%)	7681-52-9	L	>480		>480								
		Sodium metabisulfite (38% w/w in water)	7681-57-4	L			imm	>480	23			>480	>480	>480	>480
		Sodium silicate (40-42% in water)	6834-92-0	L			>480								
		Sodium sulfide (60% w/w in water slurry)	1313-82-2	L			>480	>480	>480			>480	>480	>480	>480
	345 Inorganic Cyano Compounds														
		Cyanogen chloride (>95%)	506-77-4	G							>480			>60	>60
		Hydrogen cyanide (>95%, gas)	74-90-8	G					30		>480	>480	>480	>480	>480
		Hydrogen cyanide (>95%, liquid, 21° C)	74-90-8	L								105	105	>480	105
		Potassium cyanide (10%)	151-50-8	L			>480								
		Sodium cyanide (45% in water)	143-33-9	L						>480	>480				
		Sodium cyanide (sat. sol. in water)	143-33-9	L				>480					>480		
350 Inorganic Gases and Vapors															
	350 Inorganic Gases and Vapors - All														
		Ammonia (>95%)	7664-41-7	G			imm.	26	imm.	20	90	133	133	>480	>480
		Ammonia (>95%, liquid, < -35°C)	7664-41-7	L					>480		>480			>480	>480
		Arsine (>95%)	7784-42-1	G								>480	>480	>480	>480
		Boron trichloride (>95%)	10294-34-5	G								>480	>480	>480	>480
		Boron trifluoride (>95%)	7637-07-2	G								>480	>480	>480	>480
		Carbon monoxide (>95%)	630-08-0	G								330	330	330	330
		Chlorine (>95%, liquid, -70° C)	7782-50-5	L					>480					>480	>480
		Chlorine (gas)	7782-50-5	G			imm.	>480	imm.	>480	>480	>480	>480	>480	>480
		Chlorine (gas, 20 ppm)	7782-50-5	G			>480*								
		Chlorine dioxide (1000 ppm)	10049-04-4	G								>480	>480	>480	>480
		Chlorine dioxide (150 ppm)	10049-04-4	G								>480	>480	>480	
		Chlorine trifluoride (>95%)	7790-91-2	G								45	45	45	45
		Diborane (10%)	19287-45-7	G								>480	>480	>480	>480
		Fluorine (>95%)	7782-41-4	G										>480	
		Hydrogen bromide (>95%, gas)	10035-10-6	G						>480	>480	>480	>480	>480	>480
		Hydrogen chloride (>95%, gas)	7647-01-0	G			imm.	>480	>480	>480	>480	>480	>480	>480	>480
		Hydrogen chloride (>95%, liquid, -90° C)	7647-01-0	L										>180	
		Hydrogen cyanide (>95%, gas)	74-90-8	G					30		>480	>480	>480	>480	>480
		Hydrogen cyanide (>95%, liquid, 21° C)	74-90-8	L								105	105	>480	105
		Hydrogen fluoride (>95%, gas)	7664-39-3	G			imm.	35	170	imm.	imm.	135	135	>480	>480
		Hydrogen selenide (>95%)	7783-07-5	G								>480	>480	>480	>480
		Hydrogen sulfide (>95%)	7783-06-4	G					imm.	>480	>480	>480	>480	>480	>480
		Nitric oxide (>95%)	10102-43-9	G										>480	
		Nitrogen dioxide (>95%)	10102-44-0	G				>480		14	14		>480		
		Nitrogen tetroxide (95%, liquid, 0° C)	10544-72-6	L								>480	>480	>480	>480

Chemical Permeation Data Tables

Class	Sub-Class	Chemical Name	CAS	Phase	Breakthrough Time (Minutes)										
					Tyvek® 800J	Tychem® 2000 SFR	Tychem® 2000	Tychem® 4000	Tychem® 5000	Tychem® 6000	Tychem® 6000 FR	Tychem® 9000	Tychem® RESPONDER® CSM	Tychem® 10000	Tychem® 10000 FR
		Nitrogen tetroxide (>95%, gas)	10544-72-6	G								90	90	90	420
		Nitrogen tetroxide (>95%, liquid, 21° C)	10544-72-6	L										450	
		Nitrogen trifluoride (>95%)	7783-54-2	G								>480	>480	>480	>480
		Nitrous oxide (>95%)	10024-97-2	G								>480	>480	>480	>480
		Phosgene (>95%)	75-44-5	G					>480	>480	>480	>480	>480	>480	>480
		Phosphine (>95%)	7803-51-2	G						imm.	imm.	>480	>480	>480	>480
		Sulfonyl chloride (>95%)	7791-25-5	L					120	>480	>480	>480	>480	>480	>480
		Sulfur dioxide (>95%)	7446-09-5	G			imm.	>480		38*	38*	>480	>480	>480	>480
		Sulfur hexafluoride (>95%)	2551-62-4	G								>480	>480	>480	>480
		Tungsten hexafluoride (>95%)	7783-82-6	L								>480	>480	>480	>480
360 Inorganic Acid Halides															
	360 Inorganic Acid Halides - All														
		Antimony pentachloride (>95%)	7647-18-9	L				>480		15	15		>480		
		Boron trichloride (>95%)	10294-34-5	G								>480	>480	>480	>480
		Boron trifluoride (>95%)	7637-07-2	G								>480	>480	>480	>480
		Phosphorus oxychloride (>95%)	10025-87-3	L					410	>480	>480	>480	>480	>480	>480
		Phosphorus trichloride (>95%)	7719-12-2	L				imm.	>480	>480	>480	>480	>480	>480	>480
		Silicon tetrachloride (>95%)	10026-04-7	L				35	>480	>480	>480	>480	>480	>480	>480
		Sulfonyl chloride (>95%)	7791-25-5	L					120	>480	>480	>480	>480	>480	>480
		Thionyl chloride (>95%)	7719-09-7	L					15	21	21	35	35	90	35
		Titanium tetrachloride (>95%)	7550-45-0	L				imm.	120	>480	>480	>480	>480	>480	>480
		Vanadium tetrachloride (>95%)	7632-51-1	L							>480				
	365 Inorganic Acid Oxides														
		Sulfur dioxide (>95%)	7446-09-5	G			imm.	>480		38*	38*	>480	>480	>480	>480
		Sulfur trioxide (>95%)	7446-11-9	L					imm.			90	90	90	90
370 Inorganic Acids															
	370 Inorganic Acids - All														
		Chlorosulfonic acid (>95%)	7790-94-5	L				>480	330	>480	17	180	>480	>480	180
		Chromic acid (60-62%)	1333-82-0	L		>480	>480	>480					>480		
		Fluoroboric acid (48-50%)	16872-11-0	L				>480	>480				>480		
		Fluorosilicic acid (>95%)	16961-83-4	L					>480	>480		>480	>480	>480	>480
		Fluorosulfonic acid (>95%)	7789-21-1	L								>480	>480	>480	>480
		Hydriodic acid (47%)	10034-85-2	L				>480					>480		
		Hydriodic acid (55-57%)	10034-85-2	L					>480	>480	>480	>480	>480	>480	>480
		Hydrobromic acid (48-49%)	10035-10-6	L					>480						
		Hydrochloric acid (16%)	7647-01-0	L	imm										
		Hydrochloric acid (32%)	7647-01-0	L	imm										
		Hydrochloric acid (37%)	7647-01-0	L			140	>480	>480	>480	>480	>480	>480	>480	>480
		Hydrofluoric acid (10%)	7664-39-3	L	imm										

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					Tyvek® 800J	Tychem® 2000 SFR	Tychem® 2000	Tychem® 4000	Tychem® 5000	Tychem® 6000	Tychem® 6000 FR	Tychem® 9000	Tychem® RESPONDER® CSM	Tychem® 10000	Tychem® 10000 FR
		Hydrofluoric acid (48-51%)	7664-39-3	L		400	400	>480	180	>480	15	>480	>480	>480	>480
		Hydrofluoric acid (60%)	7664-39-3	L						52					
		Hydrofluoric acid (70%)	7664-39-3	L				143	126	35		>480	>480	>480	>480
		Hydrogen bromide (>95%, gas)	10035-10-6	G						>480	>480	>480	>480	>480	>480
		Hydrogen cyanide (>95%, gas)	74-90-8	G					30		>480	>480	>480	>480	>480
		Hydrogen cyanide (>95%, liquid, 21° C)	74-90-8	L								105	105	>480	105
		Hydrogen fluoride (>95%, gas)	7664-39-3	G			imm.	35	170	imm.	imm.	135	135	>480	>480
		Hypophosphorus acid (50%)	6303-21-5	L					>480	>480	>480				
		Nitric acid (50%)	7697-37-2	L							>480				
		Nitric acid (70%)	7697-37-2	L		203	>480	>480		>480	140	>480	>480	>480	>480
		Nitric acid (90%)	7697-37-2	L					>480			>480	>480	>480	>480
		Nitric acid, red fuming (>95%)	52583-42-3	L					>480	14	imm.	>480	>480	>480	>480
		Oleum (103% (13% free SO3))	8014-95-7	L			230							>480	
		Oleum (20% free SO3)	8014-95-7	L				>480		>480	59		>480		
		Oleum (30% free SO3)	8014-95-7	L				450					450		
		Oleum (40% free SO3)	8014-95-7	L			398*			468		>480	>480	>480	>480
		Oleum (65% free SO3)	8014-95-7	L					15	248				>480	
		Perchloric acid (70%)	7601-90-3	L								>480	>480	>480	>480
		Phosphoric acid (50%)	7664-38-2	L											
		Phosphoric acid (85%)	7664-38-2	L				>480	>480	>480	>480	>480	>480	>480	>480
		Sulfamic acid (15%)	5329-14-6	L			>480					>480	>480	>480	>480
		Sulfuric acid (18%)	7664-93-9	L											
		Sulfuric acid (30%)	7664-93-9	L	>480						>480				
		Sulfuric acid (50%)	7664-93-9	L							>480				
		Sulfuric acid (70%)	7664-93-9	L							>480				
		Sulfuric acid (>95%)	7664-93-9	L		>480	>480	>480	>480	>480	50	>480	>480	>480	>480
380 Inorganic Bases															
	380 Inorganic Bases - All														
		Ammonia (>95%)	7664-41-7	G			imm.	26	imm.	20	90	133	133	>480	>480
		Ammonia (>95%, liquid, < -35°C)	7664-41-7	L					>480		>480			>480	>480
		Ammonium hydroxide (16%)	1336-21-6	L	imm										
		Ammonium hydroxide (2-3% in household cleaner)	1336-21-6	L				>480			>480		>480		
		Ammonium hydroxide (28%-30%)	1336-21-6	L			imm.	>480	89	>480	35	160	>480	>480	>480
		Lithium hydroxide (14.9%)	1310-65-2	L		>480	>480								
		Potassium hydroxide (45%)	1310-58-3	L		>480	>480	>480	>480	>480	>480	>480	>480	>480	>480
		Sodium hydroxide (10%)	1310-73-2	L	>480										
		Sodium hydroxide (40%)	1310-73-2	L											
		Sodium hydroxide (50%)	1310-73-2	L	48	>480	>480	>480	>480	>480	>480	>480	>480	>480	>480
390 Ketones															

