Moisture Wicking Fabrics:

A comparative *in vitro* assessment of the performance characteristics that make them suitable for the management and prevention of Moisture Associated Skin Damage (MASD).

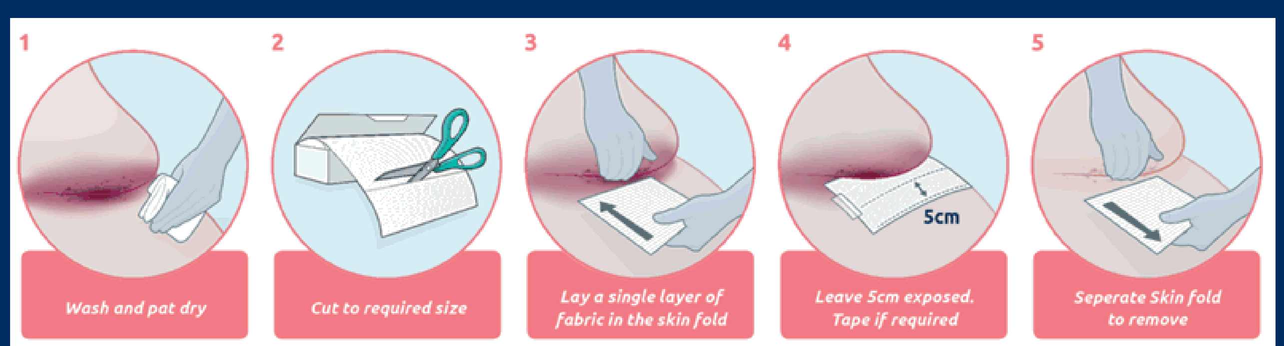
Authors:
Alexis Harding,
Peter Williams,
Alex Lawton,
Ander Bugedo,
Brian Hamerslagh

Introduction

Moisture Wicking Fabrics (MWFs) are suitable for the management of Moisture Associated Skin Damage (MASD) and typically comprise of a conformable material with excellent wicking properties. They provide rapid moisture transportation to keep skin dry and often contain an odour reduction system such as impregnated silver (Ag) which works by reducing microbial colonisation within the device. Additional benefits include a reduction to skin-to-skin friction. Fabrics are available in different sizes and are typically cut to the size required by the patient or treating clinician.

The MWF Ag* device comprises a stretch polyester fabric which contains fibres impregnated with antimicrobial metallic silver which reduce odour. The fabric is designed to provide moisture transportation and acts as a lubrication aid thereby reducing skin-to-skin friction. The device provides a protective environment for the skin and reduces colonisation of bacteria and yeasts such as *staphylococcus aureus*, *staphylococcus epidermidis*, *pseudomonas aeruginosa* and *candida albicans* within the fabric.

The performance characteristics of the MWF Ag* device are compared to the current alternative MWF† device using in vitro assessments to investigate the physical properties which impact device performance: Vertical Wicking, Co-efficient of Friction, Conformability and Absorbency.



Key Attributes

Moisture

Odour

Friction

Methods

Vertical Wicking[1] – Samples are cut to a width of 25mm, a waterproof pen is used to mark a 10mm line parallel to the base of the fabric. The sample is immersed to this line in Simulated Sweat Solution (Solution A – 8.298g Sodium Choloride + 0.368g Calcium Chloride + 1L Deionised Water coloured with blue dye to be detectable by eye) and a calibrated timer set for 60 seconds. When the time has elapsed, the distance the solution travelled is measured using a calibrated ruler.

The **greater** the Wicking Distance, the **better** the Vertical Wicking and Moisture Transport capability.

Absorbency[2] – Samples are cut to a 5x5cm size and weighed before and after immersion in Solution A for 30 mins at 37°C. The difference in weight is calculated and result recorded as g/g (weight of fluid uptake per weight of material).

The greater the Absorbency, the better the uptake of fluid when applied to the anatomic area prone to excess moisture.

