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PROCESS FOR APPLYING CREASE RESISTANT FINISHES TO CELLULOSIC FABRICS AND PRODUCTS THEREOF

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This invention relates to the production of so-called wash and wear or non-ironing crease resistant fabrics and has to do with the treatment of such, especially fabrics of a cellulosic nature, except acetate fabrics, and the invention may be applied to fabrics of a cellulosic nature whether they be woven, of a knitted construction, or otherwise fabricated.

In particular, the invention is applicable to cotton materials and materials of regenerated cellulose and linen, but excluding, as mentioned above, acetate materials. A general purpose and object of the present invention is to increase or improve the crease resistant properties or values incident to cloth of the character of fabric described without, however, unduly tendering or weakening the material.

According to the present invention, there is contemplated a method or process for applying resins, especially synthetic cellulose reactant resins and also thermosetting resinous compositions, to fabrics of the character delineated above, such that resin add-ons in amounts equal to what we may term, for convenience, the standard or customary quantities will produce or give higher crease resistance. A further object of the invention is, as by way of corollary, a method or process for obtaining crease resistant values that are substantially equal to conventional readings, but which are obtained with less resin add-ons than normally or customarily would be required to get such results. The invention, of course, contemplates also the product of such treatment, namely, fabrics exhibiting or having improved crease resistance as a result of the application of crease resistant compositions according to the method hereinafter described.

Another object of the invention is a method for finishing fabrics in relation to obtaining crease resistance therein whereby lower quantities of resin may be utilized efficiently to do the crease resisting work of normally greater concentrations of resinous material, albeit without unduly tendering or adversely affecting the strength of the treated cloth or material.

The term "crease resistance" as used herein, which is sometimes otherwise labelled "crush resistance" or "wrinkle resistance," comprehends that property in a fabric which enables it to resist wrinkling or mussing. A durable crease resistance treatment for a fabric will cause wrinkles therein to disappear or to come out immediately after hanging a short time.

The term "no iron" or "non-ironing" fabric means a cloth or an article of apparel made therefrom which previously has been given a treatment to render it crease resistant, so that after normal wear or usage the garment thus treated may be washed and hung up to dry, and after drying will be in satisfactory condition without ironing for wearing again. In plain terms, crease resistance or

crease recovery of fabrics means the loss or absence of wrinkles.

The present invention comprises, in its simplest terms, running the cloth through a reaction mixture or bath containing a reactant resin or precondensate, or a thermosetting or thermosettable synthetic resin component in a solution comprising an aliphatic ketone solvent selected from the class consisting of acetone and methyl ethyl ketone. According to normal practice, fabrics of the character described are given a crease resistant finish by running the same through a bath containing a solution consisting essentially of a cellulose reactant, or a heat hardenable resin, such as urea formaldehyde resin or melamine formaldehyde resin, a delayed action catalyst such as the metal salt catalysts and the amine hydrochloride types and/or diammonium hydrogen phosphate, or di-basic ammonium phosphate, the thermoset resin and catalyst, with or without an accompanying softener, being prepared together in a mix comprising an aqueous solution so that a typical crease resistant finish according to normal practice is made up of an aqueous solution comprising the urea formaldehyde and/or other resin or reactant material resin, the delayed acting catalyst, and the balance water.

According to the present invention, however, we have found that by replacing all or a major part, and preferably most of the water in such crease resistant finishing solutions with another solvent, viz. an aliphatic ketone selected from the class of ketones consisting of acetone and methyl ethyl ketone, and subsequently hardening or polymerizing the resin in situ, results are obtained in terms of crease resistant values which are improved over those normally acquired by the application of conventional aqueous resin treating solutions such as those just described. In fact, the substitution of an organic solvent such as acetone for water as the solvent in the application of thermosetting synthetic resinous materials to textiles gives increased values. It will be understood, therefore, that according to the present method a new wash and wear, no-iron finish is obtained which gives the treated fabric higher than usual wrinkle resistance comprising the application of synthetic cellulose reactant or thermosetting resins from organic aliphatic ketone solvent solutions to cellulosic fabrics.

