DuPont Personal Protection

Permeation Guide for DuPont™ Tychem® ThermoPro protective fabrics

The miracles of science™

Permeation Guide for DuPont™ Tychem® ThermoPro Protective Fabrics

Protection against a broad range of chemicals
DuPont™ Tychem® ThermoPro fabrics included in this Permeation Guide

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CAUTION: Tychem® ThermoPro garments are intended for flash fire escape and liquid splash protection only. Tychem® ThermoPro is the only Tychem® garment intended for flash fire escape. Tychem® ThermoPro does not provide protection for fire fighting activity, hot liquids, molten metals or long duration thermal protection.

This information is based upon technical data that DuPont believes to be reliable. It is subject to revision as additional knowledge and experience are gained. DuPont makes no guarantee of results and assumes no obligation or liability in connection with this information.

It is the user's responsibility to determine the level of toxicity and the proper personal protective equipment needed. 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.

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. Please contact the garment manufacturer for specific data. If fabric becomes torn, abraded or punctured, end user should discontinue use of garment to avoid potential exposure to chemical. **Since conditions of use are outside our control, we make 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.**

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Effective January 2005. This guide replaces all previously published until superseded.

For more information please refer to our website **www.PersonalProtection.DuPont.com** or call **1-800-931-3456.**

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How to Use this Permeation Guide

To Find Permeation Test Results

1. Locate the desired chemical in the **Data Table or Index**

   The **Chemical Index** is sorted by:

   - Index by **Chemical Abstract System (CAS) Number**

   For each chemical, the following information is listed.
   - Chemical name
   - Chemical subclass number(s)
   - CAS number
   - Chemical name used in data table if name listed is a synonym

2. Locate the name of chemical as listed in the data table

3. Locate the chemical in the data table.

Independent Testing

All permeation tests are conducted for DuPont by independent testing laboratories. Except for the chemical warfare agents, all results are based on ASTM F739, "Test Method for Resistance of Protective Clothing Materials to Permeation by Liquids or Gases under Continuous Contact." Chemical warfare agents are tested using MIL-STD282.

All tests were conducted at room temperature unless otherwise noted. Copies of individual reports are available by calling 1-800-931-3456.

What is Permeation?

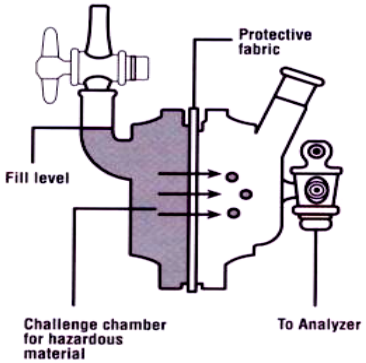
Permeation is a difficult concept to grasp because it can't be seen and does not require a hole in the barrier. It occurs when a chemical is absorbed until it saturates the barrier and then desorbs, or diffuses, from the opposite surface.

You may have experienced permeation firsthand if you stepped in gasoline at a filling station. If you noticed the odor of gasoline in your car as you drove away you experienced two of the three steps involved in permeation – absorption and desorption. The soles of your shoes absorbed some gasoline, then you smelled it as it desorbed from the bottom surface of your shoe. If you had stood in the gasoline long enough, the sole of your shoe would have become saturated with gasoline and the vapors would have started to desorb inside your shoe.

When it comes to hazardous liquids, vapors or gases, permeation testing is required.

How Permeation Tests Are Conducted

Permeation tests are conducted following the 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 protective clothing fabric and is detected on the inside surface of the fabric, it is said to have permeated the fabric.



ASTM F739 Test Cell

Definitions of Terms for ASTM F739

Permeation rate: The rate at which the challenge chemical permeates the fabric. In these tables, the permeation rate reflects the steady state rate when chemical contact is continuous and all forces affecting permeation have reached equilibrium.

Minimum Detectable Permeation Rate (MDPR): The minimum permeation rate that can be detected during a permeation test. MDPR is a function of the sensitivity of the analytical measurement technique, the volume into which the permeant is collected, and sampling time. Minimum detectable permeation rates as low as 0.001 µg/cm^2/minute are possible for many chemicals.

