

- 1 -

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 liquid drain passages are provided in the region of the bases of the nap or tufts to facilitate displacement of
10 liquid at least during mechanical cleaning treatment of the covering from central areas of the covering towards its edges, the said liquid drain passages being provided by an intermediate tissue through which the nap is secured to the back material, and wherein the inter-
15 mediate tissue is a non-woven material wholly or mainly of synthetic fibres having a weight of 100-300 (preferably 250 g per m²), a fibre thickness of 5-30 (preferably 8 decitex), and a tissue thickness of 1-5 (preferably 2 mm).

20 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
25 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 hot air drying, drum drying or the like may be reduced. Thus the energy consumption by drying after washing of the mat or carpet is considerably reduced compared to known nap mats or carpets having the same water absorption capacity per m^2 . The intermediate tissue acts as a wick or a drain for liquid from the center or interior of the napside towards the edges of the mat, so that cavities containing liquid will be emptied via the intermediate tissue. Until now a reduction of at least 20% of the drying time after washing has been found compared to corresponding mats or carpets having the same water absorption capacity. During centrifuging or squeezing after washing, a 20-25% larger dewatering than in known nap mats or carpets has been found.

The synthetic fibres of the intermediate tissue may advantageously comprise chemo fibres, mineral wool fibres and/or metal fibres depending on the intended use of the mat or the carpet; and when the synthetic fibres consist of a material having a lower adhesive coefficient to water and a smaller cross section than wool and cotton fibres it is achieved that the intermediate tissue is provided with a large water adsorption capacity because of the large fibre surface per m^2 of the mat or carpet, as well as a good dewatering capacity by centrifuging or squeezing after washing of the mat or carpet.

Claim 3 defines some chemo fibres which have proved suitable for achieving the effect of the invention, particularly in mats or carpets by which fastening the nap and the intermediate tissue in the back takes place by means of thermal fusing or vulcanization. The chemo fibres may, of course, be other materials, whereby the

fastening of the intermediate tissue and the nap to the back is carried out by cold glueing.

The intermediate tissue as further defined in claim 4 is provided with an appropriate porosity, liquid
5 absorption capacity and liquid draining effect to the mat edges and simultaneously it permits the use of relatively small forces to the tufting needles by positioning the tufts of the nap in the intermediate tissue. However, the intermediate tissue may also be held
10 together by chemical joining, such as by means of latex adhesives or fusible fibres.

The floor coverings of the invention are particularly suitable for use as mats or carpets of the washable type which e.g. are used as liquid and/or dust
15 absorbing mats or carpets for laying out on areas where many people walk. The intermediate tissue is used as a basic tissue in tufted mats or carpets wherein the nap may be made of yarns of synthetic, animal, or vegetable origin. The intermediate tissue may be manufactured of
20 synthetic fibres, such as PA, PE, PVC, PU, or fibre mixture combinations with synthetic fibres forming part thereof. The intermediate tissue may be manufactured by a carding process of piled fibres or by extrusion of endless filament fibres being tangled together by means
25 of a needle technique, by chemical joining with latex types such as SBR (styrene butadiene rubber), CSBR (carboxylated styrene butadiene rubber), PVA (polyvinyl acrylate latexes), or acrylates and/or by means of fusible fibres, such as grilan PA.K 115, to a textile
30 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 material of a gram-weight of 250 g per m^2 , 1.96 mm
35 thickness in free condition, 100% polyesterfilaments, a

fibre thickness of 0.03 mm diameter corresponding to 8 decitex, 120 perforations per cm^2 by needle technique, a porosity after needle technique measured by water passage of 50-90 l per second per m^2 at 10 cm H_2O -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 m^2 loosely disposed in a hot cupboard for 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 cm^2 of the intermediate tissue after the tissue had been tangled together by needle technique with 60 to 200 (preferably 120) needle stitches per cm^2 , 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 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.

If a mat according to the invention is provided with the same nap quantity or weight per m^2 as the known mats, the mat according to the invention obtains 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 mat according to the invention than for prior known mats but still it obtains the same liquid absorption capacity and even a still shorter hot air drying time.

5 In the intermediate tissue of the mat according to the invention it is also possible to use fibres being 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
10 the transverse direction of the mat. By this orientation of the fibres the drying time of the mat may be further reduced.

As a generality, thermoplastic fibres chosen for the intermediate tissue should have a plasticizing point
15 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 m^2 , and the tissue a thickness in the range 1 to 5 mm (preferably 2 mm.)

The intermediate tissue may be comprised of chemo
20 fibres (as mentioned above), mineral wool fibres and/or metal fibres, all preferably having a lower adhesion coefficient 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 m^2 at 10 cm H_2O column.

25 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,
30 and public swimming pools.

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 Patent Application 8211133 out of which the present Application has been divided.

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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 liquid drain passages are provided in the region of the bases of the nap or tufts to facilitate displacement of liquid at least during mechanical cleaning treatment of the covering from central areas of the covering towards its edges, the said liquid drain passages being provided by an intermediate tissue through which the nap is secured to the back material, and wherein the intermediate tissue is a non-woven material wholly or mainly of synthetic fibres having a weight of 100-300 (preferably 250 g per m²), a fibre thickness of 5-30 (preferably 8 decitex), and a tissue thickness of 1-5 (preferably 2 mm).

2. A floor covering according to claim 1, 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 coefficient to water than wool and cotton fibres and having a smaller cross section than said wool or cotton fibres.

3. A floor covering according to claim 2, 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.

4. A floor covering according to claim 1, 2 or 3, wherein the intermediate tissue is tangled together by



8

means of a needle technique having 60-200, and preferably 120, needle stitches per cm^2 .

5. A floor covering according to claim 1, 2 or 3, wherein the intermediate tissue is held together by a chemical joining, such as latex adhesives or fusible fibres.

6. A floor covering according to any preceding claim, 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 cm^2 .

7. A floor covering according to any preceding claim, wherein the intermediate tissue has a porosity for water passage right through the tissue of 30-150, preferably 50-90, 1 per second per m^2 at a pressure drop across the intermediate tissue of 10 cm H_2O -column.

8. A floor covering according to any preceding claim, 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.

