

Disposable Apparel

Performance and Selection Guide



Tailoring your Solution is More Cost-Effective

You wouldn't enter a Formula One® race in the family saloon. But neither would you use a race car for commuting or taking the kids to school. Choices depend on the situation; optimal performance is the result of tailoring your tools to the task at hand.

The same principal applies to protective clothing- selections should depend on the hazards and requirements encountered in your unique work environment.

A "one size fits all" approach to safety is not the way to optimize protection; work environments are simply too variable. In the real world, under-protecting is negligent, while over-protection adds cost and may compromise comfort.

"A solution optimized for a specific application is not only superior in performance, but is also more cost-effective, because you're only paying for what you need..."

If all you have is a hammer, everything looks like a nail.

There is no such thing as an "average" situation. When you try to do everything with the same tool, you do nothing very well. By definition, when you design for the average, you force compromises at both ends of the performance spectrum.

At Lakeland, we believe in offering multiple fabric solutions, each with its own barrier, comfort, durability and cost levels, so that you can select the single best product for your situation. Less compromise means you're more likely to have safe and happy workers. A solution optimized for a specific application is not only superior in performance, but is also more cost-effective because you're only paying for what you need.

How do you determine the best fabric choice for a given work environment?

The only reliable way is performance data using the same test methods for all fabrics.

On the following page, Chart 1 is compiled from lab testing of The Leading Brand – which we shall refer to as "Brand X" and two targeted and less expensive Lakeland fabrics, all in accordance with European EN standards, the required and expected standards in Europe and increasingly around the world. The information is published in both both companies' user instructions.

EN standards for chemical protective clothing divide products into 6 different "Types" based on the hazard the garment is designed to protect against and the level of exposure to that hazard.

There are three "Types" that apply to liquid chemical protection: Type 6, Type 4, and Type 3, of which Type 3 is the highest. There is one "Type" that applies to hazardous dry particles, Type 5. Type 2 is for positive pressure, externally supplied, air-fed suits, and Type 1 is for gas-tight garment configurations.

EN Chemical Protective Clothing Standards

TYPE 6 EN 13034:2005	TYPE 5 EN 13982-1:2004	TYPE 4 EN 14605:2005	TYPE 3 EN 14065:2005	TYPE 2 EN 943-1:2002	TYPE 1 EN 943-1:2002
Non-gas tight limited protection against liquid aerosol	Non-gas tight protection against airborne dry particulate chemicals	Non-gas tight protection against liquid chemical splash	Non-gas tight protection against high pressure liquid exposure or splash	Non gas-tight positive pressure suits	Gas-tight protection against chemicals, vapors and toxic particles

Performance Data

Type 6 Liquid Aerosol and Type 5 Dry Particulate ISO 16602 Classification

Physical Property		Test Method	Brand X*	Lakeland SafeGard®	Lakeland MicroMax® NS	Lakeland MicroMax®
Strength / Durability Test			Performance Class Range 1-6, 6 being the highest performing			
Abrasion Resistance		EN 530 (method 2)	2	2	1	2
Puncture Resistance		EN 863	2	1	1	1
Flex Cracking		ISO 7854/B	6	6	4	5
Trapezoidal Tear MD		ISO 9073-4	1	2	3	4
Trapezoidal Tear XD		ISO 9073-4	1	2	2	2
Tensile Strength (max. MD/XD)		ISO 13934-1	1	3	2	Not Tested
Burst Strength		ISO 2960	Not Disclosed	2	1	1
Antistat		EN 1149-5	Pass	Pass	Pass	Pass
Seam Strength		EN/ISO 13935-2	3	3	3	3
			> 75 N	80.5 N	88.8 N	87.28N
Resistance to Liquid Penetration			Performance Class Range 1-3			
Sulfuric Acid (30%)	Penetration Repellancy	EN/ISO 6530	3	3	3	3
			3	3	3	3
Sodium Hydroxide (10%)	Penetration Repellancy	EN/ISO 6530	3	3	3	3
			3	3	3	3
O-xylene	Penetration Repellancy	EN/ISO 6530	1	< 1	3	3
			1	< 1	2	2
Butanol-1	Penetration Repellancy	EN/ISO 6530	2	< 1	3	3
			1	< 1	2	2
Whole Garment Tests						
Type 5 Particle Aerosol Inward Leakage Test		EN/ISO 13982-2	Pass	Pass	Pass	Pass
Type 6 Low Level Spray		EN 13034	Pass	Pass	Pass	Pass
Protection Factor (whole suit)		EN 1073-2	1	1	1	1

* Taken from publicly available documents. Contact Lakeland for reference if required.

