

PATENT SPECIFICATION

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(54) TREATMENT OF WOVEN COTTON FABRIC AND A
 PROCESS FOR THE MANUFACTURE THEREOF

(71) We, WABASSO LIMITED, a company organized and existing under the laws of Canada, of 2055 Peel Street, Montreal, Quebec, Canada, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

- 10 This invention relates to a process for the treatment of woven cotton fabric either in the form of sheeting or articles made therefrom and to the cotton fabric produced thereby. In particular it is concerned with
 15 the treatment of woven cotton sheeting so that it has similar wash and wear characteristics to those of certain artificial fibres for example nylon and "Terylene", while retaining those characteristics which make
 20 cotton the material of choice in many cases. "Terylene" is a registered Trade Mark. Hence for example by the use of the process of this invention it is possible to make cotton pillowcases and bed sheets which do
 25 not require ironing and yet which retain that smooth and crisp appearance which is characteristic of freshly laundered cotton articles even after repeated machine washing and tumble drying.
- 30 Expressed in simple terms the present invention is a process which comprises treating cotton sheeting with a finish composed of a combination of synthetic resins in order to prevent the formation of permanent
 35 creases while retaining or improving the other properties of the cotton sheeting such as tear strength, abrasion resistance, fabric hand and shrinkage.

It has been known for many years as set
 40 out for example by Ellis in "The Chemistry of Synthetic Resins" Volume I, pages 639-640 published in 1935 that certain resins, particularly urea-formaldehyde resins, impart crease resistance to certain fibres, in [Price 5s. 0d. (25p)]

cluding cotton. It has also been disclosed
 by various workers that coatings of amino
 resins can have significant effect on other
 properties of fabrics such as shrinkage,
 draping, fabric hand, inflammability and
 water repellency. However while it has been
 possible by such methods to impart a certain
 measure of crease-resistance to cotton
 sheeting the resulting fabric has suffered a
 loss of break and tear strength and abra-
 sion resistance which is obviously undesirable.
 In addition many of the coatings produced
 by such treatments were brittle and un-
 pliable. Moreover in treating white
 cotton certain resins such as melamine-
 formaldehyde resins are unsuitable as the
 resin coating produced tends to yellow in
 use due to the fact that it absorbs chlorine
 from chlorine bleaches.

However it has now been found by the
 use of the process of the present invention
 that woven cotton sheeting and articles made
 therefrom may be treated to render them
 indefinitely crease-resistant, retain or im-
 prove their tear and abrasion resistance and
 pliability while overcoming all the disad-
 vantages of the prior art processes. As has
 already been indicated briefly above this
 desirable result has been achieved by treat-
 ing cotton sheeting or articles made there-
 from with a novel combination of resins.
 More particularly the present invention
 comprises treating the cotton sheeting or
 or articles made therefrom with a combi-
 nation of two materials which are polymer-
 ised by treatment with oxalic acid so as to
 provide the sheeting with a resinous finish.
 This process produces a crease-resistant
 cotton sheeting bearing within its fibrous
 structure a tough and pliable resinous com-
 position comprising an aldehyde-urea resin
 and an acid-stable acrylate resin formed by
 the polymerisation of the two materials
 used. One of these materials is a monomer

of an aldehyde-urea resin, which is slowly polymerised by treatment with oxalic acid to produce a tough and pliable polymer. The second material is a monomer or prepolymer of an acrylate resin which is acid stable when dispersed in water and produces a tough and pliable film on polymerisation.

It has been found that good results are produced using aldehyde-urea resins especially such resins produced by the acid polymerisation of dimethylol-aldehyde-urea monomers. In effecting the process of this invention specific monomers which give excellent results are dimethylolethylene urea, dimethylolpropylene urea and dimethylolglyoxal urea, especially the latter.

It has been previously stated in this specification that the second resin-producing material used in the process of this invention is a monomer or prepolymer of an acrylate resin. As the process of this invention is effected in an acid medium, preferably at a pH of 0.8 to 2.5, the dispersion of the monomer or prepolymer must be one that is stable to oxalic acid, i.e. it is not precipitated by oxalic acid. It has been found that by using as the monomer or prepolymer a plastics dispersion of the polyacrylate type with reactive groups good results are obtained. In particular it has been found that the plastics dispersion of the polyacrylate type with reactive groups sold by Badische Anilin & Soda-Fabrik AG (BASF) under the trade mark Perapret HVN gives excellent results in the process of this invention. Perapret HVN is described by BASF as being a white aqueous film-forming dispersion containing approximately 40% (calculated on a weight/volume basis) of the active substance. Perapret HVN is an aqueous emulsion containing 20 to 25% of a terpolymer of acrylic acid, butyl acrylate and N-methylolacrylic acid methylamide.

