ChemMax® 2 | Performance Comparison

ChemMax® 2 is a Type 3 & 4 coverall offering chemical protection to the European standard EN 14605.

It uses a unique, chemical barrier film which features both physical properties and chemical permeation resistance often similar to more expensive products in the market, and yet is softer, more flexible, more comfortable and less expensive.

The tables below compare ChemMax® 2 certification, physical properties and permeation with other Type 3 & 4 coveralls available.

EN Certification						
Description	**Test Standard**	**Tychem® 2000 C**	**AlphaTec® 3000 previously MICROCHEM®**	**ChemMax® 2**	**Tychem® 6000 F**	**AlphaTec® 4000 previously MICROCHEM®**
Type 3 & 4 Chemical Spray Protection	EN 14605	✓	✓	✓	✓	✓
Type 6 Aerosol Spray Protection	EN 13034	✓	✓	✓	✓	✓
Type 5 Hazardous Dust Protection	EN 13982	✓	✓	✓	✓	✓
Protection against radiation contaminated dust particles	EN 1072-3	✓	✓	✓	✓	✓
Protection against Infectious Agents	EN 14126	✓	✓	✓	✓	✓
Anti-Static Clothing	EN 1149-5	✓	✓	✓	✓	✓

Physical Properties											
Description	**Test Standard**	**Tychem® 2000 C**		**AlphaTec® 3000 previously MICROCHEM®**		**ChemMax® 2**		**Tychem® 6000 F**		**AlphaTec® 4000 previously MICROCHEM®**	
Tensile Strength MD/CD	EN 13934	160/150 N	Class 3	>100/>60 N	Class 2	300/150 N	Class 3	240/245 N	Class 3	>100/>60 N	Class 2
Abrasion Resistance	EN 530	>1500 cycles	Class 5	>500 cycles	Class 3	>2000 cycles	Class 6	>2000 cycles	Class 6	>2000 cycles	Class 6
Puncture Resistance	EN 863	18 N	Class 2	>10 N	Class 2	11.8 N	Class 2	26 N	Class 2	>10 N	Class 2
Flex Cracking	ISO 7854	>5000 cycles	Class 3	>100k cycles	Class 6	100k cycles	Class 6	>1000 cycles	Class 1	>40k cycles	Class 5
Trapezoidal Tear MD/CD	ISO 9073	35/30 N	Class 1	>20/>20 N	Class 2	167.2/67.5 N	Class 6/4	40/35 N	Class 2	>60/>40 N	Class 3
Seam Strength	EN 5082	>125 N	Class 4	>125 N	Class 4	148.3 N	Class 4	>125 N	Class 4	>125 N	Class 4

Summary: In all six physical properties, ChemMax® 2 achieves as good or better results than all four competitor products.

Permeation Classification according to EN 14325 (tested to EN 6529)
Normalised Breakthrough (Time in minutes to Permeation Rate of 1.0µg/min/cm²)