Actual breakthrough time: The time between initial contact of the chemical with the outside surface of the fabric and the detection of permeation.

An actual breakthrough time of >480 does not mean there was no breakthrough. It means that permeation was not detected. Permeation may have occurred, but at a rate less than the minimum detectable permeation rate (MDPR).

Normalized breakthrough time: The time at which permeation rate reaches 0.1 µg/cm^2/min. Normalized breakthrough times are used in this table. They are used for fabric comparison because they eliminate test sensitivity issues.

A normalized breakthrough time of >480 minutes does not mean there was not permeation; it means that the rate of permeation did not exceed 0.1 µg/cm^2/min during the 8-hour test. When the normalized breakthrough time is ten minutes or less, DuPont chooses to report the breakthrough time as immediate.

Results of permeation tests are variable. The results reported here are averages of three or more separate tests. Users should not be misled in assuming these breakthrough times and permeation rates are exact. This variability should be taken into account in material selection. (See ASTM F739.)

PLEASE NOTE: in Europe, normalized breakthrough times are based on a permeation rate of 1.0 µg/cm^2/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 being reported: solid-S, liquid-L, gas-G, mixture-M.

CAS: Chemical Abstract System

N/A: Not applicable

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Chemical Warfare Agents

Permeation test results are shown as follows:
Average Breakthrough Time
Minimum Detectable Permeation Rate (µg/cm2/min)

Symbols Used:
> = greater than

Agent	Common Name	CAS Number	Protocol	Tychem® ThermoPro
GA	Tabun	77-81-6	DN6	>720 2×10^{-6}
GB	Sarin	107-44-8	DN6	>720 2×10^{-6}
GD	Soman	99-64-0	DN6	>720 2×10^{-6}
HD	Sulfur Mustard	505-60-2	DN4	>720 <0.002
L	Lewisite	541-25-3	DN4	360 0.006
VX	VX Nerve Agent	50782-69-9	DN6	>720 2×10^{-6}

Data is based on Tychem® F and Tychem® 7500 permeation results.
Fabric Test Protocols. All tests performed in triplicate for DuPont Personal Protection by an independent accredited laboratory at 22ºC, 50% R.H.

Protocol DN4 - MIL-STD-282, Method T-209 (HD) or modified for Lewisite, for 12 hours at 100 g/m2 (total coverage).
Protocol DN6 - MIL-STD-282, Method T-208 (GB) or modified for GA, GD, and VX, for 12 hours at 100 g/m2 (total coverage).

Permeation Guide for DuPont™ Tychem® ThermoPro Protective Fabrics

Effective January 2005 **Permeation data based on Tychem® F data unless otherwise indicated by an ***

Permeation Test Results are as Follows:

Average Standardized BreakthroughTime (minutes)

Average Steady-State Permeation Rate (µg/cm^2/min.)

Symbols and Abbreviations used in table:

> = more than < = less than
imm = immediate (less than 10 min)

nm = not measured nd = not detected
S = Solid L = Liquid G = Gas

Chemical Name	CAS	Phase	Tychem® ThermoPro
Acetaldehyde	75-07-0	L	>480*
			<0.1
Acetic acid	64-19-7	L	>480
			0.08
Acetone	67-64-1	L	>480*
			<0.01
Acetone cyanohydrin	75-86-5	L	>480
			0.05
Acetonitrile	75-05-8	L	>480*
			<0.01
Acetyl chloride	75-36-5	L	>480
			<0.0014
Acrolein	107-02-8	L	63
			0.41
Acrylamide, 50% in water	79-06-1	L	>480
			<0.01
Acrylic acid	79-10-7	L	>480
			<0.001
Acrylonitrile	107-13-1	L	12
			0.57
Adiponitrile	111-69-3	L	>480
			<0.05
Allyl alcohol	107-18-6	L	>480
			0.04
Allyl chloride	107-05-1	L	>480
			<0.1
Ammonia gas	7664-41-7	G	>480*
			<0.01
Ammonium hydroxide, 28%-30%	1336-21-6	L	>480
			<0.1
n-Amyl acetate	628-63-7	L	>480
			0.07
Aniline	62-53-3	L	>480*
			<0.02
Anthracene, sat. sol. in toluene	120-12-7	L	>480
			<0.01
Antimony pentachloride	7647-18-9	L	15
			10
Arsenic Trichloride	7784-42-1	L	38
			334.1

