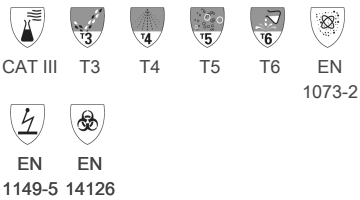
Technical Data Sheet

# DuPont™ Tychem® 4000 S , SLCHZ5TWH00



## Tychem® 4000 S

DuPont™ Tychem® 4000 S. Hooded coverall. Stitched and over-taped seams. Double cuffs. Thumb loops. Elastication at wrists, ankles, face and waist. Double zippers and double flaps with chin flap. White.

## Certifications

- Certified according to Regulation (EU) 2016/425
- Chemical protective clothing, Category III, Type 3-B, 4-B, 5-B and 6-B
- EN 14126 (barrier to infective agents), EN 1073-2 (protection against radioactive contamination)
- Antistatic treatment (EN 1149-5) - on inside
- Stitched and over-taped seams with barrier tape for protection and strength
- Double cuffs for good glove compability
- Double zippers and double flaps for greater tightness, outer flap with adhesive tape and integrated chin flap

## Packaging(Quantity/Box)

20 per box, individually packed.

| Product Size | Article Number | Additional info |
|---|---|---|
| SM | D15193449 | |
| MD | D15193451 | |
| LG | D15193467 | |
| XL | D15193473 | |
| 2X | D15193481 | |
| 3X | D15193494 | |

Full Part Number: SLCHZ5TWH00

## PHYSICAL PROPERTIES

| Property | Test Method | Typical Result | EN |
|---|---|---|---|
| Abrasion Resistance [7] | EN 530 Method 2 | >2000 cycles | 6/6 [1] |
| Basis Weight | DIN EN ISO 536 | 124 g/m$^2$ | N/A |
| Colour | N/A | White | N/A |
| Flex Cracking Resistance [7] | EN ISO 7854 Method B | >1000 cycles | 1/6 [1] |
| Flex Cracking Resistance at -30°C | EN ISO 7854 Method B | >1000 cycles | N/A |
| Puncture Resistance | EN 863 | >10 N | 2/6 [1] |
| Resistance to Ignition [7] | EN 13274-4 Method 3 | No after flame, no drop formation, no hole formation | N/A |
| Surface Resistance at RH 25%, inside [7] | EN 1149-1 | < 2,5 • 10$^9$ Ohm | N/A |
| Surface Resistance at RH 25%, outside [7] | EN 1149-1 | No antistatic treatment | N/A |
| Tensile Strength (MD) | DIN EN ISO 13934-1 | >100 N | 3/6 [1] |
| Tensile Strength (XD) | DIN EN ISO 13934-1 | >100 N | 3/6 [1] |
| Trapezoidal Tear Resistance (MD) | EN ISO 9073-4 | >20 N | 2/6 [1] |
| Trapezoidal Tear Resistance (XD) | EN ISO 9073-4 | >20 N | 2/6 [1] |

**1** According to EN 14325 **2** According to EN 14126 **3** According to EN 1073-2 **4** According to EN 14116 **12** According to EN 11612 **5** Front Tyvek ® / Back **6** Based on test according to ASTM D-572 **7** See Instructions for Use for further information, limitations and warnings **>** Larger than **<** Smaller than **N/A** Not Applicable **STD DEV** Standard Deviation

## GARMENT PERFORMANCE

| Property | Test Method | Typical Result | EN |
|---|---|---|---|
| Nominal protection factor [7] | EN 1073-2 | >5 | 1/3 [3] |
| Seam Strength | EN ISO 13935-2 | >125 N | 4/6 [1] |
| Shelf Life [7] | N/A | 5 years [6] | N/A |
| Type 3: Resistance to Penetration by Liquids (Jet Test) | EN 17491-3 | Pass [7] | N/A |
| Type 4: Resistance to Penetration by Liquids (High Level Spray Test) | EN ISO 17491-4, Method B | Pass | N/A |
| Type 5: Inward Leakage of Airborne Solid Particulates | EN ISO 13982-2 | Pass [7] | N/A |
| Type 6: Resistance to Penetration by Liquids (Low Level Spray Test) | EN ISO 17491-4, Method A | Pass | N/A |

**1** According to EN 14325 **3** According to EN 1073-2 **12** According to EN 11612 **13** According to EN 11611 **5** Front Tyvek ® / Back **6** Based on test according to ASTM D-572 **7** See Instructions for Use for further information, limitations and warnings **11** Based on the average of 10 suits, 3 activities, 3 probes **>** Larger than **<** Smaller than **N/A** Not Applicable **•** Based on lowest single value

## COMFORT

| Property | Test Method | Typical Result | EN |
|---|---|---|---|
| Air Permeability (Gurley method) | ISO 5636-5 | No | N/A |
| Moisture Vapour Permeability | EN ISO 12752 Klima C | Impermeable | N/A |

**2** According to EN 14126 **5** Front Tyvek ® / Back **>** Larger than **<** Smaller than **N/A** Not Applicable

## PENETRATION AND REPELLENCY

| Property | Test Method | Typical Result | EN |
|---|---|---|---|
| Repellency to Liquids, o-Xylene | EN ISO 6530 | >95 % | 3/3 [1] |
| Repellency to Liquids, Butan-1-ol | EN ISO 6530 | >95 % | 3/3 [1] |
| Repellency to Liquids, Sodium Hydroxide (10%) | EN ISO 6530 | >95 % | 3/3 [1] |
| Repellency to Liquids, Sulphuric Acid (30%) | EN ISO 6530 | >95 % | 3/3 [1] |
| Resistance to Penetration by Liquids, Butan-1-ol | EN ISO 6530 | <1 % | 3/3 [1] |
| Resistance to Penetration by Liquids, Sodium Hydroxide (10%) | EN ISO 6530 | <1 % | 3/3 [1] |
| Resistance to Penetration by Liquids, Sulphuric Acid (30%) | EN ISO 6530 | <1 % | 3/3 [1] |
| Resistance to Penetration by Liquids, o-Xylene | EN ISO 6530 | <1 % | 3/3 [1] |

**1** According to EN 14325 **>** Larger than **<** Smaller than

## BIOLOGICAL BARRIER

| Property | Test Method | Typical Result | EN |
|---|---|---|---|
| Resistance to Penetration by Biologically Contaminated Aerosols | ISO/DIS 22611 | log ratio >5 | 3/3 [2] |
| Resistance to Penetration by Blood and Body Fluids using Synthetic Blood | ISO 16603 | 20 kPa | 6/6 [2] |
| Resistance to Penetration by Blood-borne Pathogens using Bacteriophage Phi-X174 | ISO 16604 Procedure C | 20 kPa | 6/6 [2] |
| Resistance to Penetration by Contaminated Liquids | EN ISO 22610 | >75 min | 6/6 [2] |
| Resistance to Penetration by Contaminated Solid Particles | ISO 22612 | log cfu <1 | 3/3 [2] |