Co-efficient of Friction[3] – Samples are cut to the size of a small sled, which is pulled along a plane at a constant rate by a tensometer with calibrated load cell. The force transduced within the load cell is measured which is proportional to the resistance the material exerts on the reference surface of the plane.

The **lower** the co-efficient of friction (μD), the **lower** the skin-on-skin friction and **improved** conditions for the patient in preventing MASD.

Conformability[4] – Samples are cut to a width of 25mm and placed upon the Shirley Stiffness tester beneath a moveable slide. The sample is pushed along the tester at constant rate until the sample touches the knife edge (decline set to 41.5°). Calculations are performed based on fabric mass per unit area (g/m2) and bending length (mm) to determine the flexural rigidity (μ Joule/m).

The **lower** the flexural rigidity the **better** the conformability of the sample and the **easier** it is for the sample to follow the body's natural anatomical contours.

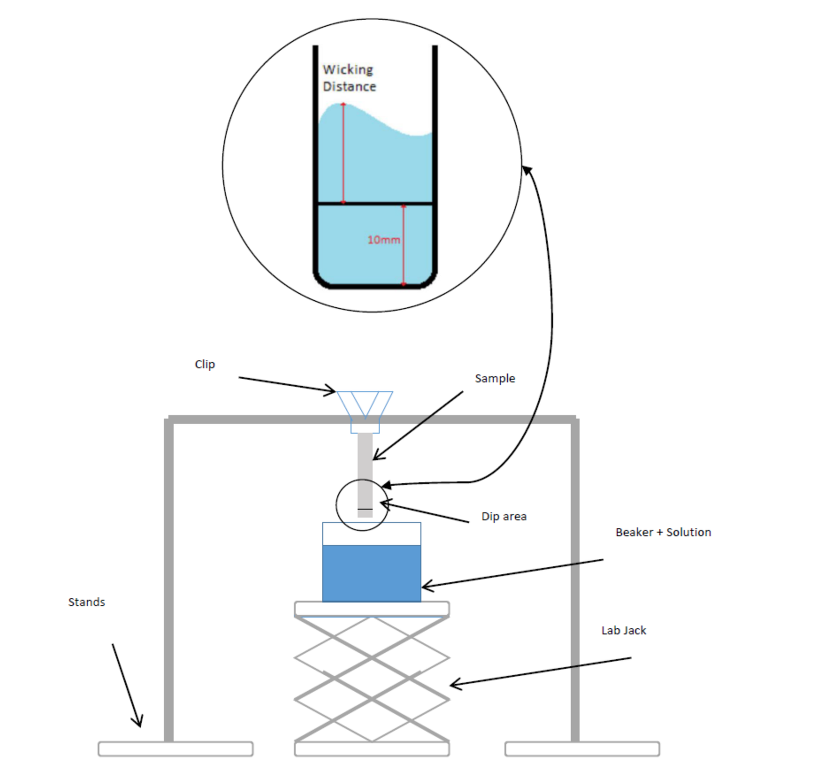


Figure 1: Vertical Wicking Test Rig with close up of the Wicking Action of MWFs

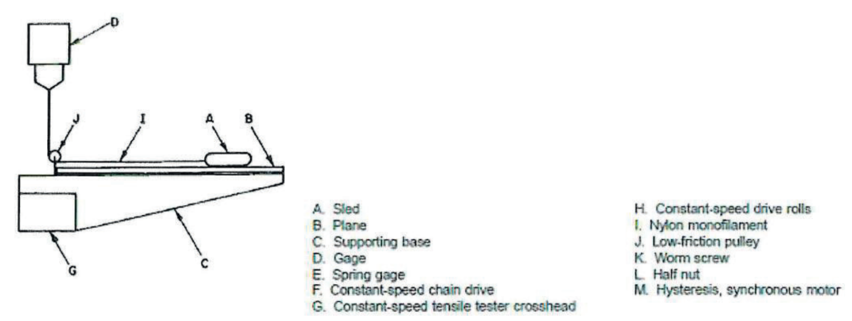
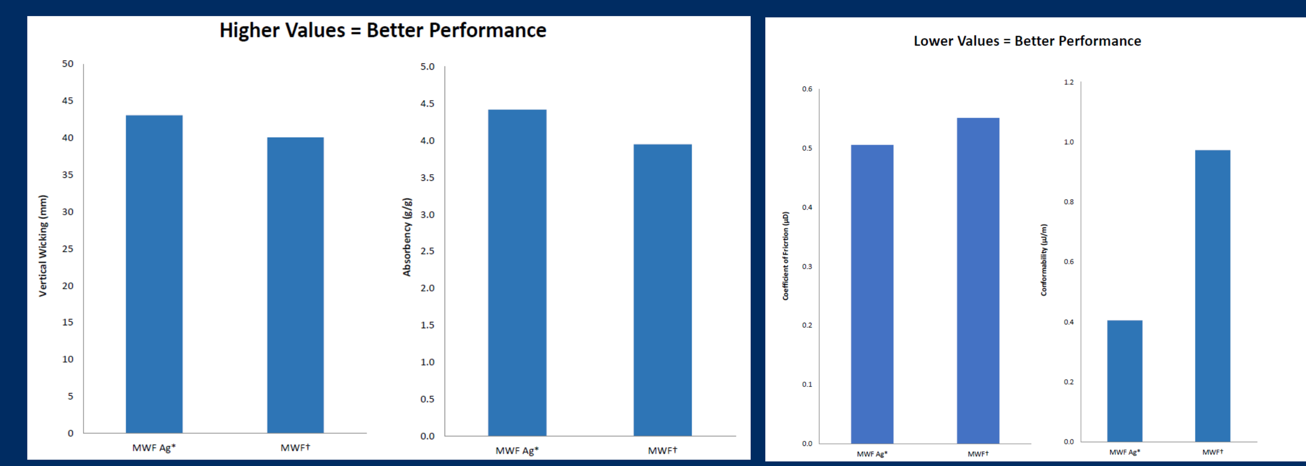


Figure 2 - Methods of assembly of Apparatus for the determination of Coefficient of Friction (ASTM D1894. Fig 1)

Figure 3: Shirely Stiffness Test Equipment

Results



Discussion

Vertical Wicking - MWF Ag* device demonstrated similar or improved performance compared with the alternative MWF† device. Increased Vertical Wicking provides improved moisture transportation.

