



Asbestos: Guide to Protective Clothing Selection

The hazards relating to asbestos dust have been recognised for decades. Yet the full danger and how extensive protection might need to be in the worst circumstances is less well understood



Asbestos abatement focuses on either removing it or enclosing it so fibres cannot be released. The hazard presented can vary from high to relatively low depending on the concentration of dust in the atmosphere and the availability of ventilation or extraction (though it is worth noting that [The Mesothelioma Centre](#) states "any amount of asbestos exposure can cause serious health defects.")

Garment & Wear Selection Matrix

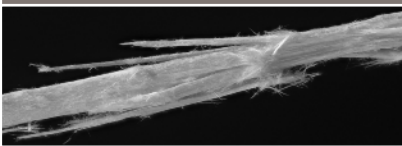
Inward leakage (IL) (see page 2) relates to environment particle concentration and ventilation/extraction as well as protection provided by clothing. A Garment Selection Matrix provides a general guide to appropriate clothing and additional measures.

Thus if an application features low challenge concentration and good ventilation a standard Type 5 garment such as Safeguard® GP (bottom left) may be suitable.

Or where the challenge concentration is high and ventilation poor, a fully enclosed gas tight suit such as Interceptor® Plus (top right) might be appropriate.

Why is asbestos so dangerous?

A single asbestos fibre may look like... a single asbestos fibre. Yet it is actually a bundle of much finer fibres, some broken and jutting out like barbs.



Being light they float in the air. If inhaled they enter the lungs and "hook" into the lung lining. Unable to remove them the body builds scar tissue around them.

As more fibres lodge in the lungs and more scar tissue builds, less air can be processed. The eventual result respiratory problems including several cancers - such as Mesothelioma, a cancer of the lung lining.

Once fibre is lodged in the lungs there is no way to remove it. *There is no cure for diseases caused by asbestos.*

The UK Health & Safety Executive 2019 report on asbestos related diseases stated:-

- There were over 2,500 deaths from mesothelioma in 2017 in the UK alone
- There will continue to be between 1500 and 2500 deaths per year at least until 2030

(Source: <https://www.hse.gov.uk/statistics/causdis/asbestos-related-disease.pdf>)

How much asbestos dust is required to cause harm?

The Mesothelioma Centre states "Any amount of asbestos exposure can cause serious health defects."

Garment & Wear Selection Matrix

Ventilation / Dust Extraction Facilities	MicroMax® TS Better barrier Type 4 Coverall with sealed seams & seal-able zip cover	ChemMax® 1 Film barrier Type 3 Coverall with sealed seams & seal-able zip cover	Interceptor® Plus Fully gas-tight Type 1a fully encapsulating gas-tight suit		
	Safeguard® 76 Diamant * Type 5 SMMS breathable Coverall with sealable zip-flap & Bound Seams Tape up zip cover	ChemMax® 1 Barrier film Type 3 Coverall with sealed seams Double zip & storm flap sealed front fastening	ChemMax® 1 Film barrier Type 3 Coverall with sealed seams & sealable zip cover Tape up joins with other PPE Or use Push-Lock Glove Connection System		
	Safeguard® GP/76 Standard Type 5 SMS breathable Coverall	Safeguard® 76 Diamant * Type 5 SMMS breathable Coverall with sealable zip-flap & Bound Seams	MicroMax® TS Better barrier Type 4 Coverall with sealed seams		
	Low	Medium	High		
	Likely concentration of airborne asbestos fibres				
	Dust Concentration LOW	Dust Concentration LOW to MEDIUM	Dust Concentration MEDIUM	Dust Concentration MEDIUM to HIGH	Dust Concentration HIGH











* Safeguard 76 Diamant was developed specifically in response to the French Asbestos Industry Regulations

The protection matrix is a general guide only and does not guarantee protection in any specific application. A key factor to consider is the toxicity of the dust. In the case of highly toxic particles - where a small amount could cause damage (such as can be the case with asbestos) a higher level of protection than indicated may be appropriate - as suggested by the Type 5 EN standard. Final choice of protective clothing and other PPE is always the final responsibility of the user.



Asbestos: Protective Clothing Selection Guide

Lakeland Garments listed in the protection matrix along with other options are shown below. Images links to product web pages.

