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RESIN FINISH FOR CELLULOSE TEXTILE MATERIAL

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The present invention relates to textile finishing compositions, the method of finishing textile materials, and to the finished textile materials themselves.

More particularly it relates to compositions suitable for the finishing of cellulosic textile materials with novel resinous composition whereby shrinkage control and wrinkle resistance are imparted thereto with little or no loss in tensile strength.

Heretofore, cellulose containing textile materials have been finished with "crease proofing resins" to impart wrinkle resistance thereto. In such a procedure a suitable resin, as for example, a water soluble melamine-formaldehyde condensate, is applied to the material, and the finished goods are dried and cured. Such a procedure is described in U.S. Patent 2,339,203. The fabric finished by such a procedure is characterized by improved wrinkle resistance. However, the effect of curing the resin, whereby cross-linking of the fibers is effected, and wrinkle resistance achieved, results in reducing the tensile strength of the material. The use of creaseproofing resins, in addition to imparting wrinkle resistance, imparts dimensional stability to the material finished therewith.

A principal shortcoming in the finishing of cellulose textiles to impart wrinkle resistance thereto is the adverse effect on tensile strength of the material. In general, the higher the wrinkle resistance, the lower the tensile strength. This adverse effect on tensile strength is such that in many instances cellulose textile materials may not be finished to impart wrinkle resistance because the tensile strength of the finished goods is below acceptable standards. This is the case almost without exception with respect to so-called "weak goods" which have an initial low tensile strength for example of less than about 25 pounds in the fill direction as measured by the ASTM test method D-39, Section A paragraph 10.

It has long been sought to provide a finish for cellulose containing textile materials in which good properties of wrinkle resistance and shrinkage control could be obtained with little or no loss in tensile strength. Such a finish has been particularly sought for so-called "weak goods" for which heretofore no successful method of imparting durable wrinkle resistance has been available.

Accordingly it is an object of this invention to provide a novel textile finishing composition containing a component which normally effects wrinkle resistance but adversely affects tensile strength and a second component normally not capable of effecting wrinkle resistance, which when applied to cellulose containing textile materials, gives good wrinkle resistance and unexpected good tensile strength.

It is a further object of this invention to provide a process for finishing cellulose containing textile materials with such a composition, and the materials so finished.

It is a particular object of this invention to provide a finishing composition for "weak goods," whereby wrinkle resistance may be imparted to these goods, and for which, heretofore an acceptable wrinkle resistance finish was unavailable.

These and other objects and advantages of the present invention will become more apparent from the detailed description thereof set forth hereinbelow.

According to the present invention a composition is provided comprising a water soluble crease proofing resin and an acid dispersible resin.

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For purposes of convenience and clarity, in accordance with the present invention, the following terms employed herein, have the following meanings:

(1) "Crease proofing resin": Crease proofing resin refers to those resins employed by the textile finishing industry to impart wrinkle resistance to textile materials, and more particularly cellulosic textile materials. Such resins include melamine-formaldehyde condensates, urea-formaldehyde condensates, including the cyclic urea-formaldehyde condensates, such as dimethylol ethylene urea, dimethylol 1,2-propylene urea, dimethylol 1,3-propylene urea, guanamine-formaldehyde condensates, uron-formaldehyde condensates, triazinone-formaldehyde condensates, as well as the alkylated and in particular the methylated derivatives of these and other aminoplast materials. In addition epoxide resins, acetone-formaldehyde resin and others known to those skilled in the art are intended to be included in this term.

Crease proofing resins as that term is understood in the textile finishing industry refers to substantially monomeric normally water soluble materials or compounds having more than one functional group available (usually at least two) which are capable of reacting with the cellulose fibers to form cross-links therewith, whereby wrinkle resistance is imparted to the material. Normally these materials are potentially thermosetting.

(2) "Acid dispersible resins" as that term is employed here, refers to "colloidal dispersions," "molecular dispersions" and "visible dispersions." The "acid dispersible resins" employed in this invention may be prepared by ageing acidic solutions of materials normally identified as crease proofing resins and in particular, crease proofing resins which may be termed "aminoplast resins" until an acid dispersible resin is formed.

