



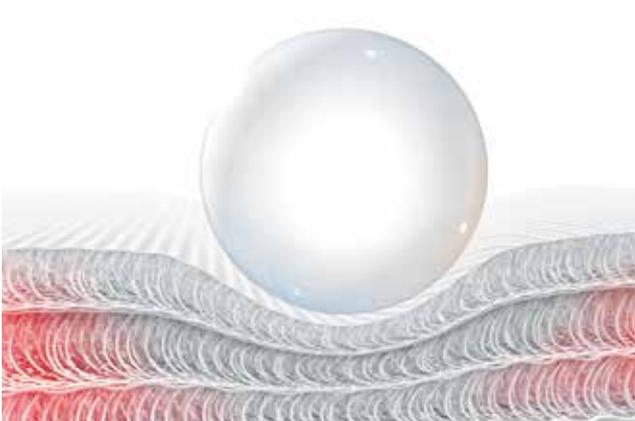
## A Revolutionary Therapeutic Mattress evidenced to:

Reduce temperature, moisture & humidity

Reduce shear strain

Provide effective pressure redistribution

Improve comfort levels



SPECIALIST PRODUCTS • UNIQUE SERVICES

Improving outcomes in the patient environment

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## A new clinically and cost effective alternative to hybrid foam and powered mattresses for the prevention and treatment of moisture lesions and all non-complex pressure ulcers\*

AeroSpacer® is a revolutionary new reactive therapeutic support system comprising 3D spacer textiles, which are shown to be superior to foam in assisting the prevention and treatment of moisture lesions and pressure ulcers and improving a patient's microclimate and comfort levels<sup>1,2</sup>.

- Actively manages microclimate by reducing temperature, moisture and humidity at the skin/surface interface<sup>1</sup>
- Provides effective pressure redistribution by effectively displacing load therefore maximising immersion and envelopment<sup>1</sup>
- Absorbs external and internal shear strain, reducing tissue distortion over bony prominences<sup>1</sup>

### Reduces temperature & humidity, improves comfort



In contrast to foam, gel and air cells, the textiles inside AeroSpacer comprise an open, breathable structure, removing heat and humidity at the skin/

surface interface<sup>1</sup>. Independent testing published by the University of Southampton's Department of Health Sciences demonstrates how passive body movement circulates air throughout the mattress, reducing temperature and humidity at the skin/surface interface.<sup>1</sup> This creates a cooler, less moist environment conducive to preventing moisture lesions and improving comfort levels.

### Heat and moisture reduction

Independent testing<sup>1</sup> demonstrates a trend of decreasing temperatures over 24 hours at the support surface interface, with AeroSpacer producing an average decrease of 5-6°C.

Estimations of heat flux measurements at the support surface interface revealed a greater withdrawal of heat through the AeroSpacer mattress in comparison to a foam mattress. The removal of heat can contribute to reduced sweating and moisture on the skin.

Foam is an insulator which retains heat. A patient lying on a foam mattress will generate heat which over time (8 – 24 hours) will raise the temperature in the underlying foam mattress above the perspiration threshold.<sup>3</sup> Hybrid foam mattresses partially or wholly enclosed in polyurethane may exacerbate perspiration. The graph (Fig 1) demonstrates how AeroSpacer maintained temperature at the patient-surface interface below the perspiration threshold.

“Foam surfaces increase skin temperature because they have poor heat transfer properties.”<sup>3</sup>

\*In conjunction with good care and sound clinical judgment.