Regarding ketone solvents other than those mentioned above, namely, acetone or dimethyl ketone, and methyl ethyl ketone, it appears that higher molecular weight ketones do not have sufficient tolerance for water to allow solubility of catalyst materials or to include the water portions added to the system, either directly or by reason of that which occurs in the resin product.

Among the properties and effects obtainable by the instant invention are increased crease resistance without undue tendering, the production of a satisfactory wash and wear finish, better deposition of the synthetic resin particles on the fabrics treated thereby, and a decrease in the normal amount of swelling action that usually occurs upon the deposition of reactant or heat hardenable synthetic resin solutions, especially those of relatively high water concentration. Further, according to the present invention, in view of the greater volatility of the substitute solvents, it is practical simultaneously to dry and cure the cloth after impregnation thereof with the crease resistant finishing agent contemplated thereby.

Another interesting facet of the invention is that formulations of the present crease resistant finishing agents offer a very convenient and useful means for the householder or garment wearer, as for example, a housewife, to apply the same to a garment in much the same manner as starch is applied before ironing, the excess being removed by wringing or spinning in a washing machine. The present compositions and methods of application should also be useful to garment manufacturers, to laundries, and to dry cleaners for wash and wear finishing of garments. For example, a cotton shirt was dipped in a bath containing the present crease resistant finish or composition, and thereafter the shirt was hand washed and drip dried more than 40 times, and was worn about 60 times, without ever having been re-ironed. A performance of this type obviously exceeds that of ordinary commercially produced wash and wear finishes in shirts that are now on the market.

The treating solutions ordinarily are prepared simply by mixing together an organic solvent solution comprising an aliphatic ketone, preferably acetone, synthetic thermosettable resin, or a reactant or cross-linking precondensate, preferably a dimethylol ethylene urea resin hereinafter called "DMEU," and a suitable catalyst, that is, a delayed acting catalyst such as an amino-propinol hydrochloride known as Catalyst A.C. and sold by the Monsanto Chemical Company. A typical resin mix formulation is as follows:

	Grams
DMEU resin	100
A.C. Catalyst	10
Water	178
Acetone	712
	1000

There may be substituted for the acetone solvent in the present crease resistant compound or formulation methyl ethyl ketone, or a mixture of the methyl ethyl ketone and acetone may be employed in place of acetone alone, or instead of the methyl ethyl ketone alone. Another suitable substitute solvent for acetone is the ether, dioxane. Still another substitute solvent is an acetic anhydride. For the dimethylol ethylene urea resin there may be substituted other synthetic resin components such as a triazone or a triazine or a methylated methylol or an unmethylated methylol melamine formaldehyde resin, or urea formaldehyde resin or mixtures or combinations thereof either with each other or with the DMEU resin. In place of the Catalyst A.C., any other delayed action catalyst adapted to promote condensation of the precondensate synthetic resinous material may be used, such as the catalyst diammonium phosphate, or a metal salt catalyst such as zinc nitrate, or magnesium chloride, or the ethanol-amine hydrochlorides.

The amount of DMEU or other resin of the character described may be varied from about 2% to about 20% by weight of the treating solution. At concentrations below this range the solution has decreased effects, while above 20% no worthwhile improvements result. The preferred concentration for the resin is about 10% by weight. The acetone solvent or other organic solvent making up the major component of the resinous solution may be present in amounts ranging from about 50% by weight to about 90% or 95% by weight of the total treating solution, the preferred concentration thereof being of the order of about 71% by weight. For the catalyst there may be used concentrations of the order of from about .5% to about 10% by weight, the preferred catalyst concentration being about 1%. The amount of water is not critical and may range from 0 to about 35% by weight concentration, the preferred proportion being about 18% by weight.