Chemical Permeation Data Tables

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					Tyvek® 800J	Tychem® 2000 SFR	Tychem® 2000	Tychem® 4000	Tychem® 5000	Tychem® 6000	Tychem® 6000 FR	Tychem® 9000	Tychem® RESPONDER® CSM	Tychem® 10000	Tychem® 10000 FR
	390 Ketones - All														
		Diketene Acetone (>95%)	5394-63-8	L						>480					
	391 Aliphatic and Alicyclic														
		Acetone (>95%)	67-64-1	L			imm.	imm.	>480	>480	>480	>480	>480	>480	>480
		Chloroacetone (>95%)	78-95-5	L				258	>480	>480	>480		258		
		Cyclohexanone (>95%)	108-94-1	L				136		>480	>480	>480	>480	>480	>480
		Dichloroacetone (>95% at 40° C)	534-07-6	L										>480	
		Dichloroacetone (>95% at 45° C)	534-07-6	L						>480	>480				
		Hexone (>95%)	108-10-1	L					>480	>480	>480	>480	>480	>480	>480
		Mesityl oxide (>95%)	141-79-7	L					>480						
		Methyl ethyl ketone (>95%)	78-93-3	L				18	>480	71	71	>480	>480	>480	>480
		Trichloroacetone, 1,1,3- (>95%)	921-03-9	L						>480	>480				
430 Nitriles															
	431 Aliphatic and Alicyclic														
		Acetone cyanohydrin (>95%)	75-86-5	L						>480	>480	>480	>480	>480	>480
		Acetonitrile (>95%)	75-05-8	L			imm.	60	imm.	>480	>480	>480	>480	>480	>480
		Acrylonitrile (>95%)	107-13-1	L			imm.	48	13	12	12	>480	>480	>480	>480
		Acrylonitrile (>95%, 10 g/m² coverage)	107-13-1	L								>480	>480	>480	>480
		Adiponitrile (>95%)	111-69-3	L					>480	>480	>480	>480	>480	>480	>480
		Chloroacrylonitrile, 2- (>95%)	920-37-6	L						>480	>480				
		Methyl-1,5-pentantedinitrile, 2- (87%)	4553-62-2	L								>480	>480		
		Methyl-1,5-pentantedinitrile, 2- (>95%)	4553-62-2	L						>480	>480				
		Pentenenitrile, 2- (>95%)	13284-42-9	L						>480	>480				
		Pentenenitrile, 3- (>95%)	4635-87-4	L								>480	>480	>480	>480
		cis-2-Pentenenitrile (70%)	25899-50-7	L								>480	>480	>480	>480
	432 Aromatic														
		Benzonitrile (>95%)	100-47-0	L					450	>480	>480	>480	>480	>480	>480
		Benzyl cyanide (>95%)	140-29-4	L					>390	>390	>390				
440 Nitro Compounds															
	441 Unsubstituted														
		Nitrobenzene (>95%)	98-95-3	L			imm.	57	>480	>480	>480	>480	>480	>480	>480
		Nitromethane (>95%)	75-52-5	L						229	229	>480	>480	>480	>480
		Nitropropane, 2- (>95%)	79-46-9	L					>480	>480	>480	>480	>480	>480	>480
	442 Substituted														
		Dinitrocresol (sat. sol. in methanol)	534-52-1	L								>480	>480	>480	>480
		Nitrochlorobenzene, o-	88-73-3	S			15								
		Nitrochlorobenzene, p-	100-00-5	S			imm.								
		Nitrophenol, o- (>95% at 70° C)	88-75-5	L				imm.				208	208	208	208
		Nitrophenol, p- (>95% at 60° C)	100-02-7	L				imm.					imm.		

Chemical Permeation Data Tables

Class	Sub-Class	Chemical Name	CAS	Phase	Breakthrough Time (Minutes)										
					Tyvek® 800J	Tychem® 2000 SFR	Tychem® 2000	Tychem® 4000	Tychem® 5000	Tychem® 6000	Tychem® 6000 FR	Tychem® 9000	Tychem® RESPONDER® CSM	Tychem® 10000	Tychem® 10000 FR
		Nitrotoluene, o- (>95%)	88-72-2	L				95					95		
		Nitrotoluene, p-	99-99-0	S			imm.								
450 Nitroso Compounds															
	450 Nitroso Compounds - All														
		Dimethyl nitrosamine (>95%)	62-75-9	L						>480	>480				
460 Organo-Phosphorus Compounds															
	462 Derivatives of Phosphorus-based acids														
		Ethyl parathion (>95%)	56-38-2	L								>480	>480	>480	>480
		Malathion (50% in methanol)	121-75-5	L								>480	>480	>480	>480
		Malathion (50% in water)	121-75-5	L				>480					>480		
		Malathion (>95%)	121-75-5	L								>480	>480	>480	>480
		Sarin (>95%, 10 g/m² coverage)	107-44-8	L				>480	120			>480	>480	>480	>480
		Sarin (>95%, 100 g/m² coverage)	107-44-8	L						>480	>480	>480	>480	>480	>480
		Skydrol® (>95%)	95660-51-8	L			>480								
		Soman (>95%, 10 g/m² coverage)	96-64-0	L					>480			>480	>480	>480	>480
		Soman (>95%, 100 g/m² coverage)	96-64-0	L						>480	>480			>480	
		Tabun (>95%, 10 g/m² coverage)	77-81-6	L								>480	>480	>480	>480
		Tabun (>95%, 100 g/m² coverage)	77-81-6	L						>480	>480			>480	
		Trimethyl phosphate (>95%)	512-56-1	L								>480	>480	>480	>480
		Trimethyl phosphite (>95%)	121-45-9	L				210				>480	>480	>480	>480
		VX Nerve agent (>95%, 10 g/m² coverage)	50782-69-9	L				>480	>480			>480	>480	>480	>480
		VX Nerve agent (>95%, 100 g/m² coverage)	50782-69-9	L						>480	>480	>480	>480	>480	>480
470 Organo-Metallic Compounds															
	470 Organo-Metallic Compounds - All														
		Dimethyl mercury in decane (100 ppm)	593-74-8	L							>480				
		Lewisite (>95%, 10 g/m² coverage)	541-25-3	L				>360	120			>480	>480	>480	>480
		Lewisite (>95%, 100 g/m² coverage)	541-25-3	L						360	360	120	120	>480	120
		Nickel carbonyl (>95%)	13463-39-3	L										>480	
		Tetraethyl lead (>95%)	78-00-2	L					>480			>480	>480	>480	>480
		Triethylaluminum (>95%)	97-93-8	L											>480
		Vinylmagnesium chloride (15% in tetrahydrofuran)	3536-96-7	L				imm.							
		Vinylmagnesium chloride (16.5% in tetrahydrofuran)	3536-96-7	L								>480	>480	>480	>480
480 Organo-Silicon Compounds															
	480 Organo-Silicon Compounds - All														
		Dichlorosilane (>95%)	4109-96-0	G								>480	>480	>480	>480
		Dimethyldichlorosilane (>95%)	75-78-5	L				46		>480	>480		46	>480	
		Hexamethyldisilazane (>95%)	999-97-3	L				>480				>480	>480	>480	>480
		Methyl trichlorosilane (>95%)	75-79-6	L						>480	>480	>480	>480	>480	>480
		Silane (>95%)	7803-62-5	G								>480	>480	>480	>480

Chemical Permeation Data Tables

Class	Sub-Class	Chemical Name	CAS	Phase	Breakthrough Time (Minutes)										
					Tyvek® 800J	Tychem® 2000 SFR	Tychem® 2000	Tychem® 4000	Tychem® 5000	Tychem® 6000	Tychem® 6000 FR	Tychem® 9000	Tychem® RESPONDER® CSM	Tychem® 10000	Tychem® 10000 FR
		Silicon tetrachloride (>95%)	10026-04-7	L				35	>480	>480	>480	>480	>480	>480	>480
		Tetraethoxysilane (>95%)	78-10-4	L								>480	>480	>480	>480
		Trichlorophenylsilane (>95%)	98-13-5	L				>480		>480	>480		>480	>480	
		Trichlorosilane (>95%)	10025-78-2	L				60			>480	>480	>480	>480	>480
		Trichlorovinylsilane (>95%)	75-94-5	L				100					100		
500 Sulfur Compounds															
	501 Thiols														
		Ethyl Mercaptan (>95%)	75-08-1	L				imm.	>480	>480	>480	>480	>480	>480	>480
		Mercaptoethanol (>95%)	60-24-2	L						>480	>480			>480	
		Methyl mercaptan (>95%)	74-93-1	G					>480	>480	>480	>480	>480	>480	>480
		Phenyl mercaptan (>95%)	108-98-5	L										>480	>480
		Thioglycolic acid (>95%)	68-11-1	L					>480	>480	>480	>480	>480	>480	>480
	502 Sulfides and Disulfides														
		Carbon disulfide (>95%)	75-15-0	L			imm.	imm.	16	>480	>480	>480	>480	>480	>480
		Chlorine sulfide (80%)	10545-99-0	L					imm.			70	70	>480	70
		Chlorine sulfide (>95%)	10545-99-0	L										440	
		Dimethyl sulfide (>95%)	75-18-3	L						271	271				
		Hydrogen sulfide (>95%)	7783-06-4	G					imm.	>480	>480	>480	>480	>480	>480
		Sulfur monochloride (>95%)	10025-67-9	L					210			>480	>480	>480	>480
		Sulfur mustard (>95%, 10 g/m² coverage)	505-60-2	L				>480	120			>480	>480	>480	>480
		Sulfur mustard (>95%, 100 g/m² coverage)	505-60-2	L						>480	>480	>480	>480	>480	>480
	503 Sulfones and Sulfoxides														
		Dimethyl sulfoxide (>95%)	67-68-5	L					>480	36	36	>480	>480	>480	>480
	504 Sulfonic Acids														
		Chlorosulfonic acid (>95%)	7790-94-5	L				>480	330	>480	17	180	>480	>480	180
		Methanesulfonic acid (70% in water)	75-75-2	L				>480					>480		
		Trifluoromethane sulfonic acid (>95%)	1493-13-6	L				>480		>480	>480	>480	>480	>480	>480
	505 Sulfonyl Chlorides														
		Benzene sulfonyl chloride (>95%)	98-09-9	L					>480	>480	>480	>480	>480	>480	>480
		Methane sulfonyl chloride (>95%)	124-63-0	L								>480	>480	>480	>480
	507 Sulfonates, Sulfates,and Sulfites														
		Diethyl sulfate (>95%)	64-67-5	L					>480	>480	>480			>480	
		Dimethyl sulfate (>95%)	77-78-1	L				>480	>480	>480	>480	>480	>480	>480	>480
	509 Other														
		Sulfamic acid (15%)	5329-14-6	L			>480					>480	>480	>480	>480
		Sulfur hexafluoride (>95%)	2551-62-4	G								>480	>480	>480	>480
550 Organic Salts and Organic Salt Solutions															
	550 Organic Salts and Organic Salt Solutions - All														
		Sodium methylate (50% in methanol)	124-41-4	L								>480	>480	>480	>480

