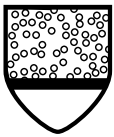
APRIL 2020

well **INFORMED**
well **PROTECTED**
well **AHEAD**



TYPE 5

EN ISO 13982-1:2004+A1:2010
TYPE 5 PROTECTIVE CLOTHING

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

To view other body protection standard guides, please visit www.ansell.com/feelequipped and click on the resources tab

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GUIDE TO EUROPEAN NORMS

To assist you with the selection of chemical protective clothing the EU has developed six categories for "types" of chemical protective clothing.

Certification to a particular type offers an indication of your suit's protection against a particular hazard (gas, liquid or dust). This guide explains performance requirements for protective clothing providing ***protection to the full body against airborne solid particulates (Type 5 clothing).***

Please be aware that conformance to these type standards does not mean that your suit is 100% impervious to your hazard. Under this testing, suits are only required to meet the minimum performance requirements specified. In the case of the Type 5 particulate test for example, suits are allowed individual leakages of up to 30%, providing the average for the suits tested is less than 15%. Please see 'Whole Suit' Inward leakage test for further guidance.

'Type 5' Protective Clothing Performance Requirements Includes:

EN ISO 13688:2013 General Requirements*
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 and labelling that is required.

1. ***Whole Suit Inward Leakage Test***
   This test indicates the barrier efficiency of the suit against particulates of a specific size distribution.
2. ***Seams, Joins & Assemblages Test***
   The Seam Strength of a coverall is required to meet the minimum performance class.
3. ***Material (Fabric) Test Requirements***
   EN 14325:2004 comprises of a range of performance test methods which include: Abrasion, Flex Cracking, Trapezoidal Tear & Puncture Resistance.

**EN 340:2003 was replaced with EN ISO 13688:2013. Although this change is not yet reflected in EN ISO 13982-1, the required tests are essentially the same, and either reference is expected to be accepted by the notified body certifying the product.*

PROTECTIVE PERFORMANCE REQUIREMENTS

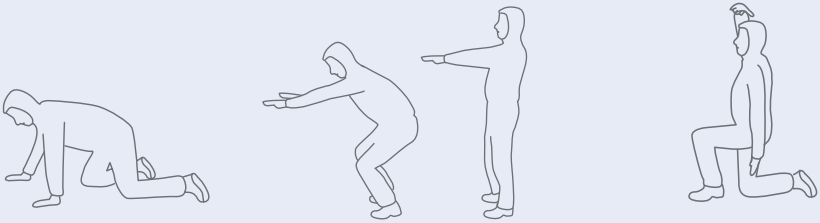
1 'Whole Suit' Inward Leakage Test - EN ISO 13982-2:2004

Protective clothing for use against solid particulates. Test method for the determination of inward leakage of aerosols of fine particles into suits. 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.

Did you know...
At least 5 test subjects are involved, each testing 2 suits. So at least 10 suits are tested!

Prior to Entering the Test Chamber

Prior to entering the test chamber the test subject 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 45 cm 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 90°, left arm hanging loosely at side. Raise right 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 is discontinued if the damage is significant or has been hindered the test subjects' movement. If this happens, then the garment is deemed to have failed!

Pass Criteria

Inward leakage must be less than 30% for 82 of the 90 measurements. Average inward leakage (all movements and measurements for each suit) must be less than 15% for 8 of the 10 suits.

Did you know...
The standard allows 8 out of the 90 measurements to have individual leakages greater than 30%!

Example: AlphaTec® 3000 tested at IOM in October 2017 it passed 90/90 measurements <30% and all of the TILS results were <15% with an average of < 2.45% TILS which is well under the 15%!

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.

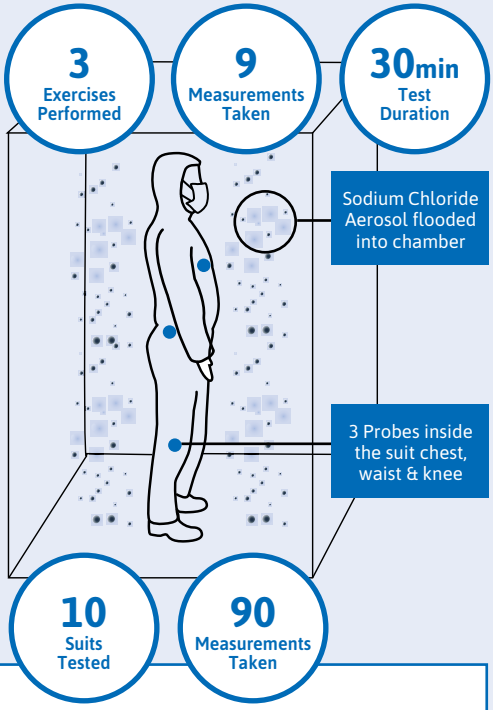
PROTECTIVE PERFORMANCE REQUIREMENTS

Chamber Test

Sodium Chloride (salt) particulates are flooded into the chamber. The test subject is asked to perform various test exercises in sequence. These are;