In its simplest terms, according to the present invention the process of imparting improved crease resistance to cellulosic fabrics involves running the cloth through a reaction mixture or bath containing the several resin mix components thus described, namely, the heat setting synthetic resin precondensate, the organic solvent, and the catalyst. The cloth ordinarily is passed through a bath or solution containing these components, and after emerging therefrom the excess solution is removed from the fabric as by passing it through a padder, the cloth picking up from about 50% to about 60%, usually about 55% of its weight of the treating solution. The treated fabric is then quickly dried, as for example, on a bank of steam heated drying cans, then cured in a heating oven at the usual temperatures and times, say for example, for 5 minutes at about 300° F.; the drying time and temperature preceding the curing may, for example, comprise about 1 minute at about 240° F. It is to be understood, of course, that with respect to drying and curing, the time and temperature are correlative factors and wide variations in each are to be expected and will be entirely compatible with variations in operating conditions and equipment, and also variations in the nature and construction of the cloth being treated for crease resistance.

With regard to after-treatment, it will also be understood that many variations depending on specification and circumstances may be included. In some cases it is desirable and required to after-wash. In others, it will not be necessary to do so. In addition, it may be required that the cloth, after first being impregnated for crease resistance with a treating composition according to the teachings hereof, may subsequently be run through a caustic application range, with or without framing, for the production of a plisse or puckered appearance or other surface texture effects. In any case, it is to be understood that the application of the present crease resistant finish does not in any wise restrict or limit the subsequent treatment of the cloth.

The following examples illustrate the improved crease resistant values obtained by the present invention. In all of these examples, the concentrations recited therein are the solution concentrations and not the concentration of material on the fabric, and the pick-up from water solutions is about 70% in every case. In contrast, the pick-up from acetone and methyl ethyl ketone solutions was about 55% in every case. Therefore, in Examples 1 through 11 following, in those instances where the Monsanto crease angles are the same or approximately the same with respect to fabrics treated with acetone or methyl ethyl ketone solutions as for fabrics treated with water solutions, there is, notwithstanding, an indicated advantage for the acetone or methyl ethyl ketone process because about 15% or 20% less resin solids exist on such fabrics after treatment. The crease resistance readings were determined on the Monsanto crease angle tester. This is a special device developed by Monsanto Chemical Company for this specific test. Samples of cloth, 1 cent. x 4 cent., are cut from the cloth and a fold is made across the long direction. This fold is placed under a standard weight, which is generally 1 lb., for a period of 5 minutes. The sample is then removed from beneath the weight and placed in a clip on the machine and the fold allowed to open. The angle to which it recovers after 5 minutes is measured and recorded. This is the so-called crease angle. In reality it is the angle of recovery from creasing.

EXAMPLE 1

The table below serves to contrast the relative superiority of acetone solvent treating solutions of several or varying concentrations over conventional water solutions.

Cotton fabric		Treatment applied [1]	Solvent	Crease angle warp	Crease angle filling
Ends	Picks				
80	80	10% DMEU resin product, 1% A.C. cat	100% acetone	137	134
80	80	do	90% acetone/10% H_2O	140	139
80	80	do	80% acetone/20% H_2O	142	139
80	80	do	70% acetone/30% H_2O	140	136
80	80	do	60% acetone/40% H_2O	138	135
80	80	do	100% H_2O	130	128
80	80	do	do	132	128
80	80	do	do	132	131
80	80	do	do	129	130
80	80	Control—No treatment		70	59

[1] All samples dried at 240° F. for 1 min. and cured at 300° F. for 5 min.

EXAMPLE 2

Example 2 illustrates, as seen below, certain increased values in crease angles that are obtained by giving the treated cloth a final washing, or after-washing the fabric subsequent to impregnation with the resin precondensate and intermediate drying and curing. It is of interest to note that these increased readings are obtained not only with the acetone solvent baths, but also with aqueous treating solutions.