**2** According to EN 14126 **>** Larger than **<** Smaller than

## Permeation Data for Tychem® 4000 S

| Hazard / Chemical Name | Physical State | CAS | BT Act | BT 0.1 | BT 1.0 | EN | SSPR | MDPR | Cum 480 | Time 150 | ISO |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2-(2-Ethoxyethoxy) ethanol | Liquid | 111-90-0 | >480 | >480 | >480 | 6 | <0.08 | 0.08 | <38.4 | >480 | 6 |
| Acetic acid (>95%) | Liquid | 64-19-7 | >480 | >480 | >480 | 6 | <0.02 | 0.02 | <9.6 | >480 | 6 |
| Acetic acid 2 ethoxy ethyl ester | Liquid | 111-15-9 | 67*/180 | 116*/238 | >480 | 6 | 0.11 | 0.01 | 3.04 | >480 | 6 |
| Acetic acid 2 methoxy ethyl ester | Liquid | 110-49-6 | 60 | >480 | >480 | 6 | 0.03 | 0.005 | 3.97 | >480 | 6 |
| Acetic acid ethenyl ester | Liquid | 108-05-4 | 23 | 24 | 30 | 1 | 20.3 | 0.0139 | | | |
| Acetic acid ethyl ester | Liquid | 141-78-6 | imm | imm | imm*/167 | | 1.55 | 0.01 | | | |
| Acetic anhydride | Liquid | 108-24-7 | imm*/23 | 12*/48 | >480 | 6 | na | 0.006 | | | |
| Acetic chloride | Liquid | 75-36-5 | 23 | 39*/63 | >480 | 6 | 0.146 | 0.006 | | | |
| Acetone | Liquid | 67-64-1 | 13 | 13 | 29*/258 | 1 | 0.9 | 0.01 | | | |
| Acetonitrile | Liquid | 75-05-8 | 56 | 60 | >480 | 6 | 0.35 | 0.05 | | | |
| Acetyl chloride | Liquid | 75-36-5 | 23 | 39*/63 | >480 | 6 | 0.146 | 0.006 | | | |
| Acroleic acid | Liquid | 79-10-7 | | >480 | >480 | 6 | <0.1 | 0.029 | | | |
| Acrolein (90%) | Liquid | 107-02-8 | | 24 | 24 | 1 | 7.9 | 0.009 | | | |
| Acrylamide (50%) | Liquid | 79-06-1 | >480 | >480 | >480 | 6 | <0.04 | 0.04 | <19.2 | >480 | 6 |
| Acrylic acid | Liquid | 79-10-7 | | >480 | >480 | 6 | <0.1 | 0.029 | | | |
| Acrylic acid n-butyl ester | Liquid | 141-32-2 | >480 | >480 | >480 | 6 | <0.05 | 0.05 | >480 | >480 | 6 |
| Acrylicamide (50%) | Liquid | 79-06-1 | >480 | >480 | >480 | 6 | <0.04 | 0.04 | <19.2 | >480 | 6 |
| Acrylonitrile | Liquid | 107-13-1 | | 36*/48 | 36*/48 | 2 | 3.2 | 0.0085 | | | |
| Acryloyl Chloride | Liquid | 814-68-6 | imm | imm | imm | | na | 0.04 | 441/40 min | 23 | 1 |
| Allyl alcohol | Liquid | 107-18-6 | >480 | >480 | >480 | 6 | <0.01 | 0.01 | <4.8 | >480 | 6 |
| Amino 3,4-dichlorobenzene, 1- (70 °C, molten) | Liquid | 95-76-1 | imm | imm | imm | | 17 | 0.001 | | | |
| Amino benzene | Liquid | 62-53-3 | 322 | >480 | >480 | 6 | <0.025 | 0.005 | | | |
| Amino ethylethanolamine | Liquid | 111-41-1 | imm | imm | >480 | 6 | <0.3 | 0.005 | | | |
| Amino ethylethanolamine (60%) | Liquid | 111-41-1 | >480 | >480 | >480 | 6 | <0.005 | 0.005 | <2.4 | >480 | 6 |
| Amino ethylpiperazine | Liquid | 140-31-8 | >480 | >480 | >480 | 6 | <0.005 | 0.005 | <2.4 | >480 | 6 |
| Amino pyridine, 2- (sat) | Liquid | 504-29-0 | >480 | >480 | >480 | 6 | <0.01 | 0.01 | <4.8 | >480 | 6 |
| Ammonia (gaseous) | Vapor | 7664-41-7 | 25 | 26 | 33 | 2 | 0.25 | 0.0024 | | | |
| Ammonium hydroxide (2-3% in Householdcleaner) | Liquid | 1336-21-6 | | >480 | >480 | 6 | <0.1 | 0.0027 | | | |
| Ammonium hydroxide (32%) | Liquid | 1336-21-6 | 24 | >480 | >480 | 6 | 0.04 | 0.01 | 20 | >480 | 6 |

## Permeation Data for Tychem® 4000 S

| Hazard / Chemical Name | Physical State | CAS | BT Act | BT 0.1 | BT 1.0 | EN | SSPR | MDPR | Cum 480 | Time 150 | ISO |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aniline | Liquid | 62-53-3 | 322 | >480 | >480 | 6 | <0.025 | 0.005 | | | |
| Antimony pentachloride | Liquid | 7647-18-9 | >480 | >480 | >480 | 6 | <0.01 | 0.01 | <4.8 | >480 | 6 |
| Benzenamine | Liquid | 62-53-3 | 322 | >480 | >480 | 6 | <0.025 | 0.005 | | | |
| Benzene | Liquid | 71-43-2 | imm | imm | imm | | >300 | 0.0126 | | | |
| Benzyl alcohol | Liquid | 100-51-6 | >480 | >480 | >480 | 6 | <0.05 | 0.05 | <24 | >480 | 6 |
| Bis (4-(2,3-epoxypropoxy)phenyl) propane (80%) | Liquid | 1675-54-3 | >480 | >480 | >480 | 6 | <0.05 | 0.05 | <24 | >480 | 6 |
| Bis phenol A diglycidyl ether (80%) | Liquid | 1675-54-3 | >480 | >480 | >480 | 6 | <0.05 | 0.05 | <24 | >480 | 6 |
| Black Liquor (mix) | Liquid | mix | >480 | >480 | >480 | 6 | <0.04 | 0.04 | <19.2 | >480 | 6 |
| Bromo methane | Vapor | 74-83-9 | | >480 | >480 | 6 | <0.1 | 0.0153 | | | |
| Butadiene, 1,3- (gaseous) | Vapor | 106-99-0 | >480 | >480 | >480 | 6 | <0.01 | 0.01 | <4.8 | >480 | 6 |
| Butanal, n- | Liquid | 123-72-8 | 22 | 41 | >480 | 6 | 0.16 | 0.004 | | | |
| Butanol, 1- | Liquid | 71-36-3 | >480 | >480 | >480 | 6 | <0.004 | 0.004 | <1.9 | >480 | 6 |
| Butanol, n- | Liquid | 71-36-3 | >480 | >480 | >480 | 6 | <0.004 | 0.004 | <1.9 | >480 | 6 |
| Butanone | Liquid | 78-93-3 | | 18 | 18 | 1 | 145 | 0.0116 | | | |
| Butanone oxime, 2- | Liquid | 96-29-7 | >480 | >480 | >480 | 6 | <0.05 | 0.05 | <24 | >480 | 6 |
| Butenal, 2- | Liquid | 123-73-9 | | 34 | 34 | 2 | 14 | 0.0113 | | | |
| Butoxy ethanol, 2- | Liquid | 111-76-2 | >480 | >480 | >480 | 6 | <0.005 | 0.005 | <2.4 | | |
| Butyl acrylate, n- | Liquid | 141-32-2 | >480 | >480 | >480 | 6 | <0.05 | 0.05 | >480 | >480 | 6 |
| Butyl alcohol, n- | Liquid | 71-36-3 | >480 | >480 | >480 | 6 | <0.004 | 0.004 | <1.9 | >480 | 6 |
| Butyraldehyde, n- | Liquid | 123-72-8 | 22 | 41 | >480 | 6 | 0.16 | 0.004 | | | |
| Carbon disulfide | Liquid | 75-15-0 | imm | imm | imm | | 15.5 | 0.05 | | | |
| Caustic ammonia (2-3% in Householdcleaner) | Liquid | 1336-21-6 | | >480 | >480 | 6 | <0.1 | 0.0027 | | | |
| Caustic ammonia (32%) | Liquid | 1336-21-6 | 24 | >480 | >480 | 6 | 0.04 | 0.01 | 20 | >480 | 6 |
| Caustic soda (50%) | Liquid | 1310-73-2 | >480 | >480 | >480 | 6 | <0.005 | 0.005 | <2.4 | >480 | 6 |
| Cellosolve acetate | Liquid | 110-80-5 | >480 | >480 | >480 | 6 | <0.005 | 0.005 | <2.4 | >480 | 6 |
| Chemidize 727 ND (mix) | Liquid | mix | >480 | >480 | >480 | 6 | <0.01 | 0.01 | <4.8 | >480 | 6 |
| Chlorine (gaseous) | Vapor | 7782-50-5 | >480 | >480 | >480 | 6 | <0.05 | 0.05 | <24 | >480 | 6 |
| Chloro 1-methylbenzene, 2- | Liquid | 95-49-8 | | 13 | 13 | 1 | 102 | 0.0204 | | | |
| Chloro 2,3-epoxy propane, 1- | Liquid | 106-89-8 | 15 | 15 | 15 | 1 | >248 | 0.01 | | | |
| Chloro acetic acid (80%) | Liquid | 79-11-8 | >480 | >480 | >480 | 6 | <0.04 | 0.04 | <19.2 | >480 | 6 |