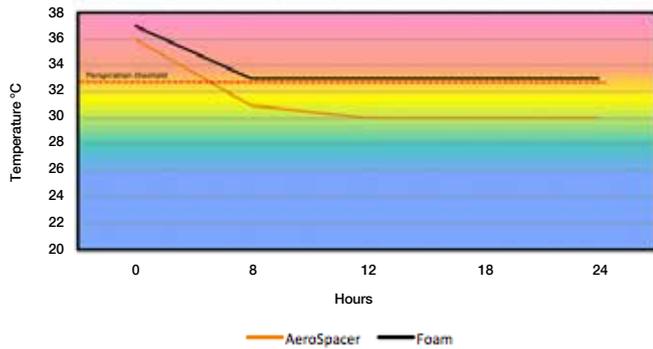


Fig 1 Results of temperature testing on materials, demonstrating the 'Lachenbruch surface sweat threshold'<sup>3</sup>

“Gel-filled products may have an initial cooling effect but this wears off after two hours and they tend to increase humidity at the skin-surface interface.”<sup>3</sup>

The graph below (Fig 2) demonstrates how, after the application of a sweating phantom, relative humidity increased to 100% at the support surface interface. The foam mattress retained this moisture over a 24hr period. In contrast AeroSpacer demonstrated a reduction in relative humidity from 100% down to approximately 80%.

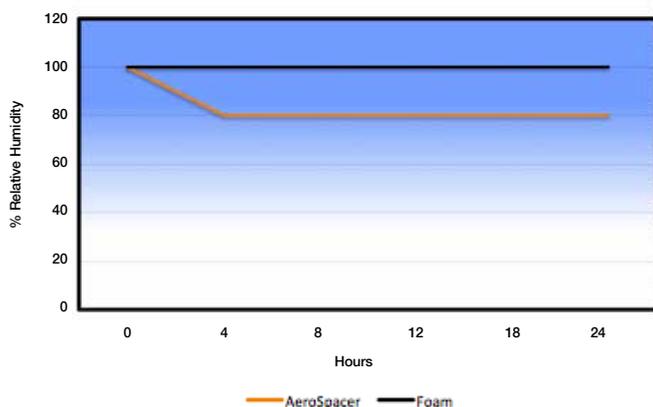


Fig 2 Results of relative humidity testing on AeroSpacer and foam

AeroSpacer: a new generation of hybrid mattresses. The difference to other hybrids is its 3D spacer construction. All other hybrids comprise foam partially or wholly enclosed in polyurethane sheets or cells. These are reported to increase temperature and humidity,<sup>3</sup> resulting in perspiration. Immersion into the foam may be limited when the hybrid is not in powered mode. A non-powered hybrid is a static foam mattress. All foam mattresses are vulnerable to strikethrough and being condemned.<sup>10</sup>

### Absorption of shear strain and a reduction in tissue deformation



The three layers of 3D spacer textile are formulated with differing compression levels designed to move independently. As a patient repositions on AeroSpacer, each layer absorbs the shear force by differentially distorting, reducing tissue deformation and the stress on tissue as it moves across bony prominences.

The University of Southampton's Department of Health Sciences also assessed how AeroSpacer and foam responded to non-uniform loading, simulating the presence of shear e.g. when a patient is semi-recumbent in bed. An indenter was used to apply inclined loading at 30° through the top surface, with simultaneous measurement of force and displacement taking place.

The higher level of displacement observed with AeroSpacer demonstrated its ability to absorb shear strain significantly more effectively than foam, indicating its superior ability to reduce the effect of shear strain in tissue over bony prominences (Fig 3).

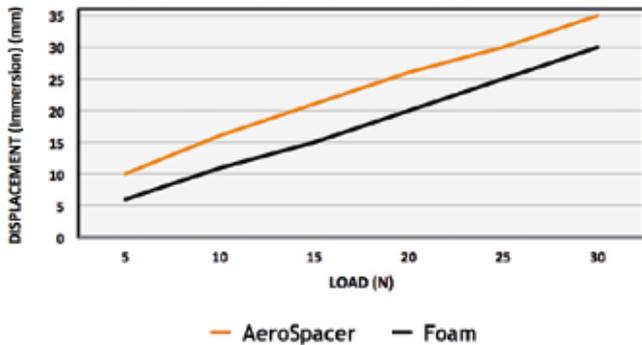


Fig 3 Results of load testing at a 30° incline representing shear absorption.

