AN EVALUATION OF THE PRESSURE REDUCING MATTRESSES

Dynaform Mercury
Softform Premier
Dynaform Saturn
Conformex

17 April 2009
**Pressure distributive properties**

The phantom is left to dwell for 10 minutes on the mattress, to allow for initial stabilisation of the mattress.

Multiple measurements are made, to obtain confidence intervals for the peak pressures in the pelvic and heel regions. Low peak interface pressure is deemed to be the most valid measure of pressure reducing properties according to current evidence at the time of publication.

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MATTRESS EVALUATION

Report Outputs, pressure distribution:

- Peak Interface pressure Pelvic area (95% confidence limits) (mmHg)
- Peak Interface pressure Heels (95% confidence limits) (mmHg)
- Pressure map (10mmHg Isobars)
**Heat and water vapour transfer properties**

The ability of a mattress to dissipate body heat and moisture makes an important contribution to comfort. Excessively moist conditions at the skin/mattress interface are also known to macerate the skin, exacerbating the risk of mechanical damage to the skin.

A controlled environment testing facility with a thermal-guarded sweating hot-plate is used. This permits accurate measurements to be made of both heat transfer rates and water-vapour transfer rates through the product.

The hot-plate is maintained at constant temperature and humidity at the interface to the mattress, and losses of heat and water vapour into the mattress are electronically monitored simultaneously.

Tests are conducted using the whole mattress construction, complete with cover. It has been shown that surface microclimate is determined by the transfer properties of the entire system, and cannot be inferred from data relating to individual components of the system, such as the cover.

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MATTRESS EVALUATION

Report outputs, heat and water vapour transfer properties:

- Heat Transfer rate (Wm$^{-2}$K$^{-1}$)
- Water Vapour Transfer rate (gm$^{-2}$day$^{-1}$)
Mattresses are known to have a finite life-span. Their pressure-distributive properties degrade substantially over a period of years. Significant changes in these properties, if left undetected, may lead to increased risk of pressure ulcers.

A representative sample of mattresses would have to be monitored in service for several years, by which time the sample would no longer be representative of the mattresses on the market. In the interests of currency, the preferred approach is to subject mattresses to an accelerated, artificial fatigue cycle.

Products undergo 100,000 repetitive indentations using a cylindrical indentor of 80mm diameter. Force-indentation tests using a Quince 2 mattress audit device (having a matching 80mm cylindrical indentor) quantify changes in mattress properties relative to the starting point. A high percentage indicates a large change in indentation properties after fatigue.

This measure cannot be directly extrapolated to give an estimate of the service life of the mattress, since the fatigue conditions are artificial, and not accurately representative of the fatigue of a mattress in use. It does however allow indicative comparisons to be made between mattresses.

Report Outputs, fatigue longevity:

- %Change in Quince2 bottoming force after 100,000 indentations
### Technical Data

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Interface Pressure (pelvis)</td>
<td>57 +/- 4 mmHg</td>
</tr>
<tr>
<td>Peak Interface pressure (heels)</td>
<td>75 +/- 7 mmHg</td>
</tr>
<tr>
<td>Heat transfer rate</td>
<td>25.2 +/- 0.05 Wm^-2</td>
</tr>
<tr>
<td>Vapour transfer rate</td>
<td>677 +/- 2 gm *day^-1</td>
</tr>
<tr>
<td>Longevity (% reduction Quince after 10^6 cycles)</td>
<td>6%</td>
</tr>
<tr>
<td>Turning</td>
<td>Rotate only, no turning</td>
</tr>
</tbody>
</table>

### Other Comments

Consists of a U-channel of high resilience combustion modified foam, with an insert of foam into separate squares. Cover access is via a zip on 3 sides, with a protective flap to prevent ingress. Cleaning instructions are marked on the label.

### Evaluation

This report adheres to a standard protocol for evaluation of static mattresses, as described in the document MHRA 03129-0 Pressure Reducing Mattresses, available from MHRA.