EN14126 – Protection Against Infectious Agents

Physical Property	Test Method	Brand X**	Lakeland SafeGard®	Lakeland MicroMax® NS	Lakeland MicroMax®
		Performance Class Range 1-3 or 1-6			
Protection against Blood and Body Fluids	ISO 16604:2004	< 1	Not Recommended	6	6
Protection against Biologically Contaminated Aerosols	ISO 22611:2003	1	Not Recommended	3 (3 is maximum)	3 (3 is maximum)
Protection against Dry Microbial Penetration	ISO 22612:2005	1	Not Recommended	3 (3 is maximum)	3 (3 is maximum)
Protection against Mechanical Contact with Substances Containing Contaminated Liquids	EN 14126:2003 Annex A	1	Not Recommended	6	6

** All data on Brand X with the exception of air permeability and MVTR data (which is from independent testing) is taken from publicly available User Instructions and other documents. Lakeland will provide references or copies of relevant test reports on request if required.

Analysis

Strength Tests: Of the ten tests in this category, the Lakeland fabrics shown meet or exceed the performance of Brand X in more cases than Brand X exceeds them. In only one test- puncture resistance- does Brand X exceed the Lakeland solutions. The unique MicroMAX® fabric (featuring strengthening scrim) offers a higher strength product – the only fabric with trapezoidal tear of 4N (MD).

Barrier Tests: The Type 6 garment standard requires tests against four common chemicals. In the case of the first two repellency and penetration are the same for all three fabrics. However in the case of the 3rd and 4th chemicals the repellency and penetration for MicroMAX® exceeds that of Brand X. Note that whilst MicroMAX® retains a Class 3 for Penetration for all four chemicals, Brand X results drop to the lowest class – Class 1 – for the 3rd and 4th chemicals.

Whole Garment Tests: These tests cover particle inward leakage, low level spray, and whole suit protection. All three fabrics pass Type 5 and Type 6 standards.

Protection Against Infectious Agents: In all four tests against blood-borne pathogens, Lakeland MicroMax® NS is significantly more effective, performing at the highest possible class in each test. SafeGard® was not tested because it was known it would not pass. Brand X did not meet the minimum performance threshold to qualify for a classification in protection against blood and body fluids, and only met the minimum classification in the other tests.

Primary Decision Considerations: The Lakeland fabrics meet or exceed Brand X's performance overall, and provide the versatility of choices for better targeting. So how does the data guide actual product selection?

One of the most critical considerations in evaluating fabric performance is the inevitable trade-off between barrier protection and comfort, as they are in direct opposition to each other. Protection is dependent on the proper wearing of the garment. The less comfortable a garment is, the more likely it is to be worn improperly.

The Freedom of Choices While Brand X is based on the idea of using a single fabric for all Type 5 & 6 applications, Lakeland's approach is to

offer multiple tailored solutions to better cover the entire performance spectrum. This allows the user to more precisely target for particular needs, as the "Barrier/Comfort Spectrum" below illustrates.

