

# DuPont™ Tychem® Responder® CSM

## High level protection against chemical agents

When you need chemical protection, consider DuPont™ Tychem® garments.

Tychem® Responder® CSM combines multiple film barriers laminated to both sides of a three-ounce polypropylene, for high level protection against toxic and corrosive chemicals. It is especially effective for handling chemical agents as well as military site cleanup and HazMat first response.

Tychem® Responder® CSM fabric is a tan version of Responder® fabric. All Tychem® Responder CSM garments are made to military quality control specifications. Extensive testing and quality assurance on both fabric and garments, including roll-by-roll testing of all fabric, is conducted by Geomet Technologies. Each suit undergoes rigorous inspection and pressure testing, and one suit per lot is selected randomly for seam and material testing with live toxic agents.

Tychem® Responder® CSM garment configurations include encapsulated, vapor protective Level A suits as well as splash protective Level B coveralls.

Tychem® Responder® CSM is desert tan for low visibility.



Chemical Warfare Agents			
Agent	Protocol	Time (minutes)	Minimum Detectable Permeation Rate (µg/cm²/min)
GA, Tabun	DN5	>720	8 x 10 <sup>-7</sup>
GB, Sarin	DN5	>720	4.2 x 10 <sup>-7</sup>
	DN6	>720	4 x 10 <sup>-4</sup>
GD, Soman	DN5	>720	4.2 x 10 <sup>-7</sup>
HD, Sulfur Mustard	DN3	>720	4.2 x 10 <sup>-7</sup>
	DN4	>720	8 x 10 <sup>-4</sup>
L, Lewisite	DN3	>720	2.5 x 10 <sup>-6</sup>
	DN4	120	7 x 10 <sup>-5</sup>
VX, VX Nerve Agent	DN5	>720	4.2 x 10 <sup>-7</sup>
	DN6	>720	8 x 10 <sup>-7</sup>

**Fabric Test Protocols.** All tests performed in triplicate for DuPont Personal Protection by an independent accredited laboratory at 22° C, 50% R.H.

**Protocol DN3**—MIL—STD—282, Method T—209 (HD) or modified for Lewisite, for 12 hours at 10 g/m<sup>2</sup>.

**Protocol DN4**—MIL—STD—282, Method T—209 (HD) or modified for Lewisite, for 12 hours at 100 g/m<sup>2</sup> (total coverage).

**Protocol DN5**—MIL—STD—282, Method T—208 (GB) or modified for GA, GD, and VX, for 12 hours at 10 g/m<sup>2</sup>.

**Protocol DN6**—MIL—STD—282, Method T—208 (GB) or modified for GA, GD, and VX, for 12 hours at 100 g/m<sup>2</sup> (total coverage).

Physical Properties of Tychem® Responder® CSM			
Basis Weight ASTM D751	8.2 oz/yd <sup>2</sup>	Grab Tensile Strength (md/cd) ASTM D751	82 lbf/79 lbf
Thickness ASTM D1117	21 mils	Trap Tear (md/cd) ASTM D5597	21 lbf/19 lbf
Ball Burst ASTM D750	82 lbf		
Flammability	Class 1		

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.



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# Tychem® Responder® CSM

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

CHEMICAL NAME	PHYSICAL PHASE	AVERAGE STANDARDIZED BREAKTHROUGH TIME (minutes)	AVERAGE STEADY-STATE PERMEATION RATE ( $\mu\text{g}/\text{cm}^2/\text{minute}$ )
Acetone	L	>480	<0.1
Acetonitrile	L	>480	<0.1
Ammonia (gas)	G	>480	<0.1
1,3-Butadiene	G	>480	<0.1
Carbon disulfide	L	>480	<0.1
Chlorine gas	G	>480	<0.1
Dichloromethane	L	>480	<0.1
Diethylamine	L	>480	<0.1
N,N-Dimethylformamide	L	>480	<0.1
Ethyl acetate	L	>480	<0.1
Ethylene oxide	G	>480	<0.1
n-Hexane	L	>480	<0.1
Hydrogen chloride	G	>480	<0.1
Methanol	L	>480	<0.1
Methyl chloride	G	>480	<0.1
Nitrobenzene	L	>480	<0.1
Sodium hydroxide, 50%	L	>480	<0.1
Sulfuric acid, 98%	L	>480	<0.1
1,1.2.2 - Tetrachloroethylene	L	>480	<0.1
Tetrahydrofuran	L	>480	<0.1
Toluene	L	>480	<0.1

#### INDEX OF CODES:

> = greater than, < = less than,  
L = liquid, G = gas

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.

It is the user's responsibility to determine the level of toxicity and the proper personal protective equipment needed. The information set forth herein reflects laboratory performance of fabrics, not complete garments, under controlled conditions. It is intended for information use by persons having technical skill for evaluation under their specific end-use conditions, at their own discretion and risk.

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.

This information is not intended as a license to operate under or a recommendation to infringe any patent or technical information of DuPont or others covering any material or its use.

#### WARNINGS:

- 1) Tychem® Responder® CSM 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® Responder® CSM 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.

#### For more information:

For specific permeation data and breakthrough times for other chemicals:

Visit our website at:

[www.PersonalProtection.DuPont.com](http://www.PersonalProtection.DuPont.com)

**DuPont Personal Protection Fax-On-Demand Service at 1-800-558-9329**

DuPont manufactures a complete line of garments for personal protection.

For more information, call **1-800-931-3456**

# DuPont Personal Protection

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