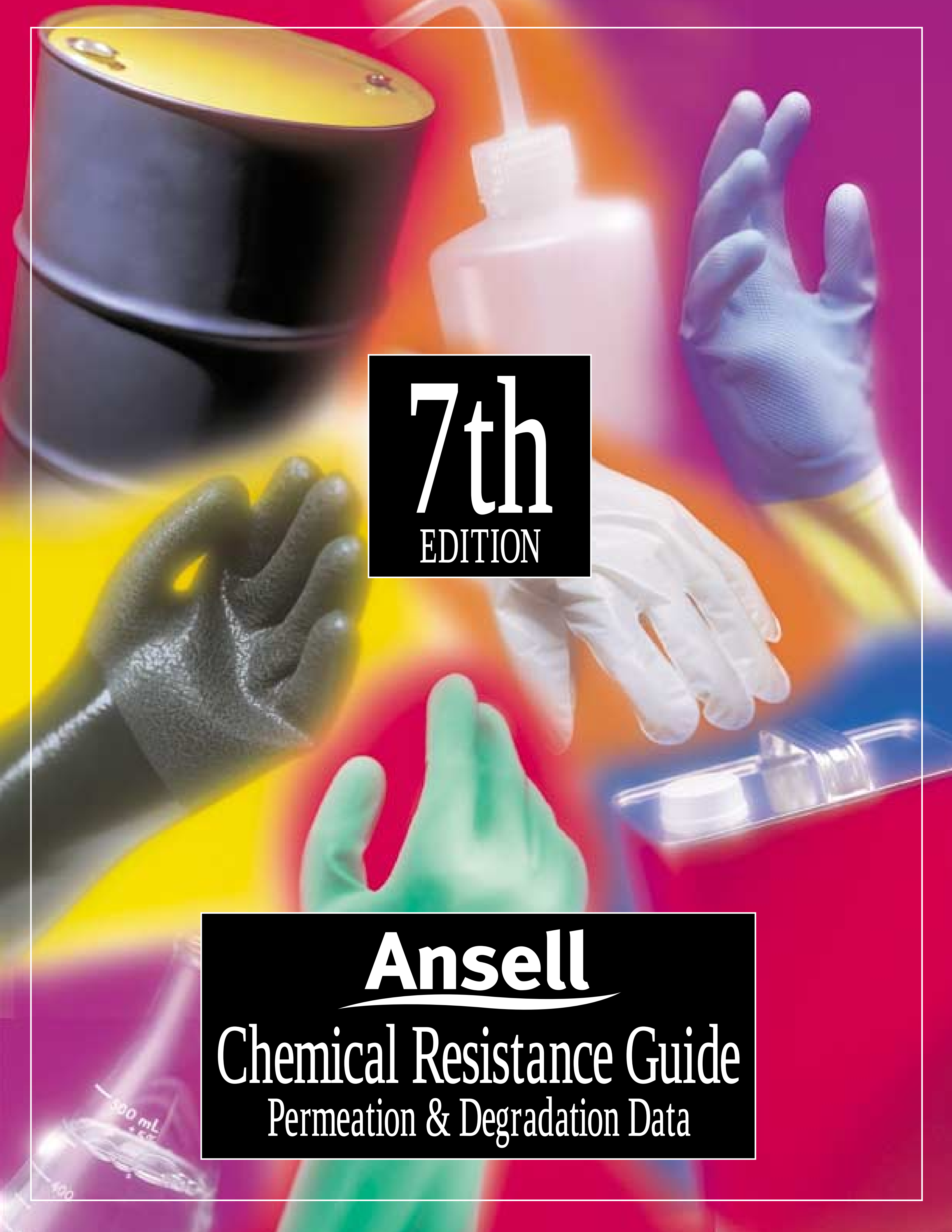

7th EDITION

Ansell

Chemical Resistance Guide

Permeation & Degradation Data

Introduction to the 7th Edition

When reviewing the following recommendations, remember that tests are conducted under laboratory conditions, and that actual workplace conditions usually dictate a *combination* of performance capabilities. A product's resistance to cuts, punctures, and abrasion must also be taken into account as a critical usage factor. A glove with excellent permeation resistance may not be adequate if it tears or punctures easily. Always factor in the physical performance requirements of the job or application when selecting a chemical-resistant glove.

Permeation/Degradation Resistance Guide for Ansell Chemical Resistant Gloves

Ansell's ASTM standard permeation and degradation tests are presented on the following pages as an aid in determining the general suitability of various products for use with specific chemicals. Because the conditions of ultimate use are beyond our control, and because we cannot run permeation tests in all possible work environments and across all combinations of chemicals and solutions, these recommendations are advisory only. THE SUITABILITY OF THE PRODUCT FOR A SPECIFIC JOB MUST BE DETERMINED BY TESTING BY THE PURCHASER.

Definition of Key Terms

Permeation is a process by which a chemical can pass through a protective film without going through pinholes, pores, or other visible openings. Individual molecules of the chemical enter the film, and "squirm" through by passing between the molecules of the glove compound or film. In many cases the permeated material may appear unchanged to the human eye.

Chemical permeation can be described in simple terms by comparing it to what happens to the air in a balloon after several hours. Although there are no holes or defects, and the balloon is tightly sealed, the air gradually passes through (permeates) its walls and escapes. This simple example uses gas permeation, but the principle is the same with liquids or chemicals.

