

Chemical Resistance Information Guide

KLEENGUARD* Brand Apparel



KLEENGUARD* Brand Apparel

How to Use This Guide

The chemical resistance test data is organized by chemical class as defined in ASTM F1186, "Standard Classification System for Chemicals According to Functional Groups."

Locate your specific chemical in the alphabetical Chemical Index on pages 5-6, and note the corresponding Chemical Sub-Class Number. Then locate that Sub-Class Number in the Chemical Resistance Test Data tables on pages 7-14 according to the product you are interested in.



Independent Testing

All permeation and penetration testing reported in this literature has been conducted by an independent laboratory in accordance with the American Society of Testing and Materials (ASTM) Standard Test Methods.

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For more information, visit our online
Chemical Resistance Database at
www.kc-safety.com/chemicalbarrierdata

Chemical Resistance Test Methods

When choosing chemical protective apparel, it is recommended that both Penetration and Permeation testing be considered.

PENETRATION

Penetration is the flow of liquid through a material, or through seams or closures. Penetration resistance of protective clothing materials is measured using ASTM F903, a standard test method that visually determines material barrier performance against liquid chemicals under conditions of continuous, saturated contact. This test is specified for protective clothing materials in both NFPA 1992: "Standard on Liquid Splash-Protective Ensembles and Protective Clothing for Hazardous Materials Emergencies" (2005 Edition).

Description of Test - ASTM F903: "Standard Test Method for Resistance of Protective Clothing Materials to Penetration by Liquids." A protective fabric swatch is placed into a test cell. The chemical barrier side of the fabric is placed in contact with a test chemical for one (1) hour. Part of the contact period may be performed under pressure. The condition of the fabric on the other (interior) side is periodically monitored to determine if the test chemical is seen penetrating the fabric.

Results - Expressed as PASS or FAIL. A material passes the test when there is no visual evidence of liquid penetration after the one hour test period. Any visual detection of penetrating liquid during the test period constitutes a failing performance.

PERMEATION

Permeation is the process by which a chemical moves through protective clothing material on a molecular level. ASTM F739 provides a standard test method designed to measure the resistance of protective clothing materials to permeation by chemical liquids and gaseous chemicals under conditions of continuous contact.

ASTM F1186: "Standard Classification System for Chemicals According to Functional Groups"

NFPA 1992: "Standard on Liquid Splash Protective Ensemble and Protective Clothing for Hazardous Material Emergencies (2005 Ed.)"

ASTM F903: "Standard Test Method for Resistance of Protective Clothing Materials to Penetration by Liquids"

ASTM F739: "Standard Test Method for Resistance of Protective Clothing Materials to Permeation by Liquids or Gases Under Conditions of Continuous Contact"

Description of Test - ASTM F739: "Standard Test Method for Resistance of Protective Clothing Materials to Permeation by Liquids or Gases Under Conditions of Continuous Contact." A protective clothing fabric swatch divides a test cell into two different chambers. One chamber is filled with the chemical being tested. A collection gas or liquid is used in the opposite chamber in combination with an analytical instrument (analyzer) to detect chemical molecules permeating through the fabric.

Result: Normalized Breakthrough - The elapsed time (reported in minutes) measured from the start of the test to the time the permeating chemical reaches a permeation rate of $0.1 \mu\text{g}/\text{cm}^2/\text{min}$.

Result: 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. In some cases the permeation rate is very high. Permeation in rates in excess of $400\text{mg}/\text{cm}^2/\text{min}$ are reported by Kimberly-Clark as a result of "High."

