



DPL

Handling you with care

The Chemical Permeation Guide

Gloves Vs Chemicals

As we proceed with our daily lives we may encounter hazards at the workplace. This guide will aid you in preparing for one such hazard, chemical hazards. DPL has a range of gloves that have been specially developed to protect users from many of the dangerous and complex chemicals, these can be in a pure or diluted form but most often as mixtures.

By understanding when and where each glove should be worn, you can greatly help to mitigate the incidence of localized injuries such as irritations or burns. Furthermore, we can prevent more severe and chronic impairments which could lead to detrimental consequences. Remember, there is no such thing as a 'broad spectrum' or 'universal' chemical protective glove. So please take the time to read through this Chemical Permeation Guide and understand the different chemical applications that our gloves may be used for.

CHEMICAL RESISTANCE TESTS

Before looking at the charts here are some key words that should be known

PERMEATION

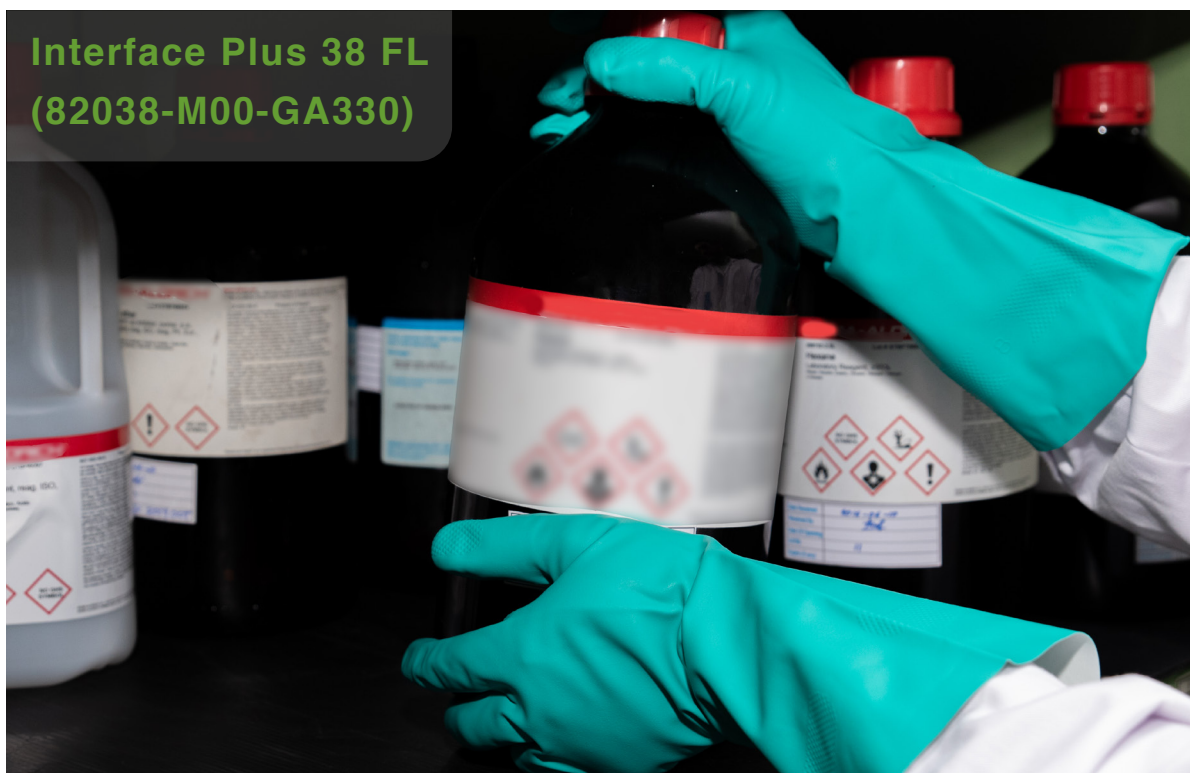
This refers to the process of a chemical moving through a protective glove, which is a result of the chemicals being absorbed at a molecular level through the contacted surface of the glove. This differs from “penetration” which occurs when a chemical leaks through seams, pinholes, and other manufacturing imperfections.