## Permeation Data for Tychem® 4000 S

| Hazard / Chemical Name | Physical State | CAS | BT Act | BT 0.1 | BT 1.0 | EN | SSPR | MDPR | Cum 480 | Time 150 | ISO |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloro acetone (95%) | Liquid | 78-95-5 | 360 | 258 | 258 | 5 | 0.557 | 0.0149 | | | |
| Chloro acetyl chloride | Liquid | 79-04-9 | 100 | 120 | 150 | 4 | >3.7 | 0.01 | | | |
| Chloro aniline, p- (70 °C, molten) | Liquid | 106-47-8 | imm | imm | imm | | 90 | 0.001 | | | |
| Chloro benzenamine, 4- (70 °C, molten) | Liquid | 106-47-8 | imm | imm | imm | | 90 | 0.001 | | | |
| Chloro ethene | Vapor | 75-01-4 | >480 | >480 | >480 | 6 | <0.06 | 0.06 | <28.8 | >480 | 6 |
| Chloro form | Liquid | 67-66-3 | imm | imm | imm | | | | | | |
| Chloro propan-2-one, 1- (95%) | Liquid | 78-95-5 | 360 | 258 | 258 | 5 | 0.557 | 0.0149 | | | |
| Chloro toluene, o- | Liquid | 95-49-8 | | 13 | 13 | 1 | 102 | 0.0204 | | | |
| Chlorsulfonic acid | Liquid | 7790-94-5 | | >480 | >480 | 6 | <0.1 | 0.038 | | | |
| Chromic acid (CrO3) (44.9%) | Liquid | 1333-82-0 | >480 | >480 | >480 | 6 | <0.07 | 0.07 | <33.6 | >480 | 6 |
| Cresol o- | Liquid | 95-48-7 | | >480 | >480 | 6 | <0.1 | 0.0174 | | | |
| Cresols, mixed isomers | Liquid | 1319-77-3 | 100 | 100 | 90*/130 | 3 | 1.14 | 0.01 | | | |
| Cresylic acid | Liquid | 1319-77-3 | 100 | 100 | 90*/130 | 3 | 1.14 | 0.01 | | | |
| Croton aldehyde | Liquid | 123-73-9 | | 34 | 34 | 2 | 14 | 0.0113 | | | |
| Crude oil, California | Liquid | 8002-05-9 | 162*/286 | >480 | >480 | 6 | <0.075 | 0.04 | | | |
| Cyanoethylene | Liquid | 107-13-1 | | 36*/48 | 36*/48 | 2 | 3.2 | 0.0085 | | | |
| Cyanomethane | Liquid | 75-05-8 | 56 | 60 | >480 | 6 | 0.35 | 0.05 | | | |
| Cyclo hexanone | Liquid | 108-94-1 | | 136 | 136 | 4 | 8 | 0.0158 | | | |
| Cyclo hexyl isocanyte | Liquid | 3173-53-3 | | 36*/54 | | | 1.74 | 0.0202 | | | |
| Diaminoethane, 1,2- | Liquid | 107-15-3 | >480 | >480 | >480 | 6 | <0.0097 | 0.0097 | <4.7 | >480 | 6 |
| Dichlorbenzen, 1,2- | Liquid | 95-50-1 | imm | 76 | >480 | 6 | 0.8 | 0.005 | 102.5 | >480 | 6 |
| Dichlorbenzen, 1,3- | Liquid | 541-73-1 | imm | 45 | 57 | 2 | 1.8 | 0.005 | 251.7 | nm | |
| Dichlorbenzen, 1,4- (50% in Ethanol) | Liquid | 106-46-7 | >480 | >480 | >480 | 6 | <0.005 | 0.005 | <2.4 | >480 | 6 |
| Dichlorethane, 1.2.- | Liquid | 107-06-2 | imm | imm | imm | | <80 | 0.04 | 676/20 min | 10 | |
| Dichloro -4,4'-methylenedianiline, 2,2'- (sat in Methanol) | Liquid | 101-14-4 | | >480 | >480 | 6 | <0.1 | 0.043 | | | |
| Dichloro aniline, 3,4- (70 °C, molten) | Liquid | 95-76-1 | imm | imm | imm | | 17 | 0.001 | | | |
| Dichloro methane | Liquid | 75-09-2 | imm | imm | imm | | 30.4 | 0.09 | | | |
| Diesel Fuel Grade D-2 | Liquid | mix | >480 | >480 | >480 | 6 | <0.03 | 0.03 | <14.4 | >480 | 6 |
| Diethyl amine | Liquid | 109-89-7 | 15 | 15 | 15 | 1 | 11.5 | 0.05 | | | |
| Diethyl aniline crude | Liquid | 91-66-7 | | >480 | >480 | 6 | <0.1 | 0.024 | | | |

