

# Chemical Resistance Chart

ASTM Breakthrough Times in Minutes and ISEA/CE Ratings for Best Gloves

## Explanation of Ratings

BTT or Breakthrough times are given in minutes and represent the Normalized breakthrough times required by ASTM F 739-96 Method for Permeation. The ratings are a part of the ANSI/ISEA 105-2000 American National Standard for Hand Protection Selection Criteria. The ratings range from 0 to 6 with 6 being the best choice.

## Chemical Resistance Ratings

0	< 10 minute breakthrough time
1	≥ 10 minute breakthrough time
2	≥ 30 minute breakthrough time
3	≥ 60 minute breakthrough time
4	≥ 120 minute breakthrough time
5	≥ 240 minute breakthrough time
6	≥ 480 minute breakthrough time

Chemical by Class	Neoprene		Nitrile		Rubber		PVC		Butyl		Viton*	
	BTT	Rating	BTT	Rating	BTT	Rating	BTT	Rating	BTT	Rating	BTT	Rating
<b>Aliphatic Solvents</b>												
1. Cyclohexane	228	4	>480	6	NR	0	88	3	44	2	>480	6
2. Gasoline (unleaded)	46	2	>480	6	NR	0	22	1	NR	0	>480	6
3. Heptane	>480	6	>480	6	24	1	39	2	23	1	>480	6
4. Hexane	173	4	>480	6	21	1	29	1	13	1	>480	6
5. Isooctane	>480	6	>480	6	57	2	114	3	56	2	>480	6
6. Kerosene	>480	6	>480	6	NR	0	>480	6	94	3	>480	6
7. Petroleum Ether	99	3	>480	6	5	0	19	1	15	1	>480	6
<b>Acids, Organic</b>												
8. Acetic Acid 84%	>480	6	240	5	>480	6	300	5	>480	6	>480	6
9. Formic Acid 90%	>480	6	75	3	>480	6	>480	6	>480	6	>480	6
<b>Acids, Mineral</b>												
10. Battery 47%	>480	6	>480	6	>480	6	>480	6	>480	6	>480	6
11. Hydrochloric 37%	>480	6	>480	6	>480	6	>480	6	>480	6	>480	6
12. Hydrofluoric 48%	>480	6	60	3	45	2	110	3	>480	6	>480	6
13. Muriatic 10%	>480	6	>480	6	>480	6	>480	6	>480	6	>480	6
14. Nitric 70%	>480	6	NR	0	>480	6	240	5	>480	6	>480	6
15. Sulfuric 97%	>480	6	180	4	>480	6	>480	6	>480	6	>480	6
<b>Alcohols</b>												
16. Amyl	>480	6	>480	6	>480	6	116	3	>480	6	>480	6
17. Butyl	>480	6	>480	6	>480	6	155	4	>480	6	>480	6
18. Cresols	>480	6	NR	0	371	5	>480	6	>480	6	>480	6
19. Ethyl	>480	6	225	5	>480	6	66	3	>480	6	>480	6
20. Methyl	64	3	28	1	82	3	39	3	>480	6	>480	6
21. Isobutyl	>480	6	>480	6	>480	6	138	4	>480	6	>480	6
<b>Aldehydes</b>												
22. Acetaldehyde	1	0	NR	0	55	2	13	1	>480	6	NR	0
23. Benzaldehyde	93	3	NR	0	81	3	NR	0	>480	6	>480	6
24. Formaldehyde	>480	6	>480	6	>480	6	>480	6	>480	6	>480	6
25. Furfural	116	3	NR	0	>480	6	85	3	>480	6	298	5
<b>Alkalies</b>												
26. Ammonium Hydroxide	>480	6	>480	6	>480	6	>480	6	>480	6	>480	6
27. Potassium Hydroxide	>480	6	>480	6	>480	6	>480	6	>480	6	>480	6
28. Sodium Hydroxide	>480	6	>480	6	>480	6	>480	6	>480	6	>480	6

