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AGENT FOR SIZING TEXTILE FIBERS AND A
PROCESS OF APPLYING IT

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The present invention relates to agents for sizing textile fibers and a process of sizing textile fibers.

We have found that an excellently well sized textile material is obtained by treating the fibers with derivatives of the polyvinyl alcohols which contain hydroxyl groups and are capable of being dissolved or emulsified in water. Water-soluble derivatives of this kind are, for instance, the only partially esterified polyvinyl alcohols obtainable by partially saponifying polyvinyl esters so as to obtain products which are soluble in water and organic solvents or by partially esterifying polyvinyl alcohols in such a manner that there are obtained products which are still soluble in water. Furthermore there may be used the water-soluble products (probably the acetates) obtainable by a mild reaction between an aldehyde and a polyvinyl alcohol, finally those products which can be obtained by exchanging for hydroxyl by saponification the halogen in the polyvinyl esters of halogen fatty acids. There may be used all products of various lengths of chain and various degrees of polymerization and viscosity.

A polyvinyl ester containing hydroxyl groups may for instance be obtained by saponifying a polyvinyl ester and interrupting the saponification before the ester groups are wholly saponified. By examination of test samples there can be easily ascertained whether the saponification products are already soluble in water and whether some ester groups are still contained in the molecule. Products of this type are disclosed in Examples 1, 4, 5, 6 and 9. In a similar manner the esterification of the polyvinyl alcohol can be interrupted at a stage at which the esters to be produced and containing hydroxyl groups are still soluble in water, this being easily ascertained by examination of test samples. Products of this type are disclosed in Examples 3, 7 and 8. The reaction between polyvinyl alcohols and aldehydes may likewise be interrupted at a stage at which products still soluble in water are present. A product of this type is disclosed in Example 2. In this case, too, it is possible easily to follow the course of the reaction by examination of test samples.

The possibility of using not only the polyvinyl alcohol itself, but also its water-soluble derivatives for sizing purposes, constitutes a great industrial advance. The invention renders possible the provision of agents which meet to a large extent the various industrial requirements of a good sizing agent; these requirements considerably vary ac-

cording to the fibers used, the kind of the sizing process and the effects desired.

The derivatives of polyvinyl alcohols may be applied either alone or in admixture with substances commonly used for sizing, such as oil, fat, wax or the like. The thread remains very pliable if a sulfonated oil is added to the sizing bath. The material sized and dried according to the present process is free from dust, whereas this is generally not the case with material prepared with a size containing starch.

The material can very easily be freed from the size, for instance by simply rinsing it in hot water to which may be added a small quantity of soap, without applying any other auxiliary means.

Material which has not been or has only been incompletely freed from the size can be dyed without any difficulty since the size and the fibrous material used are dyed equally.

In order to obtain a good sizing effect and an easy removal of the size it is indifferent whether the derivatives of the polyvinyl alcohol are soluble in water or capable of being readily emulsified. In the claims the capability of being dissolved has, therefore, to be regarded as an equivalent to the capability of being emulsified in water.

The following examples serve to illustrate the invention, but they are not intended to limit it thereto, the parts being by weight:

1. An aqueous solution of 20 per cent strength of a polyvinyl acetic acid ester which has been saponified until it has become soluble in water and still contains about a quarter of the original content of acetyl groups is diluted with water in the proportion 1:10 and to this solution are added about 20 per cent of amylose and 10 per cent of a sulfonated oil, the percentage being calculated upon the quantity of the derivative of polyvinyl alcohol used. Artificial silk yarn is treated for a short time in this bath. The material is then squeezed and dried at about 40° C.—50° C. There is obtained a perfectly well sized material having a soft feel.

2. An aqueous solution of 25 per cent strength of a product still soluble in water and obtained by the reaction between polyvinyl alcohol and formaldehyde is mixed with water in the proportion 1:30 and 10 per cent of Turkey red oil are added thereto. Cotton is treated for a short time in this bath. The material is then squeezed and dried at 50° C.—60° C.