Chemical Permeation Data Tables

Class	Sub-Class	Chemical Name	CAS	Phase	Breakthrough Time (Minutes)										
					Tyvek® 800J	Tychem® 2000 SFR	Tychem® 2000	Tychem® 4000	Tychem® 5000	Tychem® 6000	Tychem® 6000 FR	Tychem® 9000	Tychem® RESPONDER® CSM	Tychem® 10000	Tychem® 10000 FR
		Tetraethyl Ammonium Hydroxide (35%)	77-98-5	L				>480					>480		
		Tetramethylammonium hydroxide (25%)	75-59-2	L			>480	>480		>480	>480			>480	
590 Miscellaneous (Not classified)															
	590 Miscellaneous (Not classified) - All														
		Black liquor (>95%)	308074-23-9	L			>480	>480				>480	>480	>480	>480
		Boron trifluoride dimethyletherate (>95%)	353-42-4	L					>480	>480	>480				
		Boron trifluoride etherate (>95%)	109-63-7	L						>480	>480			>480	
		Chemidize 727 ND (>95%)	mixture	L				>480					>480		
		DuPont Activator 193S (>95%)	mixture	L			>480								
		DuPont Activator 4505S (>95%)	mixture	L			>480								
		DuPont Activator 4507S (>95%)	mixture	L			>480								
		Green liquor (>95%)	68131-30-6	L			>480	>480				>480	>480	>480	>480
		Tetramethyltin (0.5% in n-pentane)	mixture	L								>480	>480	>480	>480
		White liquor (>95%)	68131-33-9	L			>480	>480				>480	>480	>480	>480
		t-Sodium-amylate / t-amyl alcohol	mixture	S								120	120**	120	120
990 Cytostatic drugs (Active Pharmaceutical Potent Compound)															
	990 Cytostatic drugs (Active Pharmaceutical Potent Compound) - All														
		Carboplatin (10 mg/ml)	441575-94-4	L											
		Carmustine (3.3 mg/ml, 10 % Ethanol)	154-93-8	L	>240***		>240***			>240					
		Cisplatin (1 mg/ml)	15663-27-1	L	>240										
		Cyclophosphamide (20mg/ml)	50-18-0	L	>240		>240								
		Doxorubicin HCl (2 mg/ml)	25136-40-9	L	>240		>240								
		Etoposide (20 mg/ml, 33.2 % (v/v) Ethanol)	33419-42-0	L			>240								
		Fluorouracil, 5- (50 mg/ml, 1 N NH3OH)	51-21-8	L	>240		>240								
		Ganciclovir (3 mg/ml)	82410-32-0	L											
		Gemcitabine (38 mg/ml)	95058-81-4	L											
		Ifosfamide (50 mg/ml)	3778-73-2	L											
		Irinotecan (20 mg/ml)	100286-90-6	L											
		Methotrexate (25 mg/ml, 0.1 N NaOH)	59-05-2	L	>240										
		Mitomycin (0.5 mg/ml)	50-07-7	L	>240										
		Oxaliplatin (5 mg/ml)	63121-00-6	L											
		Paclitaxel (6 mg/ml, 49.7 % (v/v) Ethanol)	33069-62-4	L			>240								
		Sodium chloride (9 g/l)	7647-14-5	L											
		Thiotepa (10 mg/ml)	52-24-4	L	>240***		>240***			>240***					
		Vincristine sulfate (1 mg/ml)	2068-78-2	L											
		Vinorelbine (0.1 mg/ml)	71486-22-1	L											

> = greater than imm. = immediate (<10 minutes) {empty} = not tested L = Liquid G = Gas S = Solid

* Actual breakthrough time; normalized breakthrough time is not available.

Chemical Permeation Data Tables

Class	Sub-Class	Chemical Name	CAS	Phase	Breakthrough Time (Minutes)										
					Tyvek® 800J	Tychem® 2000 SFR	Tychem® 2000	Tychem® 4000	Tychem® 5000	Tychem® 6000	Tychem® 6000 FR	Tychem® 9000	Tychem® RESPONDER® CSM	Tychem® 10000	Tychem® 10000 FR

** Solid tested, vapor phase permeation measured.

Permeation data for Tyvek® Plus and Tyvek® Xpert

DuPont™ Tyvek® fabric provides an ideal balance of protection, durability and comfort. Tyvek® garments are composed of flash spun high density polyethylene fabric which creates a unique, nonwoven material available only from DuPont.

Tyvek® Plus and Tyvek® Xpert garments use a special type of Tyvek® fabric which has different physical properties and improved chemical resistance properties when compared to fabric used in standard Tyvek® garments.

Tyvek® Xpert garments have external sewn seams where the seam thread is visible on the outside of the garment. This seam design, when coupled with the enhanced fabric, offers improved overall garment protection levels. Tyvek® Xpert garments are CE certified to Types 5 & 6 (light liquid aerosols and airborne solid particles).

Tyvek® Plus garments have sewn seams which are over-taped. This seam design, when coupled with the enhanced fabric, offers further improved overall garment protection levels. Tyvek® Plus garments are CE certified to Types 4, 5 & 6 (light and heavy liquid aerosols and airborne solid particles).

NOTE

The permeation data provided in the following table only applies to Tyvek® Xpert and Tyvek® Plus garment fabrics.

Chemical Permeation Data Table

Class	Sub-Class	Chemical Name	CAS	Phase	Breakthrough Time (Minutes)	
					Tyvek® 500	Tyvek® 600
100 Carboxylic acids						
	102 Aliphatic and Alicyclic, Unsubstituted					
		Acetic acid (30%)	64-19-7	L	imm	imm
380 Inorganic Bases						
	380 Inorganic Bases - All					
		Ammonium hydroxide (16%)	1336-21-6	L	imm	imm
		Ammonium hydroxide (28%-30%)	1336-21-6	L	imm	imm
990 Cytostatic drugs (Active Pharmaceutical Potent Compound)						
	990 Cytostatic drugs (Active Pharmaceutical Potent Compound) - All					
		Carboplatin (10 mg/ml)	441575-94-4	L		>240
		Carmustine (3.3 mg/ml, 10 % Ethanol)	154-93-8	L		imm
		Cisplatin (1 mg/ml)	15663-27-1	L		>240
		Cyclophosphamide (20mg/ml)	50-18-0	L		>240
500 Sulfur Compounds						
	507 Sulfonates, Sulfates,and Sulfites					
		Dimethyl sulfate (>95%)	77-78-1	L	imm	imm
990 Cytostatic drugs (Active Pharmaceutical Potent Compound)						
	990 Cytostatic drugs (Active Pharmaceutical Potent Compound) - All					
		Doxorubicin HCl (2 mg/ml)	25136-40-9	L		>240
310 Hydroxylic Compounds (includes alcohols)						
	314 Aliphatic and Alicyclic, Polyols					
		Ethylene glycol (>95%)	107-21-1	L	imm	imm
990 Cytostatic drugs (Active Pharmaceutical Potent Compound)						
	990 Cytostatic drugs (Active Pharmaceutical Potent Compound) - All					
		Etoposide (20 mg/ml, 33.2 % (v/v) Ethanol)	33419-42-0	L		>240
		Fluorouracil, 5- (50 mg/ml, 1 N NH3OH)	51-21-8	L		imm
100 Carboxylic acids						
	102 Aliphatic and Alicyclic, Unsubstituted					
		Formic acid (30%)	64-18-6	L	imm	imm

Chemical Permeation Data Table

Class	Sub-Class	Chemical Name	CAS	Phase	Breakthrough Time (Minutes)	
					Tyvek® 500	Tyvek® 600
990 Cytostatic drugs (Active Pharmaceutical Potent Compound)						
	990 Cytostatic drugs (Active Pharmaceutical Potent Compound) - All					
		Ganciclovir (3 mg/ml)	82410-32-0	L		>240
		Gemcitabine (38 mg/ml)	95058-81-4	L		<60***
370 Inorganic Acids						
	370 Inorganic Acids - All					
		Hydrochloric acid (16%)	7647-01-0	L	imm	imm
		Hydrochloric acid (32%)	7647-01-0	L	imm	imm
300 Peroxides						
	300 Peroxides - All					
		Hydrogen peroxide (30%)	7722-84-1	L	imm	imm
990 Cytostatic drugs (Active Pharmaceutical Potent Compound)						
	990 Cytostatic drugs (Active Pharmaceutical Potent Compound) - All					
		Ifosfamide (50 mg/ml)	3778-73-2	L		>240
		Irinotecan (20 mg/ml)	100286-90-6	L		>240***
		Methotrexate (25 mg/ml, 0.1 N NaOH)	59-05-2	L		>240
		Mitomycin (0.5 mg/ml)	50-07-7	L		>240
		Oxaliplatin (5 mg/ml)	63121-00-6	L		imm
		Paclitaxel (6 mg/ml, 49.7 % (v/v) Ethanol)	33069-62-4	L		>240
370 Inorganic Acids						
	370 Inorganic Acids - All					
		Phosphoric acid (50%)	7664-38-2	L	>480	>480
990 Cytostatic drugs (Active Pharmaceutical Potent Compound)						
	990 Cytostatic drugs (Active Pharmaceutical Potent Compound) - All					
		Sodium chloride (9 g/l)	7647-14-5	L		>240
380 Inorganic Bases						
	380 Inorganic Bases - All					
		Sodium hydroxide (40%)	1310-73-2	L	>480	>480
370 Inorganic Acids						

Chemical Permeation Data Table

Class	Sub-Class	Chemical Name	CAS	Phase	Breakthrough Time (Minutes)	
					Tyvek® 500	Tyvek® 600
	370 Inorganic Acids - All					
		Sulfuric acid (18%)	7664-93-9	L	>480	>480
		Sulfuric acid (30%)	7664-93-9	L		>240
990 Cytostatic drugs (Active Pharmaceutical Potent Compound)						
	990 Cytostatic drugs (Active Pharmaceutical Potent Compound) - All					
		Thiotepa (10 mg/ml)	52-24-4	L		imm
		Vincristine sulfate (1 mg/ml)	2068-78-2	L		>240
		Vinorelbine (0.1 mg/ml)	71486-22-1	L		>240

> = greater than imm. = immediate (<10 minutes) {empty} = not tested L = Liquid G = Gas S = Solid

