How to Utilize this Chemical Resistance Guide

Three categories of data are provided for each product and corresponding chemical:
1) Permeation *breakthrough time*;
2) Permeation *rate*, and
3) *Degradation* resistance rating.

Color Code Rating System

A glove/chemical combination receives a **GREEN** rating if either Condition A or B is met.

Condition A

- The permeation breakthrough time is 240 minutes or longer.
- The permeation rate is not specified.
- The degradation rating is Excellent or Good.

OR

Condition B

- The permeation breakthrough time is 30 minutes or longer.
- The permeation rate is Excellent or Good.
- The degradation rating is Excellent or Good.

A glove/chemical combination receives **RED** if: the degradation rating is Not Recommended, regardless of the permeation time or rate; or if the breakthrough time is less than 30 minutes and the degradation rating is poor.

Any glove/chemical combination not meeting either set of conditions required for **GREEN** or **RED** receives a **YELLOW**, or cautionary rating.

Criteria for Chemical Resistance Guide

Permeation Breakthrough Time (PB)

Rating	Minutes
Excellent	> 240
Good	> 30
Poor	≥ 10
Not Rated	< 10

Permeation Rate (PR)

Rating	µg/cm²/min
Excellent	< 1
Good	< 100
Poor	< 10,000

Degradation (D)

Rating	Key
Excellent (E)	Excellent; fluid has very little degrading effect.
Good (G)	Good; fluid has minor degrading effect.
Poor (P)	Poor; fluid has pronounced degrading effect.
Not Recommended (NR)	NR – Fluid was not tested against this material or the fluid has excessive degrading effects.

GREEN

The results for this specific chemical suggest that the glove would provide adequate barrier for use in most applications.

RED

Not recommended for use.

YELLOW

The results require additional consideration by a safety professional to determine suitability for use.

KLEENGUARD* G80 PURPLE NITRILE* Chemical Resistant Gloves

KLEENGUARD* G80 PURPLE NITRILE* Chemical Resistant Glove

	ASTM F739						ASTM F739			
	Permeation Breakthrough Time (PB)	Permeation Breakthrough Rate (PR)	Degredation (D)	Overall Rating			Permeation Breakthrough Time (PB)	Permeation Breakthrough Rate (PR)	Degredation (D)	Overall Rating
Acetonitrile	10	250	E			Isobutylene (gas)	>480	ND	E	
Ammonia	>480	ND	E			Isopropanol 90% (IPA)	>480	ND	E	
Ammonium Nitrate (fertilizer)	>480	ND	E			Kerosene	>480	ND	E	
Brake Fluid	>480	ND	E			Methanol	36	20.8	G	
1, 3 Butadiene (gas)	299	0.75	E			Methyl Ethyl Ketone	*	5	P	
Carbon Disulfide	9	26	G			Methyl Sulfoxide (DMSO)	61	50.1	E	
Carbon Tetrachloride	206	3	G			Methyl Tert Butyl Ether	235	21.3	E	
Chlorine (gas)	>480	ND	E			Mineral Spirits	>480	ND	E	
Cumene	115	59.3	E			Motor Oil	>480	ND	E	
Cutting Oil	>480	ND	E			Muriatic Acid (concrete etch)	>480	ND	E	
Cyclohexane	>480	ND	E			Nitrobenzene	91	3.21	P	
Diesel Fuel	>480	ND	E			Perchlorethylene	121	141	G	
Dimethylformamide (DMF)	31	89.7	P			Pine Oil	>480	ND	E	
Dioctyl Phtalate	>480	ND	E			Potassium Hydroxide 50%	>480	ND	E	
Ethyl Benzene	38	21.33	G			Rust Remover	>480	ND	E	
Ethylene Dichloride	5	10.34	G			Sodium Hypochlorite (bleach)	>480	ND	E	
Ethylene Glycol	>480	ND	E			Tetrachloroethylene	148	36	G	
Ethylene Oxide (gas)	42	12.53	E			Toluene	11	High	P	
Formaldehyde	>480	ND	E			1,1,1 Trichloroethane	34	High	G	
Fuel Oil	>480	ND	E			Turpentine	>480	ND	E	
Gasoline	>480	ND	E			Vinyl Acetate	22	156	G	
Herbicide	>480	ND	E			Weed Killer	>480	ND	E	
n-Heptane	456	0.17	G			Window Cleaner (ammonia based)	>480	ND	E	
n-Hexane	>480	ND	E			Wood Finish	>480	ND	E	
Hydraulic Fluid	>480	ND	E			Wood Preservative	>480	ND	E	
Hydrogen Peroxide	>480	ND	G			p-Xylene	30	44.3	G	