Chemical	CAS No.	Conc.	Tychem® 2000C	AlphaTec® 3000 previously MICROCHEM®	ChemMax® 2	Tychem® 6000 F	AlphaTec® 4000 previously MICROCHEM®
1,2-Dichloroethane	107-06-2	99%	N/A	N/A	6	3	6
1,2-Dichloropropane	78-87-5	99%	N/A	N/A	6	N/A	N/A
1,3-Butadiene	106-99-0	99%	0	N/A	6	6	6
1,4-Dioxane	123-91-1	99%	N/A	N/A	2	6	6
2,2,2-Trichloroethanol	115-20-8	99%	N/A	N/A	6	6	N/A
4,4-Methylene-Bis	5124-30-1	90%	N/A	N/A	0	N/A	N/A
Acetic Acid	64-19-7	99%	3	6	6	6	6
Acetic Anhydride	108-24-7	99%	N/A	6	6	6	6
Acetone	67-64-1	99%	0	1	6	6	6
Acetonitrile	75-05-8	99%	0	0	6	6	6
Acrolein	107-02-8	90%	N/A	N/A	0	6	N/A
Acrylic Acid	79-10-7	99%	0	6	6	6	6
Acrylonitrile	107-13-1	99%	0	N/A	6	6	6
Ammonia	7664-41-7	99%	0	0	1	1	6
Ammonium Hydroxide	1336-21-6	29%	0	N/A	6	(32%) 6	(28%) 6
Aniline	62-53-3	99%	0	6	6	6	6
Benzene	71-43-2	99%	N/A	0	0	6	6
Benzyl Alcohol	100-51-6	95%	N/A	N/A	6	6	N/A
Bromine	7726-95-6	99%	N/A	0	0	0	1
Butyraldehyde	123-72-8	99%	0	N/A	6	N/A	N/A
Carbon Disulfide	75-15-0	99%	0	0	0	6	0
Carbon Monoxide	630-08-0	99%	N/A	N/A	6	0	N/A
Chlorine	7782-50-5	99%	0	1	6	6	6
Chloroacetic Acid	79-11-8	75%	N/A	(79%) 6	6	(80%) 6	(79%) 6
Chloroacetone	78-95-5	99%	N/A	N/A	6	6	N/A
Chlorosulfonic Acid	7790-94-5	97%	N/A	N/A	6	6	3
Crotonaldehyde	4170-30-3	99%	N/A	N/A	6	6	N/A
Cyclohexane	110-82-7	99%	N/A	N/A	6	6	N/A
Cyclohexanone	108-94-1	99%	N/A	N/A	4	6	N/A
Cyclohexyl Isocyanate	3173-53-3	99%	N/A	N/A	0	N/A	N/A
Dichlorodimethyisilane	75-78-5	99%	N/A	N/A	2	N/A	N/A
Dichloromethane	75-09-2	99%	0	0	0	0	0
Diesel Fuel	Mixture	Neat	N/A	1	6	6	6

Chemical Permeation Resistance

The table of Normalised Breakthrough *(continued overleaf)* shows available data for ChemMax® 2 compared with the available data against the same chemicals for the competitor products.

Of 98 chemicals for which there is comparable data, 65 (or 66%) achieve as good or better a permeation resistance as the competitor products including the more expensive and less comfortable options.

In applications involving these chemicals, ChemMax® 2 is an option which is softer, more flexible, more comfortable and less expensive.

Permeation Classifications (according to EN 14325)	
Class 0	<10 minutes
Class 1-3	Class 1 - >10 minutes Class 2 - >30 minutes Class 3 - >60 minutes
Class 4-5	Class 4 - >120 minutes Class 5 - >240 minutes
Class 6	>480 minutes

Colour coding indicates the permeation class. EN 14325 classifies permeation as normalised breakthrough - the time to reach a RATE or SPEED of permeation of 1.0µg/min/cm².

Red = Class 0 /'unclassified' - 1.0µg/min/cm² is reached in less than 10 minutes.

Green = Class 6 - the highest class - 1.0µg/min/cm² not reached after 480 minutes

** Note: Permeation normalised breakthrough is NOT an indication of safe-use time.*

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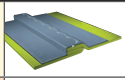
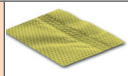
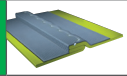
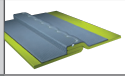
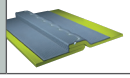
ChemMax® 2 | Performance Comparison

Permeation Classification according to EN 14325 (tested to EN 6529)
Normalised Breakthrough (Time in minutes to Permeation Rate of 1.0µ/min/cm²)