Permeation data are presented in two values: **Breakthrough** time and **Rate.** Breakthrough times (min.) are the times observed from the start of the test to first detection of the chemical on the other side of the sample (for test methodology, see the outside back cover of this guide). These times represent how long a glove can be expected to provide effective permeation resistance when totally immersed in the test chemical.

Permeation rates are the highest *flow rates* recorded for the permeating chemicals through the glove samples during a six-hour or eight-hour test. These qualitative ratings are comparisons of permeation rates to each other.

Degradation is a reduction in one or more physical properties of a glove material due to contact with a chemical. Certain glove materials may become hard, stiff, or brittle, or they may grow softer, weaker, and swell to several times their original size. If a chemical has a significant impact on the physical properties of a glove material, its permeation resistance is quickly impaired. For this reason, glove/chemical combinations rated "Poor" or "Not Recommended" in degradation testing were not tested for permeation resistance. Please note, however, that permeation and degradation do not always correlate.

The overall Degradation **Rating** for each chemical is explained in "How To Read The Charts."

How to Read the Charts

Three categories of data are represented for each Ansell product and corresponding chemical: 1) overall degradation resistance rating; 2) permeation breakthrough time, and 3) permeation rate.

Standards for Color-Coding

A glove-chemical combination receives GREEN if either set of the following conditions is met:

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

OR

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

A glove-chemical combination receives RED if: the degradation rating is Poor or Not Recommended, regardless of the permeation rating.

All other glove-chemical combinations receive YELLOW. In other words, any glove-chemical combination not meeting either set of conditions required for Green, and not having a Red degradation rating of either Poor or Not Recommended, receives a YELLOW rating.

Key to Permeation Rate

	Simply Stated, Drops/hr Through a Glove (eyedropper-size drops)
E – Excellent; permeation rate of less than 0.9 µg/cm²/min.	0 to 1/2 drop
VG – Very Good; permeation rate of less than 9 µg/cm²/min.	1 to 5 drops
G – Good; permeation rate of less than 90 µg/cm²/min.	6 to 50 drops
F – Fair; permeation rate of less than 900 µg/cm²/min.	51 to 500 drops
P – Poor; permeation rate of less than 9000 µg/cm²/min.	501 to 5000 drops
NR – Not Recommended; permeation rate greater than 9000 µg/cm²/min.	5001 drops up

Note: The current revision to the ASTM standard permeation test calls for permeation to be reported in micrograms of chemical permeated per square centimeter of material exposed per minute of exposure, "µg/cm²/min."

Key to Permeation Breakthrough

>Greater than (time) <Less than (time)

Key to Degradation Ratings

E – Excellent; fluid has very little degrading effect.
G – Good; fluid has minor degrading effect.
F – Fair; fluid has moderate degrading effect.
P – Poor; fluid has pronounced degrading effect.
NR – Fluid was not tested against this material.

NOTE: Any test samples rated P (poor) or NR (not recommended) in degradation testing were not tested for permeation resistance. A dash (–) appears in those cases.

Specific Gloves Used for Testing

	Degradation	Permeation
Nitrile	Sol-Vex® 37-145 (11 mil/0.28 mm)	Sol-Vex® 37-165 (22 mil/0.54 mm)
Neoprene Unsupported	29-865 (18 mil/0.46 mm)	29-865 (18 mil/0.46 mm)
Polyvinyl Alcohol Supported	PVA™	PVA™
Polyvinyl Chloride Supported	Snorkel®	Monkey Grip™
Natural Rubber Latex	Canners 392 (19 mil/0.48 mm)	Canners 392 (19 mil/0.48 mm)
Neoprene/Latex Blend	Chemi-Pro 224 (27 mil/0.67 mm)	Chemi-Pro 224 (27 mil/0.67 mm)
Laminated LCP™ Film	Barrier 2-100 (2.5 mil/0.06 mm)	Barrier 2-100 (2.5 mil/0.06 mm)

Single palm thickness is listed in both mil and metric millimeter (mm) for Unsupported Gloves. Supported Gloves are specified by glove weight, not thickness.

Why is a product with a shorter breakthrough time sometimes given a better rating than one with a longer breakthrough time?

One glove has a breakthrough time of just 4 minutes. It is rated "very good," while another with a breakthrough time of 30 minutes is rated only "fair." Why? The reason is simple: in some cases the *rate* is more significant than the *time*.

Imagine connecting two hoses of the same length but different diameters to a faucet using a "Y" connector. When you turn on the water, what happens? Water goes through the smaller hose first because there is less space inside that needs to be filled. But when the water finally gets through the larger hose it really gushes out. In only a few minutes, the larger hose will discharge much more water than the smaller one, even though the smaller one started first.

The situation is similar with gloves. A combination of a short breakthrough time and a low permeation rate may expose a glove wearer to less chemical than a combination of a longer breakthrough time and a much higher breakthrough rate, if the glove is worn long enough.

SPECIAL NOTE: The chemicals in this guide highlighted in BLUE are experimental carcinogens, according to the ninth edition of Sax' *Dangerous Properties of Industrial Materials.* Chemicals highlighted in GRAY are listed as suspected carcinogens, experimental carcinogens at extremely high dosages, and other materials which pose a lesser risk of cancer.

