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(54) **Bed mattress filling materials**

(57) A bed mattress fibre filling material consisting of a blend of cellulosic fibre and polymeric fibre where the cellulosic fibre preferably represents between 50% and 65% of the blend, and the polymeric fibre preferably represents between 35% and 50% of the blend. Such a material combines comfort and load bearing character-

istics and improves fire safety performance such that a bed mattress containing the filling material is subject to neither smouldering, ignition nor flaming ignition, when subjected to ignition sources up to ignition source 5 (BS 5852) or its equivalent.

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Description

5 **[0001]** Textile fibre webs are widely used for bed mattress fillings to provide a structure which is both comfortable and resilient. To comply with fire safety requirements, the characteristics of the filling material must ensure resistance to smouldering and flaming ignition.

[0002] Many bed mattress fillings are produced either from a polyester staple fibre or from a cellulosic, usually cotton, fibre.

10 **[0003]** Polyester-based mattress fillings demonstrate good load bearing characteristics and are non-ignitable with smouldering cigarette and small flaming ignition sources. However, such fillings have a tendency to melt under the influence of an ignition source and thus may expose lower layers of the filling assembly to ignition.

[0004] Cotton based fillings have reduced load bearing characteristics but show an ability to absorb moisture (perspiration) and thereby provide a more comfortable sleeping surface. When subjected to an ignition source, cotton will char to form a protective barrier, but progressive smouldering of the cotton occurs. Conventionally, cotton materials are chemically treated to prevent smoulder and a common method is to apply approximately 10% by weight of boric acid powder.

15 **[0005]** An object of the present invention is to provide a blend of textile fibres for a bed mattress filling which improves fire safety performance without the need to apply fire-retardant chemicals but yet provides the comfort and load bearing characteristics of cellulosic and polymeric fibres.

20 **[0006]** According to the present invention there is provided a bed mattress fibre filling material including a blend of cellulosic fibre and a polymeric fibre having a melting temperature lower than its temperature of decomposition; characterised in that the cellulosic fibre represents between 45% and 65% of the blend and the polymeric fibre represents between 35% and 55% of the blend.

[0007] The invention includes a bed mattress having a fibre filling as aforesaid.

25 **[0008]** Preferably, the cellulosic fibre represents between 50% and 65% of the blend and the polymeric fibre represents between 35% and 50% of the blend.

[0009] An embodiment of the invention will now be described, by way of example only.

30 **[0010]** In accordance with the invention a textile fibre web for use as a bed mattress filling material, comprises a blend of polyester and cotton fibres. The web of fibres may be formed by any standard web forming technique for example carding and cross laying, air laying, straight laying, and may be provided as a non-bonded web, a chemically bonded web, a thermally bonded web or a mechanically bonded web, for example by needling.

35 **[0011]** Cotton rich blends are prone to smouldering ignition and polyester rich blends are prone to flaming ignition. A range of blend proportions is provided wherein smouldering ignition is prevented by polyester additions and flaming ignition is prevented by cotton additions. In broad terms this range is represented by between 45% and 65% cotton and between 35% and 55% polyester with the preferred range being from 50% to 65% cotton and from 35% to 50% polyester. The polyester fibres are typically 1.7 dtex to 50 dtex with a staple length of between 25mm and 100mm. The product weight range is typically from 50grams per square metre to 4,000 grams per square metre depending upon the intended use. For example, a lightweight filling at 300 grams per square metre may be used to provide a protective fire resistant cover or layer superimposed on less fire resistant materials where a web of 1,500 grams per square metre may be used.

40 **[0012]** Tests have shown that in these ranges, neither smouldering ignition nor flaming ignition will occur when a bed mattress containing the filling material is subject to ignition sources up to ignition source 5 (BS 5852) or its equivalent.

[0013] Two such tests are described in the following examples.

