

Permeation

Tychem® LV is backed by extensive documentation and provides at least 30 minutes protection against more than 282 chemical challenges. These not only include live chemical warfare agents, but toxic industrial chemicals, which are more likely to be encountered during a terrorism incident according to experts.

Physical Properties of DuPont™ Tychem® LV

Property	Values	Standard
Thickness, mil	18	ASTM D1777
Basis Weight, oz/yd ²	7.4	ASTM D3776
Ball Burst, lbf	79	ASTM D3787
Trapezoidal Tear, MD, lbf	26	ASTM D5733
Trapezoidal Tear, CD, lbf	22	ASTM D5733
Breaking Strength, Grab (MD), lbf	84	ASTM D5034
Breaking Strength, Grab (CD), lbf	83	ASTM D5034

These results are measured using the latest ASTM test methods. Results will vary due to the changes in test methods. A true test of performance is *in use*.

Chemical Warfare Agents

Agent	Breakthrough Time, hr	Minimum Detectable Permeation Rate, µg/cm ² /min
HD, Sulfur Mustard	>12	4.2 x 10 ⁻⁷
L, Lewisite	>12	2.5 x 10 ⁻⁵
GB, Sarin	>12	4.2 x 10 ⁻⁷
VX	>12	4.2 x 10 ⁻⁷
GD, Soman	>12	4.2 x 10 ⁻⁷
GA Tabun	>12	8 x 10 ⁻⁷

Applied at 10 g/m² in 1 µl drops at 22°C, 50% RH

Permeation Data for ASTM Recommended List of Chemicals for Evaluating Protective Clothing Materials (ASTM F1001)

Chemical Name	Physical Phase	Average Normalized Breakthrough Time, min	Average Permeation Rate, µg/cm ² /min
Acetone	L	>480	<0.001
Acetonitrile	L	>480	<0.0003
Ammonia	G	47	0.62
1,3-Butadiene	G	>480	<0.001
Carbon disulfide	L	>480	<0.001
Chlorine	G	>480	<0.01
Dichloromethane	L	432	0.06
Diethylamine	L	>480	<0.001
N,N-Dimethylformamide	L	>480	<0.001
Ethyl acetate	L	>480	<0.001
Ethylene oxide	G	>480	<0.01
n-Hexane	L	>480	<0.001
Hydrogen chloride	G	>480	<0.1
Methanol	L	158	0.81
Methyl chloride	G	>480	<0.001
Nitrobenzene	L	>480	<0.001
Sodium hydroxide, 50%	L	>480	<0.01
Sulfuric acid, 98%	L	>480	<0.01
1,1,2,2-Tetrachloroethylene	L	>480	<0.001
Tetrahydrofuran	L	>480	<0.001
Toluene	L	>480	<0.001

Index of Codes:

> = greater than, < = less than, L = liquid, G = gas, immed. = immediate (<10 minutes)

Numbers reported are averages of samples tested by the ASTM F739 test method. Sample results do vary and therefore averages for these results are reported.

This information is based upon technical data that DuPont believes to be reliable. It is subject to revision as additional knowledge and experience are gained. DuPont makes no guarantee of results and assumes no obligation or liability in connection with this information.

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Anyone intending to use this information should first verify that the garment selected is suitable for the intended use. In many cases, seams and closures have shorter breakthrough times and higher permeation rates than the fabric. Please contact the garment manufacturer for specific data. If fabric becomes torn, abraded or punctured, end user should discontinue use of garment to avoid potential exposure to chemical. **SINCE CONDITIONS OF USE ARE OUTSIDE OUR CONTROL, WE MAKE NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE AND ASSUME NO LIABILITY WHATSOEVER IN CONNECTION WITH ANY USE OF THIS INFORMATION.**

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WARNINGS: 1) Tychem® LV is not flame-resistant and should not be used around heat, flame, sparks or in potentially flammable or explosive environments. 2) Garments made of Tychem® LV should have slip-resistant or antislip materials on the outer surface of boots, shoe covers or other garment surfaces in conditions where slipping could occur.

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