Hence according to the process of this invention and the mixture of the resin monomers (or monomer and prepolymer) is dissolved or dispersed in water and oxalic acid added and the cotton to be treated passed through the aqueous mixture. Obviously this particular process step is normally preceded and followed by one or more conventional steps and details of such steps will be given later in the disclosure of this specification.

The process of the present invention is effected as has been previously stated in acid medium preferably at a pH of 0.8 to 2.5 in order to polymerise the resin monomers. Best results are achieved by operating at a pH of 1.0 to 1.6.

While the process of the present invention may be performed without any additional catalyst it is preferred to impregnate the cotton sheeting with the resins in the presence of a swelling agent for the cotton

fibres. Ammonium salts are suitable swelling agents such as ammonium chloride, ammonium nitrate or ammonium sulphate, the chloride being particularly suitable.

Similarly although the use of a wetting agent is not essential it has been found that more complete impregnation of the cotton sheeting can be effected if one is used. Any suitable wetting agent may be used but it is preferred to use a non-ionic wetting agent such as that produced by the sulphonation of alkylphenol polyglycol ethers, alkylpolyalkylene ethers, and ethoxylated straight chain alcohols. However while the process of the present invention is equally useful for treating dyed, printed or white cotton sheeting, or articles prepared therefrom, the results are particularly pleasing in the case of white goods. When the process is used in the treatment of white cotton it is preferable to incorporate an optical brightening agent in the aqueous solution containing the resin-producing materials. Obviously such an optical brightener must be stable under the acidic conditions used and be compatible with both the acrylate dispersion and the wetting agent. In order to avoid difficulties of this type the wetting agent should be non-ionic in character. While the reaction conditions and amounts of materials used in the process of this invention may vary within wide limits they should be selected so as to produce the optimum desired result. Hence the aqueous impregnation solution or dispersion should preferably contain 10 to 20% (calculated on a weight/volume basis) of the amino resin monomer and 1.5 to 5% (calculated on a weight/volume basis) of the acrylate monomer or prepolymer the quantities of the two materials being so selected that the weight ratio of amino resin monomer to acrylate monomer or prepolymer is between 10:1 and 25:1 preferably 10:1. As previously stated in this specification the amount of acid used should be such that it produces an aqueous solution of the desired working pH. Hence the aqueous mixture will preferably contain about 5.5% (calculated on a weight/volume basis) of the acid. Again the amount of wetting agent used will depend on its nature but in the case of a non-ionic wetting agent will usually be about 0.3% (calculated on a weight/volume basis).

After impregnating the woven cotton sheeting with the mixture of resins as previously described it may then be submitted to a series of conventional steps. Hence in order to produce a finished product the impregnated cotton sheeting may be passed through the following steps:—

- 1) It is dried to a particular moisture content preferably so that 8 to 12% by weight of the resin remains in the

material. This may be effected by drying at a temperature of 230 to 250°F;

- 2) The cotton sheeting is set to width;
- 3) It is pressed and tightly rolled under tension with exclusion of air;
- 4) The rolled fabric is aged for a period of between 5 to 14 days preferably 7 days at a temperature of 70 to 80°F;
- 5) The cotton fabric is unrolled and thoroughly washed to remove any excess acid with neutralisation of any excess acid being made with a base such as caustic soda or ammonia if necessary; and
- 6) The cotton fabric is finally rolled and dried.

In the case of the treatment of dyed goods the process of this invention should be performed after the dyeing of the fabric.

The following example is provided to further illustrate the present invention. The percentage concentrations are calculated on a weight/volume basis.