Cotton fabric		Treatment applied	Solvent	Crease angle warp	Crease angle filling
Ends	Picks				
80	80	10% DMEU resin product, 1% (A.C.) cat	90% acetone/10% H_2O	140	133
80	80	do	90% acetone washed	145	141
80	80	do	80% acetone/20% H_2O	139	134
80	80	do	80% acetone washed	158	144
80	80	do	100% H_2O	122	130
80	80	do	100% H_2O washed	131	139

EXAMPLE 3

The readings appearing below furnish indications of the relative effect, in terms of crease resistance, of acetone treating solutions of varying concentrations, different values being obtained at each concentration for treated fabrics subsequently given a final wash at both 105° F. and 160° F.

Cotton fabric		Treatment applied	Acetone content of solvent (balance water)	Crease angle warp	Crease angle filling
Ends	Picks				
80	80	10% DMEU resin product, 1% (A.C.) cat	90% acetone	139	137
80	80	do	90% acetone washed 105° F	144	141
80	80	do	90% acetone washed 160° F	143	139
80	80	do	85% acetone	137	137
80	80	do	85% acetone washed 105° F	134	136
80	80	do	85% acetone washed 160° F	139	133
80	80	do	75% acetone	139	139
80	80	do	75% acetone washed 105° F	139	134
80	80	do	75% acetone washed 160° F	145	140
80	80	do	80% acetone	134	131
80	80	do	80% acetone washed 105° F	136	138
80	80	do	80% acetone washed 160° F	142	145

EXAMPLE 4

The table of figures here given concerns the effects of increasing the concentration of the resin precondensate dimethylol ethylene urea.

Cotton fabric		Treatment applied	Acetone content of solvent (balance water)	Crease angle warp	Crease angle filling
Ends	Picks				
80	80	6% DMEU product, 1% cat. A.C.	80% acetone unwashed	128	123
80	80	do	80% acetone washed [1]	133	134
80	80	7% DMEU product, 1% cat. A.C.	80% acetone unwashed	134	126
80	80	do	80% acetone washed [1]	137	130
80	80	8% DMEU product, 1% cat. A.C.	80% acetone unwashed	132	131
80	80	do	80% acetone washed [1]	139	141
80	80	9% DMEU product, 1% cat. A.C.	80% acetone unwashed	137	134
80	80	do	80% acetone washed [1]	142	140
80	80	15% DMEU product, 1% cat. A.C.	80% acetone unwashed	149	145
80	80	do	80% acetone washed [1]	154	153
80	80	10% DMEU product, 1% cat. A.C.	80% acetone unwashed	141	140
80	80	do	80% acetone washed [1]	142	145
80	80	do	100% water unwashed	129	128
80	80	do	100% water washed [1]	135	138

[1] Soap at 105° F.

EXAMPLE 5

In this example are shown the results obtained by substituting other solvents, namely, methyl ethyl ketone and dioxane for the acetone of the previous examples, and here again comparative figures are furnished to contrast the effectiveness of methyl ethyl ketone and dioxane solvent solutions with acetone and with aqueous resin treating baths. In all cases listed below, in this example, 10% DMEU resin was present in the treating solution with the usual amount, that is, 1% of Catalyst A.C. Moreover,

the acetone, methyl ethyl ketone, and dioxane concentrations are as indicated below, the balance being water.

