



S.p.A. Presents the new garment line made with the fabric

Eptaform[®]



Garments made with double over taped seams
(**TOPGUARD**[®] Technology)
cat. 3 type 1a-B-ET
for NBC (nuclear, biological and chemical) protection



NUCLEAR PROTECTION
(EN 1073-1) ventilated suits



BIOLOGICAL PROTECTION
(EN 14126)



CHEMICAL PROTECTION
(EN 943-1 type 1)
(EN 943-2 type 1-ET)
(EN 943-1 type 2)
(EN 14605 type 3)
(EN 14605 type 4)
(EN ISO 13982-1 type 5)
(EN 13034 type 6)

CWA (CHEMICAL WARFARE AGENTS) PERMEATION RESISTANCE (NATO Test)

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(**TOPGUARD**® Technology) cat. 3 type 1a-B-ET
for NBC (nuclear, biological and chemical) protection
made with raw material *Eptaform*®

PHYSICAL PROPERTIES

PROPERTY	METHOD	U.M.	VALUE	CLASS	
Abrasion resistance	EN 530/96	cycles	> 2000	6	
Flex cracking resistance	EN-ISO 7854/99 (B)	cycles	> 2500	2	
Trapezoidal tear resistance	MD	EN-ISO 9073-4/99	N	123	5
	XD	EN-ISO 9073-4/99	N	90,7	4
Traction resistance	MD	EN-ISO 13934-1/00	N	370	4
	XD	EN-ISO 13934-1/00	N	360	4
Puncture resistance	EN 863/95	N	71,1	3	
Burst resistance	EN-ISO 13938-2/01	KPa	365	4	
Stability to heat	ext./ext	ISO 5978/90	-	no adhesion	-
	ext./int	ISO 5978/90	-	few adhesion	-
	int./int	ISO 5978/90	-	no adhesion	-
Surface resistivity	EN 1149-1/97	Ω	ND	-	
Hydrostatic head	EN ISO 20811/93	cm H ₂ O	> 1000	-	
		Pa	> 98000	-	
Ignition resistance	prEN 13274-4/98 (3)	-	Self extinguishing*	-	
Seam strength resistance	EN-ISO 13935-2/01	N	670	6	



PROTECTIVE PROPERTIES: Chemical Protection

Total tight ness for any particle dimension

Permeation resistance (EN 369 – ISO 6529: 1 µg/min/cm²)

Chemical	n° CAS	Real Permeation (min.)	Permeation ASTM F 739 (min.)	Permeation EN 369 (min.)	480 th minute Permeation (µg/min/cm ²)
Methanol	67-56-1	> 480	> 480	> 480	< 0,1
Sodium Hydroxide 40%	1310-73-2	> 480	> 480	> 480	< 0,001
Sulphuric Acid 96%	7664-93-9	> 480	> 480	> 480	< 0,001
Ammonium Hydroxide (30%)	1336-21-6	> 480	> 480	> 480	< 0,001
Hydrogen Chloride	7647-01-0	180	> 480	> 480	0,004
Acetone	67-64-1	> 480	> 480	> 480	< 0,1
Chlorine	7782-50-5	200	> 480	> 480	0,008
n-Heptane	142-82-5	> 480	> 480	> 480	< 10,0
Toluene	108-88-3	> 480	> 480	> 480	< 10,0
Acetonitrile	75-05-8	> 480	> 480	> 480	< 0,01
Ethyl acetate	141-78-6	> 480	> 480	> 480	< 1,0
Diethylamine	109-89-7	47	62	> 480	0,28
Carbon disulphide	75-15-0	> 480	> 480	> 480	< 0,1
Tetrahydrofuran	109-99-9	> 480	> 480	> 480	< 10,0
Dichloromethane	75-09-2	146	146	146	20

