ABSTRACT

The present invention relates to a method for producing a velour rug, comprising the following steps: a) needling of a nonwoven/mali nonwoven on a bristle strip using a needling machine, in the process of which a pile nonwoven/carrier nonwoven is pulled into and partially back out of the bristle strip such that the fibers of the pile nonwoven/carrier nonwoven are located in the plane of the bristle strip, b) separating the nonwoven from the bristle strip by means of a roller brush, c) brushing the pile side prior to cutting the loops, characterized in that, in order to increase the fiber density and enhance the pile stability, an additional nonwoven/mali nonwoven, especially a pile nonwoven/carrier nonwoven, is placed onto the reverse of the nonwoven/mali nonwoven, especially between a first and second needling unit, between steps a) and b).
Magnification of the fibrillated fine hair bristles

Segment section of the roller brush

Fig. 5

Support and velour layer

Variant 2

Fig. 6
VELOUR CARPET WITH TUFTING-LIKE SURFACE

[0001] The present invention relates to a process for preparing a velour carpet that has advantageous properties over velour carpets of the prior art.

[0002] The term “tufting” refers to a technology for the production of three-dimensional textile sheets, it is the process most frequently employed worldwide for preparing carpets.

[0003] Tufting works on the principle of a sewing machine. Needles insert the so-called pile yarn into a base material (woven or non-woven fabric), the so-called primary backing or support.

[0004] The needles stitch through the base material; before the needles are running back again, the inserted pile yarn is held by loopers. This produces loops (pile knots) on the top side of the tufting fabric.

[0005] In this way, a so-called loop-pile carpet is obtained. If the loops are cut open with a knife, a velour carpet (cut-pile carpet) is formed. Frequently, the knife is already attached to the looper, so that the holding and cutting of the pile is done in one operation.

[0006] In order to hold the stitched pile yarn tight, a secondary bucking or latex layer must be applied. This process is referred to as lamination or integration.

[0007] In addition, a “simpler” method is known in the prior art, which produces similar carpets without a pile yarn inserted into the primary backing from outside. For velour forming, needles stitch through a fibrous web/Malifleece and draw fiber loops between the bristles of a brush belt lying under the fibrous web/Malifleece. The fibers carried along by the up and down movement of the needles are crossed and thereby bonded together. The needles employed may be needles having small bars on their sides, so-called crown needles, or needles having fork-like ends, so-called fork needles.

[0008] After the needleling process, the velour is separated from the running brush belt by a pair of rollers. The degree of densification is determined by the number of stitches per unit area, the penetration depth of the needles into the fibrous web/Malifleece and the fiber count.

[0009] When dual-layer coats (velour+wear layer) are prepared, the fabric is turned over after the first needle zone and needleed with the wear layer in the second needleling zone. This is followed by backside bonding of the fibers by means of a binder based on synthetic rubber or acrylate by different application methods. For latex-free integrations, binding fibers or thermoplastic dispersions are employed. In this case, the fiber linear densities are between 6.7 and 17 dtex.

[0010] As described above in the just mentioned “simpler” method, no additional pile yarn is inserted from outside into the substrate web, especially Malifleece, i.e., the primary backing. In this case, the shape of a velour carpet is obtained due to the fact that the needles carry individual fibers from the fibrous web, especially Malifleece, into the brush belt.

[0011] Although this process yields velour carpets similar to those prepared by the tufting method, the former have a somewhat worse property profile as compared to the latter. Namely, tufting velour carpets usually have a higher fiber density. A high fiber density is in turn considered an important quality feature of such velour carpets, because it results among others in better cleaning properties, an increased resistance against pressure load and a better abrasion resistance.

[0012] Therefore, it is an object of the present invention to improve the processes of the prior art, especially the “simpler” process as set forth above, for preparing velour carpets in such terms that a velour carpet having a higher fiber density than has been possible by the previously known prior art processes can be prepared.

[0013] In a first embodiment, the object of the invention is achieved by a process for preparing a velour carpet, comprising the following steps:

[0014] a) needleling a web/Malifleece on a brush belt using a needleling machine, a pile/support web being drawn into the brush belt and partially back again, so, that the fibers of the pile/support web are in the plane of the brush belt;

[0015] b) separating the web from the brush belt by means of a roller brush;

[0016] c) brushing up the pile side before the loops are cut open;

[0017] characterized in that a further web/Malifleece, especially a pile/support web, is applied to the back side of the web/Malifleece between steps a) and b), especially between a first and a second needleling unit, to increase the fiber density and enhance the pile stability.