(3) By the term "colloidal dispersion" as that term is employed herein, it is meant "aminoplast resins" which have been converted to their colloids by the action of a suitable acid and aged. Acid colloids of "aminoplast resins" may be prepared generally in accordance with U.S. Patent 2,345,543 and U.S. Patent 2,661,262 which are incorporated herein by reference. These colloids are characterized in that they produce a Tyndall effect and an opalescent blue haze. It should be noted that acid dispersible melamine-formaldehyde resins need not be acid colloids, but may be employed as "visible dispersions" and "molecular dispersions" as these terms are defined hereinafter.

(4) By the term "visible dispersion" as it is employed herein, it is meant an acid dispersible resin, which in an acidic medium, is characterized by the presence of polymer particles which are visible to the naked eye. An example of such a dispersion would be an acid solution of urea-formaldehyde resins which had been aged until polymer particles appeared.

(5) By the term "molecular dispersions" as that term is employed herein, it is meant an acid dispersible resin which in acidic medium is characterized by the presence of polymer particles which are not visible to the naked eye. An example of such a dispersion would be an acidic solution of dimethylol ethylene urea, which had been acid aged for example in accordance with the colloid forming procedure described in U.S. Patent 2,661,262.

These acid dispersible resins may be prepared for example by the procedures outlined in the above referred to U.S. Patents 2,345,543 and 2,661,262 in which aqueous solutions of the resins are aged under suitable acidic conditions to produce acid dispersible resins. However, the ageing times and temperatures referred to therein are in many instances substantially in excess of what is required for purposes of the present invention. In general, acid dispersible resins employable in the present

invention are preferably those characterized by the degree of condensation or polymerization that would be effected by employing the colloid forming conditions set forth in U.S. Patent 2,345,543 and U.S. Patent 2,661,262. The degree of polymerization may be substantially greater and its formation may be accelerated or retarded by appropriate variations in time, temperature, and pH; however, the maximum degree would be at that point at which a hydrophobic floc began to form which is not dispersible in an acid medium.

Here it should be noted that the acid dispersible resin need not be prepared immediately prior to use. Thus a suitable aminoplast resin may be condensed or polymerized, and then neutralized, in which case the resin could be instantly dispersible in acidic mediums.

(6) By the term "aminoplast" as it is employed herein, it is meant aldehyde and in particular, formaldehyde condensation products of polyfunctional compounds characterized by the presence of amino ($-NH_2$) and imino ($=NH$) radicals in their molecules. These reaction products are potentially thermosetting.

(7) "Cellulose containing textile material" refers to textile materials (fibers, filaments, yarns, fabrics whether woven or non-woven, knitted, felted or otherwise formed) containing at least 50% of cellulose fiber such as cotton, rayon, linen, hemp, jute or the like. The cellulose fibers may be present in combination with other natural or synthetic fibers such as wool, acetate, nylon, polyester fibers such as Dacron, acrylic fibers such as Cyanamid acrylic fiber, Orlon, Acrilan and the like. Preferably the textile material is a formed woven cotton fabric.

(8) "Weak goods" refers to those goods characterized either by the nature of the fibers employed in their manufacture or their method of manufacture by a grab tensile strength in the fill direction of less than about 25 pounds as determined by the ASTM Test Method D-39, Sec. A, paragraph 10. An important representative class of such goods is cotton flannel.

The compositions of this invention are classifiable as an aqueous composition of a water soluble crease proofing resin and an acid dispersible resin. The composition is characterized by an acid pH usually within the range of between about 2.5 to about 5.

The crease proofing resin component and the acid dispersible resin, may be the same or different resinous materials, and either component may contain one or more different resinous materials in substantially the same physical state.

Thus for example the crease proofing resinous component may contain a melamine-formaldehyde condensate and a urea-formaldehyde condensate or an ethylene urea formaldehyde condensate or all three.

Likewise, the acid dispersible resin may for example contain only a melamine-formaldehyde condensate or a mixture of a melamine-formaldehyde condensate with a urea-formaldehyde condensate.