EXAMPLE

An aqueous mixture was prepared from the following materials:—

- 300 lbs of a 50% aqueous solution of dimethylolglyoxal urea resin monomer
- 100 lbs ammonium chloride
- 25 lbs of PERAPRET HVN (40% aqueous dispersion)
- [A plastics dispersion of the polyacry-

ate type with reactive groups marketed by BASF]

- 55 lbs of oxalic acid
- 5 lbs of a 30% aqueous solution of a non-ionic wetting agent (a sulphonated alkyl aryl polyglycol ether)
- 20 lbs optical brightener (a stilbene derivative)

Water to 100 gallon total.

by dissolving the dimethylolglyoxal urea monomer in water, adding the oxalic acid and ammonium chloride to the solution followed by the Perapret HVN. The optical brightener is then added as an aqueous solution followed by the wetting agent to give a solution having a pH of about 1.0. Bleached cotton sheeting was passed through the resulting aqueous mixture at 60 to 70°F to give a liquid pick-up of about 65% by weight.

The impregnated cotton sheeting was then dried at 230 to 250°F until 9 to 11% by weight of the resin remained in the cotton. It was then tightly rolled under maximum tension so as to produce a warp elongation of 7% with the exclusion of air.

The resulting covered rolls were then stored for 7 to 14 days at normal temperature (70° to 80°F) to age.

The cotton fabric was then unrolled and thoroughly washed with cold water until the pH was about 5, and then completely neutralized with hot alkali (soda ash) wash water, and finished in a weak ammonia solution.

It is estimated that the finished fabric contains 8.0% to 9.0% by weight of permanently fixed resin.

The treated cotton was then compared with similar but untreated cotton and the results are listed in the following table.

	<i>Treated</i>	<i>Untreated</i>
Breaking	Warp—58 p.s.i.	Warp—71.6 p.s.i.
Strength	Weft—47.8 p.s.i.	Weft—57.8 p.s.i.
Tearing	Warp—1.93 lbs.	Warp—3.02 lbs.
Strength	Weft—1.67 lbs.	Weft—2.70 lbs.
Abrasion	141.6 cycles	65 cycles
(TABER)		
Shrinkage	Warp—1.5%	Warp—8.66%
(tumble-dry)	Weft—1.39%	Weft—1.6%
Crease Recovery	272.2°	Nil
(wet and dry)		
Wash and Wear	Class 4	Class 1
Evaluation		

The finish imparted to the cotton sheeting is permanent and of excellent wash fastness; the deterioration of the cotton fibres is very small, approximately 15% when shown as breaking strengths.

To summarize the results produced by the process just described will give cotton sheeting and cotton pillow fabric that will resist wrinkles when wet and dry, will dry up after

wetting (washing) to remain smooth and will not require ironing. Such cotton sheeting and pillow cotton will have the following properties:—

- 1) A dry crease angle of 260-280° and a wet crease angle of 260-280° (as measured in the Monsanto Test);

- 2) It is a permanent dry and wet wrinkle free fabric having a No. 4 rating in the AATCC Test for fabric evaluation after 20 washings;
- 3) Better abrasion resistance than any treated cotton sheeting and pillow cotton;
- 4) Satisfactory tear strength (as shown by results in the Elmendorf Method);
- 5) They are stabilized fabrics having a shrinkage of less than 2% both warp and weft after 20 washings followed by tumble drying; and
- 6) They can be washed by normal laundry methods and tumble dried for use in normal household purposes without further pressing or ironing.

The various tests used in testing the cotton as stated above were performed as follows:—

ABRASION TEST

- The machine used for the abrasion test was a Model 503 TABER ABRASER designed exclusively for use in determining the abrasion resistance of fabrics or cloth durability when the specimen is subjected to rotary rubbing action under controlled conditions of pressure and abrasive action.
- The test samples positioned on the machine are subjected to rotary rubbing action by an abrasive wheel while being held uniformly taut, and the abrasion of each specimen is stopped at the first appearance of broken thread or a pin hole. The reading of each specimen is evaluated by the number of cycles required to produce the first pin hole or yarn breakdown, and an average of 5 specimens taken from both treated and untreated cotton are recited in the table above. In these particular tests head weights of 500 and 1000 grams and an abrasive wheel No. H-38 and vacuum setting at 50 were used.
- The TABER ABRASER required an average of 141.6 cycles to break down the cotton treated according to the above process, but an average of only 65 cycles to break down similar but untreated cotton, clearly indicating the greatly increased abrasion resistance of the treated fabric.

WRINKLE RECOVERY TEST

- The crease or wrinkle recovery test was performed on a special machine designed for this purpose manufactured by T. J. Edwards Inc., of Jamaica Plain, Boston, Massachusetts. The test is effected by creasing and compressing a test specimen under measured conditions of time and load. The

specimen under test is then allowed to recover in the wrinkle recovery tester and the recovery angle measured. The fabric to be tested is conditioned at $65 \pm 2\%$ relative humidity and at a temperature $70 \pm 2^\circ\text{F}$ for at least six hours and should be flat and free of wrinkles.