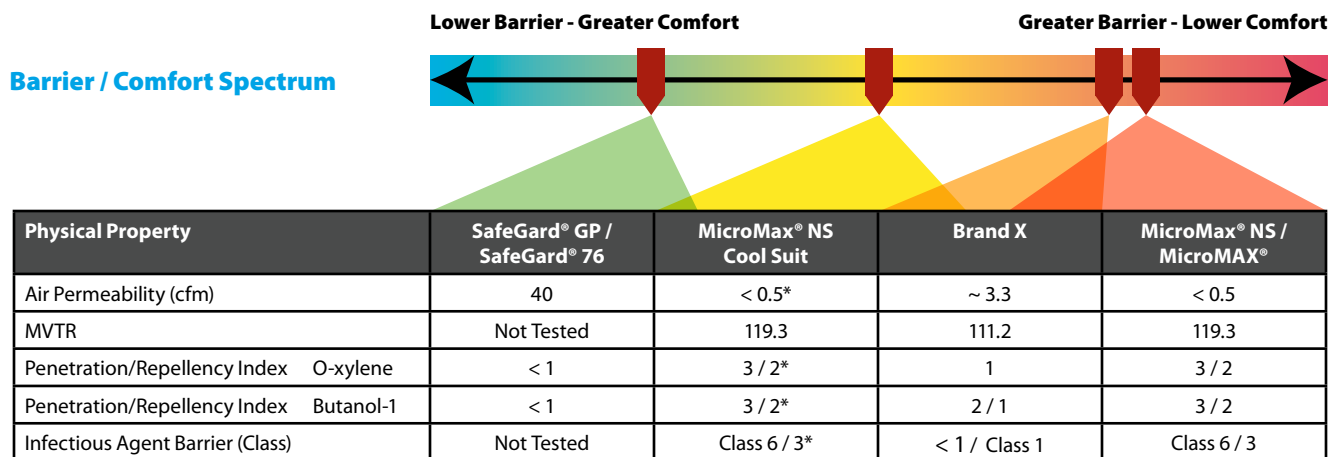
SafeGard® favors comfort over barrier and provides unmatched air permeability and strength compared to a one-size fits- all fabric. It is a superior choice in hot, humid environments where maximum barrier protection is not required but where fabric breathability and comfort are paramount.

In contrast, MicroMax® NS provides superior barrier properties and strength. It is the choice for environments where chemical and infectious hazards are the primary concern. MicroMax® is the clear choice if blood-borne pathogens may be encountered. (for protection against infectious and biological agents according to EN 14126 we recommend on MicroMAX® TS – the MicroMAX® garment made with sealed seams and certified to this standard)

Thus Lakeland fabrics provides users with a greater opportunity to target the protective overall choice more specifically at the application: SafeGard® is more comfortable but offers less barrier, while MicroMax® NS offers better barrier with similar air permeability to Brand X, and far superior protection against infectious agents. MicroMax® NS has an air permeability cfm of <.05 compared to 3.3 cfm for Brand X. Considering that SafeGard® has an air permeability of 40cfm and an average cotton t-shirt may be 150cfm, the difference between <.05 and 3.3 cfm is very small and largely irrelevant in terms of any real effect on comfort.

Lakeland also offers further options with SafeGard® 76 and MicroMAX®. Both offer greater strength options with same protection and breathability properties. Both feature superior bound seams.

When you can't compromise either comfort or barrier, you can have the best of both worlds with the MicroMax® CoolSuit - which combines the maximum barrier of the MicroMax® NS coverall with the superior comfort of SafeGard®. By placing SafeGard® fabric in the upper back panel of the garment, in most cases away from the chemical threat, the garment is far more comfortable.



*With exception of SMS back panel

MVTR = Moisture Vapor Transmission Rate: grams/hour/square meter @ 100° Fahrenheit

All data taken from Performance Data Chart on page 2, except for Air Permeability and MVTR which is data from independent testing. Independent test reports are available from Lakeland on request.

Lakeland Applications Guide

Lakeland's application targeting goes even deeper than the three examples above (SafeGard®, MicroMax® NS, and MicroMax® Cool Suit), with the basic ZoneGard®, two variations of Safegard, three variations of MicroMax®, and two of MicroMax® Cool Suit each

garment targeted to address a specific application or requirement more precisely. Additionally, we offer Pyrolon® fabrics that combine comfort, barrier, and FR protection. The following two charts will help you to find the optimal protection and comfort for specific hazards.