APPENDIX
CHEMICAL INDEX - Alphabetical Listing - Chemical Names and Synonyms

Chemical Name	Synonym	CAS Number	Class	Sub-Class
(2-Ethoxyethoxy)-ethanol, 2-		111-90-0	240	245
2-(2-Butoxyethoxy)-ethanol	Butyl Carbitol, DEG Monobutyl Ether, Diethylene Glycol Monobutyl Ether	112-34-5	240 / 310	245 / 311
Acetaldehyde		75-07-0	120	121
Acetic acid		64-19-7	100	102
Acetic anhydride		108-24-7	160	161
Acetone		67-64-1	390	391
Acetone cyanohydrin		75-86-5	310 / 430	313 / 431
Acetonitrile		75-05-8	430	431
Acetyl chloride		75-36-5	110	111
Acrolein		107-02-8	120	121
Acrylamide		79-06-1	130	135
Acrylic acid		79-10-7	100	102
Acrylonitrile		107-13-1	430	431
Acryloyl Chloride	Acrylic Acid Chloride	814-68-6	110	111
Adiponitrile		111-69-3	430	431
AFFF		191681-14-8	590	590
Allyl alcohol		107-18-6	310	311
Allyl chloride		107-05-1	260	265
Aluminum sulfate hydrate		17927-65-0	340	340
Aminodiphenyl, 4-		92-67-1	140	145
Aminoethylethanolamine	N-Aminoethyl ethanolamine	111-41-1	140 / 310	148 / 311
Aminoethylpiperazine		140-31-8	140 / 270	148 / 274
Aminopyridine, 2-		504-29-0	270	271
Ammonia	Anhydrous ammonia	7664-41-7	350 / 380	350 / 380
Ammonium Bifluoride	Ammonium Hydrofluoride, Ammonium Hydrogen Difluoride	1341-49-7	340	340
Ammonium chloride		12125-02-9	340	340
Ammonium fluoride		12125-01-8	340	340
Ammonium hydroxide		1336-21-6	380	380
Amyl acetate, n-		628-63-7	220	222
Aniline		62-53-3	140	145
Aniline, 4-trifluoromethoxy		461-82-5	140 / 240	145 / 242
Anthracene		120-12-7	290	293
Antimony pentachloride		7647-18-9	360	360
Arsenic trichloride		7784-34-1	340	340
Arsine		7784-42-1	350	350
Asbestos (all forms)		1332-21-4	sol	sol1
Astromat Orange		mixture		590
Benzene		71-43-2	290	292
Benzene sulfonyl chloride		98-09-9	500	505
Benzidine		92-87-5	140	145 / 149
Benzonitrile		100-47-0	430	432
Benzotrichloride		98-07-7	260	263
Benzoyl chloride		98-88-4	110	112
Benzyl alcohol		100-51-6	310	312
Benzyl chloride		100-44-7	260	266
Benzyl chloroformate		501-53-1	110	113
Benzyl cyanide		140-29-4	430	432
Beryllium		7440-41-7	sol	sol1
Bisphenol-A diglycidyl ether		1675-54-3	270	275
Black liquor		308074-23-9	590	590
Borane-pyridine complex		110-51-0	590	590
Boron trichloride		10294-34-5	350 / 360	350 / 360
Boron trifluoride		7637-07-2	350 / 360	350 / 360
Boron trifluoride dimethyletherate		353-42-4	590	590
Boron trifluoride etherate		109-63-7	590	590
Bromine		7726-95-6	330	330
Bromochloromethane		74-97-5	260	261
Bromofluorobenzene, 4-		460-00-4	260	263
Butadiene, 1,3-	1,3-Butadiene	106-99-0	290	296
Butanol tert.	2-methyl 2-propanol	75-65-0	310	313
Butanol, n-		71-36-3	310	311
Butyl acetate, n-		123-86-4	220	222
Butyl acrylate, n-		141-32-2	220	223
Butyl Cellosolve®		111-76-2	240	245
Butyl ether, n-		142-96-1	240	241
Butylamine, n-	1-Aminobutane, Aminobutane, 1-, Butan-1-amine	109-73-9	140	141
Butylamine, tert-	tert-Butylamine	75-64-9	140	141
Butylene oxide, 1,2-		106-88-7	270	275
Butyraldehyde, n-	Butanal	123-72-8	120	121
Butyric acid		107-92-6	100	102
Calcium chloride		10043-52-4	340	340
Carbon disulfide		75-15-0	500	502
Carbon monoxide		630-08-0	350	350
Carbon tetrachloride		56-23-5	260	261
Carboplatin		441575-94-4	990	990
Carmustine		154-93-8	990	990
Chemidize 727 ND		mixture	590	590
Chlordane		57-74-9	260	261
Chlorine		7782-50-5	330 / 350	330 / 350
Chlorine dioxide		10049-04-4	350	350
Chlorine sulfide	Sulfur dichloride	10545-99-0	500	502
Chlorine trifluoride		7790-91-2	350	350
Chloro-1,2-propanediol, 3-		96-24-2	310	314
Chloro-1,3-butadiene, 2-		126-99-8	260	264
Chloro-benzotrifluoride, 4-		98-56-6	260	263
Chloroacetic acid		79-11-8	100	103
Chloroacetone		78-95-5	390	391
Chloroacetophenone		532-27-4	260	261
Chloroacetyl chloride		79-04-9	110	111
Chloroacrylonitrile, 2-		920-37-6	260 / 430	264 / 431
Chloroaniline, p-	Chloroaniline, 4-	106-47-8	140	145
Chlorobenzene		108-90-7	260	263
Chlorobenzotrichloride, 4-		5216-25-1	260	263

APPENDIX
CHEMICAL INDEX - Alphabetical Listing - Chemical Names and Synonyms

Chemical Name	Synonym	CAS Number	Class	Sub-Class
Chloroethanol, 2-		107-07-3	260 / 310	261 / 315
Chloroform		67-66-3	260	261
Chloromethyl methyl ether		107-30-2	240	241
Chlorophenol, 4-		106-48-9	260 / 310	263 / 316
Chloropicrin		76-06-2	260	261
Chlorosulfonic acid		7790-94-5	370 / 500	370 / 504
Chlorotoluene, o-		95-49-8	260	263
Chromic acid		1333-82-0	370	370
cis-2-Pentenenitrile		25899-50-7	430	431
Cisplatin		15663-27-1	990	990
Citric acid		77-92-9	100	104
Creosote		8001-58-9	310	316
Cresol, mixed isomers		1319-77-3	310	316
Cresol, o-		95-48-7	310	316
Crude oil		8002-05-9	290	294
Crude oil on wildlife		mixture	liq	liq4
Cumene		98-82-8	290	292
Cyanogen chloride	CK (Cyanogen chloride)	506-77-4	340	345
Cyanuric chloride		108-77-0	260	263
Cyclohexane		110-82-7	290	291
Cyclohexanone		108-94-1	390	391
Cyclohexyl isocyanate		3173-53-3	210	211
Cyclohexylamine		108-91-8	140	141
Cyclooctadiene		1552-12-1	290	296
Cyclophosphamide		50-18-0	990	990
d-Limonene		5989-27-5	290	296
Decontaminating agent (DS-2)		mixture	590	590
Diborane		19287-45-7	350	350
Dibromo-3-chloropropane, 1,2-		96-12-8	260	261
Dichloro-2-butene, 1,4-		764-41-0	260	264
Dichloro-6-isopropyl-S-triazine, 2,4-		30894-74-7	270	274
Dichloroacetone		534-07-6	260 / 390	261 / 391
Dichloroacetyl chloride		79-36-7	110	111
Dichloroaniline, 3,4-		95-76-1	140 / 260	145 / 263
Dichlorobenzene, 1,2-		95-50-1	260	263
Dichlorobenzene, 1,3-		541-73-1	260	263
Dichlorobenzene, 1,4	Dichlorobenzene, 1,4-	106-46-7	260	263
Dichloroethyl ether		111-44-4	240 / 260	241 / 261
Dichloromethane	Methylene chloride	75-09-2	260	261
Dichloropropene, 1,3-		542-75-6	260	261
Dichloropropene, 2,3-	Dichloropropene,2,3-	78-88-6	260	261
Dichlorosilane		4109-96-0	480	480
Diesel automotive test fuel		mixture	290	291
Diesel fuel		68334-30-5	290	291
Diethanolamine		111-42-2	140	142
Diethyl sulfate		64-67-5	500	507
Diethyl-m-toluidine crude		91-67-8	140	145

Chemical Name	Synonym	CAS Number	Class	Sub-Class
Diethylamine		109-89-7	140	142
Diethylaniline		91-66-7	140	146
Diethylaniline crude		91-66-7	140	146
Diethylbenzene		25340-17-4	290	290
Diethylenetriamine		111-40-0	140	148
Diethylhexyl phthalate		117-81-7	220	226
Diiodo-1,1,2,2-tetrafluorobutane, 1,4-		755-95-3	260	261
Diisopropylethylamine (DIPEA)	DIPEA (Diisopropylethylamine)	7087-68-5	140	141
Diketene Acetone		5394-63-8	220 / 240 / 270 / 390	223 / 244 / 278 / 390
Dimethyl disulfide		624-92-0	500	502
Dimethyl ether		115-10-6	240	241
Dimethyl mercury in decane		593-74-8	470	470
Dimethyl nitrosamine		62-75-9	450	450
Dimethyl sulfate		77-78-1	500	507
Dimethyl sulfide		75-18-3	500	502
Dimethyl sulfoxide		67-68-5	500	503
Dimethylacetamide, N,N-	DMAc, N,N-	127-19-5	130	132
Dimethylamine		124-40-3	140	142
Dimethylaniline, N,N-		121-69-7	140	146
Dimethyldichlorosilane		75-78-5	480	480
Dimethylformamide, N,N-	N,N-Dimethylformamide	68-12-2	130	132
Dimethylhydrazine, 1,1-		57-14-7	280	280
Dimethylmaleate		624-48-6	220	224
Dinitrocresol		534-52-1	310 / 440	316 / 442
Dioxane, 1,4-		123-91-1	270	278
Dowtherm heat transfer fluid		8004-13-5	590	590
Doxorubicin HCl	Doxorubicin	25136-40-9	990	990
DuPont Activator 193S		mixture	590	590
DuPont Activator 4505S		mixture	590	590
DuPont Activator 4507S		mixture	590	590
Dytek® A		15520-10-2	140	148
Epichlorohydrin		106-89-8	260 / 270	261 / 275
Ethanolamine		141-43-5	140 / 310	141 / 311
Ethyl acetate		141-78-6	220	222
Ethyl acrylate		140-88-5	220	223
Ethyl alcohol	Ethanol, Ethyl hydroxide	64-17-5	310	311
Ethyl benzene		100-41-4	290	292
Ethyl Cellosolve®		110-80-5	240	245
Ethyl Cellosolve® acetate		111-15-9	240	245
Ethyl chloride		75-00-3	260	261
Ethyl ether		60-29-7	240	241
Ethyl Mercaptan	Ethanethiol	75-08-1	500	501
Ethyl methyacrylate		97-63-2	220	223
Ethyl parathion		56-38-2	460	462
Ethyl vinyl ether		109-92-2	240 / 260	246 / 261
Ethylamine		75-04-7	140	141
Ethylene		74-85-1	290	294

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Chemical Name	Synonym	CAS Number	Class	Sub-Class
Ethylene dibromide		106-93-4	260	261
Ethylene dichloride	1,2-Dichloroethane	107-06-2	260	261
Ethylene glycol		107-21-1	310	314
Ethylene glycol acrylate		818-61-1	220	223
Ethylene oxide	Dimethylene oxide, Epoxyethane	75-21-8	270	275
Ethylene oxide mixture		mixture	270	275
Ethylenediamine		107-15-3	140	148
Ethyleneimine		151-56-4	270	274
Etoposide	Toposar®	33419-42-0	990	990
Ferric chloride	Iron trichloride, Iron(III) chloride	7705-08-0	340	340
Ferrous chloride	Iron (II) chloride, Iron dichloride	7758-94-3	340	340
Fluorine		7782-41-4	350	350
Fluorobenzene		462-06-6	260	263
Fluoroboric acid		16872-11-0	370	370
Fluorosilicic acid		16961-83-4	370	370
Fluorosulfonic acid		7789-21-1	370	370
Fluorouracil, 5-		51-21-8	990	990
Formaldehyde		50-00-0	120	121
Formalin	Formalin	mixture	120	121
Formic acid		64-18-6	100	102
Fuel oil		68476-30-2	290	291
Furfural		98-01-1	120 / 270	122 / 277
gamma Butyrolactone		96-48-0		225
Ganciclovir		82410-32-0	990	990
Gasoline		86290-81-5	290	291
Gasoline, E-10		308066-70-8	290	291
Gemcitabine		95058-81-4	990	990
Gluteraldehyde	1,5-Pentanedial, Glutaric acid dialdehyde, Glutaric aldehyde, Pentanedial, 1,5-	111-30-8	120	121
Glycolic acid		79-14-1	100	103
Green liquor		68131-30-6	590	590
Heptane		142-82-5	290	291
Hexachlorobutadiene		87-68-3	260	264
Hexachlorocyclopentadiene		77-47-4	260	264
Hexafluoroethane		76-16-4	260	261
Hexafluoroisobutylene		382-10-5	260	261
Hexamethyldisilazane	Hexamethyldisilizane	999-97-3	140 / 480	142 / 480
Hexamethylene diisocyanate		822-06-0	210	211
Hexamethylene diisocyanate in DuPont Activator 193S		mixture	210	211
Hexamethylene diisocyanate in DuPont Activator 4505S		mixture	210	211
Hexamethylene diisocyanate in DuPont Activator 4507S		mixture	210	211
Hexamethylenediamine, 1,6-		124-09-4	140	148
Hexane, n-	n-Hexane	110-54-3	290	291
Hexene, 1-		592-41-6	290	294
Hexone	MIBK (Methyl isobutyl ketone), Methyl isobutyl ketone	108-10-1	390	391