Permeation Guide for DuPont™ Tychem® ThermoPro Protective Fabrics

Effective January 2005 **Permeation data based on Tychem® F data unless otherwise indicated by an ***

Chemical Name	CAS	Phase	Tychem® ThermoPro
Benzene	71-43-2	L	>480
			<0.05
Benzene sulfonyl chloride	98-09-9	L	>480
			<0.02
Benzonitrile	100-47-0	L	>480
			<0.001
Benzoyl chloride	98-88-4	L	>480
			<0.05
Benzyl chloride	100-44-7	L	>480
			<0.05
Bisphenol-A diglycidyl ether	1675-54-3	L	>480
			<0.01
Boron trifluoride Dimethyl Etherate	353-42-4	L	>480
			<0.01
Bromine	7726-95-6	L	imm.
			105
4-Bromofluorobenzene	460-00-4	L	>480
			<0.02
1,3-Butadiene	106-99-0	G	>480*
			<0.01
n-Butanol	71-36-3	L	>480
			<0.05
n-Butyl ether	142-96-1	L	196
			0.2
Carbon disulfide	75-15-0	L	>480*
			<0.15
Carbon tetrachloride	56-23-5	L	11
			0.57
Chlorine gas	7782-50-5	G	>480*
			<0.025
Chloroacetic acid	79-11-8	L	>480
			<0.1
4-Chloroaniline (70ºC)	106-47-8	L	344
			9.4
Chlorobenzene	108-90-7	L	>480
			<0.1
2-Chloroethanol	107-07-3	L	>480
			<0.001
Chloroform	67-66-3	L	imm.
			10

Chemical Name	CAS	Phase	Tychem® ThermoPro
Chloromethyl methyl ether	107-30-2	L	46
			0.7
Chlorosulfonic acid	7790-94-5	L	>480
			0.0003
o-Chlorotoluene	95-49-8	L	>480
			0.02
Creosote	8001-58-9	L	>480
			<0.001
o-Cresol	95-48-7	L	180
			2.7
Cumene	98-82-8	L	>480
			0.05
Cyclohexane	110-82-7	L	>480
			0.04
Di (2-ethylhexyl) phthalate	117-81-7	L	>480
			<0.1
1,3-Dichloroacetone (40ºC)	534-07-6	L	>480
			0.02
1,2-Dichloroethane	107-06-2	L	118
			7.2
Dichloroethyl ether	111-44-4	L	>480
			<0.02
Dichloromethane	75-09-2	L	imm.*
			12.7
1,3-Dichloropropene	542-75-6	L	25
			1.6
2,3-Dichloropropene	78-88-6	L	25
			2.4
Diesel fuel	68334-30-5	L	>480
			<0.001
Diethyl sulfate	64-67-5	L	>480
			<0.02
Diethylamine	109-89-7	L	>480*
			<0.01
Diethylenetriamine	111-40-0	L	>480
			<0.05
Dimethyl nitrosamine	62-75-9	L	>480
			<0.001
Dimethyl sulfide	75-18-3	L	271
			1.21
Dimethyl sulfoxide	67-68-5	L	36
			1.9
N,N-Dimethylacetamide	127-19-5	L	>480
			<0.05