CWA (CHEMICAL WARFARE AGENTS) PERMEATION RESISTANCE

<i>Chemical</i>	<i>Permeation NATO - Quantity 4 h. $\mu\text{g}/\text{cm}^2$</i>	<i>Permeation FINABEL (h:min.)</i>	<i>Accuracy FINABEL $\mu\text{g}/\text{cm}^2$</i>
Mustard (HD)	< 0,05	>6:00 <24:00	0,1
Soman (GD)	0,08	> 24:00	0,05
Sarin (GB)	not testable	> 24:00	0,05
Tabun (GA)	not testable	> 24:00	0,05
VX	< 0,05	> 24:00	0,05
Lewisite	not testable	>6:00 <24:00	0,5

All the garments are in conformity with the following norms:

- EN 340 General requirements
- EN 943-1:2002 Performance requirements for ventilated and non-ventilated “gas-tight” (Type 1) and “non-gas-tight” (Type 2) chemical protective suits
- EN 943-2:2002 Performance requirements for “gas-tight” (Type 1) chemical protective suits for emergency teams (ET)
- EN 14605 Liquid jet tight chemical protective garments (Type 3)
- EN 14605 Liquid aerosols tight chemical protective garments (Type 4)
- EN ISO 13982 Particle tight chemical protective garments (Type 5)
- EN 13034 Liquid limited splash tight chemical protective garments (Type 6)



PROTECTIVE PROPERTIES: Biological Protection (EN 14126)

Test	EN 14126:2003	
	Value	class
Synthetic blood under hydrostatic pressure	20 KPa	6 of 6
Blood born infective agents (Phi-X 174 bacteriophage)	20 KPa	6 of 6
Penetration of infecting agents by contact	> 75 min.	6 of 6
Biologically contaminated aerosols	0 micro organisms	3 of 3
Biologically contaminated powders	0 micro organisms	3 of 3



PROTECTIVE PROPERTIES: Nuclear Protection (EN 1073-1)

These garments passed all the tests included in EN 1073-1 norm (ventilated suits) for the protection against nuclear contaminated particles.



NUCLEAR PROTECTION
(EN 1073-1) ventilated suits

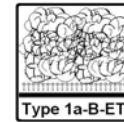


BIOLOGICAL PROTECTION
(EN 14126)



CHEMICAL PROTECTION

**CWA (CHEMICAL WARFARE AGENTS) PERMEATION
RESISTANCE (NATO Test)**



AVAILABLE MODELS

- ENCAPSULATED SUIT B.O.
- SPECIAL GARMENTS on customer need.

MOST COMMON WORKING AREAS

- Emergency interventions after accidents with loss of chemicals
- Firebrigades
- Army
- Petrochemical companies
- Production, treatment and shipment of chemicals





Eptaform® Permeation Test Datasheet

Norms: ASTM F739; EN ISO 6529 (ex EN369)

Legenda:

Real: Time between the first contact and the minimum permeation detectable tax

ASTM: Time between the first contact and the minute in which 0,1 microgram is detected

EN: Time between the first contact and the minute in which 1 microgram is detected

TPC: Permeation tax at 480th minute

TPM: Minimum detectable tax

Garments:



<i>Chemical</i>	<i>CAS</i>	<i>State</i>	<i>Real</i>	<i>ASTM</i>	<i>EN</i>	<i>Class</i>	<i>TPC</i>
Acetaldehyde	75-07-0	L	19	>480	>480	6	0,01
Acetic acid (glacial)	64-19-7	L	>480	>480	>480	6	<0,001
Acetic Anhydride	108-24-7	L	1	54	>480	6	0,002
Acetone	67-64-1	L	>480	>480	>480	6	<0,1
Acetonitrile	75-05-8	L	>480	>480	>480	6	<0,01
Acrolein	107-02-8	L	>480	>480	>480	6	<0,01
Ammonia	7664-41-7	G	>480	>480	>480	6	<0,001
Ammonium hydroxide (30%)	1336-21-6	L	>480	>480	>480	6	<0,001
Benzene	71-43-2	L	>480	>480	>480	6	<1
Benzonitrile	100-47-0	L	1	>480	>480	6	0,04
Benzoyl chloride	98-88-4	L	10	>480	>480	6	0,03
Black liquor	-	M	4	>480	>480	6	0,004
Butanol n-	71-36-3	L	>480	>480	>480	6	<0,1
Butyl aldehyde	123-72-8	L	>480	>480	>480	6	<0,1
Carbon tetrachloride	56-23-5	L	>480	>480	>480	6	<1
Chlorine	7782-50-5	G	200	>480	>480	6	0,008
Chloroacetic acid	79-11-8	L	>480	>480	>480	6	<0,001
Chlorobenzene	108-90-7	L	>480	>480	>480	6	<1
Chloroethanol 2-	107-07-3	L	>480	>480	<480	6	<0,001