Cotton fabric		Treatment applied		Crease angle warp	Crease angle filling
Ends	Picks				
80	80	80% acetone	Unwashed	129	135
80	80	do	Washed H_2O only	140	131
80	80	do	Washed—Soap	136	136
80	80	80% M.E. ketone	Unwashed	145	147
80	80	do	Washed	155	154
80	80	80% dioxane	Unwashed	146	144
80	80	100% water	do	129	128

EXAMPLE 6

In this example is seen the suitability of employing mixtures of ketones, as for example, a mixture of dimethyl ketone or acetone, and methyl ethyl ketone in the resin treating bath, with figures being given to cover specific applications of both washed and unwashed treated material. It should be mentioned that the crease resistance values given below in this example are not entirely or directly comparable with the crease resistance figures or values given in the preceding examples hereof, because the cotton fabric used in this example had been given a pretreatment with sodium borohydride which alters the effect produced, giving somewhat higher crease resistance values than were obtained in the other cases or examples where the cotton fabric employed, although of the same construction, had not been pretreated with the sodium borohydride. Furthermore, the treatment indicated by the last two lines of this example is somewhat higher in resin concentration than had been practised elsewhere, that is, in the preceding examples.

Cotton Fabric		Treatment applied		Crease angle warp	Crease angle filling
Ends	Picks				
80	80	10% DMEU 1% catalyst 80% A.C.	Unwashed	140	144
80	80	do	Washed	150	145
80	80	do	Unwashed	143	144
80	80	do	Washed	150	147
80	80	10% DMEU 1% catalyst 80% M.E.K.	Unwashed	146	148
80	80	do	Washed	153	153
80	80	do	Unwashed	150	154
80	80	do	Washed	155	157
80	80	100 g. DMEU, 10 g. Cat., 300 g. M.E.K. No water, 300 g. Acetone.	Unwashed	154	153
80	80	do	Washed	155	153

EXAMPLE 7

In the schedule appearing below are seen comparative results in terms of crease resistance properties of cotton cloth of the same type and construction as that used in all other previous examples namely, 80 x 80 cotton print cloth, for acetone and aqueous solutions, washed and unwashed, in which the cloth had not been pre-dried before curing. This example and Example 8 following are interesting for the purpose of showing replicates of data illustrating improvement of the acetone solvent system over straight water. The figures in the left-hand column in inches, in both examples, refer to the width of the fabric before starting the trials, and these readings were taken as part of another investigation having to do with fabric shrinkage and in that respect unrelated to the present work. This explains the reason for setting forth the multiple results.

Fabric, inches	Treatment applied			Crease angle warp	Crease angle filling
		Solvent			
35½	10% resin, 1% cat	100% H_2O, not pre-dried, cured	Unwashed	125	133
35½	do	do	Washed	-------	-------
37½	do	do	Unwashed	128	131
37½	do	do	Washed	134	131
39	do	do	Unwashed	133	131
39	do	do	Washed	128	133
35½	10% DMEU, 1% cat	80% acetone–20% H_2O cured	Unwashed	139	135
35½	do	do	Washed	141	136
37½	do	do	Unwashed	140	141
37½	do	do	Washed	146	144
39	do	do	Unwashed	138	139
39	do	do	Washed	142	138

EXAMPLE 8

In Example 8 the same type of cotton cloth as that of previous examples is subjected to acetone and aqueous treating solutions, the procedure of Example 7 being modified in that in the present example the cloth was pre-dried prior to curing.

Fabric, inches	Treatment applied			Crease angle warp	Crease angle filling
		Solvent			
35½	10% DMEU, 1% cat	80% acetone, 20% H_2O, pre-dried, cured.	Unwashed	139	135
35½	do	do	Washed	138	139
37½	do	do	Unwashed	137	134
37½	do	do	Washed	137	139
39	do	do	Unwashed	137	139
39	do	do	Washed	139	137
35½	do	100% H_2O pre-dried, cured	Unwashed	128	129
35½	do	do	Washed	131	133
37½	do	do	Unwashed	129	133
37½	do	do	Washed	131	133
39	do	do	Unwashed	127	131
39	do	do	Washed	129	130

EXAMPLE 9

In Example 9, additional readings of crease resistance values for 80 x 80 cotton cloth fabric are given, which were obtained by subjecting cloth to 10% DMEU acetone solutions and 10% DMEU water solutions.