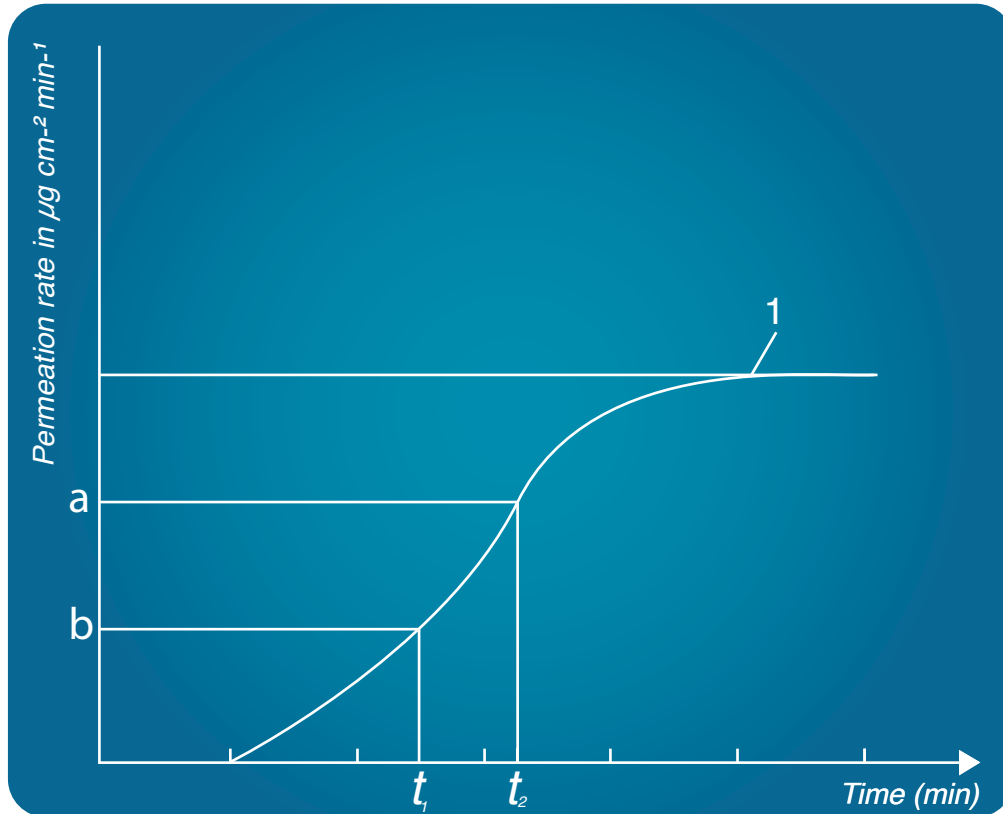
BREAKTHROUGH TIME (BTT)

This is one of the parameters used to measure permeation, it indicates how long a glove can be used before different chemicals permeate through the material. The test to measure BTT involves a chemical being applied to the glove surface, we then measure the time taken for said chemical to be detected at a molecular level.

PERMEATION RATE

This is the measure used to quantify the movement of a chemical as it permeates through the surface of the glove. During the usage of a glove in a chemical application, the glove material may become exposed to the chemical in use. This in turn may cause the physical properties of the glove to degrade as a result of the chemical absorption. Therefore it is very important to choose an appropriate glove for the desired application.





Y - Permeation rate in $\mu\text{g cm}^{-2} \text{ min}^{-1}$

t - Time (min)

1 - Steady-state permeation

a - normalized permeation rate (NPR)





b - minimum detectable permeation rate (MDPR)

t_2 - normalized breakthrough time (NBT)

- Minimum detectable permeation rate - This refers to the lowest permeation rate that could be measured by the permeation testing equipment.
- Normalized permeation rate - A calculation which tells us the permeation rate at $1 \mu\text{g}/\text{cm}^2/\text{min}$ by using the actual permeation results.
- Steady state permeation rate - This is the point where the liquid passes through the glove material, continuously at a constant permeation after breakthrough.

DEGRADATION

This occurs due to a reduction in one or more of a material's physical properties after it has been exposed to a chemical. Once absorbed, signs of degradation can appear in the form of flaking, swelling, disintegration, embrittlement, and hardening or softening of the glove.