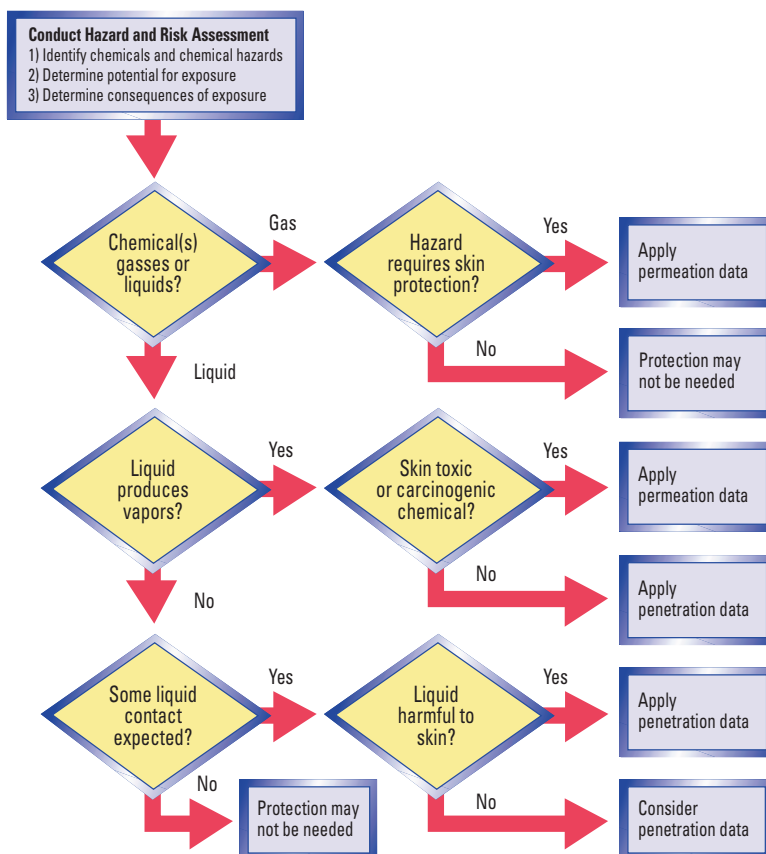
If the chemical demonstrates permeation at the first time of measurement, Kimberly-Clark reports the result as "immediate." In some cases, there is no permeation above a rate of $0.1 \mu\text{g}/\text{cm}^2/\text{min}$ detected for the entire length of the test; in these cases, Kimberly-Clark reports the result as "> 480 minutes."

Choosing the Right Protective Apparel

A Simplified Guide To Choosing The Right Protective Apparel

Step 1:
Conduct a thorough Hazard Analysis

Step 2:
Use this flowchart to choose the optimum protective Apparel for you application



Example of Data:

Class and Sub-Class Name	Chemical Name	Physical Phase	Liquid Penetration ASTM F903 <small>Test Duration: 60 mins. Saturation Exposure</small>	Permeation ASTM F739	
				Normalized Breakthrough Time (minutes)	Rate (µg/cm ² /min)
Amides					
<i>132 Aliphatic and Alicyclic</i>	n,n-Dimethylformamide	L	Pass	Immed.	2.5

NT= Not Tested Immed. = Immediate ND = Not Detected L = Liquid G = Gas

⚠ Warning: This chemical passes Penetration testing but is considered a known/suspected human carcinogen or skin absorbed toxic chemical, and has a vapor pressure greater than 5 mm Hg at 77°F (25°C), as defined in NFPA 1992-2005 (paragraphs 4.1.11 and 4.1.12). These chemicals are considered both a liquid and vapor hazard. Suitability for use should be determined by a professional trained in industrial safety. Failure to comply with this warning can result in serious injury or death.