80 x 80 cotton fabric		Monsanto crease angles			
	Solvent	Washed		Unwashed	
		Warp	Filling	Warp	Filling
10% DMEU	80% acetone–20% H_2O	129.0	130.0	128.6	130.0
Do	H_2O	118.5	120.0	118.0	117.3
Do	+80% acetone–20% H_2O	130.5	132.1	127.1	130.0
Do	+H_2O	122.3	123.1	122.1	126.3
Do	+80% acetone–20% H_2O	135.5	143.0	134.0	133.0
Do	do	136.3	140.5	133.6	132.5
Do	+H_2O	128.8	125.1	125.0	130.3

EXAMPLE 10

Example 10 illustrates the effects of the application of aqueous and acetone treating solutions on a cellulosic material or cloth other than cotton, namely, a 100% regenerated cellulose spun rayon usually described as butcher linen. In each treating solution, the same catalyst was used as in the preceding examples, its concentration being typical, viz. 10% on the weight of the DMEU resin.

Blue rayon	Solvent	Monsanto crease angles			
		Washed		Unwashed	
		Warp	Filling	Warp	Filling
20% DMEU	+H_2O	110.8	118.5	130.6	129.0
15% DMEU	+H_2O	102.8	99.8	120.1	126.0
10% DMEU	+H_2O	94.6	96.0	110.0	113.0
20% DMEU	+80% acetone and 20% H_2O	131.6	123.8	141.1	145.6
15% DMEU	do	115.0	116.0	123.0	120.0
10% DMEU	do	103.5	109.8	117.3	118.5
REPEAT					
20% DMEU	+H_2O	121.3	124.8	129.6	131.1
15% DMEU	+H_2O	117.6	119.3	126.4	122.3
10% DMEU	+H_2O	115.8	115.8	119.6	120.8
20% DMEU	+80% acetone and 20% H_2O	139.0	138.1	140.0	140.1
15% DMEU	do	129.1	130.0	135.0	138.8
10% DMEU	do	116.1	118.0	119.0	113.0

EXAMPLE 11

In the table below, other resins are substituted for dimethylol ethylene urea, viz.: Aerotex 23, which is a combination of Triazone and urea formaldehyde resins of American Cyanamid; Resipon N.D.C., which is a modified urea formaldehyde resin of the Arkansas Chemical Company; and Rhonite D–5, which is also a modified U.F. resin, made and sold by Rohm & Haas. D.A. Catalyst is a solution of zinc nitrate; and MX Catalyst is a magnesium chloride catalyst sold by American Cyanamid. Although the concentrations of the several solution components are set forth differently in this table than was the case in the preceding examples, nevertheless, in every instance of the acetone system treatments, 80% of the solvent is acetone. Moreover, we mention here again that the pick-up in the case of acetone treating solutions is about 55%, whereas it is about 70% in the case of water solutions. Because of this circumstance where acetone and water readings in this table are alike, or nearly alike, nevertheless such readings truly indicate a higher efficiency for the resin applied from acetone systems because less resin accomplishes the same result.

	Monsanto crease angles			
	Washed		Unwashed	
	Warp	Filling	Warp	Filling
850 cc. acetone plus 170 cc. H_2O, 120 g. Aerotex 23, 30 g. MX Catalyst	128.5	129.0	131.3	130.1
850 cc. H_2O, 120 g. Aerotex 23, 30 g. MX Catalyst	136.8	136.6	131.4	131.3
780 cc. H_2O, 200 g. Resipon N.D.C., 50 g. Cat. D.A	145.0	143.1	133.8	137.3
780 cc. acetone, 156 cc. H_2O, 200 g. Resipon N.D.C., 50 g. Cat. D.A	150.3	149.3	142.5	142.0
780 cc. H_2O, 200 g. Rhonite D–5, 50 g. Cat. D.A	144.5	143.5	142.	147.
780 cc. acetone, 156 cc. H_2O, 200 g. Rhonite D–5, 50 g. Cat. D.A	149.8	148.4	140.	143.3

Table I, hereunder, gives additional examples and data concerning the application of the present invention to cotton fabrics wherein aldehyde, namely, formaldehyde, replaces the resin in the treating bath.