<i>Chemical</i>	<i>CAS</i>	<i>State</i>	<i>Real</i>	<i>ASTM</i>	<i>EN</i>	<i>Class</i>	<i>TPC</i>
Chloroform	67-66-3	L	184	184	410	5	1,3
Chloromethyl methyl ether	107-30-2	L	>480	>480	>480	6	<1
Chlorotoluene o-	95-49-8	L	>480	>480	>480	6	<1
Cresol (mixed isomers)	108-39-4	L	>480	>480	>480	6	<1
Cyclohexane	110-82-7	L	>480	>480	>480	6	<1
Di-(2-ethylhexyl)phthalate	117-81-7	L	>480	>480	>480	6	<1
Dichloroethane 1,2-	107-06-2	L	>480	>480	>480	6	<1
Dichloromethane	75-09-2	L	146	146	146	4	20
Dichloropropane 1,2-	78-87-5	L	122	122	122	4	3
Dichloropropene 2,3-	78-88-6	L	>480	>480	>480	6	<1
Diesel fuel	70892-10-3	L	>480	>480	>480	6	<0,1
Diethylamine	109-89-7	L	>480	>480	>480	6	<0,001
Dimethylamine	124-40-3	G	>480	>480	>480	6	<0,01
Dimethyldichlorosilane	75-78-5	L	>480	>480	>480	6	<1
Dimethylformamide N,N-	68-12-2	L	>480	>480	>480	6	<0,001
Dioxane 1,4-	123-91-1	L	>480	>480	>480	6	<1
Epichlorohydrin	106-89-8	L	10	>480	>480	6	0,09
Ethanolamine	141-43-5	L	>480	>480	>480	6	<0,01
Ethyl acetate	141-78-6	L	>480	>480	>480	6	<1,0

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Ethyl cellosolve® acetate	111-15-9	L	16	>480	>480	6	0,03
Ethyl ether	60-29-7	L	>480	>480	>480	6	<1
Ethylene dibromide	106-93-4	L	10	10	10	1	16
Ethylene dichloride	107-06-2	L	>480	>480	>480	6	<1
Fluorobenzene	462-06-6	L	381	381	381	5	3,8
Formaldehyde (37%)	50-00-0	L	50	>480	>480	6	0,006
Formic acid	64-18-6	L	350	>480	>480	6	0,001
Freon® 113	76-13-1	I	>480	>480	>480	6	<0,1
Gasoline, unleaded	8006-61-9	L	>480	>480	>480	6	<0,1
Glutaraldehyde (5% in water)	111-30-8	L	>480	>480	>480	6	<0,1
Gluteraldehyde (50%)	111-30-8	L	>480	>480	>480	6	<0,1
Green liquor	-	M	>480	>480	>480	6	<0,001
Hexamethylene diisocyanate	822-06-0	L	>480	>480	>480	6	<1
Hexane n-	110-54-3	L	7	7	>480	6	0,6
Hydrochloric acid (37%)	7647-01-0	L	>480	>480	>480	6	<0,001
Hydrofluoric acid (70%)	7664-39-3	L	>480	>480	>480	6	<0,001
Hydrogen chloride	7647-01-0	G	180	>480	>480	6	0,004
Hydrogen peroxide (30%)	7722-84-1	L	>480	>480	>480	6	<1
Hydrogen peroxide (70%)	7722-84-1	L	>480	>480	>480	6	<1