## Effective Pressure Redistribution



The combination of moisture, friction and shear on elderly skin will eventually lead to tissue breakdown without quick intervention.<sup>4,5</sup> There is a strong correlation between the level of tissue strain and damage caused.<sup>6</sup>

AeroSpacer’s three independent layers of 3D spacer textile are formulated to enable immersion and envelopment, providing effective redistribution of body load, reducing pressure at the skin/surface interface and improving comfort levels.

“3D knitting technologies such as AeroSpacer can be considered to provide favourable redistribution properties when compared to other commonly used materials such as foams.”<sup>1</sup>

Independent testing<sup>1</sup> assessed how AeroSpacer and foam responded to a uniaxial (vertical) force intended to simulate pressure. An indenter was used to apply load\*, with simultaneous measurement of force and displacement taking place. The degree of displacement indicates the degree of immersion.

Results indicated that as load increases, the level of displacement (immersion) increases. At a load of 20N displacement was approximately 30% greater on AeroSpacer than foam, indicating a significantly higher level of immersion into the AeroSpacer mattress (Fig 4).

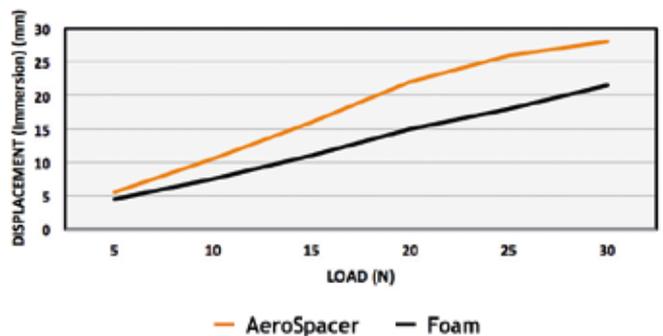


Fig 4 Results of vertical load testing representing immersion.

\*At 30N the load approximates to a 265kg patient.



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## Clinical Evaluation

Preliminary data from a multi-centre clinical evaluation indicates a preference for the continued use of AeroSpacer by both patients and clinicians in preference to the support systems that the patient was on prior to the evaluation. These surfaces included high specification and viscoelastic foam mattresses, hybrid foam mattresses, static air overlays, alternating pressure and continuous low pressure powered mattresses.

The majority of patients reported improved comfort and reduced or no sweating. Clinician feedback is overwhelmingly positive, reporting reduced moisture levels at the skin-surface interface, with some moisture lesions healing and pressure ulcers remaining static or improving.

## AeroSpacer – a truly better alternative

It is well recognised that there has been an over-reliance on powered mattresses and current NICE and EPUAP guidance stresses the importance of using non-powered mattresses instead where suitable.<sup>4</sup>

A recent alternative has been provided by the introduction of hybrid mattresses, which comprise foam partially or wholly enclosed in polyurethane sheets or cells. Despite an apparent lack of peer reviewed evidence, some claims for foam hybrids suggest a suitability for category IV pressure ulcers without reference to reducing temperature or humidity, which are both well recognised contributory factors to tissue breakdown.<sup>4</sup>

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## Conclusion

There is currently more independently researched and peer reviewed evidence suggesting 3D spacer textiles are superior to foam mattresses to assist in the prevention and treatment of non-complex pressure ulcers in conjunction with good care and sound clinical judgment.<sup>1,2</sup>

## AeroSpacer can be laundry disinfected, providing infection prevention benefits and cash-releasing savings

AeroSpacer is the first mattress that can be machine washed and tumble dried. This not only improves governance with improved infection prevention, it also provides significant cost savings versus foam, as disposal due to strikethrough is no longer an issue. This significantly extends mattress life.

- The AeroSpacer cover can be wiped clean in accordance with current practice.
- The entire AeroSpacer overlay can be machine washed and tumble dried.
- The top therapeutic surface of the AeroSpacer MR (mattress replacement) can be removed, machine washed and tumble dried. Simply unzip the outer cover of the MR and remove the top therapeutic mattress, replacing with a clean top section. The base layer is fully enclosed in its own cover, and can be wiped clean.

Medstrom also provide a laundry disinfection service for our clients.