In Table II, examples are given of the application of urea formaldehyde and melamine formaldehyde resin treating solutions to cotton.

In Table III, rayon fabrics are treated with urea formaldehyde, melamine formaldehyde, and dimethylol ethylene urea formaldehyde solutions.

Table IV contains illustrations of the application of the invention to linens, as by resin impregnating agents comprising dimethylol ethylene urea formaldehyde, melamine formaldehyde, and urea formaldehyde.

In these four tables numbered I, II, III, and IV, the treatment is listed in percentage based on the weight of the solution, and it will be understood that these are not the percentages of materials on the fabric. The pick-up from water solution is approximately 70%, and about 55% in the case of the ketone or acetone systems. For that reason, even though in some cases set down in these four tables, the crease angles are not appreciably different between the water and acetone systems, nevertheless, the results are significant when it is considered that there is approximately 15% less pick-up of resin in the case of the ketone systems.

Several additional comments about the data set forth in Tables I, II, III, and IV should also be made, as follows. Curing was always practised at 300° F., unless stated otherwise. The concentration of formaldehyde is listed as 100% formaldehyde, although actually what was used was the regular 37% concentration material which is now quite generally furnished commercially. In all cases the catalyst used was an amino-propanol-hydrochloride, such as the catalyst known as Catalyst A.C., previously mentioned herein.

The urea formaldehyde resin used in these four tables was a typical paste resin; the Resloom M–75 is a methylated methylol melamine; the Resloom HP is an unmethylated methylol melamine; and the Resloom E–63 is a special new resin manufactured by Monsanto Chemical Company, the nature of which is not presently known

to the applicant. However, the Resloom E–63 is in the general category of the Resipon NDC of Arkansas mentioned above, and also the Aerotex 23 Special of American Cyanamid, also previously mentioned.

Table I

FORMALDEHYDE ON 80 x 80 COTTON

Treatment, percent weight of solution	Monsanto crease angle				Notes
	Unwashed		Washed		
	W	F	W	F	
5% Formaldehyde, 1% catalyst, 80% acetone, 14% water.	------	------	124	129	Cured at 350° F.
10% formaldehyde, 2% catalyst, 80% acetone, 8% water.	------	------	137	142	Do.
5% formaldehyde, 1% catalyst, 94% water.	------	------	119	119	Do.
10% formaldehyde, 2% catalyst, 88% water.	------	------	130	135	Do.
20% formaldehyde, 2.5% catalyst, 77.5% water.	------	------	139	144	Do.
5% formaldehyde, 2% catalyst, 93% water.	108	111	107	107	Reg. cure (300° F.).
5% formaldehyde, 2% catalyst, 84% acetone, 9% water.	123	126	123	124	Do.

Table II

SPECIAL RESINS ON 80 x 80 COTTON

Treatment, percent weight of solution	Monsanto crease angle			
	Unwashed		Washed	
	W	F	W	F
10% Resloom E–63, 0.5% catalyst, 89.5% water	123	123	118	119
10% Resloom E–63, 0.5% catalyst, 72% acetone, 17.5% water	127	125	129	129
10% Resloom H.P., 1% catalyst, 89% water	120	125	119	124
10% Resloom H.P., 1% catalyst, 71.2% acetone, 17.8% water	124	128	126	125
10% Resloom M–75, 1% catalyst, 89% water	118	122	120	123
10% Resloom M–75, 1% catalyst, 71.2% acetone, 17.8% water	118	120	121	120
20% Resloom M–75, 2% catalyst, 78% water	130	131	129	138
20% Resloom M–75, 2% catalyst, 62.4% acetone, 15.6% water	141	141	142	143
20% Urea Formaldehyde, 2% catalyst, 78% water	110	117	113	122
20% Urea Formaldehyde, 2% catalyst, 62.4% acetone, 15.6% water	121	118	120	120