## Permeation Data for Tychem® 4000 S

| Hazard / Chemical Name | Physical State | CAS | BT Act | BT 0.1 | BT 1.0 | EN | SSPR | MDPR | Cum 480 | Time 150 | ISO |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Diethyl benzene (95%) | Liquid | 25340-17-4 | 30 | 31 | 42 | 2 | 19.7 | 0.0216 | | | |
| Diethyl ethanamine, N,N- | Liquid | 121-44-8 | 12 | 12*/22 | >480 | 6 | 0.23 | 0.04 | | | |
| Diethyl ether | Liquid | 60-29-7 | imm | imm | imm | | | 0.002 | | | |
| Diethyl m-toluidine, N,N- | Liquid | 91-67-8 | >480 | >480 | >480 | 6 | <0.01 | 0.01 | <4.8 | >480 | 6 |
| Diethylene imide oxide | Liquid | 110-91-8 | | 158 | >480 | 6 | 0.114 | 0.014 | | | |
| Diethylene triamine | Liquid | 111-40-0 | imm | imm*/321 | >480 | 6 | <0.15 | 0.005 | 0.3 | >480 | 6 |
| Dimethyl acetamide, N,N- | Liquid | 127-19-5 | 91 | 96 | 115 | 3 | 2.76 | 0.014 | | | |
| Dimethyl dichlorosilane | Liquid | 75-78-5 | | 46 | >480 | 6 | 0.131 | 0.0208 | | | |
| Dimethyl formamide, N,N- | Liquid | 68-12-2 | 86 | 90 | >480 | 6 | 0.56 | 0.03 | 146 | >480 | 6 |
| Dimethyl hydrazine, N,N- | Liquid | 57-14-7 | 13 | 13 | 11*/47 | 1 | 2.62 | 0.01 | | | |
| Dimethyl ketal | Liquid | 67-64-1 | 13 | 13 | 29*/258 | 1 | 0.9 | 0.01 | | | |
| Dimethyl ketone | Liquid | 67-64-1 | 13 | 13 | 29*/258 | 1 | 0.9 | 0.01 | | | |
| Dimethyl maleate | Liquid | 624-48-6 | | >480 | >480 | 6 | <0.1 | 0.0232 | | | |
| Dimethyl sulfate | Liquid | 77-78-1 | >480 | >480 | >480 | 6 | <0.005 | 0.005 | <2.4 | >480 | 6 |
| Diphenyl methane diisocyanate, 4,4'- (50 °C, molten) | Liquid | 101-68-8 | >480 | >480 | >480 | 6 | <0.0403 | 0.0403 | <19.3 | >480 | 6 |
| Disodium sulfide (60% (slurry)) | Liquid | 1313-82-2 | | >480 | >480 | 6 | <0.1 | 0.052 | | | |
| Epichlorohydrin | Liquid | 106-89-8 | 15 | 15 | 15 | 1 | >248 | 0.01 | | | |
| Epoxy ethane (gaseous) | Vapor | 75-21-8 | imm | imm | imm | | 21.8 | 0.01 | | | |
| Ethane 1,2-diol | Liquid | 107-21-1 | >480 | >480 | >480 | 6 | <0.006 | 0.006 | <2.8 | >480 | 6 |
| Ethane diol dipropanoate, 1,2- | Liquid | 123-73-9 | | 34 | 34 | 2 | 14 | 0.0113 | | | |
| Ethane nitrile | Liquid | 75-05-8 | 56 | 60 | >480 | 6 | 0.35 | 0.05 | | | |
| Ethane thiol | Liquid | 75-08-1 | imm | imm | imm | | 498 | 0.01 | | | |
| Ethanol | Liquid | 64-17-5 | | >480 | >480 | 6 | <0.1 | 0.0074 | | | |
| Ethanoyl chloride | Liquid | 75-36-5 | 23 | 39*/63 | >480 | 6 | 0.146 | 0.006 | | | |
| Ethoxy ethanol, 2- | Liquid | 110-80-5 | >480 | >480 | >480 | 6 | <0.005 | 0.005 | <2.4 | >480 | 6 |
| Ethoxy ethylacetat | Liquid | 111-15-9 | 67*/180 | 116*/238 | >480 | 6 | 0.11 | 0.01 | 3.04 | >480 | 6 |
| Ethyl Cellosolve® | Liquid | 110-80-5 | >480 | >480 | >480 | 6 | <0.005 | 0.005 | <2.4 | >480 | 6 |
| Ethyl acetate | Liquid | 141-78-6 | imm | imm | imm*/167 | | 1.55 | 0.01 | | | |
| Ethyl alcohol | Liquid | 64-17-5 | | >480 | >480 | 6 | <0.1 | 0.0074 | | | |
| Ethyl benzene | Liquid | 100-41-4 | imm | imm | >480 | 6 | <0.25 | 0.005 | 8.7 | >480 | 6 |

## Permeation Data for Tychem® 4000 S

| Hazard / Chemical Name | Physical State | CAS | BT Act | BT 0.1 | BT 1.0 | EN | SSPR | MDPR | Cum 480 | Time 150 | ISO |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ethyl ethanamine, N- | Liquid | 109-89-7 | 15 | 15 | 15 | 1 | 11.5 | 0.05 | | | |
| Ethyl ether | Liquid | 60-29-7 | imm | imm | imm | | | 0.002 | | | |
| Ethyl glycol acetate | Liquid | 111-15-9 | 67*/180 | 116*/238 | >480 | 6 | 0.11 | 0.01 | 3.04 | >480 | 6 |
| Ethyl mercaptan | Liquid | 75-08-1 | imm | imm | imm | | 498 | 0.01 | | | |
| Ethyl nitrile | Liquid | 75-05-8 | 56 | 60 | >480 | 6 | 0.35 | 0.05 | | | |
| Ethylene carboxylic acid | Liquid | 79-10-7 | | >480 | >480 | 6 | <0.1 | 0.029 | | | |
| Ethylene diamine | Liquid | 107-15-3 | >480 | >480 | >480 | 6 | <0.0097 | 0.0097 | <4.7 | >480 | 6 |
| Ethylene dichloride | Liquid | 107-06-2 | imm | imm | imm | | <80 | 0.04 | 676/20 min | 10 | |
| Ethylene glycol | Liquid | 107-21-1 | >480 | >480 | >480 | 6 | <0.006 | 0.006 | <2.8 | >480 | 6 |
| Ethylene glycol mono ethyl ether acetate | Liquid | 111-15-9 | 67*/180 | 116*/238 | >480 | 6 | 0.11 | 0.01 | 3.04 | >480 | 6 |
| Ethylene glycol monobutyl ether | Liquid | 111-76-2 | >480 | >480 | >480 | 6 | <0.005 | 0.005 | <2.4 | | |
| Ethylene glycol monoethyl ether | Liquid | 110-80-5 | >480 | >480 | >480 | 6 | <0.005 | 0.005 | <2.4 | >480 | 6 |
| Ethylene glycol monomethyl ether | Liquid | 109-86-4 | >480 | >480 | >480 | 6 | <0.005 | 0.005 | <2.4 | >480 | 6 |
| Ethylene glycol monomethyl ether acetate | Liquid | 110-49-6 | 60 | >480 | >480 | 6 | 0.03 | 0.005 | 3.97 | >480 | 6 |
| Ethylene oxide (gaseous) | Vapor | 75-21-8 | imm | imm | imm | | 21.8 | 0.01 | | | |
| Ethylene tetrachloride | Liquid | 127-18-4 | imm | imm | imm | | 2.28 | 0.03 | | | |
| Ethylene trichloride | Liquid | 79-01-6 | imm | imm | imm | | | | | | |
| Ferric (III) chloride (50%) | Liquid | 7705-08-0 | | >480 | >480 | 6 | <0.046 | 0.046 | | | |
| Fluorobenzene | Liquid | 462-06-6 | imm | imm | imm | | >500 | 0.1 | | | |
| Fluoroboric acid (48-50%) | Liquid | 16872-11-0 | >480 | >480 | >480 | 6 | <0.01 | 0.01 | <4.8 | >480 | 6 |
| Fluorosilicic acid (33-35%) | Liquid | 16961-83-4 | >480 | >480 | >480 | 6 | <0.04 | 0.04 | <19.2 | >480 | 6 |
| Formaldehyde (37%) | Liquid | 50-00-0 | >480 | >480 | >480 | 6 | <0.04 | 0.04 | <19.2 | >480 | 6 |
| Formalin (37% (10-15% Methanol)) | Liquid | 50-00-0 | >480 | >480 | >480 | 6 | <0.0048 | 0.0048 | <2.3 | >480 | 6 |
| Formalin (37%) | Liquid | 50-00-0 | >480 | >480 | >480 | 6 | <0.04 | 0.04 | <19.2 | >480 | 6 |
| Formic acid (88%) | Liquid | 64-18-6 | | >480 | >480 | 6 | <0.1 | 0.019 | | | |
| Fuel-oil no 2 | Liquid | 68476-30-2 | 87*/109 | >480 | >480 | 6 | <0.1 | 0.005 | | | |
| Furaldehyde, 2- | Liquid | 98-01-1 | | 198*/227 | | | 1.1 | 0.0155 | | | |
| Furfural | Liquid | 98-01-1 | | 198*/227 | | | 1.1 | 0.0155 | | | |
| Gasoline, unleaded | Liquid | 86290-81-5 | imm | imm | imm | | 4.8 | 0.03 | | | |
| Gasoline, unleaded E10 (87 Octane) | Liquid | 308066-70-8 | imm | imm | imm | | >13.83 | 0.04 | | | |

