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Washable Floor Coverings

The present invention relates to a washable floor covering having a rubber or plastics back to which a nap or tufts are fastened.

The invention provides a washable, napped or
5 tufted floor covering, having a rubber or plastics back which is water impermeable in normal use of the covering and to which the nap or tufts are fastened, wherein the back is formed with through perforations which are closed against the passage of liquid through the back in
10 normal use of the covering but which open to permit the passage of liquid therethrough when the covering is subjected in the course of mechanical treatment to a pressure difference across the back or to mechanical forces.

15 With this construction, soap or wash liquid may be removed more efficiently from the nap during an operation of pressing, centrifuging and/or suction. Thus it is possible either to economize the water consumption or, at maintained water consumption, to procure a more
20 complete cleaning since the normal liquid removal ability has been increased. Furthermore, the increased removal of liquid permits more liquid than normal to be removed during washing and a subsequent centrifuging or wringing, so that the energy consumption for subsequent
25 hot air drying, drum drying or the like may be reduced.

The covering may also comprise a tissue of non-woven material covering the face side of the back and through which the nap or tufts are fastened to the back, the said tissue providing drain passages
5 along which liquid can drain from the central areas of the covering towards its edges. The tissue acts as a wick or drain which facilitates dispersal of accumulated liquid to the edges of the covering and/or to the through perforations.

10 A washable mat or carpet according to the invention is particularly suitable for use in areas where many people walk and which is required to absorb relatively large amounts of dust and/or liquid.

The rubber or plastics back is preferably
15 formed with its through perforations by needling. The perforations are liquid tight in normal use of the floor covering but which are opened to permit the passage of liquid therethrough when covering is subjected in the course of mechanical treatment to a pressure difference
20 across the back or to mechanical forces, for example during centrifuging or squeezing. If squeezing is carried out between rollers, at least one of them may be a hollow, porous suction roller. The covering may also be dewatered by suction.

25 Preferably the needles used are of Y or V form so as to form individual perforations each capable of acting as a simple pressure relief valve which is normally closed but can open during mechanical or suction treatment of the covering.

30 On its front face the back may carry an intermediate tissue by which the nap or tufts are fastened to the back.

The intermediate tissue is used as a basic tissue in tufted mats or carpets wherein the nap may be
35 made of yarns of synthetic, animal, or vegetable origin.

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The intermediate tissue may be manufactured of synthetic fibres, such as PA, PE, PVC, PU, ^{polypropylene,} or fibre mixture combinations with synthetic fibres forming part thereof. The intermediate tissue may be manufactured by a carding
5 process of piled fibres or by extrusion of endless filament fibres being tangled together by means of a needle technique, by chemical joining with latex types such as SBR (styrene butadiene rubber), CSBR (carboxylated styrene butadiene rubber), PVA (polyvinyl acrylate
10 latexes), or acrylates and/or by means of fusible fibres, such as grilan PA.K 115, to a textile basic tissue.

As an example of a non-woven material, which may be used as an intermediate tissue in a first mat or carpet according to the invention, may be mentioned a
15 material of a gram-weight of 250 g per m², 1.96 mm thickness in free condition, 100% polyesterfilaments, a fibre thickness of 0.03 mm diameter corresponding to 8 decitex, 120 perforations per cm² by needle technique, a porosity after needle technique measured by water
20 passage of 50-90 l per second per m² at 10 cm H₂O-column, a melting temperature of 256°C, a plasticizing temperature of 237°C, shrinkage measured by the relaxation method of not more than 1.0% to 0.5% at 200°C measured on 1 m² loosely disposed in a hot cupboard for
25 10 minutes. The needle machine used for needling technique was an OSCAR DILO needle machine. The nap consisting of cotton tufts was fastened to the intermediate tissue by 4 to 9 (preferably 6) tufting stitches per cm² of the intermediate tissue after the tissue had been
30 tangled together by needle technique with 60 to 200 (preferably 120) needle stitches per cm², and the intermediate tissue with the nap was then vulcanized onto a rubber back in a press at 200°C.

In a second mat the intermediate tissue with the
35 nap was also vulcanized onto a rubber back which was perforated after the vulcanization with 1600 needle

stitches per m^2 by means of needles having a diameter of 2 mm, a stroke length of 7 mm and a needle point length of 2 mm. The perforation of the back may, however, also take place before and during the vulcanization.

By the first mat a 20% larger dewatering by centrifuging after mat washing and before final drying by hot air was found, as the water draw off was compared to that of a known mat with the same water absorption capacity and size. By the second mat a 10% shorter heat drying time was found compared to that of the first mat. These reductions are in addition to those achieved by the perforations through the backing.