Chemical Index

Chemical Name	Sub-Class Number	Page Number	CAS Number
Acetaldehyde	121	9	75-07-0
Acetic acid, glacial	102	9	64-19-7
Acetic anhydride	161	10	108-24-7
Acetone	391	8, 13	67-64-1
Acetonitrile	431	13	75-05-8
Acetyl chloride	111	9	75-36-5
Acrolein	121	9	107-02-8
Acrylamide	135	9	79-06-1
Acrylic acid	102	9	79-10-7
Acrylonitrile	431	13	107-13-1
Ammonia gas	350	12	7664-41-7
Ammonium hydroxide	380	13	1336-21-6
Aniline	145	10	62-53-3
Antimony pentachloride	360	13	7647-18-9
Benzaldehyde	122	9	100-52-7
Benzene	292	11	71-43-2
Benzyl alcohol	312	12	100-51-6
Benzyl chloride	266	11	100-44-7
Benzyl chloroformate	113	9	501-53-1
Black liquor	590	8	308074-23-9
n-Butanol	311	12	71-36-3
Butyl Cellosolve®	245	10	111-76-2
Butyraldehyde	121	9	123-72-8
Carbon disulfide	502	8, 14	75-15-0
Carbon tetrachloride	261	11	56-23-5
Chlorine gas	350	8, 12	7782-50-5
Chloroacetic acid	103	9	79-11-8
Chloroacetone	391	13	78-95-5
Chromic acid	370	8,13	1333-82-0
Cresol (mixed isomers)	316	12	1319-77-3
Dichloromethane (methylene chloride)	261/263	7, 11	75-09-2
Diesel fuel, mixture	291	11	68334-30-5
Diethylamine	142	7, 10	109-89-7
n,n-Dimethylacetamide	132	9	127-19-5
n,n-Dimethylformamide	132	7, 9	68-12-2
1,1-Dimethylhydrazine	280	11	57-14-7
Epichlorohydrin	275	11	106-89-8
Ethanolamine	141/311	10, 12	141-43-5
Ethyl acetate	222	7, 10	141-78-6
Ethyl Cellosolve®	245	10	110-80-15
Ethyl Cellosolve® acetate	222/245	10	111-15-9
Ethylbenzene	292	11	100-41-4
Ethylene diglycol monoethyl ether	245	10	111-90-0
Ethylene glycol	314	7, 12	107-21-1
Ethylenediamene	148	10	107-15-3
Formaldehyde	121	9	50-00-0
Formic acid	102	9	64-18-6
2-Furaldehyde	122/277	9, 11	98-01-1
Gasohol	590	14	N/A
Gasoline (unleaded)	292	11	8006-61-9
Green liquor	590	8	68131-30-6
Hexamethylene diisocyanate	211	10	822-06-0
n-Hexane	291	7, 11	110-54-3

Chemical Index

Chemical Name	Sub-Class Number	Page Number	CAS Number
Hydrazine	280	11	302-01-2
Hydrochloric acid	370	13	7647-01-0
Hydrofluoric acid	370	13	7664-39-3
Hydrogen peroxide	300	8,11	7722-84-1
Isopropyl alcohol (2-Propanol, IPA)	312	12	67-63-0
Jet fuel	291	11	8008-20-6
Lithium chloride	340	8	7447-41-8
Lithium hydroxide	380	8	1310-65-2
Mercury	330	12	7439-97-6
Methanol	311	7, 12	67-56-1
Methyl ethyl ketone	391	13	78-93-3
Methyl Cellosolve®	245	10	109-86-4
Methyl Cellosolve® acetate	222/245	10	110-49-6
Methyl isocyanate	211	10	624-83-9
Methyl salicylate	226	10	119-36-8
Mineral spirits	291	11	64475-85-0
Naphthalene in IPA	293	11	91-20-3
Nitric acid	370	13	7697-37-2
Nitrobenzene	441	8, 13	98-95-3
o-Nitrochlorobenzene	263/442	11, 13	88-73-3
o-Nitrotoluene	442	13	88-72-2
Oleum	370	13	7664-93-9
Oxalic acid	104	7, 9	6153-56-6
Phenol	316	12	108-95-2
Phosphoric acid	370	13	7664-38-2
Phosphorous trichloride	360	13	7719-12-2
Potassium acetate	340	12	127-08-2
Potassium chromate	340	12	7789-00-6
Potassium hydroxide	380	13	1310-58-3
Sodium cyanide	345	12	143-33-9
Sodium fluoride	340	12	7681-49-4
Sodium hydroxide	380	8, 13	1310-73-2
Sodium hypochlorite	340	8, 12	7681-52-9
Styrene	292	11	100-42-5
Sulfuric acid	370	8, 13	7664-93-9
1,1,2,2-Tetrachloroethane	261	11	79-34-5
Tetrachloroethylene	264	7, 11	127-18-4
Tetraethyl-lead	462	14	78-00-02
Tetrahydrofuran	241	7, 10	109-99-9
Toluene	292	7, 11	108-88-3
Toluene-2,4-diisocyanate	212	10	584-84-9
o-Toluidine	145	10	95-53-4
1,2,4-Trichlorobenzene	263	11	120-82-1
2,2,2-Trichloroethanol	315	12	115-20-8
2,2,2-Trifluoroethanol	315	12	75-89-8
Triethylamine	143	10	121-44-8
White liquor	590	8	68131-33-9
Xylene	292	11	1330-20-7