The crease proofing resin is normally water soluble; however with respect to epoxide resins, certain of their more simple members are infinitely water-soluble while others of their class are characterized by limited solubility and are best employed in solvent mediums or mixtures of solvents and water, as for example, alcohol and water.

Among the crease proofing resins employed as such in the present invention, melamine-formaldehyde condensates are probably the single most important group. Suitable condensates include those having from 1 to 6 moles of combined formaldehyde and from 1 to 6 moles of combined alcohol, such as for example methyl, ethyl and the like, although in addition to aliphatic monohydric alcohols, polyhydric alcohols and ether alcohols are also contemplated. Examples of such resins and how they are prepared may be found in U.S. Patent 2,197,357 and U.S. Patent 2,529,856. As noted above, preferably such crease proofing resins are fully water soluble and

essentially monomeric potentially thermosetting materials. Examples of such materials include tris(methoxymethyl) melamine, tris(methoxymethyl) dimethylol melamine, hexakis(methoxymethyl) melamine and the like.

Urea and thiourea formaldehyde condensates are contemplated such as dimethylol urea, alkylated such as methylated dimethylol urea and thiourea, dimethylol ethylene urea, dimethylol ethylene thiourea, dimethylol 1,2-propylene urea and thiourea, dimethylol 1,3-propylene urea and thiourea and other related homologous compounds. Additionally the formaldehyde condensates of dicyandiamide, biuret and the like are contemplated as are the water soluble formaldehyde condensates of thiobis amides described in U.S. Patent 2,887,408.

Guanamine formaldehyde condensates, as for example, those described in U.S. Patent 2,887,409 including the formaldehyde condensates of methoxyacetoguanamine, ethoxyacetoguanamine, tertiary butoxy acetoguanamine and the like are contemplated.

Urons, such as for example N'-bis(methoxymethyl) uron and various other and closely related compounds such as are described in U.S. Patent 2,373,135 are contemplated. Additionally, tetrahydrotriazones such as tetrahydro - 5 - (beta - hydroxyethyl) - 5 - triazone and related compounds that are described in U.S. Patent 2,304,624 are contemplated.

In addition to the above examples, polyepoxides having an epoxy equivalency greater than 1, as for example, those described in U.S. Patent 2,730,427, U.S. Patent 2,752,269 and 2,794,754 are also fully contemplated for use as crease proofing resins in accordance with the present invention.

These exemplary crease proofing resins may be employed singly or in combination with each other and with other crease proofing resins known to those skilled in the art, in accordance with the present invention.

The acid dispersible resins as noted above may be made from the same or a different resin or resin mixture than that employed as the water soluble crease proofing components of the composition.

Acid dispersible resins may be prepared illustratively by the addition of a suitable acid to an aqueous solution of a suitable resin until an acid pH is reached and then the solution is aged until an acid dispersible resin is formed. In the case of colloidal dispersions thereafter, the resin acid mixture is aged for a suitable period of time such as 24 hours at room temperature until the colloid is formed in accordance with procedures well known to those skilled in the art. See U.S. Patent 2,345,543 and 2,661,262. In general, the time required to form the colloid may be shortened by heating the resin-acid mixture.

Suitable acids are preferably the weak organic acids, such as formic acetic, hydroxy acetic, and the like, lactic acid being preferred. More generally, the preferred acids are those characterized by an ionization constant of 10^{-5} and preferably from between 10^{-5} and 10^{-1} . Inorganic mineral acids, such as hydrochloric, sulfuric, and the like, may be employed although these are less attractive in that the presence of strong acid results in a marked tenderizing of the fabric finished with acid dispersible resin prepared employing the same. The acid dispersible resin component is usually characterized by a pH of between about 2 and about 4.

The water soluble crease proofing component and the acid dispersible resin component individually are preferably mixtures containing a melamine-formaldehyde resin. Thus, in a preferred composition, the crease proofing component would be or contain a melamine-formaldehyde resin and at least one other crease proofing resin and the acid dispersible resin would contain a melamine-formaldehyde resin and at least one other acid dispersible resin. Preferably the melamine-formaldehyde component is a highly substituted material as for example

the tris(methoxymethyl) dimethylol melamine or substantially fully etherified fully methylolated melamines such as hexakis(methoxymethyl) melamine. Suitable mixtures of melamine resins in combination with other resins are described in U.S. Patent 2,690,404 and U.S. Patent 2,804,402, although the relative mole ratios and weight ratios specifically described therein are in no way restrictive of the present invention.