ND = Not Detected * = Immediate

Conditions/Color Codes

GREEN

Condition 1	
PB	>240
PR	Any
D	E, G
Condition 2	
PB	>30
PR	<100
D	E, G

RED

Condition 1	
PB	Any
PR	Any
D	NR
Condition 2	
PB	<30
PR	Any
D	P

TAN

No Results Reported

Criteria for Chemical Resistance Guide

Permeation Breakthrough Time (PB)

Rating	Minutes
Excellent	> 240
Good	> 30
Poor	≥ 10
Not Rated	< 10

Permeation Rate (PR)

Rating	µg/cm²/min
Excellent	< 1
Good	< 100
Poor	< 10,000

Degradation (D)

Rating
Excellent (E)
Good (G)
Poor (P)
Not Recommended (NR)

YELLOW

Any Other Condition

KLEENGUARD* G80 Neoprene / Latex† Chemical Resistant Gloves

KLEENGUARD* G80 Neoprene/Latex† Chemical Resistant Glove	ASTM F739 Permeation Breakthrough Time (PB)	ASTM F739 Permeation Breakthrough Rate (PR)	Degredation (D)	Overall Rating		ASTM F739 Permeation Breakthrough Time (PB)	ASTM F739 Permeation Breakthrough Rate (PR)	Degredation (D)	Overall Rating
Acetaldehyde	4	141	E		Liquid Fertilizer	>480	ND	E	
Acetic Acid	66	19.3	E		Methyl Ethyl Ketone	4	231	P	
Aluminum Sulfate	>480	ND			Methyl Formate	4	385		
Ammonium Hydroxide	49	197	E		Mineral Spirits	74	0.3	G	
Aniline	28	59.8	E		Muriatic Acid (Concrete)	>480	ND	E	
Benzylic Alcohol	41	17.4			Nitric Acid 70%	261	0.12	G	
Boric Acid	>480	ND	E		Oleic Acid	>480	ND	G	
Chloracetone	11	59.4			Phenol	8	60.4	E	
Citric Acid 10%	>480	ND	E		Phosphoric Acid	>480	ND	G	
Cutting Oil	>480	ND			Polyurethane	55	64.2	G	
Diethyl Ether	2	High			Potassium Hydroxide 50%	>480	ND	E	
Ethyl Alcohol (ethanol)	34	0.56	E		Rust Remover	275	0.3	E	
Ethylene Glycol	79	1.32	E		Sodium Hydroxide 50%	>480	ND	E	
Formaldehyde	>480	0.31	E		Sodium Hypochlorite (bleach)	>480	ND	E	
Furniture Polish	>480	ND			Sulfuric acid 47% (battery acid)	>480	ND	E	
Herbicide	>480	ND	E		Sulfuric Acid 96%	45	276	NR	
Hydrochloric Acid	310	29.6	E		Turpentine	32	High	NR	
Hydrofluoric Acid 47%	>480	ND	E		Vinyl Acetate	4	High	NR	
Hydrogen Peroxide	>480	ND	G		Windex	141	0.12	G	
Isopropanol 90% (IPA)	63	38.6	E		Wood Finish	36	59	G	
Linseed Oil	90	0.31	G						