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Isopropylamine	75-31-0	L	>480	>480	>480	6	<0,01
Mercuric chloride (sat'd)	7487-94-7	L	134	134	>480	6	0,11
Methanol	67-56-1	L	>480	>480	>480	6	<0,1
Methyl-t-butyl-ether	1634-04-4	L	10	10	>480	6	0,3
Methyl ethyl ketone	78-93-3	L	194	194	>480	6	0,3
Methyl iodide	74-88-4	L	>480	>480	>480	6	<0,1
Methyl isobutyl ketone	108-10-1	L	2	2	>480	6	0,4
Methyl methacrylate	80-62-6	L	>480	>480	>480	6	<1
Methylamine (40% in water +	74-89-5	L	26	26	>480	6	0,5
Mineral spirits	64475-85-0	L	>480	>480	>480	6	<1
n-Heptane	142-82-5	L	>480	>480	>480	6	<10,0
Nitric acid (> 90%, fuming)	7697-37-2	L	180	>480	>480	6	<0,001
Nitric acid (70%)	7697-37-2	L	4	>480	>480	6	0,02
Octane n-	111-65-9	L	2	2	2	0	5
Oxalic acid (10.5%)	144-62-7	L	>480	>480	>480	6	<0,001
Perchloric acid (70%)	7601-90-3	L	>480	>480	>480	6	<0,001
Petrol, leaded	86290-81-5	L	>480	>480	>480	6	<0,1
Phosphoric acid (85%)	7664-38-2	L	110	>480	>480	6	0,003
Phosphorous oxychloride	10025-87-3	L	>480	>480	>480	6	<0,001

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Phosphorous trichloride	7719-12-2	L	1	>480	>480	6	0,04
Pyridine	110-86-1	L	237	237	376	5	1,2
Sodium hydroxide (40%)	1310-73-2	L	>480	>480	>480	6	<0,001
Stoddard solvent (Nonane/Tri	8052-41-3	L	2	2	14	1	1,2
Styrene	100-42-5	L	>480	>480	>480	6	<0,1
Sulphuric acid (103%, fuming)	8014-95-7	L	>480	>480	>480	6	<0,001
Sulphuric acid (96%)	7664-93-9	L	>480	>480	>480	6	<0,001
Sulphuric acid (98%)	7664-93-9	L	>480	>480	>480	6	>0,01
Tetrachloroethane 1,1,2,2-	79-34-5	L	>480	>480	>480	6	<1
Tetrachloroethylene 1,1,2,2-	127-18-4	L	>480	>480	>480	6	<1
Tetrahydrofuran	109-99-9	L	>480	>480	>480	6	<0,1
Thioglycolic acid	68-11-1	L	>480	>480	>480	6	<0,1
Toluene	108-88-3	L	>480	>480	>480	6	<10,0
Toluidine o-	95-53-4	L	12	24	>480	6	0,68
Trichlorobenzene 1,2,4-	120-82-1	L	>480	>480	>480	6	<1
Trichloroethane 1,1,1-	71-55-6	L	>480	>480	>480	6	<0,1
Trichloroethane 1,1,2-	79-00-5	L	>480	>480	>480	6	<1
Trichloroethanol 2,2,2-	115-20-8	L	>480	>480	>480	6	<1
Trichloroethylene	79-01-6	L	132	132	132	4	4,1

<i>Chemical</i>	<i>CAS</i>	<i>State</i>	<i>Real</i>	<i>ASTM</i>	<i>EN</i>	<i>Class</i>	<i>TPC</i>
Triethylamine	121-44-8	L	122	>480	>480	6	0,008
Trifluoroethanol 2,2,2-	75-89-8	L	18	>480	>480	6	0,04
Vinyl acetate	108-05-4	L	>480	>480	>480	6	<0,001
White liquor	-	M	>480	>480	>480	6	<0,001
Xylene (iso-mix)	1330-20-7	L	>480	>480	>480	6	<10