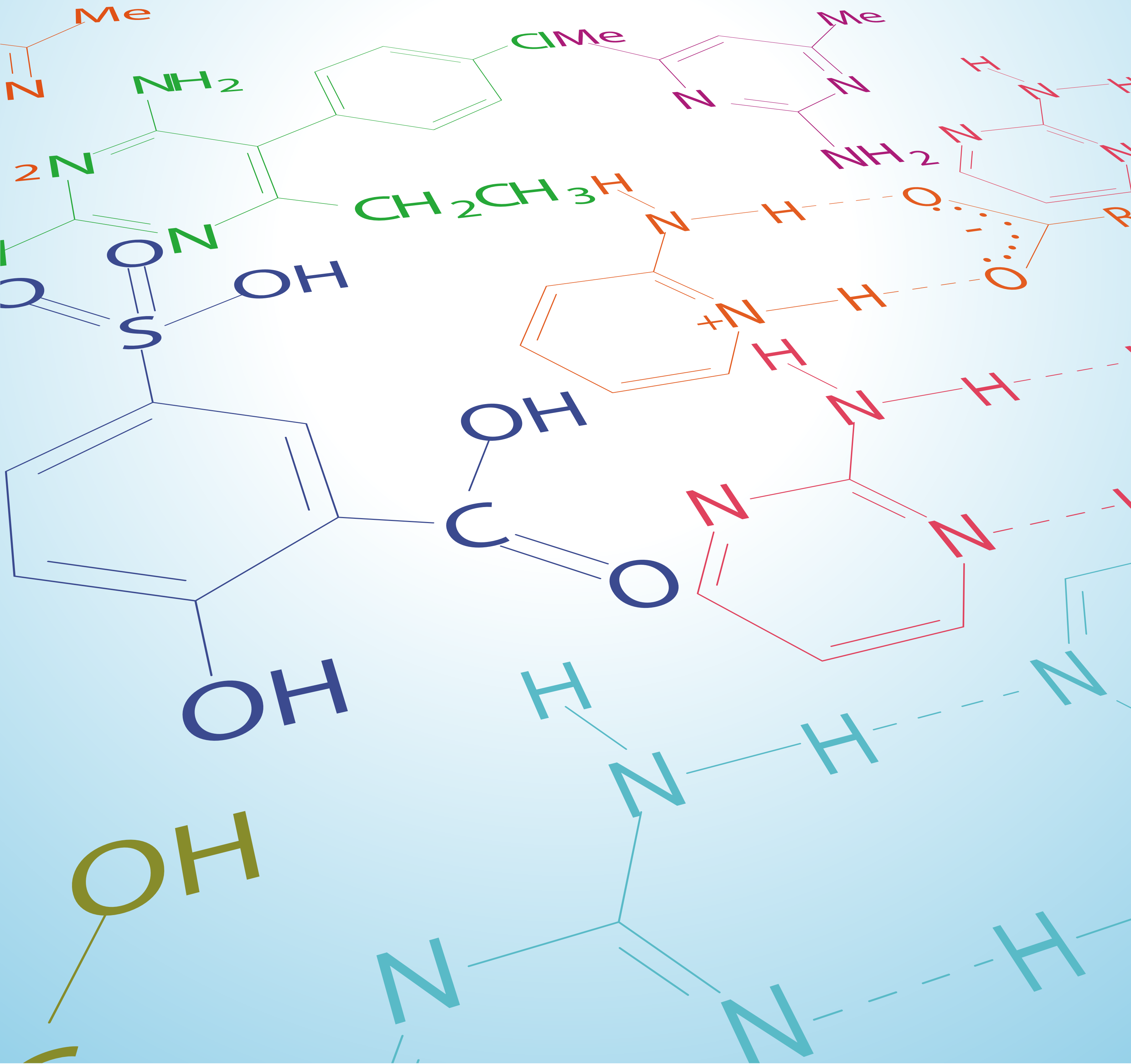
DPL
Handling you with care

INTERFACE PLUS - 821C

CHEMICAL RESISTANCE GUIDE

Dipped Products PLC



How This Guide Will Help You

There are many different forms of chemical hazard in today's industrial workplace. DPLs Occupational range of nitrile gloves has been specially developed to protect operators from many of the dangerous and complex chemicals that are used in pure or diluted form or most often as mixtures. By understanding which glove should be worn when and where, you can greatly help to mitigate the incidence of localized injuries such as irritations or burns, as well as prevent more severe and chronic impairment, or in the worst case, death. 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 our nitrile gloves may be used for.