Chemical Name	CAS	Phase	Tychem® ThermoPro
Dimethylamine	124-40-3	G	>480
			<0.05
N,N-Dimethylaniline	121-69-7	L	>480
			<0.1
Dimethyldichlorosilane	75-78-5	L	>480
			<0.0001
N,N-Dimethylformamide	68-12-2	L	>480*
			<0.01
1,4-Dioxane	123-91-1	L	>480
			0.001
d-Limonene	5989-27-5	L	>480
			<0.02
Epichlorohydrin	106-89-8	L	372
			0.51
Ethanolamine	141-43-5	L	>480
			<0.001
Ethyl acetate	141-78-6	L	>480*
			<0.01
Ethyl Cellosolve® acetate	111-15-9	L	>480
			0.03
Ethyl ether	60-29-7	L	>480
			<0.01
Ethylene dibromide	106-93-4	L	288
			0.52
Ethylene glycol	107-21-1	L	>480
			<0.001
Ethylene oxide gas	75-21-8	G	>480*
			<0.01
Ethylenediamine	107-15-3	L	>480
			<0.001
Fluorobenzene	462-06-6	L	>480
			<0.1
Fluorosilicic acid	16961-83-4	L	>480
			0.0001
Formalin (Formaldehyde 37%)	50-00-0	L	>480
			<0.001
Formic acid	64-18-6	L	>390
			<0.01
2-Furaldehyde	98-01-1	L	>480
			0.01
Gasoline, leaded	86290-81-5	L	30
			0.32
Gasoline, Unleaded	86290-81-5	L	>480
			<0.001

Chemical Name	CAS	Phase	Tychem® ThermoPro
Hexamethylene diisocyanate	822-06-0	L	>480
			<0.07
1,6-Hexamethylenediamine (45ºC)	124-09-4	L	>480
			<0.0001
n-Hexane	110-54-3	L	>480*
			<0.025
Hydrazine	302-01-2	L	283
			1.6
Hydriodic acid, 57%	10034-85-2	L	>480
			<0.01
Hydrochloric acid, 37%	7647-01-0	L	>480
			<0.1
Hydrofluoric acid, 48%-51%	7664-39-3	L	>480
			<0.1
Hydrofluoric acid, 70%	7664-39-3	L	39
			1.2
Hydrogen bromide	10035-10-6	G	>480
			0.0001
Hydrogen chloride gas	7647-01-0	G	>480*
			<0.01
Hydrogen fluoride gas	7664-39-3	G	imm.
			high
Hydrogen fluoride liquid (18°C)	7664-39-3	L	43
			2.2
Hypophosphorus acid, 50%	6303-21-5	L	>480
			<0.01
Isopropanol	67-63-0	L	>480
			<0.001
Isopropylamine	75-31-0	L	>480
			<0.05
Kerosene	8008-20-6	L	>480
			<0.1
Lewisite (L) Chemical Agent	541-25-3	L	See Chemical Warfare Agents
			Data Sheet for test results pg. 4
Mercuric chloride, sat. sol. in water	7487-94-7	L	>480
			<0.1
Mercury	7439-97-6	L	>480
			<0.04
Methacrylic acid	79-41-4	L	>480
			<0.0001
Methanol	67-56-1	L	>480*
			<0.01
Methyl acrylate	96-33-3	L	>480
			<0.02

Chemical Name	CAS	Phase	Tychem® ThermoPro
Methyl Cellosolve®	109-86-4	L	>480
			0.002
Methyl Cellosolve® acetate	110-49-6	L	>480
			<0.05
Methyl chloride	74-87-3	G	>480*
			<0.01
Methyl ethyl ketone	78-93-3	L	71
			0.37
Methyl ethyl ketoxime	96-29-7	L	>480
			<0.02
Methyl isobutyl ketone	108-10-1	L	>480
			<0.01
Methyl isocyanate	624-83-9	L	imm.
			0.42
Methyl mercaptan	74-93-1	G	>480
			0.05
Methyl methacrylate	80-62-6	L	70
			1.55
n-Methyl-2-pyrrolidone	872-50-4	L	>480
			<0.001
Methyl tert-butyl ether	1634-04-4	L	>480
			<0.01
Methyl trichlorosilane	75-79-6	L	>480
			<0.0001
Methylamine	74-89-5	G	>480
			<0.05
Methylene Bromide	74-95-3	L	imm.
			11
N-Methylformamide	123-39-7	L	>480
			<0.05
2-Methylglutaronitrile, 87%	4553-62-2	L	>480
			<0.1
Methylhydrazine	60-34-4	L	283
			0.98
Naphthalene	91-20-3	S	>480
			<0.001
Nicotine	54-11-5	L	>480
			<0.1
Nitric acid, 70%	7697-37-2	L	>480
			<0.001
Nitric acid, red fuming	52583-42-3	L	14
			>50
Nitrobenzene	98-95-3	L	>480*
			<0.01

