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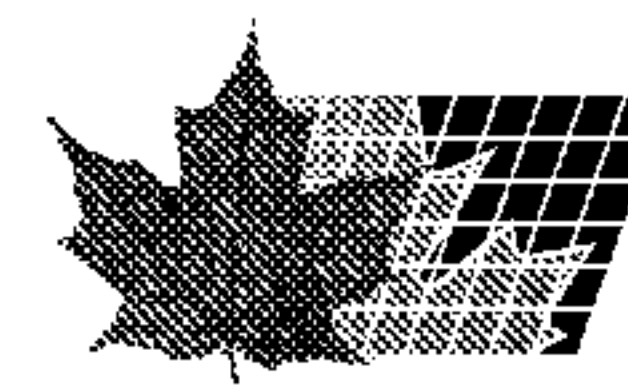
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(54) Titre : TORCHON DE NETTOYAGE

(54) Title: CLEANING CLOTH

(57) **Abrégé/Abstract:**

The invention relates to a cleaning cloth consisting of a micro-fiber fleece with a basis weight of 30 to 500 g/m², wherein the fleece is made of melt spun, stretched multicomponent endless filaments immediately deposited as a fleece web and having a titer of 1.5 to 5 dtex, and the multicomponent endless filaments are, optionally after a pre-solidification, split into 80% endless micro-filaments with a titer of 0.05 to 1 dtex and solidified. The cleaning cloth can be manufactured in an economic manner in a wide range of basis weights for a wide range of applications.



Abstract

The invention relates to a cleaning cloth consisting of a micro-fiber fleece with a basis weight of 30 to 500 g/m², wherein the fleece is made of melt spun, stretched multicomponent endless filaments immediately deposited as a fleece web and having a titer of 1.5 to 5 dtex, and the multicomponent endless filaments are, optionally after a pre-solidification, split into 80 % endless micro-filaments with a titer of 0.05 to 1 dtex and solidified. The cleaning cloth can be manufactured in an economic manner in a wide range of basis weights for a wide range of applications.

Cleaning cloth

Field of the Invention

The invention relates to a cleaning cloth, consisting of a microfiber fleece with basis weights of 30 to 500 g/m².

Background of the Invention

Cleaning cloths of fleece materials are known from reference US-A 4,298,649, which discloses a cloth consisting of at least two layers of micro-filaments with different mean filament diameters. Mutually compatible polymers which can be thermally bonded are thereby used as the polymeric starting materials for the two layers and are pattern bonded by way of a thermal calendaring process which provides for cohesion of the layers.

Summary of the Invention

It is an object of the invention to provide a cleaning cloth as well as a process for its manufacture, which cloth can be manufactured in an economic manner in a wide range of basis weights.

In accordance with the invention, this object is achieved with a cleaning cloth which consists of a microfiber fleece having a basis weight in the range of 30 to 500g/m², whereby the fleece material is made of melt spun, stretched multi-component endless filaments immediately deposited into a fleece web and having a titer of 1.5 to 5 dtex, whereby the multi-component endless filaments are, optionally after a pre-solidification, split into at least 80% endless micro-filaments having a titer of 0.05 to 1.0 dtex, and compressed. Such a cleaning cloth has a surface structure which is easily penetrated by dust and fiber particles and can easily capture such dust and particles. It is therefore suitable as a cleaning cloth.

The multicomponent endless filaments are preferably bicomponent endless filaments made of two incompatible polymers, especially a polyester and a polyamide. Such a bicomponent endless filament can be easily split into endless micro-filaments and results in a favorable ratio of strength to basis weight.

The cleaning cloth preferably includes multi-component endless filaments of a cross-section with an orange type multi-segment structure or a "pie" multi-segment structure, whereby segments including one of the two incompatible polymers are respectively alternated. Besides this orange type multi-segment structure of the multi-component endless filaments a side-by-side (s/s) positioning of the incompatible polymers is possible in the multi-component endless filaments in the form of one or more stripes. This is preferably used for the production of crimped filaments. Such arrangements of the incompatible polymers in the multi-component endless filament have been found to split easily.