## Permeation Data for Tychem® 4000 S

| Hazard / Chemical Name | Physical State | CAS | BT Act | BT 0.1 | BT 1.0 | EN | SSPR | MDPR | Cum 480 | Time 150 | ISO |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Glutaral (50%) | Liquid | 111-30-8 | | >480 | >480 | 6 | <0.0161 | 0.0161 | | | |
| Glutaraldehyde (50%) | Liquid | 111-30-8 | | >480 | >480 | 6 | <0.0161 | 0.0161 | | | |
| Glycol alcohol | Liquid | 107-21-1 | >480 | >480 | >480 | 6 | <0.006 | 0.006 | <2.8 | >480 | 6 |
| Green Liquor (mix) | Liquid | mix | >480 | >480 | >480 | 6 | <0.04 | 0.04 | <19.2 | >480 | 6 |
| Hexamethyl disilazane | Liquid | 999-97-3 | | >480 | >480 | 6 | <0.1 | 0.026 | | | |
| Hexamethyl disilazane, 1,1,1,3,3,3- | Liquid | 999-97-3 | | >480 | >480 | 6 | <0.1 | 0.026 | | | |
| Hexamethylene diamine (50 °C, molten) | Liquid | 124-09-4 | 60 | 80 | 120 | 3 | >1.52 | 0.01 | | | |
| Hexamethylene diisocyanate | Liquid | 822-06-0 | >480 | >480 | >480 | 6 | <0.0271 | 0.0271 | <13 | >480 | 6 |
| Hexane, n- | Liquid | 110-54-3 | imm | imm | >480 | 6 | 0.42 | 0.01 | | | |
| Hexanone | Liquid | 108-94-1 | | 136 | 136 | 4 | 8 | 0.0158 | | | |
| Hydrazine | Liquid | 302-01-2 | | >480 | >480 | 6 | <0.1 | 0.0052 | | | |
| Hydriodic acid (47%) | Liquid | 10034-85-2 | | >480 | >480 | 6 | <0.1 | 0.052 | | | |
| Hydrochloric acid (37%) | Liquid | 7647-01-0 | | >480 | >480 | 6 | <0.1 | 0.015 | | | |
| Hydrofluoric acid (48-51%) | Liquid | 7664-39-3 | | >480 | >480 | 6 | <0.1 | 0.008 | | | |
| Hydrofluoric acid (70%) | Liquid | 7664-39-3 | 98 | 143 | >480 | 6 | <0.5 | 0.04 | 84.8 | >480 | 6 |
| Hydrogen chloride (gaseous) | Vapor | 7647-01-0 | | >480 | >480 | 6 | <0.1 | 0.015 | | | |
| Hydrogen fluoride (20-27 °C, gaseous) | Vapor | 7664-39-3 | 93*/133 | 93*/134 | 94*/138 | 3 | 40.1 | 0.0008 | | | |
| Hydrogen peroxide (30%) | Liquid | 7722-84-1 | | >480 | >480 | 6 | <0.1 | 0.014 | | | |
| Hydroxy 2-nitrobenzene, 1- (70 °C, molten) | Liquid | 88-75-5 | | imm | imm | | 4.53 | 0.004 | | | |
| Hydroxy propene | Liquid | 107-18-6 | >480 | >480 | >480 | 6 | <0.01 | 0.01 | <4.8 | >480 | 6 |
| Hydroxy toluene | Liquid | 100-51-6 | >480 | >480 | >480 | 6 | <0.05 | 0.05 | <24 | >480 | 6 |
| Hydroxy toluene, o- | Liquid | 95-48-7 | | >480 | >480 | 6 | <0.1 | 0.0174 | | | |
| Iodine | Solid | 7553-56-2 | | >480 | >480 | 6 | <0.1 | 0.0409 | | | |
| Iodomethane | Liquid | 74-88-4 | imm | imm | imm | | 342 | 0.007 | | | |
| Isoamyl alcohol | Liquid | 123-51-3 | >480 | >480 | >480 | 6 | <0.006 | 0.006 | <2.9 | >480 | 6 |
| Isopropanol | Liquid | 67-63-0 | >480 | >480 | >480 | 6 | <0.0097 | 0.0097 | <4.7 | >480 | 6 |
| Isopropanol (70%) | Liquid | 67-63-0 | >480 | >480 | >480 | 6 | <0.01 | 0.01 | <4.8 | >480 | 6 |
| Isopropyl alcohol | Liquid | 67-63-0 | >480 | >480 | >480 | 6 | <0.0097 | 0.0097 | <4.7 | >480 | 6 |
| Isopropyl alcohol (70%) | Liquid | 67-63-0 | >480 | >480 | >480 | 6 | <0.01 | 0.01 | <4.8 | >480 | 6 |
| Isopropylidenediphenol diglycidyl ether, 4,4'- (80%) | Liquid | 1675-54-3 | >480 | >480 | >480 | 6 | <0.05 | 0.05 | <24 | >480 | 6 |

## Permeation Data for Tychem® 4000 S

| Hazard / Chemical Name | Physical State | CAS | BT Act | BT 0.1 | BT 1.0 | EN | SSPR | MDPR | Cum 480 | Time 150 | ISO |
|---|---|---|---|---|---|---|---|---|---|---|---|
| JP-4 Jet Fuel | Liquid | 50815-00-4 | imm | imm | imm*/22 | | >13 | 0.05 | | | |
| JP-8 Jet Fuel | Liquid | 94114-58-6 | 27 | 39*/67 | >480 | 6 | 0.61 | 0.01 | | | |
| Kerosene | Liquid | 8008-20-6 | | 69 | | | 0.185 | 0.0185 | | | |
| Ketone propane | Liquid | 67-64-1 | 13 | 13 | 29*/258 | 1 | 0.9 | 0.01 | | | |
| Lewisite (L), MIL-STD-282 (10 g/m$^2$) | Liquid | 541-25-3 | | >360[8] | | | | | | | |
| MEK | Liquid | 78-93-3 | | 18 | 18 | 1 | 145 | 0.0116 | | | |
| Maleic anhydride (66 °C, molten) | Liquid | 108-31-6 | 12 | 13 | 18 | 1 | 9.2 | 0.016 | | | |
| Mercuric II chloride (sat) | Liquid | 7487-94-7 | | >480 | >480 | 6 | <0.1 | 0.087 | | | |
| Mercury | Liquid | 7439-97-6 | >480 | >480 | >480 | 6 | <0.09 | 0.09 | <43.2 | >480 | 6 |
| Methanesulphonic acid (70%) | Liquid | 75-75-2 | | >480 | >480 | 6 | <0.1 | 0.031 | | | |
| Methanol | Liquid | 67-56-1 | >480 | >480 | >480 | 6 | <0.05 | 0.05 | <24 | >480 | 6 |
| Methoxy 2-methylpropane, 2- | Liquid | 1634-04-4 | 17 | >480 | >480 | 6 | <0.1 | 0.004 | | | |
| Methoxy ethanol, 2 | Liquid | 109-86-4 | >480 | >480 | >480 | 6 | <0.005 | 0.005 | <2.4 | >480 | 6 |
| Methoxy ethylacetate, 2- | Liquid | 110-49-6 | 60 | >480 | >480 | 6 | 0.03 | 0.005 | 3.97 | >480 | 6 |
| Methyl 2-methyl-2-propenoate | Liquid | 80-62-6 | | 23 | 23 | 1 | 161 | 0.0161 | | | |
| Methyl 2-pyrrolidon, N- | Liquid | 872-50-4 | >480 | >480 | >480 | 6 | <0.01 | 0.01 | <4.8 | >480 | 6 |
| Methyl acetyl | Liquid | 67-64-1 | 13 | 13 | 29*/258 | 1 | 0.9 | 0.01 | | | |
| Methyl acrolein | Liquid | 123-73-9 | | 34 | 34 | 2 | 14 | 0.0113 | | | |
| Methyl aniline, o- | Liquid | 95-53-4 | >480 | >480 | >480 | 6 | <0.01 | 0.01 | <4.8 | >480 | 6 |
| Methyl benzol | Liquid | 108-88-3 | imm | imm | imm | | 5.87 | 0.03 | | | |
| Methyl bromide | Vapor | 74-83-9 | | >480 | >480 | 6 | <0.1 | 0.0153 | | | |
| Methyl butan-1-ol, 3- | Liquid | 123-51-3 | >480 | >480 | >480 | 6 | <0.006 | 0.006 | <2.9 | >480 | 6 |
| Methyl chloride (gaseous) | Vapor | 74-87-3 | >480 | >480 | >480 | 6 | <0.02 | 0.02 | <9.6 | >480 | 6 |
| Methyl cyanide | Liquid | 75-05-8 | 56 | 60 | >480 | 6 | 0.35 | 0.05 | | | |
| Methyl ethyl ketone | Liquid | 78-93-3 | | 18 | 18 | 1 | 145 | 0.0116 | | | |
| Methyl ethyl ketoxime | Liquid | 96-29-7 | >480 | >480 | >480 | 6 | <0.05 | 0.05 | <24 | >480 | 6 |
| Methyl iodide | Liquid | 74-88-4 | imm | imm | imm | | 342 | 0.007 | | | |
| Methyl isocyanate | Liquid | 624-83-9 | imm | imm | imm | | 210 | 0.0081 | | | |
| Methyl ketone | Liquid | 67-64-1 | 13 | 13 | 29*/258 | 1 | 0.9 | 0.01 | | | |
| Methyl methacrylate | Liquid | 80-62-6 | | 23 | 23 | 1 | 161 | 0.0161 | | | |

