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(71) Demandeur/Applicant:
MILLIKEN & COMPANY, US

(72) Inventeurs/Inventors:
USHER, CHRISTOPHER TODD, US;
KIMBRELL, WILLIAM CARL, US

(74) Agent: GOWLING LAFLEUR HENDERSON LLP

(54) Titre : TISSU DE PROTECTION CONTRE LES FLUIDES RECOUVERT DE SILICONE

(54) Title: SILICONE COATED FLUID SHIELD FABRIC

(57) **Abrégé/Abstract:**

A fabric possessing both cleanability and fluid resistant properties is provided which can, if desired, be transfer printed. The fabric includes a textile substrate treated with a fluorochemical stain resist agent. The treated textile substrate is covered substantially on the back with a layer of coated silicone polymer. A process for forming the fluid shield fabric according to the present invention is also provided.



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(54) Title: SILICONE COATED FLUID SHIELD FABRIC (57) Abstract A fabric possessing both cleanability and fluid resistant properties is provided which can, if desired, be transfer printed. The fabric includes a textile substrate treated with a fluorochemical stain resist agent. The treated textile substrate is covered substantially on the back with a layer of coated silicone polymer. A process for forming the fluid shield fabric according to the present invention is also provided.		

Description**SILICONE COATED FLUID SHIELD FABRIC**

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Technical Field

This application is a continuation-in-part of our copending prior Application Serial No. 08/799,790 entitled FLUID SHIELD FABRIC having a filing date of February 12, 1997.

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The present invention relates to a fabric useful in upholstery applications and more particularly to a fabric having antimicrobial and stain resistant properties in combination with a fluid barrier coating suitable for transfer printing which does not adversely affect the tactile hand of the fabric. A method for forming such fabric is also provided.

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Background Art

Heretofore, a number of approaches have been taken to making fabrics both cleanable and liquid resistant so as to be more useful in environments where liquid staining is likely to occur. Vinyl coated fabrics have been most broadly accepted for these purposes due to relatively easy cleanability and fairly low cost. However, such vinyl coated fabrics are typically rather stiff to the touch and thereby lack the desired appearance and feel for use in environments such as restaurants, nursing homes, and the like where pleasing tactile and visual perceptions by the user are considered important. Surface laminated fabrics have been utilized to enhance the aesthetic characteristics of the fabrics, but due to the generally disjunctive adherence between

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the laminate film and the fabric itself, these products tend to peel, crack, and delaminate after long periods of use. Such laminated products also tend to lack the generally desirable feel of standard upholstery products. Adherence of a liquid barrier film or coating to a fabric substrate is made all the more difficult when fluorochemical stain-resist treatments are applied, since such compositions by their nature tend to repel an applied coating.

The present invention overcomes these seemingly contradictory requirements of fluorochemically based stain resistance in combination with a strongly adherent fluid barrier shield through proper selection of the base textile material in combination with the selection of coating materials and application processes so as to permit a very thin layer (preferably less than 2 oz/sq. yd.) of barrier material to be applied. Moreover, the actual material making up this barrier layer preferably possess dyeability and elastomeric properties which tend to conform substantially to those of the fabric substrate. The present invention thus represents a useful advancement over present practices.

Objects and Summary of the Invention

In light of the foregoing, it is a general object of the present invention to provide a fabric which possesses both stain resist and fluid barrier properties but which also exhibits a soft fabric hand as in traditional untreated upholstery fabrics where a soft fabric hand is understood to mean flexibility and/or lack of stiffness in the fabric itself.

It is a more particular object of the present invention to provide a fabric wherein a barrier coating of polymeric material is adhered in stable relation to a fluorochemically treated surface.

It is yet a more particular object of the present invention to provide a fluid shield
5 fabric useful in upholstery applications possessing a barrier coating of silicone polymer material in stable relation to a fluorochemically treated surface of a woven, knitted, or nonwoven fabric substrate.

Other objects, advantages and features of the present invention will, no doubt, occur to those skilled in the art upon reading of the following specification. Thus, while the
10 invention will be described and disclosed in connection with certain preferred embodiments and procedures, it is by no means intended to limit the invention to such specific embodiments and procedures. Rather, it is intended to cover all such alternative embodiments, procedures, and modifications thereto as may fall within the true spirit and scope of the invention as defined only by the appended claims and equivalents thereto.

15 A fluid shield fabric is provided which may be transfer printed. The fabric exhibits a good hand while maintaining intimate adhesion between the base fabric and the polymeric barrier material despite the use of an intermediate fluorochemical composition.

In the potentially preferred practice of the present invention, a fabric substrate is treated with a fluorochemical stain resist agent and thereafter coated substantially on the back
20 side (i.e. the surface which is not to undergo printing) with a layer of polymeric material so as to yield a final construction which exhibits both fluid and stain resistant properties.

The fabric substrate is preferably a woven material although it is contemplated that

tightly formed knitted materials and/or nonwovens as are known to those of skill in the art may likewise be used if desired. Such fabric substrates are preferably formed from polyester yarns although it is contemplated that other materials including, by way of example only and not limitation, cotton-polyester blends, nylon, and polypropylene may also be utilized.