[0018] In the following, the various variants of the process according to the invention are further illustrated:

Reference variant 1:

[0019] On the one hand, step a) is to be understood in such terms that the pile/support web can be inserted into the brush belt (in accordance with the tufting method). However, alternatively and/or cumulatively, the fibers of the web/Malifleece may also represent the pile layer; thus, no separate pile yarn is introduced from outside in this case, but the fibers are drawn along with the needles into the brush belt (in accordance with the above described “simpler” method without a pile yarn).

[0020] After the needleling, the web/Malifleece is separated from the brush belt not only in step b). In addition, additional fibers are eliminated from the web by means of brushes in step c). This achieves a defined fiber standing condition, and the web retains its support layer. Thus, for equal weights, the fiber density is 1.5 times to twice as high as with standard velour carpets. The use of binding fibers further enhances the fiber density.

[0021] In particular, it is advantageous in the above described process if steps b) and c) are performed simultaneously. All in all, this corresponds to the saving of a process step and is thus particularly favorable under aspects of process economy.

[0022] Further, it is preferred that the back side of the web is sprayed with water and/or a commercially available dispersion or bonded only by the use of binding fibers, and dried, especially without tension. This fixes the standing condition of the fibers, and the fiber density is again increased. At the same time, the fibers are integrated.

[0023] Further, it is preferred that the pile side of the web/Malifleece is brushed against the grain after step c) for erect-
ing the fibers, and protruding fibers are shorn off. This again additionally fixes the standing condition of the fibers, and the surface of the velour carpet is clearly smoothed, which is important, in particular, for those applications in which the pile side is the visible side of the velour carpet.

[0024] Preferably, a web/Malfilbeece and/or a pile yarn is employed that comprises fibers of polypropylene (PP), polyester (PES), polyamide (PA) or mixtures thereof.

[0025] Depending on the application, the respective advantage of the fibers and/or fiber mixtures resides in the price, light fastness and abrasion resistance.

[0026] Further, a web/Malfilbeece and/or a pile/support web whose fibers have a yarn count within a range of from 3.3 to 11 dtex is preferably employed.

[0027] The respective advantage resides in the higher density for the same weights of fiber employed, the improved cleaning ability and an increase of the abrasion resistance.

[0028] In particular, it is preferred that a densified pile/support web is employed as the web/Malfilbeece, especially a web with a longitudinal/transversal strength ratio of 1.0/1.2 to 1.4.

[0029] It serves for a higher fiber transport during the needling process, and for better elongation properties in the deforming process.

Variant 2 according to the invention:

[0030] To increase the fiber density and enhance the pile stability, it is preferred that a further web/Malfilbeece, especially a pile/support web, is applied to the back side of the web/Malfilbeece before step a or between steps a) and b).

[0031] The use of such an additional pile/support web ultimately results in a fiber density that is about 2 to 3 times higher than that of standard velour carpets. The additional increase of the pile density and the use of the Malfilbeece causes an improved, i.e., reduced, abrasion, an increased resistance against pressure load and an increased cleaning ability.

[0032] The process according to the invention will be explained illustratively by means of FIGS. 1 to 6.

[0033] In FIG. 1, the pile/support web 1 lying on the brush belt 3 is at first needled and thereby densified. A plurality of needles are attached to the needle beam 2. After this step, the needled web/Malfilbeece is separated from the brush belt by roller brushes 4, which corresponds to a simultaneous performance of steps b) and c).

[0034] In FIG. 2, it is shown according to the invention how the pile/support web 1, which is at first non-densified and lying on the brush belt 3, is first densified using the needle beam 2 and then needled onto the additional pile/support web 9. The simultaneous performance of steps c) and d) is effected by the roller brushes 4 in this case too.

[0035] FIG. 3 shows the spraying of the back side of the web with water and/or a dispersion by means of spray bar 5 or only use of binding fibers, followed by drying (without tension) via suspension loop 6, wherein the standing condition of the fibers is fixed, the fiber density is again increased, and a simultaneous integration of the fibers takes place.

[0036] FIG. 4 shows a process step that usually follows the drying, in which the fixed fibers are erected at first against the grain using the further brush 7. Subsequently, the web/Malfilbeece is passed over a shearing table, and fiber loops are shorn off using a shearing cylinder 8.

[0037] FIG. 5 shows an embodiment of the roller brushes 4.

[0038] FIG. 6 shows the velour carpet obtained by the process according to the invention schematically represented as 10 and again represented in a macro photograph 11.

