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METHOD OF PRESENSITISING FABRIC COMPRISING KERATINOUS FIBERS FOR SUBSEQUENT SETTING

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ABSTRACT OF THE DISCLOSURE

A fabric comprising keratinous fibres is presensitised for a subsequent setting operation by impregnating the fabric with an aqueous alkaline solution of an aliphatic amine sulphite and drying the impregnated fabric.

This invention relates to the presensitising of fabric comprising keratinous fibres for a subsequent setting step, e.g. flat setting or permanent pleating or creasing.

In the past such fabric has been presensitised by padding through a bath containing a cold aqueous solution of monoethanolamine sulphite maintained at an acid pH of about 6. The treated fabric from the bath is usually dried and lightly blown with steam. The resulting presensitised fabric is subsequently set in its final desired shape e.g. flat, or pleated or creased along predetermined lines, in a setting operation involving the application of heat, e.g. in a steam box or autoclave or on a Hoffman press.

It has been found that fabric presensitised as described above at pH 6 develops an unpleasant odour, apparently due to the formation of mercaptans. Other disadvantages of the process are that optimum permanent pleating or creasing properties are not consistently obtained and that the resistance of the fabric to adventitious wrinkling is frequently poor. The latter is a significant drawback since, whilst it is required that creases purposely formed in the setting operation should be as long-lasting as possible, it is important that the fabric should not readily wrinkle or crease during handling and that any such unwanted creases as may be formed should fall out naturally and rapidly.

It is an object of the present invention to provide a process which overcomes one or more of the above disadvantages.

This object is achieved in accordance with the present invention by a process for presensitising fabric comprising keratinous fibres, which process comprises treating the fabric with an alkaline aqueous solution of an aliphatic amine sulphite, and thereafter drying the fabric, preferably at about ambient temperature or slightly above. In contrast with the prior process, it is preferred not to wet blow the treated fabric before drying.

In order to minimise relaxation shrinkage it is preferred to dry the wet fabric under as little tension as possible, a festoon drier, for example, being suitable, and similarly only minimum tension should be applied to the treated fabric during the final setting and finishing process.

By the process according to the invention both woven and nonwoven presensitised fabrics, consisting wholly or partly of wool, may be produced which do not develop the unpleasant odour associated with fabrics presensitised at pH 6 and which give improved results in the setting process, the fabrics exhibiting superior wrinkle-resistance and wrinkle-recovery properties. Particularly

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good wrinkling properties are obtained if the presensitised fabric is subjected to a dry blowing step after drying; such dry blowing also serves to improve the texture and finish of the fabric.

Examples of aliphatic amine sulphites which may be employed in alkaline aqueous solution in the practice of this invention include the sulphites and bisulphites of alkylamines, particularly lower alkylamines of 1 to 6 carbon atoms such as methylamine, ethylamine and the like, of alkyl and alkylene polyamines such as ethylene diamine and the like, and of substituted derivatives thereof e.g. mono-, di-, and trialkanolamines such as monoethanolamine, propanolamines and butanolamines etc.

The pH of the presensitising solution may be maintained above 7, and preferably at least 8, by conventional means, the solution preferably being buffered to a pH of from 8 to 9.5, e.g. about 8.5 or 9. The solution will usually contain from 2.5 to 15 weight percent of amine sulphite, based on the total weight of the solution. Solutions of pH higher than 9.5, or containing a higher or lower proportion of amine sulphite can however be employed, depending upon the particular amine sulphite or sulphites chosen and upon the nature and intended end-use of the fabric to be treated.

The process of the invention is exemplified hereinafter mainly with reference to the use of monoethanolamine sulphite. The source of monoethanolamine sulphite available commercially, which will be designated herein as "commercial monoethanolamine sulphite," is made by bubbling SO₂ into a 50% aqueous monoethanolamine solution until an acid solution of pH about 5.8–6.0 is obtained, and contains about 50% monoethanolamine bisulphite and about 20% monoethanolamine sulphite.

A monoethanolamine sulphite solution suitable for use in the method according to the invention may be obtained by diluting such a "commercial monoethanolamine sulphite" with monoethanolamine (for convenience in the form of a 50% by weight aqueous solution) to bring the pH to the required value, e.g. about 9, or by bubbling SO₂ into 50% aqueous monoethanolamine until the pH reaches this value.

Aqueous solutions of the other amine sulphites useful in the invention may be produced in similar manner. Since many of the amines, e.g. monoethanolamine, are themselves setting agents, better results are generally obtained by using them to buffer the sulphite solution than by employing other agents such as alkali metal acetates or phosphates etc.