The components (crease proofing or water soluble resin and acid dispersible resin) are preferably employed in a suitable composition in relative weight ratios of from 95 to 25 parts by weight of crease proofing resin to 5 to 75 parts by weight of acid dispersible resin. More preferably, from 95 to 45 parts by weight of crease proofing resin to 5 to 55 parts by weight of acid dispersible resin are employed.

The composition may be applied to suitable cellulose containing textile material by any of the techniques known to those skilled in the art. Thus, it may be applied by spraying, dipping, immersion, padding or other suitable techniques. Preferably the composition is applied by padding, the most conventional finishing technique currently practiced by the industry.

Employing a suitable technique, as for example, padding, the composition is applied so that from between about 2% and about 15% of resin solids (both crease proofing resin and acid dispersible resin) is applied based on the dry weight of the textile material. Preferably, the amount applied is from between about 4% and about 8% based on the dry weight of the fabric.

Application of such amounts of the composition characterized by the above defined ratios results in the application of a practical minimum of about 1% and preferably at least 2% of the crease proofing or water-soluble resin and a practical minimum of about 1% of the acid dispersible resin (as resin solids) based on the dry weight of the fabric.

The composition may be applied in conjunction with a curing accelerator or catalyst, though for many purposes this is unnecessary, the acid present in the acid dispersible resin functioning to accelerate the cure. The catalyst may be employed, however, if it is desired to increase the wrinkle resistance of the finished material though such increases are sometimes accompanied by a decrease in tensile strength.

Suitable catalysts include the metal salts such as the chlorides and nitrates of magnesium, zinc and aluminum. Alkanolamine salts such as ethanolamine hydrochloride, certain free acids such as oxalic citric acetic and the like, diammonium phosphate, 2-aminobutanol-(1) hydrochloride and the like. It will be noted that when polyepoxides are employed, suitable catalysts for these resins, such as p-toluene sulfonic acid, ethylenediamine zinc fluoborate, magnesium perchlorate and the like, should normally be employed.

In general such catalysts would be employed in amounts of from between 2 and 20% based on the weight of crease proofing resin employed in the composition.

After application, the finished textile material is dried and the resins cured thereon. Drying and curing may be carried out separately or simultaneously. By way of example the finished textile material may be dried for from 5 minutes to 2 minutes at from 175° F. to 250° F. and thereafter cured for from 1½ minutes at about 300° F. to about 30 seconds at 450° F. By way of example, drying and curing simultaneously may be effected at from 5 minutes at 300° F. to 1½ minutes at 450° F. It will be appreciated that the above times and temperatures are exemplary and, as is well known to those skilled in the art, may be varied within relatively wide limits. Thus, in general time and temperature are inversely proportional, i.e. as the time increases, the temperature may be lowered and as the time decreases, the temperature may be elevated.

As will be demonstrated more clearly hereinafter, the

combination of a crease proofing or water soluble resin and an acid dispersible resin results surprisingly in wrinkle resistance and shrinkage control with little or no loss in tensile strength normally associated with the use of crease proofing resins.

It is further surprising that the two components appear to retain their individual identity when in combination. Thus, the presence of the acid in the composition, from the acid dispersible resin component appears to be effectively tied up. This is evidenced by the fact that amorphous solids are not precipitated out. In such a composition, the amount of acid employed to prepare the acid dispersible resin would normally be less than that required to render the entire composition acid dispersible. Thus, if the acid were free to disassociate itself, a precipitation of amorphous material should form. This would be particularly true in the case of colloidal dispersions. See U.S. Patent 2,345,543.

In order that the present invention may be more fully understood, the following examples are given primarily by way of illustrations. No details or specific enumerations contained therein should be construed as limitations on the present invention except insofar as they appear in the appended claims. All parts and percentages are by weight unless otherwise indicated.