KLEENGUARD* A70 Chemical Spray Protection

Chemical Resistance Test Data

Class and Sub-Class Name	Chemical Name	Physical Phase	Liquid Penetration ASTM F903 <i>Test Duration: 60 mins. Saturation Exposure</i>	Permeation ASTM F739	
				Normalized Breakthrough Time (minutes)	Rate (µg/cm ² /min)
Acids, Carboxylic					
104 Aliphatic and Alicyclic, Substituted	Oxalic acid, 15%	L	Pass	NT	NT
Amides					
132 Aliphatic and Alicyclic	n,n-Dimethylformamide	L	Pass	Immed.	2.5
Amines					
142 Aliphatic and Alicyclic, Secondary	Diethylamine	L	Pass ⚠	Immed.	High
Esters, Carboxylic					
222 Acetates	Ethyl acetate	L	Pass	Immed.	40.3
Ethers					
241 Aliphatic and Alicyclic	Tetrahydrofuran	L	Pass	Immed.	High
Halogen Compounds					
261/263 Aromatic	Dichloromethane	L	Pass ⚠	Immed.	85.1
264 Vinyllic	Tetrachloroethylene	L	Pass ⚠	Immed.	High
Hydrocarbons					
291 Aliphatic and Alicyclic, Saturated	n-Hexane	L	Pass ⚠	Immed.	High
292 Aromatic	Toluene	L	Pass ⚠	Immed.	High
Hydroxylic Compounds					
311 Aliphatic and Alicyclic, Primary	Methanol	L	Pass ⚠	Immed.	1.71
314 Aliphatic and Alicyclic, Polyols	Ethylene glycol	L	Pass	>480	ND

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KLEENGUARD* A70 Chemical Spray Protection

Chemical Resistance Test Data

				Permeation ASTM F739	
Class and Sub-Class Name	Chemical Name	Physical Phase	Liquid Penetration ASTM F903 <small>Test Duration: 60 mins. Saturation Exposure</small>	Normalized Breakthrough Time (minutes)	Rate ($\mu\text{g}/\text{cm}^2/\text{min}$)
Peroxides					
300	Hydrogen peroxide, 50%	L	Pass	>480	ND
Inorganic Salts					
340 (Solutions)	Lithium chloride, 20%	L	Pass	>480	ND
	Sodium hypochlorite, 5.25%	L	Pass	>480	ND
Inorganic Gases and Vapors					
350	Chlorine gas	G	Not Applicable	Immed.	10.4
Inorganic Acids					
370	Chromic acid	L	Pass	>480	ND
	Sulfuric acid, 98%	L	Pass	>480	ND
Inorganic Bases					
380	Lithium hydroxide, 20%	L	Pass	>480	ND
	Sodium hydroxide, 50%	L	Pass	>480	ND
Ketones					
391 Aliphatic and Alicyclic	Acetone	L	Pass	Immed.	7.9
Nitro Compounds					
441, Unsubstituted	Nitrobenzene	L	Pass	Immed.	97.4
Sulfur Compounds					
502 Sulfides and Disulfides	Carbon disulfide	L	Pass	Immed.	76.3
Miscellaneous					
590	Black liquor	L	Pass	>480	ND
	Green liquor	L	Pass	>480	ND
	White liquor	L	Pass	>480	ND

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KLEENGUARD* A80 Chemical Protection

Chemical Resistance Test Data

Class and Sub-Class Name	Chemical Name	Physical Phase	Liquid Penetration ASTM F903 <small>Test Duration: 60 mins. Saturation Exposure</small>	Permeation ASTM F739	
				Normalized Breakthrough Time (minutes)	Rate ($\mu\text{g}/\text{cm}^2/\text{min}$)
Acids					
102 Carboxylic Aliphatic and Alicyclic, Unsubstituted	Acetic acid, glacial	L	Pass	>480	ND
	Acrylic acid	L	Pass	>480	ND
	Formic acid, 96%	L	Pass	>480	ND
103 Aliphatic and Alicyclic,	Chloroacetic acid, 80% Substituted	L	Pass	>480	ND
104 Aliphatic and Alicyclic, Substituted	Oxalic acid, 11%	L	Pass	>480	ND
Acid Halides					
111 Carboxylic Aliphatic and Alicyclic	Acetyl chloride	L	Pass	Immed.	34.7
113 Chloroformates	Benzyl chloroformate	L	Pass	>480	ND
Aldehydes					
121 Aliphatic and Alicyclic	Acetaldehyde, 99.5%	L	Pass	16	1.7
	Acrolein	L	NT	16	3.6
	Butyraldehyde	L	Pass	25	118
	Formaldehyde, 37%	L	Pass	>480	ND
122 Aromatic	Benzaldehyde, 99+%	L	Pass	61	68.1
	2-Furaldehyde	L	Pass	148	3.4
Amides					
132 Aliphatic and Alicyclic	n,n-Dimethylacetamide	L	Pass	118	2.1
	n,n-Dimethylformamide	L	Pass	109	0.5
135 Acrylamides	Acrylamide	L	Pass	>480	ND