Lakeland Fabrics						Relative Performance				Hazards / Applications									
	% Price Difference vs. Brand X**	Comfort	Barrier	Durability	FR	Dirt, Oil & Grease	Hazardous Dry Particulate	Non-hazardous Liquids	Welding, Cutting & Grinding	Paint & Hazardous Liquids – Aerosols	Dry Particulate – Aerosols	Flammable Environments	Low Exposure, Low Risk Chemical Splash	Clean Rooms	Bloodborne Pathogens	Waste Water Treatment	Chemical Flash Fire		
ZoneGard®	-67%	9	2	2	N/A	●		●											
SafeGard® GP	-53%	8	3	6	N/A	●	●	●		●	●	●		●					
SafeGard® 76	-40%	8	4	8	N/A	●	●	●		●	●	●		●					
MicroMax®	-26%	3	9	8	N/A	●	●	●		●	●	●		●	●	●	●		
MicroMax® NS	-35%	3	9	6	N/A	●	●	●		●	●	●		●	●	●	●		
MicroMax® NS Cool Suit	-22%	4	8	7	N/A	●	●	●		●	●	●		●					
Pyrolon® XT **	+92%	6	4	8	9	●	●	●	●	●	●	●	●			●			
** Must be worn over thermally protective clothing, such as fire retardant cottons, aramids or modacrylics.																			

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Relative ratings: 1 is lowest, 10 highest, based on EN/ISO test results, and relative differences between fabrics

* Average price to distributors for standard coverall with attached hood, elastic wrists and ankles with serged seams.

ZoneGard®: Heavier spunbonded polypropylene than many competitive offerings for added durability while preserving maximum comfort. Our entry level garment for dirty work.

SafeGard® GP: Provides a high degree of comfort and durability while offering good barrier to dry particles and liquid hazards.

SafeGard® 76: Multi-layer SMS with tough CPE bound seams for added durability and appearance combined with high level of comfort.

MicroMax® fabrics are the clear choice if infectious agents such as blood-borne pathogens may be encountered.

MicroMax® NS: Microporous film offers excellent barrier to dry particles, aerosols, and liquids; a solid all around performer.

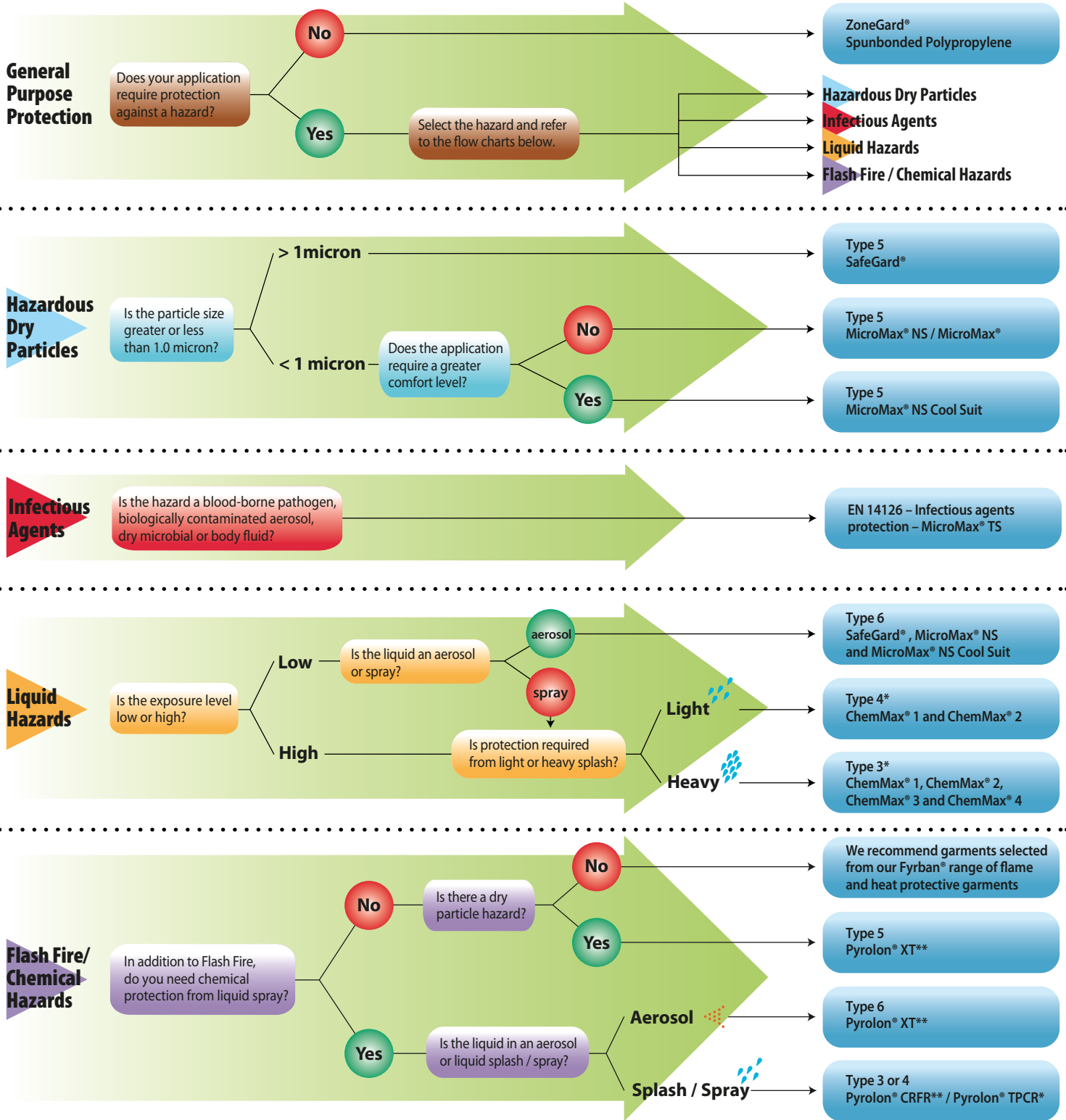
MicroMax®: Same protection as MicroMAX® NS with the addition of a rip-stop scrim for added durability and strength. Probably the highest tear strength in the class.