Chemical Name	Synonym	CAS Number	Class	Sub-Class
Hydrazine		302-01-2	280	280
Hydrazine hydrate		10217-52-4	280	280
Hydriodic acid		10034-85-2	370	370
Hydrobromic acid		10035-10-6	370	370
Hydrochloric acid	Muriatic acid	7647-01-0	370	370
Hydrofluoric acid		7664-39-3	370	370
Hydrogen bromide		10035-10-6	350 / 370	350 / 370
Hydrogen chloride		7647-01-0	350	350
Hydrogen cyanide	HCN (Hydrogen cyanide), Hydrocyanic acid	74-90-8	340 / 350 / 370	345 / 350 / 370
Hydrogen fluoride		7664-39-3	350 / 370	350 / 370
Hydrogen peroxide		7722-84-1	300	300
Hydrogen selenide		7783-07-5	350	350
Hydrogen sulfide		7783-06-4	350 / 500	350 / 502
Hypophosphorus acid		6303-21-5	370	370
Ifosfamide		3778-73-2	990	990
Iodine		7553-56-2	330	330
Irinotecan		100286-90-6	990	990
Isoamyl alcohol		123-51-3	310	312
Isobutane		75-28-5	290	291
Isobutanol		78-83-1	310	311
Isobutylbenzene		538-93-2	290	292
Isophorone diisocyanate		4098-71-9	210	211
Isoprene		78-79-5	290	296
Isopropyl alcohol	IPA (Isopropyl alcohol), Isopropanol	67-63-0	310	312
Isopropylamine		75-31-0	140	141
JP-4 jet fuel		50815-00-4	290	291
JP-8 jet fuel		94114-58-6	290	291
Kerosene	Jet A fuel	8008-20-6	290	291
Lead		7439-92-1	sol	sol1
Lewisite		541-25-3	470	470
Lime		mixture	sol	sol1
Lindane		58-89-9	260	261
Lithium chloride		7447-41-8	340	340
Lithium hydroxide		1310-65-2	380	380
m-Cresol 55%, p-Cresol 30%, Phenol 15%		mixture	310	316
Malathion		121-75-5	460	462
Maleic acid		110-16-7	100	104
Maleic anhydride		108-31-6	160	161
Mercaptoethanol		60-24-2	310 / 500	311 / 501
Mercuric chloride		7487-94-7	340	340
Mercury		7439-97-6	330	330
Mesityl oxide		141-79-7	390	391
Methacrylic acid		79-41-4	100	102
Methane		74-82-8	290	291
Methane sulfonyl chloride		124-63-0	500	505
Methanesulfonic acid		75-75-2	500	504
Methanol		67-56-1	310	311

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Chemical Name	Synonym	CAS Number	Class	Sub-Class
Methomyl		16752-77-5	230	233
Methotrexate		59-05-2	990	990
Methyl acrylate		96-33-3	220	223
Methyl bromide		74-83-9	260	261
Methyl Cellosolve®		109-86-4	240 / 310	245 / 311
Methyl Cellosolve® acetate		110-49-6	240	245
Methyl chloride		74-87-3	260	261
Methyl chloroformate		79-22-1	110	113
Methyl ethyl ketone	MEK (Methyl ethyl ketone)	78-93-3	390	391
Methyl ethyl ketoxime		96-29-7	150	150
Methyl fluoride		593-53-3	260	261
Methyl formate		107-31-3	220	221
Methyl hydrazine		60-34-4	280	280
Methyl iodide		74-88-4	260	261
Methyl isocyanate		624-83-9	210	211
Methyl mercaptan		74-93-1	500	501
Methyl methacrylate		80-62-6	220	223
Methyl parathion		298-00-0	460	462
Methyl salicylate		119-36-8	220	226
Methyl tert-butyl ether		1634-04-4	240	241
Methyl trichlorosilane		75-79-6	480	480
Methyl-1,5-pentantedinitrile, 2-	Methylglutaronitrile, 2-	4553-62-2	430	431
Methyl-2-pyrrolidone, N-		872-50-4	130	132
Methylamine		74-89-5	140	141
Methylbenzylamine	Benzyl (Methyl) amine	103-67-3	140	142
Methylene bis (o-chloroaniline), 4,4'-		101-14-4	140	149
Methylene bis-cyclohexane diamine, 4,4'-		1761-71-3	140	148
Methylene bromide		74-95-3	260	261
Methylene dianiline, 4,4'-		101-77-9	140	145 / 149
Methylene diphenyl isocyanate	Diphenylmethane Diisocyanate 4,4-	101-68-8	210	212
Methylformamide, N-		123-39-7	130	132
Mineral oil		8012-95-1	290	291
Mineral spirits		64475-85-0	290	291
Mitomycin		50-07-7	990	990
Morpholine		110-91-8	140	142
N-Methylmethacrylamide	Methylmethacrylamide, N-	3887-02-3	130	135
N-Methylmorpholine (NMM)	NMM (N-Methylmorpholine)	109-02-4	140	142
Naphthalene		91-20-3	290	293
Naphthalene		91-20-3	290	293
Nickel carbonyl		13463-39-3	470	470
Nicotine		54-11-5	270	271
Nitric acid		7697-37-2	370	370
Nitric acid, red fuming		52583-42-3	370	370
Nitric oxide		10102-43-9	350	350
Nitrobenzene		98-95-3	440	441
Nitrochlorobenzene, o-		88-73-3	260 / 440	263 / 442
Nitrochlorobenzene, p-		100-00-5	260 / 440	263 / 442
Nitrogen dioxide		10102-44-0	350	350
Nitrogen tetroxide		10544-72-6	350	350
Nitrogen trifluoride		7783-54-2	350	350
Nitromethane		75-52-5	440	441
Nitrophenol, o-		88-75-5	310 / 440	316 / 442
Nitrophenol, p-		100-02-7	310 / 440	316 / 442
Nitropropane, 2-		79-46-9	440	441
Nitrotoluene, o-		88-72-2	440	442
Nitrotoluene, p-		99-99-0	440	442
Nitrous oxide		10024-97-2	350	350
Nonylamine		112-20-9	140	141
Norbornene-2-yl acetate, 5-		6143-29-9	220	222
Octane, n-		111-65-9	290	291
Oleum		8014-95-7	370	370
Organo-Tin Paint		mixture	470	470
Otto fuel II		106602-80-6	590	590
Oxalic acid		144-62-7	100	104
Oxaliplatin		63121-00-6	990	990
Paclitaxel	Taxol	33069-62-4	990	990
Paraphenylene diisocyanate (PPDI) crude		104-49-4	210	212
PCB	Polychlorinated biphenyl	mixture	260	263
PCB 1254	Polychlorinated biphenyl 1254	11097-69-1	260	263
PCB 1254	Polychlorinated biphenyl 1254	mixture	260	263
PCB gas condensate		mixture	260	263
PCB in transformer oil		mixture	260	263
Pentachlorophenol		87-86-5	310	316
Pentanol, n-		71-41-0	310	311
Pentenenitrile, 2-		13284-42-9	430	431
Pentenenitrile, 3-		4635-87-4	430	431
Perchloric acid		7601-90-3	370	370
Perfluoro-2-propoxy propionyl fluoride	2-(Hepta Fluoro Propoxy) Tetra Fluoro Propionyl Fluoride, HFPO Dimer	2062-98-8	110 / 240 / 260	110 / 240 / 260
Phenethyl alcohol, 2-		60-12-8	310	318
Phenol		108-95-2	310	316
Phenyl glycidyl ether		122-60-1	270	275
Phenyl mercaptan		108-98-5	500	501
Phenylethanol, 1-		98-85-1	310	318
Phosgene		75-44-5	350	350
Phosphine		7803-51-2	350	350
Phosphoric acid		7664-38-2	370	370
Phosphorus oxychloride		10025-87-3	360	360
Phosphorus trichloride		7719-12-2	360	360
Picoline, 2-		109-06-8	270	271
Picoline, 3-		108-99-6	270	271
Polyethylene glycol dimethyl ether	Selexol™	24991-55-7	240	245
Polymethylene polyphenyl-polyisocyanate		9016-87-9	210	212
Potassium acetate		127-08-2	340	340
Potassium carbonate		584-08-7	340	340