Permeation/Degradation Resistance Guide for Ansell Gloves

The first square in each column for each glove type is color coded. This is an easy-to-read indication of how we rate this type of glove in relation to its applicability for each chemical listed. The color represents an overall rating for both degradation and permeation. The letter in each square is for Degradation alone…

- GREEN: The glove is very well suited for application with that chemical.
- YELLOW: The glove is suitable for that application under careful control of its use.
- RED: Avoid use of the glove with this chemical.

CHEMICAL	LAMINATE FILM BARRIER			NITRILE SOL-VEX			UNSUPPORTED NEOPRENE 29-865			SUPPORTED POLYVINYL ALCOHOL PVA			POLYVINYL CHLORIDE (Vinyl) SNORKEL			NATURAL RUBBER CANNERS AND HANDLERS*			NEOPRENE/ NATURAL RUBBER BLEND CHEMI-PRO*		
	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate
1. Acetaldehyde	■	380	E	P	—	—	E	10	F	NR	—	—	NR	—	—	E	7	F	E	10	F
2. Acetic Acid	■	150	—	G	270	—	E	60	—	NR	—	—	F	180	—	E	110	—	E	260	—
3. Acetone	▲	>480	E	NR	—	—	E	10	F	P	—	—	NR	—	—	E	10	F	G	10	G
4. Acetonitrile	▲	>480	E	F	30	F	E	20	G	■	150	G	NR	—	—	E	4	VG	E	10	VG
5. Acrylic Acid	—	—	—	G	120	—	E	390	—	NR	—	—	NR	—	—	E	80	—	E	65	—
6. Acrylonitrile	E	>480	E	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7. Allyl Alcohol	▲	>480	E	F	140	F	E	140	VG	P	—	—	P	60	G	E	>10	VG	E	20	VG
8. Ammonia Gas	■	19	E	▲	>480	—	▲	>480	—	—	—	—	■	6	VG	—	—	—	■	27	VG
9. Ammonium Fluoride, 40%	—	—	—	E	>360	—	E	>480	—	NR	—	—	E	>360	—	E	>360	—	E	>360	—
10. Ammonium Hydroxide	E	30	—	E	>360	—	E	250	—	NR	—	—	E	240	—	E	90	—	E	240	—
11. Amyl Acetate	▲	>480	E	E	60	G	NR	—	—	G	>360	E	P	—	—	NR	—	—	P	—	—
12. Amyl Alcohol	—	—	—	E	30	E	E	290	VG	G	180	G	G	12	E	E	25	VG	E	45	VG
13. Aniline	▲	>480	E	NR	—	—	E	100	P	F	>360	E	F	180	VG	E	25	VG	E	50	G
14. Aqua Regia	—	—	—	F	>360	—	G	>480	—	NR	—	—	G	120	—	NR	—	—	G	180	—
15. Benzaldehyde	▲	>480	E	NR	—	—	NR	—	—	G	>360	E	NR	—	—	G	10	VG	G	25	F
16. Benzene, Benzol	▲	>480	E	P	—	—	NR	—	—	E	>360	E	NR	—	—	NR	—	—	NR	—	—
17. Benzotrichloride	—	—	—	E	>480	E	NR	—	—	—	—	—	—	—	—	NR	—	—	NR	—	—
18. Benzotrifluoride	—	—	—	E	170	G	F	—	—	E	—	—	G	<10	F	P	50	G	—	—	—
19. Bromine Water	—	—	—	E	>480	E	E	>480	E	—	—	—	—	—	—	—	—	—	—	—	—
20. 1-Bromopropane	▲	>480	E	■	23	F	■	<10	P	▲	>480	E	■	<10	F	■	<10	P	■	<10	P
21. Bromopropionic Acid	▲	>480	—	F	120	—	E	420	—	NR	—	—	G	180	—	E	190	—	G	180	—
22. Butyl Acetate	▲	>480	E	F	75	F	NR	—	—	G	>360	E	NR	—	—	NR	—	—	P	—	—
23. Butyl Alcohol	▲	>480	E	E	>360	E	E	210	VG	F	75	G	G	180	VG	E	20	VG	E	45	VG
24. Butyl Carbitol	—	—	—	E	323	E	G	188	F	E	>480	E	E	397	VG	E	44	G	E	148	G
25. Butyl Cellosolve	▲	>480	E	E	90	VG	E	120	F	■	120	G	P	—	—	E	45	G	E	40	G
26. gamma-Butyrolactone	▲	>480	E	NR	—	—	E	190	F	E	120	VG	NR	—	—	E	60	G	E	100	F
27. Carbon Disulfide	▲	>480	E	G	30	F	NR	—	—	E	>360	E	NR	—	—	NR	—	—	NR	—	—
28. Carbon Tetrachloride	—	—	—	G	150	G	NR	—	—	E	>360	E	F	25	F	NR	—	—	NR	—	—
29. Cellosolve Acetate	▲	>480	E	F	90	G	E	40	P	▲	>360	E	NR	—	—	E	10	G	E	15	G
30. Cellosolve Solvent	E	>480	E	G	210	G	E	120	F	—	75	G	P	—	—	E	25	VG	E	20	VG
31. Chlorine Gas	▲	>480	E	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
32. 2-Chlorobenzyl Chloride	—	—	—	E	120	E	P	—	—	E	>480	E	F	65	E	F	20	F	—	—	—
33. Chlorobenzene	▲	>480	E	NR	—	—	NR	—	—	E	>360	E	NR	—	—	NR	—	—	NR	—	—
34. Chloroform	E	20	G	NR	—	—	NR	—	—	E	>360	E	NR	—	—	NR	—	—	NR	—	—
35. Chloronaphthalene	▲	>480	E	P	—	—	NR	—	—	G	>360	E	NR	—	—	NR	—	—	P	—	—
36. 2-Chlorotoluene	—	—	—	G	120	G	NR	—	—	F	—	—	F	—	—	NR	—	—	NR	—	—
37. ortho-Chlorotoluene	—	—	—	G	120	G	NR	—	—	F	—	—	F	—	—	NR	—	—	NR	—	—
38. Chromic Acid, 50%	—	—	—	F	240	—	NR	—	—	NR	—	—	G	>360	—	NR	—	—	NR	—	—
39. Citric Acid, 10%	—	—	—	E	>360	—	E	>480	—	P	—	—	E	>360	—	E	>360	—	E	>360	—
40. Cyclohexanol	▲	>480	E	E	>360	E	E	390	VG	G	>360	E	E	360	E	E	10	G	E	20	G
41. Cyclohexanone	▲	>480	E	F	103	G	P	—	—	E	>480	E	NR	—	—	P	—	—	P	—	—
42. 1, 5-Cyclooctadiene	—	—	—	E	>480	E	NR	—	—	—	—	—	P	—	—	NR	—	—	NR	—	—
43. Diacetone Alcohol	▲	>480	E	G	240	E	E	140	G	■	150	G	NR	—	—	E	15	VG	E	60	VG
44. Dibutyl Phthalate	—	—	—	G	>360	E	F	<10	F	E	>360	E	NR	—	—	E	20	—	G	>360	E
45. Diethylamine	▲	>480	E	F	45	F	P	—	—	NR	—	—	NR	—	—	NR	—	—	NR	—	—