% Degradation	Performance	Code Ltter
0 - 30	Excellent	
31 - 60	Good	
61 - 90	Fair	
>90	Poor	

Interface Tough
(81055-G08-OA480)



**Interface Plus 38 UL
(81038-G08-GA330)**



Chemical	CAS NO.	Interface Soft (81020-M00-GA330)			Interface Plus 28 UL (81028-G08-WA300B)			Interface Plus 38 UL (81038-G08-GA330)		
		BTT lowest (min)	CE rating	Degradation %	BTT lowest (min)	CE rating	Degradation %	BTT lowest (min)	CE rating	Degradation %
ORGANIC ACIDS										
Acetic Acid - Glacial	64-19-7	22	1	P	34	2	P	97	3	F
Acetic Acid, 10%	64-19-7	>480	6	E	>480	6	E	>480	6	E
Acetic Acid, 20%	64-19-7	>480	6	E	>480	6	E	>480	6	E
Acetic Acid, 25%	64-19-7	>480	6	E	>480	6	E	>480	6	E
INORGANIC ACID										
Hydrochloric Acid, 10%	7647-01-0	>480	6	E	>480	6	E	>480	6	E
Hydrochloric Acid, 37%	7647-01-0	100	3	G	100	3	E	100	3	E
Nitric Acid, 40%	7697-37-2	270	5	E	270	5	E	100	3	E
Nitric Acid, 10%	7697-37-2	>480	6	E	>480	6	E	>480	6	E
Nitric Acid, 65%	7697-37-2	16	1	P	32	2	P	60	3	P
Sulphuric Acid, 40%	7664-93-9	>480	6	E	>480	6	E	>480	6	E
Sulphuric Acid, 50%	7664-93-9	>480	6	E	>480	6	E	>480	6	E
Sulphuric Acid, 96%	7664-93-9	23	2	P	31	2	F	159	4	G
ALKALIS										
Ammonium Hydroxide, 25%	1336-21-6	41	2	E	134	4	G	349	5	E
Pottasium Hydroxide, 50%	1310-58-3	>480	6	E	>480	6	E	>480	6	E
Sodium Hydroxide, 40%	1310-73-2	>480	6	E	>480	6	E	>480	6	E
Sodium Hydroxide, 20%	1310-73-2	>480	6	E	>480	6	E	>480	6	E
Sodium Hydroxide, 50%	1310-73-2	>480	6	E	>480	6	E	>480	6	E
ALCOHOLS										
Butanol	71-36-3	>480	6	G	250	5	G	>480	6	E
Ethanol, 96%	64-17-5	>480	6	F	>480	6	G	>480	6	E
Iso Propyl Alcohol(Propan-2-ol)	67-63-0	>480	6	E	>480	6	E	>480	6	E
Methanol	67-56-1	7	0	F	17	1	F	39	2	F
Propan - 1 - ol	71-23-8	>480	6	G	>480	6	E	>480	6	E
KETONES										
Acetone	67-64-1	<1	0	P	<1	0	P	<1	0	P
Cyclohexanone	108-94-1	15	1	P	18	1	P	23	1	P
Methyl ethyl ketone	78-93-3	9	0	P	0	0	F	10	1	F
Methyl Propyl ketone	107-87-9	3	0	P	3	0	P	7	0	P
ALDEHYDES										
Formaldehyde, 37%	50-00-0	>480	6	E	>480	6	E	>480	6	E
ESTERS										
Ethyl Acetate	141-78-6	0	0	P	<1	0	F	4	0	F
ALIPHATIC SOLVENTS										
Cyclohexane	110-82-7	>480	6	E	>480	6	E	>480	6	E
n - Hexane	110-54-3	>480	6	E	>480	6	E	>480	6	E
n- Heptane	142-82-5	>480	6	E	>480	6	G	>480	6	E
AROMATIC SOLVENTS										
Toluene	108-88-3	<1	0	F	<1	0	F	6	0	F
Xylene	1330-20-7	1	0	F	9	0	F	28	1	F
Thinner	-	1	0	F	1	0	P	1	0	P
Turpentine	8006-64-2	90	3	E	250	5	E	>480	6	E
White Spirit	64742-82-1	100	3	G	300	5	E	>480	6	E
AMINES										
Diethyl Amine	109-89-7	<1	0	P	<1	0	P	12	1	P
CHLORINATED SOLVENTS										
Dichloromethane	75-09-2	<1	0	P	<1	0	P	<1	0	P
PEROXIDES										
Hydrogen Peroxide, 30%	7722-84-1	>480	6	G	>480	6	E	>480	6	E
PETROLEUM DERIVATIVES										
Kerosene	8008-20-6	100	3	E	>480	6	E	>480	6	E
Diesel Fuel	68334-30-5	98	3	E	>480	6	E	>480	6	E
Petrol Unleaded	8006-61-9	75	2	G	130	4	G	130	4	G