## Permeation Data for Tychem® 4000 S

| Hazard / Chemical Name | Physical State | CAS | BT Act | BT 0.1 | BT 1.0 | EN | SSPR | MDPR | Cum 480 | Time 150 | ISO |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Methyl phenols | Liquid | 1319-77-3 | 100 | 100 | 90*/130 | 3 | 1.14 | 0.01 | | | |
| Methyl salicylate | Liquid | 119-36-8 | >480 | >480 | >480 | 6 | <0.006 | 0.006 | <2.9 | >480 | 6 |
| Methyl tert-butyl ether | Liquid | 1634-04-4 | 17 | >480 | >480 | 6 | <0.1 | 0.004 | | | |
| Methylen Isocyclohexylamine, 4,4- (50 °C, molten) | Liquid | 1761-71-3 | >480 | >480 | >480 | 6 | <0.01 | 0.01 | <4.8 | >480 | 6 |
| Methylene bis(2-Chloroaniline), 4,4- (sat in Methanol) | Liquid | 101-14-4 | | >480 | >480 | 6 | <0.1 | 0.043 | | | |
| Methylene chloride | Liquid | 75-09-2 | imm | imm | imm | | 30.4 | 0.09 | | | |
| Methylene diphenyl diisocyanate, 4,4'- (50 °C, molten) | Liquid | 101-68-8 | >480 | >480 | >480 | 6 | <0.0403 | 0.0403 | <19.3 | >480 | 6 |
| Mineral oil | Liquid | 8002-05-9 | 162*/286 | >480 | >480 | 6 | <0.075 | 0.04 | | | |
| Mineral oil | Liquid | 8012-95-1 | >480 | >480 | >480 | 6 | <0.04 | 0.04 | <19.2 | >480 | 6 |
| Mineral spirit | Liquid | 64475-85-0 | | 190 | >480 | 6 | 0.27 | 0.018 | | | |
| Morpholine | Liquid | 110-91-8 | | 158 | >480 | 6 | 0.114 | 0.014 | | | |
| Naphthalene (25% in Diethylene glycol dimethylether) | Liquid | 91-20-3 | 57 | 79 | >480 | 6 | <0.5 | 0.007 | 54 | >480 | 6 |
| Nitric acid (70%) | Liquid | 7697-37-2 | | >480 | >480 | 6 | <0.1 | 0.025 | | | |
| Nitro benzene | Liquid | 98-95-3 | 55 | 59 | 78 | 3 | na | 0.05 | | | |
| Nitro phenol, o- (70 °C, molten) | Liquid | 88-75-5 | | imm | imm | | 4.53 | 0.004 | | | |
| Nitro toluene, 2- | Liquid | 88-72-2 | 95 | 95 | 141*/255 | 4 | 2 | 0.07 | | | |
| Norflurane | Vapor | 811-97-2 | | >480 | >480 | 6 | <0.1 | 0.0164 | | | |
| Oleum (20% free SO3) | Liquid | 8014-95-7 | >480 | >480 | >480 | 6 | <0.04 | 0.04 | <19.2 | >480 | 6 |
| Oleum (30% free SO3) | Liquid | 8014-95-7 | >480 | >480 | >480 | 6 | <0.01 | 0.01 | <4.8 | >480 | 6 |
| PCB 1254 (50% in Mineral Oil) | Liquid | 11097-69-1 | | >480 | >480 | 6 | <0.1 | 0.0483 | | | |
| PCB 1254 (90%) | Liquid | 11097-69-1 | | >480 | >480 | 6 | <0.1 | 0.0483 | | | |
| Pentachloroantimony | Liquid | 7647-18-9 | >480 | >480 | >480 | 6 | <0.01 | 0.01 | <4.8 | >480 | 6 |
| Pentanedial, 1,5- (50%) | Liquid | 111-30-8 | | >480 | >480 | 6 | <0.0161 | 0.0161 | | | |
| Phenethylene | Liquid | 100-42-5 | | 16 | 16 | 1 | na | 83.6 | | | |
| Phenol (45 °C, molten) | Liquid | 108-95-2 | 41 | 44 | 79 | 3 | na | 0.05 | <79, 120 min | 148 | 4 |
| Phenol (60 °C, molten) | Liquid | 108-95-2 | imm | imm | imm | | <20 | 0.01 | 455/52 min | 31 | 2 |
| Phenol (85%) | Liquid | 108-95-2 | >480 | >480 | >480 | 6 | <0.006 | 0.006 | <2.9 | >480 | 6 |
| Phenyl amine | Liquid | 62-53-3 | 322 | >480 | >480 | 6 | <0.025 | 0.005 | | | |
| Phenyl ethane | Liquid | 100-41-4 | imm | imm | >480 | 6 | <0.25 | 0.005 | 8.7 | >480 | 6 |
| Phenyl ethanol, 1- | Liquid | 98-85-1 | >480 | >480 | >480 | 6 | <0.06 | 0.06 | <28.8 | >480 | 6 |