Chemical Name	CAS	Phase	Tychem® ThermoPro
Nitrogen dioxide	10102-44-0	G	14
			>0.2
Nitromethane	75-52-5	L	229
			0.97
2-Nitropropane	79-46-9	L	>480
			<0.05
Oleum, 40% free SO_3	8014-95-7	L	>480
			<0.32
PCB gas condensate	mixture	L	>480
			<0.001
PCB in transformer oil	mixture	L	>480
			<0.001
2-Pentenenitrile	13284-42-9	L	>480
			<0.02
Phenol, 85%-90%	108-95-2	L	238
			4
Phosgene	75-44-5	G	>480
			<0.02
Phosphine	7803-51-2	G	imm.
			>0.11
Phosphoric acid, 85%	7664-38-2	L	>480
			<0.1
Phosphorus oxychloride	10025-87-3	L	>480
			<0.01
Phosphorus trichloride	7719-12-2	L	>480
			0.003
2-Picoline	109-06-8	L	>480
			<0.05
Polymethylene polyphenylpolyisocyanate	9016-87-9	L	>480*
			<0.65
Potassium chromate, sat. sol.in water	7789-00-6	L	>480
			<0.1
1,2-Propylene oxide	75-56-9	L	14
			1.02
Pyridine	110-86-1	L	>480
			<0.05
Pyrrolidine	123-75-1	L	100
			4.7
Sarin (GB) Chemical Agent	107-44-8	L	See Chemical Warfare Agents
			Data Sheet for test results pg. 4
Silicon tetrachloride	10026-04-7	L	>480
			0.0001
Sodium cyanide, 45%	143-33-9	L	>480
			<0.1

Chemical Name	CAS	Phase	Tychem® ThermoPro
Sodium hydroxide, conc.	1310-73-2	S	>480*
			<0.01
Sodium hydroxide, 42-50%	1310-73-2	L	>480
			<0.1
Sodium hypochlorite, 30% chlorine	7681-52-9	L	>480
			<0.1
Soman (GD) Chemical Agent	96-64-0	L	See Chemical Warfare Agents
			Data Sheet for test results pg. 4
Styrene	100-42-5	L	>480
			<0.04
Sulfur dioxide	7446-09-5	G	38*
			2
Sulfur mustard (HD)Chemical Agent	505-60-2	L	See Chemical Warfare Agents
			Data Sheet for test results pg. 4
Sulfuric acid 95-98%	7664-93-9	L	>480*
			<0.01
Sulfuryl chloride	7791-25-5	L	>480
			<0.01
Tabun (GA) Chemical Agent	77-81-6	L	See Chemical Warfare Agents
			Data Sheet for test results pg. 4
2,2',6,6' Tetrachlorobisphenol A	79-95-8	S	>480
			<0.1
1,1,2,2-Tetrachloroethylene	127-18-4	L	>480*
			<0.01
Tetrahydrofuran	109-99-9	L	>480*
			<0.06
Thioglycolic acid	68-11-1	L	>480
			<0.0001
Thionyl chloride	7719-09-7	L	imm.
			101
Titanium tetrachloride	7550-45-0	L	>480
			0.0001
Toluene	108-88-3	L	>480*
			<0.02
Toluene-2,4-diisocyanate	584-84-9	L	>480
			0.037
o-Toluidine	95-53-4	L	>480
			<0.001
Trichloroacetic acid	76-03-9	L	>480
			<0.1
1,1,3-Trichloroacetone	921-03-9	L	>480
			<0.05