Chemical	CAS NO.	Interface Tough (81055-G08-OA480)			Interface Plus 38 FL (82038-M00-GA330)			Interface Lite (82038-G24-GA330)		
		BTT lowest (min)	CE rating	Degradation %	BTT lowest (min)	CE rating	Degradation %	BTT lowest (min)	CE rating	Degradation %
ORGANIC ACIDS										
Acetic Acid - Glacial	64-19-7	182	4	F	87	3	P	49	2	P
Acetic Acid, 10%	64-19-7	>480	6	E	>480	6	E	>480	6	E
Acetic Acid, 20%	64-19-7	>480	6	E	>480	6	E	>480	6	E
Acetic Acid, 25%	64-19-7	>480	6	E	>480	6	E	>480	6	E
INORGANIC ACID										
Hydrochloric Acid, 10%	7647-01-0	>480	6	E	>480	6	E	>480	6	E
Hydrochloric Acid, 37%	7647-01-0	100	3	E	>480	6	E	>480	6	E
Nitric Acid, 40%	7697-37-2	>480	3	E	100	3	E	>480	6	E
Nitric Acid, 10%	7697-37-2	>480	6	E	>480	6	E	>480	6	E
Nitric Acid, 65%	7697-37-2	117	3	F	48	2	P	53	2	P
Sulphuric Acid, 40%	7664-93-9	>480	6	E	>480	6	E	>480	6	E
Sulphuric Acid, 50%	7664-93-9	>480	6	E	>480	6	E	>480	6	E
Sulphuric Acid, 96%	7664-93-9	253	5	G	106	3	G	80	3	F
ALKALIS										
Ammonium Hydroxide, 25%	1336-21-6	>480	6	E	>480	6	E	307	5	E
Pottasium Hydroxide, 50%	1310-58-3	6.5	6	E	>480	6	E	>480	6	E
Sodium Hydroxide, 40%	1310-73-2	>480	6	E	>480	6	E	>480	6	E
Sodium Hydroxide, 20%	1310-73-2	>480	6	E	>480	6	E	>480	6	E
Sodium Hydroxide, 50%	1310-73-2	>480	6	E	>480	6	E	>480	6	E
ALCOHOLS										
Butanol	71-36-3	>480	6	E	>480	6	G	>480	6	E
Ethanol, 96%	64-17-5	>480	6	E	>480	6	E	>480	6	G
Iso Propyl Alcohol(Propan-2-ol)	67-63-0	>480	6	E	>480	6	E	>480	6	E
Methanol	67-56-1	84	3	G	31	2	F	26	1	F
Propan - 1 - ol	71-23-8	>480	6	E	>480	6	E	>480	6	E
KETONES										
Acetone	67-64-1	6	0	F	<1	0	P	<1	0	F
Cyclohexanone	108-94-1	92	3	P	52	2	P	17	1	P
Methyl ethyl ketone	78-93-3	15	1	F	<1	0	F	<1	0	P
Methyl Propyl ketone	107-87-9	22	1	P	8	0	P	5	0	P
ALDEHYDES										
Formaldehyde, 37%	50-00-0	>480	6	E	>480	6	E	>480	6	E
ESTERS										
Ethyl Acetate	141-78-6	22	1	F	<1	0	P	<1	0	P
ALIPHATIC SOLVENTS										
Cyclohexane	110-82-7	>480	6	E	>480	6	E	>480	6	E
n - Hexane	110-54-3	>480	6	E	>480	6	E	>480	6	E
n- Heptane	142-82-5	>480	6	E	>480	6	E	>480	6	E
AROMATIC SOLVENTS										
Toluene	108-88-3	10	1	F	12	1	F	<1	0	P
Xylene	1330-20-7	155	4	G	24	1	F	8	0	P
Thinner	-			P	1	0	P	<1	0	P
Turpentine	8006-64-2	>480	6	E	>480	6	E	>480	6	E
White Spirit	64742-82-1	>480	6	E	>480	6	E	>480	6	E
AMINES										
Diethyl Amine	109-89-7	42	2	F	<1	0	P	<1	0	F
CHLORINATED SOLVENTS										
Dichloromethane	75-09-2	<1	0	P	<1	0	P	<1	0	P
PEROXIDES										
Hydrogen Peroxide, 30%	7722-84-1	>480	6	E	>480	6	E	>480	6	E
PETROLEUM DERIVATIVES										
Kerosene	8008-20-6	>480	6	E	>480	6	E	>480	6	E
Diesel Fuel	68334-30-5	>480	6	E	>480	6	E	>480	6	E
Petrol Unleaded	8006-61-9	>480	6	E	130	4	E	100	3	E

