

Dust Mite Fabric Research

A key factor in blocking dust mite allergens while you sleep is the pore size of the bedding fabric. Allergy protective bedding, from the dust mite mattress cover, to the pillow and quilt dust mite covers, need to be specifically designed and manufactured to provide effective and welcome relief from dust mite allergens and dust mites allergy symptoms. Imagine fabric threads woven together, similar to lacing your fingers together. The tighter the fingers are interlaced, the smaller the gap between the fingers, similar to the opening or pore size where woven fibres intersect in the material. Yet at the same time allowing air flow and moisture to transpire.

Professor Tom Platts-Mills and his research team from the University of Virginia, USA first published a study in 1999 "Evaluation of materials used for bedding encasement: "Effect of pore size in blocking cat and dust mite allergen". The stated purpose of the study was "to develop a method for testing encasement materials made of breathable fabrics".

The researchers developed a new testing protocol to determine two things

- the ability of woven fabrics to block cat and dustmite allergen and
- the breathability of a fabric as measured in litres of air per minute that can be drawn through it.

Why would cat allergen be used in the study, cats don't live in bedding? Cat allergen (Fel d 1) is comparably a very small allergen in size, associated with particles less than 10 µm (microns) in diameter. With the quantity of this allergen in dust samples, the study provided a more rigorous test of the fabric's ability to block the allergens' passage.

Dust mite faecal particles range from 10 to 40 µm in diameter. Therefore, fabrics that can block all or most of it, are considered most effective in terms of their allergen barrier efficiency.

The study also focused on mean pore size and results published: "Dust mite allergens (Der f 1 and Der p 1) were blocked below detectable limits by fabrics of less than 10 µm in pore size. Fabrics with an average pore size of 6 µm or less blocked cat allergen (Fel d 1)."

"For woven fabrics, the key factor in blocking allergens is pore size. Our results show that a woven fabric with an average pore size of 6 µm or less will block common indoor allergens below detectable limits."

"Our current judgment is that fabrics of 2 µm to less than 10 µm in pore size will effectively block passage of all dust mite allergen and would be suitable for use on pillow cases and mattresses."

Mean pore size is best determined by using a capillary flow test. Porous Materials, Inc. (PMI) New York, USA is the leading authority in this field. To determine further product efficiency, the material used to manufacture AllerProtect covers has been tested by an independent reference laboratory and proven to form an effective barrier to house dust mite allergen.² Further more, the construction methods used in AllerProtect have also been tested by the laboratory. They could detect no allergen leakage through the seams.³

Dust mite bedding covers have come a long way. Back during the 1980s, allergen barrier mattress covers were made from vinyl and later a vinyl-coated polyester cotton. Very effective dust mite control barrier to dust mite allergens but very uncomfortable to sleep on as the non-breathing covers caused perspiration, making symptoms worse for people with eczema and during summer.

By 1990, an article in the Lancet Medical Journal described a new barrier fabric that was woven from polyester cotton and coated with a polyurethane compound which allowed moisture to diffuse through but which blocked dust mite allergen particles. This provided the allergy sufferer with protection and greater comfort. Yet the membrane prevented air passing through, making the covers warm in summer and difficult to dry after washing. In addition, the membrane would break down after a few year's use.

Dust Mite Control

Finally, in 1997 a study published in the Journal of Allergy and Clinical Immunology described a new type of barrier fabric that established new levels of comfort with effective allergen protection. Pristine™ fabric is a precision microweave fabric. The key feature of this new fabric was the complete absence of any kind of coating or membrane that had prevented the air-flow through previous barrier fabrics.

Instead, the dust mites mattress allergen barrier property of this precision microweave fabric was achieved by the extremely tight and extremely accurate weave of the fabric. An additional advantage over the older coated fabrics is they can be hot water washed and hot tumble dried without any loss of effectiveness found in Mitey Fresh AllerProtect 100% cotton allergy protective bedding range.

Professor Tom Platts-Mills' study also included an allergen barrier fabric "non-woven" polypropylene material made by the 3M™ Corporation under the name of Propore™. This fabric is made from the fusing together of a dense mesh of polypropylene fibres which is then bonded to a polypropylene based microporous film. This film has extremely small pores in it which allow the passage of a limited amount of air but which are small enough to prevent allergen particles passing through as found in Mitey Fresh Mite-Guard anti allergy bedding range. Alternative to dust mite spray.

Sometimes dust mite mattress protector and bedding covers made from similar looking fabrics are offered for sale as allergen barrier covers. Usually these are found to be made from a non-woven polypropylene fabric but without a microporous membrane, giving a fabric with relatively large gaps between the fibres. Needless to say, while the price of these dust mite mattress cover may seem attractive, they do not provide an effective barrier to dust mite allergen.

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Resources

1. Vaughan J.W., McLaughlin T.E., Perzanowski M.S., Platts-Mills T.A. E., Evaluation of materials used for bedding encasements: Effect of pore size in blocking cat and mite allergen. J Allergy Clin Immunol 1999; 103:227-31 The studies and more can be found Journal of Allergy and Clinical Immunology.
2. IBT reference laboratory, Lexana, Kansas, USA Report 2003
3. IBT reference laboratory, Lexana, Kansas, USA Report 2000