Note: All numeric designations within the product classifications are denoted in minutes.

▲ A degradation test against this chemical was not run. However, since its breakthrough time is greater than 480 minutes, the Degradation Rating is expected to be **Good** to **Excellent.**

■ A degradation test against this chemical was not run. However, in view of degradation tests performed with similar compounds, the Degradation Rating is expected to be **Good** to **Excellent.**

***CAUTION:** This product contains natural rubber latex which may cause allergic reactions in some individuals.

      

This Information Applies Only to Ansell Occupational Healthcare Glove Brands

CHEMICAL	LAMINATE FILM BARRIER			NITRILE SOL-VEX			UNSUPPORTED NEOPRENE 29-865			SUPPORTED POLYVINYL ALCOHOL PVA			POLYVINYL CHLORIDE (Vinyl) SNORKEL			NATURAL RUBBER CANNERS AND HANDLERS*			NEOPRENE/ NATURAL RUBBER BLEND CHEMI-PRO*		
	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate
46. Di-Isobutyl Ketone, DIBK	▲	>480	E	E	120	F	P	—	—	G	>360	E	P	—	—	P	—	—	P	—	—
47. Dimethyl Acetamide, DMAC	▲	>480	E	NR	—	—	NR	—	—	NR	—	—	NR	—	—	E	15	G	E	30	G
48. Dimethyl Formamide, DMF	▲	>480	E	NR	—	—	E	40	F	NR	—	—	NR	—	—	E	25	VG	E	40	G
49. Dimethyl Sulfoxide, DMSO	▲	>480	E	E	>240	VG	E	360	G	NR	—	—	NR	—	—	E	180	E	E	150	E
50. Dioctyl Phthalate, DOP	▲	>480	E	G	>360	E	G	>480	E	E	30	F	NR	—	—	P	—	—	E	>360	E
51. Dioxane	▲	>480	E	NR	—	—	NR	—	—	P	—	—	NR	—	—	F	5	F	F	15	F
52. Electroless Copper	—	—	—	E	>360	—	E	>360	—	NR	—	—	E	>360	—	E	>360	—	—	—	—
53. Electroless Nickel	—	—	—	E	>360	—	E	>360	—	NR	—	—	E	>360	—	E	>360	—	E	>360	—
54. Epichlorohydrin	▲	>480	E	NR	—	—	P	—	—	E	300	E	NR	—	—	E	5	F	E	15	G
55. Ethidium Bromide, 10%	▲	>480	E	▲	>480	E	—	—	—	NR	—	—	—	—	—	—	—	—	—	—	—
56. Ethyl Acetate	▲	>480	E	NR	—	—	F	10	P	F	>360	E	NR	—	—	G	5	F	F	10	F
57. Ethyl Alcohol	▲	>480	E	E	240	VG	E	113	VG	NR	—	—	G	60	VG	E	37	VG	E	20	G
58. Ethylene Dichloride	▲	>480	—	NR	—	—	NR	—	—	E	>360	E	NR	—	—	P	—	—	P	—	—
59. Ethylene Glycol	▲	>480	E	E	>360	E	E	>480	—	F	120	VG	E	>360	E	E	>360	E	E	>480	E
60. Ethylene Oxide Gas	▲	234	E	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
61. Ethyl Ether	▲	>480	E	E	120	G	F	<10	P	G	>360	E	NR	—	—	NR	—	—	NR	—	—
62. Ethyl Glycol Ether	▲	>480	E	G	210	G	E	120	F	■	75	G	P	—	—	E	25	VG	E	20	VG
63. Formaldehyde	▲	>480	E	E	>360	E	E	105	G	P	—	—	E	100	VG	E	10	G	E	15	VG
64. Formic Acid, 90%	▲	>480	—	F	240	—	E	>480	—	NR	—	—	E	>360	—	E	150	—	E	>360	—
65. Furfural	▲	>480	E	NR	—	—	E	30	P	F	>360	E	NR	—	—	E	15	VG	E	40	G-VG
66. Glutaraldehyde, 25%	—	—	—	—	>360	—	E	>480	E	P	—	—	E	>360	E	E	210	VG	E	—	—
67. Gasoline (hi-test)	■	170	E	E	>360	E	NR	—	—	G	>360	E	P	—	—	NR	—	—	NR	—	—
68. HCFC-141b	▲	>480	E	E	92	F	F	33	P	P	—	—	NR	—	—	NR	—	—	NR	—	—
69. HFE 7100	▲	>480	E	E	>480	E	E	>480	E	P	—	—	E	>480	E	E	120	E	—	—	—
70. HFE 71DE	▲	164	E	F	10	F	F	<10	F	F	>480	E	NR	—	—	NR	—	—	NR	—	—
71. Hexamethyldisilazane	▲	>480	E	E	>360	—	E	15	—	G	>360	—	P	—	—	F	15	F	F	40	F-G
72. Hexane	▲	>480	E	E	>360	E	E	40	F	G	>360	E	NR	—	—	NR	—	—	P	—	—
73. Hydrazine, 65%	—	—	—	E	>360	—	E	380	—	NR	—	—	E	>360	—	E	150	VG	E	>360	—
74. Hydrobromic Acid	▲	>480	—	E	>360	E	E	>480	—	NR	—	—	E	>360	E	E	>360	E	E	>360	E
75. Hydrochloric Acid, conc.	▲	>480	—	E	>360	—	E	>480	—	NR	—	—	E	>300	—	E	290	—	E	>360	—
76. Hydrochloric Acid, 10%	—	—	—	E	>360	—	E	>480	—	NR	—	—	E	>360	—	E	>360	—	E	>360	—
77. Hydrofluoric Acid, 48%	E	>480	—	E	334	—	E	>480	—	NR	—	—	G	155	—	E	190	—	E	153	—
78. Hydrogen Fluoride Gas	▲	>480	E	■	<15	P	—	—	—	—	—	—	—	—	—	E	<15	F	■	<15	F
79. Hydrogen Peroxide, 30%	—	—	—	E	>360	—	E	>480	—	NR	—	—	E	>360	—	E	>360	—	G	90	—
80. Hydroquinone, saturated	—	—	—	E	>360	E	E	140	F	NR	—	—	E	>360	E	G	>360	E	E	>360	—
81. Hypophosphorus Acid	—	—	—	E	>480	—	E	>480	—	—	—	—	—	—	—	E	>480	—	—	—	—
82. Isobutyl Alcohol	▲	>480	E	E	>360	E	E	470	E	P	—	—	F	10	VG	E	15	VG	E	45	VG
83. Iso-Octane	▲	>480	E	E	360	E	E	230	G	E	>360	E	P	—	—	NR	—	—	P	—	—
84. Isopropyl Alcohol	▲	>480	E	E	>360	E	E	<10	VG	NR	—	—	G	150	E	E	20	VG	E	40	VG
85. Kerosene	▲	>480	E	E	>360	E	E	170	P	G	>360	E	F	>360	E	NR	—	—	P	—	—
86. Lactic Acid, 85%	▲	>480	—	E	>360	E	E	>480	—	F	>360	E	E	>360	E	E	>360	—	E	>360	—
87. Lauric Acid, 36%/EtOH	—	—	—	E	>360	—	E	>480	—	NR	—	—	F	15	—	E	>360	—	E	>360	—
88. d-Limonene	▲	>480	E	E	>480	E	P	—	—	G	>480	E	G	125	G	NR	—	—	NR	—	—
89. Maleic Acid, saturated	—	—	—	E	>360	—	E	>480	—	NR	—	—	G	>360	—	E	>360	—	E	>360	—
90. Mercury	—	—	—	▲	>480	E	—	—	—	—	—	—	▲	>480	E	▲	>480	E	—	—	—