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KLEENGUARD* A80 Chemical Protection

Chemical Resistance Test Data

Permeation ASTM F739

Class and Sub Class Name	Chemical Name	Physical Phase	Liquid Penetration ASTM F903 <small>Test Duration: 60 mins Saturation Exposure</small>	Normalized Breakthrough Time (minutes)	Rate (µg/cm ² /min)
Amines					
141 Aliphatic and Alicyclic, Primary	Ethanolamine, 99+%	L	Pass	>480	ND
142 Aliphatic and Alicyclic Secondary	Diethylamine	L	Pass ⚠	20	High
143 Aliphatic and Alicyclic Tertiary	Triethylamene	L	Pass ⚠	>480	ND
145 Aromatic, Primary	Aniline	L	Pass	396	0.12
	o-Toluidine	L	Pass	310	0.98
148 Aliphatic and Alicyclic Polyamines	Ethylenediamine, 99+%	L	Pass ⚠	> 480	ND
161 Aliphatic and Alicyclic Anhydrides	Acetic anhydride	L	Pass	> 480	ND
Isocyanates					
211 Aliphatic and Alicyclic	Hexamethylene diisocyanate	L	NT	> 480	ND
	Methyl isocyanate	L	NT ⚠	> 480	ND
212 Aromatic	Toluene-2, 4-diisocyanate	L	Pass	> 480	ND
Esters, Carboxylic					
222 Acetates	Ethyl acetate	L	Pass	18	0.82
226 Benzoates and Phthalates	Methyl salicylate, 99+%	L	Pass	> 480	ND
Ethers					
241 Aliphatic and Alicyclic	Tetrahydrofuran	L	Pass	Immed.	High
245 Glycol Ethers	Butyl Cellosolve®	L	Pass	> 480	< 0.02
	Ethyl Cellosolve®	L	Pass	> 480	ND
	Ethyl Cellosolve® acetate	L	Pass	475	0.06
	Ethylene diglycol monoethyl ether	L	Pass	> 480	ND
	Methyl Cellosolve®	L	Pass	98	1.41
Methyl Cellosolve® acetate	L	Pass	117	1.42	

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KLEENGUARD* A80 Chemical Protection

Chemical Resistance Test Data

Class and Sub Class Name	Chemical Name	Physical Phase	Liquid Penetration ASTM F903 <i>Test Duration: 60 mins Saturation Exposure</i>	Permeation ASTM F739	
				Normalized Breakthrough Time (minutes)	Rate (µg/cm ² /min)
Halogen Compounds					
261 Aliphatic and Alicyclic	Carbon tetrachloride, 99.5%	L	Pass	> 480	ND
	1,1,2,2-Tetrachloroethane	L	Pass	176	2.37
263 Aromatic	Dichloromethane	L	Pass	Immed.	High
	1,2,4-Trichlorobenzene	L	Pass	437	1.45
	o-Nitrochlorobenzene				
264 Vinyllic	Tetrachloroethylene	L	Pass	50	8.17
266 Benzylic	Benzyl chloride, 99%	L	Pass	96	81.2
Heterocyclic Compounds					
275 Oxygen, Epoxides	Epichlorohydrin	L	Pass	73	0.35
277 Oxygen, Furans	2-Furaldehyde	L	Pass	197	4.23
Hydrazines					
280 Hydrazines	1,1-Dimethylhydrazine	L	Pass	36	1.48
	Hydrazine	L	Pass	462	0.09
Hydrocarbons					
291 Aliphatic and Alicyclic, Saturated	Diesel fuel	L	Pass	> 480	ND
	JP-8 jet fuel	L	Pass	> 480	ND
	n-Hexane	L	Pass	> 480	ND
	Mineral spirits	L	Pass	> 480	ND
292 Aromatic	Benzene	L	Pass	7	20.8
	Ethylbenzene	L	Pass	92	11.64
	Gasoline	L	Pass	> 480	ND
	m-Xylene, 99%	L	Pass	95	51.3
	Styrene	L	Pass	14	17.4
	Toluene	L	Pass	6	High
	Gasoline (unleaded)	L	Pass	> 480	ND
293 Aromatic Polynuclear	Naphthalene in IPA, 15%	L	Pass	>480	ND
Peroxides					
300 Peroxides	Hydrogen peroxide (35%)	L	Pass	>480	ND