Permeation Data for Tychem® 4000 S

| Hazard / Chemical Name | Physical State | CAS | BT Act | BT 0.1 | BT 1.0 | EN | SSPR | MDPR | Cum 480 | Time 150 | ISO |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Phenyl glycidyl ether | Liquid | 122-60-1 | >480 | >480 | >480 | 6 | <0.01 | 0.01 | <4.8 | >480 | 6 |
| Phenyl trichlorosilane | Liquid | 98-13-5 | | >480 | >480 | 6 | <0.1 | 0.0341 | | | |
| Phosphoric acid (85%) | Liquid | 7664-38-2 | | >480 | >480 | 6 | <0.1 | 0.039 | | | |
| Phosphorus trichloride | Liquid | 7719-12-2 | imm | imm | imm | | >1000 | 0.01 | | | |
| Pimelic ketone | Liquid | 108-94-1 | | 136 | 136 | 4 | 8 | 0.0158 | | | |
| Polymethylene polyphenyle isocyanate (p-MDI) | Liquid | 9016-87-9 | >480 | >480 | >480 | 6 | <0.005 | 0.005 | <2.4 | >480 | 6 |
| Potassium acetate (sat) | Liquid | 127-08-2 | >480 | >480 | >480 | 6 | <0.02 | 0.02 | <9.6 | >480 | 6 |
| Potassium chromate (sat) | Liquid | 7789-00-6 | >480 | >480 | >480 | 6 | <0.04 | 0.04 | <19.2 | >480 | 6 |
| Potassium hydroxide (45%) | Liquid | 1310-58-3 | >480 | >480 | >480 | 6 | <0.1 | 0.023 | >480 | | |
| Prop-2-en-1-al (90%) | Liquid | 107-02-8 | | 24 | 24 | 1 | 7.9 | 0.009 | | | |
| Propan -2-ol | Liquid | 67-63-0 | >480 | >480 | >480 | 6 | <0.0097 | 0.0097 | <4.7 | >480 | 6 |
| Propan -2-ol (70%) | Liquid | 67-63-0 | >480 | >480 | >480 | 6 | <0.01 | 0.01 | <4.8 | >480 | 6 |
| Propan -2-one | Liquid | 67-64-1 | 13 | 13 | 29*/258 | 1 | 0.9 | 0.01 | | | |
| Propen 1-ol, 2- | Liquid | 107-18-6 | >480 | >480 | >480 | 6 | <0.01 | 0.01 | <4.8 | >480 | 6 |
| Propenamide (50%) | Liquid | 79-06-1 | >480 | >480 | >480 | 6 | <0.04 | 0.04 | <19.2 | >480 | 6 |
| Propene acid | Liquid | 79-10-7 | | >480 | >480 | 6 | <0.1 | 0.029 | | | |
| Propenenitrile, 2- | Liquid | 107-13-1 | | 36*/48 | 36*/48 | 2 | 3.2 | 0.0085 | | | |
| Propenoic acid butyl ester, 2- | Liquid | 141-32-2 | >480 | >480 | >480 | 6 | <0.05 | 0.05 | >480 | >480 | 6 |
| Propenoic acid nitrile | Liquid | 107-13-1 | | 36*/48 | 36*/48 | 2 | 3.2 | 0.0085 | | | |
| Propyl bromide, n- | Liquid | 106-94-5 | | 12 | 12 | 1 | 16.2 | 0.04 | | | |
| Propylene aldehyde | Liquid | 123-73-9 | | 34 | 34 | 2 | 14 | 0.0113 | | | |
| Pyridine | Liquid | 110-86-1 | | 31 | 31 | 2 | 63.5 | 0.0127 | | | |
| Pyroacetic ether | Liquid | 67-64-1 | 13 | 13 | 29*/258 | 1 | 0.9 | 0.01 | | | |
| Sarin (GB), MIL-STD-282 (10 $g/m^2$) | Liquid | 107-44-8 | | >480[8] | | | | | | | |
| Silicon tetrachloride | Liquid | 10026-04-7 | 35 | 35 | 35 | 2 | >43 | 0.01 | | | |
| Sodium bisulphite (38-40%) | Liquid | 7631-90-5 | >480 | >480 | >480 | 6 | <0.07 | 0.07 | <33.6 | >480 | 6 |
| Sodium cyanide (sat) | Liquid | 143-33-9 | >480 | >480 | >480 | 6 | <0.05 | 0.05 | <24 | >480 | 6 |
| Sodium fluoride (sat) | Liquid | 7681-49-4 | | >480 | >480 | 6 | <0.1 | 0.014 | | | |
| Sodium hydroxide (50%) | Liquid | 1310-73-2 | >480 | >480 | >480 | 6 | <0.005 | 0.005 | <2.4 | >480 | 6 |
| Sodium hypochlorite (15%) | Liquid | 7681-52-9 | >480 | >480 | >480 | 6 | <0.03 | 0.03 | <14.4 | >480 | 6 |

## Permeation Data for Tychem® 4000 S

| Hazard / Chemical Name | Physical State | CAS | BT Act | BT 0.1 | BT 1.0 | EN | SSPR | MDPR | Cum 480 | Time 150 | ISO |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sodium metabisulphite (38%) | Liquid | 7681-57-4 | | >480 | >480 | 6 | <0.1 | 0.052 | | | |
| Spiritus | Liquid | 64-17-5 | | >480 | >480 | 6 | <0.1 | 0.0074 | | | |
| Styrene | Liquid | 100-42-5 | | 16 | 16 | 1 | na | 83.6 | | | |
| Sulfur Mustard (HD), MIL-STD-282 (10 g/m$^2$) | Liquid | 505-60-2 | | >480[8] | | | | | | | |
| Sulfur dioxide | Vapor | 7446-09-5 | >480 | >480 | >480 | 6 | <0.02 | 0.02 | <9.6 | >480 | 6 |
| Sulfuric acid (>95%) | Liquid | 7664-93-9 | >480 | >480 | >480 | 6 | <0.005 | 0.005 | <2.4 | >480 | 6 |
| Sulfuric acid dimethyl ester | Liquid | 77-78-1 | >480 | >480 | >480 | 6 | <0.005 | 0.005 | <2.4 | >480 | 6 |
| Sulfuric acid fuming (20% free SO3) | Liquid | 8014-95-7 | >480 | >480 | >480 | 6 | <0.04 | 0.04 | <19.2 | >480 | 6 |
| Sulfuric acid fuming (30% free SO3) | Liquid | 8014-95-7 | >480 | >480 | >480 | 6 | <0.01 | 0.01 | <4.8 | >480 | 6 |
| Tetrachloro ethane, 1,1,2,2,- | Liquid | 79-34-5 | 72 | 98 | >480 | 6 | 0.26 | 0.008 | 30.8 | >480 | 6 |
| Tetrachloro ethylene, 1,1,2,2- | Liquid | 127-18-4 | imm | imm | imm | | 2.28 | 0.03 | | | |
| Tetraethyl ammonium hydroxide (35%) | Liquid | 77-98-5 | | >480 | >480 | 6 | <0.0237 | 0.0237 | | | |
| Tetraethylene pentamine | Liquid | 112-57-2 | >480 | >480 | >480 | 6 | <0.005 | 0.005 | <2.4 | >480 | 6 |
| Tetrafluoroethane, 1,1,1,2- | Vapor | 811-97-2 | | >480 | >480 | 6 | <0.1 | 0.0164 | | | |
| Tetrahydrofuran | Liquid | 109-99-9 | imm | imm | imm | | 238.8 | 0.08 | | | |
| Tetramethyl ammonium hydroxide (25%) | Liquid | 75-59-2 | >480 | >480 | >480 | 6 | <0.025 | 0.025 | <12 | >480 | 6 |
| Titan(IV) chloride | Liquid | 7550-45-0 | imm | imm | 45 | 2 | >497 | 0.01 | | | |
| Titanium tetrachloride | Liquid | 7550-45-0 | imm | imm | 45 | 2 | >497 | 0.01 | | | |
| Toluene | Liquid | 108-88-3 | imm | imm | imm | | 5.87 | 0.03 | | | |
| Toluene diisocyanate, 2,4- | Liquid | 584-84-9 | >480 | >480 | >480 | 6 | <0.0281 | 0.0281 | <13.5 | >480 | 6 |
| Toluene diisocyanate, 2,4- (80%) | Liquid | 584-84-9 | | >480 | >480 | 6 | <0.1 | 0.0281 | | | |
| Toluidine, m- | Liquid | 108-44-1 | 201 | >480 | >480 | 6 | 0.08 | 0.005 | | | |
| Toluidine, o- | Liquid | 95-53-4 | >480 | >480 | >480 | 6 | <0.01 | 0.01 | <4.8 | >480 | 6 |
| Trichlor vinylsilane | Liquid | 75-94-5 | 90 | 100 | 110 | 3 | >1.2 | 0.01 | | | |
| Trichloro benzene, 1,2,4- | Liquid | 120-82-1 | 87 | 87 | 175 | 4 | >2.5 | 0.1 | | | |
| Trichloro ethanol, 2,2,2- | Liquid | 115-20-8 | >480 | >480 | >480 | 6 | <0.008 | 0.008 | <3.8 | >480 | 6 |
| Trichloro ethylene | Liquid | 79-01-6 | imm | imm | imm | | | | | | |
| Trichloro methane | Liquid | 67-66-3 | imm | imm | imm | | | | | | |
| Trichloro phenylsilane | Liquid | 98-13-5 | | >480 | >480 | 6 | <0.1 | 0.0341 | | | |
| Trichloro silane | Liquid | 10025-78-2 | 45 | 60 | 60 | 2 | >2.5 | 0.01 | | | |

