AN EVALUATION OF THE PERMAFLEX PLUS REPLACEMENT MATTRESS
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.

The surface of the Phantom is warmed to 35 °C using special heated and temperature-controlled skin.

Tests are performed with the mattress on a 4-section profiling bed in standard position according to EPUAP draft guidelines, with the backrest inclined to 45°, the gatch section elevated to 20°, and made up with a loose sheet. The phantom is lowered onto the mattress in standard 45° rigid attitude, and then the hip and knee joints are released.

Pressure maps reveal visually much information besides peak pressure about the way pressure is distributed. A picture of the pressure map is therefore also provided, to allow readers to judge features of the pressure distribution that may be of particular interest to them (eg contact area). The pressure maps are provided with a sidebar scale to the colour map.


MATTRESS EVALUATION  Permaflex Plus

Report Outputs:

- 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\(^3\) 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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Report outputs:

- Heat Transfer rate ($W m^{-2} K^{-1}$)
- Water Vapour Transfer rate ($g m^{-2} day^{-1}$)
Fatigue Longevity

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\(^4\) (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

- %Change in Quince2 bottoming force after 100,000 indentations
MATTRESS EVALUATION Permaflex Plus

Technical Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Interface Pressure (pelvis)</td>
<td>72 +/- 4  mmHg</td>
</tr>
<tr>
<td>Peak Interface pressure (heels)</td>
<td>75 +/- 7  mmHg</td>
</tr>
<tr>
<td>Heat transfer rate</td>
<td>18.2 +/- 0.05 Wm²</td>
</tr>
<tr>
<td>Vapour transfer rate</td>
<td>671 +/- 2 gm/day</td>
</tr>
<tr>
<td>Longevity (% reduction Quince after 10⁵ cycles)</td>
<td>4 %</td>
</tr>
<tr>
<td>Turning*</td>
<td>Rotate only, no turning</td>
</tr>
</tbody>
</table>

*Information provided by manufacturer

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.

Supplier
Parkhouse Healthcare Ltd
1 Heathfield Lane
Birkenshaw
West Yorkshire
BD11 2HW

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.