The presensitising solution advantageously contains a wetting agent, typically in a proportion of from 0.05 to 1.0 percent based on the total weight of the solution. The wetting agent may be a cationic, anionic or non-ionic material, that sold under the designation "Lissapol N" being suitable.

It is also preferred to include in the solution a humectant, for example urea or ethylene glycol. The solution may for example contain from 5 to 12 weight percent of humectant, whose use simplifies the subsequent setting procedure by obviating the step of moistening the fabric prior to setting.

The presensitised fabric may be stored under dry conditions until required, e.g. by the garment manufacturer who sets the fabric in its final shape.

If desired the fabric may be flat set, and then presensitised by the method of the invention for a further setting operation e.g. permanent pleating or creasing.

The invention will now be further described, purely by way of illustration, with reference to the following examples of the presensitising of standard worsted fabric, 2 x 2 twill, 60 ends/inch in both warp and weft, one third 56s wool and two thirds 64s wool.

EXAMPLE 1

The fabric was padded through a cold aqueous solution containing 100 g./l. urea, 100 g./l. of a mixture of monoethanolamine (50% by weight aqueous solution) and "commercial monoethanolamine sulphite," and 2 cc./l. of a wetting agent sold under the name of "Lissapol N" and having a final pH of 9.0 to give 50% expression. The resulting wet fabric was festoon dried at room temperature.

EXAMPLE 2

The process described in Example 1 was repeated, the festoon drying of the fabric being followed by dry light blowing with steam.

Neither of the fabrics presensitised as in the examples was found to develop unpleasant odour, and both gave good results in the permanent pleating process.

The wrinkling properties of fabrics presensitised as in Examples 1 and 2 were tested and compared with those of untreated fabric and fabric presensitised by a prior art method at pH 6. The prior art method consisted in padding the fabric through an aqueous solution containing 100 g./l. urea, 100 g./l. monoethanolamine sulphite and 2 cc./l. Lissapol N and having a pH of 6 to give 50% expression, drying and lightly blowing the fabric with steam.

The wrinkling properties of the various fabrics were assessed by pushing a specimen of the fabric into a tube and compressing it with a weighted piston rod; the mean height of the randomly formed wrinkles was measured by means of a Shirley low pressure thickness gauge on release of the fabric from the tube and at intervals thereafter. The same tube and weighted piston and the same size specimen fabric were used in each test. The specimens were compressed at 93% relative humidity and 21° C., each for the same interval, and allowed to recover at 65% relative humidity and 21° C. The results are given in the following table:

Sample	Minutes of recovery			
	0	0.5	1	5
	Wrinkle height in inches			
Example 2	2.02	1.70	1.55	1.11
Untreated	2.09	1.78	1.60	1.10
Example 1	2.47	2.04	1.87	1.42
Prior art at pH 6	2.65	2.28	2.09	1.53

It will thus be apparent that presensitising according to the invention, particularly if followed by blowing the dry

fabric, gives much better results than are obtained by presensitising at pH 6.

Whilst the above examples of the invention relate only to the use of monoethanolamine sulphite, similar improved results can be obtained by the use in alkaline solution of other aliphatic amine sulphites, particularly those referred to hereinbefore.

I claim:

1. A method of presensitising fabric comprising keratinous fibres for a subsequent setting operation, said process comprising the steps of providing an aqueous solution of an aliphatic amine sulphite at a pH above about 8, impregnating said fabric with said solution, and thereafter drying said impregnated fabric.

2. A method as set forth in claim 1 in which said sulphite is a sulphite of an alkylamine, an alkanolamine or an alkylene polyamine.

3. The method as set forth in claim 1 in which said aqueous solution is essentially a monoethanolamine/monoethanolamine sulphite buffer solution.

4. The method as set forth in claim 1 in which said aqueous solution is essentially a solution of monoethanolamine, monoethanolamine sulphite and urea.

5. The method as set forth in claim 1 in which said aqueous solution additionally includes a wetting agent and a humectant.

6. The method as set forth in claim 5 wherein said aqueous solution contains from 5 to 12 weight percent of humectant and from 0.05 to 1.0 weight percent of wetting agent.

7. The method as set forth in claim 1 in which said aqueous solution has a pH of about 8 to 9.5.

8. The method as set forth in claim 1 which includes the additional step of dry-blowing said dried impregnated fabric.

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