



ANTI-STATIC

Static electricity arises when two dissimilar materials rub together, creating an electrical charge. Such electrical charges typically leak away to earth. However, in instances where they don't, an unpleasant and potentially dangerous electrical discharge may occur, manifesting itself as a static electric shock.

There are a number of factors that can influence the potential for static electricity generation in textiles, such as:

- Low humidity, caused by seasonality, country and/or internal air conditioning
- Friction, caused by the rubbing or walking contact between two surfaces
- Low material moisture content, that commonly occurs in synthetic fibres such as nylon, polyester, and acrylic.

WHY IS STATIC-RESISTANCE AN IMPORTANT FACTOR IN CARPETING?

Because of their high surface area and nature of usage, textiles such as carpet are particularly prone to build up of static electric charges. These static charges may be up to 20,000 V (CRI). This in turn can have an adverse affect on:

- Human comfort
- Electronic equipment e.g. damage to computer facilities
- Human safety e.g. In environments where flammable materials may be present.

Wool carpets can be used to minimise the incidence of static build up and thus create safer and more comfortable, safe interior environments.

HOW IS STATIC-RESISTANCE MEASURED?

Common test methods for static generation from carpets include:

- AATCC TM 134 - Electrostatic Propensity of Carpets
- AS2834 Computer Accommodation

AATCC TM 134 assesses the propensity for carpets to generate a static electric charge when a person walks across them in a specified manner with standardised footwear. The simulation is carried out at 21 +/- 1°C and 20 +/- 2 % RH, conditions which are known to promote accumulation of static charge.

AS2834 provides a guide as to requirements for the accommodation of computer equipment in buildings.

NB. AATCC = American Association of Textile Chemists and Colourists, AS = Australian Standard

HOW DO WOOL CARPETS PERFORM RELATIVE TO SYNTHETIC CARPETS?

Natural fibres such as wool are able to actively absorb and retain moisture from the indoor environment – with their absorption properties being much greater than most synthetic fibres (Figure 1). This confers natural fibres the ability to conduct charge away relatively efficiently.

Figure 1 and Table 1 contrast the moisture absorbance properties of synthetic fibres such as nylon, polyester, and acrylic compared to wool and the resultant effect this has on the ability to dissipate static charge. The lesser this ability, the greater the potential for static electricity to discharge through a user's body, resulting in an electric shock.

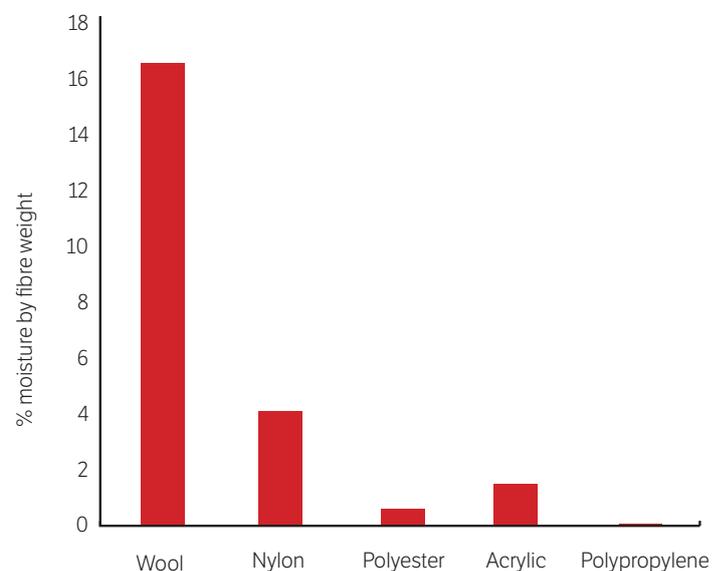


Figure 1. Moisture absorbance of wool and synthetic fibres (Collie and Johnson, 1998).

KEY POINTS

- Because of its unique moisture retention properties, wool carpeting is less prone to building up static electric charge than synthetic fibre carpeting.
- Use of wool carpets provides a safer and more comfortable work environment than synthetic products, particularly in applications where static electricity is of particular concern – aircraft carpets, buildings with sensitive electronic equipment, fuel transfer facilities, etc.

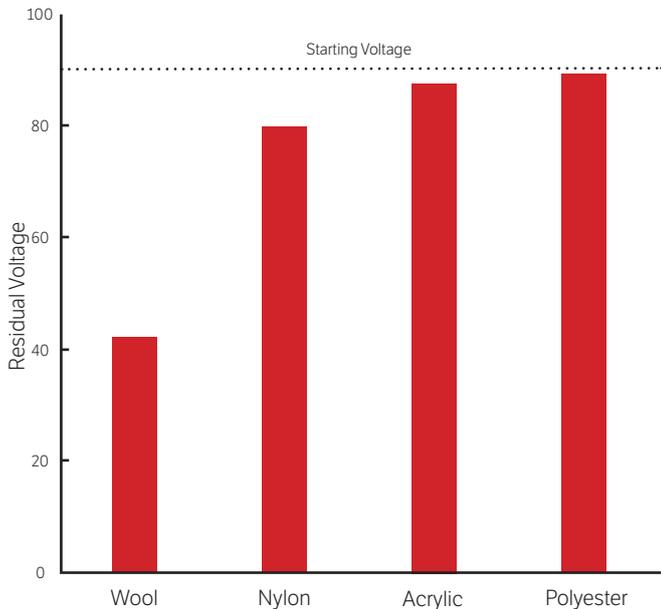


Table 1. Static charge leakage after 15 minutes at 15% RH, from fabric manufactured from different fibres. Source: (Leeder, 1984.)

IS IT POSSIBLE TO FURTHER IMPROVE ON THE STATIC RESISTANCE OF WOOL CARPET?

Higher levels of static resistance (or anti-static properties) for speciality carpeting, such as used in aircraft or in conjunction with electrical equipment, can be engineered using a number of methods:

- Incorporating a small percentage of conductive fibres into the carpet yarn or including conductive material into the wool fibres themselves.
- Including conductive material into the carpet latex.
- The use of a surface treatment works on the principle of ablating a small amount of material from one surface to the other, so that both have the same triboelectric charge and therefore no static charge is developed.

REFERENCES

- Collie, S. R. and Johnson, N. A. G., 1998. The benefits of wearing wool rather than man-made fibre garments. Lincoln, Christchurch, New Zealand, WRONZ.
- CRI The carpet and Rug Institute, Static control, Technical bulletin.
http://www.aatcc.org/technical/Test_Methods/scopes/tm134.cfm
- <http://www.saiglobal.com/PDFTemp/Previews/OSH/As/as2000/2800/2834.pdf>
- Leeder, J., 1984. Wool - Nature's Wonder Fibre, Australasian Textiles Publishers.