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Chemical Name	Synonym	CAS Number	Class	Sub-Class
Potassium chromate		7789-00-6	340	340
Potassium cyanide		151-50-8	340	345
Potassium hydroxide	Caustic potash, KOH (Potassium hydroxide), Potash lye	1310-58-3	380	380
Potassium permanganate		7722-64-7	340	340
Propane		74-98-6	290	291
Propargyl alcohol	2-Propyn-1-ol, Propyn-1-ol, 2-	107-19-7	310	311
Propionaldehyde		123-38-6	120	121
Propionic acid		79-09-4	100	102
Propylamine, n-		107-10-8	140	141
Propylbromide, n-	1-Bromopropane, 1-Propyl bromide, Bromopropane, 1-, Propyl bromide, 1-, n-Propylbromide	106-94-5	260	261
Propylene dichloride		78-87-5	260	261
Propylene imine		75-55-8	270	274
Propylene oxide, 1,2-		75-56-9	270	275
Pyridine		110-86-1	270	271
Pyrrolidine		123-75-1	270	274
Sarin		107-44-8	460	462
Silane		7803-62-5	480	480
Silicon tetrachloride		10026-04-7	360 / 480	360 / 480
Skydrol®		95660-51-8	460	462
Sodium chloride		7647-14-5	990	990
Sodium cyanide		143-33-9	340	345
Sodium dichromate		10588-01-9	340	340
Sodium fluoride		7681-49-4	340	340
Sodium hydrosulfide		16721-80-5	340	340
Sodium hydroxide	Caustic soda, Lye, NaOH (Sodium hydroxide)	1310-73-2	380	380 / 591 / 592
Sodium hypochlorite		7681-52-9	340	340
Sodium metabisulfite	Sodium disulfite, Sodium pyrosulfite	7681-57-4	340	340
Sodium methylate		124-41-4	550	550
Sodium silicate		6834-92-0	340	340
Sodium sulfide	Disodium sulfide	1313-82-2	340	340
Soman		96-64-0	460	462
Stoddard solvent		8052-41-3	290	291
Styrene		100-42-5	290	292
Sulfamic acid		5329-14-6	370 / 500	370 / 509
Sulfonyl chloride		7791-25-5	350 / 360	350 / 360
Sulfur dioxide		7446-09-5	350 / 360	350 / 365
Sulfur hexafluoride		2551-62-4	350 / 500	350 / 509
Sulfur monochloride	Disulfur dichloride, Sulfur chloride	10025-67-9	500	502
Sulfur mustard		505-60-2	500	502
Sulfur trioxide		7446-11-9	360	365
Sulfuric acid		7664-93-9	370	370
t-Sodium-amylate / t-amyl alcohol		mixture	590	590
Tabun		77-81-6	460	462
tert-Butyl alcohol	Butyl alcohol, tert-	75-65-0	310	313
Tetrabromoethane		79-27-6	260	261
Tetrachloro-bisphenol -A, 2,2',6,6'	Tetrachloro-bisphenol -A, 2,2',6,6'-	79-95-8	260 / 310	263 / 316
Tetrachloroethane, 1,1,2,2-		79-34-5	260	261
Tetrachloroethylene, 1,1,2,2-	1,1,2,2-Tetrachloroethylene	127-18-4	260	264
Tetraethoxysilane		78-10-4	480	480
Tetraethyl Ammonium Hydroxide	Tetraethylammonium hydroxide; N,N,N,	77-98-5	550	550
Tetraethyl lead		78-00-2	470	470
Tetraethylenepentamine		112-57-2	140	148
Tetrafluoroethane, 1,1,1,2-		811-97-2	260	261
Tetrafluoromethane		75-73-0	260	261
Tetrahydrofuran		109-99-9	240	241
Tetralone		529-34-0	290	292
Tetramethylammonium hydroxide		75-59-2	550	550
Tetramethylethylene oxide		5076-20-0	270	275
Tetramethylethylenediamine (TMEDA)	TMEDA (Tetramethylethylenediamine)	110-18-9	140	148
Tetramethyltin		mixture	590	590
Thioglycolic acid		68-11-1	100 / 500	103 / 501
Thionyl chloride		7719-09-7	360	360
Thiotepa		52-24-4	990	990
Titanium tetrachloride		7550-45-0	360	360
Toluene		108-88-3	290	292
Toluene-1,3-diisocyanate		26471-62-5	210	212
Toluene-2,4-diisocyanate		584-84-9	210	212
Toluidine, m-		108-44-1	140	145
Toluidine, o-		95-53-4	140	145
trans-1,2-Dichloroethylene		156-60-5	260	264
trans-1,4-Dichloro-2-butene		110-57-6	260	264
trans-Crotonaldehyde		123-73-9	120	121
Tribromophenol,2,4,6-	Tribromophenol, 2,4,6-	118-79-6	310	316
Tributylamine		102-82-9	140	143
Trichloro-1,2,2-trifluoroethane, 1,1,2-	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	260	261
Trichloroacetic acid		76-03-9	100	103
Trichloroacetone, 1,1,3-		921-03-9	260 / 390	261 / 391
Trichlorobenzene, 1,2,4-		120-82-1	260	263
Trichloroethane, 1,1,1-		71-55-6	260	261
Trichloroethane, 1,1,2-		79-00-5	260	261
Trichloroethanol, 2,2,2-		115-20-8	310	315
Trichloroethylene		79-01-6	260	264
Trichlorophenylsilane		98-13-5	480	480
Trichlorosilane		10025-78-2	480	480
Trichlorovinylsilane		75-94-5	480	480
Triethoxysilane		998-30-1	480	480
Triethylaluminum		97-93-8	470	470
Triethylamine		121-44-8	140	143
Triethylenetetramine		112-24-3		
Trifluoroacetic acid		76-05-1	100 / 260	103 / 261
Trifluoroacetyl chloride		354-32-5	110	111
Trifluoroethanol, 2,2,2-		75-89-8	310	315

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Trifluoromethane		75-46-7	260	261
Trifluoromethane sulfonic acid		1493-13-6	500	504
Trimethyl phosphate		512-56-1	460	462
Trimethyl phosphite		121-45-9	460	462
Trimethylamine		75-50-3	140	143
Trimethylbenzene, 1,2,3-		526-73-8	290	292
Triphenyl phosphite		101-02-0	460	462
Tripropylamine		102-69-2	140	143
Tungsten hexafluoride		7783-82-6	350	350
Turpentine		8006-64-2	290	294
Vanadium tetrachloride		7632-51-1	360	360
Vincristine sulfate		2068-78-2	990	990
Vinorelbine		71486-22-1	990	990
Vinyl acetate		108-05-4	220	222
Vinyl bromide		593-60-2	260	264
Vinyl chloride		75-01-4	260	264
Vinylidene chloride	Dichloroethylene, 1,1-	75-35-4	260	264
Vinylmagnesium chloride		3536-96-7	470	470
Vinylpyridine, 4-		100-43-6	270	271
VM&P Naphtha		8030-30-6	290	291
VX Nerve agent		50782-69-9	460	462
White liquor		68131-33-9	590	590
Xylene, mixed isomers		1330-20-7	290	292
Xylene, o-		95-47-6	290	292
Xylidin, 2,4-		95-68-1	140	145

APPENDIX
CHEMICAL INDEX - Chemical Abstract System (CAS) Number - Chemical Names and Synonyms

CAS Number	Chemical Name	Synonym	Class	Sub-Class
50-00-0	Formaldehyde		120	121
50-07-7	Mitomycin		990	990
50-18-0	Cyclophosphamide		990	990
51-21-8	Fluorouracil, 5-		990	990
52-24-4	Thiotepa		990	990
54-11-5	Nicotine		270	271
56-23-5	Carbon tetrachloride		260	261
56-38-2	Ethyl parathion		460	462
57-14-7	Dimethylhydrazine, 1,1-		280	280
57-74-9	Chlordane		260	261
58-89-9	Lindane		260	261
59-05-2	Methotrexate		990	990
60-12-8	Phenethyl alcohol, 2-		310	318
60-24-2	Mercaptoethanol		310 / 500	311 / 501
60-29-7	Ethyl ether		240	241
60-34-4	Methyl hydrazine		280	280
62-53-3	Aniline		140	145
62-75-9	Dimethyl nitrosamine		450	450
64-17-5	Ethyl alcohol	Ethanol, Ethyl hydroxide	310	311
64-18-6	Formic acid		100	102
64-19-7	Acetic acid		100	102
64-67-5	Diethyl sulfate		500	507
67-56-1	Methanol		310	311
67-63-0	Isopropyl alcohol	IPA (Isopropyl alcohol), Isopropanol	310	312
67-64-1	Acetone		390	391
67-66-3	Chloroform		260	261
67-68-5	Dimethyl sulfoxide		500	503
68-11-1	Thioglycolic acid		100 / 500	103 / 501
68-12-2	Dimethylformamide, N,N-	N,N-Dimethylformamide	130	132
71-36-3	Butanol, n-		310	311
71-41-0	Pentanol, n-		310	311
71-43-2	Benzene		290	292
71-55-6	Trichloroethane, 1,1,1-		260	261
74-82-8	Methane		290	291
74-83-9	Methyl bromide		260	261
74-85-1	Ethylene		290	294
74-87-3	Methyl chloride		260	261
74-88-4	Methyl iodide		260	261
74-89-5	Methylamine		140	141
74-90-8	Hydrogen cyanide	HCN (Hydrogen cyanide), Hydrocyanic acid	340 / 350 / 370	345 / 350 / 370
74-93-1	Methyl mercaptan		500	501
74-95-3	Methylene bromide		260	261
74-97-5	Bromochloromethane		260	261
74-98-6	Propane		290	291
75-00-3	Ethyl chloride		260	261
75-01-4	Vinyl chloride		260	264
75-04-7	Ethylamine		140	141

CAS Number	Chemical Name	Synonym	Class	Sub-Class
75-05-8	Acetonitrile		430	431
75-07-0	Acetaldehyde		120	121
75-08-1	Ethyl Mercaptan	Ethanethiol	500	501
75-09-2	Dichloromethane	Methylene chloride	260	261
75-15-0	Carbon disulfide		500	502
75-18-3	Dimethyl sulfide		500	502
75-21-8	Ethylene oxide	Dimethylene oxide, Epoxyethane	270	275
75-28-5	Isobutane		290	291
75-31-0	Isopropylamine		140	141
75-35-4	Vinylidene chloride	Dichloroethylene, 1,1-	260	264
75-36-5	Acetyl chloride		110	111
75-44-5	Phosgene		350	350
75-46-7	Trifluoromethane		260	261
75-50-3	Trimethylamine		140	143
75-52-5	Nitromethane		440	441
75-55-8	Propylene imine		270	274
75-56-9	Propylene oxide, 1,2-		270	275
75-59-2	Tetramethylammonium hydroxide		550	550
75-64-9	Butylamine, tert-	tert-Butylamine	140	141
75-65-0	Butanol tert.	2-methyl 2-propanol	310	313
75-65-0	tert-Butyl alcohol	Butyl alcohol, tert-	310	313
75-73-0	Tetrafluoromethane		260	261
75-75-2	Methanesulfonic acid		500	504
75-78-5	Dimethyldichlorosilane		480	480
75-79-6	Methyl trichlorosilane		480	480
75-86-5	Acetone cyanohydrin		310 / 430	313 / 431
75-89-8	Trifluoroethanol, 2,2,2-		310	315
75-94-5	Trichlorovinylsilane		480	480
76-03-9	Trichloroacetic acid		100	103
76-05-1	Trifluoroacetic acid		100 / 260	103 / 261
76-06-2	Chloropicrin		260	261
76-13-1	Trichloro-1,2,2-trifluoroethane, 1,1,2-	1,1,2-Trichloro-1,2,2-trifluoroethane	260	261
76-16-4	Hexafluoroethane		260	261
77-47-4	Hexachlorocyclopentadiene		260	264
77-78-1	Dimethyl sulfate		500	507
77-81-6	Tabun		460	462
77-92-9	Citric acid		100	104
77-98-5	Tetraethyl Ammonium Hydroxide	Tetraethylammonium hydroxide; N,N,N,	550	550
78-00-2	Tetraethyl lead		470	470
78-10-4	Tetraethoxysilane		480	480
78-79-5	Isoprene		290	296
78-83-1	Isobutanol		310	311
78-87-5	Propylene dichloride		260	261
78-88-6	Dichloropropene, 2,3-	Dichloropropene,2,3-	260	261
78-93-3	Methyl ethyl ketone	MEK (Methyl ethyl ketone)	390	391
78-95-5	Chloroacetone		390	391
79-00-5	Trichloroethane, 1,1,2-		260	261

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CAS Number	Chemical Name	Synonym	Class	Sub-Class
79-01-6	Trichloroethylene		260	264
79-04-9	Chloroacetyl chloride		110	111
79-06-1	Acrylamide		130	135
79-09-4	Propionic acid		100	102
79-10-7	Acrylic acid		100	102
79-11-8	Chloroacetic acid		100	103
79-14-1	Glycolic acid		100	103
79-22-1	Methyl chloroformate		110	113
79-27-6	Tetrabromoethane		260	261
79-34-5	Tetrachloroethane, 1,1,2,2-		260	261
79-36-7	Dichloroacetyl chloride		110	111
79-41-4	Methacrylic acid		100	102
79-46-9	Nitropropane, 2-		440	441
79-95-8	Tetrachloro-bisphenol -A, 2,2',6,6'	Tetrachloro-bisphenol -A, 2,2',6,6'-	260 / 310	263 / 316
80-62-6	Methyl methacrylate		220	223
87-68-3	Hexachlorobutadiene		260	264
87-86-5	Pentachlorophenol		310	316
88-72-2	Nitrotoluene, o-		440	442
88-73-3	Nitrochlorobenzene, o-		260 / 440	263 / 442
88-75-5	Nitrophenol, o-		310 / 440	316 / 442
91-20-3	Naphthalene		290	293
91-20-3	Naphthalene		290	293
91-66-7	Diethylaniline		140	146
91-66-7	Diethylaniline crude		140	146
91-67-8	Diethyl-m-toluidine crude		140	145
92-67-1	Aminodiphenyl, 4-		140	145
92-87-5	Benzidine		140	145 / 149
95-47-6	Xylene, o-		290	292
95-48-7	Cresol, o-		310	316
95-49-8	Chlorotoluene, o-		260	263
95-50-1	Dichlorobenzene, 1,2-		260	263
95-53-4	Toluidine, o-		140	145
95-68-1	Xylidin, 2,4-		140	145
95-76-1	Dichloroaniline, 3,4-		140 / 260	145 / 263
96-12-8	Dibromo-3-chloropropane, 1,2-		260	261
96-24-2	Chloro-1,2-propanediol, 3-		310	314
96-29-7	Methyl ethyl ketoxime		150	150
96-33-3	Methyl acrylate		220	223
96-48-0	gamma Butyrolactone			225
96-64-0	Soman		460	462
97-63-2	Ethyl methyacrylate		220	223
97-93-8	Triethylaluminum		470	470
98-01-1	Furfural		120 / 270	122 / 277
98-07-7	Benzotrichloride		260	263
98-09-9	Benzene sulfonyl chloride		500	505
98-13-5	Trichlorophenylsilane		480	480
98-56-6	Chloro-benzotrifluoride, 4-		260	263

