# 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 Disorders.

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## 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.

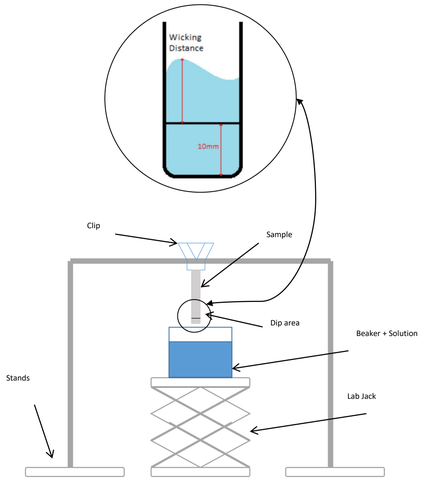



Figure 1: Vertical Wicking Test Rig with close up of the Wicking Action of MWFs

**Absorbency**$^2$ – Samples are cut to a 5x5cm size, weight calculated pre and post 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 the sled, sled is pulled along the 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.

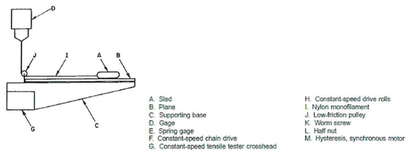



Figure 2 - Methods of assembly of Apparatus for the determination of Coefficient of Friction (ASTM D1894. Fig 1)

**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 bodies natural anatomical contours.

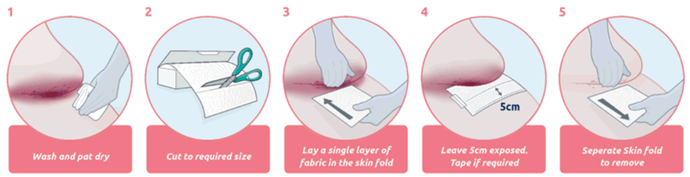

Figure 3: Shirely Stiffness Test Equipment

## Introduction

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

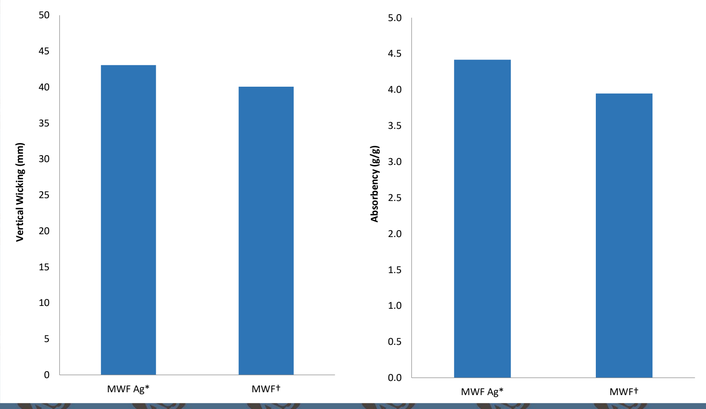
The MWF Ag* device comprises a stretch polyester fabric which contains fibres impregnated with antimicrobial metallic silver which reduce odour. The fabric is designed to provide moisture transportation and acts as a lubrication aid thereby reducing skin-to-skin friction. The device provides a protective 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 is 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.



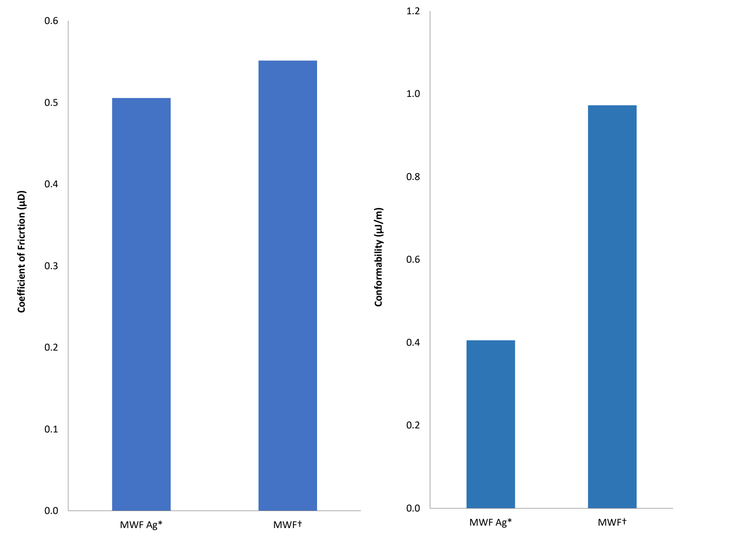

## Results

**Higher Values = Better Performance**




## Results

**Lower Values = Better Performance**




## Discussion

Vertical Wicking - MWF Ag* device demonstrated similar or increased performance to the alternative MWF† device with increased Vertical Wicking providing improved moisture transportation.

Absorbency - MWF Ag* device demonstrated similar or increased performance to the alternative MWF† device with increased absorbency providing improved initial moisture uptake of sweat ready for transportation away from the area the device has been applied.

Co-efficient of Friction – MWF Ag* device demonstrated similar or increased performance to the alternative MWF† device with lower values providing improved minimisation of skin to skin friction.

Conformability – MWF Ag* device demonstrated increased performance to the alternative MWF† device with lower values providing increased performance in the ability to contour to various anatomical locations.

## Conclusion

The MWF Ag* device demonstrated excellent performance in the comparative assessment and will be made available to patients and clinicians in 2019.

## 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.



## Key Attributes

**Moisture**
Captures and transports moisture away from the skin

**Odour**
Device reduces colonisation of bacteria and yeasts within fabric

**Friction**
Polyester fabric acts as a lubricant, reducing skin on skin friction

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