Chemical Name	CAS	Phase	Tychem® ThermoPro
1,2,4-Trichlorobenzene	120-82-1	L	>480
			<0.001
1,1,1-Trichloroethane	71-55-6	L	232
			9.1
2,2,2-Trichloroethanol	115-20-8	L	>480
			<0.02
Trichloroethylene	79-01-6	L	>480
			<0.01
Trichloronitromethane	76-06-2	L	>480
			<0.1
Trichlorophenylsilane	98-13-5	L	>480
			<0.001
Trifluoroacetic acid	76-05-1	L	>480
			<0.01
Trifluoromethane Sulfonic Acid	1494-13-6	L	>480
			<0.1
Vinyl acetate	108-05-4	L	>480
			<0.05
Vinyl chloride	75-01-4	G	>480
			<0.02
Vinylidene chloride	75-35-4	L	>480
			<0.02
VX Nerve (VX) Agent	50782-69-9	L	See Chemical Warfare Agents
			Data Sheet for test results pg. 4
Xylene, mixed isomers	1330-20-7	L	291
			0.12

Chemical Name	Name in Data Table (if Synonym)	CAS Number	Class	Sub-Class
Formalin		50-00-0	120	121
Nicotine		54-11-5	270	271
Carbon tetrachloride		56-23-5	260	261
Ethyl ether	Diethyl ether	60-29-7	240	241
Aniline		62-53-3	140	145
Dimethyl nitrosamine		62-75-9	450	450
Formic acid		64-18-6	100	102
Acetic acid		64-19-7	100	102
Diethyl sulfate		64-67-5	500	507
Methanol	Methyl alcohol	67-56-1	310	311
Isopropyl alcohol	Isopropanol	67-63-0	310	312
Acetone		67-64-1	390	391
Chloroform		67-66-3	260	261
Dimethyl sulfoxide		67-68-5	500	503
Thioglycolic acid		68-11-1	100 / 500	103 / 501
N,N-Dimethylformamide		68-12-2	130	132
n-Butanol	1-Butanol n-Butyl alcohol	71-36-3	310	311
Benzene	Coal naphtha	71-43-2	290	292
1,1,1-Trichloroethane		71-55-6	260	261
Methyl chloride		74-87-3	260	261
Methylamine		74-89-5	140	141
Methyl mercaptan		74-93-1	500	501
Methylene bromide		74-95-3	260	261
Vinyl chloride		75-01-4	260	264
Acetonitrile		75-05-8	430	431
Acetaldehyde	Ethanal	75-07-0	120	121
Dichloromethane		75-09-2	260	261
Carbon disulfide		75-15-0	500	502
Dimethyl sulfide		75-18-3	500	502
Ethylene oxide	Dimethylene oxide	75-21-8	270	275
Ethylene oxide gas		75-21-8	270	275
Isopropylamine		75-31-0	140	141
Vinylidene chloride	1,1-Dichloroethylene	75-35-4	260	264