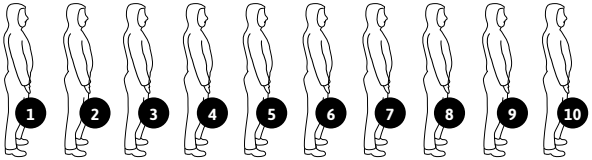
1. 9 minutes of standing still
2. 9 minutes of walking at 5 km/h
3. 9 minutes of continuous squatting at a frequency of five squats per minute, between standing up straight and knees completely bent, while keeping both hands during all squats on a grip at a height of 1 m (+/-0.05 m) above the standing surface.
4. A 3 minute rest is allowed (standing still) between the walking and squatting exercises.

Throughout the process, various measurements are taken from 3 probes inside the suit (chest, waist, knee) continually measuring the ratio of particle concentration inside and outside the suit. The test is then repeated.



Test Requirements

A total of 10 suits are tested
x 3 exercises performed
x 3 measurements taken
= 90 probe measurements



Inward Leakage Test Results Requirements

The Inward leakage (IL) test requires a result of ≤30% IL for 91.1% (or more) of all values measured (all exercises, all sampling positions all suits). So a minimum 82 out of 90 measurements must have 30% or less inward leakage.

Inward Leakage Test	Inward leakage Requirements	
	Inward Leakage %	Suit x / y
Individual Measurements	<30%	82/90
Total Inward Leakage	<15%	8/10

Note: The actual number of measurements can vary depending on how many suits are tested but 10 suits equates to 90 measurements.

PHYSICAL PERFORMANCE REQUIREMENTS

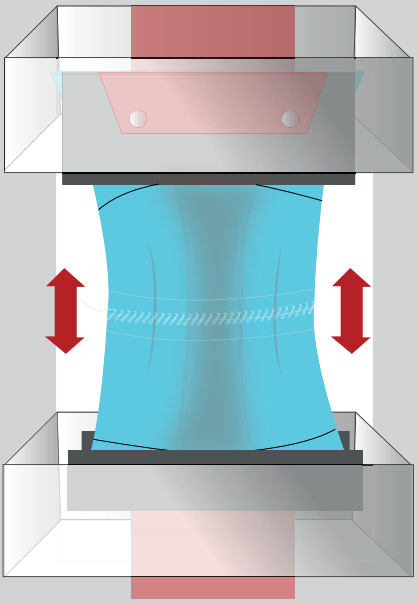
2 Seams, Joins & Assemblages Seam Strength Test - EN 14325:2004 (Physical Test)

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

The seams, as well as joins and assemblages, are also tested for penetration as part of the full suit spray test.

Seam strength is determined and classified in accordance with EN14325:2004, Clause 5.5 and must obtain at least Class 1 (>30N).

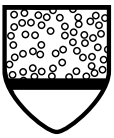
The test method specified in clause 5.5 is EN ISO 13935-2



3 Materials (Fabric) Test Requirements (Physical Test)

EN 14325:2004 comprises of a range of performance test methods. These are listed below;

Test Methods	**Clause in EN 14325:2004**	**Minimum Performance Class**
Abrasion (EN 530)	4.4	Class 1
Flex Cracking (EN ISO 7854 Method	4.5	Class 1
Trapezoidal Tear (EN ISO 9073-4)	4.7	Class 1
Puncture Resistance (EN 863)	4.10	Class 1



EN ISO 13982-1:2004+A1:2010
TYPE 5 PROTECTIVE CLOTHING

1500
1500 PLUS
1500 PLUS FR
1600 PLUS
1800
1800 COMFORT
2000
2000 COMFORT
2000 TS PLUS
2300
2300 PLUS (MODEL 132)
2500 STANDARD
2500 PLUS (not models 750, 752)
3000 (not models 750, 752, 754, 755, 756, 757)
4000 (not models 126, 750, 752, 754, 755, 756, 757)
5000 (not model 186)
FR
CFR

For additional information visit us at www.ansell.com, or call us at:

Europe, Middle East & Africa Region
Ansell Healthcare Europe NV
Riverside Business Park, Blvd International, 55
1070 Brussels, Belgium
+32 2 528 74 00
+32 2 528 74 01

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