Here are some important aspects to think about:

Chemical

- Pure chemical or mixture
- Concentration
- Working temperature
- Exposure time

Other Requirements

- Comfort
- Dexterity
- Durability
- Level of mechanical protection (Abrasion, Tear, Cut & Puncture)

Secondary Options

- Thickness
- Length
- Grip
- Colour
- Lining

Chemical Resistance Tests

The DPL Chemical Resistance Guide is based on permeation and degradation test data.

Permeation occurs when a chemical travels through intact material—a result of absorption and molecular diffusion through the glove. In the laboratory, permeation is measured by a parameter called Breakthrough Time (BTT) which provides an indication of how long gloves can be used before different chemicals permeate through the material . We measure BTT by applying a chemical to the exterior surface of a glove and then measuring the time it takes to detect the chemical on the inside surface. Chemical permeation is not the same as penetration, which occurs when a chemical leaks through seams, pinholes, and other

Chemical Resistance Tests (cont'd)

manufacturing imperfections.

Once the material is exposed to the chemical, the physical properties of the glove may degrade as a result of absorption of the chemical and/or swelling. This is particularly important when considering durability of the glove during usage on exposure to the chemical.

The thickness of the glove is also an important consideration: the BTT for a thicker product would be higher and therefore provide much better chemical resistance than a thinner glove.

Once you have considered both the BTT and Degradation Index, you will be ready to choose the right glove.

Permeation

EN374-3: 2003
Determination of Resistance to Permeation by Chemicals

The Breakthrough Time of a chemical is when the permeation rate of the chemical on the inner side of the glove reaches 1µg cm^{-2} min^{-1} at (23 +/- 1)ºC.

Degradation

The Degradation Index is based on the swelling of a glove sample that has been completely exposed to the challenge chemical. The test involves immersing a 2cm diameter specimen taken from the palm area of the glove in the chemical at (23 +/-1)ºC for 30 minutes. The glove is categorized as per Degradation Index of I, II & III shown in the chart below by taking into consideration the percentage swelling and the Breakthrough Time.

Interpreting the Chemical Resistance chart

Usage Guide	Degradation Index	Permeation BTT (min)
Excellent	III	>30
Good		<30
Fair	II	>30
Poor		<30
Not Recommended	I	Not Tested

Users should note:
a. If the degradation rating is NR the glove will not offer sufficient protection regardless of a high BTT
b. Permeation test data is obtained at room temperature (around 25ºC). If chemicals are handled at higher temperatures, the glove performance may be significantly altered

Chemical Resistance Chart

A to C

Test Chemical	CAS No.	821C Permeation BTT (min)	821C CE Rating	821C Degradation Index
1,1,1-Trichloroethane	71-55-6	27	1	II
1,1,2,2-Tetrachloroethane	79-34-5	14	1	I
1-Methoxy-2- propanol	107-98-2	129	4	III
1-Methoxy-2-propylacetate	108-65-6	84	3	II
2-Ethoxy ethylacetate	111-15-9	92	3	II
2-Ethoxyethanol	110-80-5	166	4	III
Acetic acid, glacial	64-19-7	66	3	II
Acetone	67-64-1	6	0	I
Acetonitrile	75-05-8	12	1	II
Acrylic acid	79-10-7	104	3	II
Allyl alcohol	107-18-6	51	2	II
Ammonium hydroxide	1336-21-6	328	5	III
Amyl acetate	628-63-7	77	3	II
Amyl alcohol	71-41-0	> 480	6	III
Benzine (FAM DIN 51635)	101316-46-5	> 480	6	III
Butanol, pure	71-36-3	> 480	6	III
Butyl acetate	123-86-4	57	2	II
Butyl cellosolve	111-76-2	> 480	6	III
Carbon disulphide	75-15-0	12	1	III
Chlorine gas	7782-50-5	> 480	6	III
Chromic acid, 50%	1333-82-0	> 480	6	III
Cyclohexane	110-82-7	> 480	6	III
Cyclohexanol	108-93-0	> 480	6	III

