MICROGARD®

High Performance Protection in Comfort

BS EN ISO 13982-1 & 2: 2004 – Type 5 Protective Clothing

BS EN ISO 13982-1: 2004 Protective clothing for use against solid particulates

Performance requirements for chemical protective clothing providing protection to the full body against airborne solid particulates (type 5 clothing)

- **Products must comply with EN340: 2003**
  This standard sets out the general requirements for protective clothing i.e. materials shall not be known to cause skin irritation or have any adverse effect to health. This also details garment sizing, labelling etc.

Test Requirements for Materials *(fabric)*

Materials for Type 5 clothing are tested for the following properties;

EN14325: 2004 details the test methods & performance classification of chemical protection clothing materials, seams, joins and assemblages.

Clause in EN 14325: 2004	Performance requirement
4.4	EN 530 Abrasion
4.5	EN ISO 7854 Flex Cracking
4.6(a)	EN ISO 7854 Flex Cracking
4.7	EN ISO 9073-4 Trapezoidal tear resistance
4.10	EN 863 Puncture Resistance
4.14	EN 13274-4 Resistance to ignition *(replaced ISO 6941)*
(a) Only applicable if clothing intended for use at very low temperatures.	

Test requirements for seams, joins & assemblages of Type 5 protective clothing

Seams should be constructed to minimise or prevent penetration of solid particles through stitch holes or other components of a seam.

Seam strength is determined and classified in accordance with EN14325:2004, Clause 5.5 and must obtain at least Class 1 *(>30N).*
The test method specified in clause 5.5 is EN ISO 13935-2

Testing for inward leakage of aerosols & solid particles – Type 5 protective clothing

BS EN ISO 13982-2: 2004 Protective clothing for use against solid particulates. Test method of determination of inward leakage of aerosols of fine particles into suits

This test method replaces the Aloxite particle test previously carried out in the absence of a recognised EN method for testing the inward leakage of particulates.

This test is performed using “real people” and is designed to simulate everyday use. The garment is donned according to the manufacturers’ instructions, including any protective equipment.

The manufacturers’ instructions also have to specify whether or not the additional equipment is taped to the suit and how the taping should be done.

At least 5 test subjects are involved, each testing 2 suits. *So at least 10 suits are tested.*

Prior to entering the test chamber the test subject *(real person)* is asked to repeat the following sequence of movements 3 times at what is termed "normal working speed";

1) Kneel on both knees, lean forward and place both hands on the floor 45cm in front of the knees. Crawl forward on hands and knees over a distance of 3m and crawl backwards again over the same distance
2) Stand with feet shoulder width apart, arms at side. Raise arms until they are parallel to the floor in front of the body. Squat down as far as possible.
3) Kneel on right knee, place left foot on floor with left knee bent 90º, left arm hanging loosely at side. Raise left arm fully overhead.

Once they have completed these movements the suit is inspected visually for tears or rips in the fabric, seams, closures or connections to gloves, boots or mask (if any). Any damage is mentioned in the test report, but the test would be discontinued if the damage was significant or hindered the test subjects' movement. *If this happens then the garment is deemed to have failed!*

On entering the test chamber the test subject is asked to perform various test exercises in sequence. These are;

1) standing still
2) walking at 5 km/h
3) continuous squatting at a frequency of five squats per minute, between standing up straight and knees completely bent, while keeping both hands during all squats on a grip at a height of 1m (+/-0.05m) above the standing surface.
4) A 3 min rest is allowed (standing still) between the walking and squatting exercises.

Throughout the process various measurements are taken on the concentration of particulates inside and outside of the suit. A calculation is

then used to ascertain the inward leakage during each test and the total inward leakage of particles into the suit. *The test agent used is Sodium chloride aerosol.*

Type 5 chemical protective clothing has to meet the following requirements;

Inward leakage (IL) ≤30% IL for 91.1% (or more) of all values measured (all exercises, all sampling positions all suits) *82 out of 90 measurements!*

Total inward leakage (TILS) ≤15% for 80% (or more) of all TILS values

E.g. Microchem® 3000 tested at the IOM in 2006 passed 89 out of 90 measurements and averaged 3.729% TILS (well under the 15%!)

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