In the test at least ten (five in each direction) 1.5×4.0 cm test specimens were cut from the cotton sheeting, the long dimension representing the direction of the test. This can be conveniently done by using a die being careful to align the short edges of the specimen with the yarns in the fabric.

A test specimen was placed between the metal leaves of the specimen holder with one end flush with the longer metal strip.

The exposed end of the specimen was turned back so that its edge fell on a line on the shorter thin-metal leaf. Specimens should be handled with care to avoid getting moisture from the fingers on the region to be creased.

The specimen holder was taken with the fabric specimen looped back, in the left hand and the left thumbnail was firmly pressed on the edge of the specimen to hold it on the guide line. With the right hand the plastic press was opened and the holder and specimen inserted. The press should be held so that the jaw having a small raised platform is outside of and parallel to the longer metal strip of the holder. The flat thicker side of the press is then adjacent to the fabric specimen. The end-edge of the jaw was brought into firm contact with the fabric at the left thumbnail and the press closed. This procedure formed a crease about $1/16$ inch from the end of the thin metal leaf.

The press-holder combination was inverted on a table top with the small platform upward and a load applied of 500 grams to the platform for five minutes.

The press was unloaded, the holder carefully removed, and mounted in the Tester. The mounting is readily effected by placing the back edge of the holder against the stop at the back of the shelf on the Tester and gently pushing the holder into position. The crease should line up with a spot at the center of the outer disc of the Tester.

The dangling leg of the specimen was aligned with the vertical guide line on the back panel. The alignment was periodically readjusted as the specimen recovered and finally the protractor reading was taken after a five minute recovery period. The short lines on either side of the reading index are 2° apart to facilitate estimates between the 10° intervals.

Evaluation

The data was reported as the crease recovery angle. The warp and filling readings were averaged separately and reported to the

nearest 1°.

The untreated cotton has no recovery, but the treated fabric has an average crease recovery of 272.2°.

TEAR STRENGTH

The tearing strength readings are obtained by subjecting fabric samples to tearing at very high rates of the order of about 500 inches per minute. The energy required to propagate a tear in the fabric is provided by a falling pendulum, and from the energy lost by the pendulum the equivalent average tearing force is determined. The apparatus used in determining the values recited in the above table was the Elmendorf Tearing Tester Model 60-400. While the readings obtained do indicate a lowering of the tearing strength of the treated cotton fabric the loss is negligible when compared with the crease-resistance and abrasion-resistance advantages obtained.

BREAK STRENGTH

The break test involves tensioning samples in both the warp and fill (weft) directions and recording the breaking load of each sample and averaging the results from the treated and untreated specimen samples. While treatment does appear to lower the pounds per square inch breaking load the lowering is not appreciable and amounts only to approximately 15%. This is conveniently done by using a Model J Scott Tester.

WASH AND WEAR EVALUATION

The Wash-and-Wear and Permanent Press evaluations are as prescribed by the American Association of Textile Chemists and Colorists (AATCC), and the class values are obtained by a visual comparison (under controlled conditions of home laundered and dried samples against standard plastic replicas. The evaluation is broken down to Classes 1 through 5, with Class 1 representing the highly creased appearance of laundered untreated cotton sheeting, and Class 5 the original smooth and surface textured appearance. It will be noted from the above table that the treated fabric after repeated laundering and drying is classed in Class 4 closely simulating the original appearance of the fabric.

The small loss of breaking and tearing strength due to the present treatment is unimportant when one considers the highly improved abrasion resistance, and crease recovery and wash-and-wear evaluation, and the almost negligible shrinkage (less than 2%) in the treated product.

WHAT WE CLAIM IS:

1. A process for rendering woven cotton sheeting or articles made therefrom crease-

resistant while retaining or improving their tear strength and pliability which comprises the steps of:—

a) treating a mixture of an aqueous dispersion of a monomer or prepolymer of an acrylate resin which is acid stable and a monomer of an aldehyde-urea resin with oxalic acid and
b) impregnating the cotton sheeting with the resulting aqueous mixture and
c) allowing the said aqueous mixture to polymerize and provide the sheeting with a resinous finish.