ND = Not Detected NR = Not Recommended

Conditions/Color Codes

GREEN

Condition 1	
PB	>240
PR	Any
D	E, G
Condition 2	
PB	>30
PR	<100
D	E, G

TAN

No Results Reported

RED

Condition 1	
PB	Any
PR	Any
D	NR
Condition 2	
PB	<30
PR	Any
D	P

YELLOW

Any Other Condition

Glove Comparison Chart of KLEENGUARD* G80 Chemical Resistant Gloves

KLEENGUARD* Brand Glove Chemical Resistance Guide	G80 Purple Nitrile 	G80 Neoprene/ Latex† 	G80 PVC 		G80 Purple Nitrile 	G80 Neoprene/ Latex† 	G80 PVC 
Acetaldehyde				Hydrochloric Acid			
Acetic acid				Hydrofluoric Acid 47%			
Acetonitrile				Hydrogen Peroxide			
Aluminum Sulfate				Isobutylene (gas)			
Ammonia				Isopropanol 90% (IPA)			
Ammonia Nitrate (fertilizer)				Kerosene			
Ammonium Hydroxide				Linseed Oil			
Aniline				Methanol			
Benzylic Alcohol				Methyl Ethyl Ketone			
Boric Acid				Methyl Formate			
Brake Fluid				Methyl Tert Butyl Ether (MTBE)			
1,3 Butadiene (gas)				Methylene Bisphenyl Isocyanate 4,4-			
Bromopropionic Acid				Methylene Sulfoxide (DMSO)			
Butyl Carbitol				Mineral Spirits			
Carbon Disulfide				Motor Oil			
Carbon Tetrachloride				Muriatic Acid (Concrete)			
Chloracetone				Nitric Acid 70%			
Chlorine (gas)				Nitrobenzene			
Chromic Acid				Oleic Acid			
Citric Acid 10%				Oleum			
Cumene				Perchlorethylene			
Cutting Oil				Phenol			
Cyclohexane				Phosphoric Acid			
Diesel Fuel				Pine Oil			
Diethyl Ether				Polyurethane			
Dimethylformamide (DMF)				Potassium Hydroxide 50%			
Dioctyl Phthalate				Rust Remover			
Ethyl Alcohol (ethanol)				Sodium Hydroxide 50%			
Ethyl Benzene				Sodium Hypochlorite (bleach)			
Ethylene Dichloride				Sulfuric Acid (47%) - battery			
Ethylene Glycol				Sulfuric Acid 96%			
Ethylene Oxide (gas)				Tetrachloroethylene			
Fertilizer (liquid)				1,1,1 Trichloroethane			
Formaldehyde				Toluene			
Formic Acid				Turpentine			
Fuel Oil				Vinyl Acetate			
Furniture Polish				Weed Killer			
Gasoline				Window Cleaner (ammonia based)			
Herbicide (liquid)				Wood Finish			
n-Heptane				Wood Preservative			
n-Hexane				p-Xylene			
Hexane							
Hydraulic Fluid							

Conditions/Color Codes

See color code chart on next page

Choosing the Right KLEENGUARD* Chemical Resistant Glove for the Job

This guide presents the results of ASTM F739 standard permeation testing and degradation ratings for Kimberly-Clark's family of KLEENGUARD* Chemical Resistant Gloves. It is intended as a tool to help you assess which glove is best suited for working with specific chemicals.

This guide is not designed to consider every possible factor or circumstance relative to safety in every environment. To select the appropriate glove protection, a Hazards Analysis and Risk Assessment should be performed, including identification of the chemicals and chemical hazards related to the worker's task and work environment; determination of the potential for exposure and the type of exposure that is expected (i.e. splash, saturation, spray, immersion, etc.); and determination of the consequences related to exposure.

It is the responsibility of the user to assess the types of hazards and the risks associated with exposure and to make a final decision on the appropriate personal protective equipment needed for his specific circumstance.

Understanding Testing Terminology

Permeation: This is a process by which a chemical can breach a surface in which no perceptible openings are present. In permeation, the chemical's molecules actually slip between the molecules of the glove material and are detected. The results of the permeation process are undetectable by the naked eye.

Breakthrough Time: Measured in minutes, this is the amount of time between the initiation of the permeation test and analytical detection of the chemical on the reverse side of the sample material. Breakthrough times give an indication of how long a glove, that's totally immersed in the test chemical, can provide resistance to chemical permeation.

Permeation Rate: The maximum rate at which a permeating chemical passes through the fabric as measured by the analyzer. It is reported as micrograms per square centimeter of fabric per minute.

Note: The combination of breakthrough time and permeation rate should be taken into consideration when making a glove selection. The goal is to provide the wearer with the least possible amount of chemical exposure for the duration of the task. Therefore, a long breakthrough time and a low permeation rate results in less chemical exposure over time — compared to a shorter breakthrough time and a higher permeation rate.

Degradation: This is the measurement of changes in the physical properties of a glove material, after contact with a chemical. The changes may include a stiffening of the material, becoming hard or brittle; or the glove material may swell and become softer and weaker.

† Caution: This product contains Natural Rubber Latex which may cause allergic reactions.

Kimberly-Clark warrants that its products comply with K-C's standard specifications as of the delivery date to K-C's authorized distributors/direct purchasers. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANT ABILITY OR FITNESS FOR A PARTICULAR PURPOSE. K-C is not liable for any kind of special, incidental, or consequential damages. K-C's liability for breach of contract, tort, or other cause of action shall not exceed the product purchase price. Purchasers and users are deemed to have accepted the above warranty and limitation of liability, and cannot change the terms by verbal agreement or by any writing not signed by K-C.

⚠WARNINGS: Improper use or failure to heed warnings may result in serious injury or death.
Gloves should be replaced immediately if ripped, torn, abraded or punctured.
Gloves are not flame resistant. Keep away from sparks, flames and sources of heat and ignition. Melting fabric can cause severe burns.
It is the responsibility of the user to assess the types of hazards and the risks associated with exposure and then decide on the appropriate personal protective equipment needed for each circumstance.
The information provided within this literature refers to the performance of the film only, in the laboratory under controlled conditions.
Kimberly-Clark makes no representation that its products will provide complete protection from exposure to contaminants.