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CHEMICAL	LAMINATE FILM BARRIER: Degradation Rating	LAMINATE FILM BARRIER: Permeation: Breakthrough	LAMINATE FILM BARRIER: Permeation: Rate	NITRILE SOL-VEX: Degradation Rating	NITRILE SOL-VEX: Permeation: Breakthrough	NITRILE SOL-VEX: Permeation: Rate	UNSUPPORTED NEOPRENE 29-865: Degradation Rating	UNSUPPORTED NEOPRENE 29-865: Permeation: Breakthrough	UNSUPPORTED NEOPRENE 29-865: Permeation: Rate	SUPPORTED POLYVINYL ALCOHOL PVA: Degradation Rating	SUPPORTED POLYVINYL ALCOHOL PVA: Permeation: Breakthrough	SUPPORTED POLYVINYL ALCOHOL PVA: Permeation: Rate	POLYVINYL CHLORIDE (Vinyl) SNORKEL: Degradation Rating	POLYVINYL CHLORIDE (Vinyl) SNORKEL: Permeation: Breakthrough	POLYVINYL CHLORIDE (Vinyl) SNORKEL: Permeation: Rate	NATURAL RUBBER CANNERS AND HANDLERS*: Degradation Rating	NATURAL RUBBER CANNERS AND HANDLERS*: Permeation: Breakthrough	NATURAL RUBBER CANNERS AND HANDLERS*: Permeation: Rate	NEOPRENE/ NATURAL RUBBER BLEND CHEMI-PRO*: Degradation Rating	NEOPRENE/ NATURAL RUBBER BLEND CHEMI-PRO*: Permeation: Breakthrough	NEOPRENE/ NATURAL RUBBER BLEND CHEMI-PRO*: Permeation: Rate
91. 1-methoxy-2-acetoxypropane	▲	>480	E	E	200	F	G	37	F	E	>360	E	P	—	—	G	13	F	G	18	F
92. Methyl Alcohol	E	>480	E	E	198	VG	E	65	G	NR	—	—	G	45	G	E	20	VG	E	20	VG
93. Methylamine	▲	>480	E	E	>360	E	E	140	G	NR	—	—	E	135	VG	E	55	VG	E	80	VG
94. Methyl Cellosolve	E	440	E	F	11	G	P	—	—	G	30	G	P	—	—	E	20	VG	E	20	VG
95. Methylene Bromide	▲	>480	E	NR	—	—	NR	—	—	G	>360	E	NR	—	—	NR	—	—	NR	—	—
96. Methylene Chloride	E	20	VG	NR	—	—	NR	—	—	G	>360	E	NR	—	—	NR	—	—	NR	—	—
97. MDI (Isocyanate)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	▲	>480	E
98. Methyl Amyl Ketone	E	>480	E	F	53	F	F	10	F	E	>360	E	NR	—	—	F	<10	F	F	<10	F
99. Methyl Ethyl Ketone, MEK	E	>480	E	NR	—	—	P	—	—	F	90	VG	NR	—	—	F	5	F	P	—	—
100. Methyl Glycol Ether	▲	>480	E	F	11	G	P	—	—	G	30	G	P	—	—	E	20	VG	E	20	VG
101. Methyl Iodide	▲	>480	E	NR	—	—	NR	—	—	F	>360	E	NR	—	—	NR	—	—	NR	—	—
102. Methyl Isobutyl Ketone	▲	>480	E	P	—	—	NR	—	—	F	>360	E	NR	—	—	P	—	—	P	—	—
103. Methyl Methacrylate	▲	>480	E	P	—	—	NR	—	—	G	>360	E	NR	—	—	P	—	—	NR	—	—
104. N-Methyl-2-Pyrrolidone	▲	>480	E	NR	—	—	NR	—	—	NR	—	—	NR	—	—	E	75	VG	F	40	G
105. Methyl t-Butyl Ether	E	>480	E	E	>360	E	P	—	—	G	>360	E	NR	—	—	NR	—	—	NR	—	—