Table III

RESIN TREATMENT ON RAYON

Treatment, percent weight of solution	Monsanto crease angle			
	Unwashed		Washed	
	W	F	W	F
20% urea formaldehyde, 2% catalyst, 78% water	120	121	115	120
20% urea formaldehyde, 2% catalyst, 62% acetone, 16% water	127	130	126	126
20% DMEU, 2% catalyst, 78% water	115	117	115	115
20% DMEU, 2% catalyst, 60.2% acetone, 17.8% water	129	128	127	126
20% Resloom M–75, 2% catalyst, 78% water	102	104	99	101
20% Resloom M–75, 2% catalyst, 60.2% acetone, 17.8% water	122	121	123	116

Table IV

RESIN TREATMENTS ON LINEN

Treatment, percent weight of solution	Monsanto crease angle			
	Unwashed		Washed	
	W	F	W	F
20% DMEU, 2% catalyst, 78% water	108	109	102	110
20% DMEU, 2% catalyst, 60.2% acetone, 17.8% water	139	130	118	126
14% urea formaldehyde, 1% catalyst, 85% water	99	105	105	103
14% urea formaldehyde, 1% catalyst, 68% acetone, 17% water	102	100	115	107
20% urea formaldehyde, 2% catalyst, 78% water	112	103	107	101
20% urea formaldehyde, 2% catalyst, 62% acetone, 16% water	112	112	105	109
20% Resloom M–75, 2% catalyst, 78% water	111	115	109	104
20% Resloom M–75, 2% catalyst, 62.4% acetone, 15.6% water	113	119	118	121

In the light of the foregoing, the following is claimed:

1. Method of improving the wash and wear and crease resistance properties of cellulosic fabrics, which includes the steps of impregnating the same with reactant precondensate material selected from the class of cellulose reacting materials consisting of urea formaldehyde, melamine formaldehyde, dimethylol ethylene urea, formaldehyde, triazones, and triazines, dissolved in an impregnating solution comprising a major proportion of an aliphatic ketone solvent and a minor proportion of water, and subsequently insolubilizing the precondensate in situ.

2. The method of claim 1 in which the aliphatic ketone solvent is acetone.

3. The method of claim 1 in which the aliphatic ketone solvent is methyl ethyl ketone.

4. The method of claim 1 in which the ketone solvent consists of a mixture of acetone and methyl ethyl ketone.

5. Method of improving the wash and wear and crease resistance properties of cellulosic fabrics, which includes the steps of impregnating the same with reactant precondensate material selected from the class of cellulose reacting materials consisting of urea formaldehyde, melamine formaldehyde, dimethylol ethylene urea, formaldehyde, triazones, and triazines, dissolved in an impregnating solution comprising a major proportion of a dioxane solvent and a minor proportion of water, and subsequently insolubilizing the precondensate in situ.

6. Method of improving the wash and wear and crease resistance properties of cellulosic fabrics, which includes the steps of impregnating the same with reactant precondensate material selected from the class of cellulose reacting materials consisting of urea formaldehyde, melamine formaldehyde, dimethylol ethylene urea, formaldehyde, triazones, and triazines, dissolved in an impregnating solution comprising a major proportion of an acetic anhydride solvent and a minor proportion of water, and subsequently insolubilizing the precondensate in situ.

7. Method of improving the wash and wear and crease resistance properties of cellulosic fabrics, which includes the step of impregnating the same with reactant precondensate material, namely, formaldehyde, dissolved in an impregnating solution comprising a major proportion of an aliphatic ketone solvent and a minor proportion of water.

References Cited in the file of this patent

UNITED STATES PATENTS

2,888,369 Ratcliffe et al. ---------- May 26, 1959