Example 1

45 **[0014]**

A blend of fibres of composition	Polyester 17 dtex 60mm	15%
	Cotton	50%
	Polyester 4.4 dtex bicomponent	35%

50 was formed into a web using an air laying machine and was thermally bonded at a temperature of 160°C to produce a bonded web.

55 **[0015]** The product had a weight of 1200 g/m² and a thickness of approximately 60mm making it ideally suited for use as a bed mattress filling material.

[0016] A comparison of the blended filling with a filling consisting of 100% cotton is given in the following table.

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	100% cotton	example product
weight (g/m ²)	1200	1200
thickness (mm)	38	58
density (kg/m ³)	32	21
Support @ 12500 Pa (mm)	12	36
Indentation @ 12500pa.(mm)	26	22

[0017] The increased bulk (thickness) and the increased support demonstrate a significant increase in filling performance of the example product.

[0018] A bed mattress comprising a non-fire retardant insulator pad and the example product as a filling gave the following results when tested for ignitability.

Fillings assembly	
UK - Furniture and Furnishings (Fire)(Safety) Regulations schedule 2 part 4	no ignition
Bed Mattress	
BS EN 597 - 1 (cigarette test)	no ignition
BS EN 597 - 2 (match test)	no ignition
BS6807 ignition source 5	no ignition
BS 7177 Low hazard (including ignition source (0/NS)	no ignition

Example 2

[0019]

A blend of fibres of composition	Polyester 7 dtex 60mm	35%
	Cotton	65%

was formed into a non-bonded web by carding and cross lapping. The web was layered on to a paper carrier to assist handling. The non-bonded web had a weight of 300g/m².

[0020] The example product was used as the top layer in a bed mattress filling assembly and imparted non-ignitable properties to the fillings assembly and to the bed mattress as follows.

BS EN 597 - 1 (cigarette test)	no ignition
BS EN 597 - 2 (match test)	no ignition
BS 6807 ignition source 5	no ignition
BS 7177 low hazard (including ignition source 0/NS)	no ignition

[0021] It is not intended to limit the invention to the use of cotton and polyester. Other cellulosic fibres may be used such as viscose rayon. Also, any thermoplastic fibre may be used, which has a melting temperature lower than its temperature of decomposition.

[0022] Also, the filling may contain additional components representing no more than 20% of the overall blend. Examples are wool, PVC and some acrylics having a melting temperature greater than their temperature of decomposition. Such additional components could enhance the fire retardant properties of the product.

Claims

1. A bed mattress fibre filling material including a blend of cellulosic fibre and a polymeric fibre having a melting temperature lower than its temperature of decomposition; **characterised in that** the cellulosic fibre represents between 45% and 65% of the blend and the polymeric fibre represents between 35% and 55% of the blend.

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2. A bed mattress fibre filling material according to Claim 1, wherein the cellulosic fibre represents between 50% and 65% of the blend and the polymeric fibre represents between 35% and 50% of the blend.

5 3. A bed mattress fibre filling material according to Claim 1 or Claim 2, wherein the cellulosic fibre is at least predominantly cotton.

4. A bed mattress fibre filling material according to any preceding claim, wherein the polymeric fibre is at least predominantly polyester.

10 5. A bed mattress fibre filling material according to Claim 4, wherein the polyester fibres included in the polymeric fibre proportion of the blend are in the range of 1.7 dtex to 50 dtex.

6. A bed mattress fibre filling material according to Claim —, wherein the polyester fibres included in the polymeric content of the blend have a staple length of between 25mm and 100mm.

15 7. A bed mattress fibre filling material according to any preceding claim, whose weight is in the range of 50 grams per square metre to 4,000 grams per square metre.

20 8. A bed mattress fibre filling material according to any preceding claim, containing additional components representing no more than 20% of the blend.

9. A bed mattress fibre filling material according to Claim 8, wherein the additional components comprise one or more components selected from wool, PVC and acrylic materials having a melting temperature greater than their temperature of decomposition.

25 10. A bed mattress including a fibre filling material according to any one of the preceding claims.

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