Furthermore, the cleaning cloth is preferably one wherein at least one of the incompatible polymers forming the multicomponent endless filament includes additives, such as color pigments, permanently active anti-statics, fungicides, bactericides, acaricides, and/or additives influencing the hydrophobic or hydrophilic properties in amounts of up to 10 % by weight. The cleaning cloth consisting of spun colored fibers has a very good wash fade resistance. Furthermore, static charging can be prevented or reduced with these additives and the humidity and transport properties improved.

The process in accordance with the invention for producing a cleaning cloth includes the steps of spinning multi-component endless filaments from a melt, stretching the filaments and immediately thereafter depositing the filaments into a fleece, which fleece is optionally pre-solidified, and exposing the fleece to a high-pressure fluid jet treatment for solidifying the fleece and simultaneously splitting the filaments into endless micro-filaments of a titer of 0.05 to 1 dtex. The cleaning cloth so obtained is very even with regards to its thickness, has an isotropic thread or fiber distribution, has no tendency to delamination and is characterized by higher modulus values than are achievable with comparable staple fiber fleece materials.

In a preferred embodiment of the process in accordance with the invention, a pre-solidified fleece web is impacted at least once on each side with the high-pressure water jets for bonding the web and splitting the multicomponent endless filaments. The resulting cleaning cloth then exhibits a good surface homogeneity and a degree of splitting of the micro-component endless filaments of more than 80 %.

A process is especially preferred where the multicomponent endless filaments are spun colored. The embedding of the pigments into the polymeric fibers leads to excellent color fastness.

Preferred cleaning cloths in accordance with the invention and adapted for use as multipurpose and/or dish cloths have basis weights of 40 to 240 g/m² and are optionally roughened, sanded, brushed or point calendared.

Preferred cleaning cloths in accordance with the invention and adapted for use as sanitary cleaning cloths have basis weights of 40 to 140 g/m² and are optionally are printed.

Preferred cleaning cloths in accordance with the invention and adapted for use as window and/or glass cloths have basis weights of 80 to 200 g/m² and are optionally laminated, embossed and/or printed.

Preferred cleaning cloths in accordance with the invention and adapted for use as building cleaning cloths have basis weights of 100 to 250 g/m² and are optionally embossed and impregnated with a cleaning agent.

Preferred cleaning cloths in accordance with the invention and adapted for use as dust cloths have basis weights of 100 to 280 g/m² and are optionally roughened, sanded, brushed and/or printed.

Preferred cleaning cloths in accordance with the invention and adapted for use as floor cloths have basis weights of 140 to 500 g/m² and are optionally roughened, sanded, brushed and/or printed.

The cleaning cloth in accordance with invention is further characterized by a good water absorption rate, a short drying period and low cleaning agent consumption. This results in good washing, hygiene and care properties as well as a suitability as cleaning cloth, since, due to the fast drying of the cloth, microbes are deprived of the water necessary for development, thereby reducing the possibility of colonization of the cloth with bacteria and/or fungi.

The cleaning cloth in accordance with the invention is preferably impregnated with a cleaning and/or care agent. Ionic or nonionic surfactants are used as cleaning agents, for example, sodium sulfosuccinates or the corresponding dioctylesters in amounts of 0.1 to 1 % by weight. Especially wax or paraffinic oil containing agents

can be used as care agents. The preimpregnation is intended especially for professional cleaning applications in order to save time, since the continuous refreshing with cleaning agent is obviated. In addition, undesired incorrect dosages are thereby also substantially prevented.

The cleaning cloth in accordance with invention preferably can be repeatedly washed in boiling water (95°C). The service life of the cleaning cloth is thereby increased under hygienically unobjectionable conditions and the usability in the professional cleaning field is simplified by permitting machine washing of the used cleaning cloths as well as optionally by a preimpregnation with cleaning and/or care agents.