Chemical Name	Name in Data Table (if Synonym)	CAS Number	Class	Sub-Class
Trifluoroacetic acid		76-05-1	100	103
Tabun	GA	77-81-6	460/595	462 / 595
2,3-Dichloropropene		78-88-6	260	261
Methyl ethyl ketone	2-Butanone	78-93-3	390	391
Trichloroethylene		79-01-6	260	264
Acrylamide		79-06-1	130	135
Acrylic acid	2-Propenoic acid	79-10-7	100	102
Chloroacetic acid		79-11-8	100	103
2-Nitropropane		79-46-9	440	441
2,2',6,6'-Tetrachlorobisphenol A		79-95-8	260 / 310	263 / 316
Methyl methacrylate		80-62-6	220	223
o-Cresol		95-48-7	310	316
o-Chlorotoluene		95-49-8	260	263
o-Toluidine		95-53-4	140	145
Methyl ethyl ketoxime		96-29-7	590	590
Methyl acrylate	Acrylic acid methyl ester	96-33-3	220	223
Soman	GD	96-64-0	460 / 595	462 / 595
2-Furaldehyde		98-01-1	120 / 270	122 / 277
Benzene sulfonyl chloride		98-09-9	500	505
Trichlorophenylsilane		98-13-5	480	480
Cumene	Isopropyl benzene	98-82-8	290	292
Benzoyl chloride		98-88-4	110	112
Nitrobenzene		98-95-3	440	441
Styrene		100-42-5	290	292
Benzyl chloride		100-44-7	260	266
Benzonitrile		100-47-0	430	432
4-Chloroaniline	p-Chloroaniline	106-47-8	140	145
Epichlorohydrin		106-89-8	260 / 270	261 / 275
Ethylene dibromide	1,2-Dibromoethane	106-93-4	260	261
1,3-Butadiene		106-99-0	290	296
Acrolein		107-02-8	120	121
Allyl chloride	3-Chloropropene	107-05-1	260	265
1,2-Dichloroethane		107-06-2	260	261

Chemical Name	Name in Data Table (if Synonym)	CAS Number	Class	Sub-Class
Acetyl chloride		75-36-5	110	111
Phosgene	Carbonyl chloride	75-44-5	350	350
Nitromethane		75-52-5	440	441
1,2-Propylene oxide		75-56-9	270	275
Dimethyldichlorosilane		75-78-5	480	480
Methyl trichlorosilane		75-79-6	480	480
Acetone cyanohydrin	2-Methylactonitrile	75-86-5	310 / 430	313 / 431
Trichloroacetic acid		76-03-9	100	103
Toluene		108-88-3	290	292
Chlorobenzene		108-90-7	260	263
Phenol	Carbolic acid Hydroxybenzene Phenyl hydroxide	108-95-2	310	316
2-Picoline		109-06-8	270	271
Methyl Cellosolve®	Ethylene glycol monomethyl ether	109-86-4	240	245
Diethylamine		109-89-7	140	142
Tetrahydrofuran		109-99-9	240	241
Methyl Cellosolve® acetate	Ethylene glycol monomethyl ether acetate ester	110-49-6	240	245
n-Hexane		110-54-3	290	291
Cyclohexane		110-82-7	290	291
Pyridine		110-86-1	270	271
Ethyl Cellosolve® acetate	Cellosolve® acetate Glycol monoethyl ether acetate	111-15-9	240	245
Diethylenetriamine		111-40-0	140	148
Dichloroethyl ether	2-Chloroethyl ether	111-44-4	240 / 260	241 / 261
Adiponitrile		111-69-3	430	431
2,2,2-Trichloroethanol		115-20-8	310	315
Anthracene		120-12-7	290	293
1,2,4-Trichlorobenzene		120-82-1	260	263
N,N-Dimethylaniline		121-69-7	140	146
Pyrrolidine		123-75-1	270	274
1,4-Dioxane		123-91-1	270	278
Hexamethylene diamine		124-09-4	140	148