Chemical	CAS No.	Conc.	Tychem® 2000 C	AlphaTec® 3000 previously MICROCHEM®	ChemMax® 2	Tychem® 6000 F	AlphaTec® 4000 previously MICROCHEM®
Diethylamine	109-89-7	99%	0	0	1	6	0
Dimethylacetamide	127-19-5	99%	N/A	N/A	2	6	N/A
Dimethylamine	124-40-3	40%	N/A	6	6	6	6
Dimethylformamide	68-12-2	99%	N/A	6	6	6	6
Dimethylmaleate	624-48-6	99%	N/A	N/A	6	N/A	0
Epichlorohydrin	106-89-8	99%	N/A	6	5	6	6
Ethanol	64-17-5	99%	N/A	N/A	6	6	6
Ethyl Acetate	141-78-6	99%	0	0	6	6	6
Ethyl Benzene	100-41-4	99%	N/A	N/A	0	6	6
Ethylene Glycol	107-21-1	99%	6	6	6	6	6
Ethylene Oxide	75-21-8	99%	0	N/A	6	6	6
Ethylene Oxide	75-21-8	10%	N/A	N/A	6	N/A	6
Ethylenediamine	107-15-3	99%	N/A	N/A	6	6	6
Fluoroboric Acid	16872-11-0	99%	N/A	N/A	5	N/A	N/A
Fluorosilicic Acid	16961-83-4	35%	N/A	N/A	6	N/A	N/A
Formaldehyde	50-00-0	37%	6	6	6	6	6
Formic Acid	64-18-6	99%	N/A	6	6	6	6
Gasoline	Mixture	Neat	N/A	N/A	6	N/A	N/A
Glutaraldehyde	111-30-8	99%	N/A	N/A	6	5	N/A
Hexamethyldisilazane	999-97-3	99%	N/A	N/A	6	N/A	6
Hydrochloric Acid	7647-01-0	37%	6	6	6	6	6
Hydrofluoric Acid (liquid)	7664-39-3	70%	1	(62-64%) 2	6	5	6
Hydrofluoric Acid (liquid)	7664-39-3	48%	6	6	6	6	6
Hydrogen Chloride	7647-01-0	99%	0	0	6	6	6
Hydrogen Fluoride (gas)	7664-39-3	70%	N/A	N/A	6	N/A	6
Hydrogen Fluoride (gas)	7664-39-3	99%	N/A	N/A	6	N/A	2
Hydrogen Peroxide	7722-84-1	50%	6	6	6	6	6
Iodomethane	74-88-4	99%	0	N/A	0	6	N/A
Isoamyl Alchol	123-51-3	99%	N/A	N/A	6	N/A	N/A
Isopropanol	67-63-0	99%	0	N/A	2	6	N/A
Methanol	67-56-1	99%	0	6	6	6	6
Methyl Bromide	74-83-9	99%	N/A	N/A	6	N/A	N/A
Methyl Chloride	74-87-3	99%	N/A	N/A	6	6	N/A
Methyl Ethyl Ketone	78-93-3	99%	N/A	N/A	6	6	6
Methyl Methacrylate	80-62-6	99%	N/A	N/A	6	N/A	6
Methylamine	74-89-5	40%	N/A	N/A	6	N/A	N/A
Methylene Dianaline	101-77-9	99%	N/A	N/A	0	N/A	N/A
N-Butanol	71-36-3	99%	0	6	6	6	6
N-Heptane	142-82-5	99%	N/A	0	0	N/A	6
N-Hexane (Hexane)	110-54-3	99%	N/A	0	6	6	6
Nitric Acid	7697-37-2	70%	6	6	6	6	6
Nitrobenzene	98-95-3	99%	0	6	4	6	6
Nitrogen Dioxide	10102-44-0	99%	N/A	N/A	6	N/A	N/A
Oleum	Mixture	Neat	(30%) 3	N/A	6	N/A	N/A
Phenol	108-95-2	99%	N/A	6	6	6	6
Phosphoric Acid	7664-38-2	85%	6	6	6	6	6
Phosphorus Trichloride	7719-12-2	95%	N/A	N/A	0	6	6
Potassium Acetate	127-08-2	Sat	N/A	N/A	6	6	N/A
Potassium Chromate	7789-00-6	Sat	6	N/A	6	6	N/A
Potassium Hydroxide	1310-58-3	88%	6	N/A	0	6	N/A
Propionic Acid	79-09-4	99%	N/A	N/A	6	N/A	6
Propylamine	107-10-8	99%	N/A	N/A	0	6	N/A
P-Xylene	106-42-3	99%	N/A	0	0	N/A	N/A
Sodium Carbonate	497-19-8	5%	N?A	N/A	0	N/A	N/A
Sodium Cyanide (Aq Sol'n)	143-33-9	35%	6	6	6	6	6
Sodium Hydroxide	1310-73-2	50%	6	6	6	6	6
Sodium Hypochlorite	7681-52-9	15%	6	6	6	6	6
Sodium Methoxide	124-41-4	30%	N/A	N/A	6	N/A	N/A
Sodium Silicofluoride	16893-85-9	Sat	N/A	6	0	N/A	6
Styrene	100-42-5	98%	N/A	0	1	6	6
Sulfur Dioxide	7446-09-5	99%	N/A	N/A	6	6	6
Sulfur Trioxide	7446-11-9	99%	N/A	N/A	4	N/A	1
Sulfuric Acid	7664-93-9	30%	3	6	6	N/A	6
Sulfuric Acid	7664-93-9	96%	6	6	6	N/A	6
T-Butyl Methyl Ether	1634-04-4	99%	N/A	N/A	0	N/A	N/A
Tetrachloroethane	79-34-5	99%	N/A	N/A	5	6	N/A
Tetrachloroethylene	127-18-4	99%	0	N/A	6	6	6
Tetrahydrofuran	109-99-9	99%	0	0	3	6	0
Tetrahydrothiophene	110-01-0	99%	N/A	N/A	0	N/A	N/A
Titanium Tetrachloride	7550-45-0	99%	N/A	0	6	N/A	6
Toluene	108-88-3	99%	0	0	0	6	6
Trichloroethylene	79-01-6	100%	N/A	0	0	6	0
Trichlorovinylsilane	75-94-5	99%	N/A	N/A	3	N/A	N/A
Trifluoroacetic Acid	76-05-1	99%	N/A	6	6	6	6
Unleaded Petrol	Mixture	99%	N/A	N/A	0	6	N/A
Vinyl Acetate	108-05-4	95%	N/A	0	0	6	6
Vinyl Chloride	75-01-4	99%	N/A	N/A	6	6	N/A

