MICROGARD®
High Performance Protection in Comfort

BS EN14126: 2003

Performance requirements and tests methods for protective clothing against infective agents

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Protective Clothing against infective agents has two main functions;

- to prevent infective agents from reaching the (possibly injured) skin
- to prevent the spreading of infective agents to other people and other situations, e.g. eating or drinking, when the person has taken his protective clothing off

In many work situations i.e. microbiological laboratories; the infective agents can be contained and the risk of exposure limited to the occurrence of an accident.

However, in other types of work i.e. sewage & waste water treatment, caring for infected animals, emergency clean-up; the organisms cannot be contained, exposing the worker continuously to the risk of infection by biological agents. In these situations the biological agents the worker is exposed to may not be known.

Micro-organisms are a very heterogeneous group in that they come in all shapes and sizes, and their living conditions, survival abilities etc. vary widely.
A hazard classification of micro-organisms can be found in European Directive 2000/54/EEC (on the protection of workers from the risk related exposure to biological agents at work).

Due to the heterogeneity of micro-organisms, it is not possible to define performance criteria of protective clothing on the basis of risk groups, nor on the type of micro-organism. Also it may not be possible to define exactly the organisms the worker is exposed to. Hence the test methods in this standard focus on the **medium containing** the micro-organism**, such as liquid, aerosol or a solid dust particle.**

General protective clothing requirements under EN14126:2003

Materials should be tested and classified in accordance with the test methods and performance specified in the relevant clauses BS EN14325 *(Chemical protective clothing general requirements)*

*This means that the material/fabric has to perform to the level specified on Abrasion, tear, puncture, ignition etc. as determined by the **Type** of protective clothing – also includes chemical permeation etc. relevant to that **Type** of protective clothing.*

Whole suits have to fulfil the requirements of EN340 and the whole suit requirements specified in the relevant standard for chemical protective clothing.

Microgard® 2500 Plus has already passed Type 3, 4 & 5 according to the relevant standards. As it subsequently passes all test methods specified by EN14126 the product can be labelled Type 3B, 4B & 5B – the “B” indicating a pass according the relating EN14126 test methods.

Performance Requirements

For materials to comply with EN14126:2003 they must also undergo additional testing as follows;

1) ISO 16603/ ISO 16604 - Resistance to penetration by contaminated liquids under hydrostatic pressure.

This a test conducted using synthetic blood, which establishes at what pressure the liquid will pass through the test material.

A classification system (**Table A**) is used to demonstrate the level of performance.

Table A	
Class	**Hydrostatic pressure at which material passes the test**
6	20 kPa
5	14 kPa
4	7 kPa
3	3.5 kPa
2	1.75 kPa
1	0 kPa (a)
(a) This means that the material is only exposed to the hydrostatic pressure of the liquid in the test cell.	

E.g. Microgard 2000 fabric achieves Class 6 (in fact there was no penetration of the M2000 fabric when tested according to this method)

The ASTM equivalents of the above test methods are ASTM F 1670 – 03 and ASTM F 1671 – 03 respectively. The difference with the ASTM standard is that the pressure applied is only 2psi (13.8kPa), and the criterion is, no penetration should occur.

2) EN ISO 22610 - Resistance to penetration by infective agents due to mechanical contact with substances containing contaminated liquids.

This test method is designed to determine a material's resistance to penetration of bacteria in a liquid.

The material to be tested is put on a lidless agar plate, on a rotating disk. The contaminated liquid and then a piece of 10 micron thick HD polyethylene film of corresponding size is then put on top of the test material and fixed in place.

An abrasion resistant finger is then placed on top to exert a specified force on the contaminated liquid and test material to bring them into contact with the agar. The finger is on a pivoted lever, which is moved in such away that it moves over the entire surface of the plate within 15 minutes.

After 15 minutes the agar plate is replaced and the test repeated a further 4 times. Each test is performed using the same test material and liquid.

Various measurements are then taken to establish if penetration has occurred.

Table B shows the classification system used to demonstrate a materials performance against this test method

Table B	
Class	Breakthrough time, *t* min.
6	> 75
5	60 < *t* ≤ 75
4	45 < *t* ≤ 60
3	30 < *t* ≤ 45
2	15 < *t* ≤ 30
1	≤ 15 min

E.g. Microgard 2500 Plus fabric achieves Class 6 (in fact no penetration occurred!)

3) ISO/DIS 22611 - Resistance to penetration by biologically contaminated liquid aerosols

This test method is designed to simulate particulate bacteria in the atmosphere, once again looking for any bacteria that passes through the material tested.

The test apparatus is a Perspex box with atomizer. The standard bacteria used for this test is Staphylococcus aureus. The test is repeated 4 times and the mean average of penetration is recorded.

Staphylococcus;
n: spherical gram-positive parasitic bacteria that tend to form irregular colonies; some cause boils or septicemia or infections. aureus, can be pathogenic for humans

Table C shows the classification system used to demonstrate a materials performance against this test method.

Table C	
Class	Penetration ratio (log)
3	Log > 5
2	3 < log ≤ 5
1	1 < log ≤ 3

E.g. Microgard 2500 Plus fabric achieves Class 3 (in fact no penetration occurred!)

4) ISO 22612 - Resistance to penetration by contaminated solid particles (i.e. resistance to dry microbial penetration)

We do not have any details on the testing apparatus used from this test method at this time; however the micro-organism used for this test is normally Spores of Bacillus subtillus.

Bacillus
1. Any of various rod-shaped, usually gram-positive aerobic bacteria of the genus Bacillus that often occur in chains and include Bacillus anthracis, the causative agent of anthrax.
2. Any of various bacteria, especially a rod-shaped bacterium

Table D shows the classification system used to demonstrate a materials performance against this test method.

Table D	
Class	Penetration (log cfu)
3	≤ 1
2	1 < log cfu ≤ 2
1	2 < log cfu ≤ 3

E.g. Microgard 2500 Plus fabric achieves Class 3 (in fact no penetration occurred!)

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