Chemical	CAS NO.	Interface Elite 30 (82030-M00-BA310)			Interface Elite 40 (82040-M00-CA310)			Interface Elite 45 (82045-M00-BA310)		
		BTT lowest (min)	CE rating	Degradation %	BTT lowest (min)	CE rating	Degradation %	BTT lowest (min)	CE rating	Degradation %
ORGANIC ACIDS										
Acetic Acid - Glacial	64-19-7	34	2	P	20	1	P	76	3	P
Acetic Acid, 10%	64-19-7	>480	6	E	>480	6	E	>480	6	E
Acetic Acid, 20%	64-19-7	>480	6	E	>480	6	E	>480	6	E
Acetic Acid, 25%	64-19-7	>480	6	E	>480	6	E	>480	6	E
INORGANIC ACID										
Hydrochloric Acid, 10%	7647-01-0	>480	6	E	>480	6	E	>480	6	E
Hydrochloric Acid, 37%	7647-01-0	>480	6	E	>480	6	E	>480	6	E
Nitric Acid, 40%	7697-37-2	326	5	G	326	5	E	>480	5	E
Nitric Acid, 10%	7697-37-2	>480	6	E	>480	6	E	>480	6	E
Nitric Acid, 65%	7697-37-2	20	1	P	29	1	P	45	2	P
Sulphuric Acid, 40%	7664-93-9	>480	6	E	>480	6	E	>480	6	E
Sulphuric Acid, 50%	7664-93-9	>480	6	E	>480	6	E	>480	6	E
Sulphuric Acid, 96%	7664-93-9	46	2	P	258	5	F	84	3	F
ALKALIS										
Ammonium Hydroxide, 25%	1336-21-6	126	4	G	78	3	G	>480	6	E
Pottasium Hydroxide, 50%	1310-58-3	>480	6	E	>480	6	E	>480	6	E
Sodium Hydroxide, 40%	1310-73-2	>480	6	E	>480	6	E	>480	6	E
Sodium Hydroxide, 20%	1310-73-2	>480	6	E	>480	6	E	>480	6	E
Sodium Hydroxide, 50%	1310-73-2	>480	6	E	>480	6	E	>480	6	E
ALCOHOLS										
Butanol	71-36-3	>480	6	E	>480	6	E	>480	6	E
Ethanol, 96%	64-17-5	>480	6	F	>480	6	G	>480	6	G
Iso Propyl Alcohol(Propan-2-ol)	67-63-0	102	3	E	>480	6	E	>480	6	E
Methanol	67-56-1	7	0	E	15	1	E	13	1	F
Propan - 1 - ol	71-23-8	480	6	G	>480	6	G	480	6	G
KETONES										
Acetone	67-64-1	<1	0	F	<1	0	F	<1	0	P
Cyclohexanone	108-94-1	<1	0	P	6	0	P	<1	0	P
Methyl ethyl ketone	78-93-3	<1	0	P	<1	0	P	<1	0	P
Methyl Propyl ketone	107-87-9	<1	0	P	<1	0	P	<1	0	P
ALDEHYDES										
Formaldehyde, 37%	50-00-0	>480	6	E	>480	6	E	>480	6	E
ESTERS										
Ethyl Acetate	141-78-6	<1	0	P	<1	0	P	<1	0	P
ALIPHATIC SOLVENTS										
Cyclohexane	110-82-7	>480	6	E	>480	6	E	>480	6	E
n - Hexane	110-54-3	>480	6	E	>480	6	E	>480	6	E
n- Heptane	142-82-5	>480	6	E	175	4	E	>480	6	E
AROMATIC SOLVENTS										
Toluene	108-88-3	<1	0	P	<1	0	F	<1	0	F
Xylene	1330-20-7	1	0	P	3	0	F	1	0	F
Thinner	-	<1	0	F	<1	0	P	<1	0	P
Turpentine	8006-64-2	>480	6	E	>480	6	E	>480	6	E
White Spirit	64742-88-7	>480	6	G	>480	6	E	>480	6	E
AMINES										
Diethyl Amine	109-89-7	<1	0	F	1	0	F	<1	0	F
CHLORINATED SOLVENTS										
Dichloromethane	75-09-2	<1	0	P	1	0	P	<1	0	P
PEROXIDES										
Hydrogen Peroxide, 30%	7722-84-1	>480	6	E	>480	6	E	>480	6	E
PETROLEUM DERIVATIVES										
Kerosene	8008-20-6	>480	6	E	>480	6	E	>480	6	E
Diesel Fuel	68334-30-5	>480	6	E	>480	6	E	>480	6	E
Petrol Unleaded	8006-61-9	60	3	G	70	3	G	80	3	E