2. A process as claimed in claim 1 wherein the polymerization of step (c) is effected at a pH of 0.8 to 2.5.

3. A process as claimed in claim 1 wherein the polymerization of step (c) is effected at a pH of 1.0 to 1.6.

4. A process as claimed in any one of claims 1 to 3, wherein the aqueous mixture of the monomers or the mixture of the monomer and prepolymer contains a wetting agent.

5. A process as claimed in claim 4, wherein the wetting agent is a non-ionic wetting agent of the sulphonated alkyl-aryl polyglycol ether type.

6. A process as claimed in any one of claims 1 to 5, wherein the aqueous mixture of the monomers or the monomer and prepolymer contains a swelling agent for the cotton.

7. A process as claimed in claim 6, wherein the swelling agent is ammonium nitrate or ammonium sulphate.

8. A process as claimed in claim 6, wherein the swelling agent is ammonium chloride.

9. A process for rendering woven cotton sheeting crease-resistant while retaining or improving its tear strength and pliability which comprises in a series of steps as follows:—

(a) treating a mixture of dimethylolethylene-urea, dimethylolpropylene-urea or dimethylolglyoxal-urea and an aqueous dispersion of a monomer or prepolymer of a polyacrylate with reactive groups, the dispersion not being precipitated at pH 1.0 to 1.6 with oxalic acid;

(b) impregnating the cotton sheeting with the resulting aqueous mixture; and

(d) allowing the said aqueous mixture to polymerize and provide the sheeting with a resinous finish.

10. A process as claimed in any one of claims 1 to 9, wherein an aqueous emulsion of a terpolymer of acrylic acid, butyl acrylate and N-methylol acrylic acid methylamide is used.

11. A process as claimed in claim 9 wherein the aqueous mixture contains an ammonium salt.

12. A process as claimed in claim 11

nearest 1°.

The untreated cotton has no recovery, but the treated fabric has an average crease recovery of 272.2°.

TEAR STRENGTH

The tearing strength readings are obtained by subjecting fabric samples to tearing at very high rates of the order of about 500 inches per minute. The energy required to propagate a tear in the fabric is provided by a falling pendulum, and from the energy lost by the pendulum the equivalent average tearing force is determined. The apparatus used in determining the values recited in the above table was the Elmendorf Tearing Tester Model 60-400. While the readings obtained do indicate a lowering of the tearing strength of the treated cotton fabric the loss is negligible when compared with the crease-resistance and abrasion-resistance advantages obtained.

BREAK STRENGTH

The break test involves tensioning samples in both the warp and fill (weft) directions and recording the breaking load of each sample and averaging the results from the treated and untreated specimen samples. While treatment does appear to lower the pounds per square inch breaking load the lowering is not appreciable and amounts only to approximately 15%. This is conveniently done by using a Model J Scott Tester.

WASH AND WEAR EVALUATION

The Wash-and-Wear and Permanent Press evaluations are as prescribed by the American Association of Textile Chemists and Colorists (AATCC), and the class values are obtained by a visual comparison (under controlled conditions of home laundered and dried samples against standard plastic replicas. The evaluation is broken down to Classes 1 through 5, with Class 1 representing the highly creased appearance of laundered untreated cotton sheeting, and Class 5 the original smooth and surface textured appearance. It will be noted from the above table that the treated fabric after repeated laundering and drying is classed in Class 4 closely simulating the original appearance of the fabric.

The small loss of breaking and tearing strength due to the present treatment is unimportant when one considers the highly improved abrasion resistance, and crease recovery and wash-and-wear evaluation, and the almost negligible shrinkage (less than 2%) in the treated product.

WHAT WE CLAIM IS:

1. A process for rendering woven cotton sheeting or articles made therefrom crease-

resistant while retaining or improving their tear strength and pliability which comprises the steps of:—

a) treating a mixture of an aqueous dispersion of a monomer or prepolymer of an acrylate resin which is acid stable and a monomer of an aldehyde-urea resin with oxalic acid and

b) impregnating the cotton sheeting with the resulting aqueous mixture and

c) allowing the said aqueous mixture to polymerize and provide the sheeting with a resinous finish.

2. A process as claimed in claim 1 wherein the polymerization of step (c) is effected at a pH of 0.8 to 2.5.

3. A process as claimed in claim 1 wherein the polymerization of step (c) is effected at a pH of 1.0 to 1.6.

4. A process as claimed in any one of claims 1 to 3, wherein the aqueous mixture of the monomers or the mixture of the monomer and prepolymer contains a wetting agent.