REFERENCE SYMBOLS

[0039] 1 (Pile/support) web/Malfilbeece
[0040] 2 Needle beam
[0041] 3 Brush belt
[0042] 4 Roller brushes
[0043] 5 Spray bar
[0044] 6 Suspension loop
[0045] 7 Brush
[0046] 8 Shearing table with shearing cylinder
[0047] 9 Additional pile/support web
[0048] 10 Principle drawing
[0049] 11 Macro photograph

EXAMPLES

[0050] Two different velour carpet materials (referred to as variant I and variant II in the following) were prepared using an additional pile/support web 9 as shown in FIG. 2 were prepared by the above described process.

[0051] The following Table I compares the obtained velour carpet materials variant I and variant II with other materials of the prior art (tuft velour BCF and velour standard).

[0052] The arrows represent a comparison of the materials according to the invention with those of the prior art. Their meanings are (respectively based on similar pile weights):

<table>
<thead>
<tr>
<th>Fiber standing condition</th>
<th>Abrasion</th>
<th>Cleaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>satisfactory ↔ satisfactory</td>
<td>satisfactory ↔ satisfactory</td>
<td>satisfactory ↔ satisfactory</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pile</td>
</tr>
<tr>
<td>Fine fibers</td>
</tr>
<tr>
<td>Pile weight</td>
</tr>
<tr>
<td>Support</td>
</tr>
<tr>
<td>Shorn</td>
</tr>
<tr>
<td>Total weight</td>
</tr>
<tr>
<td>Fiber density</td>
</tr>
<tr>
<td>Fiber standing condition</td>
</tr>
<tr>
<td>Abrasion</td>
</tr>
<tr>
<td>Cleaning</td>
</tr>
</tbody>
</table>

As can be seen from this Table, the velour carpet materials prepared by the process according to the invention all have more favorable properties as compared to the materials of the prior art.
TABLE 1-continued

<table>
<thead>
<tr>
<th>Pile</th>
<th>Variant I</th>
<th>Variant II</th>
<th>Tuft Velour BCF</th>
<th>Variant I</th>
<th>Variant II</th>
<th>Velour Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of drawing</td>
<td>good</td>
<td>excellent</td>
<td>low</td>
<td>good</td>
<td>excellent</td>
<td>good</td>
</tr>
<tr>
<td>Streak formation</td>
<td>low</td>
<td>low</td>
<td>high</td>
<td>low</td>
<td>low</td>
<td>low</td>
</tr>
<tr>
<td>Price</td>
<td>low</td>
<td>average</td>
<td>high</td>
<td>low</td>
<td>low</td>
<td>high</td>
</tr>
</tbody>
</table>

1-8. (canceled)

12. A process for preparing a velour carpet, comprising the following steps:
   a) needling a web/Malifleece on a brush belt using a needling machine, a pile/support web being drawn into the brush belt and partially back again, so that the fibers of the pile/support web are in the plane of the brush belt;
   b) separating the web from the brush belt by means of a roller brush;
   c) brushing up the pile side before the loops are cut open; characterized in that a further web/Malifleece, including a pile/support web, is applied to the back side of the web/Malifleece between steps a) and b), to increase the fiber density and enhance the pile stability.

13. The process according to claim 12, characterized in that steps b) and c) are performed simultaneously.

14. The process according to claim 12, characterized in that the back side of the web/Malifleece is sprayed with water and dried and integrated after step c).

15. The process according to claims 12, characterized in that the pile side of the web is brushed against the grain after step c) for erecting the fibers, and protruding fibers are shorn off.

16. The process according to claim 12, characterized in that a web/Malifleece including a pile/support web comprising fibers of PP, PES, PA or mixtures thereof is employed.

17. The process according to claim 12, characterized in that a web/Malifleece including a pile yarn whose fibers have a yarn count within a range of from 3.3 to 11 dtex is employed.

18. The process according to claim 12, characterized in that a densified pile/support web, including a web/Malifleece with a longitudinal/transversal strength ratio of 1.0/1.2-1.4, is employed as the web/Malifleece.

19. The process according to claim 12, characterized in that a further web/Malifleece, including a pile/support web, is applied to the side of the web/Malifleece facing away from the brush belt between steps a) and b).

20. The process according to claim 12, characterized in that applying the web/Malifleece occurs between a 1st and 2nd needling unit.

21. The process according to claim 19, characterized in that applying the web/Malifleece occurs between a 1st and 2nd needling unit.

22. The process according to claim 14, wherein when the web/Malifleece is dried, it is dried without tension.

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