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Sjukvårdstextilier – Bestämning av kontakttryck hos madrasser, sängar och andra liggunderlag

Health care textiles – Determination of contact pressure on mattresses, beds and other underlay

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Denna standard fastställdes 2017-11-09 som SS 8760013:2017 och har utgivits i svensk språkversion. Detta dokument återger SS 8760013:2017 i engelsk språkversion. De båda språkversionerna gäller parallellt.

Denna standard ersätter SS 8760013:2010, utgåva 1.

This Standard was approved and published 2017-11-09 as SS 8760013:2017 in Swedish. This document contains an English language version of SS 8760013:2017. The two versions are valid in parallel.

This standard supersedes the Swedish Standard SS 8760013:2010, edition 1.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS, who can also provide general information about Swedish and foreign standards.

Denna standard är framtagen av kommittén för Trycksårsprevention, SIS/TK 595.

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Introduction

This standard contains a method for determining the pressure distribution properties of an underlay. This is done by measuring the pressure distribution on the contact surface between the underlay and indenters, which simulate various parts of the human body. The maximum pressure that occurs on a contact surface of this type is affected by the nature of the underlay and is considered to be a good measure of its pressure distribution capabilities. The lower the maximum pressure, the better the pressure distribution capability.

The underlay, as defined in this standard, may comprise one or more components. The test method is based on a simplification of actual conditions (in respect of the geometry of the indenters, for example). This means that the maximum pressures (absolute values) measured may deviate from those occurring in an actual situation, when a person is lying on a bed. The extent of this deviation may vary depending on anthropometrics and the type of mattress, for example. However, measuring according to this method is considered to provide reliable information regarding which of a number of different underlays best distributes the pressure from a human body.

Edition 2 differs from edition 1 due to updating and clarification of the text, plus the addition of an explanatory section for information purposes.

The standard provides no guidance on the selection of mattresses or other types of underlay. Please see SS 8760020 for issues relating to requirements for care mattresses.

1 Scope

This standard describes a method for determining the pressure distribution capability of an underlay by measuring the contact pressure between indenters that simulate various parts of the human body, and the underlay. The underlay may comprise one or more components.

The test method as described in this standard can be used when testing new, used and/or aged underlays.

This test method is not intended for testing air mattresses, water mattresses or similar products.

2 Terms and definitions

The terms and definitions that follow below are applicable to application of this document.

2.1
pressure distribution
pressure variation over a given test area

2.2
underlay
one or more separate mattress layers with or without encasing, plus other components that affect the distribution of the pressure

2.3
pressure sensing mat
a thin, formable mat with measurement cells distributed over the surface in a grid pattern.

Note 1 to entry Measurement cells record contact pressure

3 Equipment

3.1 Pressure sensing mat

The pressure sensing mat shall have an effective measurement area of at least 40 cm × 40 cm.

To achieve sufficiently good dissolution of the distribution of the pressure, individual measurement cells in the pressure sensing mat shall be no larger than 20 mm × 20 mm.

The pressure sensing mat shall come with a unit for collecting measurement values, facilitating measurement at specific times. The unit shall facilitate subsequent evaluation of the pressure values of individual measurement cells.

The pressure sensing mat shall have a measurement accuracy of a maximum of ± 10 %.

3.2 Large indenter

A large indenter shall be rigid, smooth and rotationally symmetrical, and superelliptical with a radius *(R*) of 20 cm and height (*H*) of 12 cm.

Note 1: Aluminium is an example of an appropriate material for the indenter.

The shape of the indenter, which is designed to simulate the shape of the back and bottom of an "average" man, can be described mathematically using the following formula:

$$\frac{X^2}{R^2}+\frac{Y^2}{R^2}+\frac{Z^3}{H^3}=1$$

Where *X* and *Y* state the position laterally in cm *Z* states the position vertically in cm.

A large indenter shall, for the loading case normal load, exert a force of (300 ± 5) N when placed on an underlay.

Note 2: Normal load indicates approximately the pressure on a normal foam mattress that is achieved when a person weighing 80 kg to 90 kg is lying on his/her back on the same mattress.