EXAMPLE I

A substantially monomeric water soluble melamine-formaldehyde condensate containing approximately 6 moles of combined formaldehyde and 6 moles of combined methanol in admixtures with dimethylol ethylene urea was prepared. The melamine-formaldehyde condensate and ethylene urea-formaldehyde condensate were present in approximately equal mole quantities.

A portion of the above material was converted to its acid colloid by the addition of lactic acid, 0.36 part by weight real lactic acid being added per 1 part by weight of resin solids. Thereafter the acid resin mixture was allowed to stand at room temperature for 24 hours until the colloid formed. The colloid was characterized by a Tyndall effect and an opalescent blue haze.

A pad bath was prepared containing the lactic acid colloid of the above identified resin and the resin itself in non-colloidal form. The components were present in the composition in ratio of 1:3.3 crease proofing resin to colloid on a solids basis.

Cotton flannel (weak goods) was padded with the above composition so as to apply 1.5% resin solids of the crease proofing resin and 5% solids of the acid colloid.

Thereafter the treated flannel was dried and cured 2½ minutes at 300° F.

The treated fabric had good wrinkle recovery as measured by the Monsanto crease angle tester of 234° (warp plus fill), and the tensile strength (filling) was 24¾ pounds. The tensile strength is determined by ASTM test method D-39, Section A, paragraph 10.

The wrinkle recovery of the untreated fabric was 193° and its tensile strength was 26 pounds.

Normal resin treatment for the finishing of such goods, wherein about 6.5% by weight of the dry fabric of a similar melamine-formaldehyde condensate is applied with catalyst, dried and then cured for 2½ minutes at 300° F., would result in a tensile strength of about 18 pounds. Such a tensile strength is unacceptably low for a good quality fabric of this type.

EXAMPLE II

A 10% solids lactic acid colloid of the resin mixtures described in Example I (hereinafter identified as Resin A) was prepared employing 4.5% of 80% real lactic acid. After ageing overnight at 70° F. the formed colloid was applied to cotton percale at the 3% solids level in combination with 3% solids of resin A in non-colloidal form, without added accelerator and with 2.5%, 5% and 7.5% of magnesium chloride as an accelerator (30%

real) based on the weight of the non-colloidal component.

Additionally 3% solids of Resin A in non-colloidal form was applied alone as a control using 40% of magnesium chloride as an accelerator (30% real), based on the weight of resin solids.

The treated fabrics were cured for 1½' at 350° F. and then evaluated for wrinkle recovery and tensile strength properties. The results are given in Table I below.

Table I

	Wrinkle recovery (warp-fill, degrees)			Grab filling tensile (lbs.)
	Initial, dry	Dry after 1 L.W. ¹	Dry after 3 L.W.	
Untreated.....	143	153	161	48
3% solids resin A with:				
1. 40.0% magnesium chloride ²	212	226	222	33
2. 7.5% magnesium chloride ² 3% solids resin A colloid.....	242	244	250	29
3. 5.0% magnesium chloride ² 3% solids resin A colloid.....	232	234	229	37
4. 2.5% magnesium chloride ² 3% solids resin A colloid.....	223	233	228	38
5. 3.0% solids resin A colloid.....	212	210	218	40

¹ L.W. = A standard home laundry wash cycle, carried out at 140° F.

² 30% real.

A review of Table I above demonstrates that while Resin A, when cured with magnesium chloride accelerator, results in good wrinkle resistance, the tensile strength loss is approximately 30%. Table I further demonstrates that compositions of this invention, when employed without magnesium chloride accelerator or with amounts of 5% or less based on the weight of the crease proofing component, result in good wrinkle recovery and excellent tensile strength.

EXAMPLE III

Resin A and the lactic acid colloids thereof prepared as in Example II were blended in varying ratios and applied to cotton flannel (3.05 pounds per yard). The ratios of the components in the pad bath correspond to the relative weight ratios applied to the flannel as reported in Table II below. The fabric was thereafter dried and cured for 3'30" at 300° F.