5 In one particularly preferred embodiment, it has been found that the use of a calendering procedure to flatten the fabric on the side to be coated reduces the required amount of polymeric material to achieve the desired barrier properties when knife coating is used to apply the polymeric material across the woven fabric substrate. It has been further found that through the use of an appropriate silicone polymer that high degrees of flexibility
10 can be achieved without the occurrence of delamination. Coating materials which may be preferred include by way of example only, PDMS silicone compositions sold by Wacker Chemical in Adrian Michigan including a cross-linking agent and inhibitor as a two component kit under the trade designation LR3003-10A and B.

The use of a tightly woven fabric with albi yarn enhances adhesion between the fabric
15 substrate and the polymeric material. The polymeric material has such properties to allow heat transfer printing at temperatures ranging from 350°F to 450°F without damage to the polymeric coating. The invention may be further understood and illustrated through reference to the following non limiting example.

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SPECIFIC EXAMPLE 1

The following example describes the preparation of fabric according to the present invention intended for dye application.

A woven fabric having a weave density of about 68 ends per inch by 46 picks per inch was formed from two ply textured albi polyester yarn to yield a 100% plain weave polyester woven fabric. The fabric was scoured in a 180 - 200°F 7-8 pH bath. The fabric was thereafter padded to a pick-up of 50% on both sides with a solution containing about 1% - 5 40% (about 6.6% preferred) of a fluorochemical such as MILLIGUARD™ BK 96 a fluoroacrylate copolymer emulsion from Milliken Chemical in Spartanburg, South Carolina; about 0.5% - 5.0% (about 3.0% preferred) ULTRA-FRESH™ NM; about 0.05% - 1.0% (about 1.0% preferred) ULTRA-FRESH™ 40 available from Thompson Research; and 0.5%- 10 5.0% (3.0% preferred) of an anti-static such as Antistat 993, an ester salt from Sybron Chemical, in Welford, South Carolina.

While in the preferred practice, this solution will include both antimicrobial and anti-static components, it is to be understood and appreciated that one or more of these additional components may be eliminated if desired. Following the padding application of this preparation solution, the fabric is cured at a temperature of about 225°F to 425°F preferably 15 about 350°F for 60 seconds. The woven fabric substrate with applied fluorochemical stain resist agent is thereafter passed through a calendering operation so as to flatten at least one side of the fabric. The calendering operation is preferably carried out at a pressure of about 200N/mm with a calendering roll temperature of about 392°F.

In the preferred practice, a PDMS silicone composition is knife coated across the 20 calendered surface of the fabric thereby forming an effective barrier layer. Although the surface for application is preferably calendered it may also be uncalendered.

In the preferred practice, the total weight of the applied barrier layer is less than

about 2 oz/sq. yd., preferably less than 1.5 oz/sq. yd. and most preferably about 0.8 to 1.2 oz/sq. yd.

Following the coating procedure the fabric is then preferably passed through an oven to set the silicone barrier layer. This operation preferably takes place at a temperature of
5 about 390°F for a period of about 80 seconds.

It is contemplated that additional performance enhancing constituents may be incorporated within the polymeric materials which are coated onto the fabric substrate. These performance enhancing constituents may include, by way of example only and not limitation, antimicrobial compositions; flame retardants, antistats and/or ultraviolet stabilizing agents
10 such as are known to those of skill in the art.

In light of the above disclosure of potentially preferred embodiments and processes, it will be appreciated that the general principal of invention disclosed herein may be applied in a variety of ways. Therefore, it is contemplated by the appended claims to cover any such modifications and other embodiment as incorporate the features of this invention within the
15 broadest allowable scope thereof.

Claims

WHAT IS CLAIMED IS:

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1. A fluid shield fabric comprising:

a fabric substrate, a fluorochemical stain resist agent substantially covering said fabric substrate, and a layer of thermosetting silicone substantially covering said fabric substrate so as to provide a barrier layer against liquid passage.

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2. The invention as in Claim 1, wherein said fabric substrate is polyester.

3. The invention as in Claim 1, wherein said fabric substrate is nylon.

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4. The invention as in Claim 1, wherein said fabric substrate is polypropylene.

5. The invention as in Claim 1, wherein said fabric substrate is a woven fabric.

6. The invention as in Claim 1, wherein said fabric substrate is a knit fabric.

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7. The invention as in Claim 1, wherein said fabric substrate is a nonwoven fabric.

8. The invention as in Claim 1, wherein said fabric substrate comprises a smooth calendered surface.
9. The invention as in Claim 1, further including a flame retarding agent disposed across
5 said fabric substrate.
10. The invention as in Claim 1, further including an antimicrobial agent disposed across said fabric substrate.
- 10 11. The invention as in Claim 1, wherein said silicone includes a flame retarding agent disposed therein.
12. The invention as in Claim 1, wherein said silicone includes an ultraviolet stabilizing agent disposed therein.
- 15 13. The invention as in Claim 1, wherein said silicone includes an antimicrobial agent disposed therein.
14. The invention as in Claim 1, wherein said silicone includes an antistatic agent
20 disposed therein.
15. The invention as in Claim 1, wherein said silicone is present at a level of about 2

oz/sq. yd. or less.