If you are thinking of replacing your foam mattresses, think again!

A number of clinicians and procurement professionals who were looking to replace their foam mattresses, including some who were considering switching to hybrid foam mattresses, have had cause to think again and are currently evaluating the AeroSpacer mattress and cushion range in terms of clinical effectiveness and cost effectiveness.

## An eco-friendly and sustainable fabric

3D AeroSpacer fabric is manufactured from recyclable polyester and requires less water and energy to produce than cotton.<sup>8,9</sup>

## The AeroSpacer Range:

**AeroSpacer Mattress:** Mattress overlay

**AeroSpacer MR™:** Mattress replacement

**AeroSpacer Cushion Range:** Seat cushion available with 'Infection Prevention' acute cover or 'Climate Control' community cover for patients who are in discomfort with their current cushion or who are at risk of developing moisture lesions/pressure ulcers

**AeroSpacer Heel Offloader:** Heel protection device for patients who are at particular risk of developing heel pressure ulcers



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## Innovative Cover Technology incorporating TruFlow™

In early 2010 the MHRA released an alert (MDA/2010/002) after investigations revealed a high incidence of external damage and internal contamination on mattresses, creating a potential cross contamination risk. Since that time mattress covers have incorporated protection against chlorine corrosion<sup>7</sup>. This change is generally acknowledged to have eliminated the air permeability properties of conventional mattress covers, with only the zip providing minimal 'breathability'. This change, although necessary for patient protection, is thought by some to have contributed to an increase in patient sweating.

The range of AeroSpacer covers incorporate an innovative, patent-protected TruFlow™ panel of spacer fabric, enabling easy air flow into and out of the product. This significantly increases the removal of heat and moisture from the mattress.<sup>1</sup>



Fig 5 TruFlow spacer mesh layer.

## Warranty & Life Expectancy

AeroSpacer is designed for a five-year life with a two-year performance warranty further demonstrating significant cost benefits over traditional foam mattresses and air overlays.

## Who are Medstrom Healthcare?

AeroSpacer has been developed by Medstrom Healthcare in partnership with a leading textile consultant. AeroSpacer is the sum of more than 100 years' cumulative experience in the development of pressure area care devices.

Medstrom supply specialist beds and mattresses to the NHS and the community and are the 2nd largest provider of bed management services to the NHS, managing around 20% of all acute beds and mattresses.

Medstrom were formed in 2006, and in 2010 undertook a management buy-out of Hill-Rom's bed management contracts, and are the only independent provider of bed management services to the NHS.

Medstrom initiated pressure ulcer prevalence and incidence monitoring and recently supported the first ever national prevalence survey together with the Welsh Wound Innovation Centre and NHS Wales.

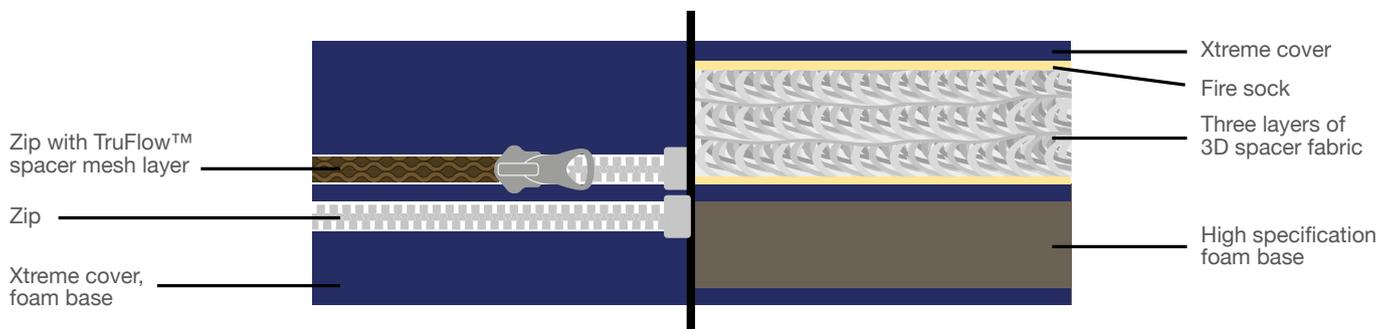


Fig 6 External and internal construction of AeroSpacer MR.