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KLEENGUARD* A80 Chemical Protection

Chemical Resistance Spray Data

				Permeation ASTM F739	
Class and Sub Class Name	Chemical Name	Physical Phase	Liquid Penetration ASTM F903 <small>Test Duration: 60 mins Saturation Exposure</small>	Normalized Breakthrough Time (minutes)	Rate $\mu\text{g}/\text{cm}^2/\text{min}$
Hydroxylic Compounds					
311 Aliphatic and Alicyclic, Primary	n-Butanol	L	Pass	>480	ND
	Ethanolamine, 99+%	L	Pass	> 480	ND
	Methanol	L	Pass	> 480	0.01
312 Aliphatic and Alicyclic, Secondary	Benzyl alcohol, 99+%	L	Pass \triangle	>480	ND
	2-Propanol (IPA-isopropanol)	L	Pass	>480	ND
314 Aliphatic and Alicyclic, Polyols	Ethylene glycol	L	Pass	> 480	ND
315 Aliphatic and Alicyclic, Substituted	2,2,2-Trichloroethanol	L	Pass	> 480	ND
	2,2,2-Trifluoroethanol	L	Pass	> 480	ND
316 Aromatic, Phenols	Cresol (mixed isomers)	L	Pass	> 480	ND
	Phenol, 90%	L	Pass	> 480	ND
Elements					
330 Element	Mercury	L	Pass	> 480	ND
Inorganic Salts					
340 Inorganic Salts (Solutions)	Potassium acetate, 10%	L	Pass	> 480	ND
	Potassium chromate, 10%	L	Pass	> 480	ND
	Sodium fluoride, 10%	L	Pass	> 480	ND
	Sodium hypochlorite, 5.25%	L	Pass	> 480	ND
Cyano Compounds					
345 Inorganic Cyano Compounds	Sodium cyanide, 10%	L	Pass	> 480	ND
Inorganic Gases and Vapors					
350 Inorganic Gases and Vapors	Ammonia gas	G	Not Applicable	> 480	ND
	Chlorine gas	G	Not Applicable	> 480	ND

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Chemical Resistance Test Data

Class and Sub Class	Chemical Name	Physical Phase	Liquid Penetration ASTM F903 <small>Test Duration: 60 mins Saturation Exposure</small>	Permeation ASTM F739	
				Normalized Breakthrough Time (minutes)	RateName (µg/cm ² /min)
Inorganic Acid Halides					
360 Inorganic Acid Halides	Antimony pentachloride	L	Pass	Immed.	255.4
	Phosphorous trichloride	L	Pass	Immed.	169
Inorganic Acids					
370 Inorganic Acids	Chromic acid	L	Pass	> 480	ND
	Nitric acid, 70%	L	Pass	> 480	< 0.07
	Oleum, 30% free SO ₃	L	Pass \triangle	> 480	ND
	Phosphoric acid, 85%	L	Pass	> 480	< 0.07
	Sulfuric acid, 98%	L	Pass	> 480	< 0.02
	Hydrochloric acid, 37%	L	Pass	> 480	ND
	Hydrochloric acid, 48%	L	Pass	> 480	ND
Hydrofluoric acid, 50%	L	Pass	> 480	ND	
Inorganic Bases					
380 Inorganic Bases	Ammonium hydroxide, 28%	L	Pass	385	0.07
	Potassium hydroxide, 50%	L	Pass	> 480	ND
	Sodium hydroxide, 50%	L	Pass	> 480	ND
Ketones					
391 Aliphatic and Alicyclic	Acetone	L	Pass	22	High
	Chloroacetone	L	Pass \triangle	> 480	0.06
	Methyl ethyl ketone	L	Pass	14	3.97
Nitriles					
431 Aliphatic and Alicyclic	Acetonitrile	L	Pass \triangle	35	0.77
	Acrylonitrile, 99+%	L	Pass \triangle	> 480	ND
Nitro Compounds					
441 Unsubstituted 442 Substituted	Nitrobenzene	L	Pass	77	3.80
	o-Nitrochlorobenzene, 99%	L	Pass	> 480	ND
	o-Nitrotoluene	L	Pass	395	0.72