Chemical Name	Name in Data Table (if Synonym)	CAS Number	Class	Sub-Class
2-Chloroethanol		107-07-3	260 / 310	261 / 315
Ethylenediamine		107-15-3	140	148
Allyl alcohol		107-18-6	310	311
Ethylene glycol		107-21-1	310	314
Chloromethyl methyl ether		107-30-2	240	241
Sarin	GB	107-44-8	460 / 595	462 / 595
Vinyl acetate		108-05-4	220	222
Methyl isobutyl ketone		108-10-1	390	391
L	Lewisite	541-25-3	470 / 595	470 / 595
1,3-Dichloropropene		542-75-6	260	261
Toluene-2,4-diisocyanate		584-84-9	210	212
Methyl isocyanate		624-83-9	210	211
n-Amyl acetate		628-63-7	220	222
Hexamethylene diisocyanate		822-06-0	210	211
n-Methyl-2-pyrrolidone		872-50-4	130	132
1,1,3-Trichloroacetone		921-03-9	260 / 390	261 / 391
Sodium hydroxide	Caustic soda	1310-73-2	380	380
Xylene, mixed isomers		1330-20-7	290	292
Ammonium hydroxide	Ammonia solution	1336-21-6	380	380
Trifluoromethane sulfonic acid		1493-13-6	500	504
Bisphenol-A diglycidyl ether		1675-54-3	270	275
Hypophosphorus acid		6303-21-5	370	370
Mercury		7439-97-6	330	330
Sulfur dioxide	Sulfur oxide Sulfurous anhydride Sulfurous oxide	7446-09-5	350 / 365	350 / 365
Mercuric chloride		7487-94-7	340	340
Titanium tetrachloride		7550-45-0	360	360
Hydrochloric acid		7647-01-0	370	370
Hydrogen chloride gas		7647-01-0	350	350
Antimony pentachloride		7647-18-9	360	360
Phosphoric acid		7664-38-2	370	370
Hydrogen fluoride	HF	7664-39-3	350	350
Hydrofluoric acid		7664-39-3	370	370
Hydrogen fluoride gas		7664-39-3	350	350
Hydrogen fluoride liquid		7664-39-3	350 / 370	350 / 370
Ammonia gas		7664-41-7	350	350

Chemical Name	Name in Data Table (if Synonym)	CAS Number	Class	Sub-Class
1,1,2,2-Tetrachloroethylene		127-18-4	260	264
Ethanolamine		141-43-5	140 / 310	141 / 311
Ethyl acetate	Acetoxyethane	141-78-6	220	222
Dibutyl ether	n-Butyl ether	142-96-1	240	241
n-Butyl ether		142-96-1	240	241
Sodium cyanide		143-33-9	345	345
Hydrazine		302-01-2	280	280
Boron trifluoride dimethyl		353-42-4	590	590
4-bromofluorobenzene		460-00-4	260	263
Fluorobenzene		462-06-6	260	263
Sulfur mustard	HD	505-60-2	500 / 595	502 / 595
1,3 Dichloroacetone	1,3-Dichloro-2-propanone Bis(chloromethyl) ketone	534-07-6	260 / 390	261 / 391
Kerosene		8008-20-6	290	291
Oleum		8014-95-7	370	370
Polymethylene poly-phenylpolyisocyanate		9106-87-9	210	212
Phosphorus oxychloride		10025-87-3	360	360
Silicon tetrachloride		10026-04-7	360 / 480	360 / 480
Hydriodic acid		10034-85-2	370	370
Hydrogen bromide		10035-10-6	350 / 370	350 / 370
Nitrogen dioxide		10102-44-0	350	350

Chemical Name	Name in Data Table (if Synonym)	CAS Number	Class	Sub-Class
Sulfuric acid		7664-93-9	370	370
Sodium hypochlorite		7681-52-9	340	340
Nitric acid		7697-37-2	370	370
Thionyl chloride	Sulfurous chloride Sulfurous oxychloride	7719-09-7	360	360
Phosphorus trichloride		7719-12-2	360	360
Bromine		7726-95-6	330	330
Chlorine		7782-50-5	330 / 350	330 / 350
Arsenic trichloride		7784-34-1	340	340
Chlorosulfonic acid		7790-94-5	370 / 500	370 / 504
Sulfuryl chloride		7791-25-5	350 / 360	350 / 360
Phosphine		7803-51-2	350	350
Creosote		8001-58-9	310	316
PCB		11097-69-1	260	263
Fluorosilicic acid		16961-83-4	370	370
2-Pentenenitrile		25899-50-7	430	431
VX Nerve Agent		50782-69-9	460 / 595	462 / 595
Nitric acid, red fuming		52583-42-3	370	370
Diesel fuel	Fuel Oil #2 Heating oil	68334-30-5	290	291
Gasoline		86290-81-5	290	291 / 292

For more information about DuPont Personal Protection

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