Detailed Description of the Preferred Embodiment

Example 1

A filament web having a basis weight of 130 g/m² was produced from polyester-polyamide (PES-PA) bicomponent endless filaments and on both sides subjected to water jet needling at pressures of 250 bar. After the water jet needling, which lead to a simultaneous splitting of the starting filaments, the bicomponent endless filaments had a titer of 0.1 dtex. A maximum tension strength of 450 N in longitudinal direction and 340 N in transverse direction was measured for this microfiber cleaning cloth. The modulus values at 10% stretch were 142 N in longitudinal direction and 55 N in transverse direction. The additional tear strength in machine direction was 15 N and 18 N transverse thereto.

Example 2

A filament web having a basis weight of 105 g/m² was produced from a polyester-polyamide (PES-PA) bicomponent endless filament and on both sides subjected to water jet needling at pressures of 250 bar. After the water jet needling, which lead to a simultaneous splitting of the starting filaments, the bicomponent endless filaments had a titer of 0.1 dtex. A maximum tension resistance of 336 N in longitudinal direction and 279 N in transverse direction was measured for this microfiber cleaning cloth. The modulus values at 10 % stretch were 93 N in

longitudinal direction and 31 N in transverse direction.

Table 1 shows a comparison of the mechanical values of the exemplary cloths in accordance with the invention with those of two cleaning cloths of staple fiber fleeces.

The maximum tension strength in longitudinal direction of the cleaning cloth in accordance with the invention is about 38% higher than that of the staple fiber fleece used for comparison, which had a basis weight of 155 g/m² and about 55% higher than in a staple fiber fleece with a basis weight of 80 g/m². The cleaning cloth in accordance with the invention clearly shows higher modulus values and achieves about the same tear strength values despite its lower basis weight.

Table 1

	Example 1 about 130g/m ²	Example 2 about 105g/m ²	Staple fiber fleece about 155g/m ²	Staple fiber fleece about 90g/m ²
Tear strength (longitudinal)	450 N	336 N	325 N	289 N
Tear strength (transverse)	340 N	279 N	323 N	177 N
Stretch (longitudinal)	49%	50%	45%	49%
Stretch (transverse)	53%	51%	66%	57%
Modulus 10% (longitudinal)	142 N	93 N	67 N	37 N
Modulus 10% (transverse)	55 N	31 N	17 N	10 N
Additional tear strength (longitudinal)	15 N	-	17 N	7 N
Additional tear strength (transverse)	18 N	-	17 N	11 N

Thus, it is apparent that there has been provided, in accordance with the invention, a

cleaning cloth that fully satisfies the objects, aims and advantages set forth above.

While the invention has been described in conjunction with specific embodiments thereof, it is evident that many alternatives, modifications, and variations will be apparent to those skilled in the art in light of the foregoing description. Accordingly, it is intended to embrace all such alternatives, modifications and variations as fall within the spirit and broad scope of the appended claims.

CLAIMS:

1. A cleaning cloth, comprising a microfiber fleece having a basis weight in the range of 30 to 500 g/m², the fleece being made of melt spun, stretched multicomponent endless filaments which have been immediately deposited after spinning in the form of a fleece web and have a titer of 1.5 to 5 dtex, and the multicomponent endless filaments in the fleece having been split into at least 80% endless micro-filaments having a titer of 0.05 to 1 dtex and solidified, the fleece being solidified by high-pressure fluid jets and the cleaning cloth being able to withstand repeated washing in boiling water (95°C).
2. The cleaning cloth according to claim 1, wherein the fleece web is pre-solidified prior to splitting of the filaments.
3. The cleaning cloth according to claim 1 or 2, wherein the fleece is made of melt spun, aerodynamically stretched multicomponent endless filaments having a titer of 2 to 3 dtex, and the multicomponent endless filaments are split into at least 80% endless micro-filaments with a titer of 0.1 to 0.5 dtex and solidified.
4. The cleaning cloth according to any one of claims 1 to 3, wherein the multicomponent endless filaments are bicomponent endless filaments made of two incompatible polymers.
5. The cleaning cloth according to claim 4, wherein the incompatible polymers are a polyester and a polyamide respectively.
6. The cleaning cloth according to any one of claims 1 to 5, wherein the multicomponent endless filaments have at least one of a cross-section of an orange type multi-segment structure and a side-by-side structure with two or more stripes, the segments alternately respectively including one of the two incompatible polymers.
7. The cleaning cloth according to claim 6, wherein the cleaning cloth has two surfaces, each having filaments with a different segment structure.

8. The cleaning cloth according to any one of claims 1 to 7, wherein at least one of the incompatible polymers forming the multicomponent endless filaments includes at least one additive, selected from the group of color pigments, permanently active antistatics, fungicides, bactericides, acaricides and additives influencing the hydrophilic or hydrophobic properties, the additive being present in an amount of up to 10% by weight.
9. A process for the manufacture of a cleaning cloth according to any one of claims 1 to 8, wherein the multicomponent endless filaments are spun from a melt, stretched and immediately thereafter deposited as a fleece web, and the fleece is subjected to high-pressure fluid jet treatment for solidifying the web and simultaneously splitting the filaments into endless micro-filaments having a titer of 0.05 to 1 dtex.
10. The process according to claim 9, wherein the fleece web is pre-solidified prior to the fluid jet treatment.
11. The process according to claim 9 or 10, wherein the steps of solidifying and splitting include the step of subjecting the fleece web at least once on each side to the high-pressure fluid jet treatment.
12. The process according to any one of claims 8 to 11, wherein the multicomponent endless filaments are colored by spun coloring.
13. The process according to any one of claims 8 to 12, wherein two spin bars are used, one of which produces multicomponent endless filaments with a "pie" segment structure and the other one produces multicomponent endless filaments with a "side-by-side" segment structure with at least two stripes.
14. The cleaning cloth according to any one of claim 1 to 8, having a basis weight of 40 to 240 g/m² for use as one of an all-purpose cloth and a dish cloth.
15. The cleaning cloth according to claim 14, further subjected to at least one of roughening, sanding, brushing and point calendaring.

16. The cleaning cloth according to any one of claims 1 to 8, having a basis weight of 40 to 140 g/m² for use as a sanitary cleaning cloth.
17. The cleaning cloth according to claim 16, further subjected to printing.
18. The cleaning cloth according to any one of claims 1 to 8, having a basis weight of 80 to 200 g/m² for use as one of a window and glass cloth.
19. The cleaning cloth according to claim 18, further subjected to at least one of laminating, embossing and printing.
20. The cleaning cloth according to any one of claims 1 to 8, having a basis weight of 100 to 250 g/m² for use as a building cleaning cloth.
21. The cleaning cloth according to claim 20, further subjected to at least one of embossing and preimpregnating with a cleaning agent.
22. The cleaning cloth according to any one of claims 1 to 8, having a basis weight of 100 to 280 g/m² for use as a dust cloth.
23. The cleaning cloth according to claim 22, further subjected to at least one of roughening, sanding, brushing and printing.
24. The cleaning cloth according to any one of claims 1 to 8, having a basis weight of 140 to 500 g/m² for use as a floor cloth.
25. The cleaning cloth according to claim 24, further subjected to at least one of roughening, sanding, brushing and printing.
26. The cleaning cloth according to any one of claims 1 to 8 and 14 to 25, impregnated with at least one of a cleaning agent and a care agent.

27. The cleaning cloth according to any one of claims 1 to 8 and 14 to 26, wherein the filaments have an isotrope fiber distribution.