3. An aqueous emulsion of 30 per cent strength of an acylation product of polyvinyl alcohol obtainable by partially esterifying the hydroxyl groups contained in the polyvinyl alcohol with

- oleic acid chloride is diluted with water in the proportion 1:20. Artificial silk yarn is treated for a short time in this bath. The material is then squeezed and dried at 50° C.-60° C. There is obtained a well sized material of a good feel and a high degree of softness; it can easily be freed from the size.
4. The water-soluble polymerization product obtainable by saponifying a mixed polymerization product from 60 parts of vinyl chloride and 150 parts of vinyl acetate is used as described in the preceding examples for sizing acetate silk. There is obtained a well sized material of a good feel and softness. The material can be freed from the size by rinsing it for a short time in hot water.
5. The water-soluble polymerization product (sodium salt) obtainable by saponifying a mixed polymerization product from vinyl acetate and maleic anhydride is used as described in the preceding examples for sizing cotton. There is obtained a well sized material which is distinguished by a soft feel and which can very easily be freed from the size.
6. A product readily soluble in water and obtainable by saponifying a mixed polymerization product from 90 parts of vinyl acetate and 10 parts of vinyl chloride is dissolved at 60° C. in 50 times its weight of water. Into this solution artificial silk in hanks is introduced, kept in motion therein for a short time then centrifuged, dried and beaten. A well sized material of a sufficient softness is obtained.
7. A water-soluble polyvinyl ester obtainable by a partial esterification of polyvinyl alcohol by means of propionyl chloride is dissolved in 40 times its weight of water. With this solution acetate silk is sized in a sizing machine. Well sized threads of a good softness are obtained.
8. Polyvinyl lauric acid ester which owing to its free hydroxyl groups is still capable of dissolving in water and which is obtainable by a partial esterification of polyvinyl alcohol and lauryl chloride is used as described in the preceding examples for sizing artificial silk. Threads of excellent softness and suppleness are obtained.
9. The water-soluble product obtained by partially saponifying a mixed polyvinyl ester of acetic acid and linoleic acid is dissolved in 30 times its weight of hot water. Into this solution viscose silk in hanks is introduced, kept in motion for a short time and then dried as it is described in the preceding examples. A well sized material of an excellent suppleness is obtained.
- We claim:
1. A process of sizing textile fibers which comprises treating the fibers with a sizing composition comprising a water-soluble derivative of polyvinyl alcohol, said derivative containing hydroxyl groups.
 2. A process of sizing textile fibers which comprises treating the fibers with a sizing composition comprising a water-soluble derivative of polyvinyl alcohol, said derivative containing hydroxyl groups, and amylose.
 3. A process of sizing textile fibers which comprises treating the fibers with a sizing composition comprising a water-soluble derivative of polyvinyl alcohol, said derivative containing hydroxyl groups, amylose and a material of the group consisting of sulfonated oils, fats and waxes.
 4. A process of sizing textile fibers which comprises treating the fibers with a sizing composition comprising a water-soluble polyvinyl ester containing hydroxyl groups.
 5. A process of sizing textile fibers which comprises treating the fibers with a sizing composition comprising a water-soluble polyvinyl ester containing hydroxyl groups, and amylose.
 6. A process of sizing textile fibers which comprises treating the fibers with a sizing composition comprising a water-soluble polyvinyl-ester containing hydroxyl groups, amylose and a material of the group consisting of sulfonated oils, fats and waxes.
 7. A process of sizing textile fibers which comprises treating the fibers with a sizing composition comprising a water-soluble polyvinyl acetate containing hydroxyl groups, amylose and sulfonated oil.
 8. A textile sizing composition comprising a water-soluble derivative of polyvinyl alcohol, said derivative containing hydroxyl groups.
 9. A textile sizing composition comprising a water-soluble derivative of polyvinyl alcohol, said derivative containing hydroxyl groups, and amylose.
 10. A textile sizing composition, comprising a water-soluble derivative of polyvinyl alcohol, said derivative containing hydroxyl groups, amylose and a material of the group consisting of sulfonated oils, fats and waxes.
 11. A textile sizing composition, comprising a water-soluble polyvinyl ester containing hydroxyl groups.
 12. A textile sizing composition, comprising a water-soluble polyvinyl ester containing hydroxyl groups, and amylose.
 13. A textile sizing composition, comprising a water-soluble polyvinyl ester containing hydroxyl groups, amylose and a material of the group consisting of sulfonated oils, fats and waxes.
 14. A textile sizing composition, comprising a water-soluble polyvinyl acetate containing hydroxyl groups, amylose and a sulfonated oil.
 15. A textile sizing composition, comprising a water-soluble partially saponified mixed polymerization product from vinyl chloride and vinyl acetate, amylose and a sulfonated oil.
 16. A textile sizing composition, comprising a water-soluble partially saponified polyvinyl lauric acid ester, amylose and a sulfonated oil.

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