

Respirex Testing Laboratory Protocol for Physical Tests

We request that clients supply us with either 2 metres of fabric full width or 2 garments size XL.

Unless otherwise requested by a client, the Respirex Testing Laboratory shall perform the physical tests covered by UKAS accreditation in the following way and applying the following assumptions:

- If no cleaning instructions are received with the garment/material or analysis request form, it is assumed that no cleaning is required. (Ref EN 14325:2004 clause 4.2).
- Conditioning will be undertaken according to EN 14325:2004 clause 4.3.
- Testing shall be conducted in the same environment in which samples have been conditioned.
- Where machine and cross direction is not indicated, A and B will be ascribed to vertical and horizontal directions. Two sets of samples will be taken at 90° to each other in line with the textile backing. Where there is no textile backing or the weave cannot be seen, A and B directions will be ascribed at 90° to each other. See figure 1.

Figure.1

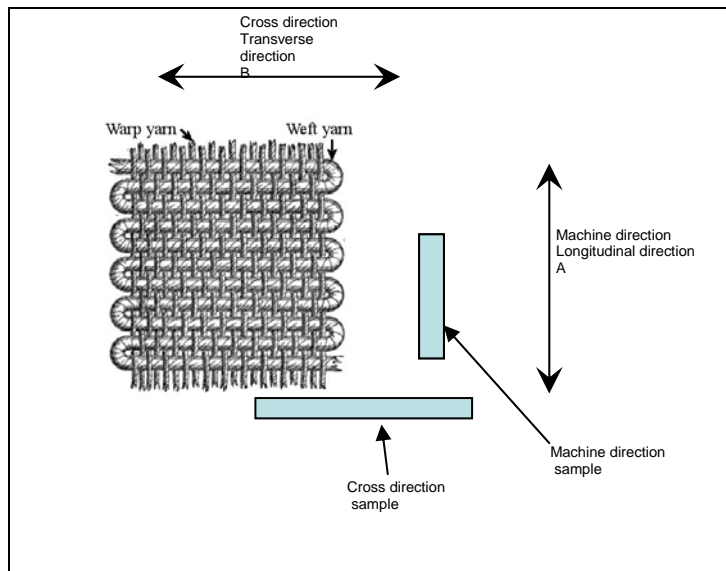
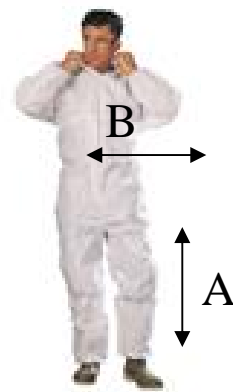


Figure.2



- In the case of testing whole garments, the assumption is made that all panels within the garment have been cut in the same direction. A and B directions are ascribed at 90° to each other, vertical and horizontal as the suit is worn. See figure 2.
- Flex cracking BS EN ISO 7854:1997. Flex cracking is a destructive test and therefore requires multiple sets of samples to be tested in order to determine a

class level according to EN 14325:2004. Unless requested to test to a specific level, testing shall begin at class level 3 followed by subsequent higher or lower class levels depending on the pass or failure at each level. Therefore a minimum of two sets of samples up to a maximum of 4 sets are tested to enable determination of class. Each level of testing incurs a separate charge. In cases of microporous materials, where method of assessment has not been specified, the material will be subject to a pre-assessment to establish the suitable means i.e. pressure pot or visual assessment. The pre-assessment incurs a separate charge. Where visual examination is performed; observations are reported and classifications according to EN 14325:2004 will be left to the client's discretion.

- Abrasion resistance BS EN 530:1995. Unless requested to test to a specific level, testing is undertaken to each class level until the point of failure. Pressure pot assessment is the preferred means of assessment; each level incurs a separate charge. In cases of microporous materials, where method of assessment has not been specified, the material will be subject to a pre-assessment to establish the suitable means i.e. pressure pot or visual assessment. The pre-assessment incurs a separate charge. Where visual examination is performed; observations are reported and classifications according to EN 14325:2004 will be left to the client's discretion.
- Seam Tensile Properties (Grab Method) BS EN ISO 13935-2:1999. Of each seam type, 3 samples will be taken. In the case of whole garments, samples will be taken from arm or leg seams. Classification is according to EN 14325:2004. Failure of one component of a seam is deemed a failure of the entire seam.
- Puncture Resistance BS EN 863:1996. The test is run until the material has punctured completely, or until the puncture spike has run to 25mm extension. During the test, a graph is plotted of force against extension. Most materials show an initial resistance and a secondary resistance to puncture; in these cases, both forces will be reported. Classification according to EN 14325:2004 will be based on initial resistance forces as this is considered to be the point at which the material is breached and no longer resistant to gas, liquid or small solid particles. Should a material not puncture after 25mm, the maximum force applied will be reported and no classification will be given.
- A full test report shall be issued. Should clients wish to receive a brief test report format which provides a summary of test results only, they can request this in writing.

Tests are performed under laboratory conditions on new material and not under actual usage conditions. The test result relates only to the sample tested.

Samples are accepted by the laboratory as being representative of the material required to be tested. No responsibility is accepted for samples submitted which do not reflect the true nature of the material.

Uncertainty of Measurement, UoM.

The uncertainty of measurement of each procedure has been calculated as follows and on the basis of the samples tested, the Respirix Testing Laboratory is 95% confident that the “true” result lies somewhere within this range:

BS EN ISO 7854:1997 Method B Flex cracking resistance	± 1.5%
BS EN 530:1995 Method 2 Abrasion resistance	± 1.2%
BS EN ISO 13934-1:1999 Tensile Strength	± 4.4%
BS EN ISO 9073-4:1997 Trapezoidal Tear resistance	± 4.8%
BS EN 863:1996 Puncture resistance	± 0.4%
BS EN ISO 13935-2:1999 Seam Tensile Strength	± 3.7%

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Where appropriate, UoM information will be included on reports when any of the following circumstances are met:

- The customer requests it
- UoM information is relevant to the validity of the test result
- The magnitude of the UoM affects compliance with a specification limit

Where results fall close to class boundaries, we will provide a calculated probability of compliance of the result to the relevant class level.