Chemical Resistance Chart

C to I

Test Chemical	CAS No.	821C Permeation BTT (min)	821C CE Rating	821C Degradation Index
Cyclohexanone	108-94-1	52	2	I
Dichloromethane	75-09-2	3	0	I
Diesel fuel		> 480	6	III
Dietylene glycol	111-46-6	> 480	6	III
Di-isobutyl ketone	108-83-8	> 247	5	III
Dimethyl acetamide	127-19-5	29	1	I
Dimetyl sulphoxide	67-68-5	50	2	II
Ethanol, absolute	64-17-5	380	5	III
Ethyl acetate	141-78-6	13	1	II
Ethyl ether	60-29-7	32	2	III
Ethylamine gas	75-04-7	31	2	III
Ethylene glycol	107-21-1	> 480	6	III
Formaldehyde, 37%	50-00-0	> 480	6	III
Gasoline (unleaded petrol)	8006-61-9	413	5	III
Glutaraldehyde, 50%	111-30-8	> 480	6	III
Heptane	142-82-5	> 480	6	III
Hexane	110-54-3	> 480	6	III
Hydrazene, 60%	7803-57-8	> 480	6	III
Hydrochloric acid	7647-01-0	> 480	6	III
Hydrofluoric acid	7664-39-3	190	4	III
Hydrogen peroxide, 30%	7722-84-1	> 480	6	III
Iso-octane	540-84-1	> 480	6	III
Iso propanol	67-63-0	> 480	6	III

Chemical Resistance Chart

K to P

Test Chemical	CAS No.	821C Permeation BTT (min)	821C CE Rating	821C Degradation Index
Kerosene	8008-20-6	> 480	6	III
Lactic acid, 85%	598-82-3	> 480	6	III
Maleic acid, saturated	110-16-7	> 480	6	III
Methanol	67-56-1	68	3	III
Methyl ethyl ketone	78-93-3	9	0	I
Methyl methacrylate	80-62-6	22	1	II
Methyl propyl ketone	107-87-9	11	1	I
Methyl tert-butyl ether	1634-04-4	370	5	III
Mineral oil/liquid paraffin		> 480	6	III
Naptha solvent	8030-30-6	311	5	III
Nitric acid, 40%	7697-37-2	> 480	6	III
Nitrobenzene	98-95-3	336	5	I
n-Undecane	1120-21-4	> 480	6	III
Octyl alcohol	111-87-5	> 480	6	III
Ortho-phophoric acid	7664-38-2	> 480	6	III
Peracetic acid	79-21-0	65	3	II
Perchloric acid, 60%	7601-90-3	> 480	6	III
Perchloroethylene	127-18-4	165	4	III
Petrol, unleaded		> 480	6	III
Petrolium ether	8032-32-4	> 480	6	III
Phenol, 90%	108-95-2	137	4	I
Phosphoric acid, 85%	7664-38-2	> 480	6	III
Piperazine, saturated	110-85-0	> 480	6	III

Chemical Resistance Chart

P to X

Test Chemical	CAS No.	821C Permeation BTT (min)	821C CE Rating	821C Degradation Index
Potassium hydroxide, 50%	1310-58-3	> 480	6	III
Propyl acetate	109-60-4	14	1	II
Propylene glycol	57-55-6	> 480	6	III
Sodium hydroxide, 50%	1310-73-2	> 480	6	III
Sodium hypochlorite, 13%	7681-52-9	> 480	6	III
Sulphuric acid, 96%	7664-93-9	150	4	II
Tetrachloroethylene	127-18-4	292	5	III
Tetrahydrofuran	109-99-9	7	0	I
Toluene	108-88-3	21	1	II
Triethylamine	121-44-8	> 480	6	III
Turpentine	8006-64-2	> 480	6	III
White spirit	64742-48-9	> 480	6	III
White spirit	68551-17-7	> 480	6	III
White spirit	8052-40-13	> 480	6	III
Xylene	1330-20-7	40	2	II

Caution:
This data is based on glove specimens cut from the palm area and tested under controlled labor atory 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.

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