CAS Number	Chemical Name	Synonym	Class	Sub-Class
98-82-8	Cumene		290	292
98-85-1	Phenylethanol, 1-		310	318
98-88-4	Benzoyl chloride		110	112
98-95-3	Nitrobenzene		440	441
99-99-0	Nitrotoluene, p-		440	442
100-00-5	Nitrochlorobenzene, p-		260 / 440	263 / 442
100-02-7	Nitrophenol, p-		310 / 440	316 / 442
100-41-4	Ethyl benzene		290	292
100-42-5	Styrene		290	292
100-43-6	Vinylpyridine, 4-		270	271
100-44-7	Benzyl chloride		260	266
100-47-0	Benzonitrile		430	432
100-51-6	Benzyl alcohol		310	312
101-02-0	Triphenyl phosphite		460	462
101-14-4	Methylene bis (o-chloroaniline), 4,4'-		140	149
101-68-8	Methylene diphenyl isocyanate	Diphenylmethane Diisocyanate 4,4-	210	212
101-77-9	Methylene dianiline, 4,4'-		140	145 / 149
102-69-2	Tripropylamine		140	143
102-82-9	Tributylamine		140	143
103-67-3	Methylbenzylamine	Benzyl (Methyl) amine	140	142
104-49-4	Paraphenylene diisocyanate (PPDI) crude		210	212
106-46-7	Dichlorobenzene, 1,4	Dichlorobenzene, 1,4-	260	263
106-47-8	Chloroaniline, p-	Chloroaniline, 4-	140	145
106-48-9	Chlorophenol, 4-		260 / 310	263 / 316
106-88-7	Butylene oxide, 1,2-		270	275
106-89-8	Epichlorohydrin		260 / 270	261 / 275
106-93-4	Ethylene dibromide		260	261
106-94-5	Propylbromide, n-	1-Bromopropane, 1-Propyl bromide, Bromopropane, 1-, Propyl bromide, 1-, n-Propylbromide	260	261
106-99-0	Butadiene, 1,3-	1,3-Butadiene	290	296
107-02-8	Acrolein		120	121
107-05-1	Allyl chloride		260	265
107-06-2	Ethylene dichloride	1,2-Dichloroethane	260	261
107-07-3	Chloroethanol, 2-		260 / 310	261 / 315
107-10-8	Propylamine, n-		140	141
107-13-1	Acrylonitrile		430	431
107-15-3	Ethylenediamine		140	148
107-18-6	Allyl alcohol		310	311
107-19-7	Propargyl alcohol	2-Propyn-1-ol, Propyn-1-ol, 2-	310	311
107-21-1	Ethylene glycol		310	314
107-30-2	Chloromethyl methyl ether		240	241
107-31-3	Methyl formate		220	221
107-44-8	Sarin		460	462
107-92-6	Butyric acid		100	102
108-05-4	Vinyl acetate		220	222
108-10-1	Hexone	MIBK (Methyl isobutyl ketone), Methyl isobutyl ketone	390	391

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CHEMICAL INDEX - Chemical Abstract System (CAS) Number - Chemical Names and Synonyms

CAS Number	Chemical Name	Synonym	Class	Sub-Class
108-24-7	Acetic anhydride		160	161
108-31-6	Maleic anhydride		160	161
108-44-1	Toluidine, m-		140	145
108-77-0	Cyanuric chloride		260	263
108-88-3	Toluene		290	292
108-90-7	Chlorobenzene		260	263
108-91-8	Cyclohexylamine		140	141
108-94-1	Cyclohexanone		390	391
108-95-2	Phenol		310	316
108-98-5	Phenyl mercaptan		500	501
108-99-6	Picoline, 3-		270	271
109-02-4	N-Methylmorpholine (NMM)	NMM (N-Methylmorpholine)	140	142
109-06-8	Picoline, 2-		270	271
109-63-7	Boron trifluoride etherate		590	590
109-73-9	Butylamine, n-	1-Aminobutane, Aminobutane, 1-, Butan-1-amine	140	141
109-86-4	Methyl Cellosolve®		240 / 310	245 / 311
109-89-7	Diethylamine		140	142
109-92-2	Ethyl vinyl ether		240 / 260	246 / 261
109-99-9	Tetrahydrofuran		240	241
110-16-7	Maleic acid		100	104
110-18-9	Tetramethylethylenediamine (TMEDA)	TMEDA (Tetramethylethylenediamine)	140	148
110-49-6	Methyl Cellosolve® acetate		240	245
110-51-0	Borane-pyridine complex		590	590
110-54-3	Hexane, n-	n-Hexane	290	291
110-57-6	trans-1,4-Dichloro-2-butene		260	264
110-80-5	Ethyl Cellosolve®		240	245
110-82-7	Cyclohexane		290	291
110-86-1	Pyridine		270	271
110-91-8	Morpholine		140	142
111-15-9	Ethyl Cellosolve® acetate		240	245
111-30-8	Gluteraldehyde	1,5-Pentanedial, Glutaric acid dialdehyde, Glutaric aldehyde, Pentanedial, 1,5-	120	121
111-40-0	Diethylenetriamine		140	148
111-41-1	Aminoethylethanolamine	N-Aminoethyl ethanolamine	140 / 310	148 / 311
111-42-2	Diethanolamine		140	142
111-44-4	Dichloroethyl ether		240 / 260	241 / 261
111-65-9	Octane, n-		290	291
111-69-3	Adiponitrile		430	431
111-76-2	Butyl Cellosolve®		240	245
111-90-0	(2-Ethoxyethoxy)-ethanol, 2-		240	245
112-20-9	Nonylamine		140	141
112-24-3	Triethylenetetramine			
112-34-5	2-(2-Butoxyethoxy)-ethanol	Butyl Carbitol, DEG Monobutyl Ether, Diethylene Glycol Monobutyl Ether	240 / 310	245 / 311
112-57-2	Tetraethylenepentamine		140	148
115-10-6	Dimethyl ether		240	241
115-20-8	Trichloroethanol, 2,2,2-		310	315

CAS Number	Chemical Name	Synonym	Class	Sub-Class
117-81-7	Diethylhexyl phthalate		220	226
118-79-6	Tribromophenol,2,4,6-	Tribromophenol, 2,4,6-	310	316
119-36-8	Methyl salicylate		220	226
120-12-7	Anthracene		290	293
120-82-1	Trichlorobenzene, 1,2,4-		260	263
121-44-8	Triethylamine		140	143
121-45-9	Trimethyl phosphite		460	462
121-69-7	Dimethylaniline, N,N-		140	146
121-75-5	Malathion		460	462
122-60-1	Phenyl glycidyl ether		270	275
123-38-6	Propionaldehyde		120	121
123-39-7	Methylformamide, N-		130	132
123-51-3	Isoamyl alcohol		310	312
123-72-8	Butyraldehyde, n-	Butanal	120	121
123-73-9	trans-Crotonaldehyde		120	121
123-75-1	Pyrrolidine		270	274
123-86-4	Butyl acetate, n-		220	222
123-91-1	Dioxane, 1,4-		270	278
124-09-4	Hexamethylenediamine, 1,6-		140	148
124-40-3	Dimethylamine		140	142
124-41-4	Sodium methylate		550	550
124-63-0	Methane sulfonyl chloride		500	505
126-99-8	Chloro-1,3-butadiene, 2-		260	264
127-08-2	Potassium acetate		340	340
127-18-4	Tetrachloroethylene, 1,1,2,2-	1,1,2,2-Tetrachloroethylene	260	264
127-19-5	Dimethylacetamide, N,N-	DMAc, N,N-	130	132
140-29-4	Benzyl cyanide		430	432
140-31-8	Aminoethylpiperazine		140 / 270	148 / 274
140-88-5	Ethyl acrylate		220	223
141-32-2	Butyl acrylate, n-		220	223
141-43-5	Ethanolamine		140 / 310	141 / 311
141-78-6	Ethyl acetate		220	222
141-79-7	Mesityl oxide		390	391
142-82-5	Heptane		290	291
142-96-1	Butyl ether, n-		240	241
143-33-9	Sodium cyanide		340	345
144-62-7	Oxalic acid		100	104
151-50-8	Potassium cyanide		340	345
151-56-4	Ethyleneimine		270	274
154-93-8	Carmustine		990	990
156-60-5	trans-1,2-Dichloroethylene		260	264
298-00-0	Methyl parathion		460	462
302-01-2	Hydrazine		280	280
353-42-4	Boron trifluoride dimethyletherate		590	590
354-32-5	Trifluoroacetyl chloride		110	111
382-10-5	Hexafluoroisobutylene		260	261
460-00-4	Bromofluorobenzene, 4-		260	263

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CAS Number	Chemical Name	Synonym	Class	Sub-Class
461-82-5	Aniline, 4-trifluoromethoxy		140 / 240	145 / 242
462-06-6	Fluorobenzene		260	263
501-53-1	Benzyl chloroformate		110	113
504-29-0	Aminopyridine, 2-		270	271
505-60-2	Sulfur mustard		500	502
506-77-4	Cyanogen chloride	CK (Cyanogen chloride)	340	345
512-56-1	Trimethyl phosphate		460	462
526-73-8	Trimethylbenzene, 1,2,3-		290	292
529-34-0	Tetralone		290	292
532-27-4	Chloroacetophenone		260	261
534-07-6	Dichloroacetone		260 / 390	261 / 391
534-52-1	Dinitrocresol		310 / 440	316 / 442
538-93-2	Isobutylbenzene		290	292
541-25-3	Lewisite		470	470
541-73-1	Dichlorobenzene, 1,3-		260	263
542-75-6	Dichloropropene, 1,3-		260	261
584-08-7	Potassium carbonate		340	340
584-84-9	Toluene-2,4-diisocyanate		210	212
592-41-6	Hexene, 1-		290	294
593-53-3	Methyl fluoride		260	261
593-60-2	Vinyl bromide		260	264
593-74-8	Dimethyl mercury in decane		470	470
624-48-6	Dimethylmaleate		220	224
624-83-9	Methyl isocyanate		210	211
624-92-0	Dimethyl disulfide		500	502
628-63-7	Amyl acetate, n-		220	222
630-08-0	Carbon monoxide		350	350
755-95-3	Diiodo-1,1,2,2-tetrafluorobutane, 1,4-		260	261
764-41-0	Dichloro-2-butene, 1,4-		260	264
811-97-2	Tetrafluoroethane, 1,1,1,2-		260	261
814-68-6	Acryloyl Chloride	Acrylic Acid Chloride	110	111
818-61-1	Ethylene glycol acrylate		220	223
822-06-0	Hexamethylene diisocyanate		210	211
872-50-4	Methyl-2-pyrrolidone, N-		130	132
920-37-6	Chloroacrylonitrile, 2-		260 / 430	264 / 431
921-03-9	Trichloroacetone, 1,1,3-		260 / 390	261 / 391
998-30-1	Triethoxysilane		480	480
999-97-3	Hexamethyldisilazane	Hexamethyldisilizane	140 / 480	142 / 480
1310-58-3	Potassium hydroxide	Caustic potash, KOH (Potassium hydroxide), Potash lye	380	380
1310-65-2	Lithium hydroxide		380	380
1310-73-2	Sodium hydroxide	Caustic soda, Lye, NaOH (Sodium hydroxide)	380	380 / 591 / 592
1313-82-2	Sodium sulfide	Disodium sulfide	340	340
1319-77-3	Cresol, mixed isomers		310	316
1330-20-7	Xylene, mixed isomers		290	292
1332-21-4	Asbestos (all forms)		sol	sol1
1333-82-0	Chromic acid		370	370