If these mats are provided with the same nap quantity or weight per m^2 as the known mats, the present mats obtain a greater liquid absorption capacity, but nevertheless a shorter hot air drying time after centrifuging or pressing between pressing rollers. On the contrary, a smaller quantity of nap per m^2 may be used in the present mats than for prior known mats but still obtain the same liquid adsorption capacity and an even shorter hot air drying time.

In the intermediate tissue, it is also possible to use fibres oriented principally in the longitudinal direction of the mat. However, there must be some crosswise fibres in the intermediate tissue for securing the strength thereof in the transverse direction of the mat. By this orientation of the fibres the drying time of the mat may be further reduced.

A further use of the mat or the carpet having an intermediate tissue is to be mentioned, said use derives from the high absorption capacity, i.e. as liquid storage mat, e.g. for dust-binding impregnation liquid, or for disinfection liquid, e.g. for use at hospitals, schools, and public swimming pools.

As a generality, thermoplastic fibres chosen for the intermediate tissue should have a plasticizing point in the range of 105 to 240°C and a melting point in the range 110 to 260°C. The fibres should have a weight in the range 100 to 300 g per m² and a thickness in the range of 5 to 30 decitex (preferably 8 decitex), and the tissue a thickness in the range 1 to 5 mm (preferably 2 mm).

The intermediate tissue may be comprised of chemo fibres (as mentioned above), mineral wool fibres and/or metal fibres, all preferably having a lower adhesion co-efficient to water than wool and cotton fibres. Its porosity to water, after needling, may be in the range of 30 to 150 l per second per m² at 10 cm H₂O column.

If a tufting with synthetic fibres, such as nylon fibres, is used instead of cotton tufting, a further decrease of the drying time after the mechanical liquid expulsion may be achieved.

Moreover, with this kind of mat or carpet it is advantageous to have a high edge around the edge of the back on the nap side in order to prevent the liquid storage or absorbed liquid of the mat or carpet from passing the edge border of the back.

Reference is hereby directed to Divisional Application No. 84/20509.

Claims:

1. A washable, napped or tufted floor covering, having a rubber or plastics back which is water impermeable in normal use of the covering and to which the nap or tufts are fastened, wherein the back is formed with through perforations which are closed against the passage of liquid through the back in normal use of the covering but which open to permit the passage of liquid therethrough when the covering is subjected in the course of mechanical treatment to a pressure difference across the back or to mechanical forces.
2. A floor covering according to claim 1, wherein the perforations are formed by needles having a Y or a V cross-section.
3. A floor covering according to claim 1 or 2, further comprising a tissue of non-woven material covering the face side of the back and through which the nap or tufts are fastened to the back, the said tissue providing drain passages along which liquid can drain from central areas of the covering towards its edges.
4. A floor covering according to claim 3, in which the non-woven material is composed wholly or substantially of synthetic fibres having a weight of 100 to 300 (and preferably 250) g per m², a fibre thickness of 5-30 (and preferably 8) decitex, and the thickness of the tissue is 1 to 5 (and preferably 2) mm.
5. A floor covering according to claim 4, wherein the synthetic fibres comprise chemo fibres, mineral wool fibres and/or metal fibres, the fibres preferably consisting of a material having a lower adhesion co-



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efficient to water than wool and cotton fibres.

6. A floor covering according to claim 5, wherein the chemo fibres are thermoplastic materials having a plasticizing point of 105-240, preferably 237°C, a melting point of 110-260, preferably 256°C, and preferably chosen from the group comprising fibres of polyamide, polyester, polyacryl, polyvinyl chloride, polyurethane, and polypropylene.
7. A floor covering according to claim 4, 5 or 6, wherein the intermediate tissue is tangled together by means of a needle technique having 60-200, and preferably 120, needle stitches per cm².
8. A floor covering according to claim 4, 5 or 6, wherein the intermediate tissue is held together by a chemical joining, such as latex adhesives or fusible fibres.
9. A floor covering according to any of claims 3 to 8, wherein the nap or tufts is/are fastened to the intermediate tissue by tufting stitches at a density of 4 to 9, preferably 6, per cm².
10. A floor covering according to any one of claims 3 to 9, wherein the intermediate tissue has a porosity for water passage through the tissue of 30-150, preferably 50-90, l per second per m² at a pressure drop across the intermediate tissue of 10 cm H₂O-column.
11. A floor covering according to any one of



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claims 3 to 10, wherein the shrinkage of the synthetic fibres is 1% at the most, preferably 0.5% at the most, after the fibres having been subjected to an ambient temperature of 200°C for 10 minutes.

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The following corrections were allowed under Section 32 on
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Front page Heading (73) below Proprietor delete whole lines
insert Clean-Tex A/S (Denmark)
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