106. Mineral Spirits, rule 66	▲	>480	E	E	>360	E	E	100	F	E	>360	E	F	150	VG	NR	—	—	G	20	F
107. Monoethanolamine	—	—	—	E	>360	E	E	260	E	F	>360	E	E	>360	E	E	50	E	E	50	E
108. Morpholine	▲	>480	E	NR	—	—	P	—	—	G	90	G	NR	—	—	G	20	G	E	30	F-G
109. Muriatic Acid	▲	>480	—	E	>360	—	E	>480	—	NR	—	—	E	>300	—	E	290	—	E	>360	—
110. Naphtha VM&P	▲	>480	E	E	>360	E	G	100	F	E	>420	E	F	120	VG	NR	—	—	NR	—	—
111. Nitric Acid, 10%	▲	>480	—	E	>360	—	E	>480	—	NR	—	—	G	>360	—	G	>360	—	E	>360	—
112. Nitric Acid, 70%	E	>480	—	NR	—	—	E	>480	—	NR	—	—	F	104	—	NR	—	—	G	90	—
113. Nitric Acid, Red Fuming	▲	>480	—	NR	—	—	NR	—	—	NR	—	—	P	—	—	NR	—	—	NR	—	—
114. Nitrobenzene	▲	>480	E	NR	—	—	NR	—	—	G	>360	E	NR	—	—	F	15	G	F	40	G
115. Nitromethane, 95.5%	▲	>480	E	F	30	F	E	60	G	G	>360	E	P	—	—	E	10	G	E	30	VG
116. Nitropropane, 95.5%	▲	>480	E	NR	—	—	E	<10	F	E	>360	E	NR	—	—	E	5	G	E	10	G
117. Octyl Alcohol	—	—	—	E	>360	E	E	218	E	G	>360	E	F	>360	E	E	30	VG	E	53	G
118. Oleic Acid	—	—	—	E	>360	E	F	13	G	G	60	E	F	90	VG	F	>360	—	G	120	—
119. Oxalic Acid, saturated	—	—	—	E	>360	—	E	>480	—	P	—	—	E	>360	—	E	>360	—	E	>360	—
120. Pad Etch 1(Ashland Chem.)	—	—	—	F	>360	—	E	>480	—	F	34	—	E	>360	—	E	>360	—	E	>360	—
121. Palmitic Acid, saturated	—	—	—	G	30	—	E	>480	—	P	—	—	G	75	—	G	5	—	E	193	—
122. Pentane	E	>480	E	E	>360	E	G	30	G	G	>360	E	NR	—	—	P	—	—	E	13	G
123. Pentachlorophenol, 5%	—	—	—	E	>360	E	E	151	F	E	5	F	F	180	E	NR	—	—	—	—	—
124. Perchloric Acid, 60%	—	—	—	E	>360	—	E	>480	—	NR	—	—	E	>360	—	F	>360	—	E	>360	—
125. Perchloroethylene	▲	>480	E	G	300	VG	NR	—	—	E	>360	E	NR	—	—	NR	—	—	NR	—	—
126. Phenol	▲	>480	E	NR	—	—	E	353	G	F	>360	E	G	75	VG	E	90	—	E	180	—
127. Phosphoric Acid, conc.	▲	>480	—	E	>360	—	G	>480	—	NR	—	—	G	>360	—	F	>360	—	G	>360	—
128. PMA Glycol Ether Acetate	▲	>480	E	E	200	F	G	37	F	E	>360	E	P	—	—	G	13	F	G	18	F
129. Potassium Hydroxide, 50%	—	—	—	E	>360	—	E	>480	—	NR	—	—	E	>360	—	E	>360	—	E	>360	—
130. Propane Gas	—	—	—	▲	>480	E	▲	>480	E	—	—	—	■	7	VG	—	—	—	—	—	—
131. Propyl Acetate	—	—	—	F	20	G	P	—	—	G	120	VG	NR	—	—	P	—	—	P	—	—
132. Propyl Alcohol	▲	>480	—	E	>360	E	E	323	E	P	—	—	F	90	VG	E	20	VG	E	30	VG
133. Propylene Oxide	▲	>480	—	NR	—	—	NR	—	—	G	35	G	NR	—	—	P	—	—	P	—	—
134. Pyridine	▲	>480	E	NR	—	—	NR	—	—	G	10	F	NR	—	—	F	10	F	P	—	—
135. Rubber Solvent	—	—	—	E	>360	E	E	43	F	E	>360	E	NR	—	—	NR	—	—	NR	—	—