### Supplier

Direct Healthcare Services Ltd  
Unit 16, Withey Court  
Western Industrial Estate  
Caerphilly, South Wales  
CF83 1BQ  
www.direct-healthcare.org.uk
Technical Data

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Peak Interface Pressure (pelvis)</td>
<td>59 +/- 6 mmHg</td>
<td></td>
</tr>
<tr>
<td>Peak Interface pressure (heels)</td>
<td>76 +/- 14 mmHg</td>
<td></td>
</tr>
<tr>
<td>Heat transfer rate</td>
<td>24.2 +/- 0.1 Wm^-2</td>
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</tr>
<tr>
<td>Vapour transfer rate</td>
<td>679 +/- 3 gm^-2day^-1</td>
<td></td>
</tr>
<tr>
<td>Longevity (% reduction Quince after 10^5 cycles)</td>
<td>6% +/-</td>
<td>%</td>
</tr>
<tr>
<td>Turning</td>
<td>Rotate only, no turning</td>
<td></td>
</tr>
</tbody>
</table>

Other Comments
The Softform Premier comprises a U-channel of high resilience combustion modified foam, with an inlaid profiled section comprising squares that compress individually. No flipping required, only rotation. Cover access is via a zip on all four sides, with a protective flap to prevent ingress of fluids. Cleaning instructions are printed on the cover. A space is provided on the cover for audit records.

Supplier
MSS
Nantgarw Business Park,
Cardiff CF15 7QU

Evaluation
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MATTRESS EVALUATION

Dynaform Saturn

Technical Data

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Interface Pressure (pelvis)</td>
<td>67 +/-5 mmHg</td>
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<tr>
<td>Peak Interface pressure (heels)</td>
<td>72 +/-8 mmHg</td>
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<tr>
<td>Heat transfer rate</td>
<td>17.9 +/-0.1 Wm^-2</td>
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<tr>
<td>Vapour transfer rate</td>
<td>657 +/-2 gm^-2 day^-1</td>
</tr>
<tr>
<td>Longevity (% reduction Quince after 10^5 cycles )</td>
<td>5%</td>
</tr>
<tr>
<td>Turning</td>
<td>Rotate only, no turning</td>
</tr>
</tbody>
</table>

Other Comments
Consists of a base layer of high resilience combustion modified foam, with a top layer of visco-elastic foam, profiled into squares. Cover access is via a zip on 3 sides, with a protective flap to prevent ingress. Cleaning instructions are marked on the cover.

Supplier
Direct Healthcare Services Ltd
Unit 16, Withey Court
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MATTRESS EVALUATION

Conformex

Pressure Map
10mmHg isobars, archive data

Technical Data

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Peak Interface Pressure (pelvis)</td>
<td>88 ±4 mmHg</td>
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<tr>
<td>Peak Interface pressure (heels)</td>
<td>87 ±7 mmHg</td>
</tr>
<tr>
<td>Heat transfer rate</td>
<td>18.0 ±0.05 Wm⁻²</td>
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<tr>
<td>Vapour transfer rate</td>
<td>530 ±2 gm⁻² day⁻¹</td>
</tr>
<tr>
<td>Longevity (% reduction Quince after 10⁵ cycles)</td>
<td>7%</td>
</tr>
<tr>
<td>Turning</td>
<td>Rotate only, no turning</td>
</tr>
</tbody>
</table>

Other Comments

The Conformex comprises a base layer of high resilience combustion modified foam, with a profiled top layer of viscoelastic foam bonded to the base layer. Cover access is via a zip on two sides, with no protective flap to prevent ingress. Cleaning instructions are printed on the cover. The mattress does not require flipping, but top and bottom are not labelled, and correct orientation is not obvious.

Supplier

Huntleigh Healthcare Ltd
310 - 312 Dallow Road, Luton
Bedfordshire LU1 1TD

Evaluation

This report adheres to a standard protocol for evaluation of static mattresses, as described in the document MHRA 03129-0 Pressure Reducing Mattresses, available from MHRA.