Type 5 (& 6)	Safegard® GP  Breathable SMS Coverall Elastic hood, cuffs, waist & ankles Stitched Seams	Safegard®76 Diamant  Breathable SMMS Coverall Elastic hood, cuffs, ankles Bound Seams & Seal-able zip-cover	MicroMax® NS Cool Suit  MPFL* Coverall with breathable rear panel Elastic hood, cuffs, waist & ankles Bound Seams	MicroMax® NS  MPFL* Coverall Elastic hood, cuffs, waist & ankles Stitched Seams	Type 4	MicroMax® TS  MPFL* Coverall with sealed seams & seal-able zip flap Elastic hood, cuffs, waist & ankles Stitched & taped Seams	MicroMax® TS Cool Suit  MPFL* Coverall with sealed seams & seal-able zip flap. Covered breathable rear panel. Stitched & taped Seams	ChemMax® 1 Cool Suit  Barrier film-laminate Coverall with sealed seams & seal-able zip flap. Covered breathable rear panel Elastic hood, cuffs, waist & ankles Stitched & taped Seams
	Dust Concentration: LOW / LOW to MEDIUM with additional measures					Dust Concentration: MEDIUM / MEDIUM to HIGH with additional measures		
Type 3	ChemMax® 1EB  Barrier film-laminate Coverall with sealed seams Elastic hood, cuffs, waist & ankles Stitched & taped Seams (Type 4:Type 3 with additional tape to zip)	ChemMax® 1  Barrier film-laminate Coverall with sealed seams Elastic hood, cuffs, waist & ankles Double zip & storm flaps Stitched & taped Seams	Interceptor® Plus  Multi-film-laminate Type 1a gas-tight, encapsulating suit. Wide vision visor option Double stitched & taped Seams		Garment Choice and Additional Measures Dust particles are most likely to be drawn inside a suit with air-flows through zip teeth, seam holes and gaps between the suit and other PPE. This can be enhanced by the "Bellows Effect" with suits constructed from non or low breathability fabrics. The level of protection provided by a garment can be enhanced through additional measures taken during donning. Such measures might include:- <ul style="list-style-type: none"> • Taping of open zip covers • Taping of joints between the coverall and other PPE such as masks, gloves etc A useful guide to maximising protection against hazardous dusts is provided in our fact sheet "Tips for Maximising Dust Protection".			
	Dust Concentration: MEDIUM to HIGH		Dust Concentration: HIGH					

* MPFL: Microporous Film Laminate

Asbestos is respiratory hazard...
So why is protective clothing so important?

Asbestos fibres becomes caught in clothing and hair. Workers may carry them home where family could inhale them. "Secondary asbestosis" is therefore more often found in women and children, and whilst less common since regulations were introduced, it remains a problem. The Mesothelioma Centre estimates that 90,000 people die of asbestos related diseases per year, of which 80% are men. Of the rest less than half are exposed directly in their work.

Thus whilst primarily a respiratory hazard, protective clothing plays a vital role in minimising the the possibility of secondary exposure, not just for the worker but for his family and friends.



Type 5 Testing and "Inward Leakage"

EN 13982 is the standard for hazardous dust or "Type 5" protection. However, it is wrong to assume a "standard" Type 5 coverall is suitable for all dust applications. EN 13982 recognises this stating in its introduction:-

EN 13982

"It is necessary to determine the suitability of type 5 clothing for each specific chemical substance and its acceptable exposure limits in relation to inward leakage of the type 5 garment. Hence, it is possible, that this type of clothing does not offer adequate protection from aerosols of highly hazardous substances, where a type 1 garment might be necessary to obtain the level of protection needed"

A basic Type 5 coverall provides the MINIMUM protection required; in more hazardous applications - where high concentrations of dust or more toxic dusts are present, a higher level of protection will be appropriate.

The Type 5 whole garment test measures Inward Leakage (IL) of dust inside the suit:-

- A test subject wearing the test garment enters a "spray cabin"
- The cabin is filled with dust. The subject performs simple exercises on a treadmill (walking, squatting and standing).
- A particle sensor outside the suit measures a "challenge count" of particles in the cabin
- Three sensors attached to the wearer count particles penetrating inside the suit during each exercise.
- Ten garments are tested allowing calculation of "Inward Leakage" (IL): the number of particles penetrating as a percentage of the challenge count for individual garments, each sensor and during each exercise
- A specific formula defines "pass" or "fail". Averages are counted for each data set.
- A key point is that a pass allows some penetration - up to 15% IL on a single garment.



When selecting protective clothing it is vital to understand that the Type 5 test allows some penetration of dust and that "Inward Leakage" relates the concentration of particles in the environment. 1% IL in a high challenge concentration means much more dust will penetrate than 1% IL in a low concentration.

Considering these issues a garment selection guide is provided overleaf.