Absorbency - MWF Ag* device demonstrated similar or improved performance compared with the alternative MWF† device. Increased absorbency provides improved initial moisture uptake of sweat ready for transportation away from the relevant area of the body where to which the device has been applied.

Co-efficient of Friction – MWF Ag* device demonstrated similar or improved performance compared with the alternative MWF† device. Lower values providing less skin on skin friction.

Conformability – MWF Ag* device demonstrated improved performance compared with the alternative MWF† device. Lower values providing an improved ability to contour to various anatomical locations.

Conclusion

The MWF Ag* device demonstrated excellent performance in the comparative assessment and is available to patients and clinicians.

References:

***Advanced Medical Solutions – ActivHeal® MWF Ag**

†Coloplast Corp.- Interdry®

1. **Vertical Wicking Method is based on AATCC Test Method 197-2018: Vertical Wicking of Textiles.**
2. **Absorbency is based on BS EN13726-1:2002 Test methods for primary wound dressings – Part 1: Aspects of Absorbency.**
3. **Co-efficient of Friction is based on ASTM D1894-01: Standard Test Method for Static and Kinetic Coefficients of Friction of Plastic Film and Sheeting.**
4. **Conformability is based on ASTM D1388 Standard Test Method for Stiffness of Fabrics, Option A; Cantilever Test. Data Available on File - LD111-17, LD011-18, LD084-18.**

activheal@admedsol.com

Advanced Medical Solutions Ltd,
Premier Park, 33, Road One,
Winsford Industrial Estate, CW7 3RT, UK

Request Samples

Scan for more information