Table II

Cotton flannel	Wrinkle recovery (degrees), initial total (W.+F.)	Grab tensile strength (filling-lbs.)
Cured 3.5 minutes at 300° F.:		
Untreated.....	145	26
1. 2.5% solids resin A (control), 40.0% magnesium chloride (30% real), based on resin solids.....	196	22
2. 2.5% solids resin A, 2.0% solids resin A colloid, aged 24 hours.....	196	24
3. 2.5% solids resin A, 4.0% solids lactic acid colloid of resin A, aged 24 hours.....	201	28
4. 2.5% solids resin A, 4.0% solids lactic acid colloid of resin A, aged 7 days.....	212	23
5. 1.25% solids resin A, 4.0% solids lactic acid colloid of resin, aged 24 hours.....	189	28
6. 1.25% solids resin A, 4.0% solids lactic acid colloid of resin A, aged 7 days.....	205	25

¹ Tensile strength—Significant difference is 3.9 lbs. evaluating eight samples versus a single control.

Table II above demonstrates that a wrinkle resistant finish can be applied to weak goods and that optimum properties of wrinkle resistance and tensile strength are achieved when 2.5% of Resin A and 4% of Resin A colloid aged for 24 hours are employed under the conditions described. It further indicates that ageing of the colloid for extended periods of time, for example 7 days, results in an increase wrinkle recovery at the expense of decreased tensile strength. Applications 5 and 6 indicate that for this application the amount of crease proofing resin is preferably in excess of 1.25% solids on the weight of the

fabric in order to insure a wrinkle recovery of 200° or more and yet retain excellent tensile strength.

EXAMPLE IV

5% resin solids of the following resins were applied to 80 x 80 cotton percale alone and in combination with 3% solids of the acid dispersible resin of each.

Resin A—See Example 2 supra.

Resin B—A formaldehyde condensate of tetrahydro-5-ethyl-2(1)-triazone.

Resin C—A water soluble partially polymerized methylated methylol urea.

Resin D—Dimethylol ethylene urea.

Resin E—Tris(methoxymethyl)melamine.

The acid dispersible resins of A-E were prepared with 10% resin solids and 4.5% of 80% lactic acid, and except for the acid dispersible resin of Resin C, were stored for 24 hours at 70° F. before use. The acid dispersion of Resin C was held for only 3 hours.

Resins A and E formed true colloid dispersions.

Resins B and D formed molecular dispersions, and Resin C formed a visible dispersion.

The application of the crease proofing resins alone were made with 40% magnesium chloride (30% real) on the resin solid. Applications with blends were made without accelerators. In all cases, the treated fabrics were cured for 1½' at 350° F., and then evaluated for wrinkle recovery initially and after laundromat washes, and for initial tensile strength.

The results appear in Table III.

Table III

	Wrinkle recovery (degrees) (W.+F.), initial	Filling grab tensile strength (lbs.)
Untreated.....	127	47
1. 5% solids resin B 40% magnesium chloride.....	246	31
2. 5% solids resin B 3% solids acid dispersible resin B.....	255	30
3. 5% solids resin B 3% solids acid dispersible resin C.....	250	32
4. 5% solids resin B 3% solids acid dispersible resin D.....	241	29
5. 5% solids resin B 3% solids acid dispersible resin E.....	232	38
6. 5% solids resin B 3% solids acid dispersible resin A.....	250	33
7. 5% solids resin C 40% magnesium chloride.....	230	30
8. 5% solids resin C 3% solids acid dispersible resin B.....	248	33
9. 5% solids resin C 3% solids acid dispersible resin C.....	244	31
10. 5% solids resin C 3% solids acid dispersible resin D.....	234	32
11. 5% solids resin C 3% solids acid dispersible resin E.....	210	36
12. 5% solids resin C 3% solids acid dispersible resin A.....	247	34
13. 5% solids resin D 40% magnesium chloride.....	239	28
14. 5% solids resin D 3% solids acid dispersible resin B.....	258	31
15. 5% solids resin D 3% solids acid dispersible resin C.....	251	30
16. 5% solids resin D 3% solids acid dispersible resin D.....	241	32
17. 5% solids resin D 3% solids acid dispersible resin E.....	221	41
18. 5% solids resin D 3% solids acid dispersible resin A.....	260	34
19. 5% solids resin E 40% magnesium chloride.....	236	32
20. 5% solids resin E 3% solids acid dispersible resin B.....	248	32
21. 5% solids resin E 3% solids acid dispersible resin C.....	249	32
22. 5% solids resin E 3% solids acid dispersible resin D.....	223	39
23. 5% solids resin E 3% solids acid dispersible resin E.....	Unstable.	
24. 5% solids resin E 3% solids acid dispersible resin A.....	Unstable.	
25. 5% solids resin A 40% magnesium chloride.....	242	29
26. 5% solids resin A 3% solids acid dispersible resin B.....	259	29
27. 5% solids resin A 3% solids acid dispersible resin C.....	256	29
28. 5% solids resin A 3% solids acid dispersible resin D.....	247	34
29. 5% solids resin A 3% solids acid dispersible resin E.....	220	38
30. 5% solids resin A 3% solids acid dispersible resin A.....	246	35