CAS Number	Chemical Name	Synonym	Class	Sub-Class
1336-21-6	Ammonium hydroxide		380	380
1341-49-7	Ammonium Bifluoride	Ammonium Hydrofluoride, Ammonium Hydrogen Difluoride	340	340
1493-13-6	Trifluoromethane sulfonic acid		500	504
1552-12-1	Cyclooctadiene		290	296
1634-04-4	Methyl tert-butyl ether		240	241
1675-54-3	Bisphenol-A diglycidyl ether		270	275
1761-71-3	Methylene bis-cyclohexane diamine, 4,4'-		140	148
2062-98-8	Perfluoro-2-propoxy propionyl fluoride	2-(Hepta Fluoro Propoxy) Tetra Fluoro Propionyl Fluoride, HFPO Dimer	110 / 240 / 260	110 / 240 / 260
2068-78-2	Vincristine sulfate		990	990
2551-62-4	Sulfur hexafluoride		350 / 500	350 / 509
3173-53-3	Cyclohexyl isocyanate		210	211
3536-96-7	Vinylmagnesium chloride		470	470
3778-73-2	Ifosfamide		990	990
3887-02-3	N-Methylmethacrylamide	Methylmethacrylamide, N-	130	135
4098-71-9	Isophorone diisocyanate		210	211
4109-96-0	Dichlorosilane		480	480
4553-62-2	Methyl-1,5-pentantedinitrile, 2-	Methylglutaronitrile, 2-	430	431
4635-87-4	Pentenenitrile, 3-		430	431
5076-20-0	Tetramethylethylene oxide		270	275
5216-25-1	Chlorobenzotrichloride, 4-		260	263
5329-14-6	Sulfamic acid		370 / 500	370 / 509
5394-63-8	Diketene Acetone		220 / 240 / 270 / 390	223 / 244 / 278 / 390
5989-27-5	d-Limonene		290	296
6143-29-9	Norbornene-2-yl acetate, 5-		220	222
6303-21-5	Hypophosphorus acid		370	370
6834-92-0	Sodium silicate		340	340
7087-68-5	Diisopropylethylamine (DIPEA)	DIPEA (Diisopropylethylamine)	140	141
7439-92-1	Lead		sol	sol1
7439-97-6	Mercury		330	330
7440-41-7	Beryllium		sol	sol1
7446-09-5	Sulfur dioxide		350 / 360	350 / 365
7446-11-9	Sulfur trioxide		360	365
7447-41-8	Lithium chloride		340	340
7487-94-7	Mercuric chloride		340	340
7550-45-0	Titanium tetrachloride		360	360
7553-56-2	Iodine		330	330
7601-90-3	Perchloric acid		370	370
7632-51-1	Vanadium tetrachloride		360	360
7637-07-2	Boron trifluoride		350 / 360	350 / 360
7647-01-0	Hydrochloric acid	Muriatic acid	370	370
7647-01-0	Hydrogen chloride		350	350
7647-14-5	Sodium chloride		990	990
7647-18-9	Antimony pentachloride		360	360
7664-38-2	Phosphoric acid		370	370
7664-39-3	Hydrofluoric acid		370	370

APPENDIX
CHEMICAL INDEX - Chemical Abstract System (CAS) Number - Chemical Names and Synonyms

CAS Number	Chemical Name	Synonym	Class	Sub-Class
7664-39-3	Hydrogen fluoride		350 / 370	350 / 370
7664-41-7	Ammonia	Anhydrous ammonia	350 / 380	350 / 380
7664-93-9	Sulfuric acid		370	370
7681-49-4	Sodium fluoride		340	340
7681-52-9	Sodium hypochlorite		340	340
7681-57-4	Sodium metabisulfite	Sodium disulfite, Sodium pyrosulfite	340	340
7697-37-2	Nitric acid		370	370
7705-08-0	Ferric chloride	Iron trichloride, Iron(III) chloride	340	340
7719-09-7	Thionyl chloride		360	360
7719-12-2	Phosphorus trichloride		360	360
7722-64-7	Potassium permanganate		340	340
7722-84-1	Hydrogen peroxide		300	300
7726-95-6	Bromine		330	330
7758-94-3	Ferrous chloride	Iron (II) chloride, Iron dichloride	340	340
7782-41-4	Fluorine		350	350
7782-50-5	Chlorine		330 / 350	330 / 350
7783-06-4	Hydrogen sulfide		350 / 500	350 / 502
7783-07-5	Hydrogen selenide		350	350
7783-54-2	Nitrogen trifluoride		350	350
7783-82-6	Tungsten hexafluoride		350	350
7784-34-1	Arsenic trichloride		340	340
7784-42-1	Arsine		350	350
7789-00-6	Potassium chromate		340	340
7789-21-1	Fluorosulfonic acid		370	370
7790-91-2	Chlorine trifluoride		350	350
7790-94-5	Chlorosulfonic acid		370 / 500	370 / 504
7791-25-5	Sulfonyl chloride		350 / 360	350 / 360
7803-51-2	Phosphine		350	350
7803-62-5	Silane		480	480
8001-58-9	Creosote		310	316
8002-05-9	Crude oil		290	294
8004-13-5	Dowtherm heat transfer fluid		590	590
8006-64-2	Turpentine		290	294
8008-20-6	Kerosene	Jet A fuel	290	291
8012-95-1	Mineral oil		290	291
8014-95-7	Oleum		370	370
8030-30-6	VM&P Naphtha		290	291
8052-41-3	Stoddard solvent		290	291
9016-87-9	Polymethylene polyphenyl-polyisocyanate		210	212
10024-97-2	Nitrous oxide		350	350
10025-67-9	Sulfur monochloride	Disulfur dichloride, Sulfur chloride	500	502
10025-78-2	Trichlorosilane		480	480
10025-87-3	Phosphorus oxychloride		360	360
10026-04-7	Silicon tetrachloride		360 / 480	360 / 480
10034-85-2	Hydriodic acid		370	370
10035-10-6	Hydrobromic acid		370	370
10035-10-6	Hydrogen bromide		350 / 370	350 / 370
10043-52-4	Calcium chloride		340	340
10049-04-4	Chlorine dioxide		350	350
10102-43-9	Nitric oxide		350	350
10102-44-0	Nitrogen dioxide		350	350
10217-52-4	Hydrazine hydrate		280	280
10294-34-5	Boron trichloride		350 / 360	350 / 360
10544-72-6	Nitrogen tetroxide		350	350
10545-99-0	Chlorine sulfide	Sulfur dichloride	500	502
10588-01-9	Sodium dichromate		340	340
11097-69-1	PCB 1254	Polychlorinated biphenyl 1254	260	263
12125-01-8	Ammonium fluoride		340	340
12125-02-9	Ammonium chloride		340	340
13284-42-9	Pentenenitrile, 2-		430	431
13463-39-3	Nickel carbonyl		470	470
15520-10-2	Dytek® A		140	148
15663-27-1	Cisplatin		990	990
16721-80-5	Sodium hydrosulfide		340	340
16752-77-5	Methomyl		230	233
16872-11-0	Fluoroboric acid		370	370
16961-83-4	Fluorosilicic acid		370	370
17927-65-0	Aluminum sulfate hydrate		340	340
19287-45-7	Diborane		350	350
24991-55-7	Polyethylene glycol dimethyl ether	Selexol™	240	245
25136-40-9	Doxorubicin HCl	Doxorubicin	990	990
25340-17-4	Diethylbenzene		290	290
25899-50-7	cis-2-Pentenenitrile		430	431
26471-62-5	Toluene-1,3-diisocyanate		210	212
30894-74-7	Dichloro-6-isopropyl-S-triazine, 2,4-		270	274
33069-62-4	Paclitaxel	Taxol	990	990
33419-42-0	Etoposide	Toposar®	990	990
50782-69-9	VX Nerve agent		460	462
50815-00-4	JP-4 jet fuel		290	291
52583-42-3	Nitric acid, red fuming		370	370
63121-00-6	Oxaliplatin		990	990
64475-85-0	Mineral spirits		290	291
68131-30-6	Green liquor		590	590
68131-33-9	White liquor		590	590
68334-30-5	Diesel fuel		290	291
68476-30-2	Fuel oil		290	291
71486-22-1	Vinorelbine		990	990
82410-32-0	Ganciclovir		990	990
86290-81-5	Gasoline		290	291
94114-58-6	JP-8 jet fuel		290	291
95058-81-4	Gemcitabine		990	990
95660-51-8	Skydrol®		460	462
100286-90-6	Irinotecan		990	990
106602-80-6	Otto fuel II		590	590

APPENDIX
CHEMICAL INDEX - Chemical Abstract System (CAS) Number - Chemical Names and Synonyms

CAS Number	Chemical Name	Synonym	Class	Sub-Class
191681-14-8	AFFF		590	590
308066-70-8	Gasoline, E-10		290	291
308074-23-9	Black liquor		590	590
441575-94-4	Carboplatin		990	990
mixture	Astromat Orange			590
mixture	Chemidize 727 ND		590	590
mixture	Crude oil on wildlife		liq	liq4
mixture	Decontaminating agent (DS-2)		590	590
mixture	Diesel automotive test fuel		290	291
mixture	DuPont Activator 193S		590	590
mixture	DuPont Activator 4505S		590	590
mixture	DuPont Activator 4507S		590	590
mixture	Ethylene oxide mixture		270	275
mixture	Formalin	Formalin	120	121
mixture	Hexamethylene diisocyanate in DuPont Activator 193S		210	211
mixture	Hexamethylene diisocyanate in DuPont Activator 4505S		210	211
mixture	Hexamethylene diisocyanate in DuPont Activator 4507S		210	211
mixture	Lime		sol	sol1
mixture	Organo-Tin Paint		470	470
mixture	PCB	Polychlorinated biphenyl	260	263
mixture	PCB 1254	Polychlorinated biphenyl 1254	260	263
mixture	PCB gas condensate		260	263
mixture	PCB in transformer oil		260	263
mixture	Tetramethyltin		590	590
mixture	m-Cresol 55%, p-Cresol 30%, Phenol 15%		310	316
mixture	t-Sodium-amylate / t-amyl alcohol		590	590