Chemicals by Class	Neoprene		Nitrile		Rubber		PVC		Butyl		Viton	
	BTT	Rating	BTT	Rating	BTT	Rating	BTT	Rating	BTT	Rating	BTT	Rating
<b>Amides</b>												
29. Dimethylacetamide	84	3	NR	0	29	1	51	2	>480	6	NR	0
30. Dimethylformamide	100	3	NR	0	>480	6	NR	0	>480	6	NR	0
31. N-Methyl Pyrrolidone	140	4	34	2	>480	6	140	4	>480	6	NR	0
<b>Amines</b>												
32. Aniline	32	2	NR	0	1	0	71	3	>480	6	>480	6
33. Butylamine	NR	0	NR	0	45	2	15	1	45	2	NR	0
34. Diethylamine	13	1	60	3	60	3	107	3	30	2	9	0
<b>Aromatic Solvents</b>												
35. Benzene	15	1	16	1	NR	0	13	1	34	2	>480	6
36. Toluene	25	1	26	1	NR	0	19	1	7	0	>480	6
37. Xylene	37	2	41	2	R	0	23	1	NR	0	>480	6
<b>Chlorinated Solv.</b>												
38. Carbon Tetrachloride	73	3	>480	6	NR	0	46	2	53	2	>480	6
39. Chloroform	23	1	6	0	NR	0	10	1	21	1	>480	6
40. Methylene Chloride	4	0	4	0	NR	0	NR	0	20	1	113	3
41. Perchloroethylene	40	2	>480	6	NR	0	NR	0	28	1	>480	6
42. Trichloroethylene	12	1	NR	0	NR	0	NR	0	13	1	>480	6
43. 1,1,1-Trichloroethane	51	2	49	2	NR	0	52	2	72	3	>480	6
<b>Esters</b>												
44. Amyl Acetate	110	3	77	3	NR	0	NR	0	158	4	NR	0
45. Ethyl Acetate	24	1	30	2	72	3	5	0	212	4	NR	0
46. Methyl Methacrylate	27	1	NR	0	77	3	NR	0	63	3	NR	0
<b>Ethers</b>												
47. Cellosolve Acetate	228	4	47	2	107	3	64	3	>480	6	>480	6
48. Ethyl Ether	12	1	33	2	11	1	14	1	19	1	29	1
49. Tetrahydrofuran	13	1	5	0	NR	0	NR	0	24	1	NR	0
<b>Gases</b>												
50. Ammonia, anhydrous	29	1	336	5	1	0	60	3	>480	6	>480	6
51. 1,3-Butadiene	33	2	>480	6	25	1	24	1	473	5	>480	6
52. Chlorine	>480	6	>480	6	>480	6	360	5	>480	6	>480	6
53. Ethylene Oxide	21	1	17	1	1	0	360	5	189	4	48	2
54. Hydrogen Fluoride	210	4	1	0	142	4	1	0	>480	6	>480	6
55. Methyl Chloride	84	3	>480	6	52	2	>480	6	>480	6	>480	6
56. Vinyl Chloride	7	0	>480	6	2	0	19	1	268	5	>480	6
<b>Ketones</b>												
57. Acetone	35	2	3	0	9	0	7	0	>480	6	NR	0
58. Methyl Ethyl Ketone	30	2	NR	0	12	1	NR	0	202	4	NR	0
59. MIBK	41	2	NR	0	38	2	NR	0	292	5	NR	0
<b>Nitriles</b>												
60. Acetonitrile	65	3	6	0	16	1	24	1	>480	6	NR	0
61. Acrylonitrile	27	1	NR	0	48	2	14	1	>480	6	55	2

This information has been provided by Best Manufacturing Company and is applicable to Best gloves only. For additional data and glove specifications, please visit [www.chemrest.com](http://www.chemrest.com).

# Liquid cryogenics

- ❖ Required PPE:
  - ❖ Goggles or face shield & insulated gloves.
  - ❖ Lab coat & closed-toe shoes.
- ❖ Cryogenics Dewar:
  - ❖ Pressure relief valve will vent normally.
  - ❖ Never take in an elevator.
- ❖ If large spillage: evacuate & report.
- ❖ Boiling & splashing will occur when filling a container.
- ❖ Injuries: cold burns & body parts will stick to cold pipes & vessels.



# Compressed gases

- ❖ Required PPE: Safety glasses, lab coat & closed-toe shoes.
- ❖ Always secured with a chain.
- ❖ Always cap when not in use.
- ❖ Do not drag or carry: use a dolly.
- ❖ Report any leaky / damaged cylinder immediately.
- ❖ Use with appropriate regulators only.
- ❖ Do NOT let acetylene tank (on AA) level drop below 70 psi.



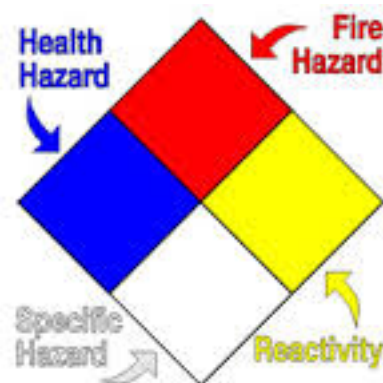
# Labeling

*All bottles/containers must be labeled with the following:*

- Identity of chemical
- Date
- Name of user
- Concentration (if a solution/mixture)
- Hazard warnings

## NFPA 704 System

- 4 Quadrants
  - Blue: health
  - Red: flammability
  - Yellow: reactivity
  - White: special warning



- Ratings are 0 - 4 with 4 being the most hazardous