A large indenter shall also be able to exert the force (600 ± 10) N when it is placed on an underlay. This load case is referred to as elevated load and shall, for example, simulate the load from heavier individuals when turning, sitting on the bed or lying on their sides.

The indenter shall maintain a temperature of (34 ± 2) °C during testing.

3.3 Small indenter

A small indenter shall be rigid, smooth, rotationally symmetrical, and superelliptical. It shall have a radius *(R)* of 6 cm and height (*H*) of 4.5 cm.

A small indenter shall exert a force of (40 ± 1) N when placed on an underlay. This load case shall represent small body parts (knees, elbows and heels) and can be described mathematically using the formula in 3.2.

The indenter shall maintain a temperature of (34 ± 2) °C during testing.

Note: Figure 1 shows examples of appropriate indenters.

Figure 1 – Examples of large and small indenters

4 Conditioning and testing climate

Prior to a testing procedure, the test objects (underlay) shall have been stored indoors for at least 72 h and conditioned in the testing climate (50 ± 5) % relative humidity at (23 ± 2) °C for at least 24 h. During this time, the test objects shall be stored so that they are not subjected to mechanical load.

5 Testing procedure

5.1 Overview

Use the three load cases during the testing procedure. The indenters simulate various selected and relevant loads from a person lying on the underlay. Perform measurements at five measuring positions on each underlay.

Measure the contact pressure occurring when each of the three indenters is pressed against the underlay, using an intermediate pressure sensing mat. The pressure varies at different locations on the contact surface.

Select the maximum pressure recorded by the pressure sensing mat as output data. The maximum pressure is considered to be a good measure of the pressure distribution capability of an underlay (the lower the maximum pressure, the better the pressure distribution). Three maximum pressures (one from each load case) will therefore be determined at each measuring position.

Also use one of the indenters for measuring the indentation depth at each measuring position.

Calculate the average of the measured maximum pressures from the five measuring positions for each indenter. These averages constitute the primary results from the testing procedure. Calculate the average from the five indentation depth measurements and specify these in the report as well.

5.2 Test objects

The underlays are test objects and may comprise one or more layers; e.g. mattress/bed, mattress pad and sheet. If multiple layers are tested together, they shall be positioned in the way in which they are normally used. Place the test objects on a base that cannot be compressed.

5.3 Measuring positions

There shall be five measuring positions for each load case. To prevent edge effects and oblique loading, the centres of all measuring positions shall, if possible, be located at least 30 cm from the outer edges of the test objects. With these restrictions, the measuring points shall be distributed over the available area.

EXAMPLE: Appropriate positioning of the measuring positions for a test object of dimensions 90 cm × 200 cm is shown in Figure 2. The dashed area shows the zone (30 cm × 140 cm) within which the centre of the indenter is placed.

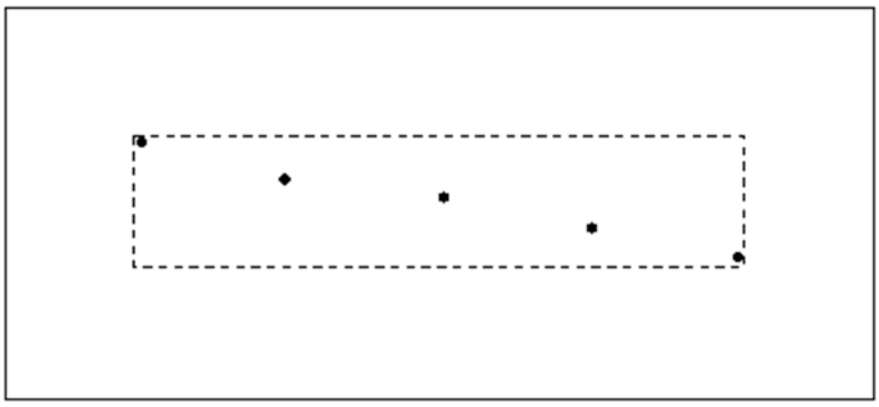

Figure 2 – Example of the positioning of measuring positions