MicroMax® Cool Suit: The best of both worlds (comfort and barrier): More comfort in warm environments, due to a breathable SafeGard® back panel. A cool solution when the hazard is mostly to the front.

Pyrolon® XT:** Breathable Type 5 & 6 protection with flame retardency to EN14116 – Class 1 and superior toughness and durability.



Lakeland Solutions Selection Guide



* For details on Type 3 & 4 protection solutions refer to Lakeland permeation data and/or contact your Lakeland sales contact or email sales-europe@lakeland.com

** Must be worn over thermally protective clothing, such as fire retardant cottons, aramids or modacrylics.

This is a general guide to selecting garments only, and should not be used as the definitive or only tool in garment selection. It is the responsibility of the user to select garments or products which are appropriate for each intended use and which meet all specified government and industry standards.

Why Choose Lakeland?

World's Largest Manufacturer of Protective Clothing

As the largest manufacturer, we are better able to deliver the best, most innovative Protective Clothing products and fabric choices available anywhere on earth... and we're stepping on the gas!

Know the Maker- We Manufacture our own Products

Lakeland protects people. It is our core business. Unlike our competitors, we don't use contractors to make our garments. We make them ourselves, so we have maximum control over quality and delivery. We design the fabric, we make the garment, we inspect it, we ship it.

Broadest Range of Products and Fabrics

From Disposables to Chemical, Reflective to Hand and Arm, Flame/Arc Flash Resistant and Fire Service/EMS, no one else in the Protective Apparel Industry can offer such comprehensive product and fabric choices- or the expertise to guide you.

Award-Winning Service

In recent months, two of our largest customers have both named us best in customer service and support out of all their many suppliers.

Investing for Growth – To Serve You Better

We're doubling our sales and support personnel, increasing R&D and product development efforts, upgrading our systems, and streamlining our operations. You will see the difference.

World-Wide Presence and Growth

Lakeland International is growing rapidly, with production and sales operations in more than 40 countries. So we can bring you the best in fabrics and innovations the world has to offer, and technical expertise for wherever you do business.

Let us help you protect your people, and grow with us!



Please contact Lakeland or your local Lakeland distributor, who will be pleased to help you analyze the hazards of your work environment and select the most appropriate and cost-effective solution.

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Protect Your People™

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