Seam Construction

Tychem® 2000 C Stitched & taped	
AlphaTec® (MICROCHEM®) 3000 Ultrasonic Weld (some over taped)	
ChemMax® 2 Stitched & taped	
Tychem® 6000 F Stitched & taped	
AlphaTec® (MICROCHEM®) 4000 Stitched & taped	

Garment Design: Super B-Style

Like all Lakeland chemical suits, ChemMax® 2 benefits from Lakeland's Super-B styling, featuring a unique combination of three elements:

❶ 3-piece hood ❷ Inset sleeves ❸ Crotch gusset

The Super-B style results in better fit, improved durability and greater freedom of movement.

Scan the QR code to view the Super-B style video and see how it compares to a competitive bat-wing coverall

Conclusions

1. ChemMax® 2 features superior physical properties including abrasion, tensile strength and tear strength compared to other options.
2. ChemMax® 2 permeation barrier is often similar or better than more expensive/less comfortable options (for aproximately 66% of chemicals).
3. ChemMax® 2 seam construction is the same as other more expensive options.
4. ChemMax® 2 benefits from the unique Lakeland Super-B style pattern, resulting in better fit, greater durability and more freedom of movement
5. ChemMax® 2 fabric is soft and flexible and more comfortable than other options... to test this request a sample at **sales-europe@lakeland.com**

Competitor information taken from publicly available sources at the time of publication. We would always recommend checking manufacturers website for the latest data.

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