Note: All numeric designations within the product classifications are denoted in minutes.

▲ A degradation test against this chemical was not run. However, since its breakthrough time is greater than 480 minutes, the Degradation Rating is expected to be **Good** to **Excellent.**

■ A degradation test against this chemical was not run. However, in view of degradation tests performed with similar compounds, the Degradation Rating is expected to be **Good** to **Excellent.**

***CAUTION:** This product contains natural rubber latex which may cause allergic reactions in some individuals.

This Information Applies Only to Ansell Occupational Healthcare Glove Brands

CHEMICAL	LAMINATE FILM BARRIER			NITRILE SOL-VEX			UNSUPPORTED NEOPRENE 29-865			SUPPORTED POLYVINYL ALCOHOL PVA			POLYVINYL CHLORIDE (Vinyl) SNORKEL			NATURAL RUBBER CANNERS AND HANDLERS*			NEOPRENE/ NATURAL RUBBER BLEND CHEMI-PRO*		
	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate	Degradation Rating	Permeation: Breakthrough	Permeation: Rate
136. Silicon Etch	—	—	—	NR	—	—	E	>480	—	NR	—	—	F	150	—	NR	—	—	P	—	—
137. Skydrol hydraulic fluid	E	>480	E	NR	—	—	NR	—	—	F	—	—	NR	—	—	NR	—	—	NR	—	—
138. Sodium Hydroxide, 50%	E	>480	—	E	>360	—	E	>480	—	NR	—	—	G	>360	—	E	>360	—	E	>360	—
139. Stoddard Solvent	▲	>480	E	E	>360	E	E	139	F	E	>360	E	F	360	E	NR	—	—	G	10	F
140. Styrene	▲	>480	E	NR	—	—	NR	—	—	G	>360	E	NR	—	—	NR	—	—	NR	—	—
141. Sulfur Dichloride	—	—	—	G	>480	E	NR	—	—	—	—	—	—	—	—	NR	—	—	—	—	—
142. Sulfuric Acid, 95%	E	>480	—	NR	—	—	F	105	—	NR	—	—	G	70	—	NR	—	—	NR	—	—
143. Sulfuric Acid 120%, Oleum	▲	>480	E	—	—	—	F	53	G	—	—	—	F	25	G	—	—	—	—	—	—
144. Sulfuric 47% battery acid	—	—	—	E	>360	—	E	>480	—	NR	—	—	G	>360	—	E	>360	—	E	>360	—
145. Tannic Acid, 65%	—	—	—	E	>360	E	E	>480	—	P	—	—	E	>360	E	E	>360	—	E	>360	—
146. Tetrachloroethene	▲	>480	E	G	300	VG	NR	—	—	E	>360	E	NR	—	—	NR	—	—	NR	—	—
147. Tetrahydrofuran, THF	▲	>480	E	NR	—	—	NR	—	—	P	90	G	NR	—	—	NR	—	—	NR	—	—
148. Toluene, toluol	▲	>480	E	F	10	F	NR	—	—	G	>360	E	NR	—	—	NR	—	—	NR	—	—
149. Toluene Di-Isocyanate (TDI)	▲	>480	E	NR	—	—	NR	—	—	G	>360	E	P	—	—	G	7	G	—	—	—
150. Triallylamine	▲	>480	E	—	>480	E	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
151. Trichloroethylene, TCE	▲	>480	E	NR	—	—	NR	—	—	E	>360	E	NR	—	—	NR	—	—	NR	—	—
152. Trichlorotrifluoroethane	—	—	—	E	>360	E	E	240	E	G	>360	E	NR	—	—	NR	—	—	NR	—	—
153. Tricresyl Phosphate, TCP	—	—	—	E	>360	E	G	<10	P	G	>360	E	F	>360	E	E	45	E	E	>360	E
154. Triethanolamine, 85%	—	—	—	E	>360	E	E	<10	G	G	>360	E	E	>360	E	G	>360	E	E	—	—
155. Turpentine	▲	>480	E	E	30	E	NR	—	—	G	>360	E	P	—	—	NR	—	—	NR	—	—
156. Vertrel MCA	▲	>480	E	E	110	G	E	20	F	F	>480	E	G	13	F	G	<10	F	G	<10	F
157. Vertrel SMT	E	<10	G	P	—	—	F	<10	P	G	17	G	G	<10	F	F	<10	F	P	—	—
158. Vertrel XE	E	105	E	E	>480	E	E	47	G	F	40	VG	G	303	E	E	17	VG	E	43	VG
159. Vertrel XF	E	>480	E	E	>480	E	E	>480	E	F	387	VG	E	>480	E	E	337	VG	E	204	VG
160. Vertrel XM	E	120	E	E	>480	E	E	105	E	F	10	G	P	—	—	E	23	VG	E	30	VG
161. Vinyl Acetate	▲	>480	E	F	18	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
162. Vinyl Chloride Gas	▲	>480	E	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
163. Xylene, Xylol	▲	>480	E	G	75	F	NR	—	—	E	>360	E	NR	—	—	NR	—	—	NR	—	—