Permeation Data for Tychem® 4000 S

| Hazard / Chemical Name | Physical State | CAS | BT Act | BT 0.1 | BT 1.0 | EN | SSPR | MDPR | Cum 480 | Time 150 | ISO |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Triethyl amine | Liquid | 121-44-8 | 12 | 12*/22 | >480 | 6 | 0.23 | 0.04 | | | |
| Triethylentetramine (60%) | Liquid | 112-24-3 | >480 | >480 | >480 | 6 | <0.005 | 0.005 | <2.4 | >480 | 6 |
| Trifluoro acetic acid | Liquid | 76-05-1 | imm | >480 | >480 | 6 | | 0.004 | | | |
| Trifluoro methansulfonic acid | Liquid | 1493-13-6 | 66*/88 | >480 | >480 | 6 | | 0.009 | | | |
| Trimethyl phosphite | Liquid | 121-45-9 | 208 | 210 | 229 | 4 | na | 0.02 | | | |
| VM & P Naphtha | Liquid | 8030-30-6 | imm | imm | 11*/15 | 1 | 21.7 | 0.0201 | | | |
| VX Nerve Agent, MIL-STD-282 (10 g/$m^2$) | Liquid | 50782-69-9 | | >480[8] | | | | | | | |
| Vinyl acetate | Liquid | 108-05-4 | 23 | 24 | 30 | 1 | 20.3 | 0.0139 | | | |
| Vinyl benzol | Liquid | 100-42-5 | | 16 | 16 | 1 | na | 83.6 | | | |
| Vinyl carbinol | Liquid | 107-18-6 | >480 | >480 | >480 | 6 | <0.01 | 0.01 | <4.8 | >480 | 6 |
| Vinyl chloride | Vapor | 75-01-4 | >480 | >480 | >480 | 6 | <0.06 | 0.06 | <28.8 | >480 | 6 |
| Vinyl cyanide | Liquid | 107-13-1 | | 36*/48 | 36*/48 | 2 | 3.2 | 0.0085 | | | |
| Vinyl ethylene (gaseous) | Vapor | 106-99-0 | >480 | >480 | >480 | 6 | <0.01 | 0.01 | <4.8 | >480 | 6 |
| Vinyl magnesium chloride (15% in Tetrahydrofuran) | Liquid | 3536-96-7 | imm | imm | imm | | 3.27 | 0.01 | | | |
| Vinyl pyridine, 4- | Liquid | 100-43-6 | 15 | 15 | 45 | 2 | >1.93 | 0.01 | | | |
| White Liquor | Liquid | mix | >480 | >480 | >480 | 6 | <0.04 | 0.04 | <19.2 | >480 | 6 |

## Important Note

The permeation data published have been generated for DuPont by independent accredited testing laboratories according to the test method applicable at that time (EN ISO 6529 (method A and B), ASTM F739, ASTM F1383, ASTM D6978, EN369, EN 374-3)
The data is typically the average of three fabrics samples tested.
All chemicals have been tested at an assay of greater than 95 (w/w) % unless otherwise stated.
The tests were performed between 20 °C and 27 °C and at environmental pressure unless otherwise stated.
A different temperature may have significant influence on the breakthrough time.
Permeation typically increases with temperature.

Cumulative permeation data have been measured or have been calculated based on minimum detectable permeation rate.
Cytostatic drugs testing has been performed at a test temperature of 27°C according to ASTM D6978 or ISO 6529 with the additional requirement of reporting a normalized breakthrough time at 0.01 µg/cm²/min.
Chemical warfare agents (Lewisite, Sarin, Soman, Mustard, Tabun and VX Nerve Agent) have been tested according to MIL-STD-282 at 22°C or according to FINABEL 0.7 at 37°C.
Permeation data for Tyvek® is applicable to white Tyvek® 500 and Tyvek® 600 only and is not applicable for other Tyvek® styles or colours.
Permeation data are usually measured for single chemicals. The permeation characteristics of mixtures can often deviate considerably from the behaviour of the individual chemicals.

The permeation data for gloves published have been generated according to ASTM F739 and to ASTM F1383.
The degradation data for gloves published have been generated based on a gravimetric method.
This degradation testing exposes one side of the glove material to the test chemical for four hours. The percent weight change after exposure is measured at four time intervals: 5, 30, 60 and 240 minutes.

Degradation Ratings:

- E: EXCELLENT (0-10% Weight Change)
- G: GOOD (11-20% Weight Change)
- F: FAIR (21-30% Weight Change)
- P: POOR (31-50% Weight Change)
- NR: NOT RECOMMENDED (Above 50% Weight Change)
- NT: NOT TESTED

Degradation is the physical change in a material after chemical exposure. Typical observable effects may be swelling, wrinkling, deterioration, or delamination. Strength loss may also occur.

Please use the permeation data provided as a part of the risk assessment to assist with the selection of a protective fabric, garment, glove or accessory suitable for your application.
Breakthrough time is not the same as safe wear time. Breakthrough times are indicative of the barrier performance, but results can vary between the test methods and laboratories. Breakthrough time alone is insufficient to determine how long a garment may be worn once the garment has been contaminated. Safe user wear time may be longer orshorter than the breakthrough time depending on the permeation behaviour of the substance, the toxicity of the substance, working conditions and the exposure conditions (e.g. temperature, pressure, concentration, physical state).

Latest Update Permeation Data: 5/5/2020

The information provided herein corresponds to our knowledge on the subject at the date of its publication. This information may be subject to revision as new knowledge and experience becomes available. The data provided fall within the normal range of product properties and relate only to the specific material designated; these data may not be valid for such material used in combination with any other materials or additives or in any process, unless expressly indicated otherwise. The data provided should not be used to establish specification limits or used alone as the basis of design; they are not intended to substitute for any testing you may need to conduct to determine for yourself the suitability of a specific material for your particular purposes. Since DuPont cannot anticipate all variations in actual end-use conditions DuPont makes no warranties and assumes no liability in connection with any use of this information. Nothing in this publication is to be considered as a license to operate under or a recommendation to infringe any patent rights.

- For enhanced liquid protection, taping of outer cuff to glove is recommended. A double cuff is not a substitute for supplementary taping.
- The garment does not protect against ionizing radiation.
- The information provided herein corresponds to our knowledge on the subject at the date of its publication. This information may be subject to revision as new knowledge and experience becomes available. The data provided fall within the normal range of product properties and relate only to the specific material designated; these data may not be valid for such material used in combination with any other materials or additives or in any process, unless expressly indicated otherwise. The data provided should not be used to establish specification limits or used alone as the basis of design; they are not intended to substitute for any testing you may need to conduct to determine for yourself the suitability of a specific material for your particular purposes. Since DuPont cannot anticipate all variations in actual end-use conditions DuPont makes no warranties and assumes no liability in connection with any use of this information. Nothing in this publication is to be considered as a license to operate under or a recommendation to infringe any patent rights.
- This garment and/or fabric are not flame resistant and should not be used around heat, open flame, sparks or in potentially flammable environments.

For further product information, literature and as well as assistance in locating a local supplier, please visit:

www.safespec.dupont.co.uk

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