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Class and Sub Class Name	Chemical Name	Physical Phase	Liquid Penetration ASTM F903 <i>Test Duration: 60 mins Saturation Exposure</i>	Normalized Breakthrough Time (minutes)	Rate $\mu\text{g}/\text{cm}^2/\text{min}$
Organic Phosphorous Compounds					
<i>462 Derivatives</i>	Tetraethyl-lead	L	PASS	> 480	ND
Sulfur Compounds					
<i>502 Sulfides and Disulfides</i>	Carbon Disulfide	L	PASS \triangle	Immed.	High
Miscellaneous					
<i>590 Miscellaneous (not classified)</i>	Gasohol	L	PASS	163	2.65

NT= Not Tested Immed. = Immediate ND = Not Detected L = Liquid G = Gas

\triangle Warning: This chemical passes Penetration testing but is considered a known/suspected human carcinogen or skin absorbed toxic chemical, and has a vapor pressure greater than 5 mm Hg at 77°F (25°C), as defined in NFPA 1992-2005 (paragraphs 4.1.11 and 4.1.12). These chemicals are considered both a liquid and vapor hazard. Suitability for use should be determined by a professional trained in industrial safety. Failure to comply with this warning can result in serious injury or death.

For more information, visit our online
Chemical Resistance Database at
www.kc-safety.com/chemicalbarrierdata



Safety Considerations

IMPROPER USE OR FAILURE TO HEED WARNINGS MAY RESULT IN SERIOUS INJURY OR DEATH.

- ⚠ The garment should be replaced immediately if ripped, torn, abraded, punctured or if damage is observed in the outer layer of the material. Discontinue use if chemical contact with the skin occurs and take appropriate action immediately.
- ⚠ Fabrics are not flame resistant. Keep away from sparks, flames and other sources of ignition. Melting fabric can cause severe burns.

The information provided in this literature is intended as a guide for safety professionals having the technical knowledge and responsibility for determining the appropriate protection needs of individuals in specific usage conditions. When selecting Chemical Protective Clothing, ensure that the garments being used are made from a fabric that is appropriate for the specific chemical exposure situation; carefully consider the work situation and other factors when deciding on the proper seam and garment type. It is the responsibility of the users to assess the level of hazardous chemical exposure and then decide on the appropriate personal protective equipment needed for each circumstance.

Test results are reported as averages. Individual results may vary.

The information provided within this literature refers to the performance of the fabric only, in the laboratory, under controlled conditions. It does not demonstrate performance of a whole garment in a use situation. Seams and closures may have shorter breakthrough times, higher permeation rates, and inferior penetration results; thus the garment may allow greater penetration of liquids compared to the fabric alone.

Protective garments should only be used in situations where the identity and concentration of each chemical exposure are known. The material used in KLEENGUARD* protective apparel should not be used for chemical emergency response or other applications of an emergency nature unless the chemical and its concentrations are known and testing demonstrates that the fabric and construction are appropriate.



Ensure the garment is worn correctly. The wearer should ensure that the front zipper is properly secured with the flap folded over the zipper. A combination of garments and other personal protective equipment should be used to provide total necessary protection.

Protective Apparel should only be used when properly supervised and assisted, following OSHA and industry recommended practices and safety precautions.

Before removing, decontaminate the garment as necessary. Do not re-use or launder apparel. The length of use of KLEENGUARD* garments is determined by the specific end-user application and the types of potential hazards present during use.

Always dispose of used garments in a safe and appropriate manner in accordance with applicable Federal, State, and local environmental regulations.



Your total satisfaction means everything to us. If, for any reason, our products do not meet your expectations, Kimberly-Clark will reimburse you† for your initial purchase, via FREE product, for up to \$1,000.

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† Guarantee extended to consuming end-user accounts only.

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