Note: All numeric designations within the product classifications are denoted in minutes.

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■ A degradation test against this chemical was not run. However, in view of degradation tests performed with similar compounds, the Degradation Rating is expected to be **Good** to **Excellent.**

***CAUTION:** This product contains natural rubber latex which may cause allergic reactions in some individuals.

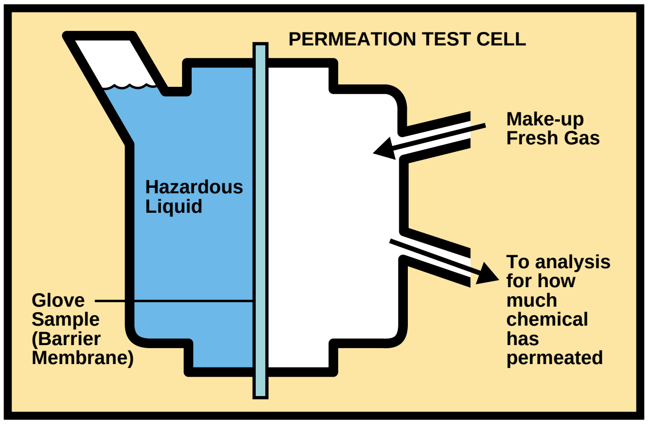
NOTE:

These recommendations are based on laboratory tests, and reflect the best judgement of Ansell Occupational Healthcare in the light of data available at the time of preparation and in accordance with the current revision of ASTM F 739. They are intended to guide and inform qualified professionals engaged in assuring safety in the workplace. Because the conditions of ultimate use are beyond our control, and because we cannot run permeation tests in all possible work environments and across all combinations of chemicals and solutions, these recommendations are advisory only. The suitability of a product for a specific application must be determined by testing by the purchaser.

The data in this guide are subject to revision as additional knowledge and experience are gained. Test data herein reflect laboratory performance of partial gloves and not necessarily the complete unit. Anyone intending to use these recommendations should first verify that the glove selected is suitable for the intended use and meets all appropriate health standards. Upon written request, Ansell will provide a sample of material to aid you in making your own selection under your own individual safety requirements.

NEITHER THIS GUIDE NOR ANY OTHER STATEMENT MADE HEREIN BY OR ON BEHALF OF ANSELL SHOULD BE CONSTRUED AS A WARRANTY OF MERCHANTABILITY OR THAT ANY ANSELL GLOVE IS FIT FOR A PARTICULAR PURPOSE. ANSELL ASSUMES NO RESPONSIBILITY FOR THE SUITABILITY OR ADEQUACY OF AN END-USER'S SELECTION OF A PRODUCT FOR A SPECIFIC APPLICATION.

Methodology



Permeation Testing

Ansell conducts permeation testing in accordance with ASTM Method F 739 standards. A specimen is cut from the glove and clamped into a test cell as a barrier membrane (see illustration above). The "exterior" side of the specimen is exposed to a hazardous chemical. At timed intervals, the unexposed "interior" side of the test cell is checked for the presence of the permeated chemical and the extent to which it may have permeated the glove material.

This standard allows a variety of options in analytical technique and collection media. At Ansell, dry nitrogen is the most common medium and gas chromatography with FID detection is the most common analytical technique. Our Research Department also uses liquids such as distilled water and hexane as collecting media, and techniques such as conductivity, colorimetry, and liquid chromatography for analysis of the collecting liquid.

Degradation Testing

Patches of the test material are cut from the product. These patches are weighed and measured, and then completely immersed in the test chemical for 30 minutes. The percentage of change in size is determined, and the patches are then dried to calculate the percentage of weight change. Observed physical changes are also reported. Ratings are based on the combined data.

Ansell Occupational Healthcare

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