Chemical
ALCOHOLS
Butanol
Ethanol, 96%
Iso Propyl Alcohol (Propan-2-ol)
Methanol
Propan - 1 - ol
KETONES
Acetone
Cyclohexanone
Methyl ethyl ketone
Methyl Propyl ketone
Isophorone
ALDEHYDES
Formaldehyde, 37%
ESTERS
Ethyl Acetate
ALIPHATIC SOLVENTS
Cyclohexane
n - Hexane
n- Heptane
AROMATIC SOLVENTS
Toluene
Xylene
Thinner
Turpentine
Tetrahydrofuran
Styrene
White Spirit
99% Nitrobenzene
SULPHUR-BASED CHEMICALS
Carbon disulfide
Tetrahydrothiophene
AMINES
Triethylamine
Diethyl Amine
AMIDES
Dimethylformamide
CHLORINATED SOLVENTS
Dichloromethane
1,2 Dichloroethane
NITRILES
Acetonitriles
Acrylonitrile
PEROXIDES
Hydrogen Peroxide, 30%
PETROLEUM DERIVATIVES
Kerosene
Diesel Fuel
Petrol Unleaded
OTHERS
Acetone:Water (50:50) mixture

CAS NO.
71-36-3
64-17-5
67-63-0
67-56-1
71-23-8
67-64-1
108-94-1
78-93-3
107-87-9
78-59-1
50-00-0
141-78-6
110-82-7
110-54-3
142-82-5
108-88-3
1330-20-7
-
8006-64-2
107025
100-42-5
64742-88-7
806-770
102211
110-01-0
121-44-8
109-89-7
68-12-2
75-09-2
107-06-2
75-05-08
107-13-1
7722-84-1
8008-20-6
68334-30-5
8006-61-9
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Keto Resister (51028-M00-XA330)		
BTT lowest (min)	CE rating	Degradation %
>480	6	G
124	4	E
>480	6	E
42	2	F
480	6	G
>480	6	G
>480	6	E
>480	6	F
>480	6	E
20	2	x
>480	6	E
>480	6	G
>480	6	E
>480	6	E
>480	6	E
>480	6	E
124	4	F
>480	6	x
>480	6	E
>480	6	x
>480	6	E
>480	6	x
>480	6	x
81	3	G
25	2	x
480	6	G
>480	6	x
>480	6	F
>480	6	x
>480	6	G
>480	6	E
>480	6	E
>480	6	E
42	2	x

Caution:

This data is based on glove specimens cut from the palm area and tested under controlled laboratory conditions. The chart is provided as a guide only. The suitability of a glove in a specific application and work environment must be verified by the users. This guide should not be construed as a warranty from DPL.

**Keto Resister
(51028-M00-XA330)**





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