Table III demonstrates that the addition of the acid dispersible resins of A-E to the water soluble crease proofing resins A-E, resulted generally in improved wrinkle recovery and tensile strength. This effect is quite surprising in view of the fact that in general it might be expected that the acid dispersible resin would not be expected to contribute to wrinkle resistance nor to improve tensile strength.

While the description of the present invention has been directed to composition containing two essential components namely the crease proofing resin and the acid dispersible resin, other components may be employed therewith to accomplish particular functions. Thus, lubricants, softeners, other resins, such as hand modifiers, including thermoplastic resins, such as acrylate-styrene copolymers, butadiene-styrene copolymers, vinyl chloride polymers and copolymers and the like may be employed therewith.

In addition formaldehyde scavengers such as dicyandiamide urea and the like, may be employed with compositions of this invention, purifying agents, germicides and the like.

It should be noted that such variables as time and temperature of cure, the optional use of accelerators, relative amounts of components, the use of additional components and the like are all considered to be within the scope of the present invention, as my invention basically resides in the combination of a water soluble crease proofing textile resin and acid dispersible resin, its use, and the improved results achieved thereby.

I claim:

1. An aqueous composition suitable for use in imparting wrinkle resistance with little or no loss in tensile strength to cellulose containing textile materials comprising relative weight ratios of from 95 to 25 parts of a water soluble substantially monomeric crease proofing resin and from 5 to 75 parts of an acid dispersible resin.

2. A composition according to claim 1 in which the crease proofing resins and the acid dispersible resin are different.

3. A composition according to claim 1 in which the crease proofing resin and the acid dispersible resin are the same.

4. A composition according to claim 3 in which the crease proofing resin and the acid dispersible resin contain melamine-formaldehyde condensate.

5. A process for finishing cellulose containing textile materials which comprises applying thereto an aqueous composition comprising relative weight ratios of from 95 to 25 parts of a water soluble substantially monomeric crease proofing resin and from 5 to 75 parts of an acid dispersible resin and heat curing the composition on the material whereby the material is characterized by wrinkle resistance and little or no loss in tensile strength.

6. A process according to claim 5 in which the crease proofing resin and the resin of the acid dispersible resin are different.

7. A process according to claim 5 in which the crease proofing resin and the resin of the acid dispersible resin are the same.

8. A process according to claim 5 in which the textile material is cotton.

9. A process according to claim 5 in which the textile material is cotton fabric characterized as weak goods.

10. A process according to claim 5 in which a catalyst is incorporated in the aqueous composition.

11. A process according to claim 7 in which the crease proofing resin and the resin of the acid dispersible resin contain melamine formaldehyde condensates.

12. Cellulose containing textile material characterized by wrinkle resistance and little or no loss in tensile strength having cured thereon a composition containing relative weight ratios of from 95 to 25 parts of a water soluble substantially monomeric crease proofing resin, and from 5 to 75 parts of an acid dispersible resin.

13. Cellulose containing textile material according to claim 12 wherein the total resin solids applied to the material is from between about 2% and about 15% based on the dry weight of the material.

14. Cellulose containing textile material according to claim 12 in which the material is characterized as weak goods.

References Cited in the file of this patent

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