5. A process as claimed in claim 4, wherein the wetting agent is a non-ionic wetting agent of the sulphonated alkyl-aryl polyglycol ether type.

6. A process as claimed in any one of claims 1 to 5, wherein the aqueous mixture of the monomers or the monomer and prepolymer contains a swelling agent for the cotton.

7. A process as claimed in claim 6, wherein the swelling agent is ammonium nitrate or ammonium sulphate.

8. A process as claimed in claim 6, wherein the swelling agent is ammonium chloride.

9. A process for rendering woven cotton sheeting crease-resistant while retaining or improving its tear strength and pliability which comprises in a series of steps as follows:—

(a) treating a mixture of dimethyloethylene-urea, dimethylolpropylene-urea or dimethylolglyoxal-urea and an aqueous dispersion of a monomer or prepolymer of a polyacrylate with reactive groups, the dispersion not being precipitated at pH 1.0 to 1.6 with oxalic acid;

(b) impregnating the cotton sheeting with the resulting aqueous mixture; and

(d) allowing the said aqueous mixture to polymerize and provide the sheeting with a resinous finish.

10. A process as claimed in any one of claims 1 to 9, wherein an aqueous emulsion of a terpolymer of acrylic acid, butyl acrylate and N-methylol acrylic acid methylamide is used.

11. A process as claimed in claim 9 wherein the aqueous mixture contains an ammonium salt.

12. A process as claimed in claim 11



wherein the ammonium salt is ammonium chloride.

13. A process as claimed in any one of claims 9 to 12 wherein the aqueous mixture
5 contains a non-ionic wetting agent.

14. A process as claimed in any one of claims 1 to 13 wherein the aqueous mixture contains an optical brightening agent.

10 15. A process as claimed in any one of claims 1 to 14 wherein the cotton sheeting is bleached before impregnation with the aqueous mixture.

15 16. A process as claimed in any one of claims 1 to 15 wherein after the steps a) and b) the treated cotton sheeting is submitted to the following additional process steps:—

- c) it is dried until from 8 to 12% by weight of resin remains in the cotton;
- 20 d) it is set to width;
- e) it is pressed and rolled under maximum tension with exclusion of air;
- f) it is aged at a temperature of 70 to 80°F for a period of from 5 to 14 days;
- 25 g) it is unrolled and washed to remove excess acids optionally in the presence of sodium hydroxide or ammonium hydroxide; and
- 30 h) it is finally rolled and dried.

17. A process as claimed in any one of claims 1 to 16, wherein the solution used in step (a) comprises from 10 to 20% (calculated on a weight/volume basis) of the
35 monomer of the aldehyde-urea resin and from 1.5 to 5% (calculated on a weight/volume basis) of the monomer or prepolymer of the acrylate resin so that the weight ratio of resin monomer to acrylate monomer or prepolymer is in the range of from
40 10:1 to 25:1.

18. A process as claimed in claim 1, carried out substantially as described in the Example herein.

19. Crease-resistant woven cotton sheeting whenever treated by a process as claimed in any one of claims 1 to 18.

20. Crease-resistant woven cotton sheeting bearing within its fibrous structure and being bonded to a tough and pliable resinous composition comprising an aldehyde-urea resin and an acid stable acrylate resin which has been formed by polymerising the monomer of the aldehyde-urea resin and the monomer or a prepolymer of the acrylate
55 resin by reaction with oxalic acid.

21. Crease-resistant woven cotton sheeting as claimed in claim 20, wherein the acrylate resin is of the polyacrylate type with reactive groups.
60

22. Crease-resistant woven cotton sheeting as claimed in claim 20, wherein the acrylate resin is derived from a terpolymer containing units derived from acrylic acid, butyl acrylate and N-methylol acrylic acid
65 methylamide.

23. Crease-resistant woven cotton sheeting as claimed in any one of claims 20 to 22, wherein the aldehyde-urea resin is derived from dimethylol ethylene-urea, dimethylol propylene urea and dimethylolglyoxal-urea.
70

24. Crease-resistant woven cotton sheeting as claimed in any one of claims 20 to 23, wherein the cotton sheeting is bleached and incorporates an optical brightening agent.
75

25. Crease-resistant cotton sheeting as claimed in any one of claims 20 to 23, wherein the aldehyde-urea resin and the acrylate resin are present in a weight ratio of from 10:1 to 25:1.
80

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