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## Technical Specification:

### AeroSpacer Overlay:

**Inner therapeutic surface:** Three layers of 3D spacer textile encased in a Proban™ shear-reducing fire retardant cotton cover.

**Outer cover:** Polyurethane-coated, chlorine-resistant, multi-stretch, waterproof, moisture vapour permeable cover incorporating TruFlow™ spacer mesh panel. Head and foot end have an adjustable polyurethane-coated strap to fit a hospital or divan mattress.

### AeroSpacer MR:

**Upper therapeutic surface:** Three layers of 3D spacer textile encased in a Proban™ shear-reducing fire retardant cotton.

**Outer cover:** Polyurethane-coated, chlorine-resistant, multi-stretch, waterproof, moisture vapour permeable cover incorporating TruFlow™ spacer mesh panel.

**Lower section:** 41kg/150H high resilience, high specification, fire retardant foam encased in polyurethane coated, multi-stretch, waterproof, moisture vapour permeable cover.

Standard sizes (customised sizes available)

	AeroSpacer Overlay	AeroSpacer MR
<b>Length:</b>	198cm (78")	198cm (78")
<b>Width:</b>	85cm (33½")	85cm (33½")
<b>Depth:</b>	5.5cm (2¼")	13.5cm (5")
<b>Weight:</b>	3.8kg (8½lbs)	13.8kg (30lbs)

**Max patient weight:** 150kg (23½ stone) 190kg (30stone)

**Warranty:** 2 year performance warranty on the mattress and cover

### AeroSpacer Cushion

<b>Length:</b>	45cm (17 3/4")
<b>Width:</b>	45cm (17 3/4")
<b>Depth:</b>	7.2cm (2 3/4")
<b>Weight:</b>	1.1kg (2.4lbs)
<b>Max patient weight:</b>	127kg (20st)

### AeroSpacer Heel Off-Loader

<b>Width:</b>	65cm (25 ½")
<b>Depth:</b>	7.5cm (3")
<b>Height:</b>	30cm (12")
<b>Weight:</b>	0.65kg (1.4lbs)

**Warranty:** A one-year performance warranty applies to the AeroSpacer cushion, heel off-loader and covers.

## References:

- 1 Evaluation of the skin microclimate and shear strain performance of the AeroSpacer 3D spacer mattress; Worsley P; Parsons B; Bader DL; University of Southampton, European Pressure Ulcer Advisory Panel Conference Proceedings. Ghent ©2015 EPUAP/NPUAP/PPPIA.
- 2 A new pressure-relieving mattress overlay for the prevention of pressure ulcers in elderly patients at risk. Ricci E, Cassino R, EWMA Journal 2013 Vol 13 No 1
- 3 Lachenbruch, C. Skin cooling surfaces: estimating the importance of limiting skin temperature. Ostomy Wound Management 2005; 51.
- 4 National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Ulcers: Clinical Practice Guideline. 2014. ©2015 National Pressure Ulcer Advisory Panel www.npuap.org
- 5 "Controlling microclimate is an important and often overlooked area of pressure ulcer prevention and is the major contributory cause, incontinence pads are not the solution." Dr. Joyce Black, President, NPUAP Orlando, USA. 2015
- 6 Conference on Biomechanics (APBiomech): 6th World Congress of Biomechanics (WCB 2010), 1 – 6 August 2010, By James Goh Cho Hong, Chwee Teck Lim. University of Singapore.
- 7 Protect, Rinse & Dry, BHTA Guidance on the care, cleaning and inspection of healthcare mattresses. BHTA HM 0112 www.bhta.com
- 8 Polyester Recycling, www.tedresearch.net/media/files/Polyester\_Recycling.pdf
- 9 What's the most sustainable fabric? The Ecologist. www.theecologist.org
- 10 MHRA Alert (MDA/2010/002).

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